National Women's Health 2023

Pūrongo Haumanu ā tau

Annual Clinical Report

National Women's Hospital 60th anniversary edition

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The purpose of this publication is to promote discussion and audit of outcomes. The opinions expressed in this publication do not necessarily reflect the official views of National Women's's Health and Te Toka Tumai.

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Contents

List of tables

Chapter 1 Executive Summary

Chapter 3 Quality

Chapter 4 Maternal Demography

Chapter 5 Antenatal Complications

Chapter 6 Labour and Birth

Chapter 7 Labour and Birth Outcomes

Chapter 8 Newborn Services

Chapter 11 Appendix

List of figures

Chapter 3 Quality

Chapter 4 Maternal Demography

Chapter 5 Antenatal Complications

Chapter 6 labour and Birth

Chapter 7 Labour and Birth Outcomes

Chapter 8 Newborn Services

Chapter 9 Perinatal and Maternal Mortality and Severe Maternal Morbidity

Chapter 10 Gynaecology

1

CHAPTER 1

EXECUTIVE SUMMARY

ŪPOKO 9

WHAKARĀPOPOTO Ā TE KAIWHAKAHAERE

1.1 Foreword

Nau mai haere mai to our 2023 Annual Clinical Report.

It comes with a rich heritage of commitment to quality and safety over many years, and represents the hard work of all our kaimahi. To all who have contributed, your care of and advocacy for whānau, your leadership, clinical and data expertise, this is your report and it is gold.

I cannot emphasise enough how fortunate we are to be able to present this report year on year, and how absolutely essential it is that we continue to do so. By reflecting on its contents, we are equipped to further improve and are challenged not to be complacent.

The regional and national scene is changing by the minute but what must not change is our commitment to patient care. We are a large unit hosting primary, secondary, tertiary and quaternary services, plus welcoming private providers to use our facilities. Teamwork and collaboration is key both within and without.

A word about the data – you will see in the appendix the methodology used. Throughout the report there is reference to the difficulties posed by new information systems. It is a tribute to the Women's Health Intelligence Team and many committed clinicians that a report of this quality can continue to be produced.

We have to acknowledge that there are gaps in data that are less than ideal and it is vital that efforts continue both on the floor, in the office and nationally, to aspire to excellence in data capture, cleaning and improved systems - "GIGO" being an apropos acronym.

Ngā Whainga is the name given to Directorate Priorities at Te Toka Tumai - rest assured that Quality is a crucial part of ours. This report highlights a wide range of quality initiatives as well as providing information about performance against standards.

Congratulations to our gynaecology colleagues for their equity focused approach and excellent clinical outcomes in 2023.

Fertility Services continue to perform well against benchmarks.

Likewise, Newborn Services being recipients of patients whom we have cared for in utero do an amazing job.

And so to maternity, where we see ongoing concerning trends in preterm birth, which in turn is impacting perinatal mortality rates especially in Māori. This tragedy must not be ignored and so may I heartily endorse the Carosika Collaborative.

Related, we must do better in completion of steroid courses.

A huge tautoko to the Te Manawa O Hine team who are bridging the gap for hapu wāhine Māori.

It is sobering to read the section on Perinatal Mortality and we must not shy away from reflection on whether the way we deliver care is negatively influencing access, particularly in relation to the main causes of perinatal mortality which are preterm birth, congenital anomaly and maternal conditions. We are seeing an ongoing rise maternal co-morbidity related to obesity and maternal age and their sequelae of diabetes and hypertension. Perhaps not coincidentally, diabetes is the top indication for induction of labour.

On a positive note, diabetes clinical outcomes are good, smoking rates at booking are low and falling, mortality associated with SGA continues to decline, and birth over 42 weeks gestation is very rare now.

These trends are undoubtedly due to intentional work by dedicated kaimahi to follow recommended best practice. On that note, the Growth Assessment Protocol deserves a mention, this is a well-established framework for detection of SGA and we are looking for a champion to take up the mantle.

There is so much more I could say – what a wealth of data we have to inform our clinical practice and service planning and what an impressive array of services we provide.

The last word goes to our whānau, to whom we dedicate all our efforts.

Ngā mihi koutou katoa.

Jenny McDougall

Director of Women's Health

5700 mothers birthing at National Women's

14.9% NICU admission rate

5821 babies born at National Women's

72.4% exclusive breastfeeding rate

42.9% spontaneous vertex

44.6% caesarean

11.8% operative vaginal

0.7% breech

1.2 Data tables: Summary statistics

Table 1.1 Māmā and pēpi numbers NWH 2023

Total number of māmā birthing at NWH	5668
Māmā birthing before arrival (BBA)	32
Total number of māmā	5700
Total number of pēpi born at NWH	5787
Pēpi born before arrival (BBA)	34
Total number of pēpi	5821

BBA = Pēpi born before arrival, and is defined as those pēpi who were born at home or en route to hospital where the intention was to be born in a hospital.

Table 1.2 Contribution of multiple births to māmā and pēpi numbers NWH 2023

	Māmā	Pēpi
NWH births		
Singletons	5550	5550
Twins	116	231
Triplets	2	6
BBA		
Singletons	31	31
Twins	1	3
Triplets	0	0
Totals (including BBA)	5700	5821

Table 1.3 Mode of onset of birth NWH 2023

	Birthing māmā n=5700	
	n	%
Spontaneous onset of labour	2100	36.8
Iatrogenic onset of birth	3600	63.2
Caesarean Section Before Labour (including failed induction)	1603	28.1
Induced - Successful	1997	35.0

Table 1.4 Mode of birth by parity NWH 2023

	Birthing māmā		Nullipara		Multipara	
	n= 5700		n= 2790		n= 2910	
	n	%	n	%	n	%
Spontaneous Vertex Birth	2446	42.9	898	32.2	1548	53.2
Vaginal Breech Birth	40	0.7	26	0.9	14	0.5
Operative Vaginal Birth	673	11.8	528	18.9	145	5.0
Forceps	278	4.9	220	7.9	58	2.0
Ventouse	395	6.9	308	11.0	87	3.0
Caesarean Section	2541	44.6	1338	48.0	1203	41.3
CS Elective	864	15.2	243	8.7	621	21.3
CS Emergency	1677	29.4	1095	39.2	582	20.0

Table 1.5 Neonatal outcomes among pēpi born at NWH in 2023

	Pēpi born	
	n= 5821	
	n	%
Gender		
Male	2992	51.4
Female	2824	48.5
Indeterminate	5	0.1
Unknown	0	0.0
Preterm birth		
20-27 weeks	109	1.9
28-31 weeks	109	1.9
32-36 weeks	450	7.7
Term birth		
37-41 weeks	5140	88.3
≥42 weeks	13	0.2
SGA (by Customised Centile)		
Preterm	224	3.8
Term	696	12.0
	Live births	
	n= 5723	
	n	**%**
Apgar at 5 min <7		
Preterm	78	1.4
Term	92	1.6
Admission to NICU		
Preterm	412	7.2
Term	341	6.0
	Live births*	
	N= 5385	
	n	**%**
Infant Feeding at Discharge from NWH facility*		
Exclusive breastfeeding	2855	53.0
Fully breastfeeding	65	1.2
Partial breastfeeding	899	16.7
Artificial feeding	112	2.1

*Excludes admissions to NICU and Starship, preterm infants and pēpi with birth weight <2500g

Table 1.6 Perinatal related mortality NWH 2023

Live births	All pēpi born	Rate
5724	**n= 5821**	**per 1000 live births/ live births**
Fetal deaths (Still birth & TOPs)	66	11.3 /1000 births
Early neonatal death	20	3.5 /1000 live births
Late neonatal death	5	0.9 /1000 live births
Neonatal death	25	4.3 /1000 live births
Perinatal deaths (fetal & early neonatal)	86	14.8 /1000 births
Perinatal related deaths (fetal & all neonatal)	91	15.6 /1000 births

Table 1.7 Maternal postpartum outcomes NWH 2023

	Birthing māmā		
	N	n	%
PPH ≥1000mls	5700	932	16.4
Spontaneous vaginal birth	2486	300	12.1
Instrumental vaginal birth	673	170	25.3
Caesarean section	2541	462	18.2
Episiotomy among vaginal births	3259	1008	30.9
Third/fourth degree tears among vaginal births	3259	82	2.5
Total blood transfusions	5700	191	3.4

Table 1.8 Numbers of māmā and pēpi 2014-2023

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	N	N	N	N	N	N	N	N	N	N
Māmā	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Pēpi	7551	7074	7368	6974	6597	6762	6310	6553	6050	5821

Table 1.9 Mode of birth NWH 2014–2024

Year	Total births	Spontaneous vertex birth		Vaginal breech		Operative vaginal		Caesarean section	
	N	n	%	n	%	n	%	n	%
2014	7400	3928	53.1	64	0.9	849	11.5	2559	34.6
2015	6933	3556	51.3	38	0.5	871	12.6	2468	35.6
2016	7241	3658	50.5	50	0.7	925	12.8	2608	36
2017	6846	3123	45.6	35	0.5	979	14.3	2709	39.6
2018	6481	2998	46.3	36	0.6	915	14.1	2532	39.1
2019	6660	3195	48	44	0.7	850	12.8	2571	38.6
2020	6212	3091	49.8	40	0.6	725	11.7	2356	37.9
2021	6462	3064	47.4	31	0.5	744	11.5	2623	40.6
2022	5925	2690	45.4	37	0.6	706	11.9	2492	42.1
2023	5700	2446	42.9	40	0.7	673	11.8	2541	44.6

Table 1.10 Term births (pēpi) by gestation NWH 2014–2023

Gestation	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
37 weeks	643	591	675	605	599	583	540	538	599	607
38 weeks	1595	1501	1677	1527	1488	1501	1389	1396	1394	1357
39 weeks	2078	1989	2109	2103	1935	2131	1944	2137	1776	1812
40 weeks	1585	1540	1489	1459	1348	1331	1229	1285	1150	995
41 weeks	818	702	690	601	566	541	508	506	451	369
≥42 weeks	73	60	48	47	40	29	37	21	11	13
Total	6792	6383	6688	6342	5976	6116	5615	5883	5381	5153

2

CHAPTER 2

OUR SERVICES

ŪPOKO 2

NGA RATONGA

2.1 Vision and Strategic Goals

- Leadership, excellence and equitable women's health service provision through empowerment and partnership.
- Ensure our models of care are based on best available evidence, are developed in collaboration with whānau and interdisciplinary teams; and lead to equitable and high quality outcomes for all.
- To embed within the service a culture which ensures we meet our obligations under Te Tiriti o Waitangi for all service development, clinical governance, service provision, auditing and monitoring.
- To identify, acknowledge, highlight and eradicate racism and ensure care is delivered sensitively in a culturally and gender appropriate manner in a safe and welcoming environment.
- To collaborate regionally and nationally to ensure service commissioning is designed around the needs of whānau and ensures funding for all levels of care including tertiary and quaternary care is appropriate and supports optimal care pathways delivered in the appropriate setting, right context and by the right people.
- To enable all whānau accessing our maternity service to be able to access services appropriate to their level of need in an equitable way. This includes ensuring that well wāhine are given the opportunity to birth in a midwifery led unit.
- To grow a culture of clinical governance across the services, including investigation of critical events and complaints which includes broad practitioner, cultural and consumer representation and ownership and functions with a focus on maintaining a Just and Learning Culture at all times.
- To critically evaluate the care we provide, to ensure it is evidence based and that our outcomes benchmark well against internal and external quality maternity and gynecological measures and standards. This includes actively working to reduce under and over delivery to optimize outcomes and reduce variation in practice.
- To maintain and further develop our nationally leading career pathways and educative environment along with specialty clinical services; and to continue our strong focus on midwifery, maternity and gynecology research in collaboration and partnership with our University colleagues; particularly the University of Auckland and the Auckland University of Technology so as to encourage and support a culture of innovation, lifelong learning and research within the service.
- To empower our staff by creating a positive culture and supportive working environment, built on our shared values, goals and accountabilities. Ensure that time and resources are appropriately allocated to support the growth, development and wellbeing of our workforce.
- To be transparent with directorate visions and goals so that all kaimahi can see the directorate A3 and understand, support and provide care and services to support this.
- To ensure we are actively participating in the creation of future workforce planning, capacity planning and sourcing of sufficient skilled staff to deliver our goals and be part of the national workforce solution.
- To work collaboratively across the organisation to achieve financial and service delivery goals, ensuring that access to women's health services is timely, equitable and prioritised by need. Always with an equity lens applied during prioritisation.
- To ensure students accessing our service for education experience a welcoming, supportive and collaborative learning environment which meets their educational, cultural and clinical development needs.

2.2 Women's Health Leadership and Structure 2023

The Women's Health Service Leadership Structure aligns with our overall clinical governance structure across the directorate.

Jenny McDougall
Director National Women's Health

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Director of Midwifery

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Associate Director of Midwifery, Māori Health Lead

Steve Harris
General Manager Women's Health

Claudine Hutchings
Allied Health Social Work Professional Leader

Hannah Sullivan
Human Resources Manager

Bhusan Phalnikar
Finance Manager

2.3 Women's Health Leadership and Structure 2023

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Service Clinical Director Regional Maternity

Dr Kerrie Hides

Service Clinical Director Secondary Maternity

Dr Lois Eva

Service Clinical Director Regional Gynaecology

Dr Saman Moeed

Service Clinical Director Secondary Gynaecological

Dr Gillian Gibson

Service Clinical Director Regional Gynaecology Day

Dr Cindy Farqhar

Service Clinical Director, Fertility Plus

Midwifery, Nursing and Operational leadership

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Associate Director Midwifery (Māori and Equity)

Jose Espineira Iglesias

Associate Director Midwifery

Angela Harvey

Associate Director Midwifery

Leanne Wilson

Nurse Unit Manager Gynaecology

Lucy Pemberton

Operations Manager

Deb Gulik

Operations Manager

Bernadine Reyland

Operations Manager

2.4 Service Provision

2.4.1 Maternity services

Women's Health at Te Toka Tumai Auckland City Hospital provides national and regional services, as well as primary, secondary and tertiary maternity services to whānau who reside in the region and to whānau who reside outside the region who have been referred to the High-Risk service.

National Services

Maternal

- Management of major maternal cardiac disease. Pregnant wāhine who are likely to require bypass or valve surgery during pregnancy, or who require cardiac monitoring in labour. Te Toka Tumai also cares for wāhine with cardiac disease who reside in the Pacific Islands.
- Management of wāhine with major liver disease in pregnancy and other complex medical conditions that other hospitals do not have the clinical capacity to care for due to their size and lack of critical care beds or specialist services.

Fetal/Neonatal

- In utero fetal blood transfusions. Te Toka Tumai has a relationship in place to obtain irradiated blood from the National Blood service.
- Management of fetal cardiac anomalies.
- Management of fetal abnormalities that will require admission to Starship Hospital following birth.
- National service for fetoscopic selective laser photocoagulation of fetal vessels in twin-to-twin transfusion syndrome (TTTS).
- Fetal reduction including selective reduction in multiple pregnancies requiring cord occlusion or interstitial laser.
- Other complex fetal procedures including fetal shunting.
- Postnatal midwifery care of māmā (māmā) whose pēpi (pēpi) are under the care of Starship Hospital.

Regional Services

Maternal

- Care of those wāhine living in Te Whatu Ora Waitematā area with Type 1 or 2 diabetes, GDM with poor control, diabetes complications and/or co-morbidities. Pre-pregnancy counselling for high risk wāhine.
- Care for pregnant wāhine (women) with HIV infection from Te Whatu Ora Counties Manukau and Waitematā. With the rollout of the "National HIV Screening in Pregnancy" programme, these caseloads have increased but absolute numbers remain small.

Fetal/Neonatal

- Diagnosis of major fetal abnormalities with management plan for ongoing care in other Te Whatu Ora localities. If this is not possible due to the severity of the abnormality, care remains with Te Toka Tumai.

Wards and clinics in the maternity service

The following wards and clinics make up the maternity service.

Labour and Birthing Suite

Te Toka Tumai Labour and Birthing Suite is a 16-bed

unit including a 2 bed Maternity Complex Care Area (MCCA) providing care for high-risk obstetric cases.

One to one midwifery care is provided for wāhine in labour. Pain relief options include the use of warm water (shower or birth pool), Entonox, morphine, and epidural anaesthesia. Te Toka Tumai Labour and Birthing Suite also provides facilities for wāhine wanting a water birth.

Care is provided to wāhine by a multidisciplinary team of midwives, including midwives specialised in high-risk obstetrics, obstetricians, anaesthetists, obstetric physicians, self-employed Lead Maternity Carers (LMCs), hospital aides and ward clerks. To ensure midwives maintain their competency in intrapartum care provision, midwives are encouraged to rotate through the antenatal/postnatal wards to Labour and Birthing Suite and the Community Midwifery Clinic.

Labour and birth care is provided by midwives to wāhine whose LMC is the Community Midwifery Clinic Service or the High-Risk Maternity and Diabetes Service, to wāhine under the care of private obstetricians who do not have a self-employed midwife contracted to provide midwifery care, and to wāhine transferred to Te Toka Tumai secondary and tertiary services. Care is available to māmā under self-employed midwifery care when their midwife needs relief.

The Labour and Birthing Suite midwives liaise closely with self-employed LMCs.

Maternity Complex Care Area (MCCA)

The MCCA contains two beds with extra monitoring equipment located within Labour and Birthing Suite. It managed 212 admissions in 2023, an increase from 158 admissions in 2022. MCCA provides care for obstetric high-risk cases when one to one midwifery care is clinically indicated. The majority of admissions are for major PPH, preeclampsia, sepsis and wāhine requiring cardiac monitoring. The midwifery and nursing staff in this unit work hard to maintain a strong focus on the experience of the wahine (woman) to ensure healthy māmā and pēpi bonding and to encourage breastfeeding.

Women's Assessment Unit (WAU)

This service is open 24 hours a day, 7 days a week and provides acute care for wāhine experiencing pregnancy and gynaecologic complications.

Inductions of labour are booked through WAU, and inductions are commenced in this unit. Wāhine are transferred to Labour and Birthing Suite when in established labour.

WAU provides a service for wāhine from 20 weeks gestation requiring second trimester termination of pregnancy and for wāhine who have experienced an intrauterine death.

Day Assessment Unit (DAU) is a service provided from within WAU, providing appointment-based care for wāhine with complex pregnancies. DAU has four chairs for simultaneous care of up to four wāhine. Most common referral reasons are hypertensive disorders, small for gestational age pēpi, iron infusion and post term assessment.

An external cephalic version (ECV) clinic is provided at the DAU two to three times per week.

Antenatal and Postnatal Wards

There are 53 antenatal and postnatal beds at Te Toka Tumai for wāhine and pēpi requiring secondary and tertiary care (there is capacity to increase this by 10 beds when needed with additional staffing resource). All primary births, where the māmā and pēpi are well, are transferred to Birthcare Auckland, who holds the provider contract for these services.

High Risk Medical Service (including Diabetes Service)

The High-Risk Medical, Fetal Medicine, and Diabetes Services are provided from the Maternity Outpatients Department located on level 9 in the support building at Te Toka Tumai Women's Health Grafton site. This facility is also used by Newborn Services, the Child Development Unit and the Anaesthetic Service.

The High Risk Medical and Diabetes services provide antenatal and postnatal visits in the clinic at Te Toka Tumai and postnatal midwifery community visits to patients at home (medical clinic only) and at Starship Hospital. Two hospital pool cars assist this service.

Community Services

Community maternity clinics are held at Greenlane Clinical Centre (GCC), along with antenatal clinics in various General Practice facilities in the hospital catchment area. Community Midwifery Clinic Services and postnatal home visits provide continuity of midwifery care during the antenatal and postnatal period with labour and birth midwifery services provided by core midwives in Labour and Birthing Suite. At times of midwifery shortages self-employed LMCs may provide the postnatal care.

Obstetric care

Clinics staffed by Te Toka Tumai obstetricians are held five times a week at GCC, seeing wāhine under Community Midwifery Clinic care and reviewing secondary referrals from private LMCs.

Clinics staffed by obstetric physicians are held two times per week.

Walk-In Centre

The midwifery-led Walk-In Centre acts as a first point of contact for wāhine via email, phone or in-person. The Walk-In Centre is responsible for the triage of referrals for wāhine needing an LMC or an in person or virtual secondary consultation. Referrals come from both Te Toka Tumai and community referrers such as GPs and self-employed midwives. The centre also acts as a resource for midwives and GPs, fielding numerous requests for advice. Virtual appointments with an obstetrician are completed for wāhine who are postdates with a low-risk pregnancy or where a face to-face consultation is not required.

Aranga Tētēkura social care

The Aranga Tētēkura interprofessional team provides a midwifery-led fortnightly advisory forum for midwives, maternal mental health staff, and Te

Toka Tumai social workers to plan and coordinate clinical and social care for wāhine with high social complexities. Some wāhine are likely to need the services of statutory child protection services or other community services such as CADS, adding a further layer of complexity. The increased coordination of service could result in outcomes such as fewer traumatic uplifts of newborn pēpi from the hospital; increased numbers of pēpi remaining in their parents' care with intensive social service support in place at the time of birth; increased numbers of pēpi being placed in kin care without the disruption to attachment inherent in protracted foster placements and reduced interdisciplinary and interagency conflict.

PBAC (Positive Birth after Caesarean) Clinic

The PBAC clinic was started in February 2011 to promote informed decision making and patient satisfaction. Wāhine who have had a Caesarean are encouraged to attend this obstetric/midwifery clinic in the first half of their next pregnancy to discuss the options for their birth. Wāhine can be referred by their LMC, via the maternity Walk-in Centre at Te Toka Tumai or can refer themselves. Most wāhine attend the clinic twice during their pregnancy and obtain the remainder of their care from their usual LMC.

Te Manawa o Hine Kaiwhakawhānau Māori

Te Manawa o Hine offer a midwifery service that embraces Te Āo Māori, guided by foundations of mātāpono (tikanga) Māori. These include Atuatanga (spirituality), Kaitiakitanga (guardianship), Rangatiratanga (autonomy), Whānaungatanga (relationships) and Manaakitanga (supports). The values of Tika (correct) and Pono (true and honest) are maintained at all times. They are a by Māori, for Māori team of new graduate and experienced Māori midwives. They are supported by a leadership team with a quality and equity lens and strategic intent for providing midwifery led continuity and complex cares. The aim is to improve access and engagement by enabling wāhine and whānau led maternity care.

Whitinga ora pēpi

Whitinga ora pēpi is our neonatal transitional care unit. The name was gifted to us from Whaea Naida Glavish and it translates to "pēpi transitioning to wellness". It comprises 8 cots in a shared environment with NICU. 4 cots are for transitional care pēpi and 4 cots for NICU graduates. The tikanga for this unit is transitioning pēpi home with their whānau feeling well equipped to care for their unique needs. Whānau stay together with their pēpi to learn how to care for them and transition to home. Midwives and nurses work in this area with support from paediatricians when needed and lactation consultants. This unit was set up following the identification of the increased care these pēpi required. Anecdotal evidence tells us that whānau feel cared for and confident going home with their pēpi following care in Whitinga ora pēpi. The average length of stay is 7 days in this unit.

Whānau Ngā Uri

Whānau Ngā Uri is located in Ward 91. The name was gifted to us from Dame Naida Glavish, and is also known as the Midwifery Led Unit It aims to promote and support primary birthing and assist in improving outcomes for whānau, as well as provide a supportive enviroment for our LMC midwives who want to birth their māmā in a low risk enviroment.

2.4.2 Gynaecology service

The gynaecology department is represented by the following services.

Secondary Gynaecology

The general gynaecology service provides care to wāhine residing within the Te Toka Tumai region of Central Auckland (population - approximately 500,000). The service is comprised of:

- Ward 97 (inpatient ward) at Auckland City Hospital (ACH)
- Women's Assessment Unit (WAU) at ACH for acute gynaecology
- Outpatient clinics at Greenlane Clinical Centre.

Gynaecologic Oncology

Te Toka Tumai has the largest Gynaecologic Oncology surgical service in Aotearoa New Zealand. The Gynaecologic Oncology service offers comprehensive cancer care for wāhine with gynaecological malignancies, in association with Te Puriri o Te Ora medical and radiation Gynaecologic Oncology teams, and hosts a weekly supraregional MultiDisciplinary Meeting (MDM) with video conferencing links to the eight referring regions.

Wards and Clinics in the Gynaecology Service

Inpatient Services

Ward 97, Auckland City Hospital. Ward 97 is a 22 bed ward providing care for wāhine with acute gynaecology concerns, and pre and post planned gynaecologic and gynae-oncologic surgery care. Ward 97 also provides care to wāhine with other medical conditions or complications resulting from early pregnancy, fertility treatment or abortion. Radiology assisted procedures, such as fibroid embolisation, management of uterine AV malformation, and image guided biopsy are part of the gynaecology caseload.The gynaecology department is represented by the

Women's Assessment Unit (WAU)

WAU is located on Level 9, ACH. It is open 24 hours a day, 7 days a week and cares for acute admissions for gynaecology and obstetrics. Admissions either come from Adult Emergency Department, from the community, or from Greenlane outpatient clinics.

Outpatient Services

Outpatient clinics. The gynaecologic outpatient clinics are held at GCC:

- General gynaecology (i.e. menstrual disorders, pelvic floor dysfunction, sterilisation)
- Hormone replacement therapy and family

planning
- Endometriosis and pelvic pain
- Urogynaecology + Urodynamics
- Pessary Clinic
- Long Acting Reversible Contraception
- Gynaecologic Oncology
- Preadmissions clinic
- Abnormal uterine bleeding clinic (AUB) and hysteroscopy
- Female multidisciplinary clinic
- Rapid Access Clinic (RAC) with hysteroscopy

Colposcopy

The Colposcopy clinic is a multidisciplinary service that provides both colposcopy services to the wāhine of central Auckland and regional care for the Vulva Specialty clinic.

Early Pregnancy Assessment Unit (EPAU)

EPAU is a nurse-led outpatient service, based at Greenlane Clinical Centre (GCC) for wāhine referred for the management of miscarriage and early pregnancy complications such as ectopic and molar pregnancy. Wāhine requiring surgical management of miscarriage have their procedure at the Greenlane Surgical Unit also based at GCC.

Epsom Day Unit (EDU)

The first trimester abortion service is a Regional Gynaecology Day Service offered at Epsom Day Unit, Greenlane Clinical Centre.

Second trimester abortion is accessed via Epsom Day Unit by medical or surgical pathway of choice.

Fertility Plus

Fertility Plus offers a range of secondary and tertiary reproductive endocrinology, infertility and sub-fertility services to the wāhine of the Northern Region. Fertility Plus is one of three public providers in the Auckland region. Private investigation and treatment is also available. Fertility Plus is accredited by the Reproductive Technologies Accreditation Committee (RTAC). Publicly funded fertility treatment is available to wāhine under 40 years of age, who are non-smokers and have a BMI under 32.

Fertility Plus also offers a Recurrent Pregnancy Loss Clinic (RPL). This is a nurse-led clinic which aims to establish underlying reasons for a couple experiencing recurrent pregnancy loss. RPL also offers additional physical and emotional support on becoming pregnant offering more frequent early pregnancy scans, monitoring of HCG levels and progesterone support if indicated throughout the first trimester.

2.4.3 Newborn Service

The Newborn Service located on the 9th Floor of Auckland City Hospital (ACH) provides neonatal care for premature and sick pēpi.

National, Regional and District Services

The Newborn Service is contracted to provide:

- Level 3 neonatal intensive care to Northland, Central, West and North Tāmaki Makaurau areas – 18 cots (tertiary service).
- Level 2 neonatal high dependency care to Central Tāmaki Makaurau area – 22 cots (secondary service). Pēpi whose whānau are domiciled in the Waitematā area are transferred back to North Shore Hospital or Waitakere Hospital to complete their secondary care closer to home. Pēpi whose whānau are domiciled in Northland area are transferred back to Whangārei Hospital when stable, to complete their neonatal care closer to home. A regional service for pēpi requiring laser treatment for retinopathy of prematurity from Northland, Central, West and North Tāmaki Makaurau areas (tertiary service).
- A national service for pēpi diagnosed antenatally with critical congenital cardiac lesions which would require intervention in the newborn period from Paediatric Cardiology services (quaternary service).

The Newborn Service also provides intensive care to pēpi from other regional districts in Te Whatu Ora, particularly if their units are at capacity. Inter-regional transfers may also occur for cardiology and surgical services or for complex metabolic diseases, and in cases where there is a need for access to paediatric subspecialty services.

The Newborn Support Services include:

- Neonatal Homecare Service
- Child Development Unit
- Newborn Outpatient Follow-up Service
- Specialist Lactation Service
- Neonatal Emergency Transport

There is a close relationship with tertiary services at Starship Hospital, with approximately 11% of neonates being transferred from NICU to Starship Hospital each year for ongoing medical care (general paediatrics, respiratory paediatrics, paediatric metabolic and neurology services) and surgical care (paediatric cardiac, general surgery and gastroenterology services).

University Links

There are close research links with the University of Auckland School of Medicine, particularly the Departments of Obstetrics and Gynaecology, Paediatrics and Child Health, and the Liggins Institute. Joint appointments exist between the Newborn Service and Auckland University of Technology for the Post Graduate Neonatal Nursing Programme. This includes the academic pathway to Neonatal Nurse Practitioner. These courses attract students locally and nationally.

2.5 Women's Health Workforce

The Women's Health Directorate workforce is made up of a large number of diverse professional roles which provide care to both gynaecology and maternity patients. In addition to the National Women's Health employed workforce, self-employed LMCs (both midwives and obstetricians) provide care for a significant proportion of our maternity population.

2.5.1 Maternity services

Self-employed Lead Maternity Carer (LMC) services

The provision of maternity care in New Zealand is funded by the Ministry of Health, which sets policy, and funds service delivery through the hospitals, facilities and community services of Te Whatu Ora.. In 1996 significant changes to the way that maternity care was funded, and therefore provided, were outlined in Section 88 of the Public Health and Disability Act. The Section 88 notice requires all wahine to have a Lead Maternity Carer (LMC) who is chosen by the wahine and has responsibility for ensuring provision of maternity services throughout her pregnancy and postpartum period. Maternity services, apart from services provided by private obstetricians, are free.

LMCs are required to obtain access agreements with any maternity facility where they intend to provide care. To ensure the wahine receives continuity of care, all LMCs are required to have back up arrangements with another selfemployed practitioner who the wahine has met. A range of LMC models of care are available in New Zealand.

At National Women's Health the following models are available:

Self-employed midwife

These midwives generally provide continuity of care in the antenatal, intrapartum and postnatal period. Antenatal visits are usually provided through a midwifery clinic in the community and postnatal visits are provided in the wahine's home. If the wahine's pregnancy and or labour become complicated then the midwife and wahine can refer to a private obstetrician or National Women's Health secondary services to provide care.

General Practitioner (GP)

Antenatal care is based in the GP's rooms. Midwifery care intrapartum and in the postnatal period for wahine who choose a GP LMC is provided by either a hospital midwife or a self-employed midwife. If the wahine's pregnancy and or labour become complicated then the GP and wahine can refer to a private obstetrician or National Women's Health secondary services to provide care.

Private Obstetrician

Private obstetricians provide antenatal care in their rooms. Midwifery care when wahine go into labour and postnatal care can beprovided by the hospital or a self-employed midwife. As shown in the report, LMCs provide primary care for approximately 76% of total births at National Women's Health. Currently, 139 self-employed midwives and 31 private obstetricians hold access holder agreements. Not all of these midwives provide full LMC services, as many of them provide care for women who are cared for by private obstetricians.

2.6 Funding of Maternity Services

2.6.1 Self-employed LMC Maternity Services

Funding for maternity services is complex and underwent significant changes in 2007. Funding for primary maternity care from self-employed midwives, general practitioners and private obstetricians is provided through the Section 94 maternity notice which forms part of the Pae Ora act 2022, and outlines expectations and funds for their services. It is module based, with first, second and third trimester, labour and birth, and postnatal modules, and is a fixed payment per wahine per module.

2.6.2 Locality delivered services

Localities provide maternity care, gynaecologic care and neonatal care, both outpatient and inpatient care, which is funded by Te Whatu Ora using Vote Health, population based funding models.

Outpatient maternity clinics, whether based at Greenlane Clinical Centre or Te Toka Tumai Auckland City Hospital, are funded through purchase unit codes (PUCs), the value of which are determined nationally by Te Whatu Ora. The payment associated with each PUC for an outpatient visit is dependent on the type of visit and who is providing the care e.g. midwife, obstetrician or physician. Midwifery home visits are also funded via PUCs. Inpatient care is funded on case mix, which looks at the diagnostic related group (DRG) and adjusts for complexity to calculate a Weighted Inlier Equivalent Separation (WIES). WIES has a standardised value, which is adjusted annually, and the WIES weight multiplied by the WIES value gives the funding associated with each unit of inpatient care.

In New Zealand, wāhine can choose where they wish to birth their pēpi if it is a primary birth. The funding for the care provided by self-employed LMCs follows the wahine.

2.7 Birthcare Auckland

Birthcare Auckland is a primary maternity unit providing birthing facilities for wāhine who choose to birth there. It also holds a contract with Te Toka Tumai to provide postnatal facilities to well wāhine and pēpi born at National Women's Health. This is funded under a contractual arrangement with Te Toka Tumai Funding and Planning.

3

CHAPTER 3

QUALITY

ŪPOKO 3

KOUNGA

Commentators

Denise West
Clare Senner
Eve Kozeluh
Louise Rowden
Sian Evans
Suzy Longville
Judyth Hilton
Adrienne Bell
Tamsin Miles
Kathy Lowe
Rose Purchas
Leah Broughton-Couch
Rebecca Clark
Dr Helen Roberts
Raffaela Slight
Hannah Kasper
Rose-Marie Vos
Lisa Dawes
Rachel Hunter
Tracey Senior
Natalya Harris
Jose Espineira Iglesias
Dr Saman Moeed
Laurinda McInnes
Peter Melville

3.1 Women's Health Directorate Ngā Whainga | Priorities

Te Tiriti o Waitangi in action

- Workforce representative of our Tiriti partnership and the population we serve.
- Working towards a workforce that is culturally competent and confident.
- We actively support career opportunities in leadership for Kaimahi Māori and Pacific people.
- Service development and delivery is intentionally co-designed with tangata whenua.
- Māori cultural support services are available and accessible as required for kaimahi and whānau.
- Directorate leadership and governance structures will be designed in a Te Tiriti honouring model.

People, patients, and whānau at the centre

- Te Ao Māori incorporated into the planning and provision of services.
- We partner with whānau, supporting them to make choices which works for them in their context.
- Kaimahi have skills to support whānau to actively contribute to the provision of care to the extent they are willing and able.
- Service leaders partner with whānau in the conduct of quality activities across the Service.
- Whānau-service relationships are strengthened through more continuity of care.

Resilient services

- Each service is staffed to the budgeted establishment and reflects the population we serve.
- Services are safe and reflecting evidence-based care, each professional group is maintained across 24 hours/7 days.
- All kaimahi understand and actively contribute to ensuring service safety.
- Performance against ESPI 2 and 5 is excellent.
- Variance response management process in place, supported by hospital-wide escalation system.

Quality, safety and risk (QSR)

- Evidence based quality plan guides improvement activity.
- Effective co-ordination and integration of existing governance structures and processes.
- Patients and consumers actively participate in our QSR systems.
- Increase in incident reporting and clear delegation.
- Clear visibility of service risks, appropriate mitigations and escalations.
- All review processes are driven by improving quality and conducted in a fair and transparent environment.

Eliminate inequity

- Working towards all whānau having equitable access with resources prioritised toward removing barriers to access.
- Māori and Pacific people cultural and navigation supports are enhanced with a new focus provided for patients who may have cancer.
- Service settings which drive inequities are adapted to eliminate inequity.
- Interventions targeted towards reducing SUDI, SGA and pre-term birth are delivered in a way which works for whānau.

Digital transformation

- Te Ao Māori incorporated into the planning and provision of services.
- We partner with whānau, supporting them to make choices which works for them in their context.
- Kaimahi are given the opportunity to upskill with whānau to actively contribute to the provision of care.
- Service leaders partner with whānau in the conduct of quality activities across the Service.
- Whānau-service relationships are strengthened through more continuity of care.

People, Culture and Values

- FTE and safety thresholds are consistently met with a corresponding reduction in additional duties kaimahi perform.
- Pipeline of talent is matched to service needs and brings kaimahi on in advance of demand

and turnover.

- Mature health and safety culture: people feel personally and professionally safe and valued, kaimahi enjoy coming to work.
- Leadership at all levels demonstrative of Te Toka Tumai values, teamwork, and organisational learning.

Financial sustainability

- All kaimahi display responsible use of directorate resources.
- Financial vigilance.
- Maintain sustainability of service within budget: cost drivers are regularly reviewed to identity efficiency opportunities.
- Increased opportunity and visibility of budget process and prioritisation.
- Better resourcing for patient population currently underserviced.
- Maintain awareness around finance and governance in Opex and Capex – i.e. decision-making and project management.

3.2 Women's Health Clinical Excellence Groups

Maternity Clinical Governance Group

The purpose of this group is to oversee, guide and monitor a quality framework model which ensures Te Toka Tumai remains accountable for continually improving the quality of their services.

This group is co-chaired by the Director of Midwifery and the Secondary Maternity Service Clinical Director and has a diverse membership, including midwives (both employed and community based), obstetricians (both employed and in private practice), a Primary Birthing Centre representative, consumer representatives, NZCOM representatives, Newborn Services, and Planning and Funding. Additional people may be invited when required. These meetings are held monthly.

Gynaecology Governance Group

This group is co-chaired by the Secondary Gynaecology Service Clinical Director and the Regional/Tertiary Gynaecology Service Clinical Director and has responsibility for matters of quality and safety across general gynaecology, urogynaecology, fertility, abortion services and gynaecological oncology.

Level 4 Area-Specific Clinical Governance groups

Level 4 Area-Specific Clinical Governance groups are focused around particular clinical service areas (such as Labour and Birth, MFM, Diabetes, Pregnancy and Parenting, SUDI, Aranga Tētēkura) with membership relevant to the area of focus.

Labour and Birthing group

This group is chaired by the LBS Midwife Manager and has the ADOM Māori Health and equity, Senior Obstetrician, Epidemiologist, Anaesthetist, MQSP, midwife educator and invited members. The intention is to review and create plans and guidelines for improved clinical practice in the LBS area. RAMP reviews and Datix plus national clinical directives and guidelines are tabled with a group approach to finding solutions and communicating these to the wider women's health team. The goal of the group is to make birth safer for whānau using evidence based care and practice within the Labour and Birthing Suite area, while including the principles of Te Tiriti o Waitangi and an equity focus in all decisions, engagement and communication.

Women's Assessment Unit Operation group:

This is a group that has recently formed to provide operational leadership for the WAU area which comprises Maternity and Gynaecology acute assessments in the same physical space.

Research Governance group

This group works in collaboration with the Te Toka Tumai research office to:

- Support a culture of research excellence in all aspects of women's health, including neonatology, at NWH.
- Enable research at NWH.
- Promote integration of research into the clinical service.
- Provide a safe research environment for staff and wāhine.
- Coordinate research to avoid duplication and burden on staff and wāhine.

The group is chaired by Associate Professor Jane Alsweiler.

Teaching and training governance group

The Teaching and Training Clinical Governance Group was established six years ago and meets regularly to discuss all matters affecting teaching and training across all our disciplines (medical, midwifery, nursing). The group is chaired by Associate Professor Michelle Wise.

3.3 The Maternity Quality and Safety Programme

Denise West

The New Zealand Maternity Quality and Safety Programme (MQSP) is a national programme established in 2011 by the Ministry of Health (MoH), Manatū Hauora. The following feed into Te Whatu Ora to provide recommendations for the MQSP programme:

- The National Maternity Monitoring group (NMMG)

- Perinatal and Maternal Mortality Review Committee (PMMRC)
- The Neonatal Encephalopathy Taskforce.

"The National Maternity Monitoring Group continues to advocate for equitable access to LMC services in the first trimester for all pregnant women/people, recommending DHBs focus on improving services for Māori, Pacific and Indian pregnant women/ people, for pregnant women/ people under the age of 20 and for those living in high deprivation."

-NZ Maternity Clinical Indicators Background Document (Oct 2020)

MQSP governance and reporting lines

The MQSP midwife reports to the Director of Midwifery.

The MoH no longer requests quarterly reporting on projects that are recommended by NMMG, PMMRC and the Neonatal Encephalopathy Taskforce. This is now reported on and captured in the Annual Clinical Report. The programme brings together clinical staff, consumers and wider community stakeholders to improve communication and to monitor and improve maternity care through the various quality initiatives which are guided by the MoH and maternity clinical indicators. The MQSP leads have been asked to ensure the headings on page 33 have been covered in the Annual Clinical Report.

3.3.1 Northern region Maternity Quality and Safety Programme consumer partnership hui

Clare Senner, Denise West, Eve Kozeluh, Louise Rowden, Sian Evans and Suzy Longville

Following the 2022 Maternity Quality and Safety Programme (MQSP) national hui, the MQSP northern region group was established. This group was established to provide support and collaboration across the northern region for the MQSP midwives. Early on we decided to bring the northern region consumer advisors together at a kanohi ki te kanohi meeting. A meeting was planned in collaboration with the Northern region MQSP consumers and was held at the Nathan Homestead in Manurewa in October 2023. The final agenda was planned by the Northern region MQSP consumers who met prior to the day to discuss activities that they would find useful.

One of the consumers opened the day with karakia and then facilitated whakawhānaungatanga through discussion and fun activities.

Annabel Johns, Senior Advisor from Te Aka Whai Ora, facilitated a session on Kahu Taurima. This discussion highlighted the importance of consumer participation in quality improvement

The remaining sessions were all facilitated by northern region consumers.

The main focus of the day was to explore roles and responsibilities of the consumers in their district and work towards ways of collaborating and supporting each other in the future. Through our discussion we discovered the wide variation in the scope of of consumer activities across the region. Activities included involvement in governance, engagement

Left to right, standing: Isis Mackey (Te Toka Tumai Auckland consumer), Natalie Allen (Te Tai Tokerau Northland consumer), Maraea Pipi-Takoko (Counties Manukau consumer), Taffy Mayumbo (Counties Manukau consumer), Luisa Silailai (Counties Manukau consumer), Eve Kozeluh (Waitematā MQSP midwife), Natalya Harris (Te Toka Tumai Auckland – Midwife Manager Tamaki ward), Claire Flavell-Kemp (Counties Manukau consumer), Zjanika Aumau (Waitematā consumer), Sian Evans (Waitematā MQSP midwife), Clare Senner (Counties Manukau MQSP midwife), Tash Wharerau (Te Tai Tokerau Northland consumer)
Left to right, front row, sitting: Renee Kohere (Te Toka Tumai Auckland consumer) with her tamariki, Amiria (4) and Te Houkura (1), Suzy Longville (Waitematā MQSP midwife), Louise Rowden (Te Tai Tokerau Northland MQSP Midwife).

with whānau on the wards and in the community, review of consumer information, service planning, and contribution to the annual report.

An outcome of the day as requested by some of the consumers was the development of district based guidelines which clarify expectations of the consumer role. This work has been completed.

Feedback from one of the consumers summed up the day: *"The regional consumer hui was a positive day for consumers and coordinators to reconnect and build networks across the region. The consumer role can feel lonely or overwhelming at times. The day enabled us to establish a foundation of frameworks for what the role involves. The hui was an opportunity to explore what can be done to improve in the space."*

MQSP Priorities

LMC engagement

Women's Health Clinical Excellence groups are outlined in chapter 3.2, and multidisciplinary panels in 3.7 Adverse Events.

MQSP projects

What we chose to focus on this year as our projects are outlined in the rest of chapter 3.4 Quality and Safety Programme Updates.

Demographics and outcomes

Refer to Maternal Demographics in chapter 4, and Labour and Birth Outcomes in chapter 7.

Refer to chapter 9 Perinatal and Maternal Mortality.

Cultural competency, safety: Equity of outcomes

We have a strong focus here at Te Toka Tumai on equity and improving outcomes for Māori whānau. We are proud of the Te Manawa o Hine Māori midwives who provide continuity of care to hāpu whānau.

We currently have Māori, Pasifika, NZ Asian and Pakeha consumer representatives who have joined Clinical Governance Groups and committees to ensure joint decision making in regard to policies, documents, and consumer information.

We are embracing change that is occurring within the health system with the opening up of the regions to be able to share resources and information.

We are working on strengthening services and connections to improve outcomes for all whānau, focusing on wellness for all.

All policies and business cases have input from the Māori leads and are presented to He Ara Whiria for endorsements before presentation to the Senior Leadership Team (SLT) or publication.

Refer to chapter 3.4 Quality and Safety Programme updates, and 3.8.4 Equitable Outcomes.

Locality Maternity facilities

Refer to chapter 2.4 Service Provision.

Workforce and learning

Refer to chapter 3.8 Investing in the Workforce.

Maternal Mental Health

Refer to chapter 3.4 Quality and Safety Programme updates.

Consumer engagement

Refer to chapter 3.3.1 Northern Region Maternity Quality and Safety Programme consumer partnership hui, chapter 3.4 Pregnancy and Parenting Programme, and chapter 3.7 Adverse events.

Previous annual clinical reports can be found on the National Women's Health website, under the subheading For Health Professionals > Annual Clinical Report > Annual Clinical Reports.

Clinical indicators

Refer to chapter 3.3.2.

Clinical guidelines

Refer to chapter 3.7 Adverse events.

Place of Birth

Refer to chapter 3.8.4 Equitable Outcomes.

Refer to chapter 2.7 and chapter 6.7 for information about birthing at Birthcare.

Implementation of Maternity Early Warning Score (MEWS) and NOC/ NEWS

Refer to chapter 3.4.6.

Sepsis 6 bundles and pathways

Maternal sepsis bundles were embedded into our practice in 2021. Staff receive ongoing education at midwifery emergency study days.

GAP

Refer to chapter 3.4.10.

Preterm Birthing

Refer to chapter 3.8.4 Equitable outcomes.

3.3.2 Performance against NZ Maternity Clinical Indicators

The maternity clinical indicators are part of the MQSP national reporting. The Ministry of Health uses the National Maternity Dataset, MAT, which is compiled from LMC early pregnancy data and hospital discharge outcome data to produce indicator data for each DHB and facility and for NZ. There are 20 indicators in the clinical indicator report as listed in Table 3.1. The full report is available at www.tewhatuora.govt.nz/for-health-professionals/data-and-statistics/maternity-clinical-indicators

Table 3.1 includes the indicator rates for NWH facility for 2022 compared to rates for all NZ secondary and tertiary facilities in 2022. Unfortunately, delay in the availability of the national maternity dataset delays the indicator report. The 2022 indicators were released by Manatū Hauora, The Ministry of Health in August 2023. The indicators where NWH was significantly outside average national rates and which were cause for concern are shaded in the table.

Table 3.1 New Zealand Maternity Clinical Indicators 2022 (NWH and NZ Facility rates for all secondary and tertiary facilities)

Indicator		NWH 2022	NZ 2022	Comment
1	Registration with a LMC in the first trimester of pregnancy	77.7%	76.0%	No Concern
2	Standard primiparae who have a spontaneous vaginal birth	44.9%	51.7%	Concern
3	Standard primiparae who undergo an instrumental birth	26.1%	24.4%	No Concern
4	Standard primiparae who undergo Caesarean section	28.9%	23.8%	Concern
5	Standard primiparae who undergo induction of labour	19.2%	10.9%	Concern
6	Standard primiparae with an intact lower genital tract (no 1st- to 4th-degree tear or episiotomy)	8.7%	14.5%	Concern
7	Standard primiparae undergoing episiotomy and no 3rd or 4th degree perineal tear	43.9%	34.0%	Concern
8	Standard primiparae sustaining a 3rd or 4th degree perineal tear and no episiotomy	2.3%	4.4%	No Concern
9	Standard primiparae undergoing episiotomy and sustaining a 3rd or 4th degree tear	2.5%	2.6%	No Concern
10	Women having a general anaesthetic for Caesarean section	5.9%	7.5%	No Concern
11	Women requiring a blood transfusion with Caesarean section	4.7%	3.8%	Concern
12	Women requiring a blood transfusion with vaginal birth	3.6%	3.1%	No Concern
13	Diagnosis of eclampsia at birth admission	0.03%	0.05%	No Concern
14	Women having a peripartum hysterectomy	0.12%	0.09%	No Concern
15	Women admitted to ICU and requiring ventilation during the pregnancy or postnatal period	0.07%	0.02%	No Concern
16	Maternal tobacco use during postnatal period	N/A	N/A	No Concern
17	Preterm birth	10.3%	8.5%	Concern
18	Small pēpi at term (37 - 42 weeks' gestation)	3.5%	3.5%	No Concern
19	Small pēpi at term born at 40 – 42 weeks' gestation	22.5%	24.7%	No Concern
20	Pēpi born at ≥37 weeks' gestation requiring respiratory support	3.6%	3.7%	No Concern

N/A: post-November 2021, data on smoking status is no longer collected by Te Whatu Ora. Accordingly, rates for this indicator are not displayed post-2021.

3.4 Quality and Safety Programme Updates

3.4.1 Te Manawa o Hine

Judyth Hilton

We are a whānau who embrace Te Ao Māori, working collectively towards improving outcomes for whānau Māori, as we work through an equity lens.

We provide an āhuru mōwai; a safe haven for our kaimahi that promotes a space of belonging.

Kaimahi are valued for the expertise and skills they contribute to our kaupapa.

In July 2023, the team farewelled Kaiwhakahaere, Annmarie Taiapa, and welcomed Judyth Hilton. At that time there was a team of four midwives.

Today, Te Manawa o Hine employ six Kahu Pōkai (Māori midwives) and two Kai Amo Pōkai (Māori maternity support workers). This increase in staffing has allowed the team to increase their referral acceptance capacity and also work synergistically with Kai Amo Pōkai.

Te Manawa o Hine has been through a number of changes in model of care and currenlty works as a fully caseloading team. What does this mean? Our midwives now carry their own caseload and work closely with wāhine and whānau from booking through to discharge (6wks). It is clear that the benefits of continuity of care have increased our engagement experience with wāhine/whānau whilst decreasing our missed appointment rates.

Kai Amo Pōkai involvment with wāhine/whānau has relieved our Kahu Pōkai of additional time and energy and increased their capacity to focus on the well-being of wāhine/whānau clinically. Kai Amo Pōkai navigate and support wāhine/whānau through their journey of maternity care; inviting other support services necessary to address other pressing issues that impact on their overall social, mental, spiritual and physical health and well-being.

With the addition of Kai Amo Pōkai and the increased midwifery staffing, wāhine/whānau have reported that they have felt nutured, supported and empowered.

One whānau reports the following:

> *Over the last nine months I have had the significant privilege of being supported through my haputanga (pregnancy) by the midwives of Te Manawa o Hine, located at Greenlane Clinical Centre. As the parent of a child with Down Syndrome, I am no stranger to the childhood medical services available in Auckland, nor am I a stranger to what participation in the healthcare system in Aotearoa means, as both a patient, parent and advocate.*
>
> *I truly wish that I could say that my experiences have all been excellent, but through my earlier pregnancies I, like many other Māori, experienced poor and at times, harmful treatment that I can only attribute to systemic and institutionalised racism, and medical practitioners who I would describe as 'racist'.*
>
> *As an advocate for my Son, and as a 'Lived Experience' advocate and spokesperson, I have come to understand that the key for improving outcomes in my case, and for my disabled child and other children, has hinged on the ability of medical professionals, and institutions, to honour our place and space in the system. This cannot be achieved without acknowledging our unique identity as Māori and by delivering a service that is empathetic to our cultural needs.*
>
> *Te Manawa o Hine breathes this very notion in all of its practices; creating a space where I as a Māmā and patient, was able to navigate my haputanga with confidence, safety and most importantly, with such joy. It is a service that not only acknowledged my experience in having already given birth, but for the first time ever, also embraced my needs and wants as a Māori Māmā.*
>
> *I cannot commend the wāhine of this service highly enough. The service was delivered with absolute professionalism and up-to-date practice, and was balanced with a deep respect for my whakapapa, and an ease of connection to me as a Māmā and as a wahine. Their commitment to truly informed consent, and ensuring understanding is also something that I don't believe that I have experienced previously. They have also worked to mitigate many of the barriers to access that might prevent a healthy and successful pregnancy and post-birth experience, such as accommodations for travel, free antenatal scans, free access to a TENS machine, and complementary services like free breastfeeding support with a lactation consultant. Again, this ensures my place and space in the system, and the health and safety of all women and pēpi who access the service.*
>
> *Whilst the Minister for Health has spoken broadly about devolving Māori health services to Iwi, in this case I would urge Te Toka Tumai to fight for the continuity of this programme should it be required. From my own experience, I have no doubt that this service leads to better outcomes for Māmā, pēpi and whānau, and is a model that should be available to all Māori Māmā, regardless of location or tribal affiliation. This is the type of service that can and will save lives, and is one that Te Toka Tumai should be proud of.*
>
> *I am truly grateful for the service and am personally so thankful for Emily, Amber and Billie who journeyed with me, my whānau and our pōtiki, on his haerenga into Te Ao Marama. I wish the service every continued success.*

Back Row: Billie Thomas-McKenzie, Amber Howard, Pani Taiapa, Shari Hohepa, Kerryn White
Front Row: Clair Williams, Cheryl Barrett, Judyth Hilton, Emily Kingi

Nga mihi maioha,

Nā Tahlia Tini, Jeremy Chapman raua ko John Rangituaeke Tūranga Tini Chapman (born March 16, 2024 at Auckland Hospital).

3.4.2 Aranga Tētēkura, Maternal Wellbeing and Child Protection Advisory Service

Adrienne Bell, Tamsin Miles

For many wāhine, pregnancy is a time that engenders a myriad of interrelated psychosocial, physical, and emotional issues, some of which may result in overwhelming a tenuous system.

The Aranga Tētēkura Advisory Forum is a health led weekly interdisciplinary/interagency professionals forum whose purpose is indirect support of wāhine hapū that are experiencing complex social factors and are considered high priority in their support needs.

The forum provides an opportunity to explore possible challenges and strengths of a wāhine and her support system. To identify areas/capacity to self-resource and to discuss potential safety/support plans when indicated, in a professional and collaborative space.

There is a core panel at the forum which includes professionals from midwifery, health social work, Oranga Tamariki, AOD services, cultural midwifery support, and Aronui Ora maternal mental health. Historically we have also had representation from Starship Community, and SHINE family harm services. Staffing issues have caused challenges for SHINE engagement with the forum; Starship Community remains involved to consult.

The main four reasons for referral to this service are family harm, substance use, mental health issues and child protection. There are other concurrent presenting factors not represented in the main four, which can include medically high-risk pregnancy, housing and financial support, trauma history and non-engagement with services including antenatal care. Whilst these needs are often identified during the forum they are not generally included as a reason to refer to the forum.

During 2023, Aranga Tētēkura received 197 referrals, which was a decrease from 241 in 2022. The number of times a wāhine is presented at the forum is determined by the level of need and risk. In 2023, there were 81 referrals where there was one concern requiring support. There were 101 referrals with two to three concurrent concerns, and 15 more noted four or more concurrent concerns.

Whānau can self-refer, however most referrals are received from the wāhine LMC, Te Aka Ora and Te Puaruruhau.

3.4.3 Women's Health Family Violence Intervention Programme

Kathy Lowe

During 2023, it was recognised that a growing number of staff had not been able to access family violence training for a variety of reasons which reflected on the low routine enquiry rates in Women's Health. The next issue was that if staff had completed their training, the system for documentation had changed to BadgerNet and was found to be problematic with gathering data. i.e. if staff do not record that they have completed a routine enquiry, in the correct place in BadgerNet, it is not auditable.

A small but dedicated group of Women's Health leaders have been working to rectify both of these issues with a large focus on targeted training in Women's Health and although the results of this hard work are yet to be seen, we remain hopeful.

The work has involved the Women's Health Intelligence team clarifying the data they release, the Family Violence Intervention team visiting the wards to deliver short updates to encourage staff and to educate them on how to record a routine enquiry in BadgerNet, a huge amount of work going into staff being supported to attend family violence intervention training and staff being encouraged by their managers and leaders to complete routine enquiry in an effective way, as often as possible.

Presently the percentage of eligible woman being asked about family violence on postnatal wards and recorded in Badgernet is 7.3%. We are hopeful this is the beginning of an increase!

3.4.4 Safe Sleep

Rose Purchas

"The overall goal of the National S.U.D.I. Prevention Programme (NSPP) is to reduce the incidence of Sudden Unexpected Death of the Infant (S.U.D.I.) to 0.1 in 1000 liveborn infants by 2025" (86% reduction for general population, 94% reduction for Māori)

- Hāpai te Hauora.

S.U.D.I. Prevention Coordinators work in most regions of the country. At Te Toka Tumai – Auckland, Senior Midwife Rose Purchas is the Coordinator Midwife.

The purpose of the Coordinator role at Te Toka Tumai - Auckland (which the Ministry of Health instituted in 2017) is to contribute to reducing the incidence of S.U.D.I. as well as striving towards achieving equitable health outcomes in the region. There is a focus on Māori and Pasifika populations who are disproportionately represented in national

Safe sleep for P.E.P.E.

Place baby in their own baby bed in the same room as their parent or caregiver.

Eliminate smoking in pregnancy and protect baby with a smokefree whānau, whare and waka.

Position baby flat on their back to sleep - face clear of bedding.

Encourage and support breastfeeding and gentle handling of baby .

S.U.D.I. statistics.

The Midwife Coordinator provides education to Midwifery, Nursing and Social Work staff within and beyond Te Toka Tumai, presenting at Midwifery and Nursing BFHI and COMBO study days; to orientating staff and return-to-practice Midwives as well as to nurses & Social Workers working in both Women's Health and at Starship, including NICU. The Coordinator also facilitates meetings and training (by visiting practitioners such as Smokefree, Te Puaruruhau and SUDI experts) for 'SUDI Prevention Champions' who hail from the primary, secondary and tertiary settings within Maternity and Newborn Services at Te Toka Tumai as well as other stakeholders such as Ngāti Whātua Ōrākei, Birthcare and Wellchild Services e.g. Plunket. The Hāpai te Hauora online SUDI training is accessible to all Te Toka Tumai staff via the Ko Awatea Learn application and is mandatory for Midwifery and Nursing staff.

Best practice for consistent safe sleep messaging is promoted to all staff and is aligned with the Northern Region Safe Sleep Policy (2019-2020) as well as the National S.U.D.I. Coordination Service, Hāpai te Hauora. The Safe Sleep P.E.P.E. message is shared with all whānau/ families who have an under-one year old within Te Toka Tumai.

In support of best practice, the Midwife Coordinator procures and distributes Infant Safe Sleep Beds (ISSB) within Te Toka Tumai as well as to the outlying stakeholders as required. Wahakura (which are distributed to Māori and Pasifika whānau), and Mānuka (bamboo) infant safe sleep beds (ISSB) are distributed (with the Safe Sleep P.E.P.E. messaging) at no cost to vulnerable families/ pēpi.

In 2023 there were approximately forty beds per month distributed to families/ whānau who met the national criteria below. This is an increase of approximately 15 per month since 2018.

Criteria for distribution of ISSB as per the Safe Sleep Intervention Programme Referral and Distribution page (which must be completed and emailed to SUDI Prevention at every ISSB distribution) are:

- Previous SUDI.
- Minimal/ no antenatal care.
- Premature birth.
- Parent is not breastfeeding or plans to formula feed.
- Low birth weight.
- Reduced income.
- Smoking during and/or after pregnancy.
- Overcrowding.
- Māmā <25 years of age.
- Drug and/or alcohol use.
- Bed sharing/ planning to bed share.
- Other household members are smokers.
- No pēpi bed/ bassinette/ cot at home.

In 2023, the SUDI coordinator facilitated the introduction of Tuatahi Small Safe Sleep Beds into the postnatal wards, for the purpose of modelling safe sleep as well as to allow easier access to pēpi for parents wanting to be closer for breastfeeding. The Tuatahi bed fits beside eligible parents in the adult bed. Feedback regarding use has been extremely positive, especially from māmā post-Caesarean section.

In order to raise awareness of the impact of S.U.D.I. on whānau in Aotearoa, there is an annual National

Wahakura

Safe Sleep Day/ Te Rā Mokopuna 2023

Safe Sleep Day (Te Rā Mokopuna), which was held in December 2023. Rose held a display in the Level 5 atrium at Grafton, supported by Safe Sleep Champions. Over 55 people entered the Safe Sleep competition and engaged with the display.

In 2024 and ongoing, Te Rā Mokopuna has been moved to the first Friday in June.

Tuatahi Small Safe Sleep Beds

3.4.5 Pregnancy and Parenting Programme

Leah Broughton-Couch

The Pregnancy & Parenting Education Service continued its delivery into the community, responding and adapting to evolving circumstances. Registration and attendance numbers were slightly down on 2022.

The purpose of the programme is to provide fully funded information, education and support to pregnant women/whānau and expectant fathers/partners of new pēpi including adoptive parents and, where appropriate, their whānau, to meet their pregnancy and early parenting information, education and social support needs.

The Service objectives are to:

- Provide parents with pregnancy and early parenting information, education and support to help prepare them for pregnancy, childbirth and parenthood, and for making informed choices
- Provide opportunities to share their experiences and form new social networks with other expectant parents
- Increase access to pregnancy and parenting education for high need groups, progressing to 30% of these population groups accessing pregnancy and parenting education, while maintaining 30% coverage for the total Auckland resident birthing population.

The Service is available to all, with a focus on first time parents domiciled in the Te Whatu Ora I Te Toka Tumai boundary. Particular emphasis is on meeting the needs of pregnant women/whānau with high needs. This includes young/teenage parents, Māori, Pasifika, Asian, parents with limited health literacy, and other women with identified needs.

Access to the programme is via self-referral or referral from a registered health professional or other allied health, education, or social service professional. Whānau register online for community courses with a confirmation receipt for all online bookings. A follow-up email confirming course details and a reminder text closer to the class date is also provided. The publicly funded classes are promoted in the maternity "welcome letter" sent to newly registered whānau.

A variety of strategies are engaged to provide education. The menu of classes includes early pregnancy and advanced pregnancy, with Calmbirth and ante-natal breastfeeding classes an extension to these services. Classes are held midweek and weekends via in-person and online classes. Importantly, the Service works with community partners to reach priority whānau and teen parents. These partners include Ngāti Whātua Ōrākei Whai Maia, E Tipu E Rea and UMMA Trust. Education sessions are provided for new migrant/refugee groups as required by provider organisations. In-patient opportunistic education continues to be provided at Auckland City Hospital. This is particularly successful in engaging with the many women who do not otherwise receive pregnancy and parenting education or are not made aware of community classes. Those with complications or health issues are engaged in the wards. Home visits are also offered via referral for women/whānau who meet the criteria. Referrals during 2023 were low with just 23 home visits being recorded in 2023. In these days of Covid these visits are provided both in-person and online. The private Pregnancy & Parenting facebook page has 2,500 members comprising those who have attended classes or engaged with Te Toka Tumai educators in other forums. The Service is reviewing the facebook page to increase engagement. Online chat numbers have fallen off and the Service is exploring other forms of social media to increase engagement.

Calmbirth, a childbirth education programme focusing on labour and birth, was piloted in 2020 and has continued through to 2023. The programme combines the physiology of birth with the psychology of birth and provides useful tools for parents to prepare for labour and birth with confidence. The pilot programme was evaluated by Auckland University of Technology with strong positive feedback from participants.

For the period 1 January to 31 December 2023 a total of 81 courses were offered (15 Early Pregnancy Classes, and 66 Advanced Pregnancy Classes). A total of 958 registrations were received – 208 for Early Pregnancy, and 750 for Advanced Pregnancy. Of those total registrations, 89% attended the Early Pregnancy and 75% attended the Advanced Pregnancy Classes. Eighty six per cent (86%) of those attending courses were first time parents. Classes remain ethnically diverse. By ethnicity, Asian and Indian registrations combined continue to represent the majority of all registrations (44.5%) with NZ European/Other European sitting at 27.3%. Unsurprisingly, Māori and Pasifika engagement in Te Toka Tumai community courses is very low at 3.9% and 3.5% respectively. Opportunistic education provides good opportunities to engage with these and other priority groups. Importantly, of those Te Toka Tumai domiciled women seen opportunistically, almost 70% fall within the priority groups. Of particular interest

Figure 3.1 Comparison of pēpi ethnicity for admissions to Whitinga Ora Pēpi, births at Auckland Hospital, and NICU admissions 2023

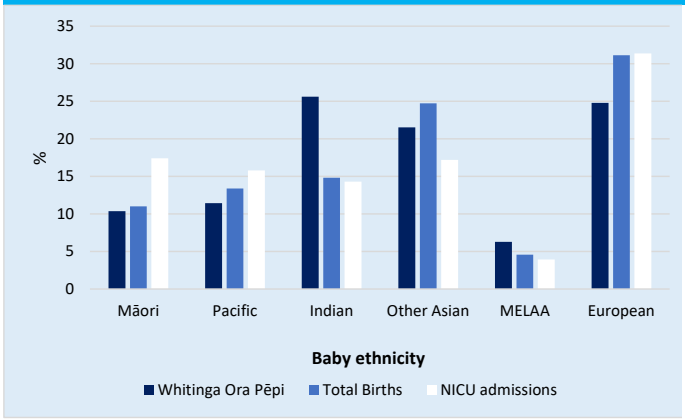
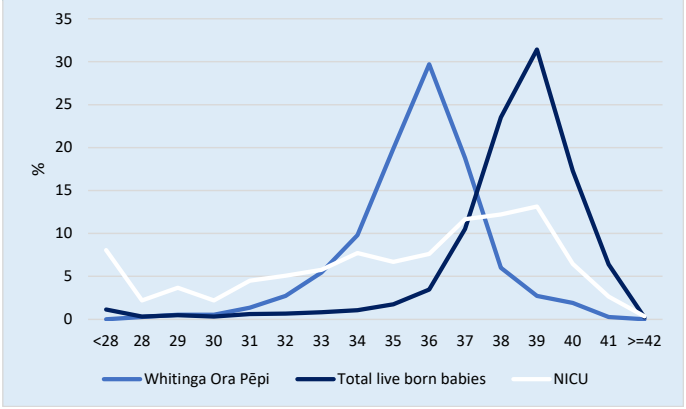


Figure 3.2 Admissions to Whitinga Ora Pēpi, NICU, and live born pēpi at Auckland Hospital by gestation at birth 2023



is the number of young/teen parents (73) engaging with the Service mainly via opportunistic education.

The Programme will continue to focus on reaching and meaningfully engaging high priority population groups and to innovate to expand the reach of the programme.

Whānau are informed of where they can give birth. A booking letter is sent once registered.

3.4.6 Whitinga Ora Pēpi

Rebecca Clark

Whitinga Ora Pēpi is our Neonatal Transitional Care Unit at Te Toka Tumai; it is a collaboration between Starship's Neonatal Intensive Care Unit (NICU) and Women's Health.

Whitinga Ora Pēpi is an eight-bedded unit, located on Level 9, ward 96 which provides care to pēpi whose needs are higher than those of a typical newborn, whilst keeping whānau together. The unit allows for whānau being resident with pēpi and supports them to transition home in a safe and confident way. A whānau-centred model of care underpins the unit, focusing on supporting and empowering whānau to be the primary care providers for their pēpi, with the support of a specialist team. Our admission criteria includes: pēpi who are born late pre-term or small for gestational age, NICU graduates who are requiring ongoing feeding support and pēpi who are readmitted from the community for treatment such as phototherapy.

Throughout 2023, 331 māmās and 367 pēpi stayed in Whitinga Ora Pēpi. The median length of stay in the unit was 6 days (range 0-27 days). The majority of our admissions included pēpi born between 35-38 weeks' gestation, however admissions to the unit included pēpi with gestation at birth varying from 28- 41 weeks.

Indian and Asian whānau are over represented for admission to Whitinga Ora Pēpi while Māori, Pacifica and European whānau are under represented. Work reviewing our under represented whānau needs to be carried out to ensure we are providing for their needs and limit any potential barriers with accessing Whitinga Ora Pēpi.

At discharge 51% of pēpi are breastfeeding (exclusive & fully) with a further 29% partial breastfeeding. A significant portion of breastfeeding data is missing and improving our data collection in Whitinga Ora Pēpi is a key focus. We acknowledge our breastfeeding rates need to be higher and have therefore established working groups and quality improvement projects involving the Neonatal Intensive Care Unit (NICU) and Maternity departments. Our main focus is to enhance our Key Performance Indicators (KPIs), and includes increasing the breastfeeding rate, streamlining discharge processes to reduce the length of stay, and improving women's satisfaction by creating a more unified approach between maternity nurses and NICU nurses under the leadership and supervision of a stronger team of Midwife Specialists.

3.4.7 LARC

Dr Helen Roberts

The LARC (long acting reversible contraceptives) project is a NMMG priority. LARCs are the most effective contraceptive method with potential to decrease unintended pregnancy. We provided the first report in 2020 and this, the third LARC report, is for the year 2023.

Discussing and offering contraception in the antenatal and postnatal period

One of the first tasks of the LARC project was to write the Contraception after Delivery Guideline and this was published on the hospital website in 2018. One of the key principles of the guideline is that staff involved with the care of women in pregnancy should provide the opportunity to discuss contraception in the antenatal period and document the woman's decision to enable provision of preferred method before leaving the hospital.

23% of women in 2023 who had as their LMC a hospital midwife had an antenatal discussion documented regarding contraception. This is higher than the previous year (17%). Of these, 0.6% left the hospital after birth with an IUD, 3.1% had a Jadelle implant, and a pill was prescribed for 0.4%. For those women who had a Caesarean section, 0.6% had a tubal ligation at the time. For women coming through the high

Figure 3.3 Number of LARC Insertions by clinic 2020–2023

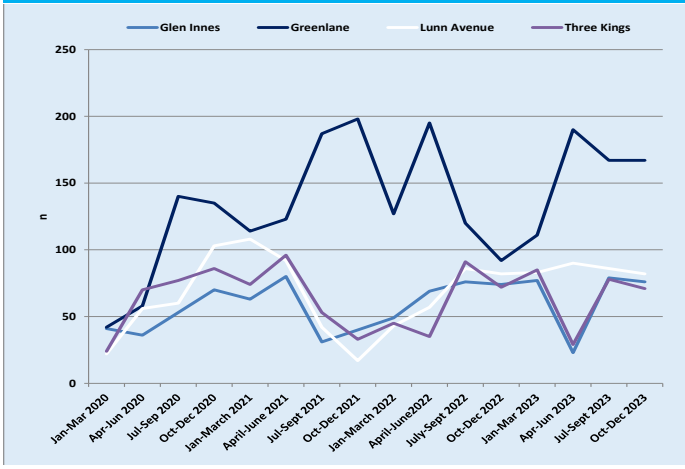
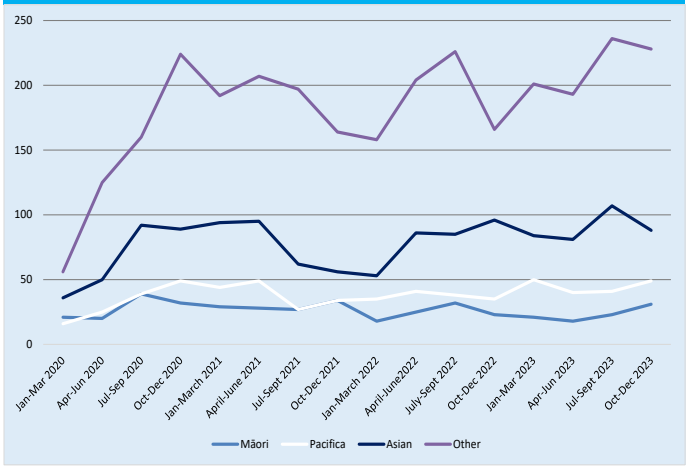


Figure 3.4 Number of LARC Insertions by ethnicity 2020–2023



risk medical clinic, 9.1% had an antenatal discussion documented, 2.3% left with an IUD, 5.7% with a Jadelle implant, 1.1% with a prescription for the pill, and 1.7% had a sterilisation. For those coming through the diabetic clinic, 9.1% had a discussion documented and 5.9% left the hospital with a Jadelle implant.

In addition some women are having an IUD inserted at the time of Caesarean section. At present these numbers are not reported from Badgernet.

Community clinics for the LARC project

The LARC pilot clinic began on 14 Feb 2019 based at Glen Innes Health Centre. The goal of this clinic was to provide free long acting reversible contraceptives (LARCs) to women living in the Tamaki area, specially targeting women below 25 years of age, and Māori and Pacific women. In addition to Glen Innes we now have clinics based at Lunn Avenue, Three Kings and Greenlane Clinical centre. These are led by clinicians trained in Jadelle and IUCD insertion and removal. The clinics are free for women. Greenlane clinic was open for one and a half days each week with an increase to two clinics for 4 months of the year. All other clinic locations run a full day clinic each week. The total number of LARC insertions at all the clinics in 2023 was 1,494, an increase of 180 from the previous year. Greenlane had 635 insertions, Glenn Innes 255, Lunn Ave 341 and Three Kings 263. The clinic and ethnic breakdown over time is shown in the figures attached.

GP and nurse LARC training through the Manatū Hauora funded Family Planning initiative

In addition to training Auckland hospital midwives and nurses, nine clinicians from the community have been trained in LARC insertion during 2023.

3.4.8 MEWS (Maternity Early Warning Score) charts

At Te Toka Tumai, the use of MEWS in BadgerNet was stopped in November 2022 due to staff not completing the total score and escalating appropriately. The service went back to using a paper based MEWS. In 2023, a plan was made to re- educate staff and to ensure BadgerNet was set up in a visual way so that staff did not overlook the total score and could see the escalation pathway. The plan is that in 2024 the service will return to using MEWS in Badgernet. Another issue for the service is that the BadgerNet system has not been implemented hospital wide, just within naternity services which causes issues when wāhine are transfered out of the maternity service. A separate MEWS chart was developed and implemented for women receiving postnatal care at Birthcare Auckland.

NOC (Newborn Observation Chart) and Newborn Early Warning Score (NEWS) is embedded in our service. We are doing regular audits to ensure pulse oximetry is performed on every pēpi.

3.4.9 Misoprostol

Raffaela Slight

Oral misoprostol Induction of labour for whānau at Te Toka Tumai was introduced in November 2022 and is now routine practice here at Te Toka Tumai for low risk induction of labour. Low risk wāhine are defined as post-dates, term PROM and GDM on metformin or diet at term with no underlying comorbidities.

It is the preferred method and given to approximately 60% of our inductions.

The introduction of misoprostol was implemented by a change process. Multiple feedback was given to us from whānau who were unhappy with their induction process. Therefore we decided that a change was needed. A group was formed with engagement from the obstetric, midwifery, pharmacy and business intelligence team who met regularly and had robust conversations regarding the guidelines and implementation. The group also looked at measurable outcomes from the administration of misoprostol. The three categories for auditing were : maternal morbidity, neonatal morbidity and effect on the service. These were not exhaustive and included admission to NICU, syntocininon augmentation and epidural usage, and time waiting in WAU.

Many of the districts in Aotearoa were already

using oral misoprostol as an induction method. We visited and spoke to other districts and used their guidelines as a base and adapted them to fit within Te Toka Tumai's practice. Decisions were made and misoprostol administration was added to the Induction of labour clinical guidelines. The Midwives in WAU were engaged as they would be the clinicians giving the misoprostol for induction of labour. The clinical coaches and educators were also involved in the roll out and support on the clinical floor to drive this initiative.

The next step in the misoprostol space is women's health pharmacists looking at a way of titrating misoprostol so that midwives are not having to mix and waste doses of the medication.

The Cochrane review of oral misoprostol (2014) concluded that compared with vaginal PGE2, oral misoprostol resulted in similar rates of vaginal birth within 24 hours and similar rates of Caesarean section (10 RCTs, 3240 women, moderate certainty). The systematic review of IOL with any PG (2015) concluded that the odds of Caesarean section were lowest for low-dose titrated oral misoprostol solution (280 RCTs of 48068 women).

Oral administration may have the added benefit of fewer vaginal examinations.

Misoprostol for use in cervical ripening for IOL can be regarded and used as a supported indication, as indicated by the National Maternity Monitoring Group (Ministry of Health).

3.4.10 Growth Assessment Protocol (GAP)

Hannah Kasper

GAP in Aotearoa

The Growth Assessment Protocol (GAP) is an international, award-winning program that aims to improve safety in maternity care and outcomes of pregnancy. GAP was developed to reduce the risk of stillbirth by identifying small for gestational age (SGA) pēpi and at-risk pregnancies. GAP uses customized growth charts to track fetal growth during pregnancy and has been shown to increase the rate of detection of pēpi with growth restriction.

GAP Champion role at Te Toka Tumai

The GAP Champion provides support regarding the Growth Assessment Protocol for maternity providers across the service. Additionally, the GAP Champion conducts a bi-annual review of missed SGA cases in their district each year. The anonymous review process is primarily an approach to review the wider hospital-based systems in place to increase the detection of SGA pēpi during pregnancy. It is an opportunity to learn what processes within the maternity system can be improved to help increase the identification of SGA pēpi and reduce the rate of stillbirth.

2023: SGA Rate and Gestation at Delivery, ADHB vs National Average

Audit Report 2023

In the audit report from January 2023 to June 2023, 32 cases were reviewed at random. In the audit report from July 2023 to December 2023, 30 cases were reviewed at random. Similar trends were seen in both reports.

Areas to highlight

- 60 out of 62 women (97%) had GROW charts created and used during their pregnancies.
- 58 out of 62 women (93.5%) had GROW charts with complete and accurate data. The incomplete or missing information on the other 4 charts was mostly due to previous births occurring overseas without available records for accurate birthweight or gestation.

Table 3.2: SGA/FGR Referral and Detection Rates, Auckland City Hospital (ACH) vs National Average

	ACH Quarter 1	ACH Quarter Q2	ACH Quarter Q3	ACH Quarter Q4	National Average Quarter Q1	National Average Quarter Q2	National Average Quarter Q3	National Average Quarter Q4
Antenatal referral for SGA (based on fundal height)	42.2%	43.7%	41.6%	43.1%	44.7%	45.8%	45.2%	44.3%
False positive antenatal referral for SGA	6.3%	7.0%	4.2%	3.8%	8.2%	8.3%	7.7%	8.1%
Antenatal detection of SGA	45.6%	43.7%	42.2%	41.6%	42.9%	43.1%	42.5%	40.1%
False positive antenatal detection of SGA	5.7%	6.8%	3.7%	3.1%	5.2%	5.6%	4.8%	5.0%
SGA at birth	13.6%	14.5%	13.5%	14.4%	14.3%	14.2%	14.2%	14.5%
Pēpi <10th delivered at/after 40+0	24.3%	19.4%	23.1%	25.4%	29.8%	28.4%	28.7%	30.8%
SGA at birth <3rd centile	4.1%	4.8%	4.8%	5.2%	4.6%	4.7%	5.2%	5.1%
Pēpi <3rd centile delivered at/after 38+0	51.3%	41.9%	53.7%	50.7%	60.6%	56.4%	60.6%	60.1%

Source: Perinatal Institute GROW App 1.5, 2023 Birthweight Centile Data

- 30 out of 37 women (81%) who had risk factors at the beginning of their pregnancies were identified and received serial growth scans.

Areas we can improve upon

- The issue that came up the most was an inadequate identification of growth problems (for example: not recognizing slowed growth of the fundal height by 30 centiles or more).
- Time from referral to scan is often greater than the recommended 3 days, which speaks to the gap in available resources for the wāhine we serve.

GAP training workshop

In 2023 there were 24 midwives in our district who completed the GAP training workshop:

- 17 core midwives
- 4 community midwives
- 3 LMC midwives

Our goal for 2024 is to increase the number of maternity providers who are up to date in their GAP training, especially as the new SGA guideline has come out. The new SGA guideline has many important changes, particularly new screening criteria for pregnancies at risk of fetal growth restriction (FGR) in which serial growth scans should be offered. These workshops occur most months and are completely remote. It's a great way to earn continuing education credits and we really encourage anyone who serves pregnant people to come along and add to their practice with the most up-to-date evidence and guidelines. Flyers with upcoming training dates can be found on the various maternity wards at Te Toka Tumai, or you can book directly at https://www.perinatal.org.uk/gap/booknz.

3.4.11 BSOTS: Birmingham Symptoms Specific Obstetric Triage System

Raffaela Slight

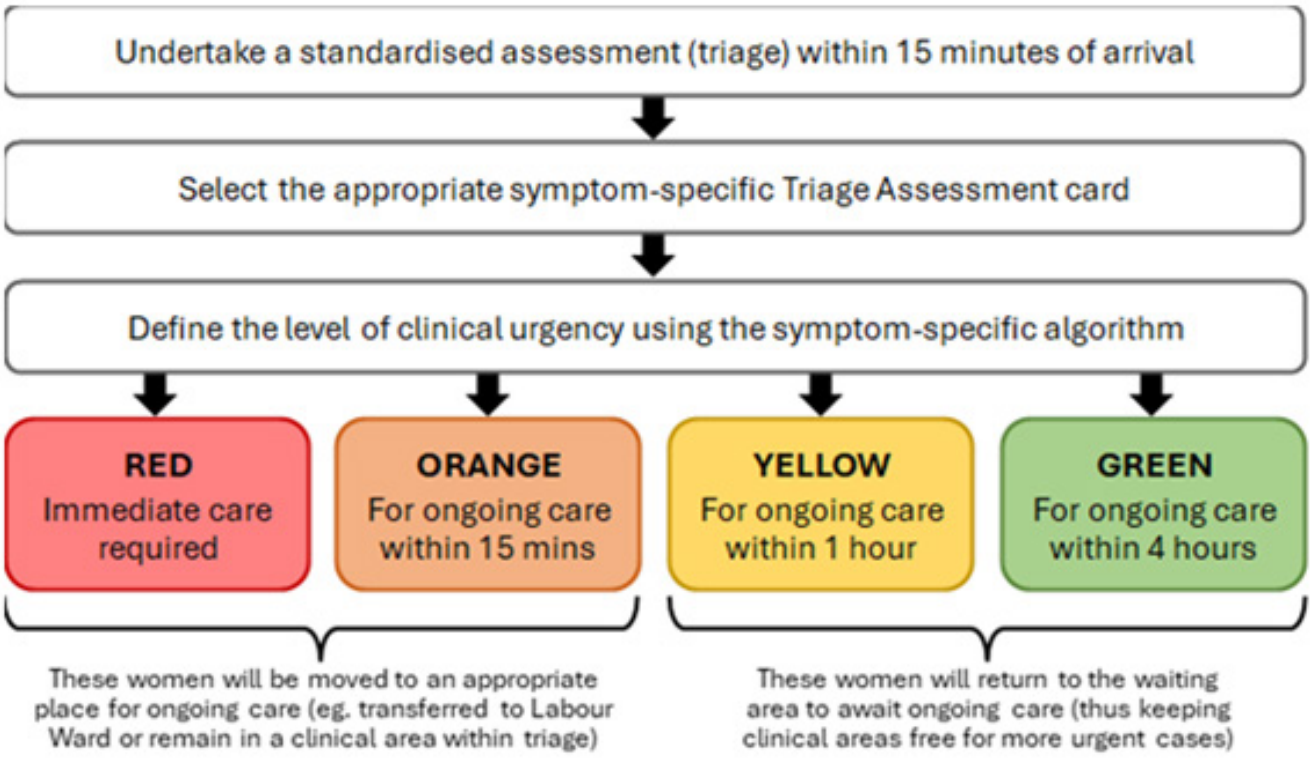
BSOTS is a standardised risk-assessment based maternity triage system developed in the NHS to improve the safety of māmā, pēpi, and the management of the department. It provides a structured evidence-based approach to triage which ensures women are seen according to their clinical need. It is easy to use, has a high inter-user reliability and is endorsed by the RCM and RCOG.

BSOTS has been implemented in 109 maternity units, mostly in the UK, but also 3 in Australia. Te Toka Tumai is the first hospital to introduce BSOTS in New Zealand. It has been adapted to the New Zealand Maternity System using our MEWS, policies and guidelines. It's implementation is one of several quality improvement initiatives in our Womens Assessment Unit to improve patient safety, experience for patients and staff, as well as addressing inequity and delays in access to urgent maternity care.

BSOTS aims to triage each wahine within 15 minutes of arrival. It includes 8 standardised algorithms for the most common presenting concerns in maternity setting:

- Abdominal pain
- Bleeding
- Hypertension
- Suspicion of Labour
- Rupture of membranes
- Reduced fetal movements
- Postnatal concerns
- Unwell or other

A designated triage midwife performs a brief and



prompt assessment which includes a minimum of a medical and obstetric history, a MEWS score, a fetal heart check. Other assessments such as a urine analysis, a pad check, a pubic symphysis- fundal uterine height, are part of the triage depending on the reason of presentation.

Following triage each wahine is allocated a clinical priority. BSOTS uses a traffic light system.

These defined targets are supported by a clear escalation pathway should the workload become heavy or there are delays in care.

BSOTS was launched in WAU on the 6th of November 2023. It is a significant change in midwifery practice as care is not provided by one midwife: wahine are triaged by one midwife and ongoing care and tasks provided by another.

There have been initial challenges in the implementation of BSOTS, particularly with limitations in bed space and a hybrid documentation system, both of which have since been resolved. Drs and midwives are working collaboratively to support a successful launch of BSOTS in Te Toka Tomai and outcome data will be available soon to highlight areas of improvement and those requiring further education and support.

3.4.12 Janm aur Parvarish: Co-design models of care to meet the needs of Indian women

This year we wanted to look at co-design models of care to meet the needs of Indian women, including improving access and outcomes for Indian families. We started out with good intentions engaging with colleagues collaboratively within the region. This unfortunately did not go ahead with people's roles being disestablished or relocated. Our budget also had diminished and we no longer could fund this project going forward.

What we did find was Janm aur Parvarish. Janm aur Parvarish birth and parenting information provides free sessions for Indian women. We are grateful to Counties Manukau and Te Rito Ora who opened up their zoom sessions nationally for all Indian women to attend. Sessions include nutrition and physical activity through pregnancy, breastfeeding, labour and birthing, immunisation, safe sleep, bathing pēpi, early childhood bonding, development and parenting.

3.4.13 Badger Notes

Rose-Marie Vos

Badger Notes is an app which consumers can download on their phone or computer to access a snapshot of their clinical records.

The Badger Notes application went live at Te Toka Tumai in 2023. Wāhine can register and use the app on their devices to view GROW chart, educational material, weekly pregnancy diary, and some clinical reports. Badger Notes use was steady throughout the year, with highest number of registrations occurring in August and September. In 2023, 0.4-3.1% of wāhine who booked at Te Toka Tumai registered to use Badger Notes.

To register, once the Badger Notes app has been downloaded on to the consumer's device, they will receive an activation phrase from their midwife. The midwife will require the consumers email address and mobile number before being able to give the consumer their activation phrase.

Although Badger Notes is not currently being used widely, the MCIS team have provided information and teaching to clinical staff.

Resources on how to set up and use Badger Notes are readily available on the Sharepoint site and on the Te Toka Tumai intranet Women's Health BadgerNet page.

MCIS team plan on re-promoting the use of Badger Notes with clinical staff in the second half of 2024. Banners will be displayed in Level 9 at Grafton and in Greenlane Clinical Center – this will increase visibility for wāhine. Support will be given to clinicians as they increase expertise and confidence in setting it up. Badger Notes continues to be promoted within our service, so it is available to all users.

3.4.14 Preterm birth prevention initiatives

Lisa Dawes

The Carosika Collaborative

The Carosika Collaborative, Taonga Tuku Iho is a national transdisciplinary group including healthcare professionals and whānau with lived experience of preterm birth. The Collaborative works across the pregnancy sector to improve the care and outcomes for preterm birth throughout Aotearoa with a specific focus on equity for all whānau. It was established in 2020 following a national stakeholder hui of the Aotearoa maternal and perinatal health community in 2019. The hui came together in a response to the lack of action following multiple calls from the Perinatal and Maternal Mortality Review Committee and the National Maternity Monitoring Group to address preterm birth and the need for cultural responsiveness in maternity care, improved equity of access and equity in outcomes.

The Carosika Collaborative is named after the eldest daughter of Tina Allen-Mokaraka and Tasi Wilson. Carosika was born unexpectedly early in August 2014 at 23+6 weeks gestation. She passed away shortly after birth. Tina, Tasi and their whānau have been involved with the Collaborative since its inception. As a young Māori Mum and Pacific Dad, Tina and Tasi's perspective is vital. They generously gifted Carosika's name to the Collaborative, alongside 'Taonga Tuku Iho' as the precious legacy of Carosika and all other pēpi who are born too early.

The Carosika Collaborative's purpose is to co-ordinate initiatives and champion change that leads to a reduction in preterm birth, improved preparation for preterm birth and equitable outcomes for all pēpi that are born preterm in Aotearoa. Activities aim to reduce spontaneous and provider-initiated preterm birth, as well as improve preparation for preterm birth to optimise outcomes.

Tasi Wilson and Tina Allen-Mokaraka

The Collaborative works through advocacy and engagement, education and promotion, embedded research opportunities and measuring impact.

Taonga Tuku Iho – Knowledge Translation for Equity

The first large piece of mahi supported by the Collaborative was Taonga Tuku Iho, Knowledge Translation for Equity in Preterm Birth Care and Outcomes in Aotearoa, a Health Research Council/Manatū Hauora funded project which concluded this year. It encompassed three main areas:

- Development of Taonga Tuku Iho, a best practice guide on the care of wāhine/people and pēpi at risk of preterm birth in Aotearoa using currently available clinical practice guidelines and evidence to create a single point of reference for healthcare professionals and maternity service providers, along with tools and resources to support its use.
- Understanding the enablers and barriers to preterm birth care in Aotearoa.
- Development of the 15-point Carosika Core Outcome Set and the Carosika Metrics – a real-time digital dashboard to present national data on preterm birth outcomes and core process measures. These measures will enable assessment of impact of the best practice guide and continuous practice improvement.

Taonga Tuku Iho (the best practice guide) and the tools and resources to support its use will be housed on the Carosika Collaborative website. The website will be active from mid-late 2024 and when launched will include the first major section 'Preparing for preterm birth when it is anticipated or planned'. Further sections will be sequentially added in late 2024.

National Women's Health Preterm Birth Service

The National Women's Preterm Birth Service is led by the Maternal Fetal Medicine Service predominantly through the Preterm Birth Clinic, which was established at Te Toka Tumai in 2013. This service continues to see an increasing number of high-risk wāhine/people who are booked to birth at Te Toka Tumai, and provides tertiary/quaternary care for very high-risk whānau nationally.

Preterm Birth Clinic Referral Criteria include:

- Previous spontaneous preterm birth/PPROM <36+0 weeks.
- Previous spontaneous miscarriage ≥16+0 weeks.
- Previous pregnancy requiring ultrasound-indicated or rescue cerclage (without preterm birth).
- History of LLETZ ≥10mm depth of excision or >1 procedure (since last term birth if multiparous).
- History of cone biopsy or trachelectomy (since last term birth if multiparous).
- Congenital uterine and/or cervical anomaly.
- Short cervix in current pregnancy ≤25mm at ≤24+6 weeks.
- Rescue cerclage in current pregnancy.
- Previous Caesarean section at full cervical dilatation (in most recent pregnancy reaching >16 weeks).
- Other risk factors e.g. ≥2 uterine instrumentations (STOP, ERPOC), connective tissue disorders.

  * People with multiple gestation (twins or higher order) as their only risk factor are not eligible. However, those with multiples and other referral criteria are eligible and should be referred.

The Preterm Birth Service team includes four preterm birth specialists, two fellows, fetal medicine midwives and a health care assistant. There are at least five half-day clinics run per fortnight. In 2023 there were 257 new patients seen within the clinic (excluding pre-pregnancy reviews), an increase from 190 in 2022 and 170 in 2021. There were 697 follow-up reviews in 2023, 587 in 2022 and 618 in 2021. The reduction in follow-up reviews between 2022 and 2023 is likely due to change in practice, whereby wāhine/people with different risk factors were stratified into moderate and high risk pathways, individualising frequency of cervical surveillance. The aim is to see all wāhine/people for first review at 10-12 weeks for risk assessment and counselling. Risk modification, cervical surveillance and treatment with cervical cerclage and progesterone are considered with care co-ordinated with each LMC. Those identified to be at moderate risk are then typically seen for follow-up at 16, 20 and 23 weeks, and those at high risk are seen fortnightly from 16 to 24 weeks. For those at highest risk, prepregnancy consultation and care are offered.

Further information is available at: https://www.nationalwomenshealth.adhb.govt.nz/assets/Womens-health/Documents/Policies-and-guidelines/PTB-Clinic-Overview-and-Referral-Guidelines_ACH_Aug2022.pdf.

Carosika Community of Practice

A key recommendation from Taonga Tuku Iho is for all hospitals providing secondary level pregnancy

care or above to have a Preterm Birth Clinic or Advisor, to improve equity in access to specialist care, regardless of region of residence. Currently there are a limited number of preterm birth clinics in Aotearoa and within these there is significant variation in who is offered care and what care is provided, and many hospitals have no specific service. The Carosika Community of Practice study has recently commenced, led by two Te Toka Tumai preterm birth specialists. This quality improvement project aims to educate, enable and empower lead obstetricians and midwives throughout Aotearoa to improve high-risk spontaneous preterm birth services nationally. The 12-month programme includes education, practical resources and support for establishing a Preterm Birth Clinic or Advisor, and an active network for timely expert advice and peer support.

There is an urgent and ongoing need for innovative strategies to enable evidence-based preterm birth care to be delivered in an equitable, culturally responsive and resource-efficient way for all in Aotearoa. The Carosika Collaborative is well-placed to lead this mahi and appreciates ongoing support from Te Toka Tumai.

3.4.15 Aronui Ora

Rachel Hunter

"Aronui Ora" means to keep wellness in the forefornt of your thinking and intent. Aronui Ora is a specialist adult mental health service, providing antenatal (before birth) and post-natal (after birth) mental health care during pregnancy and early parenthood (first 12 months of an infant's life).

Aronui Ora is actively improving access to their services. Although self referrals are not accepted, referrals are received from General Practitioners (GP), and involved health professionals in consultation with the person's GP. They are now open to receiving referrals from partners and other parents/caregivers of a child where clinically indicated. Health practitioners and Midwives can now refer via the regional clinical portal to improve accessibility.

Aronui Ora uses the Health of the Nation Outcome Scales (HoNOS) which is a clinician rated tool developed by the United Kingdom Royal College of Psychiatrist's Research Unit to measure change in the health and social functioning of people experiencing severe mental illness.

Out of nineteen referrals sent from midwives last year, thirteen showed significant improvement, five showed no change, and one showed significant deterioration.

Aronui Ora is completing a 5 year project to make services more trans-inclusive and rainbow friendly, as well as implementing an equity plan to promote engagement from our Māori whai ora.

3.5 Lactation and Breastfeeding Service

3.5.1 Lactation and Breastfeeding Service

Tracey Senior, Natalya Harris

Lactation and Breastfeeding Service

The Lactation Consultant Service provides expert lactation support for staff and whānau experiencing complex breastfeeding problems in the postnatal wards, CDU/ED, general wards, as well as ICU and the community. The Pēpi-Friendly Hospital Initiative (BFHI) Coordinator facilitates the initial and ongoing BFHI education for all maternity staff, coordinating the BFHI quality initiative and audit process, and reporting breastfeeding rates monthly to New Zealand Breastfeeding Alliance (NZBA).

The Ten Steps to Successful Breastfeeding BFHI was launched in 1991 by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in response to the 1990 Innocenti Declaration on the promotion, protection and support of breastfeeding and aims to provide health facilities with a framework for addressing practices which have a negative impact on breastfeeding. BFHI is a key outcome highlighted in the National Breastfeeding Strategy Rautaki Whakamāma Whāngote. As a BFHI Accredited Hospital, we must uphold the International Code of Marketing Breastmilk Substitutes, successfully implement The Ten Steps to Successful Breastfeeding, demonstrate an exclusive breastfeeding rate of 75% or more for whānau at discharge, and meet the criteria for the remaining nine steps to retain BFHI accreditation. The strategy acknowledges that improving breastfeeding rates will help reduce Māori inequalities (outcome 1). Māori have been understood, as indicated in policy documents, as having the right to determine Māori focused breastfeeding interventions—a right under Te Tiriti o Waitangi.

New Zealand Breastfeeding Alliance awarded NWH a limited accreditation pathway in 2022, valid for 3 years, as we met all criteria/standards except for Step Six because our exclusive breastfeeding rate at discharge was below 75%. Unfortunately, our exclusive rates at discharge from 2022 and 2023 have kept trending downwards despite our best efforts. Decreasing breastfeeding exclusive rates are common this year in tertiary units around Aotearoa without a human donor milk bank. Our strategies to enhance rates included staff recruitment, BFHI education, and implementing rigorous monitoring of formula use, by changing the formula consent form to include two staff signatures and initiating a register. When whānau ask for formula that is not clinically indicated, we have encouraged staff to seek support from their senior leaders. Assessment and audit for BFHI Accreditation is due again in March 2025, and we will commence auditing whānau in September 2024 by way of an online questionnaire, in preparation for the in-person audit in 2025.

The Lactation Consultant (LC) team

The model of care for the lactation service includes staff seeking guidance and support from the clinical midwife specialist before referral to the lactation service. The Lactation Service FTE was reduced by 0.6 FTE in 2023, leaving 2.2 FTE to run the service. Each day we have one or two lactation consultants working supporting whānau and staff, some of whom are on the bureau. We have lactation consultant cover on one day at the weekend. Our BFHI Coordinator has 0.2 to 0.5 FTE (depending on the service acuity and annual leave) to coordinate BFHI. We are hoping to recruit to our vacant 0.2FTE administrative support role. We run a frenotomy breastfeeding clinic once a week and have started a small screened human donor milk bank.

The Community Lactation Service are a small team of 1.8 FTE and half of the team was provided from lactation consultant bureau staff in 2023. The community team provide support to whānau for only the first 6 weeks unlike other localities who have funding to continue support into the first year. Whānau require timely access to the support they need to continue to breastfeed regardless of the age of their pēpi.

NWH staff and LMCs need to work towards ensuring all whānau birthing at Te Toka Tumai have had breastfeeding education in line with the 10 Steps - Step 3: Antenatal Education - Discuss the importance and management of breastfeeding with pregnant women and their whānau.

Antenatal breastfeeding classes for whānau (introduced July 2020) are still extremely popular and fully booked. The service also provides free Antenatal classes where breastfeeding education is also covered.

Breastfeeding/Frenotomy clinic at Te Toka Tumai Grafton site

Our frenotomy breastfeeding clinic continues in 2023 on a Thursday morning on the Auckland Hospital site. This service was established February 2022. Lactation Consultant/Midwives, who have been trained with support from neonatologists from Starship NICU, perform frenotomies and offer breastfeeding support. We have three lactation consultants/midwives trained to perform simple frenotomy. This service in 2023 provided appointments for assessment for 171 dyads and performed 149 frenotomies. The service with an equity lens now accepts referrals with a completed referral form and TABBY assessment from any LMC or Lactation Consultant. This has increased the number of referrals, as initially we only accepted referrals from lactation consultants. We are still working on strengthening referral pathways to Starship ENT for infants over 6 weeks when frenotomy is required and they are outside of midwifery scope of practice.

To conclude, we need to continue to aim high to increase our exclusive breastfeeding rates and to continue to work together to implement "The 10 Steps to Successful Breastfeeding" and uphold "THE CODE" to the highest standards as the evidence-based way to increase breastfeeding rates for all whānau.

3.5.2 Infant Feeding

The feeding status of infants born at Te Toka Tumai is collected at the time of discharge from the hospital. This occurs either immediately postpartum, upon leaving the Labour and Birthing Suite, or following a postnatal stay. Excluded from this dataset are pēpi admitted to and discharged from the Neonatal Intensive Care Unit, as well as infants on postnatal wards under 37 weeks gestation or below the 10th or above the 95th birthweight customised centile. Infant feeding data for NICU pēpi is in Chapter 9. Additionally, infant feeding data is gathered at postnatal discharge to well child providers at 4-6 weeks post-birth for whānau under the postnatal care of NWH Community or High-Risk Midwifery Teams. The following Manatū Hauora breastfeeding definitions are used in this section.

Exclusive breastfeeding: The infant has never, to the māmā's knowledge, had any water, formula or other liquid or solid food. Only breast milk, from the breast or expressed, and prescribed (as per Medicines Act 1981) medicines have been given from birth.

Fully breastfeeding: The infant has taken breast milk only, no other liquids or solids except a minimal amount of water or prescribed medicines, in the past 48 hours.

Partial breastfeeding: The infant has taken some breast milk and some infant formula or other solid food in the past 48 hours.

Artificial feeding: The infant has had no breast milk but has had alternative liquid such as infant formula with or without solid food in the past 48 hours.

Not fed yet: The infant is unable to feed or has left the facility immediately after birth and has not fed at time of discharge.

Exclusive Breastfeeding Rates

In 2023 our exclusive breastfeeding rate on discharge was 72.9%. Pēpi Friendly Aotearoa reports that national exclusive breastfeeding rates for 2023 have also decreased slightly to 77.1%. Nationally, exclusive breastfeeding rates for tertiary services have also decreased from 72.4% in 2022 to 69.9% in 2023. Māori whānau breastfeeding exclusive rates nationally have decreased to 80.8%. Indian and Asian whānau continue to have the lowest exclusive breastfeeding rates. Māori and Pacific infants nationally continue to have the highest rates of formula feeding at 5.1% and 5.6%, and this is reflected in our own statistics in 2023.

For NWH exclusive breastfeeding rates for 2023 also vary by ethnic grouping. Asian parents' exclusive rates have continued to decrease from 68.6% to 64.7% and Indian parents' exclusive rates dropped to 60.8% from 65.0%. Exclusive rates for European parents have increased to 83.7% from 79.6%. Māori and Pacific rates are unchanged in the past year.

Challenges and Strategies

NZBA have acknowledged a number of contributing factors to declining exclusive rates in NZ over the last few years, including an ongoing midwifery staffing shortage, lingering impacts of COVID 19, high Caesarean rates, as well as increasing co-morbidities of birthing whānau.

To combat the midwifery staffing shortages in 2023, we employed thirty-four overseas registered nurses to work on our postnatal wards, and eighteen new (mostly new graduate) midwives across the service. Most of these staff were not experienced midwives which may impact our breastfeeding rates.

Exclusive breastfeeding rates after spontaneous vaginal birth were 83% in 2023 compared to 64.9% after elective Caesarean and 59.8% after emergency Caesarean. We must protect, promote, and implement early breastfeeding and uninterrupted skin-to-skin for these groups negatively impacted by mode of birth.

Human donor milk bank

National Breastfeeding Strategy Outcome 5: System settings support the safe provision of donor breast milk for infants in need.

Health New Zealand/Te Whatu Ora are not funding donor milk banking at this time. National conversations and meetings continue on the subject of a national donor human milk bank facilitated by the National Blood Service and in the meantime other localities have established pasteurised human donor milk banks funded with donations and via private fundraising.

Human donor milk is the gold standard for supplementation after māmā's own milk and would reduce infant formula use and increase exclusive breastfeeding rates for infants who have clinical indications for supplementation. Te Toka Tumai's Neonatal Unit provides screened unpasteurised donor milk for very preterm infants when CMV negative milk is donated and is available. Late in 2023 NWH started a screened human unpasteurised donor milk bank (HDMB) for our service with small amounts of screened milk available. NWH HDMB is in its infancy and any donated milk is being utilised to increase our exclusive rates. We are very dependent on "CMV Negative" milk donations and these are difficult to obtain.

Figure 3.5 Method of infant feeding at discharge from NWH 2005-2023

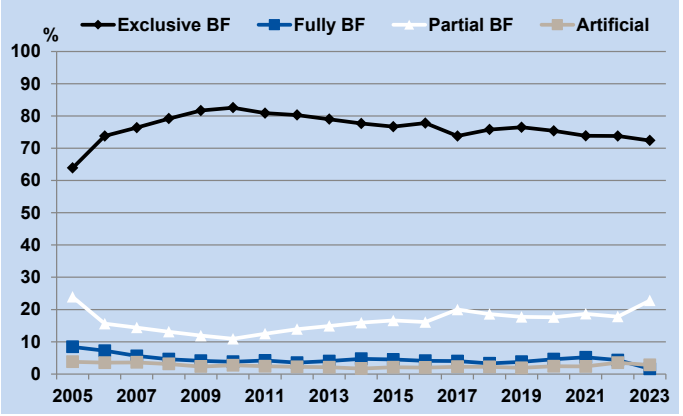
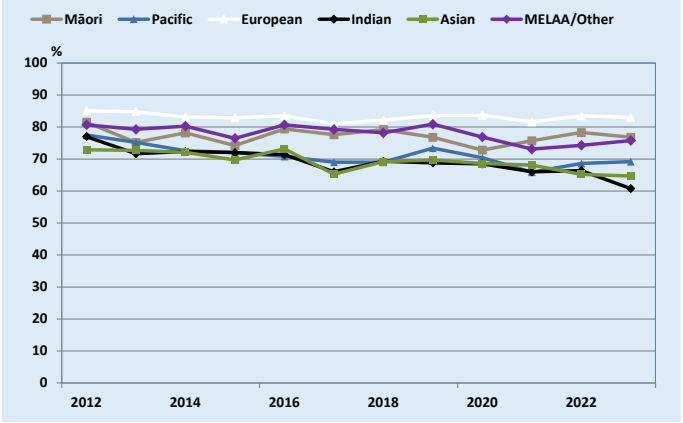


Figure 3.6 Exclusive breastfeeding by ethnicity 2012-2023



3.5.1 Data tables: Infant Feeding

Table 3.3 Method of infant feeding at discharge from NWH 2019–2023

	2019		2020		2021		2022		2023	
	N=5913		N=5531		N= 5385		N= 4512		n= 3946	
	n	%	n	%	n	%	n	%	n	%
Exclusive breastfeeding	4523	76.5	4172	75.4	3978	73.9	3331	73.8	2855	72.4
Fully breastfeeding	227	3.8	255	4.6	278	5.2	195	4.3	65	1.6
Partial breastfeeding	1048	17.7	972	17.6	1004	18.6	804	17.9	899	22.8
Artificial feeding	115	1.9	132	2.4	125	2.3	160	3.5	112	2.8

Table 3.4 Infant feeding on discharge from NWH by mode of birth, LMC, maternal age NWH 2023

	Total	Exclusive BF		Fully BF		Partial BF		Artificial	
	N	n	%	n	%	n	%	n	%
Maternal Age									
≤20	77	58	75.3	1	1.3	16	20.8	2	2.6

21-25	275	205	74.5	3	1.1	51	18.5	13	4.7
26-30	850	612	72.0	13	1.5	195	22.9	27	3.2
31-35	1690	1267	75.0	31	1.8	353	20.9	34	2.0
36-40	890	605	68.0	14	1.6	237	26.6	30	3.4
>40	164	108	65.9	3	1.8	47	28.7	6	3.7
Ethnicity									
Māori	297	228	76.8	2	0.7	49	16.5	16	5.4
Pacific	497	344	69.2	9	1.8	117	23.5	24	4.8
Indian	577	351	60.8	15	2.6	196	34.0	14	2.4
Other Asian	1050	679	64.7	10	1.0	327	31.1	31	3.0
MELAA	178	135	75.8	3	1.7	38	21.3	2	1.1
Other European	398	324	81.4	7	1.8	61	15.3	6	1.5
NZ European	949	794	83.7	19	2.0	111	11.7	19	2.0
Quintile									
1	722	549	76.0	14	1.9	142	19.7	15	2.1
2	809	596	73.7	10	1.2	183	22.6	18	2.2
3	811	585	72.1	12	1.5	181	22.3	28	3.5
4	685	493	72.0	18	2.6	158	23.1	13	1.9
5	918	631	68.7	11	1.2	235	25.6	38	4.1
Missing	1	1	100.0	0	0.0	0	0.0	0	0.0
Primipara									
Standard	730	553	75.8	14	1.9	145	19.9	16	2.2
Non standard	1176	765	65.1	21	1.8	358	30.4	26	2.2
Multipara	2040	1537	75.3	30	1.5	396	19.4	70	3.4
Mode of Birth									
Spontaneous vaginal	1775	1474	83.0	14	0.8	231	13.0	45	2.5
Operative vaginal	515	358	69.5	15	2.9	128	24.9	13	2.5
Elective CS	649	421	64.9	17	2.6	183	28.2	27	4.2
Emergency CS	1007	602	59.8	19	1.9	357	35.5	27	2.7
Birth weight									
<2.5kgs	6	2	33.3	1	16.7	3	50.0	0	0.0
2.5-2.9kgs	478	305	63.8	14	2.9	147	30.8	10	2.1
3.0-4.4kgs	3455	2542	73.6	50	1.4	748	21.6	102	3.0
≥4.5kgs	7	6	85.7	0	0.0	1	14.3	0	0.0
LMC at birth									
IMW	1918	1402	73.1	31	1.6	431	22.5	51	2.7
Private Obstetrician	1190	910	76.5	15	1.3	233	19.6	27	2.3
Hospital midwifery	718	493	68.7	12	1.7	180	25.1	27	3.8
NW Diabetes	51	14	27.5	4	7.8	33	64.7	0	0.0
NW Medical	63	33	52.4	3	4.8	20	31.7	6	9.5
Unbooked	6	3	50.0	0	0.0	2	33.3	1	16.7

Include live born pēpi with birth weight centile between 10 and 95 (inclusive), gestation between 37.0 weeks and 41.6 weeks, excluding admissions to NICU and Starship

3.6 Newborn Metabolic Screening

There is an ongoing program of work to ensure that all pēpi have their newborn metabolic screen within 48 hrs of birth. This project has been in place since 2015 and Te Toka Tumai are one of only a few

hospitals in Aotearoa who have this program well embedded in their work.

In 2022, the National Screening Unit reduced the eligible time of screening from 48 hours to 24 hours, therefore more pēpi are having their screening completed at the place of birth leading to a reduction in missed newborn metabolic screenings. There is a dedicated team within Women's Health Intelligence who continue to run this quality process to ensure that all pēpi have a newborn metabolic screen. In 2023, no pēpi missed their newborn metabolic screening.

3.7 Adverse Events

Adverse events are events with negative reactions or results that are unintended, unexpected, or unplanned, as defined by the Health Quality and Safety Commission (HQSC). In practice, this is most often understood as an event which results in harm or has the potential to result in harm to a consumer.

A review is undertaken following an adverse event related to a patient of Te Toka Tumai, and is part of Te Whatu Ora's ongoing commitment to improve and protect the health and safety of patients and the public. The principles of Just Culture are applied when conducting reviews. Both Te Whatu Ora as an organisation and its people are held accountable while focusing on risk, systems design, human behaviour, and patient safety. Patients, family and whānau are now actively engaged in major incident reviews, demonstrating a commitment to transparency and open dialogue.

Adverse events are rated with a Severity Assessment Score. The SAC score (1 = most severe) is a numerical rating which defines the severity of an adverse event, and as a consequence, the required level of reporting and review to be undertaken for the event.

The Women's Health Service conducted reviews of SAC 3 and 4 events, and select SAC 1 and 2 events, using rapid multidisciplinary panels for the services within the directorate. The remainder of the SAC 1 and 2 event reviews were led by the Clinical Quality and Safety Service with a focus on the systems and processes of healthcare. Increasing focus is being placed on refining review processes and continued implementation of recommendations.

Complaints

The complaints to Women's Health Services are reviewed weekly by the senior directorate leadership team to enable timely and effective coordination and management. In 2023 there were 83 complaints, including 7 complaints to the Health and Disability Commissioner. The three top areas for complaints were "quality of care", "coordination of care" and "communication" in 2023.

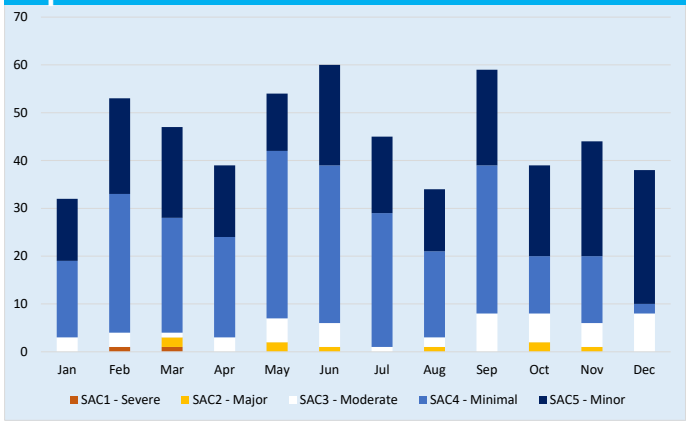
Compliments

In 2023 there were 30 compliments. The three top areas for compliments were "quality of care", "coordination of care", "respect" and "Whānau as Partners in Care" in 2023.

3.7.1 Perinatal Mortality Review

The NWH Perinatal Mortality meetings are held monthly, are multidisciplinary, and are regarded as valuable educational opportunities due to the open discussion following each case. Time does not allow for discussion of all cases of perinatal mortality, however, those discussed are chosen for educational or special interest. From these meetings, educational points raised are circulated to the wider Women's Health community. A summary of the educational points from the 2023 meetings can be found in section 9.2.

Figure 3.7 SAC Scoring and Patient Incidents Reported Across NWH Services 2023



3.7.2 Rapid Multidisciplinary Panel Review Process (RaMP)

Jose Espineira Iglesias

RaMP is a process for reviewing events within maternity services efficiently and effectively, using a multidisciplinary lens. The main aim is to identify where systems in place were sub-optimal impacting on the care of the women in our maternity service. RaMP findings contribute to quality improvement and patient safety.

The RaMP is chaired by a midwife and obstetrician alongside the disciplines of anaesthetics, neonatology, obstetric medicine, Lead Maternity Care (LMC) midwives and quality. There were 16 reviews held in 2023. The most common reason for review was hypoxic ischaemic encephalopathy (HIE) but, particularly in the second half of 2023, there was an increased number of RAMP reviews linked to maternal morbidity.

3.7.3 Gynaecology Mortality and Morbidity Review (GMMR)

Dr Saman Moeed

Gynaecology Morbidity and Mortality Review (GMMR)

is a monthly meeting, involving representatives from gynaecology, gynae oncology, nursing and anaesthesia. Adverse outcomes are reviewed using a Just Culture approach, to support best clinical practice and inform quality improvement. Cases for review are identified from Datix reporting and ward readmissions. Responsible clinicians prepare a case summary and this is reviewed by a peer, with the case presented at GMMR, to which all clinicians are invited. Severity of complications is graded according to the Clavien-Dindo classification (Dindo D, Demartines N, Clavien PA. 2004. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survery. Annals of Surgery 240:205-213). Contributory factors and whether or not the adverse outcome was potentially avoidable are discussed and documented. Cases with relevant learning points are presented twice a year at Aspiring To Excellence.

In 2023, 10 meetings were held, and a total of 31 cases were discussed, the majority of which were not avoidable.

Common themes identified were:

- Postoperative bleeding.
- Delayed recognition of sepsis.
- Lack of or suboptimal communication between services.

3.8 Investing in the Workforce

3.8.1 National workforce strategy plan

Ngātahitanga Pulse Survey was open for 19 days from 24th Nov – 12 Dec 2022.

Ngātahitanga describes the values and principles which foster a 'team of teams' culture. The survey's goal of listening to the voices of our people helps shape meaningful improvements for our kaimahi, communities, patients and whānau, kia ngātahi te haere (unified journey).

A pulse survey is a shorter number of questions done more frequently. It captures the nature of our work and time pressures on our people and is easy and quick to complete.

Themes from the Pulse Survey include:

- Employee experience: Training and development, reward and recognition, communication, and a positive and inclusive workplace.
- Resources: People, facilities and having time to do our jobs well.
- Leadership: Leaders not feeling equipped to do their jobs, managing change, decision-making and open and transparent communications.
- Operational processes and systems: To collaborate and help management to be more efficient and cost effective.
- Healthcare services: Putting patients first and providing a level of care we can all be proud of.

3.8.2 Safe staffing

Strategies that have been implemented to ensure safe staffing.

The model of care that we have adopted at Te Toka Tumai has been developed due to the Midwifery workforce shortage. A new model of care was introduced. The model of care is for a Midwife Specialist to be working at each pod/area providing midwifery oversight and support and guidance to the nursing staff in that Pod. Care plans are updated to ensure cultural and clinical safe discharge to home or Birthcare is achieved.

The model of care also has a Clinical Midwife Manager who has an overall view of the ward and the services.

Care Capacity Demand Management Programme

Te Toka Tumai is committed to the Care Capacity Demand Management programme (CCDM). This is a national programme. It is about having the right people, in the right place, at the right time to deliver the right care. The programme has three components, FTE calculation, Variance Response Management (VRM) and Core Data Set. These components are underpinned by TrendCare, governance and partnership between health unions and the district. The CCDM Executive Council has senior nurses, midwives, other senior leaders and health union representation in its quorum.

Retention Pay for New Graduates

The Northern region was once again approved to have a retention payment for new graduate midwives. This payment recognises the four year degree course and acknowledges the on call component of this training with limitation of earning potential during this time. The national shortages of the midwifery profession is also part of this retention payment.

Māori representation and joint decision making, on maternity committees and working groups

We have a Māori health lead position that is 0.5 (20 hrs a week) and Associate Director of Midwifery (ADOM), Māori Health and Equity 0.7 (28 hrs a week). Both are members of He Ara Whiria (HAW).

All policies/ business cases have input from the Māori leads and are presented to HAW for endorsements before presentation to the Senior Leadership Team (SLT) or publication.

Pacifica midwives

We have increased the number of Pacific Midwives to work at Te Toka Tumai to be able to help their family "Aiga" who reside in central Auckland. We

have achieved this through access to Pacific Scholarships to help recruit new graduate Pacific Midwives. The number of pacific midwives now working in Auckland City Hospital has increased over the past three years totalling in 9 new graduate Midwives. They are supported by the Pacific Midwives Aunties scheme to help these Midwives adapt and enjoy their work here at Te Toka Tumai.

3.8.3 Bullying

All staff are expected to role model respectful behaviour and to call bad behaviours out.

Speak up: Kaua ē patu wairua

Everyone has the right to Speak Up if they experience or witness harassment, discrimination or bullying. Kaua ē patu wairua (do not offend my spirit or my soul) captures the essence of Speak Up. We have Speak Up Navigators where volunteers actively listen and advise pathways that can be considered to address behaviours experienced/witnessed.

Korero mai: Talk to me

At Te Toka Tumai, we work in partnership with whānau to deliver patient centered care. It is a whānau approach to raising concern which supports ward teams, patients and whānau to work together to escalate care.

3.8.4 Equitable outcomes

We have a strong focus here at Te Toka Tumai on equity and to improve outcomes for Māori whānau. We are proud of the Te Manawa o Hine Māori midwives who provide continuity of care to hāpu whānau. We currently have Māori, Pasifika, NZ Asian and Pakeha consumer representatives who have joined the Clinical Governance Groups and committees to ensure joint decision making in regard to policies, documents, and consumer information. We are embracing change that is occurring within the health system with the opening up of the regions to be able to share resources and information. We are working on strengthening services and connections to improve outcomes for all whānau, focusing on wellness for all. Te Toka Tumai has developed a standard operating procedure (SOP) called Tautoko to help support whānau and patients to access care. This is by utilisation of Taxi Chits, Parking, Kai and petrol vouchers. Within women's health we are ensuring the Te Tiriti o Waitangi (Te Tiriti) is included in all policies, documents. This is done in partnership with our Māori Health Lead when policies come up for their three yearly review.

Community midwives

The community midwifery team is committed to providing equitable services including the facilitation of free ultrasounds at Greenlane or Auckland City Hospital and free taxi services for whānau who need them to attend appointments. Community clinics have been established to reach all our Māori, Pacific, Indian and high needs whānau wherever possible in the local area in which they reside.

As a team we aim to provide continuity of care, with the same midwife visiting where possible. We have recently started visiting our whānau on the postnatal wards daily to plan their discharge ensuring that we have the correct address for postnatal home visits, have had a conversation around contraception and that they have been referred to appropriate services. Community midwives provide manuka beds / wahakura to ensure a safe sleep space for our pēpi.

Midwifery Led Unit

The Midwifery Led Unit (MLU) was opened on the 17/01/2023. The gifted name is Whānau Ngā Uri, from Dame Naida Glavish. It is located at the former ward 96A, which was refurbished to change three rooms into birthing rooms with double beds and birthing pools. Five single rooms are utilised for births and primary assessments.

The main aims of this unit are to:

- Reduce the high rates of instrumental births, 3rd Degree Tears and episiotomies.
- Support our community to birth in a primary setting supported by their whānau and midwife.
- Support tangata whenua/mana whenua led change to deliver mana motuhake and Māori self-determination in the design, delivery and monitoring of health.
- Ensure whānau that are low risk are given the opportunity to birth in a midwifery led unit.

Consistent with the above priorities, the Women's Health service at Te Toka Tumai wants to provide excellent, accessible, and appropriate continuity of midwifery care, within a partnership model of care. We encourage all LMCs to utilise this unit for births and primary assessments if their women are low risk.

The Midwifery Led Unit is currently providing primary assessments as we renovate and recruit midwives. All LMCs can access this unit to use for primary assessments.

Antenatal

- Walk in for antenatal check or unbooked whānau
- First visit
- Reduced fetal movements in otherwise low risk pregnancy
- Carpel tunnel or musculoskeletal pelvic pain
- Ruptured membranes (SROM) or labour assessment > 37/40 for low risk whānau

Postnatal

- Symptoms of urinary infection (UTI)
- Post coital vaginal spotting
- Post-natal care of outpatient māmā with Pēpi in neonatal intensive are (NICU)
- Breastfeeding problems including symptoms of mastitis

- Neonatal primary assessment
- Community midwifery clients if needed to support communitie.
- Most of the women seen in the MLU have been triaged from WAU or LMCs ringing, booking a bed to assess their women.

3.8.5 Midwifery Education Team + education Delivery

Laurinda McInnes, Peter Melville

The Midwifery Education Team facilitates and delivers a high standard of educational opportunities for Te Toka Tumai core midwives, Lead Maternity Care Midwives (LMCs), Auckland Birthcare midwives and registered nurses in maternity.

The Midwifery Education Team has continued to deliver an extensive midwifery education program in 2023.

Midwifery Education Delivery in 2023

- Basic Life Support "pop-ups", delivered 7 times, 30 participants.
- Bereavement Study Day, delivered once, 13 participants.
- COMBO, provided 10 times, 242 participants.
- CTG interactive workshop, delivered 7 times, 25 participants.
- Culture in Practice Wānanga, delivered 4 times, 28 participants.
- Diabetes in Pregnancy, delivered once, 41 participants.
- Fetal Surveillance Education Programme (RANZCOG full-day), delivered 4 times, 80 participants.
- Maternity Emergency Skills for Nurses, delivered 7 times, 85 participants.
- Midwifery Emergency Skills Refresher (MESR), delivered 13 times, 167 participants.
- Maternity Complex Care Area study day, delivered 4 times, 21 participants.
- Mobile Epidural Workshop, delivered 4 times, 26 participants.
- New-born Resuscitation "pop-ups", delivered 9 times, 27 participants.
- PPH "pop-ups", delivered 3 times, 20 participants.
- Pre-Eclampsia Community Refresher, delivered once, 3 participants.
- PROMPT (PRactical Obstetric Multi-Professional Training) delivered 3 times, 81 participants.

Midwifery education also has an extensive outreach network – providing education across Te Toka Tumai including Neonatal Intensive Care Unit (NICU), Emergency Department, Post-Anaesthetic Care Unit (PACU), Auckland University and Auckland University of Technology (AUT) midwifery and nursing students, both undergraduate and post-graduate.

The education team, alongside our clinical coaches, provide a new graduate program and a "new to service" study day program. Furthermore, we play an important role supporting midwives and nurses clinically across the inpatient services at times of high workload/high acuity.

The education team holds a philosophy that investing in education encourages midwives and nurses to maximise their potential in our highly skilled and unique professions, ensuring best possible care for women and their whānau.

Midwifery education is also involved in/ contributes to;

- Midwifery Practice Development
- Audit and Effectiveness
- Clinical Governance
- Management Responsibilities
- Rapid Multidisciplinary Panel (RaMP) reviews
- Review and/or development of maternity guidelines and policies.
- Local coordination of the MERAS Quality and Leadership Programme (QLP) for midwives

3.8.6 Clinical Coaching and Return to Practice

Raffaela Slight

Clinical coaching is embedded here at Te Toka Tumai to support our new starters and existing staff to navigate the clinical floor within maternity services.

The clinical coaching team at Te Toka Tumai is a team of three senior midwives (2.4 FTE) who work with our midwifery and nursing kaimahi. All three have been approved by the NZ Midwifery Council to take on overseas midwife mentor roles, and support midwives returning to practice, to meet the requirements set out for them by the council to gain an APC (Annual Practicing Certificate) with no conditions of practice attached. This is a critical component to our midwifery pipeline work, aiming to promote the regrowth of the midwifery profession.

Currently we do not have a return to practice midwife at Te Toka Tumai, however we are working with midwives who are considering a return to practice. There are initiatives at a national level to financially support this valuable piece of mahi. In 2023, we had nine overseas midwives join our service and sixteen new graduate midwives commence with us. The clinical coaches have been integral in their orientation programme.

The clinical coaches work alongside our staff to orientate them to new areas of maternity, guide experienced staff with new clinical practice, and support the education team with study days. Our coaches also uphold our equity goal in providing our Māori whānau with care in partnership for engagement that gives the best health outcomes. They role-model this to our midwives and nurses working in maternity, and challenge this when they

see inequitable care occurring.

As always, within midwifery there are staffing shortages and our clinical coaches have been pulled to the clinical floor. The coaches take this in their stride and with a smile on their faces.

However, we can say that this year the clinical coaches have rarely been pulled to the clinical floor. This is testament to the fact that our workforce is growing at Te Toka Tumai Every working day the clinical coaches incorporate Te Toka Tumai values of Haere mai | Welcome, Manaaki | Respect, Tūhono |Together and Angamua | Aim high.

3.9 Trainee Intern Audits

The School of Population Health and the Department of Obstetrics and Gynaecology at the University of Auckland together run a program to teach year 6 medical students to undertake audit for quality improvement. This involves students selecting a project and completing part of the RANZCOG audit cycle during their four week attachment in Obstetrics and Gynaecology. At the end of their attachment the audit is presented to the department. In 2023, 15 maternity audits were completed. The reports from these audits can all be accessed by staff on the internal website at https://adhb.hanz.health.nz/site/women/SitePages/Trainee%20Intern%20audits.aspx.

A brief summary of the topics, findings and recommendations of these audits is provided in Table 3.5.

Table 3.5 Year 6 Medical student/trainee intern audit topics, key findings, and recommendations 2023

Audit Title	Standard, Findings, and Recommendations
Service Area: Maternity Antenatal	
Discharge checklist for women with hyperemesis gravidarum	**Standard** 100% of women with hyperemesis gravidarum should meet the four items listed on the Hyperemesis in Pregnancy Discharge Checklist, and at least GP/LMC follow up arranged, as stated on the ADHB Hyperemesis in Pregnancy pathway. **Findings** • In total, 3 out of 53 (6%) patients had all four of the Discharge Checklist items met. • Of these items, Prescription for Anti-Emetics was met for 92% of patients, followed by USS for 77% of patients, Routine Pregnancy Supplements for 68%, and Hyperemesis Patient Information Sheet provided to 13% of patients. • In terms of Follow Up items, 43% of patients were recommended GP/LMC follow up, and 17% had POAC referral. 19% of patients received either inpatient or outpatient dietician referral **Recommendations** • A recommendation to improve standards would be to increase awareness of the HG pathway - e.g., teaching, make flowcharts to put on Ward 97. • More importantly, the discharge standard may be outdated. There were a total of 4 references that went into making the HG pathway. This included journal articles from 2014 or older as well as an Uptodate reference in 2013. A recommendation here would be to revise and update the HG pathway with, for example, the 2019 HG SOMANZ guidelines. • Of all the discharge checklist items, the patient information sheet was the least likely to be fulfilled. In reality, the information sheet on HG was not readily found on Ward 97, WAU, or Hippo. A recommendation here would be to make sure the information sheet is readily accessible. An information sheet is provided for within the HG SOMANZ guidelines.
Proportion of women offered external cephalic version (ECV) for breech presentation at Auckland City Hospital	**Standard** The standard was developed in concordance with RANZCOG guidelines for management of breech presentation. which is in alignment with the Auckland District Health Board guidelines on breech births. The guidelines state, "all women with a breech presentation at term, with no contraindications to ECV, should be informed about and offered ECV." **Findings** • Of the 101 women who met the inclusion criteria over a 6 month period, 69 women (68.3%) were offered an ECV. • Of the 69 women who were offered an ECV, 50 (72.4%) accepted, and of those, 26 (52%) were successful, and 24 (48%) were unsuccessful. • Of the 50 ECVs that were performed, 24 (48%) resulted in elective CS, 22 (44%) resulted in cephalic births, 2 (4%) resulted in breech vaginal delivery, and 2 (4%) resulted in emergency CS regardless of ECV outcome. • Of the 26 successful ECV outcomes, 22 resulted in a cephalic vaginal delivery, and the remaining 4 in CS, one of which was an emergency.

	• ECV success rates were higher among multiparous women (69%) than nulliparous women (33%). **Recommendations** • There is substandard ECV documentation on BadgerNet. To address this, we recommend that the "Breech Management and ECV" note on BadgerNet be a compulsory and automated form when recording a breech presentation at >34 weeks. This includes women who have contraindications so that there is formal documentation on ECV on BadgerNet, offered or not. • We found that some reasons clinicians were not offering ECV included hypertension and high BMI, which did not align with the RANZCOG guidelines on contraindications. This indicates a subjective measure of whether ECV is offered or not depending on various factors. RANZCOG provides a clear list of contraindications which should help clinicians identify eligible women for ECV. We recommend that a list of these contraindications as per RANZCOG be accessible on BadgerNet to remind clinicians and to provide consistency across all clinicians. • There is a recent retrospective population based observational study showing that maternal obesity did not negatively influence the success rates of ECV [5]. Therefore, it is our recommendation that BMI should not be an absolute factor in the consideration of ECV.
Service Area: Maternity Intrapartum	
Delay in transfer from Women's Assessment Unit to Labour Birthing Suite following an Induction of Labour – July 2023	**Standard** Transfer of patient to the delivery unit within 60 minutes of being ready following an induction of labour. **Findings** • The total number of patients included in the audit was 61. • 24 patients had a transfer time of less than 60 minutes (39%). • When reviewing clinical notes for data collection, when prolonged transfer time was noted by staff, it was often concurrently documented that staffing shortages in LBS were driving the delay. • When further sub-analysed, it was identified that patients whose caregiver was a Lead Maternity Obstetrician plus a self-employed midwife had a shorter transfer time, on average at 77.3 minutes compared to 132.2 minutes average for a DHB community midwife and 191.2 minutes average for an LMC midwife. It was unclear from this data the driving reason behind the shorter transfer times with obstetricians and self-employed midwives and whether it relates to staffing or hierarchal power structures. • NZ/Other Europeans on average, had the fastest transfer times at 92.6 minutes, compared to 123 minutes for NZ Māori and 155 minutes for Indian, 201 minutes for Other Asian and 202 minutes for Pasifika. 12/15 patients managed by an LMC obstetrician + self-employed identified as NZ/Other European, so wider socio-economic differences in access to resources and cultural viewpoints about degree of medical intervention required during childbirth could be driving this difference in transfer time by ethnicity. **Recommendations** • Implementation of BSOTS (Birmingham Symtom-Specific Obstetric Triage System). • Support business cases for employing more midwives within LBS and ongoing support of Te Whatu Ora Māori and Pacific Health Scholarships in order to train and hire Māori and Pasifika Midwives.
Emergency C-Section category time adherence	**Standard** • 100% of emergency Caesarean sections (emCS) should be done within their correct category times. This is 30 minutes for category 1, 60 minutes for category 2, and 6 hours for category 3 emCS. • 100% of the automated PIMS report times should match with the Gold Standard Badgernet times. **Findings** • DDI targets were met in 64/128 (50%) of all emCS. This included: 8/12 (67%) for category 1, 41/95 (43%) for category 2, and 15/21 (71%) for category 3. • When cross checking the accuracy of the automated PIMS report against the Gold Standard Badgernet Method, they matched 84% of the time. For category 1 emCS adherence was 9/12 (75%), category 2 77/95 (81%) and category 3 21/21 (100%). • The audit analysed the recorded reasons for not meeting DDI targets. Out of the 61 emCS that did not meet their DDI target, 30 of them (49%) did not have any documentation or explanation as to the reason in the notes. • Core daytime hours (8am-6pm) had an adherence rate of 60% (25/42) across all categories compared to out-of-hours which sat at 45% (39/86) adherence.

	• With respect to the automated forms, 15% of patients in the sample were mistakenly identified as having an emCS when in reality they had another method of delivery. **Recommendations** • A recommendation the service could implement promptly to help identify the key contributors to not meeting the DDI targets is to document the reasons why the target was missed. • Incorporate a checkbox on the automated form/PIMS to confirm the delivery is an emCS, to be filled out after the operation is completed.
Epidural Response Time in Auckland City Hospital	**Standard** 80% of women should be attended to within 30 minutes (ERT <30mins), and 90% of women should be attended to within 60 minutes. **Findings** • The percentage of women (sample n=98) who were attended to within 30 minutes was 70.4%. The percentage of ERT between 30-60 minutes was 21.4% and greater than 60 minutes was 8.2%. The mean ERT was 27.1 minutes, median was 24.5 minutes and mode was 15 minutes. • 65% of Māori and Pacific patients were seen within 30 minutes. 35% had an ERT of 30-60 minutes, and none had an ERT greater than 60 minutes. 70% of non- Māori and Pacific patients were seen within 30 minutes, whereas 19% had an ERT of 30-60 minutes and 11% had an ERT greater than 60 minutes. • The ERT during weekdays were 76% under 30 minutes, 16% between 30-60 minutes and 6% greater than 60 minutes. The ERT during weekends/public days were 38% under 30 minutes, 33% between 30-60 minutes and 29% greater than 60 minutes. • The ERT during working hours was 86% under 30 minutes, 7% between 30-60 minutes and 7% greater than 60 minutes. The ERT during after-hours were 57% under 30 minutes, 32% between 30-60 minutes and 11% greater than 60 minutes. • For patients with BMI <30, the ERT was 66% under 30 minutes, 23% between 30-60 minutes and 11% greater than 60 minutes. The ERT for patients with BMI >30 were; 84% under 30 minutes, 16% between 30-60 minutes and 0% greater than 60 minutes. Anaesthetist practitioner level: Registrars had a higher percentage of ERT >30 minutes at 38%, while SHOs, SMOs and Fellows had an ERT >30mins percentage ranging between 17%-27%. • DHB LMC care had a higher percentage of ERT >30 minutes at 42%, whereas private midwife LMC-type had an ERT >30mins percentage of 28% and private obstetrician LMC-type had an ERT >30mins percentage of 25%. • Variables that did not yield great differences include: IOL status, stage of labour/dilation at request, age, parity, reason for referral (pain, early epidural request, slow progression of labour/augmentation of labour). **Recommendations** • Provide adequate anaesthetic staffing during weekends and after hours. These variables contribute to delayed ERT (anaesthetist in theatre, emergency, another epidural insertion). • Improve documentation in Safer Sleep. Remove the auto population of the time fields in order for anaesthetists to be able to manually input accurate times rather than changing existing inaccurate times. Make these time fields a requirement to complete the form in order to ensure times are being recorded. • Possibly implementing a brief referral form on Badgernet to be completed by the midwifery team during epidural request to document time of request, which can often be forgotten by the anaesthetic team. • Streamlining the epidural request process. • Understanding and re-iterating ADHB guidelines regarding epidural request processes. • Outlining and documenting a clear escalation plan if anaesthetic services are unable to attend to a patient within an adequate time frame.
Epidural Response Times: A Single Centre Retrospective Analysis (this audit builds on the audit above with further analysis)	**Standard** Anaesthetic attendance (ERT) within 30 minutes of an epidural request by the responsible midwife for 80% of cases and not exceed 60 minutes for 90% of cases. **Findings** • A total of 148 patients were included (median age 33, IQR 27-39). • 107 (72%) had ERTs within 30 minutes, 135 (91%) had ERTs within 1 hour. • Univariate analysis revealed no statistically significant differences in age, gravidity, parity, ethnicity, day and time of labour between patients with ERTs ≤30 minutes than those with ERTS >30 minutes. However, higher BMI tended to reach near significance for increased/ delayed ERT ($p<0.051$). Logistic regression validated insignificant associations between prolonged ERT and the clinico-demographic variables studied. • Patients with elevated BMI, of Indian and Other Asian ethnicity, patients having epidurals requested out-of-hours and those receiving public midwifery care all tended to have a higher likelihood of not meeting ERT guidelines.

	Recommendations • The main limitation of this quality improvement project is the poor quality of time data available in Safer Sleep and BadgerNet. Relying on BadgerNet information also significantly slowed the process of data collection. We again recommend the removal of the auto-population of time fields in Safer Sleep so that this data is filled in manually, improving reliability for future quality improvement. • Although explanations for ERTs >60 minutes were available in BadgerNet in some cases, documentation of an escalation plan to ensure timely anaesthetic attendance was rare. This brings into question whether escalation protocols are being followed. In cases where an anaesthetist is not able to attend within 60 minutes, we recommend that a clear escalation plan is communicated to the midwives and documented to ensure timely and transparent patient care. • Midwives on Level 9 should be escalating epidural requests to the obstetric team prior to calling the anaesthetic team. Although this protocol generally seemed to be followed, documentation of these discussions was variable in BadgerNet and it might be helpful for a future audit to confirm whether this escalation protocol is being followed.
Re-audit: Is a second dose of intraoperative antibiotics being given during Caesarean section with > 1500mL blood loss?	**Standard** All women undergoing lower segment Caesarean section (LSCS) should receive a second 2g cefazolin dose if there is intraoperative blood loss greater than 1500mL. Gentamicin (5 mg/kg) is substituted in penicillin anaphylaxis. **Findings** • Out of an eligible population of 123 patients, 10 patients (8.13%) received the correct repeat dose of intraoperative cefazolin. • All 123 patients were given the initial dose of cefazolin. 1 patient was given a repeat dose (1g), a different dose to the initial prophylactic dose (2g). The remaining 112 patients did not receive a repeat dose of cefazolin despite having an EBL greater than 1500mL. **Recommendations** • Checking for prophylactic antibiotics administration as part of sign out (after EBL is calculated and read out). • Including specific guidelines on Caesarean sections in the general surgical antimicrobial prophylaxis guidelines. • Incorporating specific antimicrobial prophylaxis advice in the Caesarean section guidelines. • Departmental teaching session on intraoperative prophylactic antibiotics. • Safer sleep trigger when EBL > 1500mL. • Shared responsibility between anaesthesia, surgery and nursing.
Service Area: Maternity Postpartum	
ACH follow-up of Third and Fourth-Degree Perineal Tears (OASIS) from June to November 2022	**Standard** • 100% ACH paents with third and fourth-degree perineal tears must be referred for a six-week follow-up at both: a) General Gynaecology/Urogynaecology Clinic at Greenlane, and b) Pelvic Tear Physiotherapy Clinic within their local hospital. • Gynaecology follow-ups must be scheduled for 100% of referred women between 6-12 weeks postpartum as per RCOG Greentop Guidelines. **Findings** • All 55 patients (100%) were referred to either gynaecology or physiotherapy follow-up, but only 48 (87%) were referred to both. • 50 patients (91%) were referred to gynaecology follow-up, while 53 patients (96%) were referred to physiotherapy follow-up. • Of the 50 patients referred to gynaecology, 45 (90%) had referrals completed before or on the day of discharge, while 5 (10%) were completed after. • The mean time to referral for patients referred afer discharge was 6 days. • 1 of the 5 patients missing Gynaecology Referral had a handwritten referral on 3M that was not processed. No reason for missing referrals was found for the remainder. • Of the 2 patients missing physiotherapy referrals, one was based in Dunedin, so referral documentation may not be visible on RCP. The other patient was cleared by physiotherapy as an inpatient. • Of the 50 patients referred to gynaecology clinic, 16 (32%) had their follow-up appointment scheduled between 6-12 weeks postpartum. 10 (20%) were scheduled before 6 weeks, while 24 (48%) were either scheduled for after 12 weeks or are yet to be scheduled. • Only 30 of the 50 patients (60%) referred to gynaecology clinic attended. Similarly, 39 of the 53 patients (74%) referred to physiotherapy attended. **Recommendations** We recommend updating the Hospital OASIS guidelines (currently over 5 years old) to include administrative staff responsible for processing referrals and ensure they are up to date with

	the new Te Whatu Ora administrative system. This includes offering a dedicated session explaining the required outpatient follow-up, locations and appropriate time frame from 6 weeks on wards. We also recommend educating clinical and administrative staff on new guidelines through staff orientation and direction to the revised guidelines to ensure correct and appropriate processing of referrals.
Incidence of Prophylactic Antibiotic Prescribing for Operative Vaginal Birth in Auckland City Hospital	**Standard** 100% of women undergoing operative vaginal birth are offered prophylactic antibiotic within 6 hours of birth, as according to the National Women's Hospital (NWH) Standard Operating Procedure (SOP). **Findings** • Of the 131 patients included in the audit, 94 (72%) patients received the correct antibiotic at the right dose within 6 hours post delivery. 28 (21%) patients did not receive any antibiotic for having an instrumental delivery, and 9 (7%) patients did receive an antibiotic but not as per the standard operating procedure. • Reasons patients were marked as having received an antibiotic but not as per the SOP were: • 6 patients received Cefazolin 2g IV when there was no documented allergy to Augmentin - all patients given this antibiotic in theatre by anaesthetic team for trial of instrumental +/- LSCS • 1 patient received a 7 day cause of Augmentin on discharge after not having received it within 6 hours post delivery, unclear cause of ongoing prescription • 1 patient prescribed Cefazolin 1g IV instead of 2g (1 patient) by private Obstetric Consultant (allergy to Amoxicillin) • 1 patient received Augmentin 1.2g TDS instead of STAT dose with no clear indication, poor documentation • 72% of patients were correctly offered and prescribed the appropriate antibiotic within a 6 hour window post operative vaginal birth. • A forceps delivery had a higher rate of correct prescribing of antibiotics (78%) compared with ventouse (69%). • Regarding delivery location, there were similar rates of 'yes' prescribing by Labour and Birthing Suite (LBS) (72%) and operating theatre (OT) (74%), however women birthing in DU were more likely to receive 'no' antibiotics (26%) compared to OT (8%); and women in OT were more likely to receive non-standard antibiotics (not per the SOP) (18%) compared to LBS (2%). • There was a lower rate of correct antibiotic prescribing out of hours (69%) compared to in hours (86%). • September had the greatest percentage of antibiotics correctly prescribed (79%) compared with July (70%) and August (68%). • Obstetric led care had lower rates of correct antibiotic prescribing (57%) compared to Midwife led care (75%). **Recommendations:** • Introduce posters and/or medication chart stickers in OT and the LBS to aid staff in adhering to the protocol and offering prophylactic antibiotics. • Introduce a check box in the "Labour and Birth" section of BadgerNet for simple documentation of whether prophylactic antibiotics has been offered to the patient in Operative Vaginal Birth.
Postnatal Contraception Plans at Auckland City Hospital	**Standard** 97% of pregnant women under the care of hospital maternity services should have a postnatal contraception (PNC) plan prior to hospital discharge. **Findings** • 83% had a PNC plan prior to hospital discharge • 21% were discharged with PNC • 100% of NZ European women had a PNC plan • There was a significant difference between ethnic groups ($p = 0.01$) • There was a significant difference between age groups ($p = 0.02$) • 92% had a PNC discussion • 100% of women aged 40-49 versus 57% aged <20 had a PNC discussion **Recommendations** Improve the current practice of obtaining PNC plans by adding a compulsory PNC section to BadgerNet's clinical notes and discharge summary, as well as employing a dedicated contraceptive midwife, like Counties Manukau. This, along with inadequate staff training around discussion/documentation of PNC, likely contributes to poor PNC discussion and documentation.

Provision of LARC and contraceptive choices postpartum	**Standard** • 50% percent of postnatal women choosing Long Acting Reversible Contraception (LARC) are provided with their chosen method before discharge from hospital. • 97% percent of postnatal women who have chosen a LARC method are offered a bridging method when immediate access to their chosen method is not possible. **Findings** • 44% (n=8) of the women who wanted a LARC received one. • Of those women who did not receive a LARC, none received a bridging method. • Approximately 30% of women (n= 23) had no documented contraceptive discussion. • There were similar rates of contraceptive discussions across ethnicities. • Women who chose tubal ligation or vasectomy were not provided bridging methods. Prescriptions were not provided for barrier methods prior to discharge. • Half of the contraceptive discussions were conducted antenatally and were initiated almost equally by midwives and doctors. Postnatal discussions were almost always initiated by doctors. **Recommendations** • Checklist for routine antenatal appointments (similar to the SHO postnatal checklist). • Add bridging contraception to the SHO postnatal checklist. • Make contraception plans compulsory on discharge summaries.
Were women undergoing TOP within a year of delivery offered contraception before leaving hospital?	**Standard** • PPC discussion should be offered to 100% of women under maternity care. • Effective contraceptive methods should be started immediately after childbirth. **Findings** • Overall, our audit showed that 53% (42/80) of women reviewed had a documented PPC discussion. • When breaking down the rates of PPC discussion, it was noted to vary with mode of delivery. 92% (11/12) of women who had an operational vaginal delivery had a PPC, a lot higher than the rates of PPC in women who had a CS or normal vaginal delivery at 47% and 45% respectively. • Women who had longer postpartum hospital stays were more likely to have a PPC discussion. 17% of women who were discharged the same day as delivery had a documented PPC discussion, compared to 54% and 67% of women who had stays of 1-2 days or more than 3 days respectively. • When considering NZDep scores, 47% of women who had NZDep scores of 1-5 had a PPC discussion documented, compared to 40% in NZDep scores 5-8 and 65% in women with an NZDep score of 9-10. • PPC discussions did not differ by ethnicity. • In women who had a PPC discussion, 73% had a chosen contraceptive, 23% were undecided and 2% declined contraception. Only 8 women (42%) received a script and had their chosen method of contraception dispensed. • 12 women (15%) received a PPC discussion at home, which was documented by the midwife at discharge from their care at approximately 6 weeks postpartum. **Recommendations** • Establish a clear and standardised PPC discussion protocol that must be carried out before discharging the patient. • Clear documentation of PPC discussion including charting, scripting and provision/ insertion of the contraceptive. This could involve a standardised form that is in the patients clinic notes folder and must be completed prior to discharge. • If the woman wishes to have PPC discussions with her GP instead, clear advice of this should be documented to the GP on discharge papers. • Provision of pamphlets with all contraceptive options during antenatal visits so that the patient has enough time to consider her options and consult her family.
Service Area: Maternity Neonatal	
Appropriate management of raised cord lactates	**Standard** 100% of pēpi with raised cord lactate (≥6.0 mmol/L) have (i) cord bloods (venous and arterial) sent for blood gases, and (ii) are initiated on the "severe intrapartum fetal compromise pathway (SIFC)" with the appropriate section ticked on the NOC-NEWS chart. **Findings** • 46% of pēpi had adequate cord arterial and venous samples sent to the lab within 1 hour of birth. • 17% had no adequate samples available. • 34% had a cord venous sent but no arterial and 3% had an arterial but no venous sample. • 67% of individuals had a documentation of risk (i.e. the "Severe Intrapartum Fetal

	Compromise" section ticked) on the NOC-NEWS chart. This rate varied widely by lead maternity carer (LMC) with patients who were cared for by a DHB community midwife + the DHB obstetric team having a 100% rate of documentation while patients cared by a LMC midwife had a rate of 57%. **Recommendations** • An electronic alert system which automatically alerts care providers when cord lactate is raised and the NOC NEWS pathway must be activated. • Make "foetal surveillance education resources" available to all community midwives. • Implement use of electronic systems to streamline documentation of health observations and increase accuracy. • Lactate gets sent to charge midwife who records abnormal results on the "white board".
Management of Raised Lactate and Documentation of Finding on NOC-NEWS	**Standard** • 100% of pēpi cord blood lactate >6 mmol/L have blood sent for blood gases. • 100% of pēpi cord blood lactate >6 mmol/L are properly identified on NOC-NEWS charts and monitored according to the guidelines documented on this chart. **Findings** • After screening a total of 421 newborn cord blood lactate results in our dataset, 46 were found to pass both inclusion and exclusion criteria for further analysis. • 89% of newborns with a cord blood lactate >6 mmol/L had a blood gas done. • 54% of newborns with raised cord blood lactate had the corresponding risk assessment box ticked on the NOC-NEWS chart. • For neonatal observation monitoring, 78% had observations done at 1h, 95% had observations done at 3-4 hours and only 41% had observations done every 4 hours for 24 hours. Serum lactate and glucose were measured 3-4h postpartum in 80% and 83% respectively. • In cases where serum lactate or glucose were abnormal, at 3-4 hours, follow up tests for those components were done in 4 hours 62% and 74% of the time respectively. **Recommendations** A recommendation which may improve documentation of high-risk neonates on the NOC-NEWS chart would be to add a section to tick if none of the risk factors on the chart apply to the neonate. The intention here is that by making that section of the form mandatory whether there is an increased risk or not, it will reinforce the behaviour of checking over that section of the form and make it less likely to be forgotten.
Service Area: Maternity Ante/Postnatal	
Re-Audit: Use of new Maternity Diabetic Chart (MDC)	**Standard** Applicable components of the 'Maternity Diabetes Insulin Prescription and Blood Glucose Record form #CR3138' (MDC) filled out 100% correctly. **Findings** • We audited 131 patient records in total for 80 MDCs. Of these records, 51 did not have a MDC available for audit. • Of the 80/131 patients, 14/22 were NZ European, 8/10 were Māori, 13/21 Pacific, 24/40 Asian, 12/25 Indian, 7/9 Other European, 2/4 MELAA. • Our distribution by diabetic type was 13/16 type 1 diabetes patients, 33/37 type 2 diabetes patients, and 34/78 GDM patients. • Of the patients audited, excluding type 1 diabetes; 19/43 (44%) of vaginal deliveries, 11/27 (41%) of elective c-sections, and 45/51 (88%) of emergency c-sections had a chart. **Recommendations** • Ongoing education and ward-based teaching regarding the proper use of MDC charts. Why is it important they are filled out correctly? Which patients need them? How is each section filled out correctly? • Encourage input from Health Professionals regarding how MDC charts can be more "user-friendly". • Empower and support patients who self-test/medicate to record their doses and BSLs to assist staff.

4

CHAPTER 4

MATERNAL DEMOGRAPHY

ŪPOKO 4

TATAURANGA WĀHINE HAPŪ

Commentators

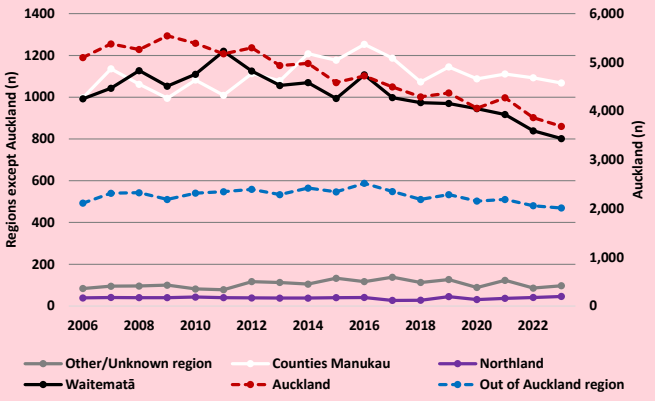
Dr Lynn Sadler

- The demographic characteristics of birthing people at Te Toka Tumai Auckland has changed over the years, and birthing numbers have continued to fall since about 2012. In 2023, 5700 people gave birth to 5821 pēpi. In 2022, 5925 people gave birth to 6050 pēpi.
- The number and proportion of people birthing at Te Toka Tumai who live in the Auckland area continues to decline, while births to parents residing outside of the Auckland region have remained stable.
- There has been a significant reduction in smoking at booking among Māori, Pacific people and European māmās birthing at Te Toka Tumai.
- In 2023, 49% of the maternity population birthing at Te Toka Tumai were overweight or obese (BMI ≥25), and 11% were morbidly obese (BMI ≥35).
- 76% of birthing people at Auckland Hospital in 2023 were under the care of a self-employed LMC compared to 65% in 2006.

4.1 Maternal Domicile

In 2023, 64.7% of people birthing at Te Toka Tumai lived in the Auckland region. This proportion has dropped significantly from 70.7% in 2006. This is due to a drop in births among residents in the Auckland region rather than an increase in births to people from outside the boundary. As shown in Figure 4.1, numbers of births of people domiciled outside the Auckland area has remained stable since 2006. Consistently about 2% of births (approximately 100/year) are to māmās from outside of the three Auckland regions (Auckland, Waitematā, and Counties Manukau). Unlike other hospital services, whānau can choose which hospital they wish to attend for birth or to birth at home. Some whānau who lived outside the Auckland region and birthed at Te Toka Tumai required tertiary services.

Figure 4.1 Maternal domicile of birthing people at Te Toka Tumai 2006-2023 (summarised in broken lines to Auckland and out of Auckland)



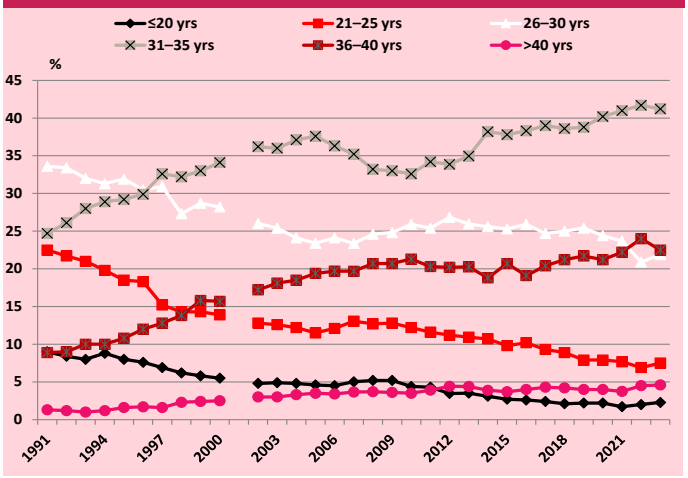
4.2 Maternal age, parity and ethnicity

Age at birthing has changed dramatically over the past two decades as demonstrated in figure 4.2, with the proportion of births to wāhine over 30 years increasing. This applies to all age groupings over 30 including births to people over 40, as the proportion of births to wāhine under 30 continues to fall.

The median age of birthing people at Te Toka Tumai in 2023 was again 33 (interquartile range 29 to 36 years). Median age varied by ethnicity (Māori 29 years, Pacific 29 years, Indian 32 years, Other Asian 34 years, MELAA 34 years, and European 34 years). The median age of a person having their first pēpi at Te Toka Tumai in 2023 was 32 years (34 years for second or later pēpi).

Prioritised ethnicity is used to represent self-identified ethnicity in this report as is usual in health statistics[1]. This means that when more than one ethnicity is identified, ethnicity is assigned according to the following hierarchy: Māori, Pacific peoples, Indian, Other Asian, MELAA (Middle Eastern, Latin American or African), Other, European. Indian people are reported separately from Other Asian

Figure 4.2 Maternal age distribution among wāhine birthing at NWH 1991-2023



ethnicities in our maternity statistics because of inequity of outcome experienced by Indian whānau compared to other Asian ethnic groupings.

In 2023, of māmās giving birth at Te Toka Tumai, 509 (8.9%) identified as Māori, 765 (13.4%) Pacific peoples, 833 (14.6%) Indian, 1418 (24.9%) Other Asian, 254 (4.5%) MELAA (Middle Eastern, Latin American, and African), 1358 (23.8%) NZ European and 563 (9.9%) Other European. Over the past almost 3 decades, there has been a decrease in the proportion of birthing people who identify as European, and an increase in those who identify as Asian, including Indian. Over this period, the proportion of māmās who identify as Māori, Pacific people, and Middle Eastern Latin American or African (MELAA) has remained relatively stable.

[1]Ministry of Health. 2017. HISO 10001:2017 Ethnicity Data Protocols. Wellington: Ministry of Health

Figure 4.3 Parity distribution among wāhine birthing at NWH 1992-2023

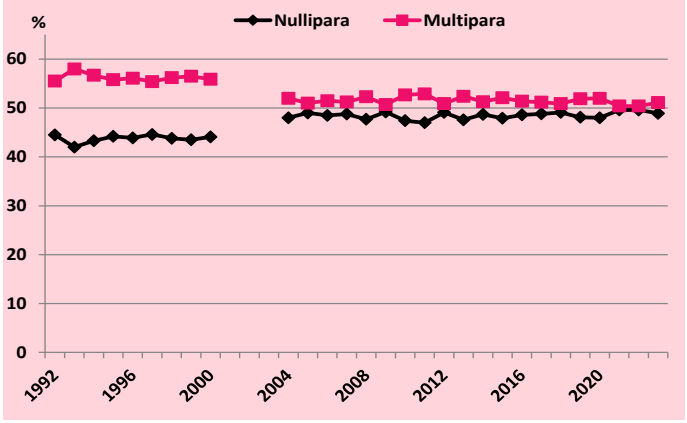


Figure 4.4 Maternal parity by age NWH 2023

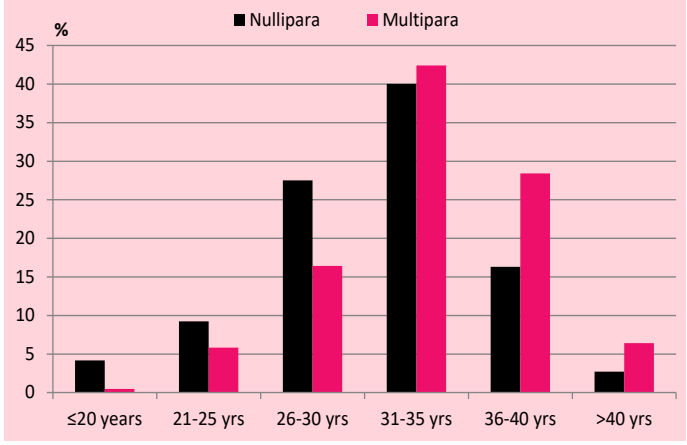


Figure 4.5 Ethnicity of wāhine giving birth at NWH 2006-2023

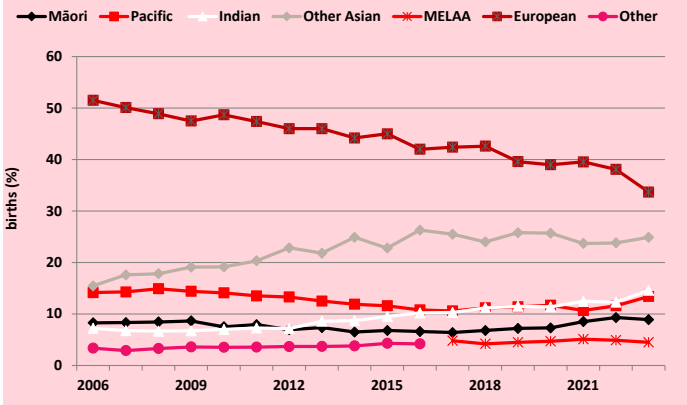


Table 4.1 Prioritised ethnicity of wāhine giving birth at NWH 2023

	Birthing wāhine 2023 n=5700	
	n	%
Māori	509	8.9
New Zealand European	1358	23.8
Samoan	285	5.0
Tongan	241	4.2
Cook Island Māori	85	1.5
Niuean	79	1.4
Fijian	52	0.9
Other Pacific Peoples	20	0.4
Tokelauan	3	0.1
Chinese	718	12.6
Indian	833	14.6
Other Asian	346	6.1
Southeast Asian	326	5.7
Asian NFD	28	0.5
European NFD	71	1.2
Other European	487	8.5
Middle Eastern	93	1.6
African	63	1.1
Latin American	98	1.7
Other Ethnicity	5	0.1

Figure 4.6 Maternal age by maternal ethnicity NWH 2023

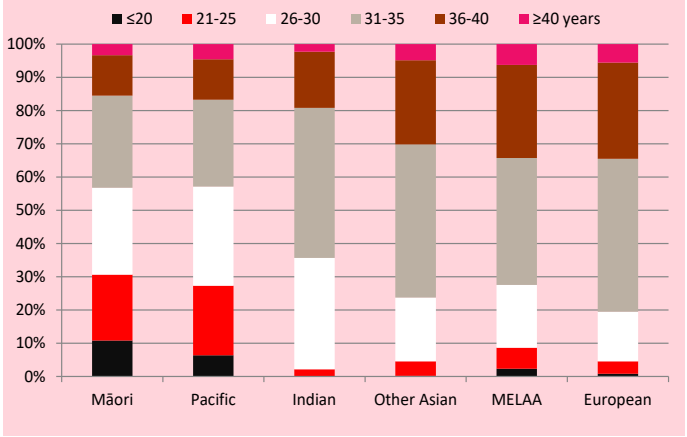
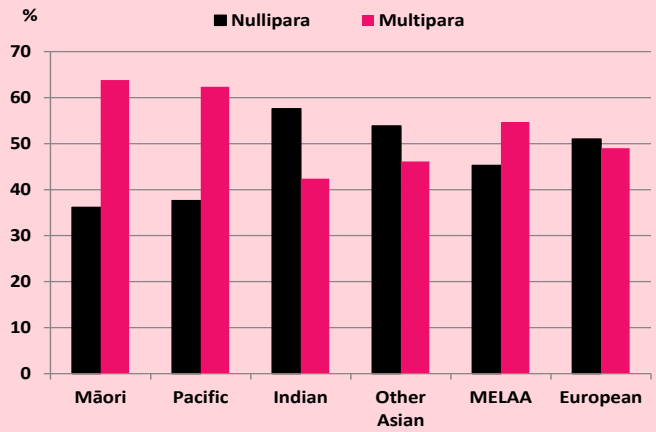


Figure 4.7 Parity distribution by maternal ethnicity NWH 2023



4.3 Smoking

Among wāhine birthing at Te Toka Tumai in 2023, 4.4% reported smoking at booking. There has been a significant reduction in smoking at booking among Māori, Pacific people and European birthing at Te Toka Tumai since 2016. Consistent with national figures, Māori hapu wāhine are among those most in need of support for smoking cessation.

Table 4.2 Smoking status of wāhine at booking NWH 2023

Smoking Status	Smoking at booking	
	n= 5700	
	n	%
Yes	249	4.4
No	5451	95.6
Missing data	0	0.0

Figure 4.8 Smoking at booking trends (2010-2023) by ethnicity NWH 2023

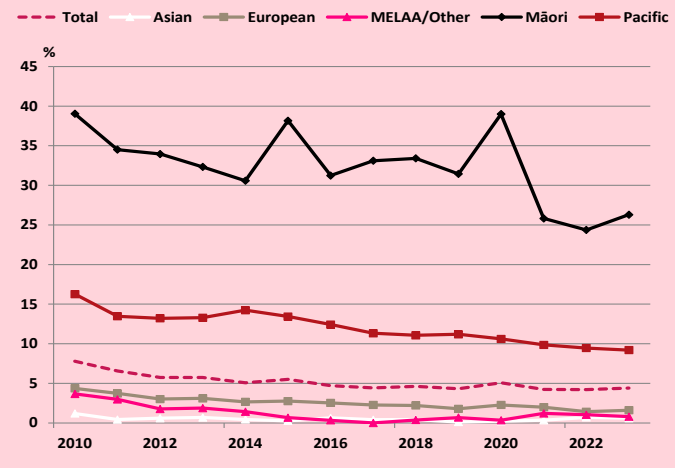


Figure 4.9 Smoking rates at booking by age and ethnicity NWH 2023

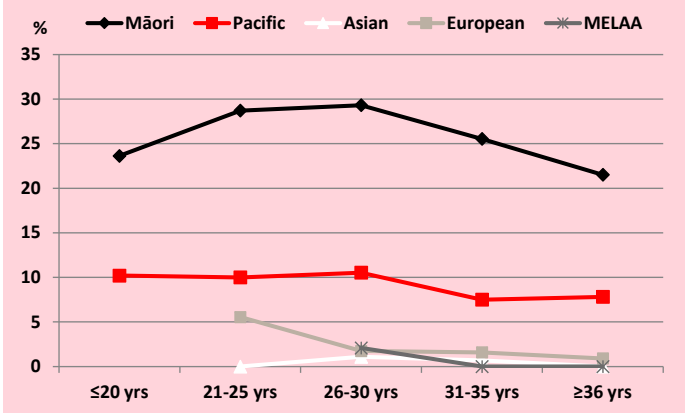
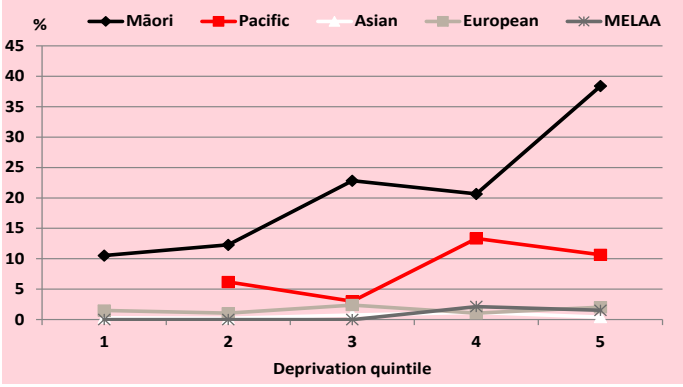


Figure 4.10 Smoking rates at booking by deprivation quintile and maternal ethnicity NWH 2023

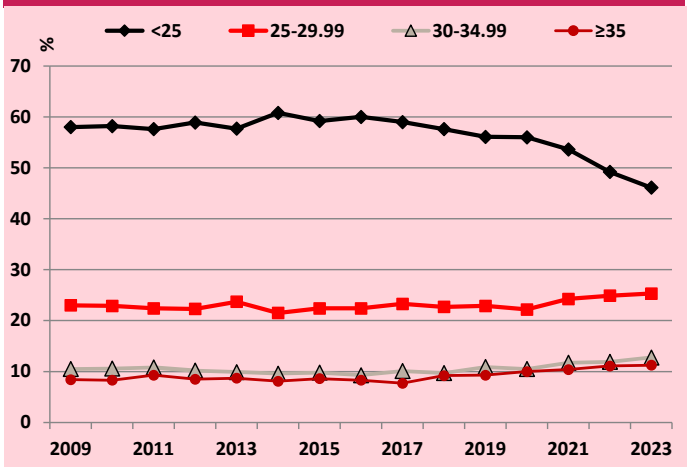


4.4 Body Mass Index (BMI)

In 2023, 49 percent of the maternity population birthing at Te Toka Tumai were overweight or obese (BMI ≥25), with 11.3% morbidly obese (BMI ≥35). The proportion of birthing people in the normal BMI range is reducing in all ethnic groupings (Figure 4.12). The biggest increases are in the BMI range 25-34 for European and Asian (Figure 4.13) and >=35 for Māori and Pacific people (Figure 4.14).

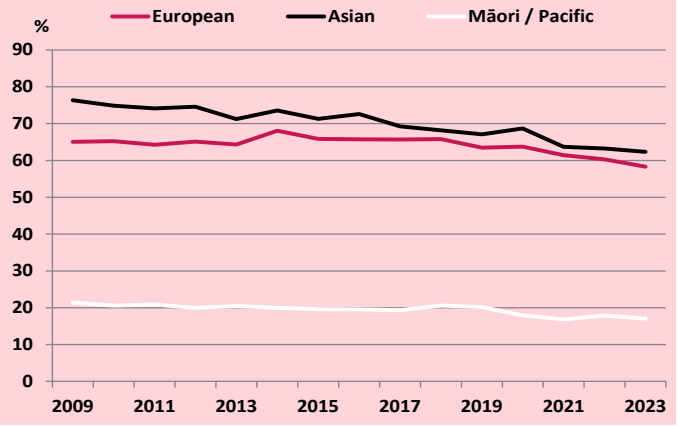
Further data, including maternity outcomes can be found in section 5.7 Body Mass Index (BMI).

Figure 4.11 BMI* over time NWH 2009-2023



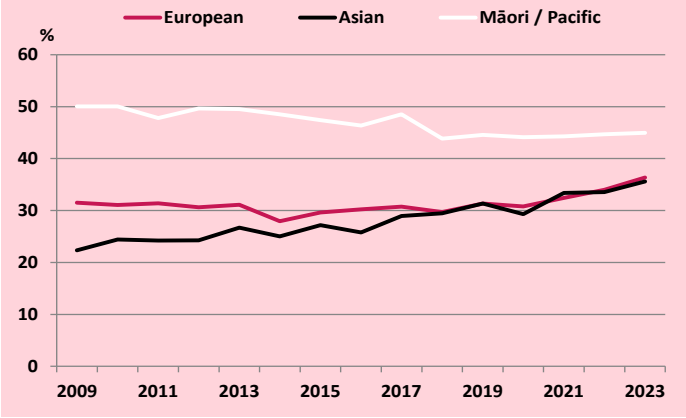
* Missing data excluded

Figure 4.12 BMI <25 by ethnic groupings NWH 2009-2023*



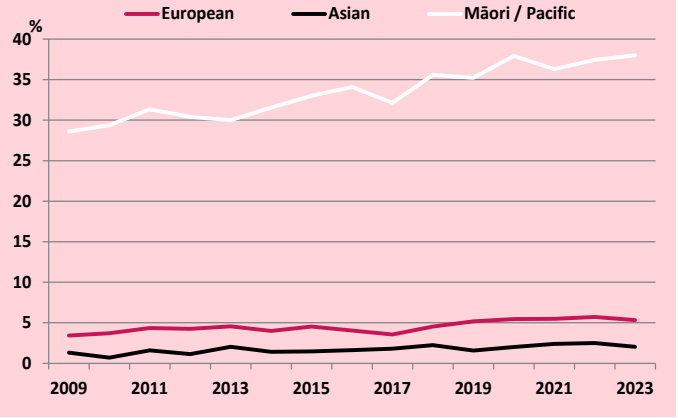
* Missing data and MELAA excluded

Figure 4.13 BMI 25-34 by ethnic groupings NWH 2009-2023*



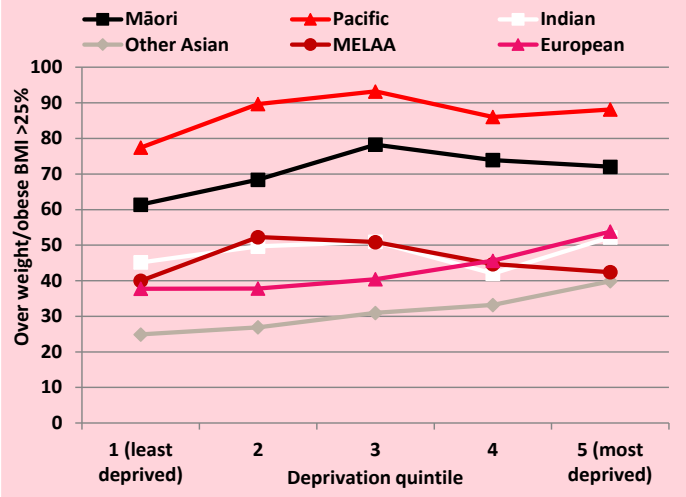
* Missing data and MELAA excluded

Figure 4.14 BMI ≥35 by ethnic groupings NWH 2009-2023*



* Missing data and MELAA excluded

Figure 4.15 Overweight/obese (BMI ≥25) by ethnicity and deprivation quintile NWH 2023*

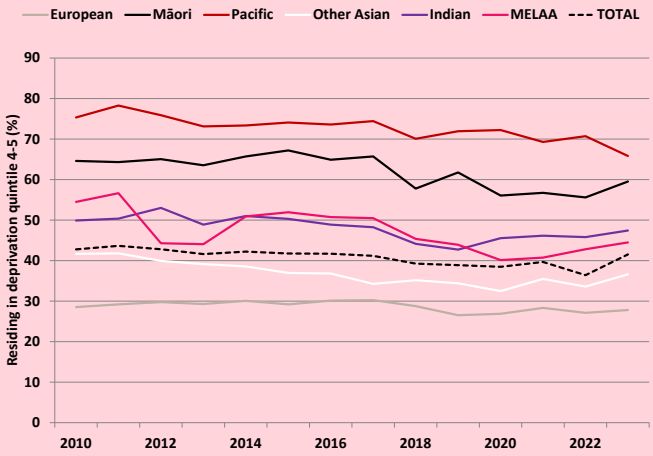


* Missing data and MELAA excluded

4.5 Socio-economic status

Socio-economic status is an area determined score, related to 2018 Census data. The decile score has been compressed to quintiles in the figures. Quintile 1 includes the least deprived two deciles and quintile 5 the most deprived two deciles. Figure 4.16 shows the significant difference in the proportion of birthing people living in the most socioeconomically deprived areas (Census area centile scores 6-10 or quintiles 4-5) by ethnicity. There has been a significant reduction in birthing people living in the most deprived two quintiles over time in all ethnic groupings, but differences between ethnicities remain.

Figure 4.16 Deprivation (quintile 4-5) by ethnicity over time 2010-2023



4.6 Lead Maternity Carer (LMC) at birth

The data given throughout this report for LMC relate to LMC at birth. LMC at birth is reported because the hospital does not collect data on the first LMC for all whānau. Collection of these data require a common database used by LMCs and hospital facilities. This may be possible as more of the country move to Badgernet as a maternity electronic record, and as Manatū Hauora develop the "Perinatal Spine" to include basic maternity data for all pregnant wāhine.

LMC at birth is relatively unchanged in 2023, with 47.9% of wāhine registered with a self-employed midwife, 28.0% with a private obstetrician, 18.8% with the NWH Community maternity service, and 3.1% with NWH specialist medical and diabetes clinic services. Overall 75.9% of wāhine who gave birth at Auckland Hospital in 2023 were under the care of a self-employed LMC compared to 65% in 2006.

In 2023, no wāhine were under the care of a GP as their LMC at birth. Twenty-four birthing people were not registered for antenatal care in 2023.

Demographics of patients vary considerably by LMC group. Wāhine under private obstetrician care are older, more often European, less often smokers, and less likely to live in socioeconomic deprivation.

Figure 4.17 LMC at birth among wāhine birthing at NWH 2006-2023

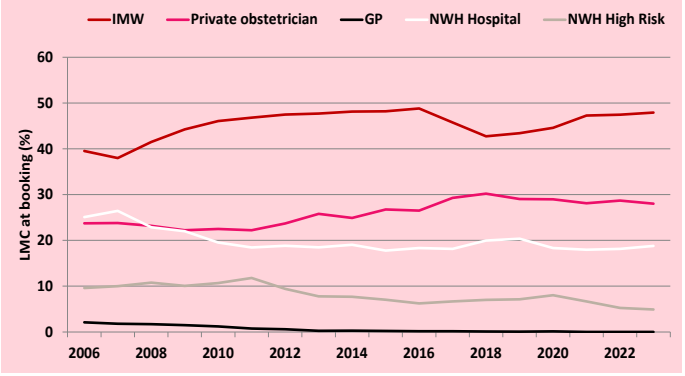


Figure 4.18 LMC at birth and maternal age NWH 2023

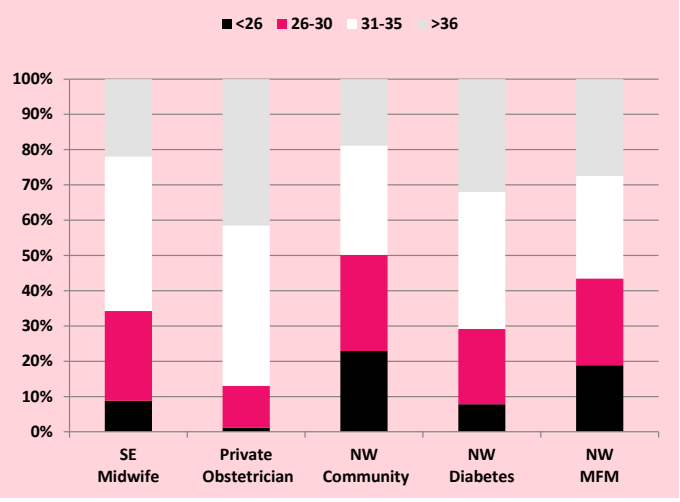


Figure 4.19 LMC at birth and maternal ethnicity NWH 2023

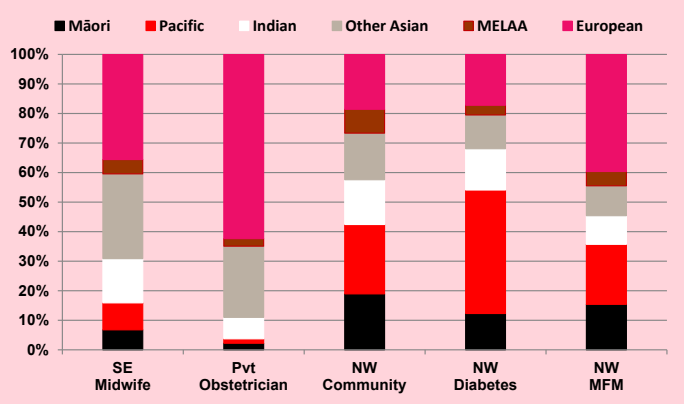
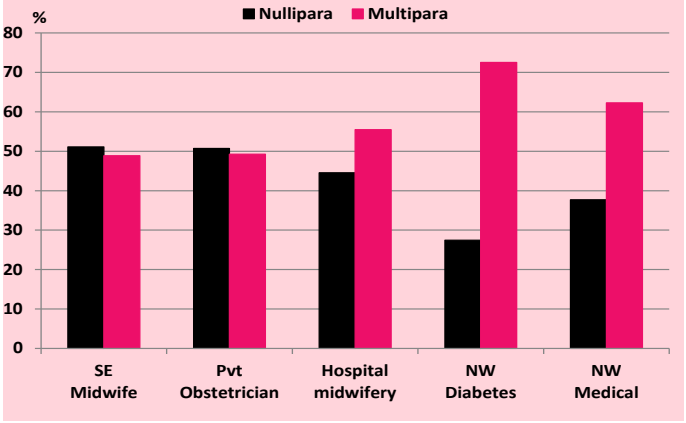


Figure 4.20 LMC at birth and parity NWH 2023



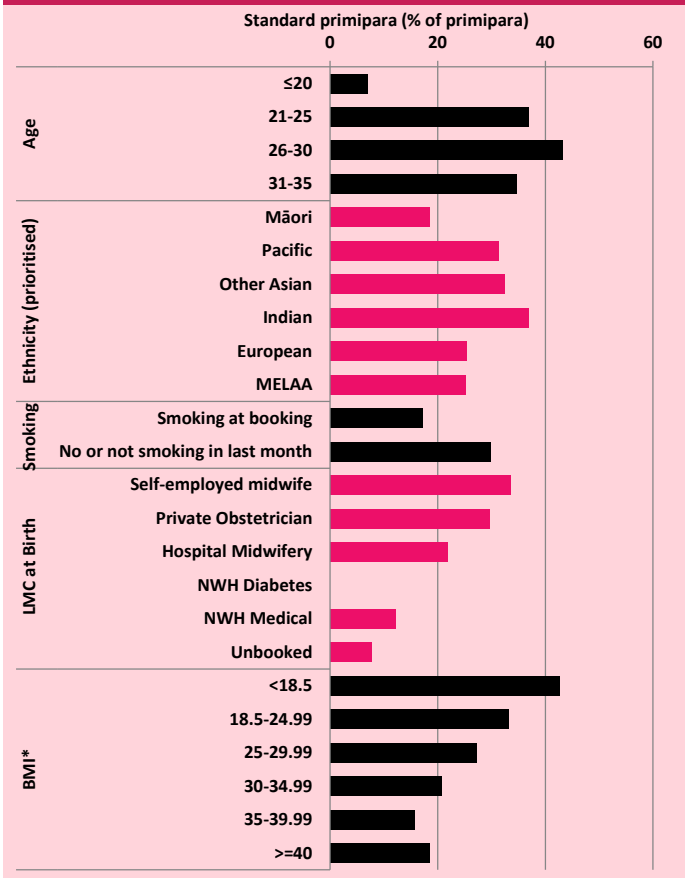
4.7 Standard primipara

A standard primiparous birthing person is defined at Te Toka Tumai as someone with no prior birth at 20 or more weeks gestation, aged 20-34 years at birth, with a singleton pregnancy, cephalic presentation, gestation 37-41 weeks at birth, with a normally grown pēpi (customised birthweight centile ≥10th), without medical disease (cardiac disease, renal disease, mental health disorder, SLE, HIV infection, CVA/ TIA, diabetes or hypertension), gestational diabetes, pregnancy induced hypertensive disease, antepartum haemorrhage or placenta praevia. This differs from the definition used by Manatū Hauora in the NZ Maternity Clinical Indicators report, which can be found in Table 3.1.

The standard primipara definition does not include restriction by BMI.

The objective of reporting outcomes for this tightly defined sub-group is to permit comparisons of similar risk profile wāhine between individual caregivers and with other institutions. In 2023, 29.5% of primiparous birthing people were defined as standard by the NWH definition. Mode of birth at term for standard primipara by LMC is presented in Figure 6.13.

Figure 4.21 Characteristics of standard primipara NWH 2023



* Missing data excluded

4.7.1 Data tables: Maternal Demography

Table 4.3 Locality of domicile of wāhine giving birth at NWH 2019-2023

Locality	2019 N=6660		2020 N=6212		2021 N=6462		2022 N=5925		2023 N=5700	
	n	%	n	%	n	%	n	%	n	%
Auckland	4373	65.7	4059	65.3	4274	66.1	3866	65.2	3687	64.7
Waitematā	970	14.6	945	15.2	917	14.2	839	14.2	802	14.1
Counties Manukau	1145	17.2	1088	17.5	1111	17.2	1093	18.4	1068	18.7

Northland	45	0.7	31	0.5	37	0.6	41	0.7	46	0.8
Other North Island	90	1.4	75	1.2	85	1.3	65	1.1	78	1.4
South Island	26	0.4	12	0.2	23	0.4	21	0.4	17	0.3
Overseas/ unknown	11	0.2	2	0.0	15	0.2	0	0	2	0.0

Table 4.4 Maternal age distribution NWH 2014-2023

	N	<20 yrs		21-25 yrs		26-30 yrs		31-35 yrs		36-40 yrs		>40 yrs	
		n	%	n	%	n	%	n	%	n	%	n	%
2014	7400	227	3.1	783	10.6	1891	25.6	2824	38.2	1390	18.8	285	3.9
2015	6933	187	2.7	677	9.8	1756	25.3	2623	37.8	1435	20.7	255	3.7
2016	7241	185	2.6	736	10.2	1877	25.9	2773	38.3	1381	19.1	289	4
2017	6846	162	2.4	637	9.3	1692	24.7	2669	39	1395	20.4	291	4.3
2018	6481	137	2.1	578	8.9	1622	25	2499	38.6	1372	21.2	273	4.2
2019	6660	148	2.2	527	7.9	1689	25.4	2585	38.8	1447	21.7	264	4
2020	6212	137	2.2	493	7.9	1516	24.4	2500	40.2	1317	21.2	249	4
2021	6462	111	1.7	496	7.7	1530	23.7	2648	41	1435	22.2	242	3.7
2022	5925	117	2	411	6.9	1240	20.9	2469	41.7	1424	24	264	4.5
2023	5700	130	2.3	428	7.5	1246	21.9	2351	41.2	1282	22.5	263	4.6

Table 4.5 Maternal age and parity NWH 2023

	Total		<=20 yrs		21-25 yrs		26-30 yrs		31-35 yrs		36-40 yrs		>40 yrs	
	n=	5700	n=	130	n=	428	n=	1246	n=	2351	n=	1282	n=	263
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nullipara	2790	48.9	116	89.2	258	60.3	768	61.6	1117	47.5	455	35.5	76	28.9
Multipara	2910	51.1	14	10.8	170	39.7	478	38.4	1234	52.5	827	64.5	187	71.1

Table 4.6 Time trends in nulliparity and multiparity NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of births	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Nullipara	3604	3321	3517	3343	3183	3202	2981	3204	3204	2790
%	48.7	47.9	48.6	48.8	49.1	48.1	48	49.6	49.6	48.9
Multipara	3796	3612	3724	3503	3298	3458	3231	3258	3258	2910
%	51.3	52.1	51.4	51.2	50.9	51.9	52	50.4	50.4	51.1

Table 4.7 Maternal prioritised ethnicity and age NWH 2023

	Total	Māori		Pacific		Indian		Other Asian		MELAA		European	
Age	**N**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Total	5700	509	8.9	765	13.4	833	14.6	1418	24.9	254	4.5	1921	33.7
<=20	130	55	42.3	49	37.7	1	0.8	3	2.3	6	4.6	16	12.3
21-25	428	101	23.6	160	37.4	17	4.0	62	14.5	16	3.7	72	16.8
26-30	1246	133	10.7	228	18.3	279	22.4	272	21.8	48	3.9	286	23.0
31-35	2351	141	6.0	200	8.5	376	16.0	653	27.8	97	4.1	884	37.6
36-40	1282	62	4.8	93	7.3	141	11.0	359	28.0	71	5.5	556	43.4
>40	263	17	6.5	35	13.3	19	7.2	69	26.2	16	6.1	107	40.7

Table 4.8 Prioritised maternal ethnicity and parity NWH 2023

	Total	European		Māori		Pacific		Other Asian		Indian		Other European		MELAA	
		n= 1358		n= 509		n= 765		n= 1418		n= 833		n= 563		n= 254	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nullipara	2790	661	48.7	184	36.1	288	37.6	764	53.9	480	57.6	298	52.9	115	45.3
Multipara	2910	697	51.3	325	63.9	477	62.4	654	46.1	353	42.4	265	47.1	139	54.7

Table 4.9 Smoking and socio economic deprivation (NZ Dep2018) NWH 2023

Deprivation decile	Total	Smoking at booking	
	5700	n=249	
	N	n	%
1	424	5	1.2
2	569	12	2.1
3	637	6	0.9
4	514	13	2.5
5	476	14	2.9
6	711	24	3.4
7	532	19	3.6
8	481	31	6.4
9	723	61	8.4
10	631	64	10.1
Overseas resident	2	0	0.0

Table 4.10 Smoking status at booking by prioritised ethnicity and maternal age NWH 2023

	Total	Smoking at booking	
	N	n%	
Total	5700	249	4.4%
Ethnicity			
Māori	509	134	26.3
Pacific	765	70	9.2
Indian	833	5	0.6
Other Asian	1418	8	0.6
MELAA/Other	254	2	0.8
European	1921	30	1.6
Age			
≤20	130	19	14.6
21-25	428	50	11.7
26-30	1246	75	6.0
31-35	2351	72	3.1
≥36	1545	33	2.1

Table 4.11 Smoking status at booking by LMC at birth NWH 2022

	Self-employed Midwife		Private Obstetrician		Hospital Midwifery		NW Diabetes		NW Medical		Unbooked	
	n= 2729		n= 1597		n= 1073		n= 102		n= 175		n= 24	
	n	%	n	%	n	%	n	%	n	%	n	%
Smoking at booking	58	2.1	8	0.5	145	13.5	12	11.8	19	10.9	7	29.2

Not smoking	2671	97.9	1589	99.5	928	86.5	90	88.2	156	89.1	17	70.8

Table 4.12 Prioritised ethnicity of wāhine birthing at NWH 2019–2023

	2019		2020		2021		2022		2023	
	N=6660		N=6212		n=6462		n=5925		n=5700	
	n	%	n	%	n	%	n	%	n	%
Māori	477	7.2	454	7.3	550	8.5	550	9.3	509	8.9
Indian	769	11.5	705	11.3	804	12.4	727	12.3	833	14.6
Chinese	1013	15.2	849	13.7	789	12.2	722	12.2	718	12.6
Other Asian	708	10.6	748	12	743	11.5	690	11.6	700	12.3
Samoan	291	4.4	275	4.4	254	3.9	270	4.6	285	5.0
Tongan	241	3.6	232	3.7	220	3.4	218	3.7	241	4.2
Cook Island	88	1.3	86	1.4	82	1.3	75	1.3	85	1.5
Niuean	56	0.8	60	1	54	0.8	68	1.1	79	1.4
Fijian	49	0.7	48	0.8	58	0.9	40	0.7	52	0.9
Other Pacific	34	0.5	25	0.4	22	0.3	21	0.4	23	0.4
NZ European	1923	28.9	1736	27.9	1793	27.7	1595	26.9	1429	25.1
Other European	710	10.7	687	11.1	763	11.8	662	11.2	487	8.5
MELAA	301	4.5	307	4.9	330	5.1	286	4.8	254	4.5
Other /not stated	0		18	0.3	0		1	0.0	5	0.1

Table 4.13 BMI ≥25 by deprivation quintile and prioritised maternal ethnicity NWH 2023

Ethnicities	Total			Dep Quintile 1			Dep Quintile 2		
	N	n	%	N	n	%	N	n	%
All	5700	2801	49.1	993	378	38.1	1151	489	42.5
Māori	509	366	71.9	57	35	61.4	57	39	68.4
Pacific	765	675	88.2	31	24	77.4	97	87	89.7
Indian	833	405	48.6	93	42	45.2	139	69	49.6
Other Asian	1418	440	31.0	237	59	24.9	338	91	26.9
MELAA	254	117	46.1	40	16	40.0	44	23	52.3
European*	1921	798	41.5	535	202	37.8	476	180	37.8

Ethnicities	Dep Quintile 3			Dep Quintile 4			Dep Quintile 5		
	N	n	%	N	n	%	N	n	%
All	1187	582	49.0	1013	517	51.0	1354	835	61.7
Māori	92	72	78.3	92	68	73.9	211	152	72.0
Pacific	133	124	93.2	165	142	86.1	338	298	88.2
Indian	206	105	51.0	169	71	42.0	226	118	52.2
Other Asian	323	100	31.0	253	84	33.2	266	106	39.8
MELAA	57	29	50.9	47	21	44.7	66	28	42.4
European*	376	152	40.4	287	131	45.6	247	133	53.8

*Include NZ European and other European

Table 4.14 Deprivation Quintile (NZ Dep2018) by prioritised maternal ethnicity NWH 2023

	Māori		Pacific		Other Asian		Indian		MELAA		NZ European		Other European	
Deprivation quintile	n=	509	n=	765	n=	1418	n=	833	n=	254	n=	1358	n=	563
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 (Least deprived)	57	11.2	31	4.1	237	16.7	93	11.2	40	15.7	365	26.9	170	30.2

2	57	11.2	97	12.7	338	23.8	139	16.7	44	17.3	346	25.5	130	23.1
3	92	18.1	133	17.4	323	22.8	206	24.7	57	22.4	257	18.9	119	21.1
4	92	18.1	165	21.6	253	17.8	169	20.3	47	18.5	216	15.9	71	12.6
5 (Most deprived)	211	41.5	338	44.2	266	18.8	226	27.1	66	26.0	174	12.8	73	13.0
Unknown	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0

Table 4.15 Deprivation Quintile (NZ Dep2018) and maternal age (years at birth) NWH 2023

Deprivation quintile	<=20		21-25		26-30		31-35		36-40		>40	
	n=130		n=428		n=1246		n=2351		n=1282		n=263	
	n	%	n	%	n	%	n	%	n	%	n	%
1 (least)	4	3.1	35	8.2	166	13.3	446	19.0	282	22.0	60	22.8
2	18	13.8	53	12.4	219	17.6	497	21.1	313	24.4	51	19.4
3	21	16.2	63	14.7	277	22.2	516	21.9	257	20.0	53	20.2
4	17	13.1	92	21.5	245	19.7	396	16.8	214	16.7	49	18.6
5 (most)	70	53.8	185	43.2	339	27.2	495	21.1	216	16.8	49	18.6
Unknown	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.4

Table 4.16 LMC at birth NWH 2019-2023

	2019		2020		2021		2022		2023	
	n=6660		n=6212		N=6462		N=5925		N=5700	
	n	%	n	%	n	%	n	%	n	%
Self-employed midwife	2891	43.4	2769	44.6	3052	47.2	2812	47.5	2729	47.9
Private Obstetrician	1933	29	1799	29	1816	28.1	1700	28.7	1597	28.0
General Practitioner	4	0.1	7	0.1	2	0.0	0	0.0	0	0.0
NWH Community	1357	20.4	1139	18.3	1161	18.0	1075	18.1	1073	18.8
NWH Diabetes	142	2.1	181	2.9	122	1.9	98	1.7	102	1.8
NWH MFM	248	3.7	237	3.8	229	3.5	212	3.6	175	3.1
Other DHB	27	0.4	44	0.7	38	0.6	0	0.0	0	0.0
Unbooked	58	0.9	36	0.6	42	0.6	28	0.5	24	0.4

Table 4.17 LMC at birth and maternal age (years at birth) NWH 2023

	Total	<=20		21-25		26-30		31-35		36-40		>40	
	N	n	%	n	%	n	%	n	%	n	%	n	%
Total	5700	130	2.3	428	7.5	1246	21.9	2351	41.2	1282	22.5	263	4.6
Self-employed Midwife	2729	46	1.7	195	7.1	694	25.4	1195	43.8	511	18.7	88	3.2
Private Obstetrician	1597	1	0.1	17	1.1	189	11.8	727	45.5	546	34.2	117	7.3
Hospital midwifery	1073	67	6.2	179	16.7	293	27.3	333	31.0	165	15.4	36	3.4
NW Diabetes	102	1	1.0	7	6.9	22	21.6	40	39.2	25	24.5	7	6.9
NW Medical	175	8	4.6	25	14.3	43	24.6	51	29.1	34	19.4	14	8.0
Unbooked	24	7	29.2	5	20.8	5	20.8	5	20.8	1	4.2	1	4.2

Table 4.18 LMC at birth and prioritised maternal ethnicity NWH 2023

	Total	Māori		Pacific		Other Asian		Indian		MELAA		NZ European		Other European	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	5700	509	8.9	765	13.4	1418	24.9	833	14.6	254	4.5	1358	23.8	563	9.9
Self-employed Midwife	2729	174	6.4	336	12.3	763	28.0	509	18.7	135	4.9	534	19.6	278	10.2

Private Obstetrician	1597	51	3.2	31	1.9	459	28.7	135	8.5	47	2.9	665	41.6	209	13.1
Hospital midwifery	1073	214	19.9	308	28.7	169	15.8	154	14.4	63	5.9	100	9.3	65	6.1
NW Diabetes	102	19	18.6	38	37.3	14	13.7	16	15.7	3	2.9	11	10.8	1	1.0
NW Medical	175	39	22.3	42	24.0	13	7.4	19	10.9	6	3.4	47	26.9	9	5.1
Unbooked	24	12	50.0	10	41.7	0	0.0	0	0.0	0	0.0	1	4.2	1	4.2

Table 4.19 LMC at birth and parity NWH 2023

	Total	Nullipara		Standard primipara		Multipara		Multipara previous CS	
	N	n	%	n	%	n	%	n	%
Total	5700	2790	48.9	822	14.4	2910	51.1	1087	19.1
Self-employed midwife	2729	1395	51.1	469	17.2	1334	48.9	394	14.4
Private Obstetrician	1597	810	50.7	240	15.0	787	49.3	390	24.4
NWH Community	1073	478	44.5	104	9.7	595	55.5	232	21.6
NWH Diabetes	102	28	27.5	0	0.0	74	72.5	29	28.4
NWH MFM	175	66	37.7	8	4.6	109	62.3	38	21.7
Unbooked	24	13	54.2	1	4.2	11	45.8	4	16.7

Table 4.20 Deprivation decile (NZ Dep2018) by LMC NWH 2023

	Self-employed midwife		Private obstetrician		NW community		NW diabetes		NW medical		Unbooked	
	n=2729		n=1597		n=1073		n=102		n=175		n=24	
	n	%	n	%	n	%	n	%	n	%	n	%
1	149	5.5	242	15.2	26	2.4	2	2.0	5	2.9	0	0.0
2	241	8.8	254	15.9	58	5.4	4	3.9	11	6.3	1	4.2
3	286	10.5	248	15.5	79	7.4	6	5.9	15	8.6	3	12.5
4	234	8.6	184	11.5	77	7.2	7	6.9	9	5.1	3	12.5
5	221	8.1	155	9.7	78	7.3	7	6.9	13	7.4	2	8.3
6	388	14.2	161	10.1	122	11.4	19	18.6	20	11.4	1	4.2
7	282	10.3	113	7.1	101	9.4	13	12.7	20	11.4	3	12.5
8	264	9.7	87	5.4	100	9.3	15	14.7	13	7.4	2	8.3
9	368	13.5	97	6.1	201	18.7	21	20.6	32	18.3	4	16.7
10	296	10.8	55	3.4	231	21.5	8	7.8	36	20.6	5	20.8
Unknown	0	0.0	1	0.1	0	0.0	0	0.0	1	0.6	0	0.0

Table 4.21 Demographic characteristics of standard and non-standard primipara NWH 2023

	Total primipara	Standard primipara		Non-standard primipara	
	N	n	%	n	%
Total	2790	822	29.5	1968	70.5
Age					
<=20	116	8	6.9	108	93.1
21-25	258	95	36.8	163	63.2
26-30	768	332	43.2	436	56.8
31-35	1117	387	34.6	730	65.4
36-40	455	0	0.0	455	100.0
>40	76	0	0.0	76	100.0
Ethnicity (prioritised)					

Māori	184	34	18.5	150	81.5
Pacific	288	90	31.3	198	68.8
Indian	480	177	36.9	303	63.1
Other Asian	764	248	32.5	516	67.5
European	959	244	25.4	715	74.6
MELAA	115	29	25.2	86	74.8
Other/not stated	0	0	0.0	0	0.0
LMC at birth					
Self-employed Midwife	1395	469	33.6	926	66.4
Private Obstetrician	810	240	29.6	570	70.4
NW Community	478	104	21.8	374	78.2
NW Diabetes	28	0	0.0	28	100.0
NW MFM	66	8	12.1	58	87.9
Unbooked	13	1	7.7	12	92.3
Smoking at booking					
Yes	76	13	17.1	63	82.9
No or not smoking in last month	2714	809	29.8	1905	70.2
Missing	0	0	0.0	0	0.0
BMI					
<18.5	108	46	42.6	62	57.4
18.5-24.99	1444	480	33.2	964	66.8
25-29.99	716	195	27.2	521	72.8
30-34.99	290	60	20.7	230	79.3
35-39.99	115	18	15.7	97	84.3
>=40	92	17	18.5	75	81.5
Missing	25	6	24.0	19	76.0

5

CHAPTER 5

ANTENATAL COMPLICATIONS

ŪPOKO 5

POAUAUTANGA HAPŪTANGA

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5.1 Small and large for gestational age pēpi

Dr Audrey Long

Customised birthweight centiles, which adjust size at birth for gestation, pēpi sex, maternal ethnicity, height, booking weight, and parity, are used to define size at birth in the maternity service at NWH.

SGA (Small for gestational age) is defined as birthweight <10th customised centile. Customised centiles define 10% of the "normal" population as SGA with the consequence that rates of SGA in a complex population like NWH are more than 10%(15.8% in 2023).

LGA (large for gestational age) is defined as birthweight >90th customised centile.

A customised centile is not calculated among perinatal deaths if gestation at stillbirth is before 20 weeks, unknown, or more than one week prior to birth.

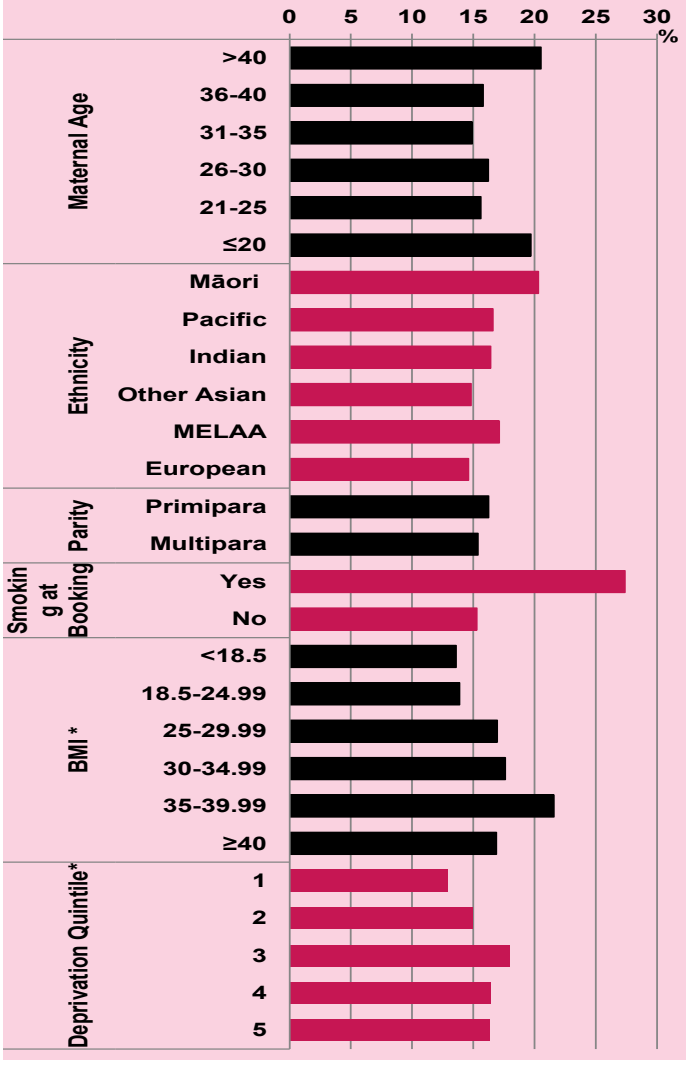
Key Findings

- SGA is associated with both young and advanced maternal age, smoking, high BMI, socioeconomic deprivation, Māori/Pacific/Indian/MELAA ethnicity with all ethnic groups having lower rates than wāhine Māori. These factors are not necessarily causative and are associated with each other.
- The rate of SGA is almost twofold in pregnant people who smoke.
- SGA is associated with increased morbidity and mortality, with increased stillbirth rates.
- SGA is associated with increased spontaneous and provider initiated preterm birth, admission to NICU and longer stays in NICU.
- There has been a statistically significant reduction in perinatal related mortality rate among SGA non-anomalous singleton pēpi born from 26 weeks gestation between 2008 and 2023 (chi square test for trend p=0.002) (Figure 5.7). Over the same time period there has been no change in perinatal mortality in AGA pēpi. We are not able to determine whether this is due to better detection or better management of SGA, due to the limitations of our dataset.
- LGA is associated with birth by Caesarean section before labour

Recommendations

- Modify risk factors- support women to stop smoking and vaping, refer to Smoke free services, use of nicotine replacement therapy.
- Identify at risk pregnancies and prescribe low dose aspirin prior to 16 weeks (previous SGA, previous stillbirth, BMI>35, hypertensive disease, multiple pregnancies, antepartum vaginal bleeding, advanced maternal age)
- See NZCOM/RANZCOG guidance www.midwife.org.nz/wp-content/uploads/2018/12/Guidance-regarding-the-use-of-low-dose-aspirin-in-the-prevention-of-pre-eclampsia-in-high-risk-women.pdf
- Serial fundal height measurements should be plotted on a customised growth chart with serial growth scans for high risk women
- LMC clinicians attending birth should complete the data on whether SGA was expected or not in Badgernet, to aid our understanding of reduced perinatal mortality rate
- Send placenta for histopathology for cases of SGA, to identify treatable causes for SGA
- Consider induction of labour at 37+0-38+6 weeks for selected cases LGA to prevent shoulder dystocia (Boulvain trial 2015)

Figure 5.1 Rates of SGA (customised) by demographic characteristics NWH 2023



*36 missing BMI, 2 missing deprivation quintile excluded

Figure 5.2 Outcomes among SGA, LGA and AGA pēpi born preterm NWH 2023 (excluding congenital abnormalities)

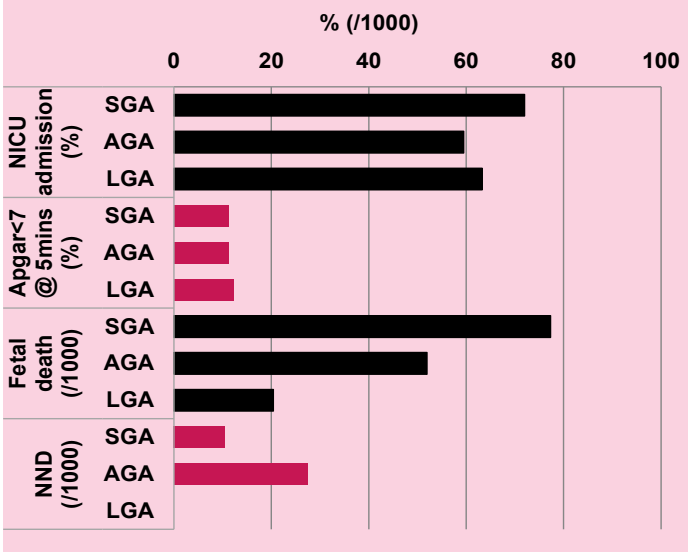


Figure 5.3 Perinatal related mortality rate (/1000 births) among SGA, AGA, and LGA singleton non-anomalous pēpi born at ≥26 weeks 2008-2023

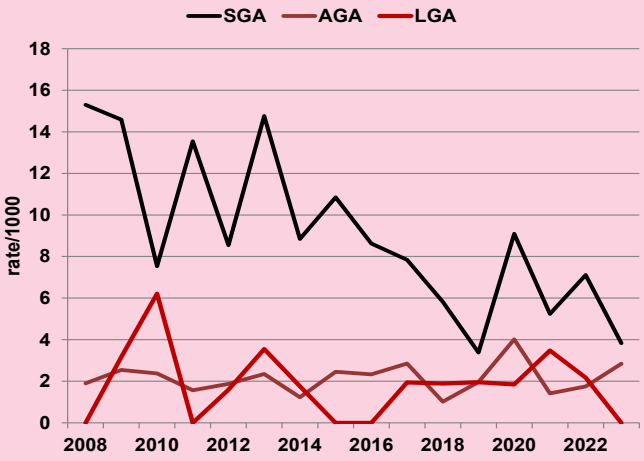
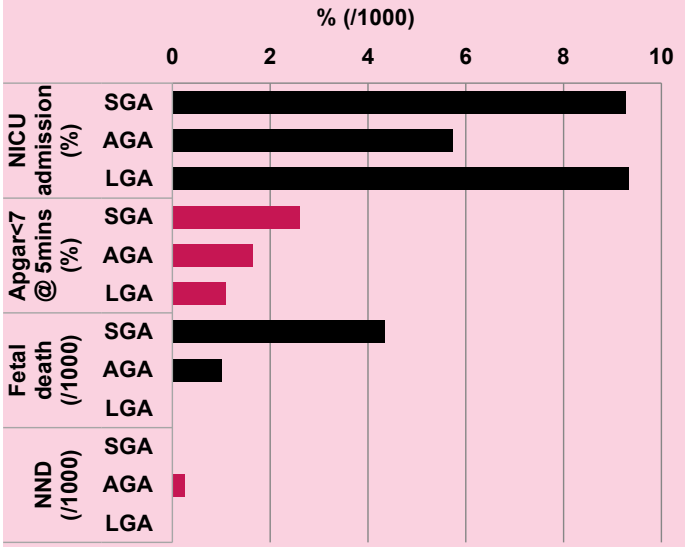


Figure 5.4 Outcomes among SGA, LGA and AGA pēpi born at term NWH 2023 (excluding congenital abnormalities)



5.1.1 Data tables: Small and large for gestational age pēpi

Table 5.1 Birthweight and gestation at birth among SGA, LGA and appropriately grown (AGA) pēpi excluding congenital abnormalities* NWH 2023

	Customised Birthweight<10th% (SGA)		Customised Birthweight≥10th% & ≤90th% (AGA)		Customised Birthweight>90th% (LGA)	
	n	%	n	%	n	%
Total	897		4381		509	
Median birth weight(IQR) (g)	2437(2219-2880)		3277(3056-3610)		3925(3720-4230)	
Gestation at birth						
Term	690	76.9	3996	91.2	460	90.4
Preterm	207	23.1	385	8.8	49	9.6
Preterm <32 wks	64	7.1	121	3.0	9	1.8
Median gestation (IQR) weeks	37(37-39)		38(38-40)		38(37-39)	

* Excluding congenital abnormalities associated with perinatal death

Table 5.2 Rates of SGA and LGA as defined by customised birthweight centiles by demographic characteristics NWH 2023

	Total Pēpi	Customised Birthweight<10th%(SGA)		Customised Birthweight ≥10th% & ≤90th%(AGA)		Customised Birthweight>90th%(LGA)	
	N	n	%	n	%	n	%
Total	5821	920	15.8	4390	75.4	511	8.8
Maternal Age (yrs)							
≤20	132	26	19.7	97	73.5	9	6.8
21-25	436	68	15.6	331	75.9	37	8.5
26-30	1277	207	16.2	963	75.4	107	8.4
31-35	2397	357	14.9	1837	76.6	203	8.5
36-40	1311	207	15.8	977	74.5	127	9.7
>=40	268	55	20.5	185	69.0	28	10.4
Ethnicity							
Māori	517	105	20.3	371	71.8	41	7.9
Pacific	783	130	16.6	578	73.8	75	9.6
Indian	847	139	16.4	633	74.7	75	8.9
Other Asian	1439	213	14.8	1115	77.5	111	7.7
MELAA	263	45	17.1	194	73.8	24	9.1
European	1972	288	14.6	1499	76.0	185	9.4
Parity							
Multipara	2966	456	15.4	2234	75.3	276	9.3
Primipara	2855	464	16.3	2156	75.5	235	8.2
Deprivation quintile							
1	1015	131	12.9	803	79.1	81	8.0
2	1177	176	15.0	892	75.8	109	9.3
3	1218	219	18.0	900	73.9	99	8.1
4	1035	170	16.4	774	74.8	91	8.8
5	1374	224	16.3	1019	74.2	131	9.5
Missing	2	0	0.0	2	100.0	0	0.0
Smoking at booking							
Currently smoking	252	69	27.4	170	67.5	13	5.2
Not smoking	5569	851	15.3	4220	75.8	498	8.9
BMI							
<18.5	184	25	13.6	141	76.6	18	9.8
18.5-24.99	2731	379	13.9	2122	77.7	230	8.4
25-29.99	1463	248	17.0	1100	75.2	115	7.9
30-34.99	750	132	17.6	537	71.6	81	10.8
35-39.99	343	74	21.6	232	67.6	37	10.8
≥40	314	53	16.9	235	74.8	26	8.3
Missing	36	9	25.0	23	63.9	4	11.1
Plurality							
Singleton	5581	819	14.7	4256	76.3	506	9.1
Multiple	240	101	42.1	134	55.8	5	2.1

Table 5.3 Onset of birth and neonatal outcomes among SGA, LGA and AGA pēpi born at term NWH 2023 (excluding congenital abnormalities*)

	Customised Birthweight<10th% (SGA)		Customised Birthweight ≥10th% & ≤90th% (AGA)		Customised Birthweight>90th% (LGA)	
	n= 690		n= 3996		n= 460	
	n	%	n	%	n	%
Onset of birth						
Spontaneous	204	29.6	1537	38.5	107	23.3
Induced - Successful	310	44.9	1455	36.4	150	32.6
Caesarean Section Before Labour (including failed induction)	176	25.5	1004	25.1	203	44.1
NICU admission						
Any stay	64	9.3	229	5.7	43	9.3
≥2 days in NICU	43	6.2	132	3.3	21	4.6
Apgar at 5 mins < 7	18	2.6	66	1.7	5	1.1
Fetal death (n/1000)	3	4.3	4	1.0	0	0.0
Neonatal death (n/1000 live births)	0	0.0	1	0.3	0	0.0

* Excluding congenital abnormalities associated with perinatal death

Table 5.4 Onset of birth and neonatal outcomes among SGA, LGA and AGA pēpi born preterm NWH 2023 (excluding congenital abnormalities*)

	Customised Birthweight<10th% (SGA)		Customised Birthweight ≥10th% & ≤90th% (AGA)		Customised Birthweight>90th% (LGA)	
	n= 207		n= 385		n= 49	
	n	%	n	%	n	%
Onset of birth						
Spontaneous preterm	68	32.9	243	63.1	26	53.1
Provider initiated preterm	139	67.1	142	36.9	23	46.9
NICU admission						
Any stay	149	72.0	229	59.5	31	63.3
≥2 days in NICU	144	69.6	210	54.5	31	63.3
Apgar at 5 mins < 7	23	11.1	43	11.2	6	12.2
Fetal death (n/1000)	16	77.3	20	51.9	1	20.4
Neonatal death (n/1000 live births)	2	10.5	10	27.4	0	0.0

* Excluding congenital abnormalities associated with perinatal death

5.2 Multiple Pregnancy

Dr Audrey Long

This section describes the characteristics and outcomes of wāhine who gave birth to twins and triplets at NWH during 2023, and the outcomes of their pēpi. The Badgernet database enables us to differentiate between twins based on chorionicity and amnionicity as long as these data are entered by clinicians. These data should be entered in the risk sheet under "current fetal risk factor" field.

Key Findings

- The proportion of twin pregnancies birthed at NWH from 2014 to 2023 has remained fairly stable.
- Perinatal mortality rate among pēpi in multiple pregnancies was higher compared to singleton pregnancies, 29.9/1000 versus 14.7/1000 births in singletons.
- Perinatal mortality rate 29.9/1000 appears lower than 2022 (when it was 49/1000) but this is highly variable by year and probably due to statistical variation from small numbers rather than because of any real change.
- To some extent the differences in mortality

rate reflect differences in reporting a case as a perinatal death. One reason why the perinatal death rate appears higher in twins, is that time of fetal demise is calculated at time of birth. Several foetuses demised prior to 20 weeks. Terminations of pregnancy were also included in the numbers for fetal demise. We cannot provide details on this for privacy reasons.

- The rate of perinatal mortality has varied a great deal over the last 10 years and this probably reflects the small absolute numbers. There has been no significant change in perinatal mortality among twin pēpi born at NWH from 2014 to 2023
- 70% of all women with multiple pregnancies birthed by caesarean section.
- 17% birthed by elective CS and 53% by emergency CS
- There were 3 cases (2.6%) where the second twin was born by CS following vaginal birth of the first twin.
- In 2022 there has been a change in definition of elective caesarean section to align with HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list or in labour is included with emergency CS. This has resulted in apparent increase in emergency CS for multiple pregnancy and a decrease in elective CS.
- Overall there is a gradual increase in CS for multiple pregnancy, which reflects the overall gradual increase in CS for any indication.
- The rate of preterm birth is high; 100% of triplets are born preterm and 73% of all twins, compared to singleton preterm birth rate of 8.8%.
- All MCDA twins are born prior to 37 weeks, because in uncomplicated MCDA twin pregnancies the recommended time for delivery is 36 weeks. The high preterm birth rate is the main reason for the high rate of NICU admission for ≥2 days. This rate is over six times higher in twins compared to singletons (50.9% vs 11.3%).
- All triplet pregnancies are born preterm, because the recommended gestation for birthing in uncomplicated triplet pregnancy is 35 weeks.

Figure 5.5 Twin perinatal mortality rate (per 1000 twin pēpi) NWH 1997-2023 with 95% confidence intervals

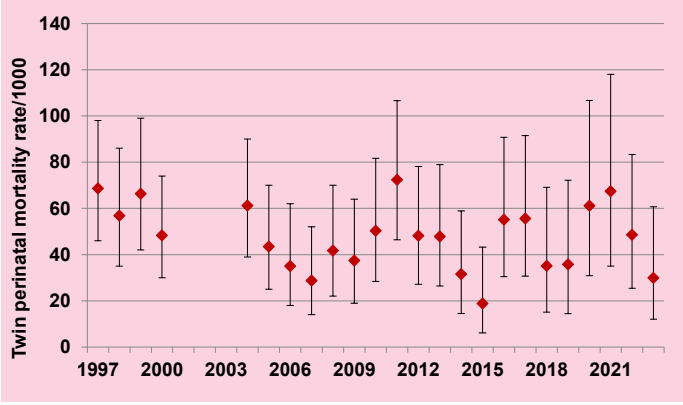
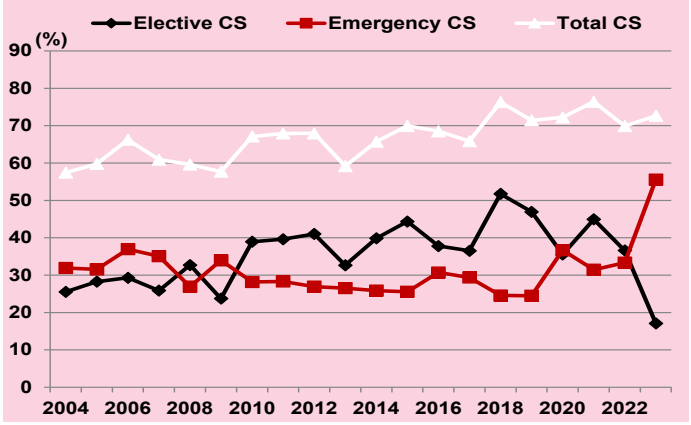


Figure 5.6 Caesarean section rate among twin births (2004-2023)



5.2.1 Data tables: Multiple Pregnancy

Table 5.5 Mode of onset of birth among twin pregnancies (māmās) by gestation at birth NWH 2023

	Preterm births N= 85		Term births N= 32	
	n	%	n	%
Mode of onset of birth				
Caesarean Section Before Labour (including failed induction)	46	54.1	20	62.5
Induced - Successful	7	8.2	10	31.3
Spontaneous	32	37.6	2	6.3

Table 5.6 Perinatal-related deaths in twin pregnancies by gestation at birth NWH 2023

	Twin pregnancies			
	One twin died		Both twins died	
	n= 4		n= 4	
Gestation at birth (weeks)	**n**	**Outcome**	**n**	**Outcome**
20 – 23			4	3 FD, 1 ENND

24 – 27	2	1 FD, 1 LNND
28 – 31	1	1 ENND
32 – 36		
37 – 40	1	1 FD

FD = fetal death
ENND = Early neonatal death
LNND = Late neonatal death
Table reflects timing of birth of demised pēpi rather than estimated time of death in utero.

Table 5.7 Multiple pregnancy rates NWH 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total number of multiple pregnancies	147	137	127	127	115	100	94	91	124	119
Incidence %	2	1.9	1.8	1.9	1.8	1.5	1.5	1.4	2.1	2.1
Number of twin pregnancies	143	133	127	126	114	98	90	89	123	117
Number of triplet pregnancies	4	4	0	1	1	2	4	2	1	2

Table 5.8 Fetal/neonatal outcomes of multiple pregnancies NWH 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total number of pēpi born in a multiple pregnancy	298	278	254	255	231	202	192	182	250	240
Incidence %	4	3.9	3.4	3.7	3.5	3	3	2.8	4.1	4.1
Number of multiple pregnancies where one or more pēpi died	8	5	13	12	8	6	10	9	9	7
Incidence % (no. of multiple pregnancies where a pēpi died/ number of multiple pregnancies)	5.4	3.6	10.2	9.4	7	6	10.6	9.8	6.4	5.9
Number of pēpi who died in a multiple pregnancy	10	6	15	16	11	7	13	12	12	9
Total number of pēpi born in a twin pregnancy	286	266	254	252	228	196	180	178	247	234
Twin perinatal deaths (<7 days)	9	5	14	14	8	7	11	12	12	7
Twin perinatal mortality rate*	31.5	18.8	55.1	55.6	35.1	35.7	61.1	67.4	49	29.9

Table 5.9 Mode of birth among twin pregnancies NWH 2019–2023

	2019		2020		2021		2022		2023	
	N=98		N=90		N= 89		N= 123		N= 117	
	n	%	n	%	n	%	n	%	n	%
SVB/vaginal breech both twins	22	22.4	22	24.4	18	20.2	29	23.6	28	23.9
SVB 1st twin, operative vaginal 2nd twin	1	1.0	1	1.1	0	0.0	2	1.6	2	1.7
Operative vaginal 1st twin, SVB 2nd twin	4	4.1	0	0.0	0	0.0	4	3.3	0	0.0
Operative vaginal birth both twins	1	1.0	2	2.2	2	2.2	2	1.6	2	1.7
SVB 1st twin, Caesarean section 2nd twin	2	2.0	0	0.0	1	1.1	0	0.0	3	2.6
Operative vaginal birth 1st twin, Caesarean section 2nd twin	1	1.0	0	0.0	1	1.1	0	0.0	0	0.0
CS elective both twins	46	46.9	32	35.6	40	44.9	46	37.4	20	17.1
CS emergency both twins	21	21.4	33	36.7	27	30.3	40	32.5	62	53.0

SVB = spontaneous vaginal birth
CS = Caesarean section
* Elective CS has been redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS.

Table 5.10 Fetal/newborn outcomes of live born singleton and twin babies NWH 2023

	Singleton babies			Twin babies		
	Total Singletons			Total Twins		
	N	n	%	N	n	%
Admission to NICU	5521	629	11.4	229	119	52.0
Admission to NICU ≥2 days	5521	474	8.6	229	109	47.6
≤34 weeks	212	202	95.3	94	88	93.6
35-36	227	76	33.5	72	16	22.2
≥37 weeks	5082	196	3.9	63	5	7.9
Apgar<7 at 5 minutes	5521	149	2.7	229	20	8.7
Preterm birth	5521	439	8.0	229	166	72.5

5.3 Diabetes

Dr Stephanie Cox

The data in this section relate to wāhine with a diagnosis of pre-existing diabetes (Type 1 and 2), diabetes diagnosed for the first time in pregnancy and gestational diabetes (GDM), who birthed from 20 weeks' at NWH in 2023.

The change from Healthware to Badgernet as our maternity electronic maternity record has led to some changes in the ability to capture data. We no longer capture the data on hypoglycaemic outcomes for neonates or postnatal HbA1c testing for diabetes among māmās at 3 months. We asked our year 6 medical students to audit a sample of patients who had GDM in 2023 to estimate the postnatal testing rate. The findings are discussed in the relevant section and the full audit is available for staff to view on the National Women's website.

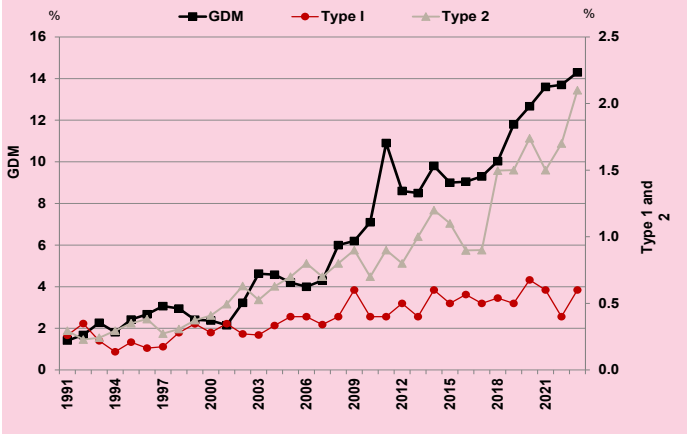
Key findings

- There has been a steep rise in rates of GDM and Type 2 Diabetes, following a small dip during the COVID pandemic which was likely due to underdiagnosis. We expect levels to continue to rise in coming years in step with increases in diabetes outside of pregnancy.
- Rates of Type 2 Diabetes have increased sharply in wāhine Māori, back to the level expected from previous growth rates. This supports the hypothesis that these patients were more impacted by the COVID pandemic and missed out on antenatal care and diagnostic testing. While the increasing rates are a cause for concern, it is reassuring to see these return to predicted levels and mirror other populations.
- Patients who are domiciled in other regions make up a significant proportion of our work. 38% of patients cared for through our Diabetes service come from other regions, with just under 40% of our patients with Type 1 and Type 2 Diabetes being domiciled in the Waitematā region, and almost a quarter of patients with GDM coming from the Counties Manukau region.
- Rates of pre-eclampsia are low for a Diabetes in Pregnancy population, reflecting the high rates of glycaemic control achieved by our team.
- There appears to be a trend towards increasing Caesarean births with a corresponding decrease in spontaneous vaginal births, after a long period of stability. The difference is predominantly among wāhine with type 1 and 2 diabetes, with rates in GDM being similar to the non-diabetic population.

Other comments

- We are expecting the release of new National Guidelines for Diabetes in Pregnancy in late 2024. We anticipate these will contain new diagnostic criteria for GDM based on a 1hr OGTT, and recommend treatment for hyperglycaemia in early pregnancy based on early OGTT or HbA1c 42-49mmol/mol. We support these evidence based changes, but the new criteria will lead to a major increase in diagnoses of gestational diabetes, with implications for service resourcing.
- We continue to work towards a more regional approach to service funding and planning. Our current model where we are looking after a significant number of wāhine from outside the Auckland region is not sustainable long term. Strengthening our neighbouring services in

Figure 5.7 Prevalence of diabetes (% of all inborn and BBA births) NWH 1991-2023



Tāmaki Makaurau is vital to allow more wāhine to have care in their own community and reduce differences in care by "postcode lottery".

- In 2023 we established a weekly High Risk Diabetes MDT meeting to allow discussion of complex cases in a supportive environment. We have now opened this up to our colleagues from Counties Manukau and Waitematā via Telehealth so that they can also contribute to discussions and receive collegial support from our experienced team.
- We must continue to try to improve access to care for Māori and others who struggle with engagement with the service. Going forwards into 2024 we plan to work on developing a "non-engagement with care pathway" to provide individualised, culturally appropriate wrap around support for these vulnerable wāhine.

5.3.1 Perinatal Losses

There were 6 perinatal losses this year, which is the lowest number in the past 10 years, and only 35% of the rate in the non-diabetic population at 6.2 vs 17.9/1000 births. Of these losses, 3 were to wāhine in their 40s, with two of these babies having major structural abnormalities. None of these wāhine had high HbA1c levels in early pregnancy, so diabetes was not likely to be the cause of these issues. The other 3 losses related to antepartum haemorrhages, with one placental abruption and 2 cases where bleeding led to very pre-term labour and birth.

5.3.2 Demographic characteristics of wāhine with diabetes NWH 2023

Figure 5.8 Incidence of diabetes by ethnic group NWH 2023

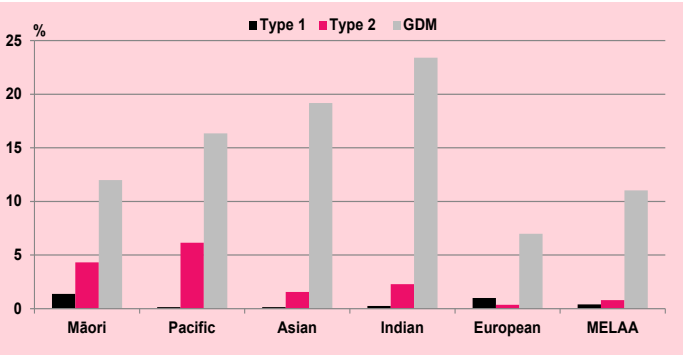


Figure 5.9 Annual trends in rate of Gestational Diabetes by ethnicity grouping and overall NWH 2006-2023

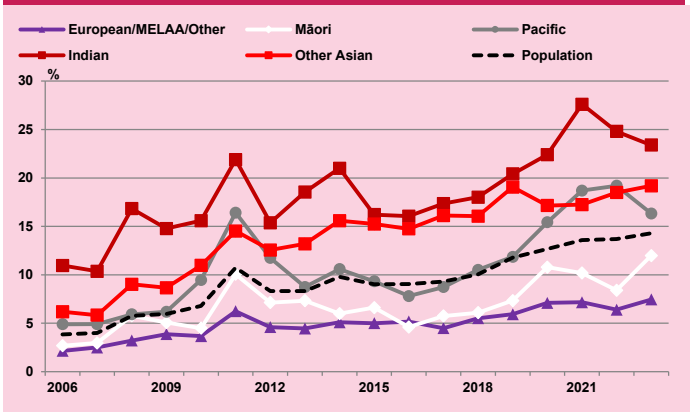


Figure 5.10 Annual trends in rate of Type 2 Diabetes by ethnicity grouping and overall NWH 2006-2023

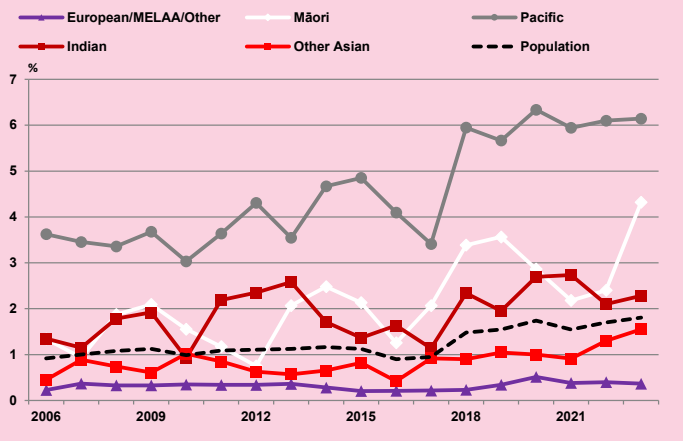
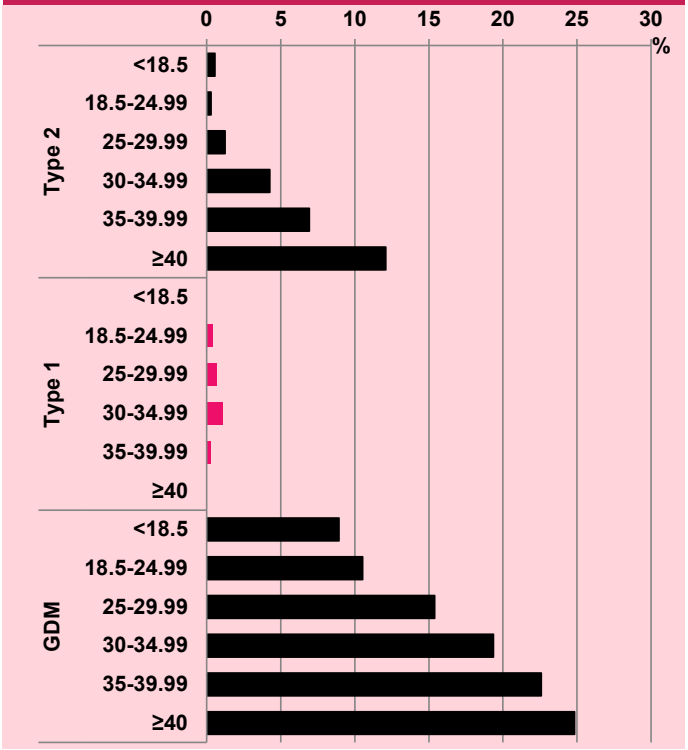


Figure 5.11 Incidence of diabetes by maternal BMI* NWH 2023



* Missing BMI excluded

5.3.3 Maternal interventions and outcomes of pregnancies complicated by diabetes 2023

Figure 5.12 Mode of birth among wāhine with GDM NWH 1999-2023

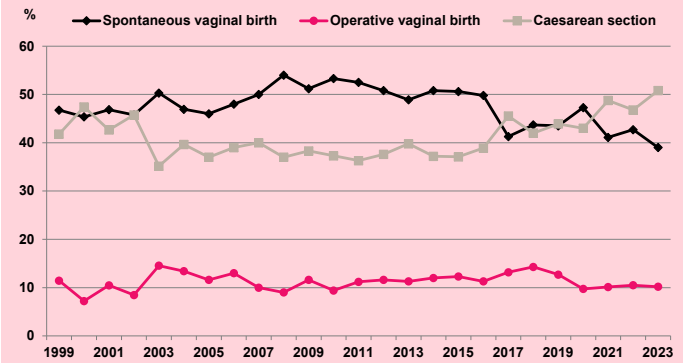


Figure 5.13 Mode of birth among wāhine with GDM NWH 2023

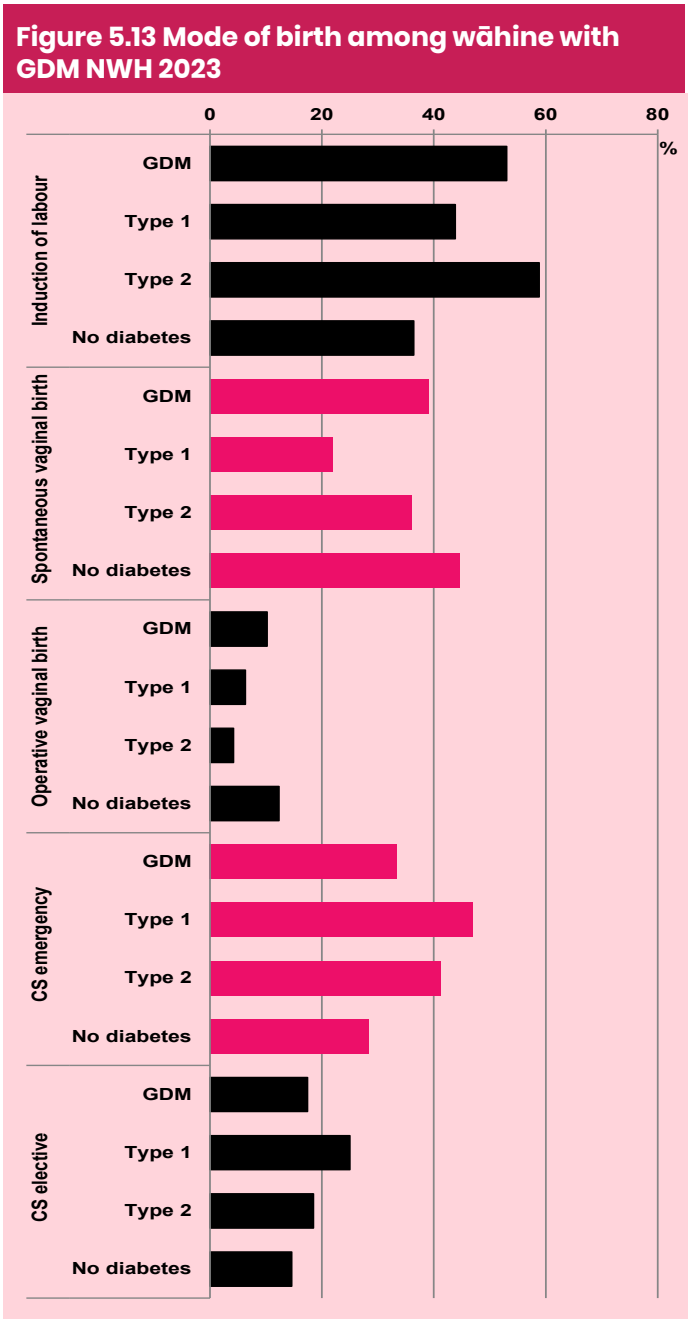
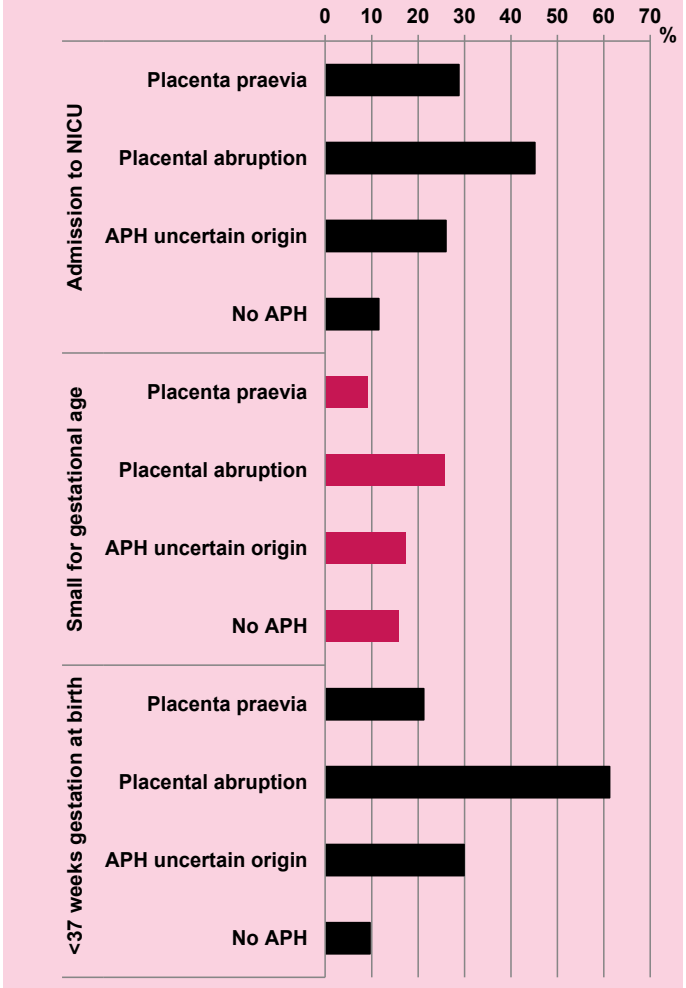


Figure 5.14 Neonatal outcomes among wāhine with GDM NWH 1999-2023



5.3.4 Data tables: Diabetes

Table 5.11 Wāhine with diabetes birthing at NWH at or beyond 20 weeks gestation 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Type I	42	34	41	33	35	31	42	37	24	32
Type 2	86	78	65	65	96	104	108	100	99	119
GDM	725	626	655	637	651	794	787	878	812	815

Table 5.12 Perinatal related deaths (2014 – 2023) among births complicated by diabetes										
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total number of perinatal related losses	9	6	8	9	13	9	9	7	13	6
Perinatal related loss rate /1000	11	8	10	12	16	10	9	7	14	6

Table 5.13 Demographic characteristics of wāhine with diabetes NWH 2022									
		Type 1		Type 2		GDM		No Diabetes	
	N	n=	32	n=	119	n=	815	n=	4734
		n	%	n	%	n	%	n	%
Age (yrs)									
<=20	130	0	0.0	3	2.3	7	5.4	120	92.3
21-25	428	3	0.7	7	1.6	41	9.6	377	88.1
26-30	1246	11	0.9	19	1.5	159	12.8	1057	84.8
31-35	2351	10	0.4	48	2.0	325	13.8	1968	83.7
36-40	1282	8	0.6	34	2.7	217	16.9	1023	79.8
41+	263	0	0.0	8	3.0	66	25.1	189	71.9
Ethnicity									
Māori	509	7	1.4	22	4.3	61	12.0	419	82.3
Pacific	765	1	0.1	47	6.1	125	16.3	592	77.4
Asian	1418	2	0.1	22	1.6	272	19.2	1122	79.1
Indian	833	2	0.2	19	2.3	195	23.4	617	74.1
European	1921	19	1.0	7	0.4	134	7.0	1761	91.7
MELAA	254	1	0.4	2	0.8	28	11.0	223	87.8
BMI									
<18.5	179	0	0.0	1	0.6	16	8.9	162	90.5
18.5-24.99	2686	12	0.4	8	0.3	283	10.5	2383	88.7
25-29.99	1435	10	0.7	18	1.3	221	15.4	1186	82.6
30-34.99	728	8	1.1	31	4.3	141	19.4	548	75.3
35-39.99	332	1	0.3	23	6.9	75	22.6	233	70.2
>40	306	0	0.0	37	12.1	76	24.8	193	63.1
Missing	34	1	2.9	1	2.9	3	8.8	29	85.3
Smoking									
Smoking at booking	249	3	1.2	13	5.2	26	10.4	207	83.1
Not currently smoking	5451	29	0.5	106	1.9	789	14.5	4527	83.0

Table 5.14 Locality of domicile of wāhine with diabetes birthing at NWH 2023								
	Type 1		Type 2		GDM		No diabetes	
	n=	32	n=	119	n=	815	n=	4734
Locality	n	%	n	%	n	%	n	%
Auckland	10	31.3	62	52.1	529	64.9	3086	65.2
Waitematā	17	53.1	43	36.1	82	10.1	660	13.9
Counties Manukau	4	12.5	9	7.6	190	23.3	865	18.3
Other	1	3.1	5	4.2	14	1.7	123	2.6

Table 5.15 Maternal outcome among wāhine with diabetes NWH 2023

	Type 1		Type 2		GDM		No diabetes	
	n= 32		n= 119		n= 815		n= 4734	
	n	%	n	%	n	%	n	%
Preeclampsia*	3	9.4	11	9.2	19	2.3	151	3.2
Induction of labour	14	43.8	70	58.8	432	53.0	1722	36.4
Mode of Birth								
Spontaneous vaginal birth	7	21.9	43	36.1	318	39.0	2118	44.7
Ventouse	0	0.0	0	0.0	49	6.0	346	7.3
Forceps	2	6.3	5	4.2	34	4.2	237	5.0
CS emergency	15	46.9	49	41.2	272	33.4	1341	28.3
CS elective	8	25.0	22	18.5	142	17.4	692	14.6
Gestation at birth								
<32 weeks	1	3.1	3	2.5	20	2.5	163	3.4
<37 weeks	12	37.5	26	21.8	90	11.0	451	9.5
PPH ≥ 500mls	22	68.8	66	55.5	349	42.8	1822	38.5
PPH ≥1000 mls	3	9.4	24	20.2	102	12.5	552	11.7
Postpartum transfusion	1	3.1	7	5.9	32	3.9	151	3.2

*Includes Preeclampsia and Preeclampsia super-imposed on chronic hypertension

Table 5.16 Neonatal outcomes among pēpi of wāhine with diabetes NWH 2023

	Type 1		Type 2		GDM		No diabetes	
	n= 32		n= 121		n= 831		n= 4837	
	n	%	n	%	n	%	n	%
Birthweight (median(IQR))	3249 (2897-3663)		3268 (2860-3720)		3177 (2900-3550)		3290 (2930-3570)	
<1500	1	3.1	4	3.3	18	2.2	167	3.5
<2500	2	6.3	10	8.3	72	8.7	353	7.3
SGA<10th percentile	1	3.1	19	15.7	107	12.9	793	16.4
LGA >90th percentile	11	34.4	25	20.7	115	13.8	360	7.4
Admission to NICU								
Any admission	13	40.6	41	33.9	109	13.1	590	12.2
>= 2 days in NICU	11	34.4	33	27.3	89	10.7	455	9.4
Perinatal related losses (/1000)	1	3.1	1	8.3	4	4.8	85	17.6

5.4 Antepartum Haemorrhage

Dr Meghan Hill

Antepartum haemorrhage has been defined here to include vaginal bleeding from any cause at or beyond 20 weeks gestation, during pregnancy and labour, and includes placenta praevia without bleeding. While bleeding before 20 weeks is also important we do not routinely collect these data.

In 2023 we changed our electronic maternity record from Healthware to Badgernet. This change had a significant impact on the way we collect data. Data on the occurrence of an antepartum haemorrhage or the presence of a placenta praevia have been collated from the risk documentation in Badgernet.

We also used data from indications for induction and Caesarean section. These data were often incomplete in 2022 but almost complete in 2023. **The rate of antepartum haemorrhage in 2022 may have been underestimated for this reason.**

Data cleaning includes reconciling antenatal data, intrapartum complication data, risk sheet data, and indications for induction and operative birth. Data were also reconciled with discharge coding data.

Key Findings

- Abruption is the most significant cause of

Figure 5.15 Antepartum haemorrhage (abruption and unspecified) incidence by ethnicity NWH 2006-2023

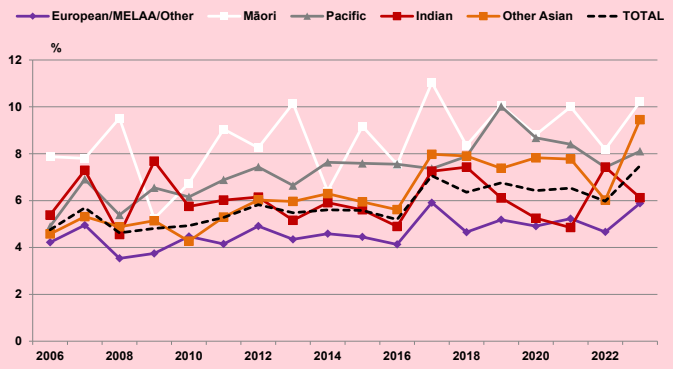
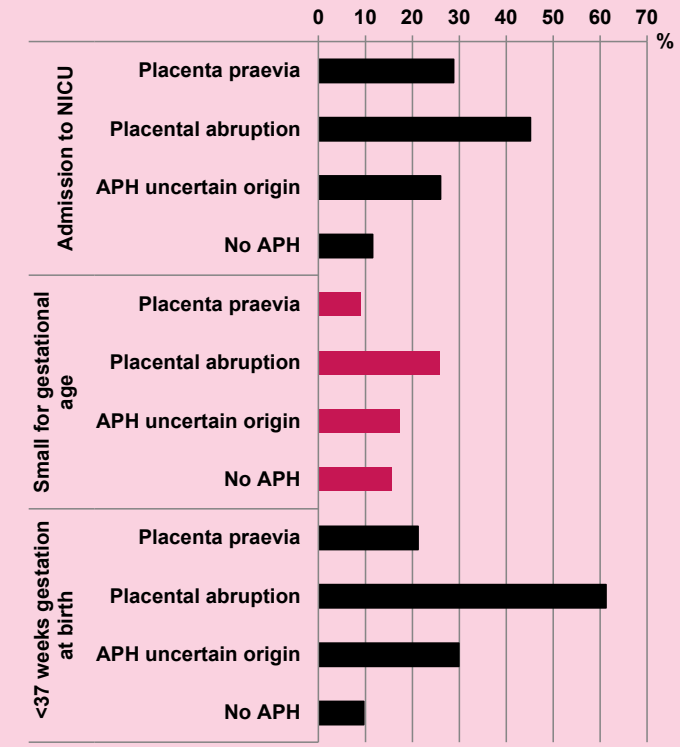


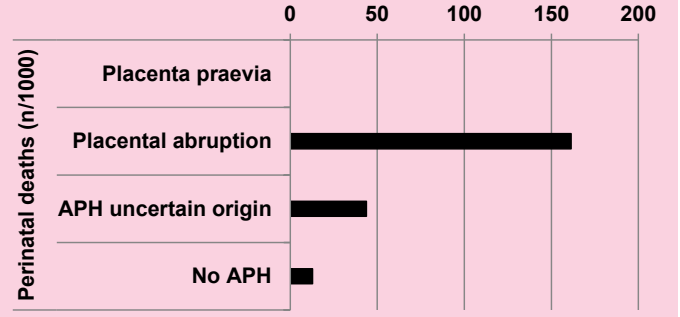
Figure 5.16 Neonatal outcomes among pregnancies complicated by antepartum haemorrhage NWH 2023



antepartum bleeding in association with NICU admission and preterm birth. Abruption is also associated with birth weights that are small for gestational age.

- Perinatal mortality is strongly associated with abruption at a rate of 160/1000 but also associated with bleeding of uncertain origin (44/1000).
- Births following placental abruption occur prior to 32 weeks in almost 1/3 of cases.
- Abruption also has significant maternal complications, with high rates of Caesarean birth (68%) and transfusion (36%).
- European/MELAA/Other ethnicity birthing people have lower rates of antepartum haemorrhage compared to Māori people.
- Smoking is related to bleeding in pregnancy from any cause, the strongest association with placental abruption.

Figure 5.17 Perinatal related deaths (n/1000) among pregnancies complicated by antepartum haemorrhage NWH 2023



5.4.1 Data tables: Antepartum Haemorrhage

Table 5.17 Antepartum haemorrhage incidence NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total APH	469	456	445	533	480	500	458	490	427	492
Incidence %	6.3	6.6	6.1	7.8	7.4	7.5	7.4	7.6	7.2	8.6
Proven abruption	37	35	44	38*	43*	51*	38*	40*	29	28*
Proven placenta praevia	54	69	69	50	68	50	59	68	75	65
APH (uncertain origin)	378	352	332	445	369	399	361	382	323	399

*Wāhine who had both placenta praevia and placental abruption are represented under abruption only

Table 5.18 Maternal outcomes of pregnancies complicated by antepartum haemorrhage NWH 2023

	Placenta praevia		Placental abruption		APH uncertain		No APH	
	n= 65		n= 28		n= 399		n= 5208	
	n	%	n	%	n	%	n	%
Mode of birth								
Normal vaginal	12	18.5	8	28.6	170	42.6	2296	44.1
Operative vaginal	3	4.6	1	3.6	56	14.0	613	11.8
CS elective	23	35.4	0	0.0	32	8.0	809	15.5
CS emergency	27	41.5	19	67.9	141	35.3	1490	28.6
Maternal transfusion	7	10.8	10	35.7	22	5.5	152	2.9

Table 5.19 Fetal/Neonatal outcomes of pregnancies complicated by antepartum haemorrhage NWH 2023

	Placenta praevia		Placental abruption *		APH uncertain origin		No APH	
	n= 66		n= 31		n= 411		n= 5313	
	n	%	n	%	n	%	n	%
Gestation at birth								
<37 weeks	14	21.2	19	61.3	123	29.9	512	9.6
<32 weeks	3	4.5	8	25.8	58	14.1	149	2.8
Birthweight								
Median(IQR)	3126 (2818-3608)		2254 (1612-2900)		2839 (2425-3460)		3300 (2950-3640)	
<2500g	11	16.7	18	58.1	108	26.3	490	9.2
<1500g	2	3.0	4	12.9	51	12.4	133	2.5
Small for gestational age	6	9.1	8	25.8	71	17.3	835	15.7
Perinatal deaths (n/1000)	0	0.0	5	161.3	18	43.8	68	12.8
Admission to NICU	19	28.8	14	45.2	107	26.0	613	11.5
≥2 days in NICU	15	22.7	11	35.5	98	23.8	464	8.7

*Wāhine who had both placenta praevia and placental abruption are represented under abruption only

Table 5.20 Characteristics of pregnancies complicated by antepartum haemorrhage NWH 2023

	Total	Placenta praevia		Placental abruption *		APH uncertain origin		No APH	
	5700	n= 65		n= 28		n= 399		n= 5208	
	N	n	%	n	%	n	%	n	%
Ethnicity									
Māori	509	6	1.2	5	1.0	47	9.2	451	88.6
Pacific	765	10	1.3	4	0.5	58	7.6	693	90.6
Asian	1418	17	1.2	9	0.6	125	8.8	1267	89.4
Indian	833	8	1.0	2	0.2	49	5.9	774	92.9
MELAA	254	3	1.2	0	0.0	24	9.4	227	89.4
NZ European	1921	21	1.1	8	0.4	96	5.0	1796	93.5
Maternal age (yrs)									
≤20	130	1	0.8			10	7.7	118	90.8
21-25	428	1	0.2	1	0.2	33	7.7	393	91.8
26-30	1246	12	1.0	7	0.6	88	7.1	1139	91.4
31-35	2351	25	1.1	10	0.4	151	6.4	2165	92.1

36-40	1282	22	1.7	6	0.5	96	7.5	1158	90.3
>=40	263	4	1.5	3	1.1	21	8.0	235	89.4
Parity									
Nulliparous	2790	36	1.3	15	0.5	197	7.1	2542	91.1
Multip previous CS	1087	15	1.4	4	0.4	74	6.8	994	91.4
Mullip no previous CS	1823	14	0.8	9	0.5	128	7.0	1672	91.7
Mutiple pregnancy									
Multiple	119	1	0.8	3	2.5	12	10.1	103	86.6
Singleton	5581	64	1.1	25	0.4	387	6.9	5105	91.5
Smoking status at booking									
Currently smoking	249	4	1.6	3	1.2	24	9.6	218	87.6
Not currently smoking	5451	61	1.1	25	0.5	375	6.9	4990	91.5
BMI									
<18.5	179	3	1.7	0	0.0	10	5.6	166	92.7
18.5-24.99	2686	33	1.2	14	0.5	193	7.2	2446	91.1
25-29.99	1435	13	0.9	3	0.2	91	6.3	1328	92.5
30-34.99	728	8	1.1	5	0.7	56	7.7	659	90.5
35-39.99	332	7	2.1	4	1.2	20	6.0	301	90.7
≥40	306	1	0.3	1	0.3	25	8.2	279	91.2
Missing	34	0	0.0	1	2.9	4	11.8	29	85.3
Hypertensive disease									
Gestational hypertension	234	2	0.9	3	1.3	23	9.8	206	88.0
Chronic hypertension	93	1	1.1	1	1.1	8	8.6	83	89.2
Chronic hypertension with superimposed preeclampsia	12	0	0.0	0	0.0	0	0.0	12	100.0
Preeclampsia	172	1	0.6	4	2.3	13	7.6	154	89.5
Nil	5189	61	1.2	20	0.4	355	6.8	4753	91.6

*Wāhine who had both placenta praevia and placental abruption are represented under abruption only

5.5 Hypertensive Disease

Dr Catherine Marnoch

In 2018 the definition of preeclampsia in pregnancy was updated based on a revised statement from the International Society for the Study of Hypertension in Pregnancy (ISSHP).

For new definitions please see Chapter 11 Appendix.

In 2022 we changed our electronic maternity record from Healthware to Badgernet. This change had a significant impact on the way we collect data. Data on the occurrence of hypertension in pregnancy have been collated from the risk documentation in Badgernet which we are aware is incomplete. We have also used data from indications for induction and Caesarean section. These data were often incomplete in 2022 but complete in 2023. The rate of hypertension in pregnancy is almost certainly underestimated in 2022, and may still be artificially low in 2023.

Key Findings

- At 9%, the total rate of hypertensive disorders of pregnancy (any hypertensive disease) is at the higher end of the global reported rate (3-10% of all pregnancies[1]). Preeclampsia rate is in keeping with the national rates reported in Australia and New Zealand (3-4%)[2,3], however our rates of chronic hypertension and gestational hypertension (1.6% and 4.1%) are higher than those reported in Australia (0.9 % and 3.4%; 2021 Australian National data[4]).
- Māori and Pacific wāhine continue to have significantly higher rates of pregnancy induced hypertension (both gestational hypertension and preeclampsia) and chronic hypertension, compared with all other ethnic groups.
    - Whilst significantly lower rates of gestational hypertension and preeclampsia are seen in European multipara compared with European nullipara, there is an increased

rate of gestational hypertension and only a mildly lower rate of preeclampsia in Māori and Pacific multipara compared with Māori and Pacific nullipara.

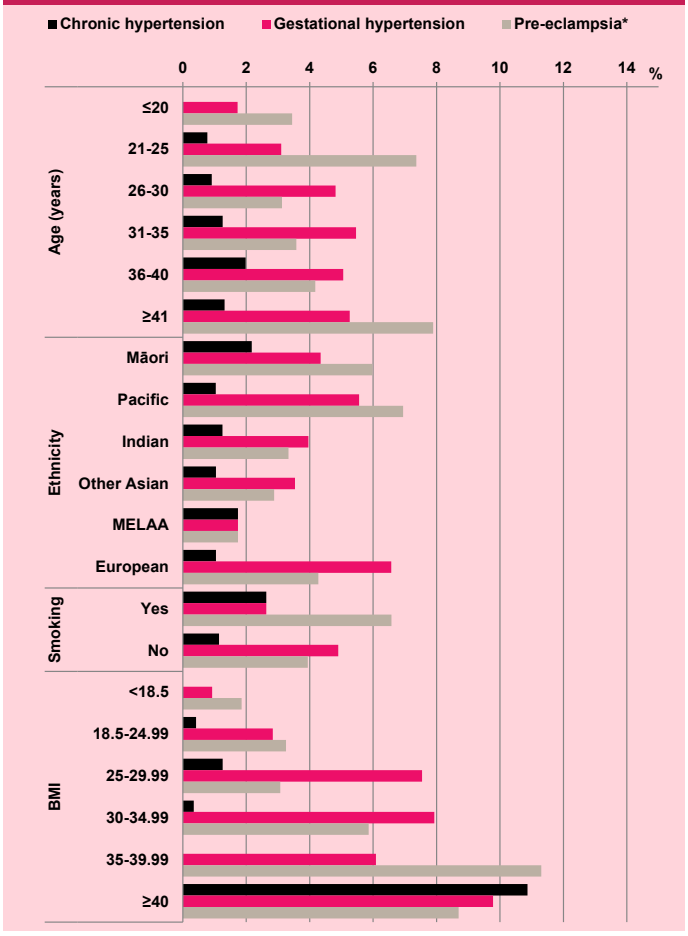
- Māori, Pacific and Asian multipara have twice the rate of chronic hypertension than nullipara of the same ethnicity.

- Rates of hypertensive disorders of pregnancy increase with increasing BMI, with highest rates seen in wāhine with BMI ≥35. Underweight multipara (BMI <18.5) also have higher rates of preeclampsia.
- Smoking is associated with increased rates of preeclampsia and chronic hypertension in nullipara and gestational hypertension and chronic hypertension in multipara.
- Preeclampsia is associated with significantly increased rates of preterm birth, SGA and NICU admission. Babies of wāhine with gestational hypertension and chronic hypertension also have increased rates of SGA compared with normotensive women. Both preeclampsia and chronic hypertension are associated with increased rates of perinatal death.
- Wāhine with chronic hypertension have the highest rates of elective Caesarean section and wāhine with preeclampsia, then gestational hypertension, have the highest rates of emergency and GA Caesarean section.

Comments

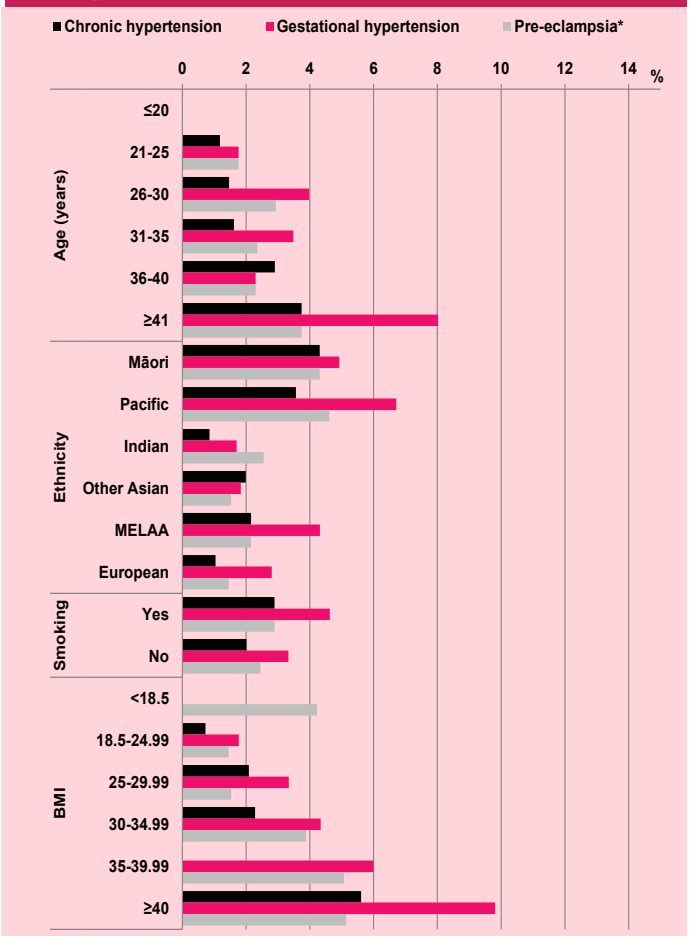
- More work on local knowledge gathering and knowledge translation is required to close the gap between Māori and Pacific wāhine. This will include:
  - Identifying and addressing differences in modifiable risk factors for hypertensive disorders of pregnancy (e.g. gestational age at start of maternity care, BMI, smoking, improved management of medical conditions before pregnancy such as hypertension, diabetes, renal, autoimmune disease)
  - Improving equity in both access to and provision of pre-pregnancy and maternity care
  - Assess and improve use of validated screening tools early in pregnancy (risk factor based; combined first trimester screen) to identify those at risk of preeclampsia
  - Assess and improve uptake of preventive treatments (e.g. aspirin, dietary calcium,

Figure 5.18 Rates of hypertensive disease by demographic characteristics among nulliparous wāhine NWH 2023



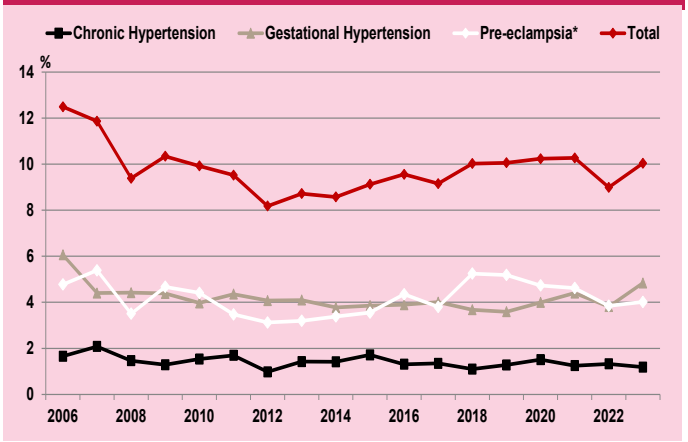
*Preeclampsia includes preeclampsia, super-imposed preeclampsia and eclampsia
Māmās with missing BMI are excluded from the figure

Figure 5.19 Rates of hypertensive disease by demographic characteristics among multiparous wāhine NWH 2023



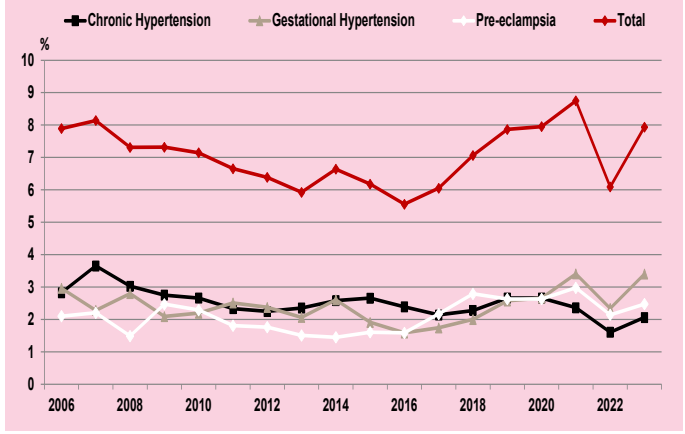
*Preeclampsia includes preeclampsia, super-imposed preeclampsia and eclampsia
Māmās with missing BMI are excluded from the figure

Figure 5.20 Rate of hypertensive disease in nulliparous wāhine NWH 2006-2023



* Includes chronic hypertension with superimposed preeclampsia

Figure 5.21 Rate of hypertensive disease in multiparous wāhine NWH 2006-2023



* Includes chronic hypertension with superimposed preeclampsia

Figure 5.22 Rate of pregnancy induced hypertension by ethnic grouping NWH 2006-2023

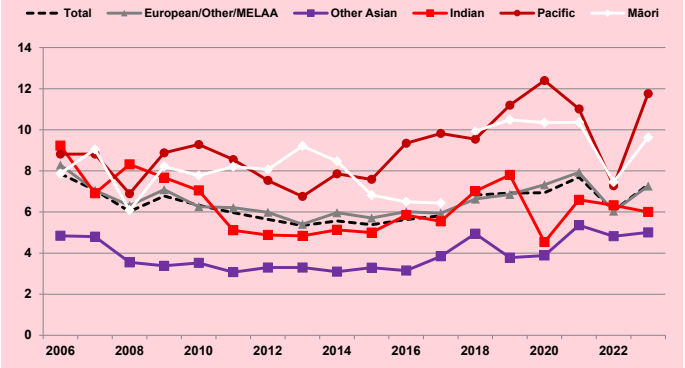
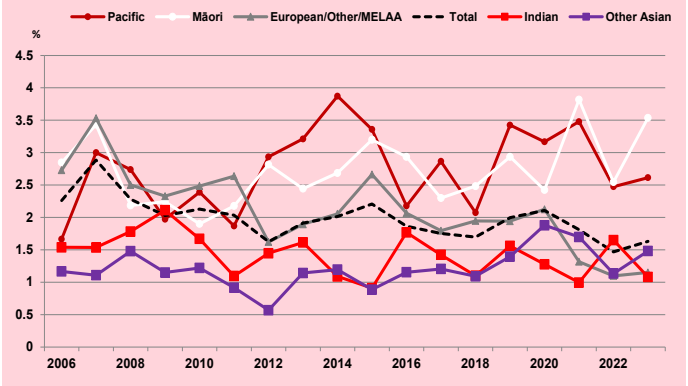


Figure 5.23 Rate of chronic hypertension in pregnancy by ethnic grouping NWH 2006-2023



moderate exercise)

- Knowledge translation needs to involve local communities and primary care with the aim of prevention and improvement of risks well before pregnancy.
- Work to reduce rates of all hypertensive disorders of pregnancy could improve both Caesarean section rates and perinatal outcomes. Reduction in the rate of preeclampsia and chronic hypertension could reduce perinatal death.

[1] Wang W, Xie X, Yuan T, et al. Epidemiological trends of maternal hypertensive disorders of pregnancy at the global, regional, and national levels: a population based study. BMC Pregnancy Childbirth 2021; 21: 364.

[2] Australian Institute of Health and Welfare. Australia's māmās and babies [website]. Canberra: AIHW, 2023. https://www.aihw.gov.au/reports/māmās&babies/australiasmāmāsbabies/contents/summary

[3] Anderson NH, Sadler LC, Stewart AW, et al. Ethnicity, body mass index and risk of preeclampsia in a multiethnic New Zealand population. Aust N Z J Obstet Gynaecol 2012; 52: 552–558.

[4] Australian Institute of Health and Welfare. Australia's māmās and babies [website]. Canberra: AIHW, 2023 https://www.aihw.gov.au/reports/māmās-babies/australias-māmās-babies/contents/antenatal-period/pre-existing-medical-condition

Figure 5.24 Perinatal outcomes and hypertensive disease in pēpi NWH 2023

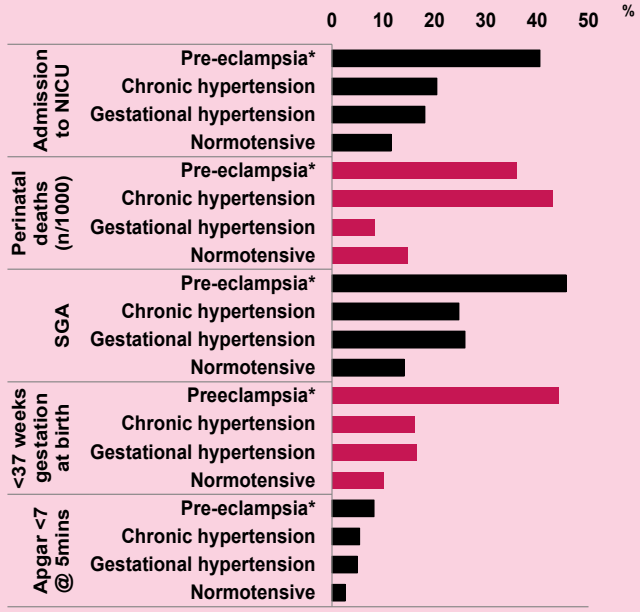
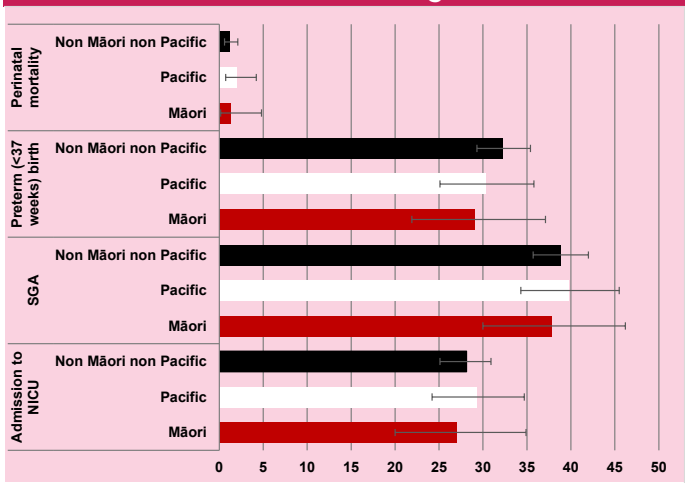


Figure 5.25 Perinatal outcomes among pēpi of Māori wāhine with pre-eclampsia birthing at NWH and who reside in ACH region 2014-2023



* Preeclampsia includes superimposed preeclampsia and eclampsia

5.5.1 Data tables: Hypertensive disease

Table 5.21 Hypertensive disease in pregnancy by parity NWH 2023

	All wāhine		Nullipara		Multipara	
	n= 5700		n= 2790		n= 2910	
	n	%	n	%	n	%
Any hypertensive disease	511	9.0	280	10.0	231	7.9
Gestational hypertension	234	4.1	135	4.8	99	3.4
Chronic hypertension	93	1.6	33	1.2	60	2.1
Superimposed pre-eclampsia	12	0.2	4	0.1	8	0.3
Pre-eclampsia	172	3.0	108	3.9	64	2.2

Table 5.22 Rates of hypertensive disease in nulliparous wāhine NWH 2014-2023

	Total māmā	Chronic Hypertension		Pre-eclampsia (including superimposed)		Gestational Hypertension		Total Hypertension	
	N	N	%	N	%	N	%	N	%
2014	3604	51	1.4	122	3.4	136	3.8	309	8.6
2015	3321	57	1.7	118	3.6	128	3.9	303	9.1
2016	3517	46	1.3	153	4.4	137	3.9	336	9.6
2017	3343	45	1.3	127	3.8	134	4.0	306	9.2
2018	3183	35	1.1	167	5.2	117	3.7	319	10.0
2019	3202	41	1.3	166	5.2	115	3.6	322	10.1
2020	2981	45	1.5	141	4.7	119	4.0	305	10.2
2021	3204	40	1.2	148	4.3	141	4.4	329	10.3
2022	3937	39	1.4	113	4.1	112	4.0	264	9.5
2023	2790	33	1.2	112	4.0	135	4.8	280	10.0

Table 5.23 Rates of hypertensive disease in multiparous wāhine NWH 2014-2023

	Total māmā	Chronic Hypertension		Pre-eclampsia (including superimposed)		Gestational Hypertension		Total Hypertension	
	N	N	%	N	%	N	%	N	%
2014	3,796	98	2.6	55	1.4	99	2.6	252	6.6
2015	3,610	96	2.7	58	1.6	69	1.9	223	6.2
2016	3,724	89	2.4	59	1.6	59	1.6	207	5.6
2017	3,503	75	2.1	76	2.2	61	1.7	212	6.1
2018	3,298	75	2.3	92	2.8	66	2.0	233	7.1
2019	3,458	92	2.7	91	2.6	89	2.6	272	7.9
2020	3,231	86	2.7	85	2.6	86	2.7	257	8.0
2021	3,258	77	2.4	97	2.4	111	3.4	285	8.7
2022	2,870	48	1.7	64	2.2	70	2.4	182	6.3
2023	2,910	60	2.1	72	2.5	99	3.4	231	7.9

Table 5.24 Demographic characteristics of nulliparous wāhine with hypertensive disease NWH 2023

	Total	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	2790	n=	135	n=	33	n=	4	n=	108	n=	2510
	N	n	%	n	%	n	%	n	%	n	%
Ethnicity (Prioritised)											
Māori	184	8	4.3	4	2.2	1	0.5	10	5.4	161	87.5
Pacific	288	16	5.6	3	1.0	1	0.3	19	6.6	249	86.5
Asian	764	27	3.5	8	1.0	1	0.1	21	2.7	707	92.5
Indian	480	19	4.0	6	1.3	1	0.2	15	3.1	439	91.5
MELAA	115	2	1.7	2	1.7	0	0.0	2	1.7	109	94.8
European	959	63	6.6	10	1.0	0	0.0	41	4.3	845	88.1
Maternal age											
≤20	116	2	1.7	0	0.0			4	3.4	110	94.8
21-25	258	8	3.1	2	0.8	0	0.0	19	7.4	229	88.8
26-30	768	37	4.8	7	0.9	3	0.4	21	2.7	700	91.1
31-35	1117	61	5.5	14	1.3	0	0.0	40	3.6	1002	89.7
36-40	455	23	5.1	9	2.0	1	0.2	18	4.0	404	88.8
≥40	76	4	5.3	1	1.3	0	0.0	6	7.9	65	85.5
Smoking											
Yes	76	2	2.6	2	2.6	0	0.0	5	6.6	67	88.2
Not currently smoking	2714	133	4.9	31	1.1	4	0.1	103	3.8	2443	90.0
BMI											
<18.5	108	1	1.0	0	0.0	0	0.0	2	1.8	105	97.2
18.5-24.99	1444	41	2.8	6	0.4	0	0.0	47	3.3	1350	93.5
25-29.99	716	54	7.5	9	1.3	2	0.3	20	2.8	631	88.1
30-34.99	290	23	7.9	7	2.4	1	0.3	16	5.5	243	83.8
35-39.99	115	7	6.1	1	0.9	0	0.0	13	11.3	94	81.7
≥40	92	9	9.8	10	10.9	1	1.1	7	7.6	65	70.7
Missing	25	0	0.0					3	12.0	22	88.0

Table 5.25 Demographic characteristics of multiparous wāhine with hypertensive disease NWH 2023

	Total	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	2910	n=	99	n=	60	n=	8	n=	64	n=	2679
	N	n	%	n	%	n	%	n	%	n	%
Ethnicity (Prioritised)											
Māori	325	16	4.9	14	4.3	1	0.3	13	4.0	281	86.5
Pacific	477	32	6.7	17	3.6	4	0.8	18	3.8	406	85.1
Asian	654	12	1.8	13	2.0	0	0.0	10	1.5	619	94.6
Indian	353	6	1.7	3	0.8	0	0.0	9	2.5	335	94.9
MELAA	139	6	4.3	3	2.2	0	0.0	3	2.2	127	91.4
European	962	27	2.8	10	1.0	3	0.3	11	1.1	911	94.7
Maternal age											
≤20	14	0	0.0	0	0.0	0	0.0	0	0.0	14	100.0
21-25	170	3	1.8	2	1.2	0	0.0	3	1.8	162	95.3
26-30	478	19	4.0	7	1.5	1	0.2	13	2.7	438	91.6
31-35	1234	43	3.5	20	1.6	5	0.4	24	1.9	1142	92.5
36-40	827	19	2.3	24	2.9	1	0.1	18	2.2	765	92.5
>=40	187	15	8.0	7	3.7	1	0.5	6	3.2	158	84.5
Smoking											
Yes	173	8	4.6	5	2.9	0	0.0	5	2.9	155	89.6
Not currently smoking	2737	91	3.3	55	2.0	8	0.3	59	2.2	2524	92.2
BMI											
<18.5	71	0	0.0	0	0.0	0	0.0	3	4.2	68	95.8
18.5-24.99	1242	22	1.8	9	0.7	1	0.1	17	1.4	1193	96.1
25-29.99	719	24	3.3	15	2.1	1	0.1	10	1.4	669	93.0
30-34.99	438	19	4.3	10	2.3	4	0.9	13	3.0	392	89.5
35-39.99	217	13	6.0	14	6.5	0	0.0	11	5.1	179	82.5
≥40	214	21	9.8	12	5.6	2	0.9	9	4.2	170	79.4
Missing	9	0	0.0	0	0.0	0	0.0	1	11.1	8	88.9

Table 5.26 Onset and mode of birth among wāhine with hypertensive disease NWH 2023

	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	n=	234	n=	93	n=	12	n=	172	n=	5189
	n	%	n	%	n	%	n	%	n	%
Onset of Birth										
Spontaneous	28	12.0	14	15.1	0	0.0	16	9.3	2042	39.4
Induced - Successful	118	50.4	42	45.2	5	41.7	70	40.7	1762	34.0
Caesarean Section Before Labour (including failed induction)	88	37.6	37	39.8	7	58.3	86	50.0	1385	26.7
Mode of birth										
Spontaneous vaginal	72	30.8	34	36.6	2	16.7	41	23.8	2297	44.3
Operative vaginal	10	4.3	6	6.5	1	8.3	15	8.7	627	12.1
CS elective	13	5.6	22	23.7	1	8.3	16	9.3	812	15.6
CS emergency	125	53.4	31	33.3	7	58.3	98	57.0	1416	27.3
Epidural	189	80.8	74	79.6	10	83.3	139	80.8	3710	71.5
General anaesthetic	14	6.0	2	2.2	1	8.3	21	12.2	173	3.3

Table 5.27 Perinatal outcomes and hypertensive disease (pēpi) NWH 2023

	Gestational hypertension		Chronic hypertension		Superimposed preeclampsia		Preeclampsia		Normotensive	
	n=	243	n=	93	n=	12	n=	183	n=	5290
	n	%	n	%	n	%	n	%	n	%
Gestation at birth										
<37 weeks	40	16.5	15	16.1	8	66.7	78	42.6	527	10.0
<32 weeks	7	2.9	5	5.4	3	25.0	23	12.6	180	3.4
SGA	63	25.9	23	24.7	4	33.3	85	46.4	745	14.1
NICU Admission	44	18.1	19	20.4	8	66.7	71	38.8	611	11.6
≥2 days in NICU	34	14.0	14	15.1	6	50.0	67	36.6	467	8.8
Apgar <7 at 5 minutes	12	4.9	5	5.4	0	0.0	16	8.7	137	2.6
Perinatal deaths (n/1000)	2	8.2	4	43.0	0	0.0	7	38.3	78	14.7

5.6 Body Mass Index

Dr Helen Winrow

Key findings

- Rates of maternal obesity continue to rise, with 49% of birthing wāhine in 2023 having a booking BMI >25. More than 70% of Pacific wāhine are obese by booking BMI, as are 8% of Asian wāhine.
- As class of maternal BMI increases, rates of gestational and type two diabetes, gestational hypertensive disorders and postpartum haemorrhage also increase.
- The proportion of women who are overweight or obese is highest among women under hospital primary care (70%) and the lowest among women under private obstetrician care (33%); however while the rate is intermediate (48%), the highest absolute number of overweight or obese birthing people receive primary care from LMC midwives.
- In nullipara, the higher the maternal BMI, the higher the rate of emergency Caesarean section; 48% of obese nullipara were delivered by emergency Caesarean section.

Figure 5.26 Distribution of BMI by maternal age NWH 2023

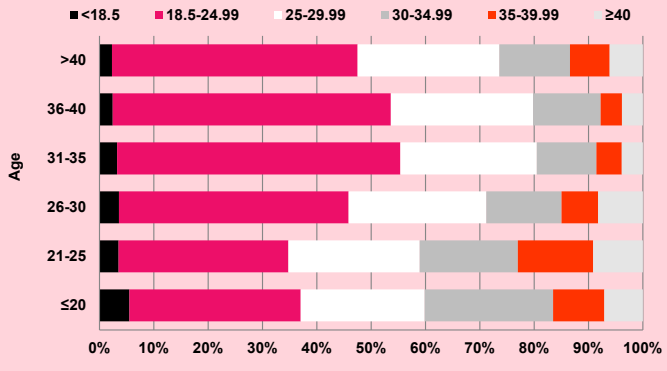


Figure 5.27 Distribution of BMI by LMC at birth NWH 2023

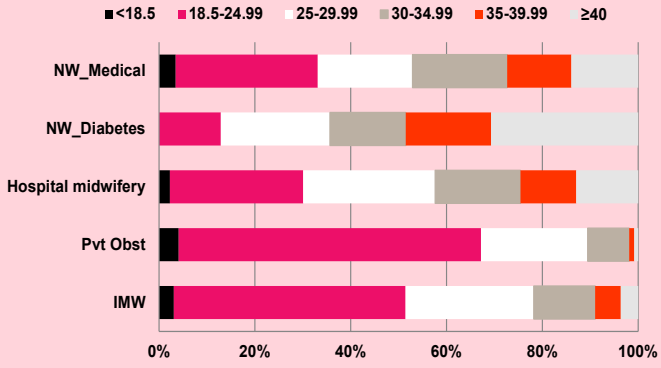


Figure 5.28 Hypertensive disease rates by maternal BMI NWH 2023

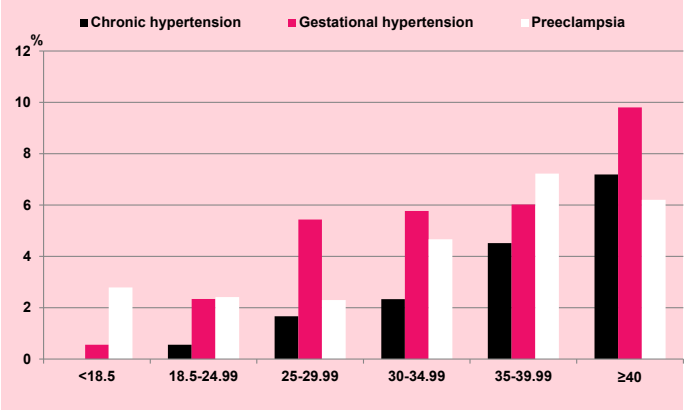
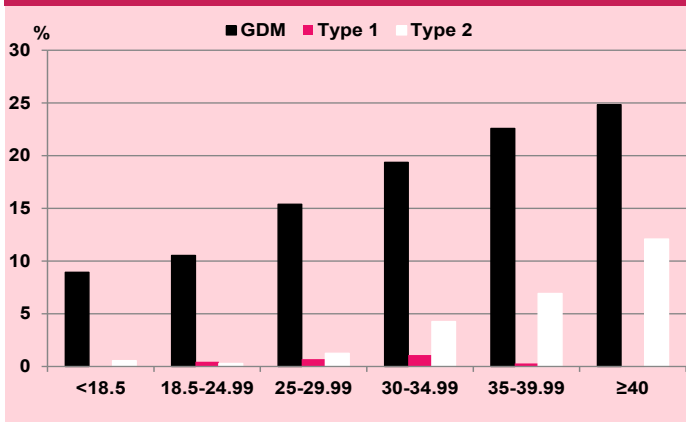


Figure 5.29 Diabetes rates by maternal BMI NWH 2023



5.5.1 Data tables: Body Mass Index

5.28 Maternal BMI using WHO categories NWH 2019-2023

	2019		2020		2021		2022		2023	
	N=6660		N=6212		N=6462		N=5925		N=5700	
	n	%	n	%	n	%	n	%	n	%
<18.5	228	3.4	201	3.2	178	2.8	169	2.9	179	3.1
18.5-24.99	3509	52.7	3277	52.8	3254	50.4	2886	48.7	2686	47.1
25-29.99	1522	22.9	1376	22.2	1553	24.0	1459	24.6	1435	25.2
30-34.99	723	10.9	650	10.5	751	11.6	697	11.8	728	12.8
35-39.99	351	5.3	332	5.3	362	5.6	376	6.3	332	5.8
≥40	264	4	291	4.7	303	4.7	272	4.6	306	5.4
Missing	63	0.9	85	1.4	61	0.9	66	1.1	34	0.6

Table 5.29 LMC at birth and BMI NWH 2023

LMC	Total	<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		>=40		Missing	
	5700	n= 179		n= 2686		n= 1435		n= 728		n= 332		n= 306		n= 34	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%
IMW	2729	83	3.0	1313	48.1	726	26.6	347	12.7	146	5.3	98	3.6	16	0.6
Private Obstetrician	1597	65	4.1	1006	63.0	355	22.2	138	8.6	17	1.1	13	0.8	3	0.1
Hospital Midwifery	1073	24	2.2	297	27.7	294	27.4	190	17.7	124	11.6	138	12.9	6	0.2
NW Diabetes	102	0	0.0	13	12.7	23	22.5	16	15.7	18	17.6	31	30.4	1	0.0
NW Medical	175	6	3.4	51	29.1	34	19.4	34	19.4	23	13.1	24	13.7	3	0.1
Unbooked	24	1	4.2	6	25.0	3	12.5	3	12.5	4	16.7	2	8.3	5	0.2

Table 5.30 Demographic characteristics and BMI NWH 2023

	Total	<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	5700	n= 179		n= 2686		n= 1435		n= 728		n= 332		n= 306		n= 34	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity															
Māori	509	4	0.8	129	25.3	115	22.6	127	25.0	72	14.1	52	10.2	10	2.0
Pacific	765	2	0.3	79	10.3	135	17.6	187	24.4	155	20.3	198	25.9	9	1.2
Asian	1418	90	6.3	883	62.3	329	23.2	93	6.6	15	1.1	3	0.2	5	0.4

Indian	833	32	3.8	394	47.3	275	33.0	102	12.2	22	2.6	6	0.7	2	0.2
MELAA	254	4	1.6	131	51.6	76	29.9	28	11.0	11	4.3	2	0.8	2	0.8
European	1921	47	2.4	1070	55.7	505	26.3	191	9.9	57	3.0	45	2.3	6	0.3
Age (yrs)															
≤20	130	7	5.4	40	30.8	29	22.3	30	23.1	12	9.2	9	6.9	3	2.3
21-25	428	15	3.5	133	31.1	103	24.1	77	18.0	59	13.8	39	9.1	2	0.5
26-30	1246	44	3.5	522	41.9	313	25.1	171	13.7	83	6.7	102	8.2	11	0.9
31-35	2351	76	3.2	1220	51.9	588	25.0	257	10.9	109	4.6	91	3.9	10	0.4
36-40	1282	31	2.4	653	50.9	334	26.1	159	12.4	50	3.9	49	3.8	6	0.5
>=40	263	6	2.3	118	44.9	68	25.9	34	12.9	19	7.2	16	6.1	2	0.8
Parity															
Nullipara	2790	108	3.9	1444	51.8	716	25.7	290	10.4	115	4.1	92	3.3	25	0.9
Multipara	2910	71	2.4	1242	42.7	719	24.7	438	15.1	217	7.5	214	7.4	9	0.3
Smoking status at booking															
Yes	249	3	1.2	59	23.7	55	22.1	49	19.7	40	16.1	37	14.9	6	2.4
Not currently at booking	5451	176	3.2	2627	48.2	1380	25.3	679	12.5	292	5.4	269	4.9	28	0.5

Table 5.31 Pregnancy complications and BMI NWH 2023

	<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	n=179		n=2686		n=1435		n=728		n=332		n=306		n=34	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Diabetes														
GDM	16	8.9	283	10.5	221	15.4	141	19.4	75	22.6	76	24.8	3	8.8
Type 1	0.0	0.0	12	0.4	10	0.7	8	1.1	1	0.3	0	0.0	1	2.9
Type 2	1.0	0.6	8	0.3	18	1.3	31	4.3	23	6.9	37	12.1	1	2.9
No diabetes	162	90.5	2383	88.7	1186	82.6	548	75.3	233	70.2	193	63.1	29	85.3
Hypertension														
Chronic hypertension	0	0.0	15	0.6	24	1.7	17	2.3	15	4.5	22	7.2	0	0.0
gestational hypertension	1	0.6	63	2.3	78	5.4	42	5.8	20	6.0	30	9.8	0	0.0
Preeclampsia	5	2.8	64	2.4	30	2.1	29	4.0	24	7.2	16	5.2	4	11.8
Superimposed Preeclampsia	0	0.0	1	0.0	3	0.2	5	0.7	0	0.0	3	1.0	0	0.0
Nil	173	96.6	2543	94.7	1300	90.6	635	87.2	273	82.2	235	76.8	30	88.2

Table 5.32 Postpartum haemorrhage rates by BMI among spontaneous vaginal births NWH 2023

	Total		<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	n=2486		n=71		n=1153		n=601		n=332		n=166		n=137		n=26	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
PPH ≥1000mls	206	8.3	5	7.0	74	6.4	45	7.5	30	9.0	21	12.7	27	19.7	4	15.4
PPH ≥1500mls	94	3.8	2	2.8	29	2.5	21	3.5	14	4.2	11	6.6	16	11.7	1	3.8

Table 5.33 Postpartum haemorrhage rates by BMI among Caesarean sections NWH 2023

	Total		<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	n=2541		n=69		n=1168		n=659		n=340		n=142		n=157		n=6	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
PPH ≥1000mls	360	14.2	7	10.1	126	10.8	90	13.7	60	17.6	36	25.4	41	26.1	0	0.0
PPH ≥1500mls	102	4.0	2	2.9	34	2.9	17	2.6	23	6.8	12	8.5	14	8.9	0	0.0

Table 5.34 Onset and mode of birth among nulliparous wāhine by BMI NWH 2023

	Total		<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	n=2790		n=108		n=1444		n=716		n=290		n=115		n=92		n=25	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Onset of birth																
Spontaneous	1018	36.5	42	38.9	587	40.7	251	35.1	80	27.6	29	25.2	12	13.0	17	68.0
Induced - Successful	1123	40.3	45	41.7	539	37.3	305	42.6	122	42.1	63	54.8	44	47.8	5	20.0
Caesarean Section Before Labour (including failed induction)	649	23.3	21	19.4	318	22.0	160	22.3	88	30.3	23	20.0	36	39.1	3	12.0
Mode of birth																
Spontaneous vaginal birth	924	33.1	30	27.8	500	34.6	222	31.0	88	30.3	45	39.1	20	21.7	19	76.0
Operative vaginal	528	18.9	35	32.4	299	20.7	126	17.6	43	14.8	15	13.0	8	8.7	2	8.0
Elective CS	243	8.7	11	10.2	136	9.4	56	7.8	30	10.3	3	2.6	7	7.6	0	0.0
Emergency CS	1095	39.2	32	29.6	509	35.2	312	43.6	129	44.5	52	45.2	57	62.0	4	16.0

Table 5.35 Onset and mode of birth among multiparous wāhine by BMI NWH 2023

	Total		<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	n=2910		n=71		n=1242		n=719		n=438		n=217		n=214		n=9	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Onset of birth																
Spontaneous	1082	37.2	34	47.9	518	41.7	271	37.7	141	32.2	59	27.2	54	25.2	5	55.6
Induced - Successful	874	30.0	17	23.9	308	24.8	220	30.6	152	34.7	91	41.9	83	38.8	3	33.3
Caesarean Section Before Labour (including failed induction)	954	32.8	20	28.2	416	33.5	228	31.7	145	33.1	67	30.9	77	36.0	1	11.1
Mode of birth																
Spontaneous vaginal birth	1562	53.7	41	57.7	653	52.6	379	52.7	244	55.7	121	55.8	117	54.7	7	77.8
Operative vaginal	145	5.0	4	5.6	66	5.3	49	6.8	13	3.0	9	4.1	4	1.9	0	0.0
Elective CS	621	21.3	12	16.9	295	23.8	150	20.9	85	19.4	36	16.6	43	20.1	0	0.0
Emergency CS	582	20.0	14	19.7	228	18.4	141	19.6	96	21.9	51	23.5	50	23.4	2	22.2

Table 5.36 Neonatal outcome and BMI NWH 2023

	Total		<18.5		18.5-24.99		25-29.99		30-34.99		35-39.99		≥40		Missing	
	N= 5821		n= 184		n= 2731		n= 1463		n= 750		n= 343		n= 314		n= 36	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Preterm birth	668	11.5	17	9.2	273	10.0	156	10.7	104	13.9	59	17.2	44	14.0	15	41.7
Provider initiated preterm	382	6.6	140	76.1	93	3.4	93	6.4	69	9.2	37	10.8	29	9.2	5	13.9
Spontaneous preterm	286	4.9	8	4.3	133	4.9	63	4.3	35	4.7	22	6.4	15	4.8	10	27.8
Term birth	5153	88.5	167	90.8	2458	90.0	1307	89.3	646	86.1	284	82.8	270	86.0	21	58.3
SGA	920	15.8	25	13.6	379	13.9	248	17.0	132	17.6	74	21.6	53	16.9	9	25.0

≥2 days in NICU	588	10.1	14	7.6	230	8.4	144	9.8	91	12.1	50	14.6	48	15.3	11	30.6
Perinatal death (n/1000)	91	15.6	1	5.4	37	13.5	23	15.7	15	20.0	9	26.2	2	6.4	4	111.1

5.7 Preterm birth

Dr Katie Groom

Preterm birth is defined as birth prior to 37 completed weeks. From 2004-2019, provider initiated preterm birth was defined as induction of labour (including induction for preterm premature rupture of membranes (PPROM)), elective Caesarean section and emergency Caesarean section before the onset of labour. Provider initiated preterm birth also includes induction of labour following an intrauterine death or as part of a termination of pregnancy.

In 2020, spontaneous preterm birth was amended to include preterm birth after PPROM even if labour was induced. Termination of pregnancy with induction of labour has been excluded from some analyses. In 2022, with the introduction of Badgernet, we continued to include PPROM with spontaneous onset of labour. However we are new to the use of Badgernet and some preterm births may have been miscategorised.

This year, we are including figures for overall preterm birth from 2006, and preterm birth separated into spontaneous and provider initiated from 2020 when we categorised PPROM with spontaneous preterm birth to allow for a more valid comparison.

Key Findings

In 2023:

- 579 wāhine (10.2%) birthing at NWH birthed their pēpi before 37 weeks, 187 (3.3%) of these before 32 weeks.
- This is the highest rate of preterm birth at NWH for more than a decade, and approaching the highest rate recorded in the last twenty years (10.3% in 2007).
- Spontaneous preterm birth represents just over half (53.7%) of all our preterm births (5.5% of the total birthing population) and the remainder are due to provider initiated preterm birth (4.7% of the total birthing population).
- Rates of preterm birth continue to differ significantly by ethnicity. European and Asian whānau have the lowest rates (9.4% and 8.0% respectively), MELAA, Indian and Pacific whānau all have similar rates (10.2%, 10.4% and 11.6% respectively) with the least advantage for whānau Māori (16.3%, a similar rate to last year – 16.5%). Māori have high rates of both spontaneous (9.6%) and provider initiated (6.7%) preterm birth.
- Differences in rates of preterm birth for whānau Māori are unlikely to be directly related to ethnicity but determined by systemic issues that afford advantage and privilege to others, as well as confounding factors known to contribute to higher rates of both spontaneous and provider-initiated preterm birth including younger age in pregnancy, smoking and socioeconomic status.
- More detailed analysis is likely to reveal that differences by ethnicity are confined to those not resident within Te Toka Tumai and potentially majorly contributed to by those transferred in for neonatal services. It is important to extend our understanding of this to be able to support effective change in the future and education and practice change will need to extend beyond our own healthcare provider teams to produce truly effective change.
- Just under 5% of our birthing population are now >40 years and based on social trends the proportion of older pregnancies may continue to rise. 15.2% of those birthing >40 years had a preterm birth, and the majority were provider initiated (9.9%). More detailed review of contributing causes should be considered as there are likely to be areas where modification of risk and care in pregnancy may help to prevent or ameliorate the effects of preterm birth.

Figure 5.30 Preterm birth NWH 2006-2023, and by type 2020-2023

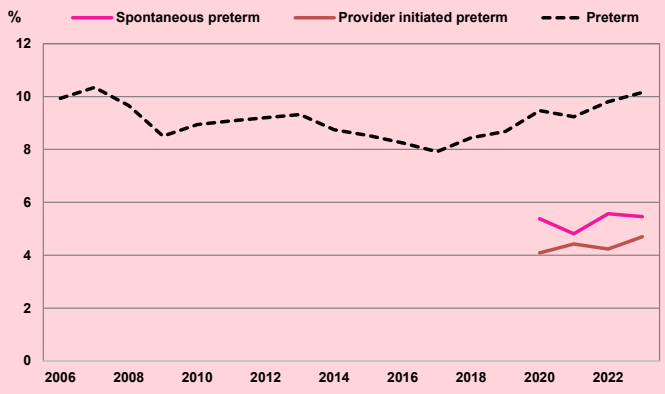


Figure 5.31 Total preterm birth by ethnicity among wāhine birthing at NWH 2006 - 2023

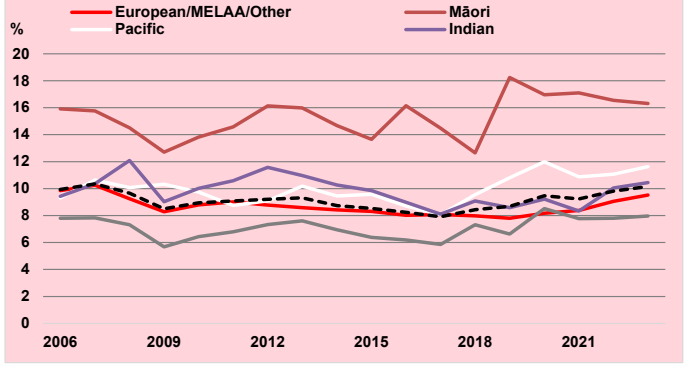


Figure 5.32 Spontaneous preterm birth by ethnicity among wāhine birthing at NWH 2006-2023

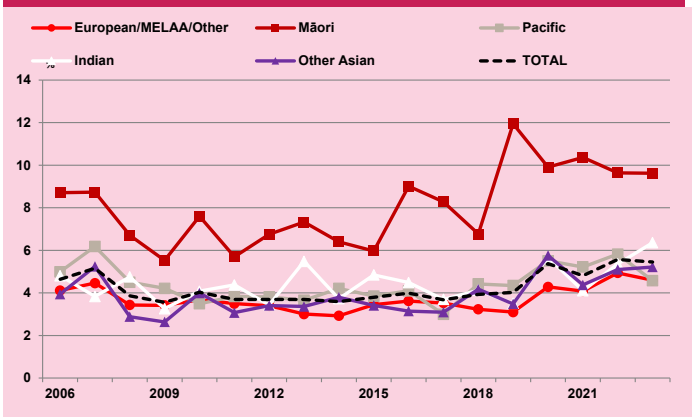
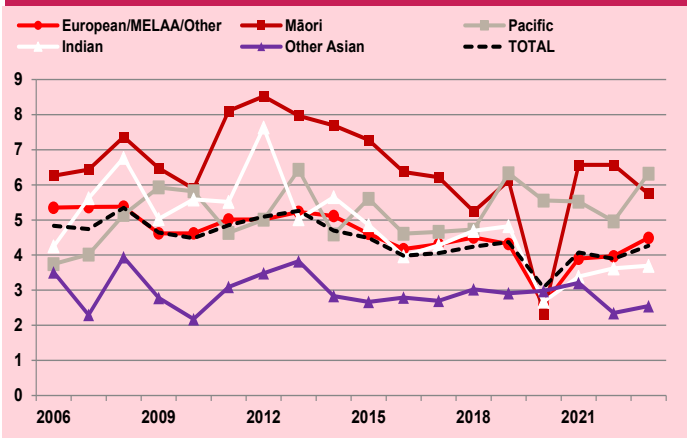


Figure 5.33 Provider initiated preterm birth (excl TOP) by ethnicity at NWH 2006-2023



- Under 5% of those giving birth at NWH are smokers at booking, but they continue to have a significantly higher chance of preterm birth (16.1%) compared with non-smokers (9.9%) and this is related to both spontaneous and provider initiated preterm birth (9.2% and 6.8%). Smoking cessation will have major impact on this group but less impact on overall rates due to the relatively low incidence of smoking in pregnancy in the Te Toka Tumai area. Alternative strategies to reduce spontaneous preterm birth must also be considered.
- Rates of survival for pēpi born preterm remain excellent ≥26 weeks. At the most extreme preterm gestations (22-25 weeks) rates of survival remain similar to other level three units within the Australian and New Zealand Newborn Network (ANZNN).

Comments

Rising rates of preterm birth persist with no change in the differences seen for Māori and non-Māori. NWH is challenged to address all of these concerns when many of the preterm births within our dataset are for whānau transferred in in preparation for early birth or cared for by us due to complex pregnancy when early birth is much more likely to be indicated for māmā and pēpi health and wellbeing.

Local activity should continue to focus on those booked for care through NWH, considering risk screening and risk modification for all and appropriate referral on for those with higher chances of both spontaneous and provider initiated preterm birth. NWH is uniquely positioned to provide these support services through its Preterm Birth Clinic and high-risk obstetric (MFM Medical) and diabetes services.

NWH is also uniquely positioned to support improvements in equitable outcomes more broadly. Several Te Toka Tumai staff members hold leadership positions with the Carosika Collaborative, a national transdisciplinary equity-focussed preterm birth group. This group has led a national knowledge translation project – Taonga Tuku Iho, Knowledge Translation for Equity in Preterm Birth Care and Outcomes in Aotearoa, which has developed a national best practice guide for preterm birth and the Carosika Metrics (to measure impact) and is in the process of launching the Carosika Community of Practice.

5.7.1 Data tables: Preterm birth

Table 5.37 Rates of total, spontaneous and provider initiated preterm birth NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total birthing wāhine	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Wāhine birthing preterm (<37) total	647	592	597	542	547	578	588	597	581	579
Incidence %	8.7	8.5	8.2	7.9	8.4	8.7	9.5	9.2	9.8	10.2
Wāhine birthing <32 weeks	185	168	172	144	169	182	197	180	182	187
Incidence %	2.5	2.4	2.4	2.1	2.6	2.7	3.2	2.8	3.1	3.3
Spontaneous and provider initiated preterm birth										
Spontaneous 32-36 weeks	187	179	205	176	171	180	219	224	238	197
Incidence %	2.5	2.6	2.8	2.6	2.6	2.7	3.5	3.5	4.0	3.5
Spontaneous <32 weeks	79	84	84	76	83	88	115	87	90	89
Incidence %	1.1	1.2	1.2	1.1	1.3	1.3	1.9	1.3	1.5	1.6
Provider initiated 32-36 weeks	275	245	220	222	207	216	172	193	159	48

Incidence %	3.7	3.5	3	3.2	3.2	3.2	2.8	3	2.7	0.8
Provider initiated <32 weeks	106	84	88	68	86	94	82	93	92	47
Incidence %	1.4	1.2	1.2	1	1.3	1.4	1.3	1.4	1.6	0.8
Total preterm pēpi	759	691	680	632	621	646	658	670	669	668
Total pēpi 32-36 weeks	554	505	481	465	439	450	441	470	459	450
Total pēpi <32 weeks	205	186	199	167	182	196	217	200	210	218

Table 5.38 Perinatal outcome of preterm pēpi by gestation at birth NWH 2023

Gestation	Births	Fetal deaths	Live births	Live born	Neonatal Death	% of live births surviving ≥ 28 days
(wks)	**N**	**n**	**n**	**%**	**n**	**%**
20	7	6	1	14	1	0
21	13	10	3	23	3	0
22	16	12	4	25	4	0
23	10	9	1	10	1	0
24	11	4	7	64	0	100
25	17	2	15	88	0	100
26	12	0	12	100	2	83
27	23	1	22	96	0	100
28	19	1	18	95	2	89
29	28	1	27	96	1	96
30	23	4	19	83	2	89
31	39	4	35	90	0	100
32	40	2	38	95	0	100
33	49	1	48	98	0	100
34	61	0	61	100	0	100
35	100	0	100	100	0	100
36	200	1	199	100	2	99
Totals	668	58	610	91	18	97

Table 5.39 Preterm birth and maternal demographic characteristics NWH 2023

	Total	Total preterm birth		Provider initiated preterm		Spontaneous preterm	
	N	**n**	**%**	**n**	**%**	**n**	**%**
Total	**5700**	**579**	**10.2**	**268**	**4.7**	**311**	**5.5**
Age (yrs)							
≤20	130	19	14.6	8	6.2	11	8.5
21-25	428	50	11.7	19	4.4	31	7.2
26-30	1246	135	10.8	59	4.7	76	6.1
31-35	2351	199	8.5	92	3.9	107	4.6
36-40	1282	136	10.6	64	5.0	72	5.6
>40	263	40	15.2	26	9.9	14	5.3
Ethnicity							
Māori	509	83	16.3	34	6.7	49	9.6
Pacific	765	89	11.6	54	7.1	35	4.6
Indian	833	87	10.4	34	4.1	53	6.4
Other Asian	1418	113	8.0	39	2.8	74	5.2
MELAA	254	26	10.2	12	4.7	14	5.5

European	1921	181	9.4	95	4.9	86	4.5
Other/not stated	0	0	0.0	0	0.0	0	0.0
Parity							
Nulliparous	2790	296	10.6	141	5.1	155	5.6
Multiparous	2910	283	9.7	127	4.4	156	5.4
Plurality							
Singleton	5581	492	8.8	217	3.9	275	4.9
Twins	117	85	72.6	49	41.9	36	30.8
Triplets	2	2	100.0	2	100.0	0	0.0
Smoking at booking							
Yes	249	40	16.1	17	6.8	23	9.2
No or not in past month	5451	539	9.9	251	4.6	288	5.3
Unknown	0	0	0.0	0	0.0	0	0.0
BMI							
<18.5	179	14	7.8	6	3.4	8	4.5
18.5-24.99	2686	239	8.9	92	3.4	147	5.5
25-29.99	1435	134	9.3	68	4.7	66	4.6
30-34.99	728	88	12.1	47	6.5	41	5.6
35-39.99	332	51	15.4	28	8.4	23	6.9
≥40	306	39	12.7	23	7.5	16	5.2
Missing	34	14	41.2	4	11.8	10	29.4
Deprivation quintile (NZ dep 2018)							
1 (least deprived)	993	99	10.0	45	4.5	54	5.4
2	1151	103	8.9	43	3.7	60	5.2
3	1187	130	11.0	64	5.4	66	5.6
4	1013	100	9.9	48	4.7	52	5.1
5 (most deprived)	1354	146	10.8	67	4.9	79	5.8
Missing	2	1	50.0	1	50.0	0	0.0

6

CHAPTER 6

LABOUR AND BIRTH

ŪPOKO 9

TE WHĀNAUTANGA

Commentators
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6.1 Onset of birth

Dr Kerrie Hides

Methods

On 30 April 2022, the Badgernet electronic maternity record replaced the previous Healthware record at Te Toka Tumai.

There are some differences in the Badgernet data collection compared to that from Healthware. This has required some changes in the way data is presented in this report. As far as possible, data has been aligned between the two systems. Where this was not possible, new definitions have been applied and this will lead to some artificial changes in trends over time. In the 2022 report, this was footnoted in the chapter where it was relevant eg definitions for elective and emergency Caesarean Section (CS). In other places, eg induction of labour, indication for induction and CS, timing of red cell transfusion, recording of risks such as hypertension and antepartum haemorrhage, the entry and extraction of data has been challenging in Badgernet, and this led to some data being unavailable for the 2022 report, or to lower than expected rates of interventions, risks and outcomes. Where applicable we either excluded data from reporting until data collection can be improved (indications for induction and CS) or footnoted unexpected or likely non-representative, reductions in rates (eg induction of labour, hypertension, antepartum haemorrhage).

In 2023, we have been able to remedy some of these issues eg we have complete data for indication for induction and Caesarean, and we have improved ascertainment of inductions due to vigilance by the team checking the daily birth list. However we have also discovered some new issues eg the overwriting of EDD (estimated date of delivery) by postnatal LMC via the perinatal spine, which has led to unexpected changes to the gestation at birth for some cases.

The change to definition of elective and emergency Caesarean from 2022, in line with HISO standards, is as follows:

Elective Caesarean section. A Caesarean done with urgency of grade 4 ie planned and on a routine list.

Emergency Caesarean. Planned Caesarean done outside routine list and prelabour and in labour Caesarean (all with urgency of 1, 2, or 3).

Prelabour Emergency Caesarean. The onset of labour is recorded as "Caesarean section before labour (including failed induction)".

In labour Emergency Caesarean. Grade 1-3 and onset of labour is recorded as "spontaneous" of "Induced – successful".

Key Findings

- The total birth numbers in Te Toka Tumai Auckland continue to decline, albeit at a slower rate than the previous year. In 2023 we had 5700 birthing māmā, down from 5925 in 2022 and 6462 in 2021.
- For the first time our Caesarean section rate is higher than the spontaneous vaginal birth rate at 44.6% compared to 42.9%. This follows an approximately 2% per year rise in Caesarean section rates for the last 3 years.
- The highest proportion of Caesarean sections were performed as an emergency, with the emergency Caesarean section rate rising from 23.7% in 2022 to 29.4% in 2023 and the elective Caesarean section rate declining from 18.4% to 15.2%. This does not necessarily indicate a reduction in planned CS as Caesareans are only reported as elective if they are planned AND executed on an elective list. The reduction therefore may be due to increased planned Caesareans performed on an acute list.
- Induction of labour rates appear consistent. 39.3% of pregnant women were induced in 2023, a slight increase from the 37.3 % reported in 2022 but remaining less than 2021 (39.7%). Some of this variation is likely due to the more complicated process of recording induction in Badgernet leading to undercounting in 2022 (at least).
- Assisted vaginal delivery rates are stable at 11.8%.
- VBAC rates remain low at 12% for all gestations. This rate increases to 26% in preterm births. There was a 7.5% reduction in patients having a repeat elective Caesarean (63.4% in 2022 and 55.9% in 2023) and a corresponding increase in emergency Caesarean sections in patients with a history of 1 previous Caesarean section. It is unclear whether this reflects an increased number of patients choosing to have a trial of VBAC or labouring prior to their planned Caesarean section date.

6.1.1 Gestation at Birth

The most common gestation at birth remains at 39 weeks. In 2023, 369 people (6.5%) birthed at 41 weeks and 13 (0.2%)at ≥ 42 weeks.

6.1.2 Induction of Labour

Methods

As noted in the introduction, induction of labour was not well captured after the change to Badgernet. The apparent fall in rates we presume is due to this difficulty rather than a reduction, and this impression

is further confirmed by the increase seen again in 2023 with vigilance at birth list checking.

In 2023, induction was assumed to have been undertaken if (1) any induction cycles were completed in Badgernet (2) labour was reported to commence by successful induction (3) indication for ARM was reported as induction of labour (4) reason for Caesarean was failed induction. In 2022, the following criterion was also used: (5) dilatation at ARM was noted as <5cm (consistent with local guidelines for onset of established labour). This criterion was removed from the definition in 2023 data as this was felt to overestimate induction in some cases.

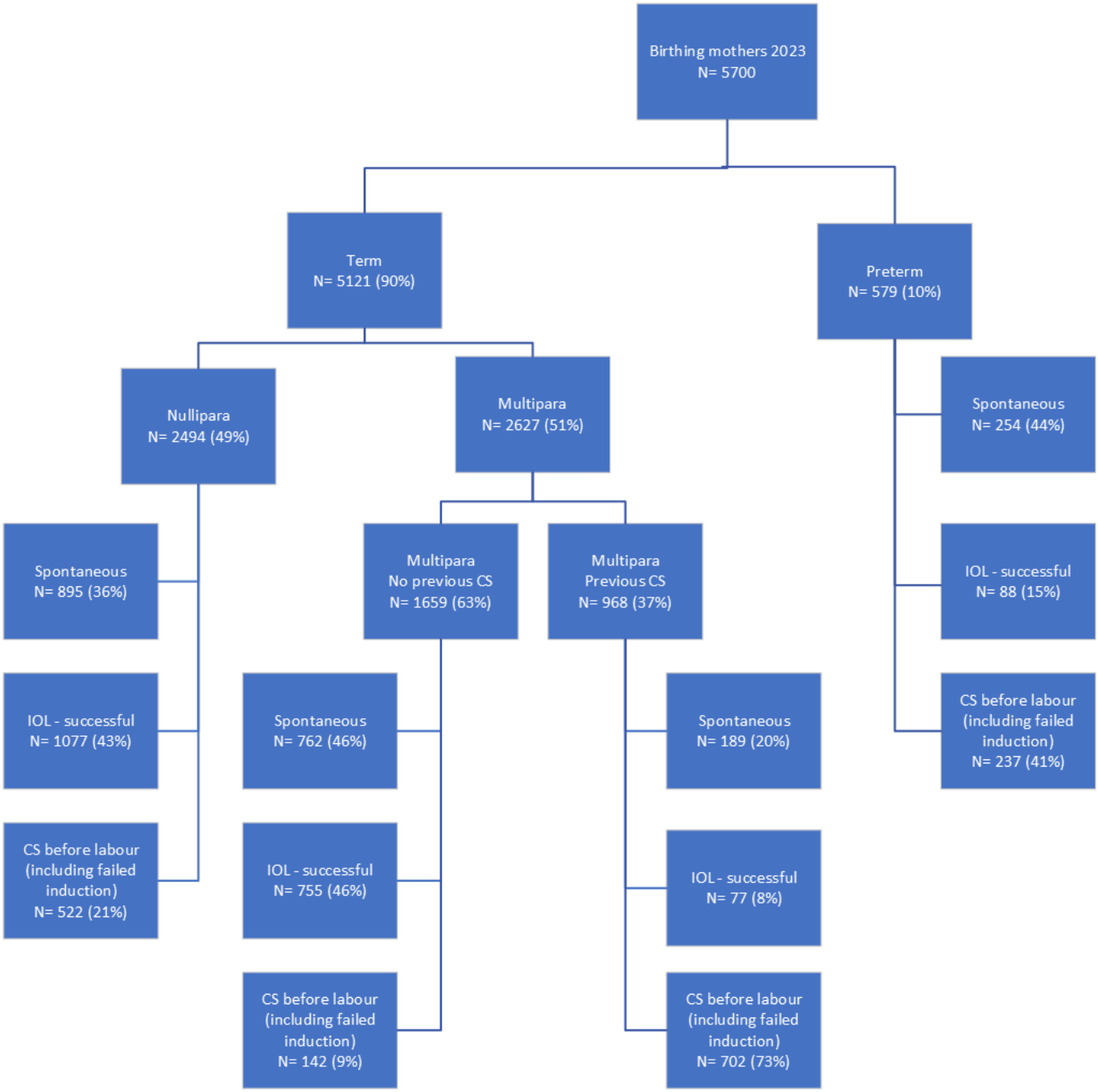
In some cases, there was an attempted induction of labour followed by an Emergency prelabour CS. Failed induction of labour leading to CS is now included in "onset of birth" as "Emergency CS prior to labour" rather than as "induced labour" (as it was previously) to increase national consistency.

These changes may have some impact on the observed trends over time.

Key findings

- Induction of labour rates appear consistent. 39.3% of pregnant women were induced in 2023, a slight increase from 37.3 % in 2022 but remaining less than 2021 (39.7%).
- Induction rates were highest in nulliparous women at 46%, similar to the previous year (45.2%). 32.2% of multiparous women had an IOL, a slight increase from the previous year (29.5%).
- The most common reason for requesting induction of labour was diabetes as the primary indication (15.6%). This was closely followed by term PROM (12.7%), fetal wellbeing concerns (12.2%) and post dates (11.4%). Indication for

Figure 6.1 Pathways to birth by gestation and parity NWH 2023



induction of labour was well documented in 2023, with missing data noted in only 2 out of 2136 requests. This is due to routine checking by the women's health intelligence team which may be enabled by a change to an electronic referral form.

- Induction of labour rates according to ethnicity have fluctuated between 2022 and 2023 with IOL in Indian primipara up 5% from 52.9% to 58%, Māori wāhine IOL rates are also slightly up from 50% to 53.9% whilst Pacific people IOL rates remain constant at 51.9%. IOL rates for other Asian and NZ European primipara have slightly reduced by 2% at 44% and 48% respectively.

6.1.2 Elective and Emergency Caesarean section

Methods

As noted in the introduction to chapter 6, there has been a change in the definitions used in this report for onset of birth, and for mode of birth.

Onset of birth does not include a category for elective CS (which previously included all preplanned CS, whether undertaken in labour or pre-labour). Categories are spontaneous onset, induced-successful, and CS before labour (including failed induction). These data are obtained directly from the variable in Badgernet in 2023.

For mode of birth changes, and definitions for urgency of Caesarean section, please see the start of chapter 6.

From 2022, there is no documentation of the total proportion of CS which were planned (previously reported as "elective CS"). In future, if elective CS are entered into the Badgernet system, for example through use of the elective CS booking form, it will be possible to extract and report data on the total proportion of planned CS, and on whether these were ultimately executed as planned or as emergency CS. In 2024 we will attempt to include these data from the referrals system.

In summary, CS is reported in 2022-2023 in onset of birth as those that were undertaken before labour (whether planned or emergency or failed induction), and in mode of birth as elective CS (those that were planned and executed as a planned (category or grade 4) CS) and emergency CS (those that were planned and executed acutely, or unplanned (prelabour, following failed induction, or following onset of spontaneous or induced labour)).

Key Findings

- Maternal age is strongly associated with Caesarean section delivery, with 78% of >40 year old nulliparous patients having a Caesarean section in 2023 (30.3% elective and 47.4% emergency).
- Interestingly the number of patients birthing in Te Toka Tumai Auckland aged > 40 continues to rise with a 42% increase since 2022.
- Ethnicity is also associated with mode of birth. Caesarean section rates remain lowest amongst Māori and Pacifica birthing people, at 37% and 36% respectively, however these groups have seen the highest increase in Caesarean section rate with an 8% rise since 2022. Caesarean section rates remain highest amongst European women at 49.6% , followed closely by MELAA at 47.3%, Indian 46.8% and other Asian 43%.

6.1.3 Use of syntocinon

We have not reported use of syntocinon in labour since 2021; while there is a place to indicate in the record that syntocinon was used for augmentation, these data are very different from rates we believed were correct in the Healthware system. Dilatation at which syntocinon is commenced is not accessible in Badgernet other than where this is included in induction of labour cycles.

Figure 6.2 Distribution of gestation at birth among pēpi born NWH 2006-2023

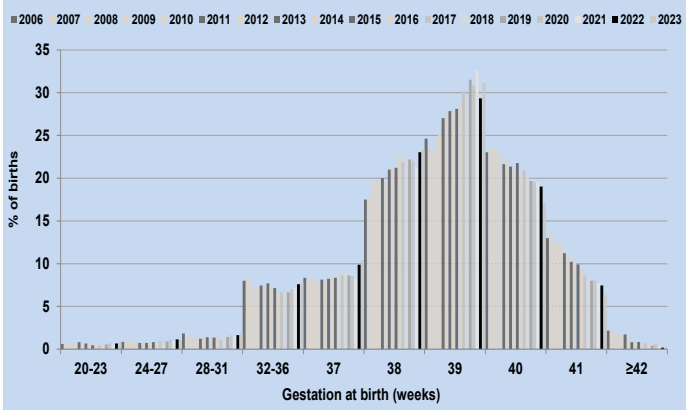


Figure 6.3 Distribution of gestation at birth among pēpi born NWH 2006-2023

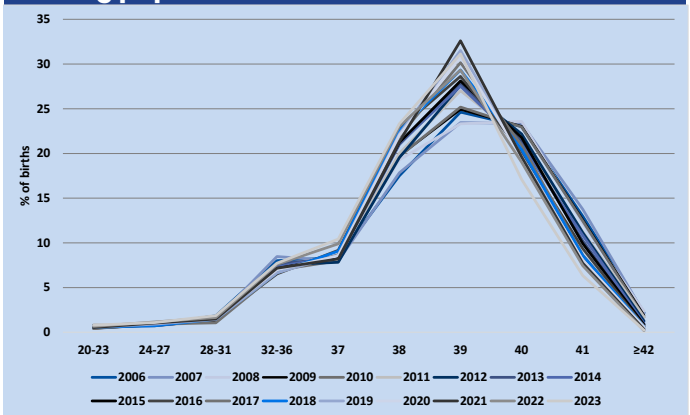


Figure 6.4 Distribution of gestation at birth among term pēpi by LMC 2023

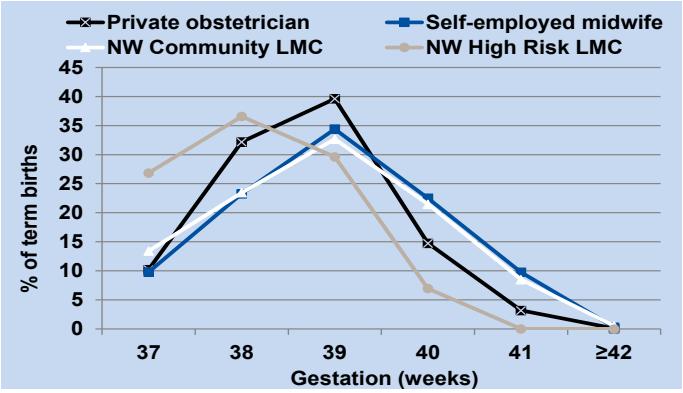


Figure 6.5 Induction of labour rates NWH 1992-2023

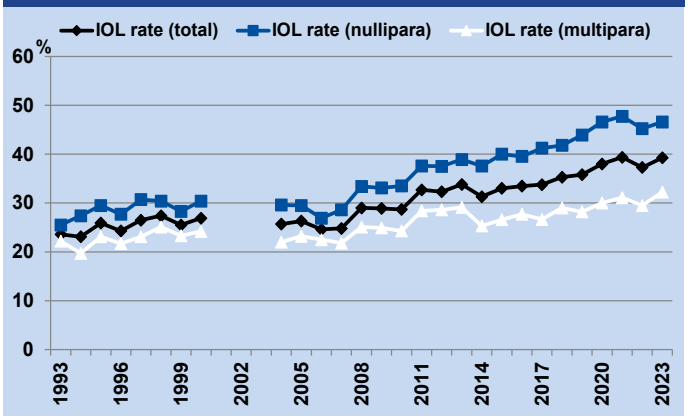


Figure 6.6 Reported primary indication for elective or prelabour CS by parity NWH 2023

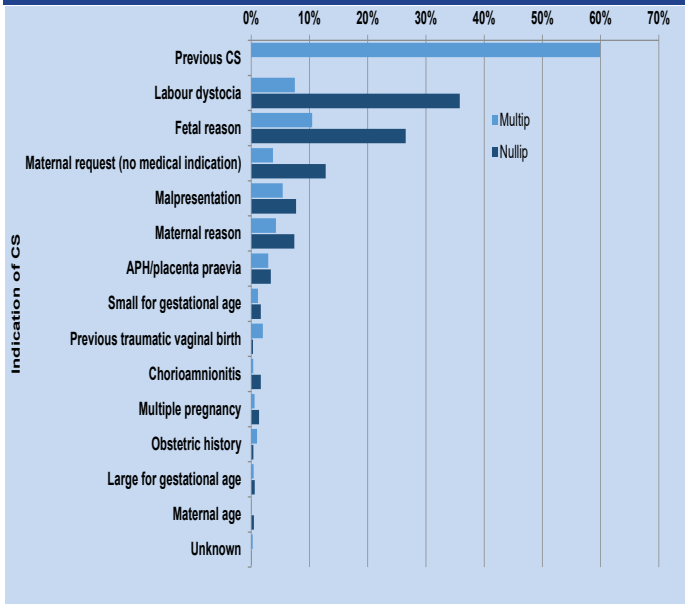
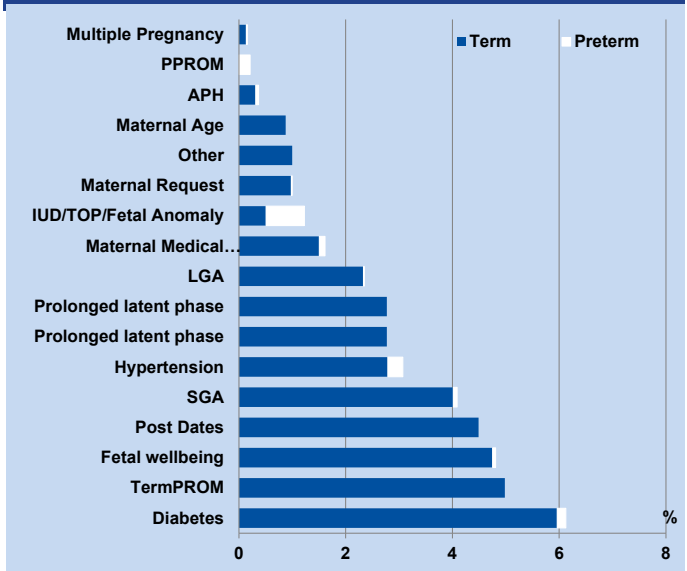


Figure 6.7 Primary indication for induction by gestation (as a percentage of all births) NWH 2023



6.1.4 Data tables: Onset of birth

Table 6.1 Onset of birth at term by maternal demographic characteristics NWH 2023

	Total	Spontaneous Labour		Induced - Successful		CS Before Labour (including failed induction)	
	N	n	%	n	%	n	%
Total	5121	1846	36.0	1909	37.3	1366	26.7
Maternal Age (yrs)							
≤20	111	64	57.7	39	35.1	8	7.2
21-25	378	160	42.3	169	44.7	49	13.0
26-30	1111	427	38.4	472	42.5	212	19.1
31-35	2152	811	37.7	772	35.9	569	26.4
36-40	1146	342	29.8	379	33.1	425	37.1
41+	223	42	18.8	78	35.0	103	46.2
Ethnicity							
Māori	426	156	36.6	178	41.8	92	21.6
Pacific	676	251	37.1	306	45.3	119	17.6
Indian	746	252	33.8	298	39.9	196	26.3

Other Asian	1305	566	43.4	420	32.2	319	24.4
MELAA/Other	228	69	30.3	83	36.4	76	33.3
European	1740	552	31.7	624	35.9	564	32.4
BMI							
<18.5	165	69	41.8	59	35.8	37	22.4
18.5-24.99	2447	988	40.4	805	32.9	654	26.7
25-29.99	1301	464	35.7	505	38.8	332	25.5
30-34.99	640	190	29.7	263	41.1	187	29.2
35-39.99	281	70	24.9	146	52.0	65	23.1
≥40	267	52	19.5	124	46.4	91	34.1
Missing	20	13	65.0	7	35.0	0	0.0
LMC at Birth							
Self-employed Midwife	2471	1046	42.3	998	40.4	427	17.3
Private Obstetrician	1479	420	28.4	438	29.6	621	42.0
Hospital Midwifery	955	347	36.3	358	37.5	250	26.2
NW Medical	124	18	14.5	67	54.0	39	31.5
NW Diabetes	80	5	6.3	46	57.5	29	36.3
Unbooked	12	10	83.3	2	16.7	0	0.0
Parity							
Nullipara	2494	895	35.9	1077	43.2	522	20.9
Multipara no previous CS	1659	762	30.6	755	30.3	142	5.7
Multipara with previous CS	968	189	7.6	77	3.1	702	28.1

CS = Caesarean Section, CS before labour includes booked CS performed on an elective list, emergency CS if it occurs before onset of labour, and failed induction.

Table 6.2 Induction of labour rates 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Births	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Wāhine Induced	2315	2289	2423	2312	2290	2381	2359	2568	2209	2238
Incidence (%)	31.3	33	33.5	33.8	35.3	35.8	38	39.7	37.3	39.3
Total Nullipara	3604	3321	3517	3343	3183	3202	2981	3204	2937	2790
Nullipara Induced	1354	1328	1391	1378	1332	1407	1389	1544	1328	1300
Incidence (%)	37.5	40	39.6	41.2	41.8	43.9	46.6	48.2	45.2	46.6
Total Multipara	3796	3612	3724	3503	3298	3458	3231	3258	2988	2910
Multipara Induced	961	961	1032	934	958	974	970	1024	881	938
Incidence (%)	25.3	26.6	27.7	26.7	29	28.2	30	31.4	29.5	32.2

Table 5.3 Indication for induction by gestation NWH 2023

	Total number induced		Preterm		Term	
	n= 2238		n= 102		n= 2136	
	n	%	n	%	n	%
Diabetes	349	15.6	9	8.8	340	15.9
Term PROM	284	12.7	0	0.0	284	13.3
Post Dates	256	11.4	0	0.0	256	12.0
Fetal wellbeing	274	12.2	3	0.1	271	12.7
SGA/FGR	233	10.4	4	0.2	229	10.7
Prolonged latent phase	158	7.1	0	0.0	158	7.4

Hypertension	175	7.8	16	0.7	159	7.4
LGA	134	6.0	1	0.0	133	6.2
Maternal Age	50	2.2	0	0.0	50	2.3
Maternal Medical Complications	92	4.1	6	0.3	86	4.0
Maternal Request	57	2.5	1	0.0	56	2.6
IUD/Fetal Anomaly	70	3.1	41	1.8	29	1.4
Other	57	2.5	0	0.0	57	2.7
APH	21	0.9	3	0.1	18	0.8
PPROM	12	0.5	12	0.5	0	0.0
Multiple Pregnancy	12	0.5	4	0.2	8	0.4
Missing	4	0.2	2	0.1	2	0.1

Table 6.4 Indication for induction by parity (term births) NWH 2023

All births at term	Total		Nullipara		Multipara	
	n=	5121	n=	2494	n=	2627
	n	%	n	%	n	%
Total IOL at term	2136	41.7	1246	50.0	890	33.9
Diabetes	340	6.6	160	6.4	180	6.9
Term PROM	284	5.5	191	7.7	93	3.5
Post Dates	256	5.0	175	7.0	81	3.1
Fetal Wellbeing	271	5.3	168	6.7	103	3.9
SGA	229	4.5	148	5.9	81	3.1
Prolonged Latent Phase	158	3.1	107	4.3	51	1.9
Hypertension	159	3.1	94	3.8	65	2.5
Maternal Age	50	1.0	14	0.6	36	1.4
Maternal Medical Comps	86	1.7	39	1.6	47	1.8
Maternal Request	56	1.1	25	1.0	31	1.2
Other	57	1.1	18	0.7	39	1.5
IUD/TOP/FA	29	0.6	18	0.7	11	0.4
APH	18	0.4	10	0.4	8	0.3
LGA	133	2.6	76	3.0	57	2.2
Multiple Pregnancy	8	0.2	2	0.1	6	0.2
Missing	2	0.0	1	0.0	1	0.0

Table 6.5 Rates of induction by age and ethnicity (prioritised) among term nullipara and multipara (excluding previous Caesarean) NWH 2023

	Term Nullipara	Induced Labour		Term Multipara no previous CS	Induced Labour	
	N	n	%	N	n	%
Total	2494	1246	50.0	1659	786	47.4
Age						
≤25	333	172	51.7	117	46	39.3
26-30	685	354	51.7	308	147	47.7
31-35	1009	513	50.8	732	322	44.0
>35	467	207	44.3	502	271	54.0
Ethnicity						
Māori	154	83	53.9	192	96	50.0

Pacific	258	134	51.9	305	177	58.0	
Indian	424	246	58.0	191	80	41.9	
Other Asian	694	309	44.5	391	143	36.6	
MELAA	108	58	53.7	71	32	45.1	
European	856	416	48.6	509	258	50.7	

Table 6.6 Primary indication for elective or prelabour emergency Caesarean section (all gestations) NWH 2023

	All CS		Elective CS (category 4)		Emergency CS prior to labour		Emergency CS in labour	
	N= 2541		N= 864		N= 673		N= 1004	
	n	%	n	%	n	%	n	%
Previous CS	721	28.4	510	59.0	122	18.1	89	8.9
Labour dystocia	569	22.4	0	0.0	132	19.6	437	43.5
Fetal reason	481	18.9	10	1.2	145	21.5	326	32.5
Maternal request (no medical indication)	216	8.5	128	14.8	42	6.2	46	4.6
Malpresentation	168	6.6	74	8.6	47	7.0	47	4.7
Maternal reason	150	5.9	56	6.5	78	11.6	16	1.6
APH/placenta praevia	80	3.1	25	2.9	42	6.2	13	1.3
Small for gestational age	36	1.4	6	0.7	29	4.3	1	0.1
Previous traumatic vaginal birth	28	1.1	18	2.1	7	1.0	3	0.3
Chorioamnionitis	26	1.0	0	0.0	7	1.0	19	1.9
Multiple pregnancy	25	1.0	9	1.0	11	1.6	5	0.5
Obstetric history	17	0.7	13	1.5	3	0.4	1	0.1
Large for gestational age	13	0.5	7	0.8	5	0.7	1	0.1
Maternal age	7	0.3	5	0.6	2	0.3	0	0.0
Unknown	4	0.2	3	0.3	1	0.1	0	0.0

Fetal reason includes abnormalities on CTG, concerns about fetal wellbeing, cord prolapse; Maternal reason includes diabetes, hypertension, maternal medical conditions; Previous CS includes women where this was chosen as main indication for CS; Labour dystocia covers all abnormalities of labour including failed induction and failed forceps.

6.2 Mode of Birth

Key Findings

- Spontaneous vaginal birth (SVB) rate is down 2.5% from 45.4% in 2022 to 42.9% in 2023, 32.2% for nulliparous and 53.2% for multiparous women.
- For standard primipara, SVB rates are highest amongst midwifery LMCs at 44.6%, closely followed by hospital care at 41.6%. The SVB rate in this group was 30.4% for private obstetricians. The standard primipara was defined in order to remove the confounding of maternal age and medical and obstetric complications associated with operative birth.
- Instrumental delivery rates for a standard primipara were lowest amongst private obstetricians at 21.3%, compared to 26.6% for Hospital care and 25.1% for self employed midwives.
- For multipara at term with no previous CS, the highest SVB rate is for self employed midwives at 83.6%, compared to 76.5% for private obstetric LMC and 78.6% hospital care.

6.2.1 Caesarean section

Methods

Please see the beginning of chapter 6 for updated definitions of CS. These changes to definitions will lead to changes in the time trend data relating to onset of birth and to elective and emergency CS rates from 2022.

From 2004 to 2021, an elective CS was defined as a CS which was planned in advance and performed either prior to, or after, the onset of labour. An emergency CS was defined as an unplanned CS

Figure 6.8 Mode of birth NWH 1991–2023

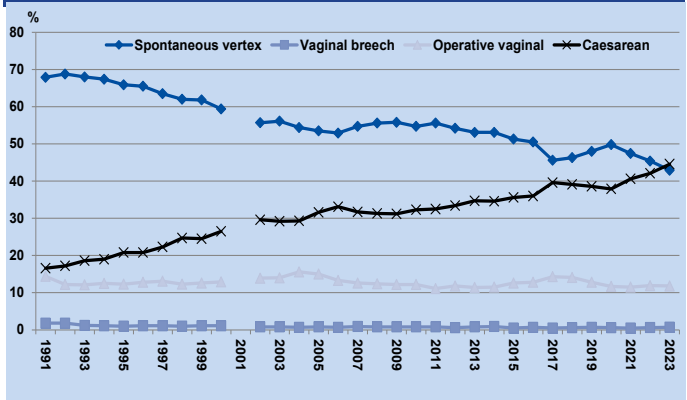


Figure 6.9 Mode of birth at term by LMC at birth among standard primipara NWH 2023

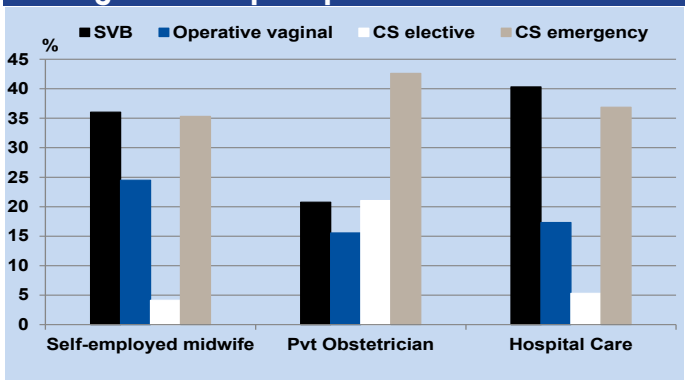


Figure 6.10 Mode of birth by ethnicity among nullipara NWH 2023

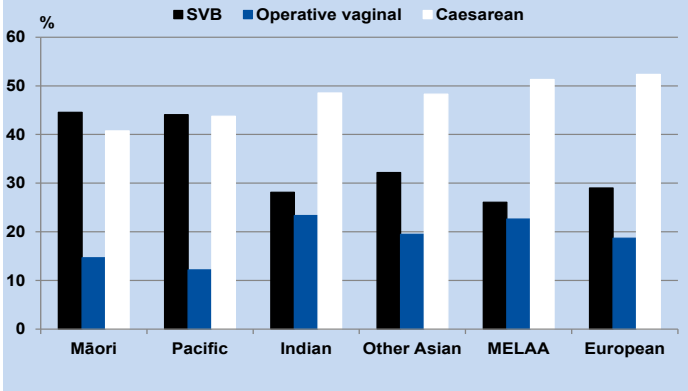
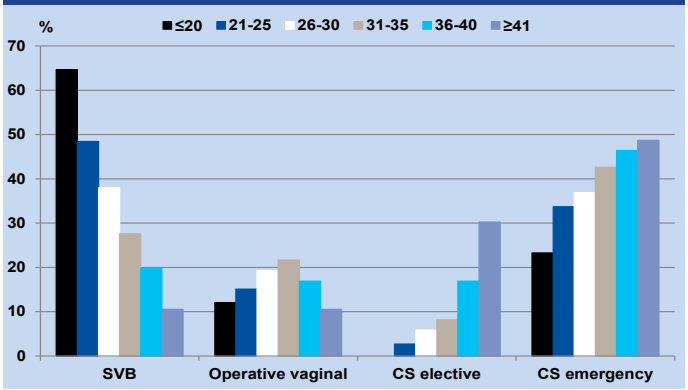


Figure 6.11 Mode of birth by maternal age among nullipara NWH 2023



that was performed either prior to onset of labour or during labour. CS following failed induction was classified as an emergency CS prior to labour. Labour was defined conservatively as being established when the cervix was greater than or equal to 3cms dilated (and effaced if nulliparous) and there are three contractions in 10 minutes, each lasting more than 40 seconds. (WHO, 2003) It is noted that clinical guidelines now define active labour as >5cm dilated.

From 2022, elective CS is defined as a planned CS performed on a routine list. Emergency CS includes planned CS performed outside a routine list.

Key Findings

- The Caesarean section rate continues to rise. In 2023, 44.6% of patients were birthed by Caesarean section. This reflects approximately a 2% rise each year since 2020. The actual numbers of Caesarean sections performed reduced by 42 (2581 from 2623).
- The largest contribution to the Caesarean section rate continues to come from two main groups. See Robson 10-group Classification. In 2022, Robson group 2 (nullipara, singleton, cephalic, term, induced OR prelabour CS) contributed 855 Caesarean sections (33.6% of the total CS). This is up from 30.6% in 2022, although in part due to definition changes due to the introduction of Badgernet. Robson group 5 (Previous CS, singleton, cephalic, term) contributed 787 CS (31% of the total CS performed) and has remained similar for the previous 2 years.
- The most frequ=ent indication for previous Caesarean section is 28.4% of all Caesareans in 2023. Labour dystocia (22%) and fetal wellbeing concerns (18.9%) constitute the key primary indicators for Caesarean section.

6.2.2 Vaginal birth after Caesarean

Methods

There are some differences in the time trend figures showing mode of birth for previous CS. This is because pre-planned CS undertaken on an acute list or after onset of spontaneous labour is now denoted as emergency CS, whereas previously was included as elective CS.

Key findings

- In 2023, 787 women birthed at Te Toka Tumai Auckland who had had a previous Caesarean section, singleton, cephalic at term. This total remains the same as 2022 (786), contributing 31% to the overall Caesarean section rate.
- The overall VBAC rate, including all women at any gestation with a previous Caesarean, was 12%, a further reduction from 14.7% in the previous year.
- The proportion of elective Caesarean sections performed for multiparous women with a previous CS at term continues to decline; 55.4% in 2023, compared to 63.7% in 2022 and 70% in

2021. This is unlikely to be reflective of a higher proportion of women opting for a trial of VBAC.

- VBAC rates vary by LMC, being highest amongst independent midwives at 22.3% in 2023 (21.2% in 2022) and lowest amongst private obstetricians at 4.9% in 2023 (8% in 2022).

Figure 6.12 Spontaneous vaginal birth rate among all nullipara by LMC 2006 – 2023

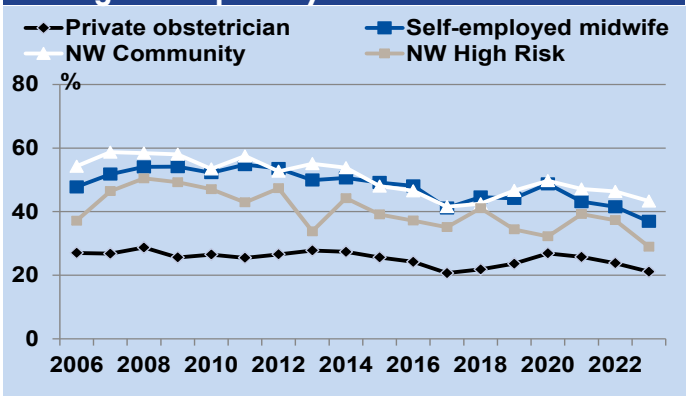


Figure 6.13 Caesarean section rate among all nullipara by LMC 2006 - 2023

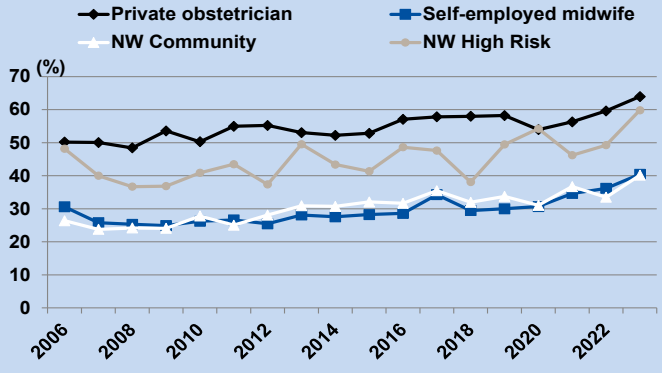


Figure 6.14 Robson groups 1&2 Nulliparous Caesarean section rates among singleton cephalic term pregnancies by onset of labour NWH 2004-2023

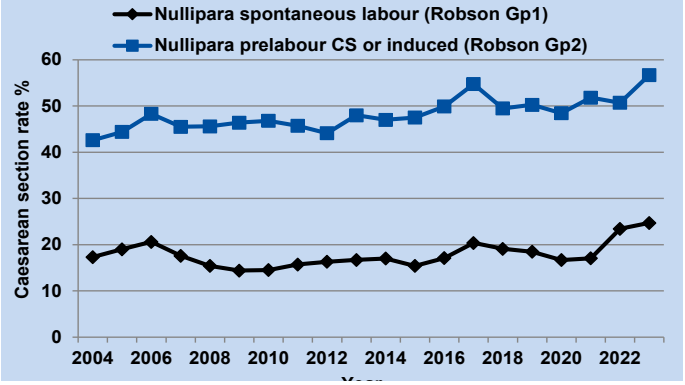


Figure 6.15 Robson groups 3-5 Multiparous Caesarean section rates among singleton cephalic term pregnancies by onset of labour and previous Caesarean status NWH 2004-2023

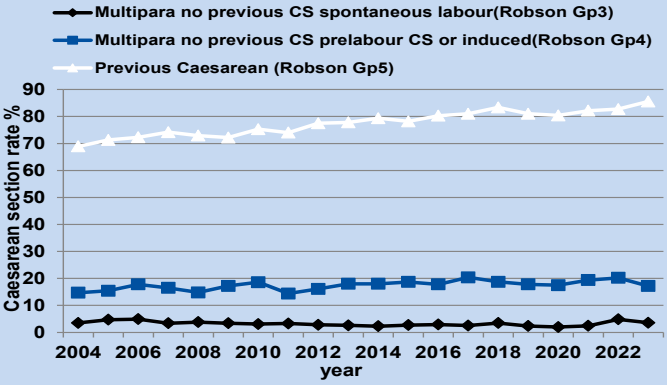
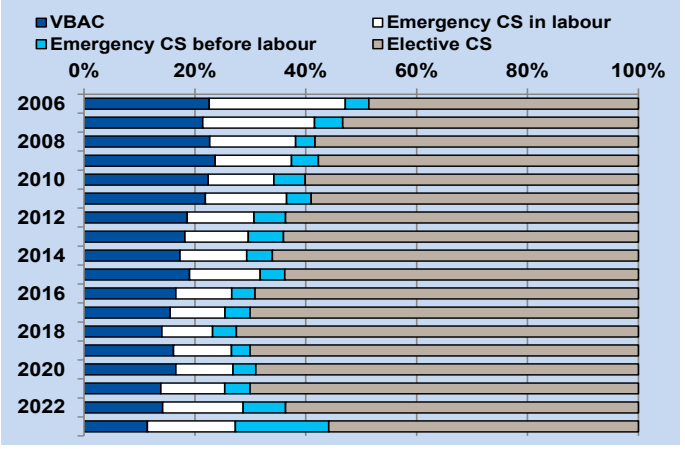


Figure 6.16 Mode of birth among parity 1, singleton, cephalic, term prior Caesarean pregnancies - all LMCs 2006-2023



In 2022, the introduction of Badgernet has led to an apparent reduction in the proportion of elective CS as elective CS in labour are now included with emergency CS in labour.

Figure 6.17 Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies - Private Obstetrician as LMC at birth 2006-2023

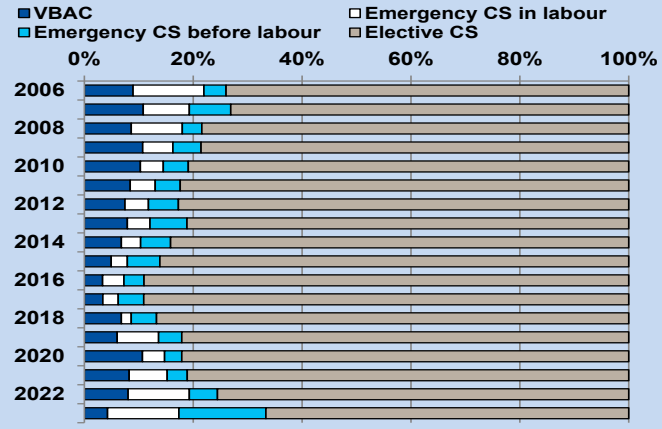


Figure 6.18 Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies - Self-employed midwife as LMC at birth 2006-2023

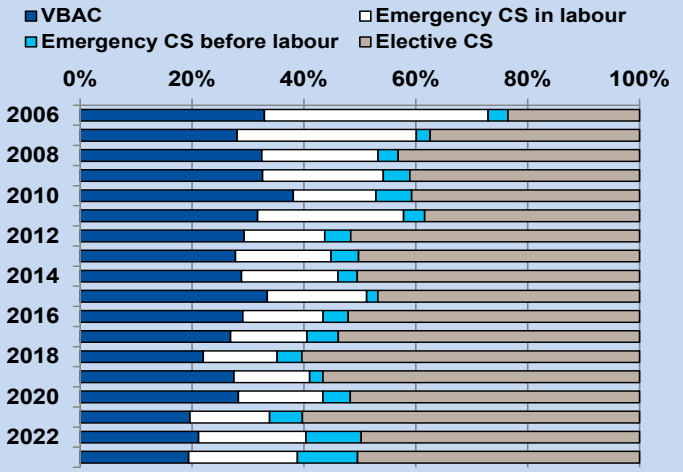


Figure 6.19 Mode of birth among parity 1 term cephalic singleton previous Caesarean pregnancies NWH as LMC at birth 2006-2023

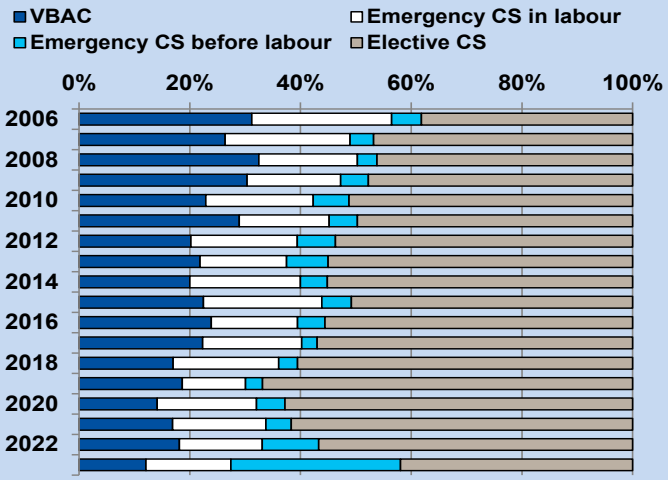
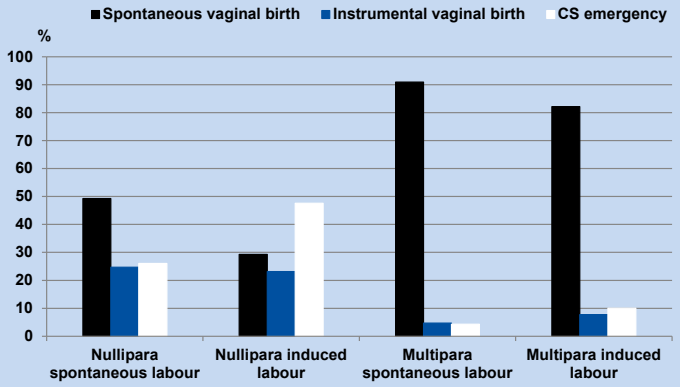


Figure 6.20 Mode of birth among intended vaginal births at term by parity and onset of labour (excludes previous CS) NWH 2023



6.2.3 Data tables: Mode of birth

Table 6.7 Mode of birth and epidural rate at term by onset of birth and parity (excluding wāhine with previous Caesarean) among intended vaginal births NWH 2023

	Nullipara				Multipara			
	Spontaneous labour		Induced labour		Spontaneous labour		Induced labour	
	N= 895		N= 1246		N= 762		N= 786	
	n	%	n	%	n	%	n	%
Mode of birth								
SVB	441	49.3	365	29.3	693	90.9	646	82.2
Operative Vaginal	221	24.7	288	23.1	36	4.7	61	7.8
CS emergency	233	26.0	593	47.6	33	4.3	79	10.1
Epidural	575	64.2	946	75.9	375	49.2	511	65.0

Table 6.8 Robson 10-Group Classification NWH 2021-2023

	2021				2022				2023			
Robson Group	CS	Total Births	CS rate	Contribution to CS rate	CS	Total Births	CS rate	Contribution to CS rate	CS	Total Births	CS rate	Contribution to CS rate
Totals	n	N	%	%	n	N	%	%	n	N	%	%
	2623	6462	40.6		2492	5925	42.1		2541	5700	44.6	
1 Nullip, singleton, cephalic, term, spontaneous labour	180	1056	17.0	6.9	231	986	23.4	9.3	217	879	24.7	8.5
2 Nullip, singleton, cephalic, term, induced or CS before labour	909	1755	51.8	34.7	763	1505	50.7	30.6	855	1508	56.7	33.6
3 Multip, singleton, cephalic, no previous CS, term, spontaneous labour	22	901	2.4	0.8	41	848	4.8	1.6	27	754	3.6	1.1
4 Multip, singleton, cephalic, no previous CS, term, induced or CS before labour	187	965	19.4	7.1	169	837	20.2	6.8	146	850	17.2	5.7
5 Previous CS, singleton, cephalic, term	832	1013	82.1	31.7	786	950	82.7	31.5	787	920	85.5	31.0
6 Nullip, singleton, breech	120	138	87.0	4.6	136	150	90.7	5.5	123	143	86.0	4.8
7 Multiip, singleton, breech (incl prev CS)	82	93	88.2	3.1	79	91	86.8	3.2	88	96	91.7	3.5
8 All multiple (incl prev CS)	69	91	75.8	2.6	87	125	69.6	3.5	87	119	73.1	3.4
9 All abnormal lie (incl prev CS)	5	5	100.0	0.2	24	24	100.0	1.0	37	37	100.0	1.5
10 All preterm singleton cephalic (incl prev CS)	217	445	48.8	8.3	176	409	43.0	7.1	174	394	44.2	6.8

Note that in 2022, with the introduction of Badgernet as the electronic record, the data available changed. The impact of this to the Robson groups is the move of planned elective section performed in labour from the "CS before labour" categories to the "spontaneous labour" category ie for nullipara from group 2 to group 1 and for multipara from group 4 to group 3.

Table 6.9 Spontaneous vaginal birth rates NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total births (māmā)	7400	6933	7241	6846	6481	6660	6212	6462	5924	5700
Spontaneous vaginal birth	3992	3594	3706	3158	3034	3239	3131	3095	2726	2446
Incidence %	53.9	51.8	51.2	46.1	46.8	48.6	50.4	47.9	46.0	42.9
Total nullipara	3604	3321	3517	3343	3183	3202	2981	3204	2936	2790
Spontaneous vaginal birth	1603	1392	1427	1150	1164	1211	1238	1233	1083	898
Incidence %	44.5	41.9	40.6	34.4	36.6	37.8	41.5	38	37	32.2
Total multipara	3796	3612	3724	3503	3298	3458	3231	3258	2988	2910
Spontaneous vaginal birth	2389	2202	2279	2008	1870	2028	1893	1862	1643	1548
Incidence %	62.9	61	61.2	57.3	56.7	58.6	58.6	57.2	55.0	53.2

Table 6.10 Mode of birth trends NWH 2012-2023 (n=mother)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	7400	**6933**	**7241**	**6846**	**6481**	**6660**	**6212**	**6462**	**5925**	**5700**
Number of births	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Spontaneous vertex	53.1	51.3	50.5	45.6	46.3	48	49.8	47.4	45.4	42.9
Vaginal breech	0.9	0.5	0.7	0.5	0.6	0.7	0.6	0.5	0.6	0.7
Forceps/Ventouse	11.5	12.6	12.8	14.3	14.1	12.8	11.7	11.5	11.9	11.8
Caesarean	34.6	35.6	36	39.6	39.1	38.6	37.9	40.6	42.1	44.6
Elective	17.3	18	17.7	19.4	20.6	20.4	19.2	19.7	18.4	15.2
Emergency	17.3	17.6	18.3	20.1	18.5	18.2	18.8	20.9	23.7	29.4

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.11 Caesarean section rates NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total births (māmā)	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Caesarean Sections	2559	2468	2608	2709	2532	2571	2356	2623	2492	2581
Incidence %	34.6	35.6	36	39.6	39.1	38.6	37.9	40.6	42.1	45.3
Total nullipara	3604	3321	3517	3343	3183	3202	2981	3204	2937	2790
Caesarean	1289	1206	1338	1424	1263	1295	1161	1341	1268	1364
Incidence %	35.8	36.3	38	42.6	39.7	40.4	38.9	41.9	43.2	48.9
Total elective	379	369	390	402	394	402	316	349	315	243
Elective %	10.5	11.1	11.1	12	12.4	12.6	10.6	11	10.7	8.7
Total emergency	910	837	948	1022	869	893	845	992	953	1121
Emergency %	25.2	25.2	27	30.6	27.3	27.9	28.3	31.0	32.4	40.2
Total multipara	3796	3612	3724	3503	3298	3458	3231	3258	2988	2910
Caesarean	1270	1262	1270	1285	1269	1276	1195	1282	1224	1217
Incidence %	33.5	34.9	34.1	36.7	38.5	36.9	37.0	39.3	41.0	41.8
Total elective	902	878	892	929	942	959	874	923	775	621
Elective %	23.8	24.3	24	26.5	28.6	27.7	27.1	28.3	25.9	21.3
Total emergency	368	384	378	356	327	317	321	359	449	596
Emergency %	9.7	10.6	10.2	10.2	9.9	9.2	9.9	11.0	15.0	20.5

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.12 Mode of birth by parity and previous Caesrean section status NWH 2023

	Nullipara preterm		Nullipara term		Multipara no prev CS preterm		Multipara no prev CS term		Multipara prev CS preterm		Multipara prev CS term	
	n=296		n=2494		n=164		n=1659		n=119		n=968	
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	92	31.1	806	32.3	93	56.7	1339	80.7	26	21.8	90	9.3
Vaginal breech	25	8.4	1	0.0	7	4.3	3	0.2	4	3.4	0	0.0
Operative vaginal birth	19	6.4	509	20.4	4	2.4	97	5.8	1	0.8	43	4.4
Ventouse	8	2.7	300	12.0	2	1.2	57	3.4	0	0.0	28	2.9
Forceps	11	3.7	209	8.4	2	1.2	40	2.4	1	0.8	15	1.5
Caesarean section	160	54.1	1178	47.2	60	36.6	220	13.3	88	73.9	835	86.3
Emergency	152	51.4	943	37.8	55	33.5	147	8.9	81	68.1	299	30.9
Elective	8	2.7	235	9.4	5	3.0	73	4.4	7	5.9	536	55.4

In 2022, elective CS has been redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.13 Mode of birth at term by LMC (nullipara) NWH 2023

	Self-employed Midwife		Private Obstetrician		Hospital Care*	
	n= 1257		n= 746		n= 491	
	n	%	n	%	n	%
SVD	453	36.0	155	20.8	198	40.3
Vaginal breech	0	0.0	0	0.0	0	0.0
Forceps	126	10.0	46	6.2	37	7.5
Ventouse	182	14.5	70	9.4	48	9.8
CS elective	52	4.1	157	21.0	26	5.3
CS emergency	444	35.3	318	42.6	181	36.9

*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked women.

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.14 Mode of birth at term by LMC at birth (standard primipara) NWH 2023

	Self-employed Midwife		Private Obstetrician		Hospital Care*	
	n= 469		n= 240		n= 113	
	n	%	n	%	n	%
SVD	209	44.6	73	30.4	47	41.6
Vaginal breech	0	0.0	0	0.0	0	0.0
Forceps	47	10.0	21	8.8	15	13.3
Ventouse	71	15.1	30	12.5	15	13.3
CS elective	9	1.9	31	12.9	3	2.7
CS emergency	133	28.4	85	35.4	33	29.2

*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked women.

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.15 Mode of birth at term by LMC at birth (multipara, no previous CS) NWH 2023

	Self-employed Midwife n=864		Private Obstetrician n=366		Hospital Care* n=429	
	n	%	n	%	n	%
SVD	722	83.6	280	76.5	337	78.6
Vaginal breech	0	0.0	1	0.3	2	0.5
Forceps	15	1.7	9	2.5	16	3.7
Ventouse	27	3.1	19	5.2	11	2.6
CS elective	32	3.7	24	6.6	17	4.0
CS emergency	68	7.9	33	9.0	46	10.7

*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked women.

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.16 Mode of birth at term by LMC at birth (multipara, previous CS) NWH 2023

	Self-employed Midwife n= 350		Private Obstetrician n= 367		Hospital Care* n= 251	
	n	%	n	%	n	%
SVD	50	14.3	11	3.0	29	11.6
Vaginal breech	0	0.0	0	0.0	0	0.0
Forceps	8	2.3	5	1.4	2	0.8
Ventouse	20	5.7	2	0.5	6	2.4
CS elective	161	46.0	249	67.8	126	50.2
CS emergency	111	31.7	100	27.2	88	35.1

*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked women.

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.17 Mode of birth by ethnicity NWH 2023

	Māori n= 509		Pacific n= 765		Other Asian n= 1418		Indian n= 833		European n= 1921		MELAA n= 254	
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	280	55.0	427	55.8	613	43.2	296	35.5	732	38.1	98	38.6
Vaginal breech	6	1.2	8	1.0	9	0.6	6	0.7	10	0.5	1	0.4
Forceps	13	2.6	25	3.3	70	4.9	59	7.1	95	4.9	16	6.3
Ventouse	24	4.7	27	3.5	113	8.0	82	9.8	130	6.8	19	7.5
CS elective	50	9.8	67	8.8	200	14.1	100	12.0	408	21.2	39	15.4
CS emergency	136	26.7	211	27.6	413	29.1	290	34.8	546	28.4	81	31.9

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.18 Mode of birth by ethnicity (nullipara) NWH 2023

	Māori n=184		Pacific n=288		Other Asian n=764		Indian n=480		European n=959		MELAA n=115	
	n	%	n	%	n	%	n	%	n	%	n	%
Spontaneous vertex	82	44.6	127	44.1	246	32.2	135	28.1	278	29.0	30	26.1

Vaginal breech	4	2.2	3	1.0	7	0.9	4	0.8	8	0.8	0	0.0
Forceps	9	4.9	19	6.6	57	7.5	49	10.2	76	7.9	10	8.7
Ventouse	18	9.8	16	5.6	92	12.0	63	13.1	103	10.7	16	13.9
CS elective	9	4.9	12	4.2	69	9.0	29	6.0	116	12.1	8	7.0
CS emergency	62	33.7	111	38.5	293	38.4	200	41.7	378	39.4	51	44.3

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.19 Mode of birth by ethnicity (multipara) NWH 2023

	Māori		**Pacific**		**Other Asian**		**Indian**		**European**		**MELAA**	
	n=325		**n=477**		**n=654**		**n=353**		**n=962**		**n=139**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Spontaneous vertex	198	60.9	300	62.9	367	56.1	161	45.6	454	47.2	68	48.9
Vaginal breech	2	0.6	5	1.0	2	0.3	2	0.6	2	0.2	1	0.7
Forceps	4	1.2	6	1.3	13	2.0	10	2.8	19	2.0	6	4.3
Ventouse	6	1.8	11	2.3	21	3.2	19	5.4	27	2.8	3	2.2
CS elective	41	12.6	55	11.5	131	20.0	71	20.1	292	30.4	31	22.3
CS emergency	74	22.8	100	21.0	120	18.3	90	25.5	168	17.5	30	21.6

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.20 Mode of birth by maternal age (yrs) (nullipara) NWH 2023

	≤20		**21-25**		**26-30**		**31-35**		**36-40**		**>40**	
	n=116		**n=258**		**n=768**		**n=1117**		**n=455**		**n=76**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Spontaneous vertex	75	64.7	125	48.4	292	38.0	308	27.6	90	19.8	8	10.5
Vaginal breech	4	3.4	1	0.4	6	0.8	10	0.9	4	0.9	1	1.3
Forceps	4	3.4	11	4.3	64	8.3	102	9.1	34	7.5	5	6.6
Ventouse	10	8.6	28	10.9	84	10.9	140	12.5	43	9.5	3	3.9
CS elective	0	0.0	7	2.7	45	5.9	91	8.1	77	16.9	23	30.3
CS emergency	23	19.8	86	33.3	277	36.1	466	41.7	207	45.5	36	47.4

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.21 Mode of Birth by maternal age (yrs) (multipara) NWH 2023

	≤20		**21-25**		**26-30**		**31-35**		**36-40**		**>40**	
	n=14		**n=170**		**n=478**		**n=1234**		**n=827**		**n=187**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Spontaneous vertex	11	78.6	120	70.6	310	64.9	669	54.2	367	44.4	71	38.0
Vaginal breech	0	0.0	1	0.6	2	0.4	3	0.2	7	0.8	1	0.5
Forceps	0	0.0	0	0.0	6	1.3	23	1.9	21	2.5	8	4.3
Ventouse	0	0.0	4	2.4	18	3.8	37	3.0	26	3.1	2	1.1
CS elective	2	14.3	15	8.8	63	13.2	264	21.4	224	27.1	53	28.3
CS emergency	1	7.1	30	17.6	79	16.5	238	19.3	182	22.0	52	27.8

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.22 VBAC: Mode of birth among parity 1 wāhine with previous CS by onset of birth (N=752) NWH 2023

	Previous Caesarean (Parity 1), all gestations							
	Spontaneous labour		Induced - Successful		Caesarean Section Before Labour (including failed induction)		Total	
	n=164		n=46		n=542		n=752	
	n	%	n	%	n	%	n	%
Vaginal birth	38	23.2	14	30.4	0	0	52	6.9
Operative vaginal	24	14.6	14	30.4	0	0	38	5.1
CS elective	1	0.6	0	0.0	387	71.4	388	51.6
CS emergency	101	61.6	18	39.1	155	28.6	274	36.4

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.23 VBAC: Mode of birth among parity 1, singleton, cephalic, term prior Caesarean by onset of birth (N=655) NWH 2023

	Parity 1, previous Caesarean, singleton, cephalic, term							
	Spontaneous labour		Induced - Successful		Caesarean Section Before Labour (including failed induction)		Total	
	n=132		n=39		n=484		n=655	
	n	%	n	%	n	%	n	%
Vaginal birth	26	19.7	10	25.6	0	0	36	5.5
Operative vaginal birth	24	18.2	14	35.9	0	0	38	5.8
CS elective	1	0.8	0	0.0	365	75.4	366	55.9
CS emergency	81	61.4	15	38.5	119	24.6	215	32.8

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 6.24 VBAC: Mode of birth among parity 1, singleton, cephalic, term prior Caesarean by LMC at birth (n=655) NWH 2023

	Parity 1, previous Caesarean, singleton, cephalic, term							
	IMW		Pvt Obstetrician		Hospital Care*		Total	
	n=245		n=285		n=125		n=655	
	n	%	n	%	n	%	n	%
Vaginal birth	22	9.0	5	1.8		0.0	36	5.5
Operative vaginal birth	25	10.2	7	2.5	6	4.8	38	5.8
CS elective	124	50.6	190	66.7	52	41.6	366	55.9
CS emergency	74	30.2	83	29.1	58	46.4	215	32.8

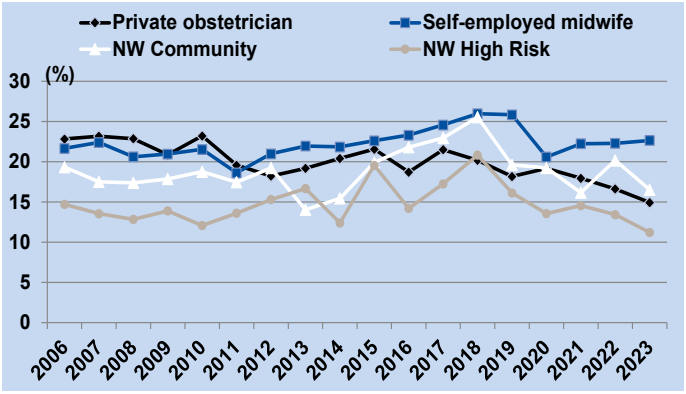
*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked women.

In 2022, elective CS was redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

6.3 Instrumental Vaginal Birth

The rate of instrumental birth has been fairly stable over recent years, with an overall rate of 11.8% in 2023. As expected, the rate is higher in nullipara (24.7%), compared to 5% in multiparous women. The rate of instrumental birth following an induced labour for nulliparous patients is slightly less at 23.1%. This is despite the higher epidural use in this group at 75.9%, compared to 64.2% in spontaneous labouring nulliparous women. Instrumental birth rates for nulliparous women vary by ethnicity, with lowest rates amongst Māori and Pacifica wāhine at 15% and 12%, and highest amongst Indian and MELAA women at 23% and 22% respectively.

Figure 6.21 Operative vaginal birth rate among all nullipara by LMC 2006 – 2023



6.3.2 Data tables: Instrumental Vaginal Birth

Table 6.25 Operative vaginal birth rates 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total births (māmā)	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Total operative vaginal births	849	871	927	979	915	850	725	744	706	673
Incidence %	11.5	12.6	12.8	14.3	14.1	12.8	11.7	11.5	11.9	11.8
Total nullipara	3604	3321	3517	3343	3193	3202	2981	3204	2937	2790
Total nullipara operative vaginal births	712	723	752	769	756	696	582	630	585	528
Nulliparous operative vaginal birth rate (%)	19.8	21.8	21.4	23	23.8	21.7	19.5	19.7	19.9	18.9
Total multipara	3796	3612	3724	3503	3298	3458	3231	3258	2988	2910
Total multipara operative vaginal births	137	148	175	210	159	154	143	114	121	145
Multiparous operative vaginal birth rate (%)	3.6	4.1	4.7	6	4.8	4.5	4.4	3.5	4.0	5.0

6.4 Breech presentation

6.4.1 Breech birth

In 2023, the proportion of breech deliveries remained at 5.4%, the same as 2022. The Caesarean section rate for breech presentation at term continues to rise, now 99% in 2023, previously 96% in 2022 and 87% in 2021. At 25-31 weeks gestation 17% singleton breech were delivered vaginally and 19% 32-36 weeks.

Overall in 2023, 211 CS were performed at all gestations where the presentation was breech in a singleton, similar to 2022 at 215.

6.4.2 External cephalic version (ECV)

These data were not available in 2022 but have been completed in 2023.

There were only 199 referrals for ECV at term in 2023 (42% of eligible cases). ECV referral rates were highest amongst Māori and Pacific women at 49%, closely followed by NZ European women at 44%. The lowest rates of referral for ECV were amongst Indian women at only 31%. Overall numbers are however low.

Most ECV referrals came from LMC midwives at 55% and lowest rates amongst private obstetricians and NW diabetes/ medical, both at 27%.

ECV success rates are similar to the literature at 48%. The vaginal birth rate for those who had a successful ECV was 60.5% and 95% remained cephalic at birth.

6.4.3 Data tables: Breech presentation

Table 6.26 Breech birth 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total pēpi born	7551	7074	7368	6974	6597	6762	6310	6553	6050	5821
Total breech births	367	345	351	317	326	322	292	279	328	317
Percent of total births	4.9	4.9	4.8	4.5	4.9	4.8	4.6	4.3	5.4	5.4
Total singleton pēpi	7253	6796	7114	6719	6366	6560	6118	6371	5800	5581
Total singleton breech	294	265	282	251	263	265	234	231	241	239
Percent of singletons	4.1	3.9	4	3.7	4.1	4	3.8	3.6	4.2	4.3
Total multiple pēpi	298	278	254	255	231	202	192	182	250	240
Total multiple breech	73	80	69	66	63	57	58	48	87	78
Percent of multiple births	24.5	28.8	27.2	25.9	27.3	28.2	30.2	26.4	34.8	32.5

Table 6.27 Mode of birth by gestation for breech presentation (singletons) NWH 2023

	N	Total breech	% Breech/total singleton birth	Breech & CS	% CS/total breech
Total singleton births	5581	239	4	211	88
20–24 weeks	53	18	34	3	17
25–31 weeks	105	30	29	25	83
32–36 weeks	334	37	11	30	81
≥37 weeks	5089	154	3	153	99

Table 6.28 Mode of birth and presentation at birth following attempted ECV NWH 2023

Type of Birth	Failed ECV		Successful ECV	
	n= 40		n= 43	
	n	%	n	%
Vaginal	1	2.5	26	60.5
Unassisted vaginal birth	1	2.5	21	48.8
Operative vaginal birth	0	0.0	5	11.6
CS elective	24	60.0	2	4.7
CS emergency	15	37.5	15	34.9
Presentation at birth				
Cephalic	1	2.5	41	95.3
Breech	36	90	2	4.7
Other	3	7.5	0	0.0

Table 6.29 Referral for ECV (wāhine at term with singleton breech presentation or attempted ECV) by demographic and clinical characteristics NWH 2023

	Singleton Breech at term or attempted for ECV	ECV Referral		No referral for ECV	
	N=199	n= 83		n= 116	
	N	n	%	n	%
Age (years)					
≤20	1	1	100	0	0
21-30	48	16	33	32	67

31-40	139	64	46	75	54
≥41	11	2	18	9	82
Ethnicity (prioritised)					
Māori/Pacific Island	41	20	49	21	51
Other Asian	43	16	37	27	63
Indian	26	8	31	18	69
NZ/Other European	81	36	44	45	56
MELAA	8	3	38	5	63
BMI					
<18.5	2	0	0	2	100
18.5-24.99	91	36	40	55	60
25-29.99	55	25	45	30	55
30-34.99	21	10	48	11	52
35-39.99	18	8	44	10	56
≥40	12	4	33	8	67
LMC at Birth					
Self-employed Midwife	100	55	55	45	45
Hospital midwifery	28	9	32	19	68
NW Diabetes/Medical	11	3	27	8	73
Private Obstetrician	60	16	27	44	73
Previous CS					
Yes	35	3	9	32	91
No	164	80	49	84	51

6.5 Obstetric Analgesia and Anaesthesia

Dr Matthew Drake

Data for use of analgesia in labour were inadequately collected in Badgernet in 2022 and 2023. We need to improve the completion of the required data fields in Badgernet.

Data for regional analgesia were also difficult to extract in 2022 and 2023, due to the introduction of Badgernet in May 2022 with simultaneous roll-out of a robot system to export theatre anaesthesia from the anaesthetic system "SaferSleep" to Badgernet for the capture of in-theatre regional anaesthesia data, as well as a phased migration of anaesthetist documentation of labour epidurals from paper to Safersleep. In time, the SaferSleep system will be linked to Badgernet and this will hopefully improve the capture of anaesthetic data in Badgernet.In 2023, data for regional and general anaesthesia were obtained by merging data from PIMS Theatre, Badgernet, and SaferSleep. Using these data sources, both regional and GA were defined around datetime of birth and datetime of theatre and administration of drugs. General anaesthesia during the birth theatre episode was defined by use of an anaesthetic relaxant drug within two hours before birth as long as entering theatre time was before birth and relaxant drug was administered after entering theatre and before leaving theatre. Regional was defined by drug delivery within 48 hours prior to birth. However the SaferSleep and PIMS theatre sources left some women without anaesthesia for CS and so the analgesia/anaesthesia summary data entered into Badgernet fields were used in addition to the SaferSleep and PIMS theatre data, adding 47 general anaesthetics (22%) and 137 (3%) regional anaesthetics to the totals. It is possible therefore that the total general anaesthetics still includes some cases where GA was used for complications of birth rather than for the birth episode.

We have used the term "Regional" in this chapter to denote any of epidural, combined spinal and epidural (CSE), or spinal analgesia or anaesthesia. Data were unfortunately not adequate to separate type of regional analgesia/anaesthesia this year.

No data are presented for analgesia other than epidural analgesia for labour in 2022-2023 as these data, such as for use of entonox, TENS and opioids, appear incomplete in Badgernet.

Key Findings

- Nearly two thirds (2577/4097 (62.9%)) of all birthing people chose epidural analgesia, which is similar to previous years (62% in 2021). When operative births and other peripartum surgery is included, obstetric anaesthetists are involved in

over four fifths of all births at NWH (4641/5700)

- Epidurals were more commonly used amongst nulliparous (1606/2141(75.0%)) than multiparous patients (971/1956(49.6%)), with induction of labour being associated with greater epidural use (86.1% of nulliparous birthing people).
- Epidurals were chosen significantly more commonly by nulliparous Europeans (79.6%) compared to 61.0% of Pacific and 60.3% of Māori birthing people.
- Nulliparous birthing people who had a private obstetrician LMC were more likely to use epidural analgesia for labour (88.8% compared to 92.2% in 2022) than those who had a self-employed midwife (72.2% vs. 73.6% in 2022) or hospital midwifery teams (68.6% vs. 71.1% in 2022). Though numbers are small, only 7.7% of unbooked patients received epidural analgesia for labour.
- Data on the use of General Anaesthesia (GA) at the time of birth includes some GAs given postpartum, for example for management of postpartum haemorrhage or trauma repair, as well as those administered a GA for birth. 3.7% of all wāhine received a GA in the peripartum period in 2023, likely a more reliable figure than the 5.2% reported in 2022.
- It is unfortunately not possible to determine the exact timing of GA administration. GA is a higher risk for the patient during pregnancy than immediately postpartum. Conversion from spinal/epidural anaesthesia to GA during surgery is associated with higher rates of anaesthesia complications compared to a planned GA, and the international target for this rate is <5%.
- Reassuringly only 1.7% of patients received both a GA and epidural/spinal for an elective Caesarean, and 5.8% for an emergency Caesarean, giving an overall rate of 3.9% of Caesarean sections started under regional block and converted to GA. This is below the recommended international target and much lower than the rate reported in 2022 (6.1%). This is consistent with a separate manual data review from this period, which suggested the 2022 data were not accurate in this regard. The improved data acquistion in 2023 has been achieved through merging of PIMS theatre, Badgernet and Safersleep, and will be used in future reports. A good proportion of these will reflect a labour epidural judged unsuitable for conversion to regional anaesthesia, or a regional anaesthetic that was insufficiently dense and therefore required an additional GA to be administered to ensure comfort for the patient. The remainder will comprise patients with an existing labour epidural choosing a GA for surgery, or an epidural sited for the purpose of postoperative analgesia following complex surgery that required GA in addition.

Figure 6.22 Regional use among wāhine with spontaneous and induced labour NWH 2023

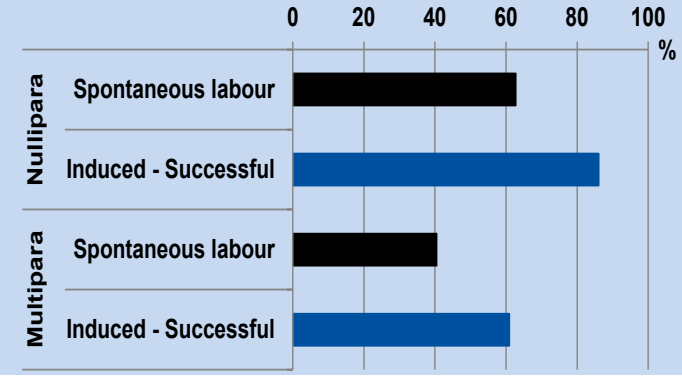
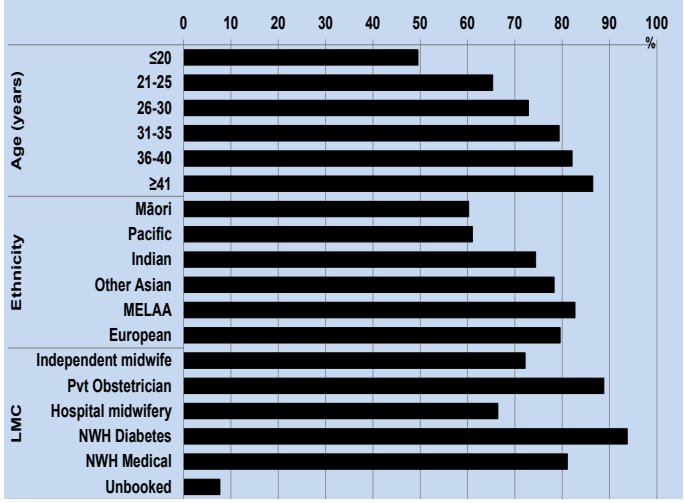


Figure 6.23 Regional use among wāhine with spontaneous and induced labour NWH 2023



6.5.1 Data tables: Obstetric Analgesia and Anaesthesia

Table 6.30 Regional anaesthesia use among women with spontaneous and induced labour NWH 2023

	Total	Regional	
	N	n	%
All wāhine	5700	4539	79.6
Mode of onset of birth			
Caesarean Section Before Labour (including failed induction)	1603	1545	96.4
Labouring women*			
Nullipara	2141	1606	75.0

Multipara	1956	971	49.6
Induced - Successful			
Nullipara	1123	967	86.1
Multipara	874	533	61.0
Spontaneous labour			
Nullipara	1018	639	62.8
Multipara	1082	438	40.5

* Excludes Caesarean Section Before Labour (including failed induction)

Regional includes epidural, CSE, and spinal

Table 6.31 General anaesthesia use and mode of birth NWH 2023

	Total	GA only		GA + Regional		Total GA	
	N	n	%	n	%	n	%
Total	5700	102	1.8	109	1.9	211	3.7
Spontaneous vaginal birth	2446	14	0.6	5	0.2	19	0.8
Operative vaginal	673	3	0.4	4	0.6	7	1.0
CS elective	864	9	1.0	15	1.7	24	2.8
CS emergency	1717	76	4.4	85	5.0	161	9.4

Regional includes epidural, CSE, and spinal

Table 6.32 Regional anaesthesia use among wāhine with spontaneous and induced labour 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of births	7400	6933	7241	6846	6481	6660	6212	6462	5925	5700
Number wāhine with spontaneous labour	3523	3139	3292	2924	2633	2703	2434	2372	2361	2100
Spontaneous labour and regional	1423	1237	1301	1249	1125	1146	1107	1037	1268	1077
%	40.4	39.4	39.5	42.7	42.7	42.4	45.5	43.7	53.7	51.3
Number of wāhine with induced labour	2315	2289	2423	2312	2290	2381	2384	2568	2033	1997
Induced labour and regional	1583	1624	1702	1660	1642	1721	1790	1873	1584	1500
%	68.3	70.9	70.2	71.8	71.7	72.3	75.1	72.9	77.9	75.1

Table 6.33 Regional anaesthesia use by LMC, ethnicity and maternal age among labouring nulliparous wāhine NWH 2023

	Total	Regional anaesthesia	
	N	n	%
LMC			
Independent midwife	1179	851	72.2
Pvt Obstetrician	509	452	88.8
Hospital midwifery	387	257	66.4
NWH Diabetes	16	15	93.8
NWH Medical	37	30	81.1
Unbooked	13	1	7.7
Ethnicity (prioritised)			
Māori	151	91	60.3
Pacific	236	144	61.0
Indian	379	282	74.4

Other Asian	599	469	78.3
MELAA	81	67	82.7
European	695	553	79.6
Maternal age (yrs)			
≤20	107	53	49.5
21-25	222	145	65.3
26-30	623	454	72.9
31-35	867	688	79.4
36-40	285	234	82.1
>40	37	32	86.5

6.6 Postnatal Admissions

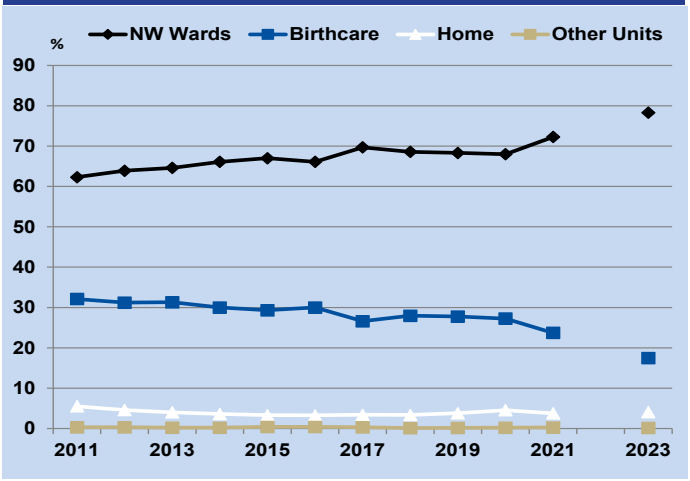
Raffaela Slight

Birthcare Auckland is contracted to provide postnatal primary care to well wāhine and their pēpi. Where clinically indicated, wāhine receive postnatal care at NWH in either a secondary or tertiary postnatal unit. For example, wāhine whose pēpi require neonatal care or paediatric review are admitted to NWH postnatal wards to remain close to their pēpi.

Key Findings

- The proportion of wāhine who went directly to Birthcare from Labour and Birthing Suite slowly declined from just over 30% in 2011 to around 27% in 2020. In 2021, this proportion reduced to 23.7%, and in 2023 to 17.4% (Figure 6.24). The introduction of the NEWS (Newborn Early Warning Score) chart led to more of our pēpi not being eligible to go straight to Birthcare and needing 24 hours of observations in the inpatient areas. The main reasons for this are SGA pēpi (small for gestational age ie less than the 10th centile on a customised growth chart or less than 2.8 Kg at term) and any pēpi whose mama has GDM (gestational diabetes) and needs insulin.
- As expected, māmā are initially admitted to the NWH wards after Caesarean section. Thirty-five percent of wāhine having a spontaneous vaginal birth are admitted directly to Birthcare Auckland for postnatal care. The percentage of Caesarean births continues to rise leading to more wāhine needing an initial inpatient stay before transfer to Birthcare.
- It appears that Māori and Pacific wāhine are less inclined to be transferred to Birthcare immediately postnatal, and are more likely to go home immediately following birth. In addition, Māori and Pacific wāhine are more likely to be ineligible to transfer directly to Birthcare due to reasons mentioned in the above narrative.

Figure 6.24 Maternal destination immediately after birth NWH 2012-2023



Note: Data not available for 2022 due to change of database.

6.6.1 Data tables: Postnatal Admissions

Table 8.34 Maternal destination immediately after birth NWH 2019 - 2023

	2019 N=6660		2020 N=6212		2021 N=6462		2022 N= n/a	2023 N= 5700	
	n	%	n	%	n	%	n %	n	%
NW Wards	4550	68.3	4225	68	4670	72.3	n/a	4464	78.3
Birthcare	1848	27.7	1693	27.3	1532	23.7	n/a	994	17.4
Home	252	3.8	282	4.5	244	3.8	n/a	232	4.1

Other Units	10	0.2	12	0.2	16	0.2	n/a		9	0.2

N/A = not available

Table 8.35 Maternal destination following birth by mode of birth NWH 2023

	Total	NW Wards		Birthcare		Home		Other Units	
	N	n	%	n	%	n	%	n	%
Total	5700	4464	78.3	994	17.4	232	4.1	9	0.2
Spontaneous vaginal	2486	1369	55.1	878	35.3	230	9.3	8	0.3
Operative vaginal	673	554	82.3	116	17.2	2	0.3	1	0.1
CS Elective	864	864	100.0	0	0.0	0	0.0	0	0.0
CS Emergency	1677	1677	100.0	0	0.0	0	0.0	0	0.0

Table 8.36 Maternal destination following birth by prioritized maternal ethnicity NWH 2023

	Total	NW Wards		Birthcare		Home		Other Units	
	N	n	%	n	%	n	%	n	%
Māori	509	409	80.4	60	11.8	39	7.7	0	0.0
Pacific	765	615	80.4	106	13.9	43	5.6	1	0.1
Asian	1418	1087	76.7	276	19.5	53	3.7	2	0.1
Indian	833	699	83.9	108	13.0	24	2.9	2	0.2
European	1921	1455	75.7	402	20.9	60	3.1	4	0.2
MELAA	254	199	78.3	42	16.5	13	5.1	0	0.0

Table 8.37 Maternal destination following birth by LMC at birth NWH 2023

	Total	NW Wards		Birthcare		Home		Other Units	
	5700	n= 4464		n= 994		n= 232		n= 9	
	N	n	%	n	%	n	%	n	%
Total	5700	4464	78.3	994	17.4	232	4.1	9	0.2
Self-employed Midwife	2729	2038	74.7	576	21.1	110	4.0	5	0.2
Private Obstetrician	1597	1255	78.6	300	18.8	38	2.4	4	0.3
Hospital midwifery	1073	881	82.1	116	10.8	75	7.0	0	0.0
NW High risk	277	271	97.8	1	0.4	5	1.8	0	0.0
Unbooked	24	19	79.2	1	4.2	4	16.7	0	0.0

6.6 Labour and Birth at Birthcare Auckland

Christine Biggs

Birthcare is a primary maternity hospital located in Parnell, Auckland's oldest suburb, across the domain from Health New Zealand Te Toka Tumai Auckland City Hospital. Birthcare's vision is to provide an environment that supports active labour and physiological birth to all wāhine who have a low-risk pregnancy. Postnatally, Birthcare's vision is to give the very best start in life to wāhine, whānau and pēpi.

Birthing

162 wāhine commenced labour at Birthcare in 2023. 135 wāhine birthed at Birthcare (93 multipara and 42 nullipara). Transfer rate in labour in 2023 was 17% (34% of nullipara and 5% of multipara). This greatly reflects the skill of the LMCs in guiding wāhine to birth at Birthcare.

The number of women commencing labour at Birthcare continues to decrease (2019 – 376, 2023 - 135). Unfortunately, over the last few years some Lead Maternity Carers (LMCs) who birthed large numbers of wāhine at Birthcare have retired and/or made lifestyle changes which impacted greatly on the birthing numbers.

Birthcare supports 9 LMC midwives to provide antenatal clinics onsite. To strengthen the relationship between Birthcare and the Te Toki Tumai Community team, Birthcare provides a free antenatal clinic weekly. This provides an

opportunity for the wāhine attending these clinics to familiarise themselves with the Birthcare environment and what it can offer wāhine and whānau on their journey.

Breastfeeding

Birthcare's exclusive breastfeeding rate (EBR) of 79% aligns with BFHI requirements. In 2023, wāhine who transferred into Birthcare had an exclusive breastfeeding rate of 80% on admission, and a rate of 64% on discharge. Exclusive breastfeeding on discharge for those wāhine who transferred to Birthcare was 54% for Caesarean section, 51% for operative vaginal birth, and 70% for spontaneous vaginal births.

Postnatal Stay at Birthcare

There are 45 postnatal beds at Birthcare. In 2023 (calendar year), Birthcare provided postnatal stays for 2510 wāhine who birthed at other Te Whatu Ora facilities, and in 2022, 2,819 wāhine.

Support services at Birthcare include:

- Antenatal assessment with Cardiotocography (CTG)
- LMC clinic facilities
- Lactation services
- Phototherapy for jaundice newborns
- Physiotherapy services and classes
- Preparation for home classes
- Tours of the facility
- Breastfeeding classes
- Neonatal hearing newborn screening
- Labtest service
- BSL monitoring (iSTAT machine)

6.6.1 Data tables: Labour and Birth at Birthcare Auckland

Table 6.38 Interventions and outcomes among wāhine who commenced labour at Birthcare 2023

	Intrapartum transfer to NW		Birth at Birthcare		Totals	
	n= 27		N= 135		N= 162	
	n	%	n	%	n	%
Mode of birth						
Normal vaginal	13	48.1	135	100.0	148	91.4
Operative vaginal	6	22.2	n/a		6	3.7
Emergency Caesarean	8	29.6	n/a		8	4.9
Blood loss						
<500 mls	19	70.4	120	88.9	139	85.8
>=500mls	8	29.6	15	11.1	23	14.2
Perinatal outcome						
Stillbirth (/1000)	0	0.0	0	0.0	0	0.0
Admitted to NICU	0	0.0	0	0.0	0	0.0
Neonatal death (/1000)	0	0.0	0	0.0	0	0.0
Exclusive breastfeeding rate	22	81.5	107	79.3	129	79.6
Transfusion	1	3.7	0	0.0	1	0.6
Perineal trauma	n = 19				n = 154	
Episiotomy	5	26.3	5	3.7	10	6.5
Third/fourth degree tear	0	0.0	1	0.7	1	0.6
2° tear	9	47.3	60	44.4	69	44.8
1° tear	2	10.5	25	18.5	27	17.5
Graze/labial laceration	1	5.2	7	5.2	8	5.2
Vaginal wall tear	2	10.5	1	0.7	3	1.9
Intact	5	26.3	36	26.7	41	26.6

Table 6.39 Demographic characteristics of wāhine labouring at Birthcare by place of birth 2023

	Intrapartum transfer		Birth at Birthcare		Totals	
	n= 27		N= 135		N= 162	
	n	%	n	%	n	%
Parity						
Nullipara	22	81.1	42	31.1	64	39.5
Multipara	5	18.9	93	68.9	98	60.5
Age						
<21	0	1.9	0	0.0	0	0.0
21-25	0	5.7	7	5.2	7	4.3
26-30	8	24.5	38	28.1	46	28.4
31-35	14	49.1	56	41.5	70	43.2
36-40	5	17.0	33	24.4	38	23.5
>40	0	1.9	1	0.7	1	0.6
Ethnicity						
Māori	1	7.5	12	8.9	13	8.0
Pacific	4	5.7	13	9.6	17	10.5
Indian	1	0.0	12	8.9	13	8.0
Other Asian	3	17.0	15	11.1	18	11.1
MELAA	4	7.5	14	10.4	18	11.1
European	14	62.3	65	48.1	79	48.8
Other/not stated			4	3.0	4	2.5
Locality of Domicile						
Auckland	23	75.5	74	54.8	97	59.9
Counties Manukau	1	7.5	13	9.6	14	8.6
Waitematā	3	13.2	36	26.7	39	24.1
Other	0	1.9	12	8.9	12	7.4

7

CHAPTER 7

LABOUR AND BIRTH OUTCOMES

ŪPOKO 7

HUE O TE WHAKAMĀMAE ME TE WHĀNAUTANGA

Commentators
Dr Meghan Hill

7.1 Perineal trauma

Key Findings

- The rate of Obstetric Anal Sphincter Injury (OASI) appears to have fallen slightly in the past year, while rates of episiotomy and episiotomy with OASI tears have not changed.
- Episiotomy rates are high for nullipara having instrumental births, in line with RANZCOG recommendations. The episiotomy rates for parous patients having instrumental births are also 60-80%, despite no RANZCOG recommendation for an episiotomy in this situation.
- OASI is more common in instrumental births, with forceps being associated with the highest rate.
- Indian and Other Asian people remain at the highest risk of OASI and also have the highest rates of episiotomy.

Figure 7.1 Perineal trauma among all vaginal births NWH 1995 - 2023

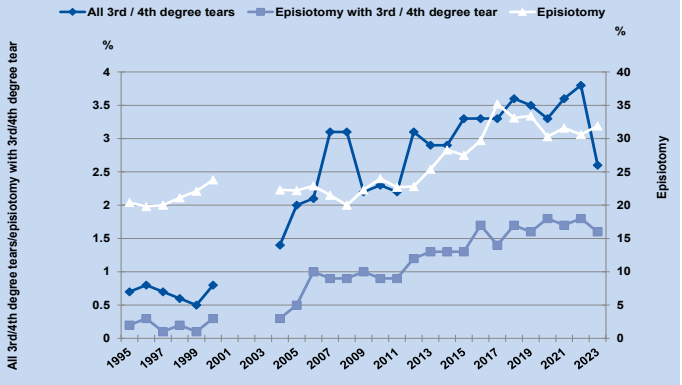


Figure 7.2 Perineal trauma among vaginal births by mode of birth and parity NWH 2023

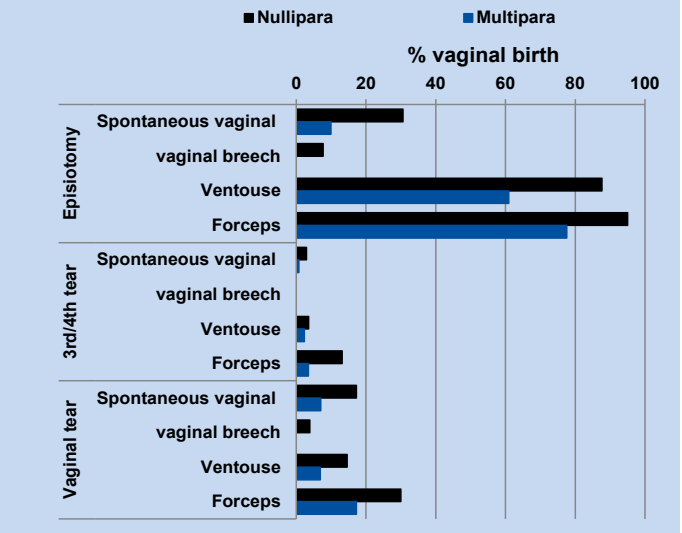


Figure 7.3 Perineal trauma among vaginal births by ethnicity NWH 2023

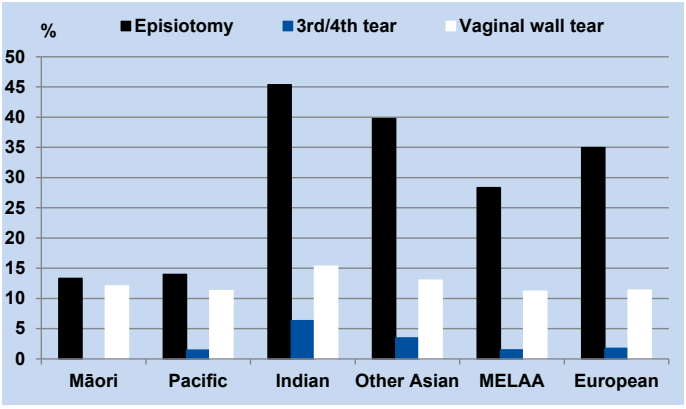
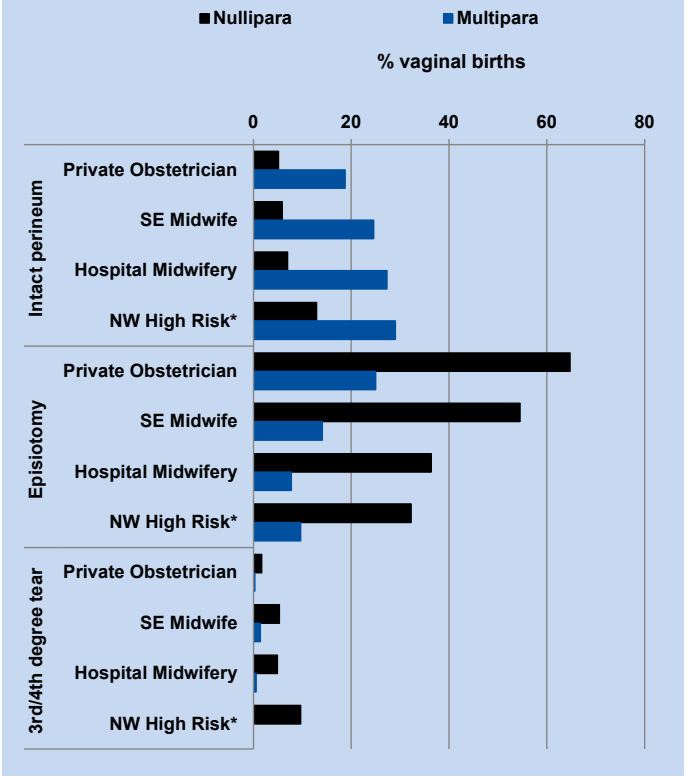


Figure 7.4 Perineal trauma among vaginal births by LMC and parity NWH 2023



7.1.1 Data tables: Perineal trauma

Table 7.1 Perineal outcomes in spontaneous (non-operative) vertex birth, all gestations, by LMC at birth and parity NWH 2023

	Total	Intact perineum		Episiotomy		Third or forth degree tear	
	N	n	%	n	%	n	%
Nullipara	924	93	10.1	277	30.0	26	2.8
Self-employed midwife	515	48	9.3	165	32.0	17	3.3
Private Obstetrician	171	15	8.8	79	46.2	1	0.6
Hospital care*	238	30	12.6	33	13.9	8	3.4
Multipara	1562	406	26.0	154	9.9	12	0.8
Self-employed midwife	834	219	26.3	73	8.8	10	1.2
Private Obstetrician	316	64	20.3	65	20.6	0	0.0
Hospital care*	412	123	29.9	16	3.9	2	0.5

*Hospital Care includes women cared for by National Women's and other hospital clinic LMCs, and, unbooked wom-

Table 7.2 Episiotomy rates among vaginal births NWH 2019-2023

	2019	2020	2021	2022	2023
	n=4089	n=3856	n=3839	n=3433	n=3259
Number of episiotomies	1367	1170	1212	1050	1008
Incidence %	33.4	30.3	31.6	30.6	31.9
Episiotomy with 3rd/4th degree tear	66	69	64	63	49
Incidence %	1.6	1.8	1.7	1.8	1.6
All 3rd/4th degree tears	144	129	138	131	82
Incidence %	3.5	3.3	3.6	3.8	2.6

Table 7.3 Episiotomy rates in vaginal births, all gestations by LMC at birth and parity NWH 2023

	Nullipara			Multipara		
	Total	n	%	Total	n	%
Total	1452	756	52.1	1707	252	14.8
Self-employed Midwife	831	453	54.5	907	128	14.1
Private Obstetrician	292	189	64.7	352	88	25.0
Hospital midwifery	286	104	36.4	348	27	7.8
NW Diabetes	7	1	14.3	37	2	5.4
NW Medical	24	9	37.5	56	7	12.5

Table 7.4 Perineal trauma by mode of birth, parity and LMC at birth among all vaginal births NWH 2023

	Total	Episiotomy		3rd/4th tear		Vaginal wall tear	
	N	n	%	n	%	n	%
Total vaginal birth	3159	1008	31.9	82	2.6	392	12.4
Mode of birth							
Normal vaginal	2446	429	17.5	38	1.6	264	10.8
Vaginal breech	40	2	5.0	0	0.0	1	2.5
Ventouse	395	323	81.8	13	3.3	51	12.9
Forceps	278	254	91.4	31	11.2	76	27.3

Parity							
Nullipara	1452	756	52.1	66	4.5	267	18.4
Multipara	1707	252	14.8	16	0.9	125	7.3
LMC at birth							
Independent midwife	1738	581	33.4	57	3.3	215	12.4
Private obstetrician	644	277	43.0	6	0.9	68	10.6
Hospital midwifery	634	131	20.7	16	2.5	92	14.5
NW Diabetes	44	3	6.8	1	2.3	2	4.5
NW Medical	80	16	20.0	2	2.5	13	16.3
Unbooked	19	0	0.0	0	0.0	2	10.5
Ethnicity							
Māori	323	43	13.3	0	0.0	39	12.1
Pacific	487	68	14.0	7	1.4	55	11.3
Indian	443	201	45.4	28	6.3	68	15.3
Other Asian	805	320	39.8	28	3.5	105	13.0
MELAA	134	38	28.4	2	1.5	15	11.2
European	967	338	35.0	17	1.8	110	11.4

7.2 Postpartum haemorrhage (PPH)

Methods

The source of blood loss data varies for some of the years shown. In the years 2005 to 2007, blood loss in labour and birth was not combined with blood loss recorded postnatally as in numerous births the total blood loss was recorded in both places. The amended data on PPH rate in 2005 and 2006 given here may underestimate the PPH rate in those years. From 2008, the data have been cleaned extensively. This cleaning has included a comparison of blood loss recorded in Healthware to blood loss in the PIMS theatre database. These data were not available in previous years. The effect of this is likely to have been an increase in the reporting of PPH, especially in those wāhine giving birth in Labour and Birthing Suite and then transferring to theatre for the management of retained placenta or bleeding.

Further to these data management improvements, the estimation of blood loss, including the weighing of all blood, is now part of labour ward culture. While this is undoubtedly a more accurate way to measure blood loss, there are still incidences where losses are not measured and these may lead to inaccurate comparisons at this institution and between units.

In 2022, with the introduction of Badgernet, the data available on timing of transfusion changed. Timing of transfusin data were not included in 2022 but are available in 2023. Transfusion data are not currently reliably completed in Badgernet by clinicians.

Key Findings

- While the rate of postpartum haemorrhage ≥500mL appears to be increasing slightly, the rates of PPH ≥1000mL and blood transfusion remain stable. Possible explanations include more consistent weighing of blood loss, patient factors such as increasing blood loss with increasing maternal weight, or increasing Caesarean section rates.
- Operative vaginal births are associated with transfusion as are emergency Caesarean births.
- Patients cared for under a high risk pathway have the highest rate of transfusion, while those cared for by either a self-employed midwife or the low risk pathway have similar transfusion rates. Care by a private obstetrician is associated with the lowest rate of transfusion, the reason for which is unknown.
- Induction of labour confers a slight increase in rate of transfusion.

Figure 7.5 Postpartum haemorrhage and transfusion rates NWH 1992-2023

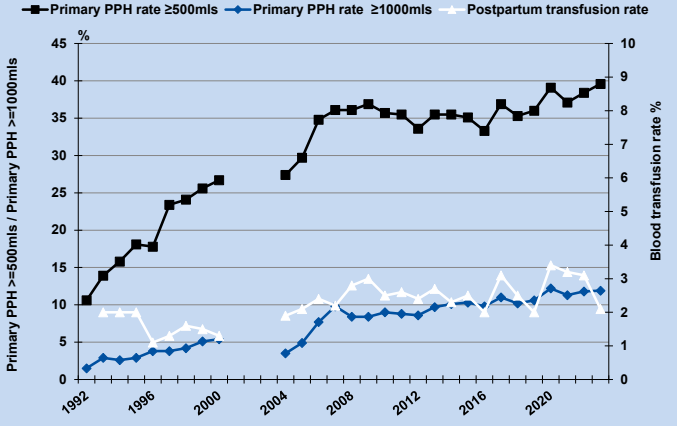
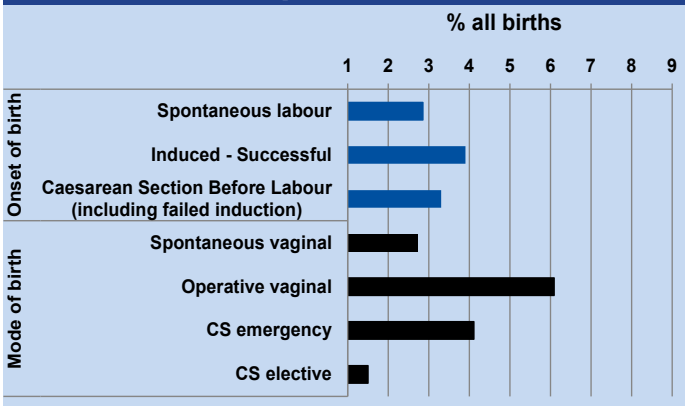
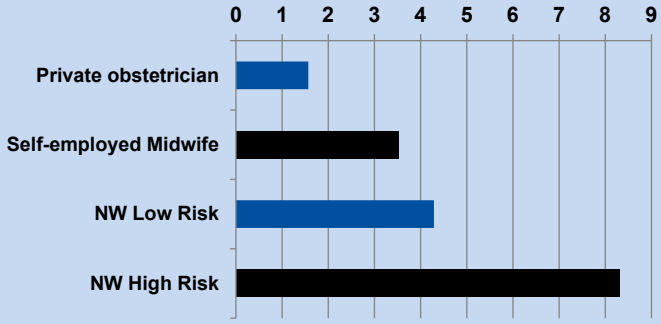


Figure 7.6 Postpartum transfusion by mode of onset of birth and by mode of birth NWH 2023



Elective CS has been redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Figure 7.7 Postpartum transfusion during pregnancy, labour or postpartum by LMC (% of all births) NWH 2023



7.2.1 Data tables: Postpartum haemorrhage

Table 7.5 Total transfusion rates by recorded blood loss at birth NWH 2023

	Total	Total transfusion	
		n	%
Total (mls)	5700	191	3.4
Blood loss <500	3441	19	0.6
PPH 500-999	1578	31	2.0
PPH 1000-1499	430	35	8.1
PPH 1500-2499	207	69	33.3
PPH ≥2500	44	37	84.1

Table 7.6 Postpartum haemorrhage rate NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Births	7695	7223	7400	6933	6481	6660	6212	6462	5925	5700
Primary PPH (≥500mls)	2587	2563	2628	2433	2289	2397	2428	2302	2274	2259
Incidence %	33.6	35.5	35.5	35.1	35.3	36	39.1	35.6	38.4	39.6
Primary PPH (≥1000mls)	662	701	746	713	662	707	755	707	701	681
Incidence %	8.6	9.7	10.1	10.3	10.2	10.6	12.2	10.9	11.8	11.9

Table 7.7 Total blood loss by onset of birth NWH 2023

	Spontaneous labour		Induced - Successful		Caesarean Section Before Labour (including failed induction)		Total	
	n=	2100	n=	1997	n=	1603	N=	5700
	n	%	n	%	n	%	n	%
PPH ≥500mls	656	31.2	770	38.6	833	52.0	2259	39.6
PPH≥1000mls	214	10.2	273	13.7	194	12.1	681	11.9
PPH≥1500mls	77	3.7	106	5.3	68	4.2	251	4.4
Total transfusion	60	2.9	78	3.9	53	3.3	191	3.4

Table 7.8 Total blood loss by mode of birth NWH 2023

	Spontaneous vaginal birth		Operative vaginal birth		CS emergency		CS elective		Total	
	n= 2486		n= 673		n= 1677		n= 864		N= 5700	
	n	%	n	%	n	%	n	%	n	%
PPH ≥500mls	542	21.8	259	38.5	1067	63.6	391	45.3	2259	39.6
PPH≥1000mls	206	8.3	115	17.1	281	16.8	79	9.1	681	11.9
PPH≥1500mls	94	3.8	55	8.2	76	4.5	26	3.0	251	4.4
Total transfusion	68	2.7	41	6.1	69	4.1	13	1.5	191	3.4

Elective CS has been redefined in alignment with the HISO definition as booked CS performed on an elective list. Planned CS undertaken on an acute list and/or in labour is included with emergency CS

Table 7.9 Blood transfusion NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Antenatal	7	4	11	3	7	16	7	4	n/a	13
Antenatal & intrapartum	0	0	0	0	0	0	0	1	n/a	n/a
Antenatal & postpartum	1	0	2	0	0	1	4	1	n/a	7
Intrapartum	2	7	6	0	4	6	4	4	n/a	n/a
Intrapartum & postpartum	1	3	1	0	0	0	4	0	n/a	n/a
Postpartum	170	168	147	211	165	131	205	210	n/a	171
Total transfusions	181	182	167	214	176	154	224	220	221	191
Total transfusion rate	2.4	2.6	2.3	3.1	2.7	2.3	3.6	3.4	3.7	3.4

n/a = not available

7.3 Neonatal Outcomes

Methods

Most outcome data presented in this section are obtained from Healthware or Badgernet.

Admission to NICU, length of NICU stay, and hypoxic ischaemic encephalopathy data are obtained from the NICU clinical database.

Days of admission to NICU are based on total hours of any stay derived from date and time of admission and discharge from NICU and so a day in NICU is a period of 24 hours whenever that started or finished.

Key Findings

- The rate of NICU admission has continued a gradual increase. However, the rate of admission for ≥2 days has remained stable. The slight increase in overall NICU admissions may correlate with the observed gradual increase in the rate of low Apgars at birth and at 5 minutes.
- In relation to onset of birth, babies born by prelabour Caesarean have the highest observed rates of low Apgars, admission to NICU and admission to NICU for ≥ 2 days.
- In relation to actual mode of birth, babies born by emergency Caesarean make the biggest contribution to NICU admissions.
- Babies born via breech vaginal birth have the highest complication rates, but make up a small percentage of all births, and this probably relates to preterm gestation at birth.
- Stillbirth, neonatal death and neonatal encephalopathy are all rare outcomes at term at Te Toka Tumai Auckland. These rates at term have remained stable over time.

Figure 7.8 NICU admission and low Apgar scores among live births at term NWH 2006-2023

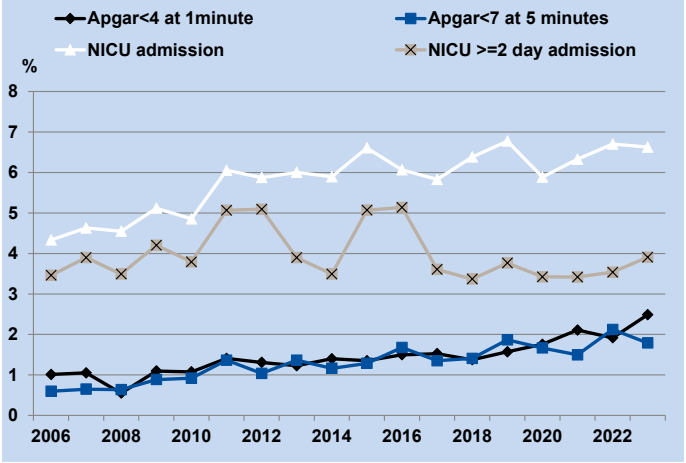


Figure 7.9 Admission to NICU among live births at term by LMC NWH 2006-2023

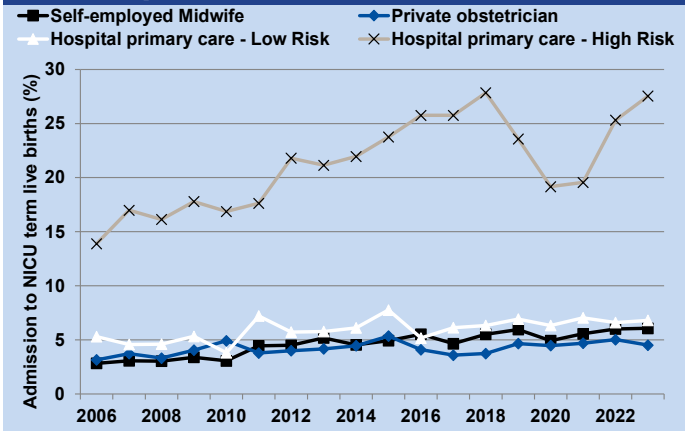


Figure 7.10 Admission (≥2 days) to NICU among live births at term by LMC NWH 2006-2023

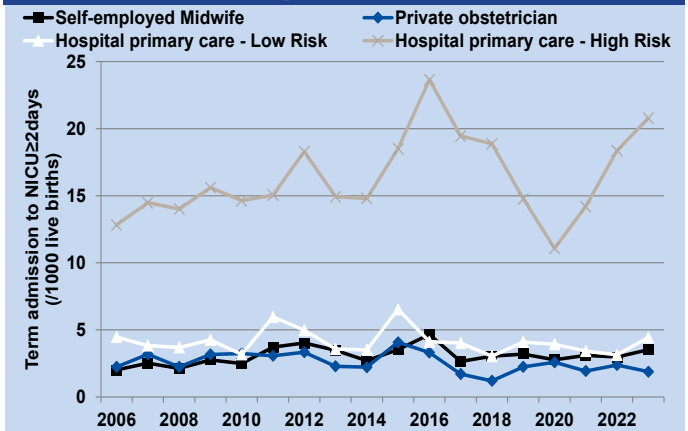


Figure 7.11 Apgar <7 at 5 minutes among live births at term by LMC NWH 2006-2023

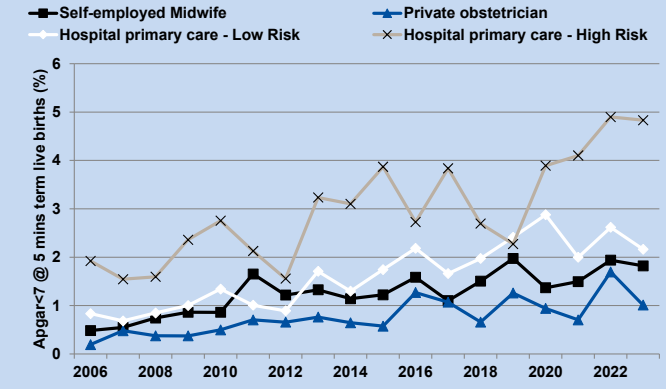


Figure 7.12 Stillbirth and neonatal death rates at term NWH 2006-2023

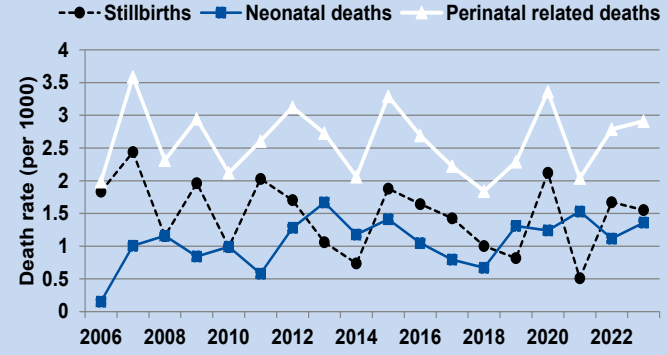


Figure 7.13 Perinatal related mortality rate at term (per 1000 term births) by LMC NWH 2006-2023

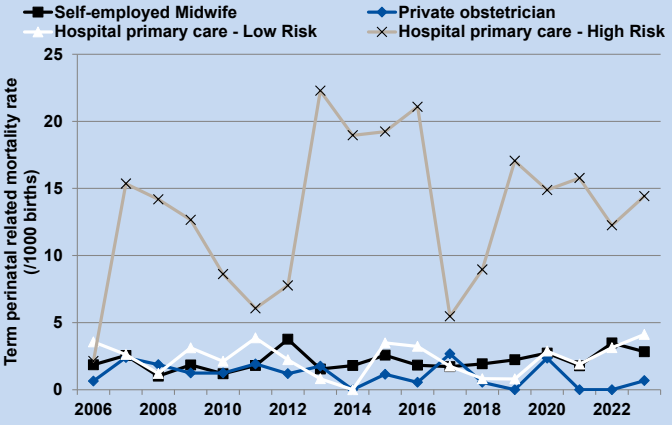
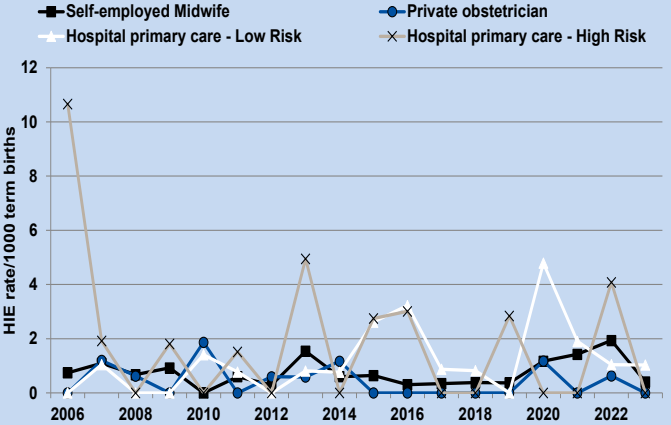


Figure 7.14 Hypoxic Ischaemic Encephalopathy(HIE) (stage 2 and 3) rate (per 1000 term births) by LMC NWH 2006-2023



7.3.1 Data tables: Neonatal Outcomes

Table 7.10 Neonatal mortality and morbidity among live births by onset of birth (all gestations) NWH 2023

	Spontaneous labour		Induced - Successful		Caesarean Section Before Labour (including failed induction)		Total	
	n= 2134		n= 2014		n= 1673		n= 5821	
	n	%	n	%	n	%	n	%
1 min Apgar<4	58	2.7	59	2.9	80	4.8	197	3.4

1 min Apgar<7	193	9.0	204	10.1	219	13.1	616	9.6
5 min Apgar <7	48	2.2	39	1.9	83	5.0	170	2.5
Admitted to NICU	265	12.4	154	7.6	334	20.0	753	11.6
≥=2 days in NICU	212	9.9	101	5.0	275	16.4	588	8.4
Neonatal deaths (/1000 live births)	11	5.2	7	3.5	7	4.2	25	5.8

Table 7.11 Neonatal mortality and morbidity among live births by mode of birth (all gestations) NWH 2023

	Spontaneous vertex		Vaginal breech		Forceps birth		Ventouse birth		CS elective		CS emergency		Total	
	n=	2477	n=	42	n=	280	n=	395	n=	884	n=	1743	N=	5821
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	30	1.2	3	7.1	16	5.7	12	3.0	13	1.5	123	7.1	197	3.4
1 min Apgar <7	136	5.5	15	35.7	43	15.4	50	12.7	61	6.9	311	17.8	616	10.6
5 min Apgar <7	27	1.1	5	11.9	7	2.5	7	1.8	30	3.4	108	6.2	170	2.9
Admitted to NICU	215	8.7	18	42.9	27	9.6	27	6.8	76	8.6	390	22.4	753	12.9
≥=2 days in NICU	166	6.7	17	40.5	18	6.4	13	3.3	41	4.6	333	19.1	588	10.1
Neonatal deaths (/1000 live births)	12	4.8	2	47.6	0	0.0	0	0.0	1	1.1	10	5.7	25	4.3

Table 7.12 Neonatal mortality and morbidity by mode of birth in live born term or post term (≥37 weeks) pēpi NWH 2023

	Spontaneous vertex		Vaginal breech		Forceps birth		Ventouse birth		CS elective		CS emergency		Total	
	n=	2243	n=	4	n=	264	n=	385	n=	857	n=	1400	N=	5153
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	23	1.0	0	0.0	13	4.9	12	3.1	13	1.5	67	4.8	128	2.5
1 min Apgar <7	94	4.2	1	25.0	38	14.4	46	11.9	56	6.5	169	12.1	404	7.8
5 min Apgar <7	16	0.7	0	0.0	4	1.5	7	1.8	16	1.9	49	3.5	92	1.8
Admitted to NICU	107	4.8	1	25.0	19	7.2	25	6.5	63	7.4	126	9.0	341	6.6
≥=2 days in NICU	63	2.8	1	25.0	11	4.2	11	2.9	29	3.4	86	6.1	201	3.9
Neonatal deaths (/1000 live births)	3	0.1	0	0.0	0	0.0	0	0.0	1	0.1	3	0.2	7	1.4

Table 7.13 Neonatal morbidity in term or post term live born (≥37 weeks) pēpi NWH 2019-2023

	2019		2020		2021		2022		2023	
	N=6110		N=5640		N=5880		N=5372		N=5153	
	n	%	n	%	n	%	n	%	n	%
1 min Apgar <4	96	1.6	99	1.8	124	2.1	100	1.9	128	2.5
5 min Apgar <7	114	1.9	190	3	88	1.5	114	2.1	92	1.8
Admitted to NICU	414	6.8	332	5.9	372	6.3	360	6.7	341	6.6
>=2 days in NICU	230	3.8	193	3.4	201	3.4	190	3.5	201	3.9
Neonatal deaths (/1000 live births)	8	1.3	7	1.2	9	1.5	6	1.1	7	1.4

Table 7.14 Neonatal outcomes among term births by LMC 2014–2023										
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	n	n	n	n	n	n	n	n	n	n
Private Obstetrician										
Term births (total)	1708	1742	1812	1872	1823	1827	1703	1705	1593	1486
Stillbirth	0	2	1	3	1	1	3	0	0	1
Neonatal Death	0	0	0	2	0	0	1	0	0	0
Apgar<7 at 5 minutes	11	10	23	20	12	23	16	12	27	15
NICU admission	76	93	74	66	68	85	76	80	80	67
>=2 days in NICU	38	82	60	32	22	41	44	33	38	28
Hypoxic ischaemic encephalopathy	2	0	0	0	0	0	2	0	1	0
Self employed midwives										
Term births (total)	3332	3115	3286	2911	2595	2689	2564	2809	2585	2475
Stillbirth	3	7	5	4	3	4	6	2	6	4
Neonatal Death	3	1	1	1	2	2	1	3	0	3
Apgar<7 at 5 minutes	38	38	52	32	39	53	35	42	50	1
NICU admission	151	153	181	134	143	160	126	156	155	150
>=2 days in NICU	90	133	153	77	79	86	71	87	77	87
Hypoxic ischaemic encephalopathy	2	2	1	1	1	1	3	4	5	1
Hospital primary maternity care - Low risk										
Term births (total)	1310	1148	1240	1144	1217	1244	1044	1052	958	972
Stillbirth	0	1	3	1	1	1	1	1	3	2
Neonatal Death	0	3	1	1	0	0	2	1	0	2
Apgar<7 at 5 minutes	17	20	27	19	24	30	30	21	25	21
NICU admission	80	89	64	70	77	86	66	74	63	66
>=2 days in NICU	46	78	51	46	37	51	41	36	30	43
Hypoxic ischaemic encephalopathy	1	3	4	1	1	0	5	2	1	1
Hospital primary maternity care - High risk										
Term births (total)	422	364	332	366	335	352	336	317	245	208
Stillbirth	3	2	2	1	1	0	2	0	0	1
Neonatal Death	5	5	5	1	2	6	3	5	3	2
Apgar<7 at 5 minutes	13	14	9	14	9	8	13	13	12	10
NICU admission	92	86	85	91	93	83	64	62	62	57
>=2 days in NICU	62	77	78	69	63	52	37	45	45	43
Hypoxic ischaemic encephalopathy	0	1	1	0	0	1	0	0	1	0

8

CHAPTER 8

NEWBORN SERVICES

ŪPOKO 8

RATONGA PIRIPOHO

Commentators
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This chapter provides data on the outcomes of pēpi cared for in the Neonatal Intensive Care Unit (NICU). Additional data can be found at the end of each section. Data in the Newborn section pertain to all pēpi admitted to and cared for at the NWH Neonatal Intensive Care Unit if born during the 2023 calendar year. This includes pēpi transferred from other units or admitted from home. Admissions and all other data in this chapter except occupancy relate to pēpi born in the 2023 calendar year. Occupancy data relate to the unit occupancy for each day in 2023.

In the presentation of the data in this chapter, there are a number of comparisons with matched data from other sources. Consequently, the denominator used variably relates to (1) all pēpi born in 2023 and admitted to NICU, (2) inborn (NWH) pēpi and (3) pēpi born in 2023 assigned to NWH by the Australian and New Zealand Neonatal Network (ANZNN).

8.1 ANZNN

ANZNN collects standardised data from all level 3 NICUs in Australia and New Zealand. A dataset is collected for each pēpi admitted to a NICU who:

- is <1500g birth weight or
- is <32 weeks gestation or
- requires assisted ventilation (IPPV, CPAP, high flow or HFOV) for four or more hours, or dies while receiving mechanical ventilation prior to four hours of age or
- has major surgery (defined as opening of a body cavity) or
- pēpi who are cooled as a treatment for neonatal encephalopathy.

Each infant is assigned to the level 3 NICU at which they were originally treated for at least 4 hours, even if that pēpi was subsequently transferred. Data are collected up to discharge home, even if care is in several hospitals. Long term follow-up data (up to 4 years of age) is also collected for eligible pēpi.

ANZNN was established in 1994 and NWH has supplied data since 1995. De-identified data are sent electronically to the Sydney secretariat. Approval to send data was obtained from the North Health Ethics Committee prior to NWH joining ANZNN. An annual report of the combined data from all units is published and feedback data are sent to each unit that contributes, comparing outcomes of that unit to those of the Network overall. ANZNN data have been included in the figures in this chapter where these data are able to be extracted from ANZNN reports. The most recent ANZNN annual report includes 2021 data. Sometimes ANZNN data are unavailable due to small numbers and sometimes the data are not available for comparable groupings by gestation.

8.1.1 Data tables: ANZNN assigned pēpi

Table 8.1 Characteristics of <32 week or <1500g babies cared for at NWH NICU by ANZNN status 2023

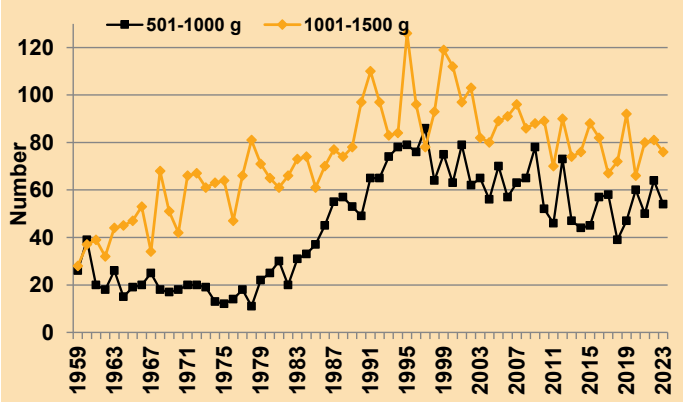
			<32 weeks or <1500g			
	Total		ANZNN		Non ANZNN	
	N=194		N=181		N=13	
	N	%	n	%	n	%
Gestation (weeks)						
<24	1	0	1	1	0	0
24-25	28	14	23	12	5	36
26-27	41	20	35	18	6	43
28-29	51	25	50	26	1	7
30-31	58	28	57	30	1	7
32-36	15	7	15	8	0	0
>36	0	0	0	0	0	0
Weight (g)						
<500	2	1	2	1	0	0
500-749	18	9	14	7	4	29

750-999	39	19	34	18	5	36
1000-1249	42	20	41	21	1	7
1250-1499	49	24	47	24	2	14
1500-1999	38	18	37	19	1	7
2000-2499	6	3	6	3	0	0
2500-2999	0	0	0	0	0	0
Birthplace						
National Women's	167	81	167	87	0	0
Northland	3	1	3	2	0	0
Waitematu	10	5	10	5	0	0
Counties Manukau	11	5	0	0	11	79
BBA/Home	1	0	1	1	0	0
Other	2	1	0	0	2	14

8.2 Inborn live births at National Women's Health (NWH) 1959-2023

This includes all pēpi born alive (including those who died at or soon after birth and those with lethal anomalies). The weight ranges 501-1000g and 1001-1500g are used as these data have been collected prospectively since 1959, initially by Professor Ross Howie.

Figure 8.1 Number of inborn live births ≤1500g NWH 1959-2023 (excludes BBAs)



8.3 NICU occupancy

The 2023 occupancy of 13,538 bed days is approximately equivalent to a mean of 37 pēpi in NICU per day, representing an average occupancy of around 93%. Day to day occupancy is a lot more variable, with occupancy well over 100% at various times during the year. Trends for the occupancy by gestational age groups and birth weight are given in the figures below. Whitinga Ora Pēpi (Transition to Wellness) model of care for late preterm pēpi opened on Ward 96 in November 2021. This initially resulted in closure of four NICU beds to reassign neonatal nursing staff to Whitinga Ora Pēpi. These four NICU beds have since reopened. Pēpi born at extremely preterm and very preterm gestation tend to have the longest duration of stay in NICU. Since the early 2000s, the two Waitematā units have cared for their own uncomplicated level 2 pēpi, so the overall acuity of the NWH neonatal unit has risen for a given occupancy.

Figure 8.2 Occupancy (baby days per year) of NICU by gestational age 2010-2023

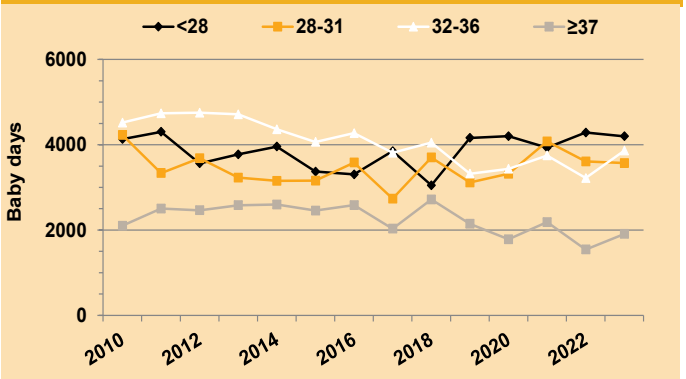
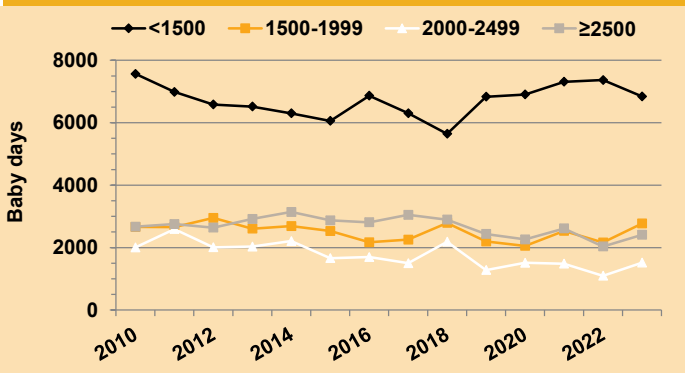


Figure 8.3 Occupancy (baby days per year) of NICU by birth weight 2010–2023



8.3.1 Data tables: NICU occupancy

Table 8.2 Occupancy (baby days) on NICU 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Baby days	14070	13060	13779	12430	13514	12741	12735	13941	12659	13538

Table 8.3 Occupancy (baby days) for NICU by gestational age 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	14070	13050	13743	12430	13514	12741	12735	13941	12659	13538
<28	3956	3370	3305	3851	3049	4160	4201	3930	4287	4199
28–31	3153	3157	3582	2735	3701	3114	3318	4077	3609	3570
32–36	4362	4066	4271	3812	4048	3321	3434	3748	3220	3861
≥37	2599	2457	2585	2031	2716	2146	1782	2186	1543	1908

Table 8.4 Occupancy (baby days) for NICU by birth weight 2014–2023

Weight (g)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	14070	13060	13779	12430	13514	12741	12735	13941	12659	13538
<1500	6302	6059	6866	6305	5644	6833	6905	7312	7367	6843
1500–1999	2687	2530	2169	2254	2790	2194	2055	2534	2162	2771
2000–2499	2209	1661	1697	1498	2186	1281	1513	1484	1097	1516
≥2500	3142	2872	2810	3047	2894	2434	2261	2611	2034	2408

8.4 Admissions to NICU

There were 867 admissions to NICU of pēpi born in 2023 calendar year compared to 843 in 2022. Auckland NICU is the tertiary referral unit for the two Waitematā hospitals and for Northland Base Hospital, and also provides regional intensive care services for pēpi undergoing surgical procedures in the newborn period, and care for pēpi with antenatally diagnosed critical congenital cardiac disease from around the country. The neonatal units at North Shore,Waitakere and Northland Hospitals admit pēpi >1500g and/or >32 weeks gestation and provide Level 2 care including CPAP respiratory support and total parenteral nutrition. Some pēpi >32 gestation from the two Waitematā units are looked after in NICU if there is no space in these units.

8.4.1 Admissions to NICU by gestation and birth weight

The total number of admissions of pēpi born >36 weeks gestation (term) in 2023 was 403. This includes 65 outborn pēpi and 338 inborn pēpi. Term inborn pēpi admitted to NICU are likely to have a range of indications for admission but the two most common reasons remain respiratory distress and congenital abnormality, which includes antenatally diagnosed congenital cardiac and surgical anomalies (Table 8.13). The term outborn number includes pēpi retrieved for treatment of hypoxic ischaemic encephalopathy, pēpi with significant congenital anomalies diagnosed postnatally or

pēpi unexpectedly needing tertiary care after birth. The total number includes transfers from level 2 units for level 3 care and also infants who are transferred from Middlemore Hospital NICU for surgical care and so are another significant group with regard to complexity of care.

In 2023, there was only one pēpi born at 23 weeks' gestation admitted to NICU. This number is significantly lower than previous years (range 4-7 pēpi per year for the previous few years). There were no admissions of outborn pēpi at 23 weeks' gestation. As a general principle, antenatal transfer is preferable as this avoids transportation of small or fragile infants. Hence the number of outborn infants is very much lower than the number of infants born to mothers domiciled outside of ADHB. The vast majority of pēpi born at <32 weeks' gestation and admitted to NICU were inborn; only 15% were outborn and retrieved by the neonatal team. The overall number of pēpi born <32 weeks gestation are low (only 20% of total admissions), however, they remain in the neonatal unit longer than pēpi born at more advanced gestation, contributing significantly to the overall occupancy.

8.4.2 Admissions to NICU by domicile of mother

There was an overall decline in admissions of pēpi whose mothers are domiciled in the Waitematā area with the opening of their two level 2 units in the early 2000s. In the last few years the proportion of total admissions of pēpi of mothers domiciled in Counties Manukau area has been steady. The reasons for this are not fully elucidated but could be a mixture of mothers from Counties Manukau electing to give birth at NWH, planned antenatal transfer for a medical indication or Counties Manukau neonatal unit being full. There is also antenatal transfer to Auckland associated with the Maternal Fetal Medicine Team providing antenatal care for a small number of infants with major congenital anomalies or maternal conditions. The "unknown" group includes the small number of mothers referred to obstetric or fetal medicine team from overseas (for example, Cook Islands and Tahiti). The number of pēpi in this group has remained low over the years.

8.4.3 Admissions to NICU by ethnicity of pēpi

The most frequent ethnicity of pēpi admitted to NICU in 2022 was NZ European at 32%, followed by Māori at 23% and Other Asian 15%, Indian 13% and Pacific 12%. In 2023, New Zealand European pēpi made up the largest ethnic group but the overall proportion dropped to 25.1%, with an increase in Other Asian (18.8%), Pacific (17.3%) and Indian (15.6%) ethnicities. Māori pēpi made up 19% of all admissions (figure 8.9)

8.4.4 Reasons for admission to NICU

Prematurity, respiratory distress and congenital anomalies remain the three commonest reasons for admission to NICU, accounting for 79% of total

Figure 8.4 Admissions to NICU 1981-2023

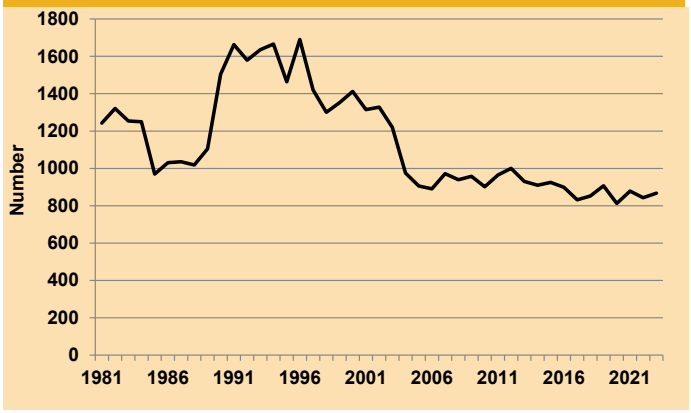


Figure 8.5 Admissions to NICU (total) by gestational age 1999-2023

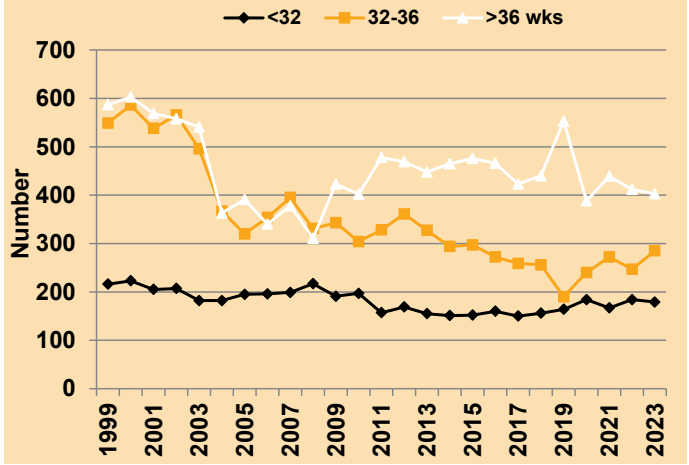
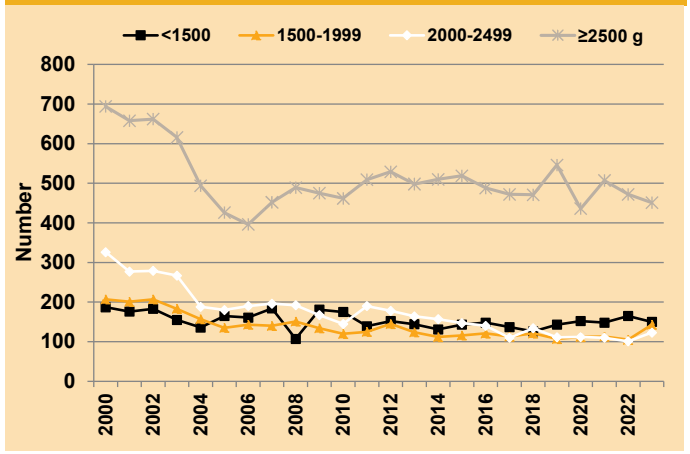


Figure 8.6 Admission to NICU (total) by birth weight 2000-2023



admissions in 2023.Treatment of hypoglycaemia in term pēpi is an important reason for admission to NICU. This group represented 10.7% of term pēpi admitted to NICU in 2023. Use of dextrose gel and early feeding are some of the interventions used to keep pēpi on the ward with mother; the pēpi who are admitted to NICU have more severe hypoglycaemia and often require interventions such as intravenous dextrose to treat hypoglycaemia. The full list of reasons for admission is presented in Table 8.13.

8.4.5 Antenatal corticosteroids (benchmarked with ANZNN)

Antenatal corticosteroids have a beneficial effect on a range of outcomes in preterm pēpi. Antenatal corticosteroid use has been consistently high in the Network (ANZNN) and in NWH. Treatment with any antenatal corticosteroid is in the range of 90-95% for pēpi born at <32 weeks' gestation. The rates of a complete course of antenatal corticosteroid given between 1 to 7 days of birth is much lower, with an overall rate of 58% only. Birth before the second dose of corticosteroid can be administered would be one of the reasons for the incomplete course.

Figure 8.7 Admissions to NICU of <1500g pēpi (VLBW) by place of birth 1996-2023 (outborn includes BBAs)

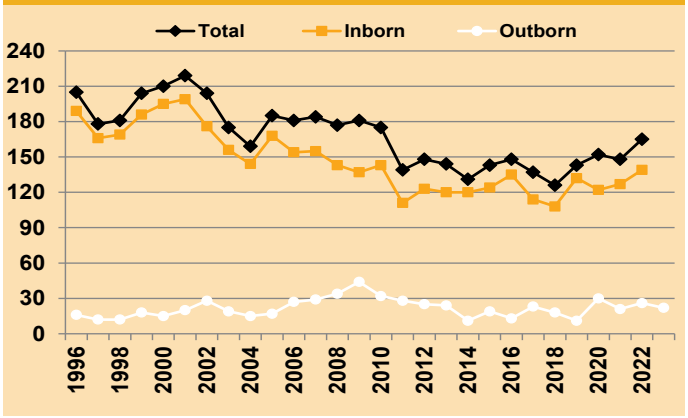


Figure 8.8 Admissions to NICU by maternal domicile 2001-2023

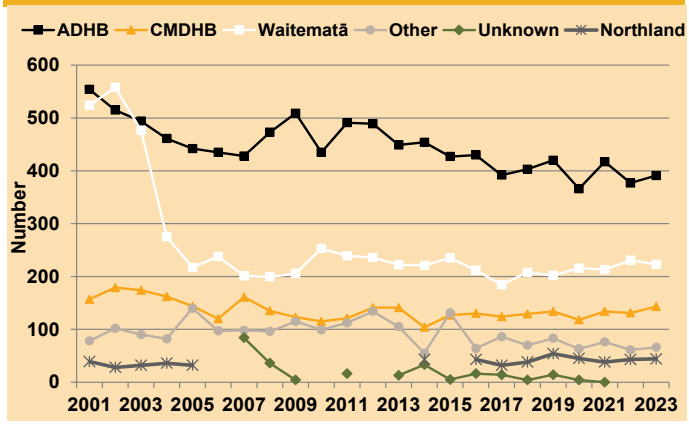


Figure 8.9 Admissions to NICU by ethnicity of pēpi 2023

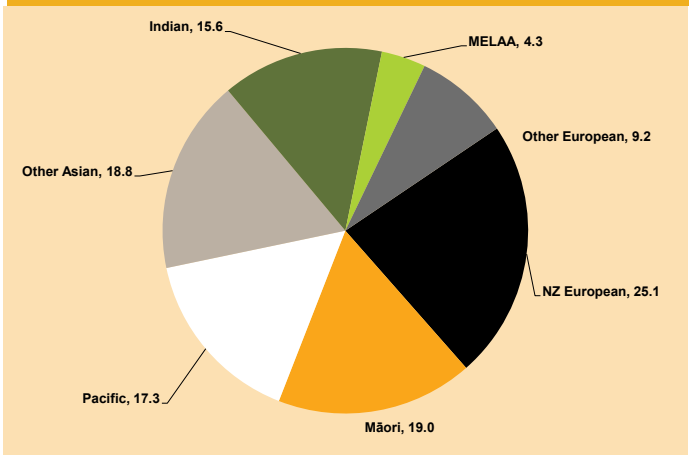


Figure 8.10 Reasons for admissions to NICU 2023

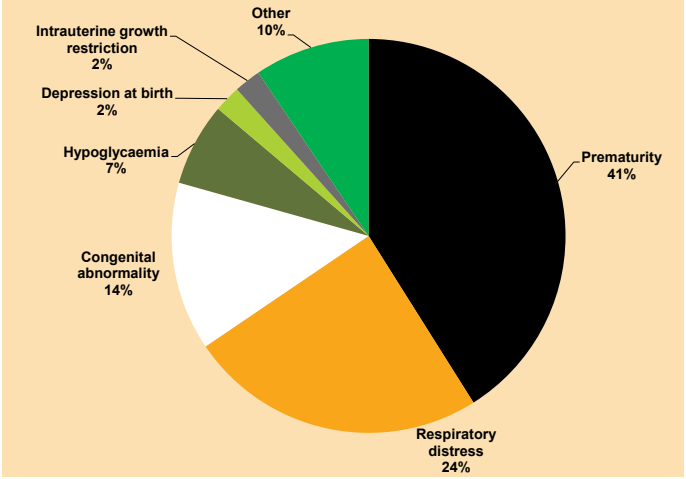


Figure 8.11 Any antenatal corticosteroids at 24-27 weeks 1995-2023

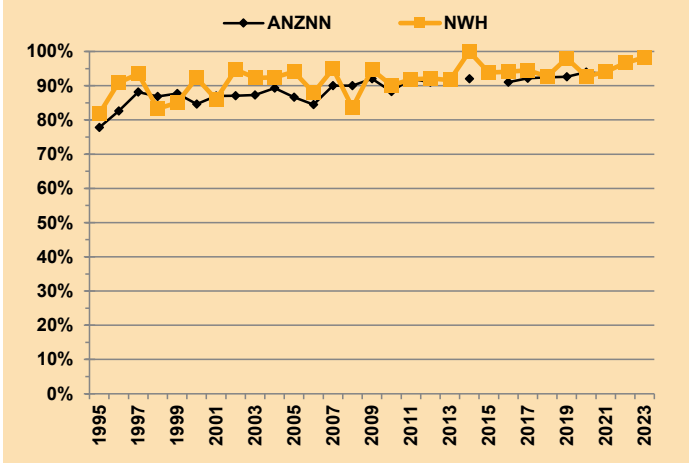
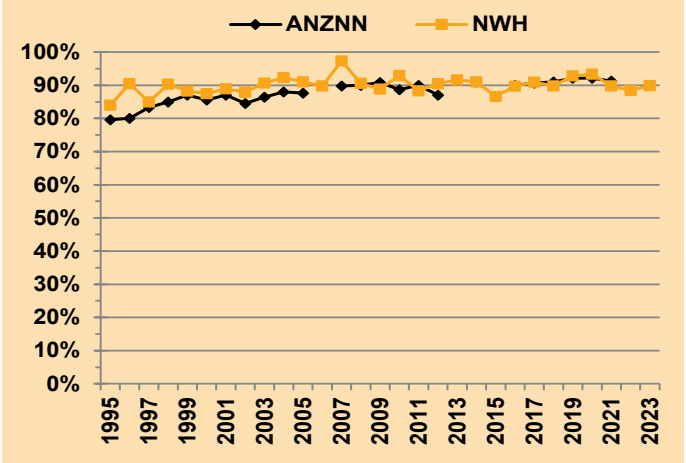


Figure 8.12 Any antenatal corticosteroids at 28-31 weeks 1995-2023



8.4.6 Data tables: Admissions to NICU

Table 8.5 NICU admissions by year 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number	910	925	898	832	852	907	812	878	843	867

Table 8.6 Admissions of inborn pēpi to NICU by birth weight 2014–2023

Birth Weight (g)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total (n)	809	825	797	720	739	777	692	744	733	749
<500	1	0	0	0	3	2	0	2	1	2
500–749	19	16	21	18	14	19	24	18	21	14
750–999	23	21	31	32	22	22	33	25	39	33
1000–1249	37	39	42	29	29	49	31	41	37	38
1250–1499	40	48	41	35	40	40	34	41	41	41
1500–1999	102	109	110	98	105	96	98	91	95	130
2000–2499	145	131	124	96	118	99	101	96	86	108
2500–2999	121	124	114	114	114	143	110	126	133	119
3000–3999	270	288	269	263	256	254	211	254	227	221
≥4000	51	49	45	35	38	53	50	50	53	43

Table 8.7 Admissions of inborn pēpi to NICU by gestational age 2014–2023

Gestation (weeks)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	809	825	797	720	739	777	692	744	733	749
23	0	0	4	3	2	6	7	4	6	1
24	12	6	11	8	4	4	12	12	9	7
25	7	9	9	10	9	12	11	11	15	15
26	14	14	10	11	10	15	15	6	16	13
27	13	17	18	19	14	18	13	20	15	21
28	11	17	23	10	14	12	14	21	18	18
29	15	17	25	18	23	21	21	16	28	27
30	37	23	18	10	17	29	27	16	24	17
31	26	31	25	31	37	32	32	35	21	34
32	25	43	26	41	33	35	22	35	42	39
33	46	40	49	37	43	40	48	37	31	46
34	65	83	66	66	53	47	51	48	64	61
35	68	46	45	47	54	47	41	47	41	52
36	70	60	67	44	45	49	48	67	45	60
37	67	70	68	55	75	84	71	71	77	92
38	105	99	104	86	111	100	82	92	93	92
39	98	110	101	112	83	120	89	110	92	97
40	80	93	90	85	78	71	60	57	70	40
41	46	43	34	27	32	31	25	38	26	15
42	4	4	4	0	2	4	3	1	0	2

Table 8.8 Admissions of outborn pēpi to NICU by birth weight 2014–2023

Birth Weight (g)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	101	100	101	112	113	130	120	134	110	118

<500	0	0	0	0			0	0	0	0
500-749	3	1	0	2	3		2	1	7	4
750-999	2	3	2	8	5	3	10	10	7	6
1000-1249	1	5	5	8	5	4	10	6	6	4
1250-1499	6	10	6	5	5	4	8	4	6	8
1500-1999	10	7	11	15	16	11	14	22	10	13
2000-2499	11	16	16	14	16	12	11	14	15	15
2500-2999	14	13	9	14	14	22	19	22	15	23
3000-3999	44	38	39	37	38	52	31	44	32	37
>=4000	10	7	13	9	11	22	15	11	12	8

Table 8.9 Admissions of outborn pēpi to NICU by gestational age 2014-2023

Gestation (weeks)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	101	100	101	112	113	130	120	134	110	118
22	0	0	0	0	0			0		0
23	0	0	0	0	0			1	2	0
24	3	0	1	2	1		2	1	4	3
25	1	2	1	4	2	1	3	1	4	3
26	2	1	0	5	3	3	4	4	3	4
27	0	3	5	1	4	3	2	4	2	3
28	1	4	1	5	4	1	5	4	2	1
29	1	3	3	2	2	3	7	3	3	5
30	4	3	1	8	3	2	5	3	7	2
31	4	2	5	3	7	2	4	5	5	5
32	2	2	2	4	4	4	8	8	7	5
33	4	5	5	4	7	3	5	3	2	4
34	5	6	5	8	9	8	6	5	7	6
35	4	5	5	5	3	6	10	11	4	6
36	5	7	2	3	5	8	1	11	4	6
37	6	12	7	9	10	13	10	9	9	9
38	12	13	14	13	7	13	10	16	8	14
39	15	10	14	8	12	21	15	14	12	17
40	18	12	22	17	23	26	15	21	17	16
41	13	9	7	9	7	11	7	8	8	8
42	1	1	1	0	0	2	1	2	0	1

Table 8.10 Domicile of mother of all pēpi admitted to NICU 2019-2023

	2019 n=907		2020 N=812		2021 N=878		2022 N=843		2023 N=867	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Northern Region	810	88.3	745	91.7	802	91.3	781	92.6	801	92.4
Auckland	420	46.3	366	45.1	417	47.5	377	44.7	391	45.1
Counties Manukau	134	14.8	118	14.5	134	15.3	131	15.5	143	16.5
Waitematā	202	22.3	216	26.6	213	24.3	231	27.4	223	25.7
Northland	54	6	45	5.5	38	4.3	43	5.1	44	5.1
Midland Region	45	5	35	4.3	38	4.3	30	3.6	31	3.6

Central Region	17	1.9	8	1	12	1.4	12	1.4	15	1.7
Southern Region	21	2.3	20	2.5	25	2.8	19	2.3	19	2.2
Overseas					1	0.1	0	0.0	1	0.1
Missing	14	1.5	4	0.5	0	0.0	0	0.0	0	0.0

Table 8.11: Locality of domicile of mothers of all pēpi admitted to NICU 2023

DHB	2023 n=867		DHB	2023 n=867	
	n	%		n	%
Auckland	391	46.4	**Hawkes Bay**	4	0.5
Counties Manukau	143	17.0	**MidCentral**	5	0.6
Waitematā	223	26.5	**Hutt**	3	0.4
Northland	44	5.2	**Capital & Coast**	2	0.2
Waikato	16	1.9	**Nelson Marlborough**	4	0.5
Bay of Plenty	6	0.7	**Canterbury**	9	1.1
Wairarapa	0	0.0	**South Canterbury**	1	0.1
Tairawhiti	3	0.4	**Southern**	5	0.6
Taranaki	4	0.5	**West Coast**	0	0.0
Lakes	2	0.2	**Unknown**	0	0.0
Whanganui	1	0.1	**Overseas**	1	0.1

Table 8.12: Prioritised ethnicity of pēpi admitted to NICU 2023

	Preterm (<37 weeks) N=464		Term (>=37 weeks) N=403		Total N=867	
	n	%	n	%	n	%
NZ European	95	22.3	104	28.3	199	25.1
Māori	94	22.1	57	15.5	151	18.0
Pacific	76	17.8	61	16.6	137	17.3
Other Asian	77	18.1	72	18.6	149	18.8
Indian	63	14.8	61	16.6	124	15.6
MELAA	21	4.9	13	3.5	34	4.3
Other European	38	8.9	35	8.5	73	8.2

Table 8.13: Main reason for admission to NICU 2023

	Preterm N=431		Term N=412		Total N=843	
	n	%	n	%	n	%
Prematurity	356	78.8	0	0	356	42.3
Respiratory distress	46	8.6	166	48.5	212	25.2
Congenital abnormality	18	4	102	28.4	120	14.3
Hypoglycaemia	16	2.4	43	7	59	7.0
Depression at birth	3	0.9	16	5.2	19	2.3
IUGR	10	1.9	9	1.3	19	2.3
Cyanotic episode	0	0.2	9	1.5	9	1.1
Suspected infection	1	0	11	2.3	12	1.4
Neurological problem	0	0.7	9	1.8	9	1.1

Haemolytic disease	1	0	0	0.3	1	0.1
Feeding difficulty	1	0.2	3	0.8	4	0.5
Bile stained vomiting	0	0	6	0.5	6	0.7
Jaundice	2	0.2	13	1.5	15	1.8
Other	10	1.4	16	6.2	26	3.1

8.4.6 Data tables: Antenatal Corticosteroids

Table 8.14 Percentage receiving antenatal corticosteroids by birth weight among ANZNN assigned pēpi <1500g (2019–2023)

Birth weight (g)	2019			2020			2021			2022			2023		
	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any
	n	%	%	n	%	%	n	%	%	n	n(%)	n(%)	n	n(%)	n(%)
Total	135	67	97	135	49	90	136	56	93	150	62	94	138	82(59)	128(93)
<500	2	100	100	0			2	100	100	1	0	100	2	2(100)	2(100)
500–749	19	79	100	24	71	100	18	61	100	22	77	100	14	12(86)	14(100)
750–999	22	73	100	37	43	92	25	68	100	42	57	100	34	21(62)	33(97)
1000–1249	51	65	94	36	61	86	46	52	91	40	68	90	41	27(66)	39(95)
1250–1499	41	61	98	38	29	87	45	49	87	45	56	89	47	20(43)	40(85)

Table 8.15 Percentage receiving antenatal corticosteroids by gestational age among ANZNN assigned pēpi <32 weeks (2019–2023)

Gestation (weeks)	2019			2020			2021			2022			2023		
	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any	N	1–7d	Any
	n	%	%	n	%	%	n	%	%	n	%	%	n	%	%
Total	149	64	95	167	51	93	153	54	92	170	58	92	166	90(54)	153(92)
<24	6	83	100	7	71	100	4	50	100	7	71	100	1	0	1(100)
24–25	16	75	100	25	44	96	23	65	100	26	54	100	23	17(74)	23(100)
26–27	35	51	97	30	57	90	28	54	89	33	70	94	35	21(60)	34(97)
28–29	34	65	94	40	38	93	41	51	93	49	57	94	50	25(50)	44(88)
30–31	64	63	92	65	57	94	57	51	88	55	53	84	57	27(47)	51(89)

8.5 Care and complications

8.5.1 Infection (inborn admissions)

In 2023, there were 26 episodes of infection diagnosed in 23 pēpi. Four pēpi were diagnosed with early onset infection. There were 3 episodes of early onset infection caused by E. coli, all in preterm pēpi (born 24, 28 and 30-weeks gestation) and one case of Group B streptococcus in a term pēpi. All episodes of E. coli infection were in preterm pēpi born after premature prolonged rupture of membranes. There were 22 episodes of late onset infection in 19 pēpi. This included 5 pēpi with acquired viral infections. The viral infections were caused by Covid 19 (2 pēpi), one pēpi each had rhinovirus, enterovirus and human metapneumovirus infection. One pēpi had both Covid 19 and RSV isolated from a nasopharyngeal swab. There were 14 episodes of late onset bacterial infection. Seven pēpi had central line associated blood stream infection (CLABSI). Three episodes were due to Staphylococcus epidermidis, one each due to Staphylococcus aureus, Klebsiella pneumonia, E. coli and Candida parasilosis. CLABSI secondary to Candida and other fungi is very rare in NICU. It is our standard practice to use fungal prophylaxis when a pēpi is on treatment with antibiotics to minimise the risk of fungal infection. There were 9 other episodes of late onset sepsis (in pēpi who did not have a central line within 48 hours of sepsis onset). Staph aureus and GBS were the commonest underlying causes – 4 episodes each of Staphylococcus aureus and GBS. There were two discrete episodes of GBS sepsis in one pēpi who was born at 26 weeks' gestation.

Figure 8.13 Intraventricular haemorrhage in <1250g infants admitted to NICU 1985-2023

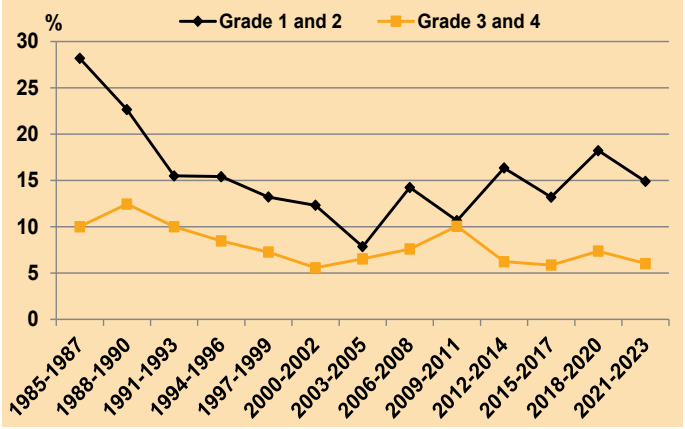


Figure 8.14 Any IVH at 24-27 weeks 1995-2023 (ANZNN assigned)

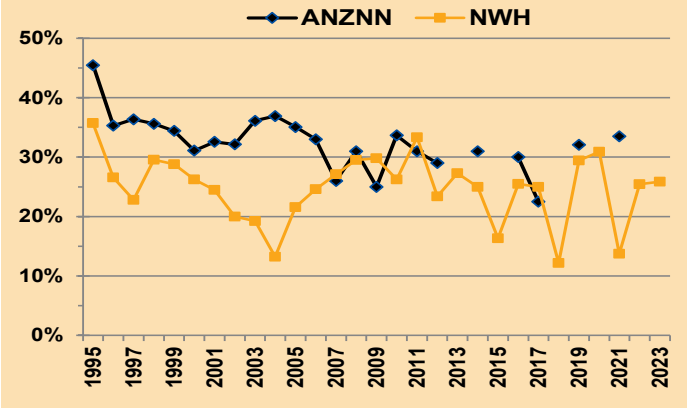


Figure 8.15 Severe (G3-4) IVH at 24-27 weeks 1995-2023 (ANZNN assigned)

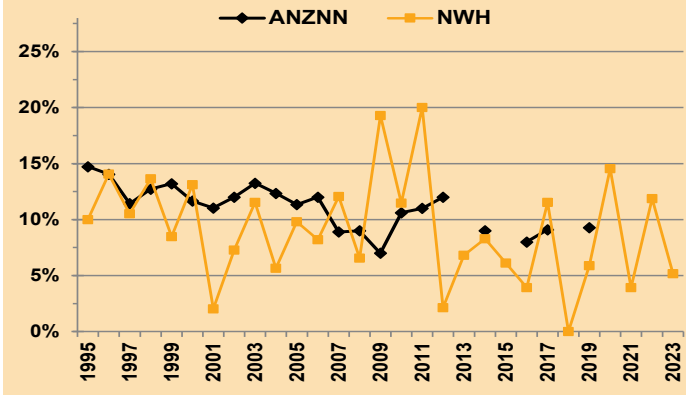
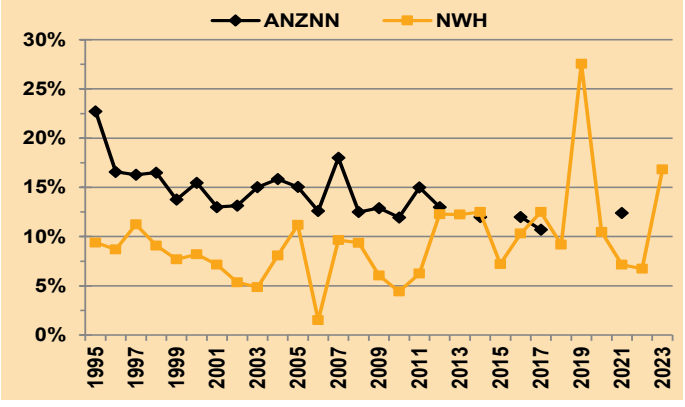


Figure 8.16 Any IVH at 28-31 weeks 1995-2023 (ANZNN assigned)



8.5.2 Hypoxic ischaemic encephalopathy (all admissions)

In 2023, there were 15 pēpi admitted to NICU with a diagnosis of moderate to severe (stage 2-3) hypoxic ischaemic encephalopathy (HIE). Pēpi born at Waitematā or Whangarei Hospitals and diagnosed with moderate to severe HIE are retrieved by the neonatal team for further management, including treatment with therapeutic hypothermia. Treatment with therapeutic hypothermia in pēpi with moderate to severe HIE improves long term neurodevelopmental outcomes. Initiating treatment within 6 hours of hypoxic insult provides the most benefit. This can be challenging to achieve, especially for outborn pēpi who are retrieved from Whangarei Hospital.

Two term pēpi and two late perterm (36 weeks gestation) pēpi with moderate to severe HIE were inborn. Of the outborn pēpi, seven were retrieved from Whangarei hospital and three from Waitakere hospital. Fourteen pēpi were treated with therapeutic hypothermia. One pēpi was transferred from another level 3 NICU and was treated with therapeutic hypothermia prior to transfer. Three pēpi (one outborn and two inborn) died as a result of stage 3 HIE.

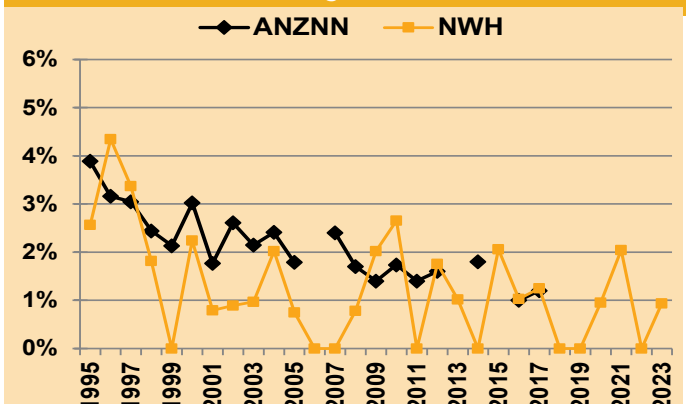
8.5.3 Intraventricular haemorrhage in very low birth weight infants admitted to NICU 1985-2023

Figure 8.13 demonstrates the historical trend in the rates of intraventricular haemorrhages in pēpi with birthweight <1250 g from 1985 to 2023. Pēpi born extremely preterm and/or with extremely low birth weight are at highest risk of severe grades of IVH. Over the years, the rates of severe grades (grades 3-4 IVH) have remained low with some fluctuations from year to year, depending on number of extremely preterm pēpi. It is, however, worth noting that there is a small overall increase in the rates of grades 1 and 2 IVH. Some of this may be explained by improvements in technology over time, resulting in better detection of milder grades of IVH.

8.5.4 Intraventricular haemorrhage (IVH) (Benchmarked with ANZNN)

Severe grades of IVH can result in significant

Figure 8.17 Severe (G3-4) IVH at 28-31 weeks 1995-2023 (ANZNN assigned)



medium and long term complications and remain an important outcome to benchmark against ANZNN rates. Figures 8.14 to 8.17 show the trend in the rates of IVH from 1995 until 2023, compared to ANZNN rates where these data are available. On the whole, NWH data for rates of IVH are comparable with ANZNN rates. The rates of any IVH in pēpi born at 28-31 weeks' gestation remains low overall. The rates fluctuate from year to year, driven mostly by changes in rates of grade 1-2 IVH.

8.5.5 Assisted ventilation

Data in this section are presented for all inborn pēpi at NWH, thus excluding pēpi transferred to NICU in the postnatal period. This allows more meaningful comparisons of postnatal care at NWH NICU over time. Note that we have redrawn the figure to include numbers of pēpi who received support using High Frequency Oscillatory Ventilation (HFOV), which in the past has typically been used as a rescue therapy and mostly in term pēpi. Over the past few years, there has been a move towards greater and earlier use of HFOV, especially in the extremely preterm pēpi due to the greater availability and ease of use of this mode of ventilation. Importantly, we have also added numbers receiving Humidified High Flow air/oxygen (HiFlow). This practice was introduced in 2010/11 after HiFlow was shown to be non-inferior to CPAP. Over the years, its use has increased and it now represents a proportion of our respiratory support use. CPAP as the primary mode of respiratory support in uncomplicated inborn premature infants has been in use since the late 1990s. Although the majority of infants born below 26 weeks' gestation receive a period of positive pressure ventilation initially, there is a steady reduction in the proportion receiving such support from around 28 weeks' gestation. Another change in practice in recent years has been the increasing use of minimally invasive surfactant therapy (MIST), thus avoiding the need for intubation to administer surfactant in some pēpi with respiratory distress syndrome. The median days on any respiratory support (ventilation, CPAP and HiFlow) is highest for the extremely preterm pēpi (<28 weeks' gestation). Note small peaks in HFOV use at 23-28 weeks' and around term. The use of humidified high flow air/oxygen (HiFlow) as a method of weaning off CPAP or as an alternative to CPAP has now become standard practice in many neonatal units. Data on this is available for the past 8 years and the number of pēpi treated with this form of respiratory support fluctuates over the years. This system offers advantages in the ease of care and handling, and softer interface for the pēpi. At low flow rates and with clinical stability, some pēpi are able to attempt sucking feeds, which is not possible on CPAP respiratory support. As with any changes in practice, there is a need to review this on an ongoing basis, especially in view of duration of respiratory support and long term respiratory outcomes, including chronic lung disease. Pēpi born at < 24 weeks require the longest duration of

Figure 8.18 Median ventilation days by gestational age among (ventilated) inborn survivors NWH 2023

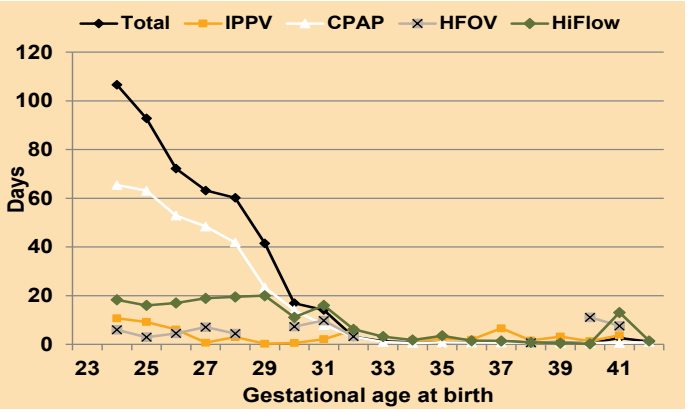


Figure 8.19 Median days on CPAP NWH 1995-2023

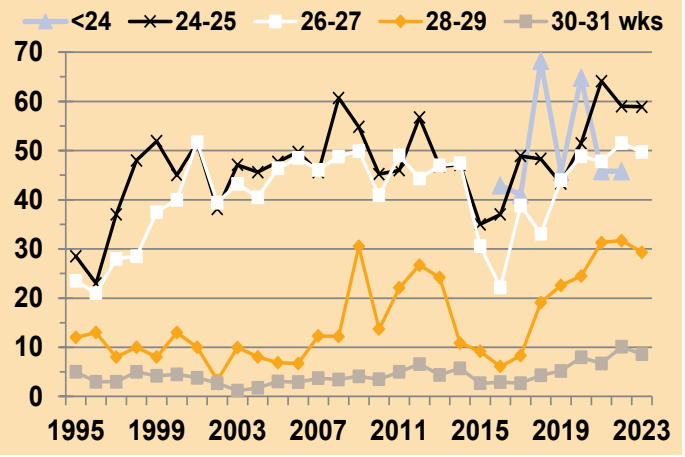


Figure 8.20 Median days on any ventilation NWH 1995-2023

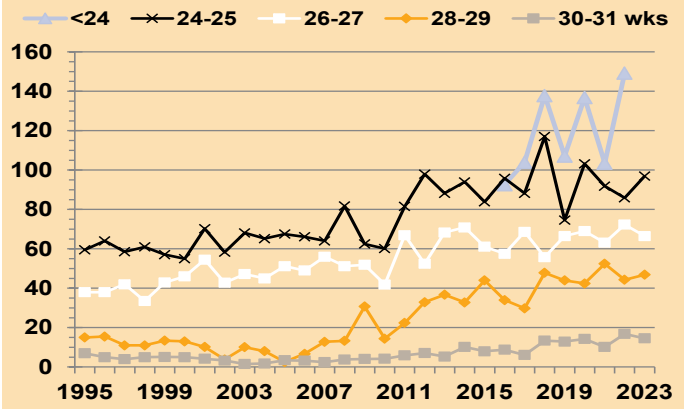
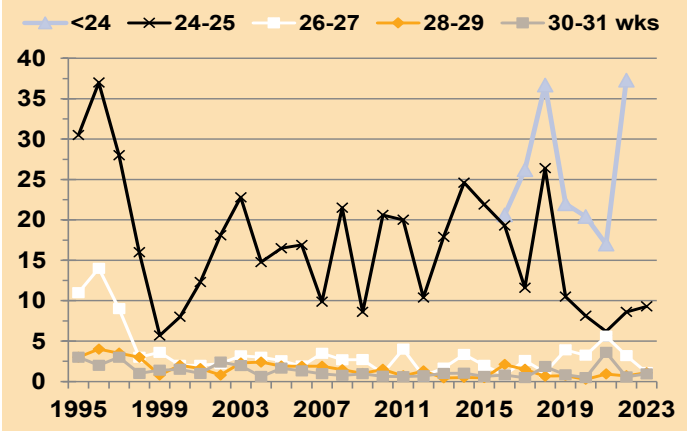


Figure 8.21 Median days on IPPV NWH 1995-2023



any respiratory support as shown in Figures 8.19 – 8.21. There is also an increasing trend in the median number of days on CPAP respiratory support for all pēpi born between 24 and 32 weeks' gestation. It is not clear without a review whether this represents a change in practice or reflects changing needs of preterm pēpi.

8.5.6 Trends in use of assisted ventilation among <32 week inborn survivors

(Note that medians apply only to pēpi ventilated; pēpi not ventilated are NOT included in the calculations)

HiFlow. High flow air oxygen.

HFOV. High frequency oscillatory ventilation.

IPPV. Intermittent positive pressure ventilation.

CPAP. Continuous positive airway pressure.

These figures illustrate median days on respiratory support for inborn survivors. This group may be considered a more homogeneous population than outborn pēpi. There are yearly variations in the median days on respiratory support for the different gestational age groups, with the most preterm pēpi needing respiratory support for the greatest number of days. The total number of pēpi in each group is small and the increase seen in pēpi born under 24 weeks is due to a change in practice towards more proactive management of pēpi born at this gestation. The number of pēpi born < 24 weeks is very small, resulting in wide variation in the median days on IPPV. There is a trend towards an increase in the median days on any ventilation over the last decade in this group of pēpi. This seems to be largely driven by an increase in CPAP use, especially in CPAP use in pēpi born between 28 and 32 weeks' gestation. The number of pēpi in this group has remained mostly stable over the years. The median number of days on IPPV for this group of pēpi remains low at 1-2 days.

8.5.7 Trends in the use of assisted ventilation among all infants born in NWH

These figures (8.22 – 8.26) show the number of pēpi receiving respiratory support from 1995 to 2023. From 2011 onward we have collected information on the use of High Flow Humidified Air / Oxygen (HiFlow). Figures representing these data and HFOV were added in 2013. Use of HFOV and HiFlow has been fairly stable over the years. In 2014, NICU introduced non-invasive ventilation (NIPPV) but numbers are very small and included in the CPAP group. With

Figure 8.22 Number on IPPV NWH 1995-2023

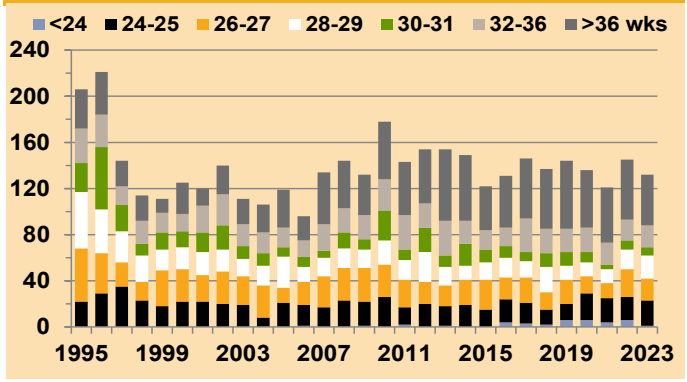


Figure 8.23 Number on CPAP NWH 1995-2023

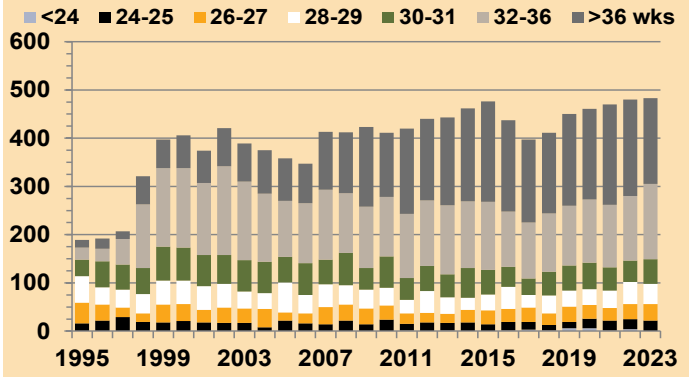


Figure 8.24 Number on HFOV NWH 2013-2023

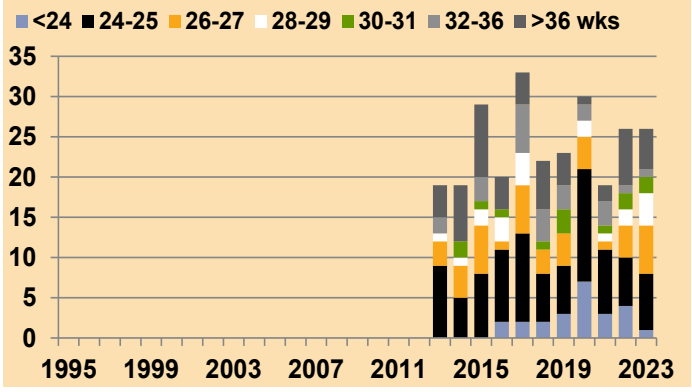


Figure 8.25 Number on HiFlow NWH 2013-2023

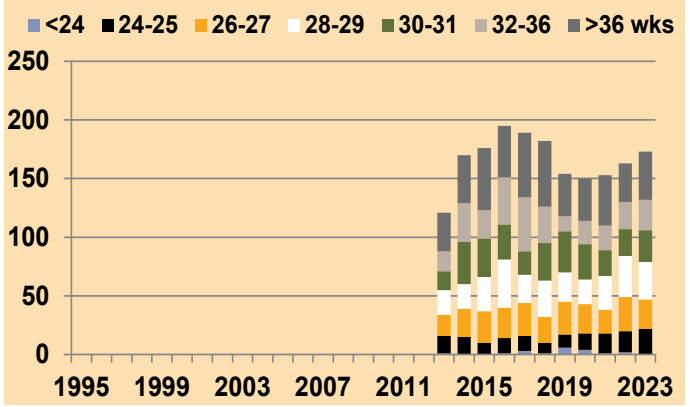


Figure 8.26 Number on any ventilation NWH 1995-2023

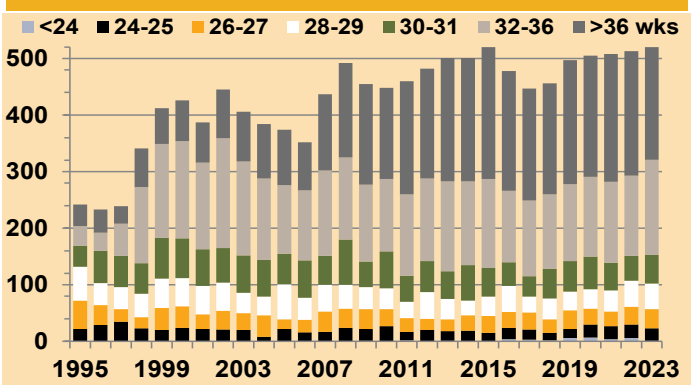


Figure 8.27 Percentage on IPPV (24-27 wks ANZNN assigned) NWH 1995-2023

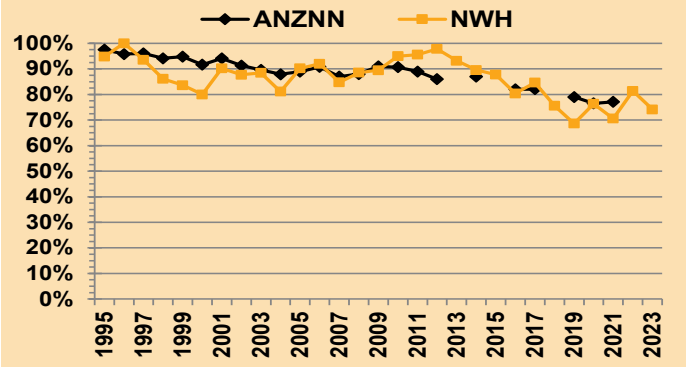


Figure 8.28 Percentage on CPAP (24-27 wks ANZNN assigned) NWH 1995-2023

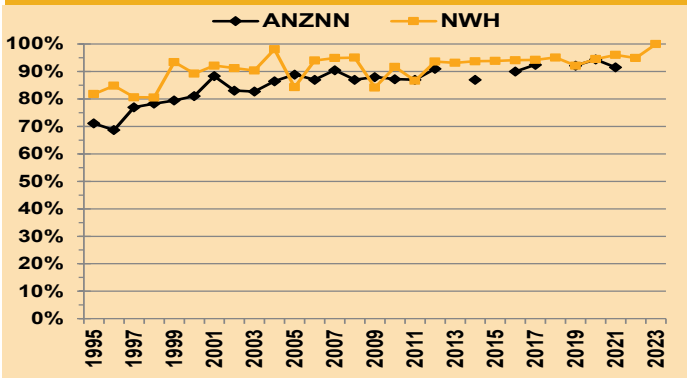


Figure 8.29 Median days on IPPV (24-27 wks ANZNN assigned) NWH 1995-2023

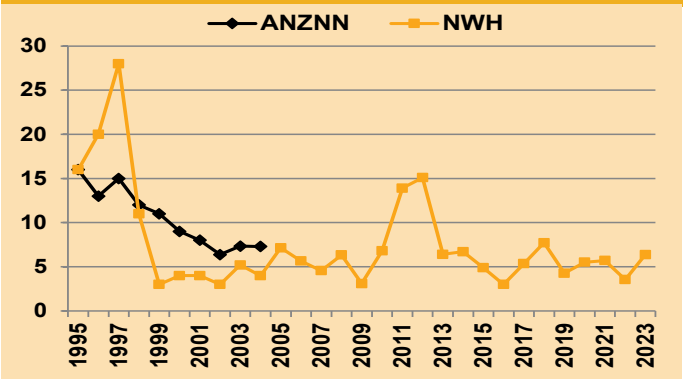
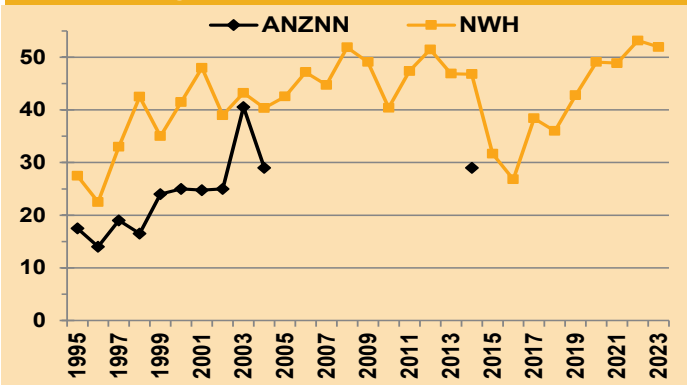


Figure 8.30 Median days on CPAP (24-27 wks ANZNN assigned) NWH 1995-2023



increasing use of CPAP in the late 1990s, the use of IPPV decreased accordingly. In recent years, there is a trend towards greater use of CPAP, especially used in conjunction with less invasive surfactant therapy. There is also a small increase in the use of IPPV in term pēpi. This may be due to a variety of reasons, such as term pēpi ventilated during therapeutic hypothermia or term pēpi with cardiac or surgical conditions. There is an increasing trend in the use of HFOV for extremely preterm pēpi which may reflect a change in neonatal clinical practice in recent years.

8.5.8 Positive pressure ventilation and CPAP use in NWH and across Australia and New Zealand at 24-27 weeks' gestation (ANZNN benchmarking)

These data (Figures 8.27-8.30) compare the use of IPPV and CPAP in NICU and across the Australian and New Zealand Neonatal Network. The Network collects standardised data from all NICUs in Australia and New Zealand. The median data presented here are for all pēpi ventilated (i.e. pēpi not ventilated are excluded). Missing data for ANZNN makes any comparisons in the use of IPPV and CPAP in extremely preterm pēpi with other NICUs difficult. Efforts are made to change to less invasive forms of respiratory support (CPAP) sooner in pēpi <28 weeks' gestation, explaining some of the high CPAP use. The sharp drop in the median days of IPPV in the late 1990s was due to adoption of CPAP as an alternative, less invasive respiratory support in NICU.

The drop in the median days on CPAP in 2016 may be partly explained by increasing use of HiFlow as an intermediate step in weaning from CPAP. The median number of CPAP days for this group of pēpi is high at around 50 days. Many pēpi would have been transferred to their local level 2 unit prior to weaning off CPAP.

8.5.9 Positive pressure ventilation and CPAP use in NWH and across Australia and New Zealand at 28-31 weeks' gestation (ANZNN benchmarking)

ANZNN data (Figures 8.31-8.34) is incomplete due to maintenance of anonymity for small numbers in the dataset, therefore direct comparisons of clinical practice between NICU and other neonatal units is not possible. Pēpi born between 28 and 32 weeks are more mature and therefore should need less time on respiratory support compared to pēpi born <28 weeks. As CPAP is the main modality of respiratory support after birth in these pēpi, almost 100% are treated with CPAP whereas approximately 20 - 30% only are treated with IPPV. As these pēpi are more mature, they are generally ventilated for <48 hours. There has been a significant increase in the duration of CPAP for this group of pēpi, especially in the last 3-4 years. This trend is despite the use of HiFlow respiratory support in this group of pēpi. NICU is currently in the process of reviewing clinical practices regarding CPAP weaning in pēpi born <32 weeks' gestation which will include a review of this trend.

Figure 8.31 Percentage on IPPV (28-31 wks ANZNN assigned) NWH 1995-2023

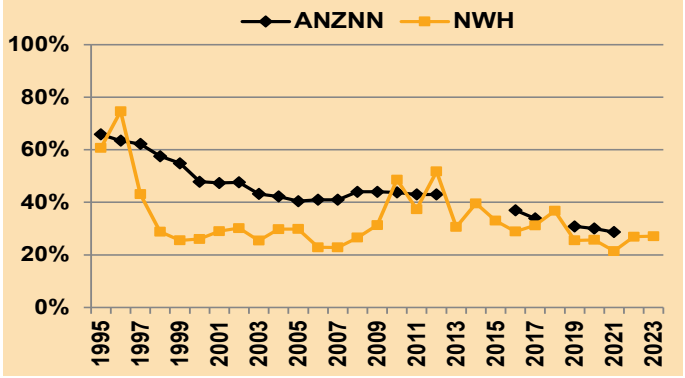


Figure 8.32 Percentage on CPAP (28-31 wks ANZNN assigned) NWH 1995-2023

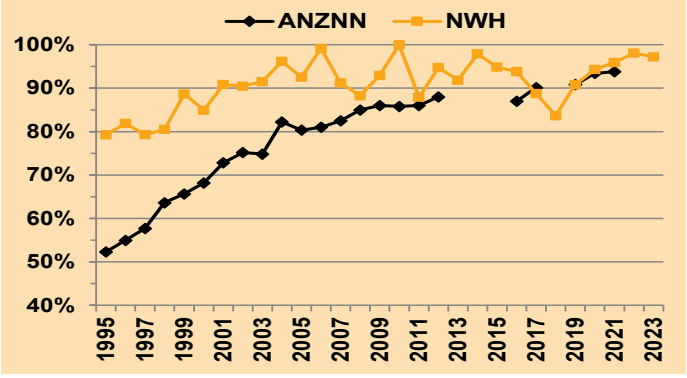


Figure 8.33 Median days on IPPV (28-31 wks ANZNN assigned) NWH 1995-2023

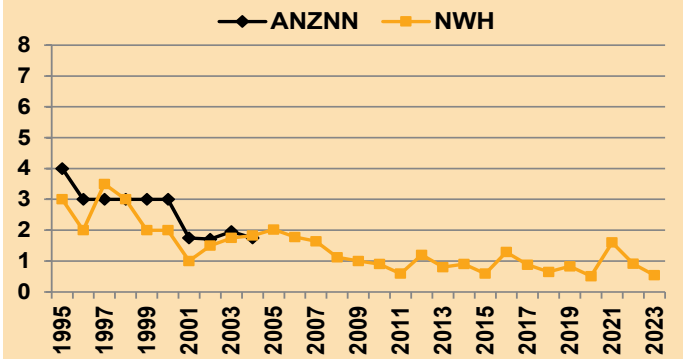
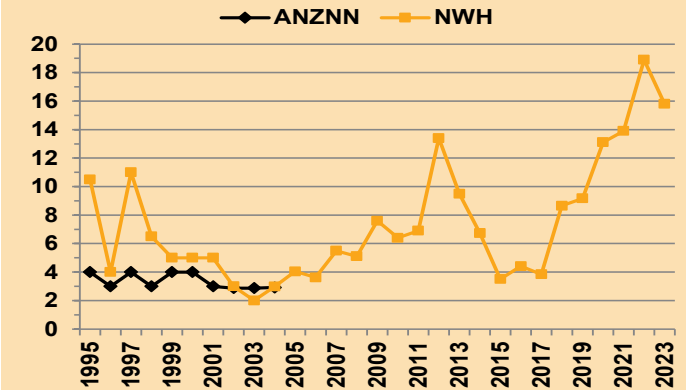


Figure 8.34 Median days on CPAP (28-31 wks ANZNN assigned) NWH 1995-2023



8.5.10 High frequency oscillatory ventilation and inhaled nitric oxide (iNO)

These data (Tables 8.20-8.24) are for all pēpi admitted to NICU each year, including those born in other hospitals or at home. In NICU, high frequency oscillatory ventilation (HFOV) has typically been used for 'rescue' treatment. Hence, pēpi treated with HFOV are the sickest pēpi in NICU who would be expected to have a very poor outlook whatever the treatment. There is, however, a trend towards greater use of HFOV in the more immature pēpi with the ability to deliver this form of support using the Dräger Babylog® VN500 ventilators. Figure 8.35 and Figure 8.36 compare the use of HFOV and iNO at NWH with use across the ANZNN. Generally, the use of these interventions in preterm pēpi has increased since 2003 but is probably comparable with ANZNN data as the actual number of pēpi is small and there is variation in practice in the neonatal units within the Network. There is an overall trend towards increasing use of both HFOV and iNO in these extremely premature pēpi, with considerable variation in rates over the years.

8.5.11 Term/post-term pēpi on assisted ventilation from 1995 to 2023

Figure 8.37 shows trends in the number of term infants treated with different forms of respiratory support. As seen with preterm infants, in the late 1990s there was a significant increase in the use of CPAP for term pēpi. In 2013 we revised the figure to include data for HFOV and HiFlow, and included an indication of total respiratory support use (i.e. all modes combined). There has been a sustained high use of CPAP in this group of pēpi in the last decade, with rates continuing to increase over the years. A large proportion of these pēpi will be admitted with transient tachypnoea of newborn (TTN), requiring short duration (mostly <24 hours) of CPAP respiratory support. The use of HiFlow respiratory support is also increasing, but use of the other more invasive forms of support remains stable. The slight decline in the number on CPAP between 2015 and 2018 may be explained by an increase in use of HiFlow as an alternative to CPAP. This is a heterogeneous group of pēpi. TTN, meconium aspiration syndrome/ PPHN, congenital anomalies, support for surgery, neonatal encephalopathy and 'other', which could include a neuromuscular problem, were the reasons for ventilation in term infants (Table 8.24)

Figure 8.35 HFOV at 24-27 weeks (ANZNN assigned pēpi) NWH 1995-2023

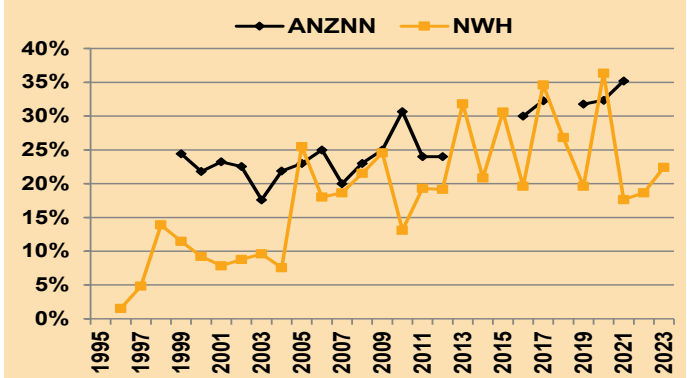


Figure 8.36 Inhaled nitric oxide at 24-27 weeks (ANZNN assigned pēpi) NWH 1995-2023

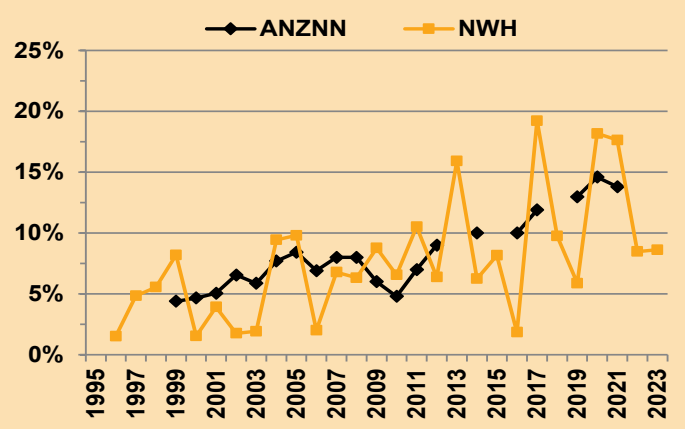
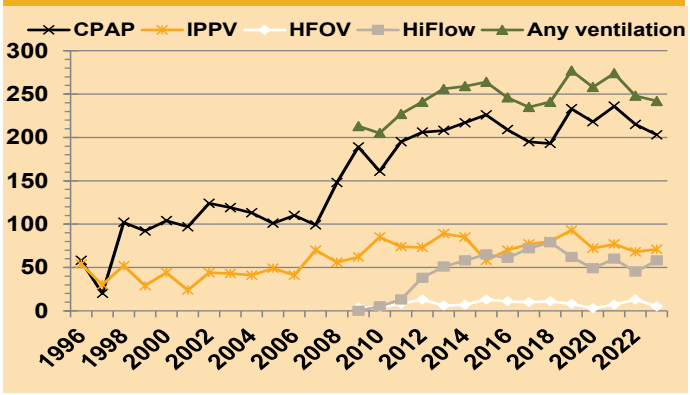


Figure 8.37 Number of term and post term pēpi needing respiratory support (IPPV, HFOV, CPAP and HiFlow) NWH 1995-2023



8.5.12 Data tables: Intraventricular haemorrhage

Table 8.16 Intraventricular haemorrhage by birth weight 2023 (ANZNN assigned pēpi)

Birth Weight (g)	N	Unknown	None	Grade 1	Grade 2	Grade 3	Grade 4
Total	181	44	103	26	3	0	5
<500	2	0	2	0	0		0
500-749	14	0	9	1	1		3
750-999	34	1	25	6	1		1
1000-1249	41	0	31	9	0		1
1250-1499	47	15	26	6	0		0
1500-1999	37	24	8	4	1		0
2000-2499	6	4	2	0	0		0

Table 8.17 Intraventricular haemorrhage by gestation 2023 (ANZNN assigned pēpi)

Gestation (weeks)	N	Unknown	None	Grade 1	Grade 2	Grade 3	Grade 4
Total	181	44	103	26	3	0	5
<24	1	0	0	0	0		1
24-25	23	0	16	4	2		1
26-27	35	0	27	6	0		2
28-29	50	1	39	9	0		1
30-31	57	34	15	7	1		0
32-36	15	9	6	0	0		0

Table 8.18 Intraventricular haemorrhage in all <1250g pēpi admitted to NICU 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	86	85	102	97	81	99	110	103	118	101
Unknown	8	9	0	0	12	6	14	14	15	11
None	59	66	79	76	59	62	71	75	81	67
Grade 1	13	5	11	11	9	21	5	9	12	16
Grade 2	1	1	5	3	0	4	9	0	3	2
Grade 3	1	1	3	1	0	1	1	1	0	0
Grade 4	4	3	3	5	1	5	10	4	7	5

Table 8.19 Number of pēpi on assisted ventilation (inborn) NWH 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Any ventilation	501	522	478	449	456	497	505	508	513	523
IPPV	149	122	131	146	137	144	136	121	145	132
CPAP	462	476	437	397	411	450	461	470	480	483
HFOV	19	29	20	33	22	23	30	19	26	26
HiFlow	170	176	195	189	182	154	150	153	163	173

8.5.13 Data tables: Assisted ventilation

Table 8.20: High Frequency Oscillatory Ventilation (HFOV) and inhaled nitric oxide (iNO) use and survival NWH 2023

	HFOV			iNO			HFOV + iNO		
	Treated	Survivors	Survival	Treated	Survivors	Survival	Treated	Survivors	Survival
	N	n	%	N	n	%	N	n	%
Total	26	19	73	29	25	86	14	11	79
<28 weeks	14	10	71	6	4	67	6	4	67
28-31 weeks	6	5	83	5	4	80	4	4	100
32-36 weeks	1	1	100	2	2	100	1	1	100
≥37 weeks	5	3	60	16	15	94	3	2	67

Table 8.21 High Frequency Oscillatory Ventilation (HFOV) 2014-2023

Gestation (wks)	2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		10 year survival
	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	20	12	35	31	30	23	42	34	32	24	32	21	38	28	25	15	34	22	26	19	72.9
<28	10	5	16	14	14	8	20	15	14	9	16	9	29	20	12	5	15	5	14	10	62.5
28-31	3	1	3	3	5	5	5	5	2	0	4	3	4	3	2	2	5	5	6	5	82.1
32-36	0	0	3	2	0	0	7	4	5	4	4	1	2	2	4	1	1	1	1	1	58.3
≥37	7	6	13	12	11	10	10	10	11	11	8	8	3	3	7	7	13	11	5	3	92.0

Table 8.22 Inhaled Nitric Oxide (iNO) 2014-2023

Gestation (wks)	2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		10 year survival
	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	17	12	20	18	22	20	36	30	36	29	32	26	29	24	39	33	34	24	29	25	82.0
<28	3	1	4	3	1	0	12	9	6	4	4	1	13	9	10	5	11	4	6	4	57.1
28-31	2	1	2	2	2	2	4	3	3	2	3	2	1	1	2	2	4	3	5	4	78.6
32-36	1	1	2	2	1	1	5	4	7	5	3	1	7	6	2	2	0		2	2	80.0
≥37	11	9	12	11	18	1	15	14	20	20	22	22	8	8	25	24	19	17	16	15	84.9

Table 8.23 Inhaled nitrous oxide and High Frequency Oscillatory Ventilation combined (iNO and HFOV) 2014–2023

	2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		10 year survival
Gestation (wks)	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	total	survivors	%
Total	10	7	16	15	14	12	21	17	21	15	16	10	17	13	16	11	22	13	14	11	74.3
<28	3	1	3	3	1	0	12	9	6	2	4	1	13	9	8	3	9	2	6	4	52.3
28–31	1	1	2	2	2	2	2	2	1	0	3	2	0	0	1	1	2	2	4	4	88.9
32–36	0	0	2	2	0	0	2	1	4	3	2	0	2	2	0	0	0		1	1	68.2
≥37	6	5	9	8	11	10	5	5	10	10	7	7	2	2	7	7	11	9	3	2	91.5

Table 8.24 Reason for IPPV and CPAP in term and post-term infants 2019–2023

	2019		2020		2021		2022		2023	
	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP	IPPV	CPAP
TTN/RDS	14	155	9	150	13	150	8	134	8	146
Infection	0	8	1	2	0	1		1		
Meconium	5	5	10	20	17	20	11	12	4	7
Anomaly	18	17	20	17	11	8	11	11	6	5
PPHN	22	25	4	5	8	8	10	11	12	10
Encephalopathy	4	4	8	6	7	6	6	4	8	4
Support for surgery	24	10	15	9	18	10	20	13	24	16
Other	4	6	8	13	3	4	2	5	8	9
Missing reason			1	1	0	29		24	1	4

8.6 Outcomes

8.6.1 Survival of NWH inborn pēpi by birth weight

Over the years the definitions used have been the same, counting all pēpi, including those who died soon after birth, if they showed signs of life. The numbers of pēpi with anomalies and the number who were not actively treated because of their low gestation vary from year to year, and have a big influence on the overall survival rate, particularly in the extremely low birth weight group (500–1000g, ELBW). Significant advances in neonatal care have been reviewed in previous reports. However, it is worth noting the current quality of survival, in terms of neurodevelopment, as reported in the Child Development Unit (CDU) section of the report.

8.6.2 Survival of inborn pēpi (23 to 31 weeks) by gestational age

There is a gradient in survival rates between 23 and 31 weeks' gestational age. Although the number of pēpi in each group per year is small, the pattern of survival in very preterm pēpi has been steady over the last decade. In comparison with ANZNN and some other international data sets, survival at 23 weeks' gestation has previously been low. After this was highlighted by a previous review, work has been done locally and nationally to review practice. A national consensus statement on the care of pēpi born at these extremely preterm gestations has been published by the Newborn Clinical Network. At NWH, we offer intensive care at 23 weeks' gestation if parents, after discussions with obstetric and neonatal teams, opt for this. In 2023, only one 23-weeks gestation pēpi was admitted to NICU. This pēpi is recorded as 22+6 weeks' gestation in the maternity report, reflecting different sources of data.

8.6.3 Survival of 24–27 week pēpi admitted to NICU (benchmarked with ANZNN)

These data are for all inborn pēpi admitted, including those with lethal malformations but excluding deaths in Labour and Birthing Suite. The survival for this group of extremely preterm inborn pēpi is overall high and comparable with ANZNN rates.

Figure 8.38 Neonatal survival (0-28 days) of ≤1500g inborn live births NWH 1959-2023

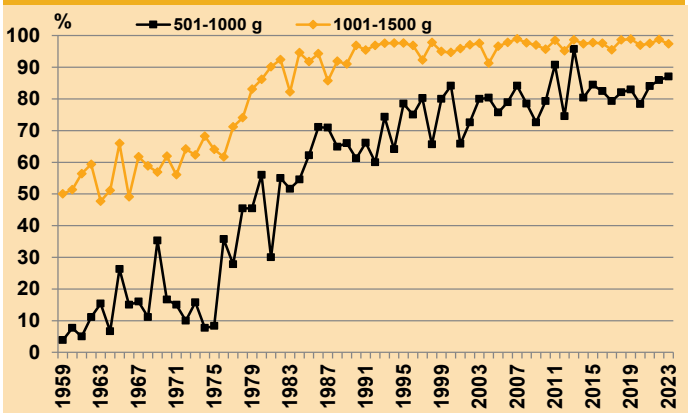


Figure 8.39 Numbers of live inborn pēpi 23 to 31 weeks gestation by outcome NWH 2014-2023 (n=1422)

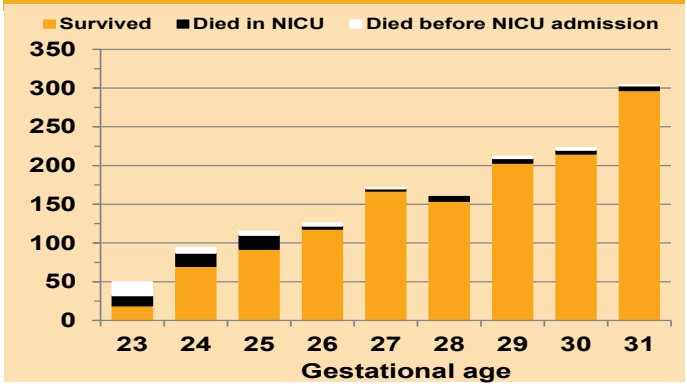


Figure 8.40 Survival of live inborn pēpi 23-31 weeks NWH 2014-2023 (n=1422)

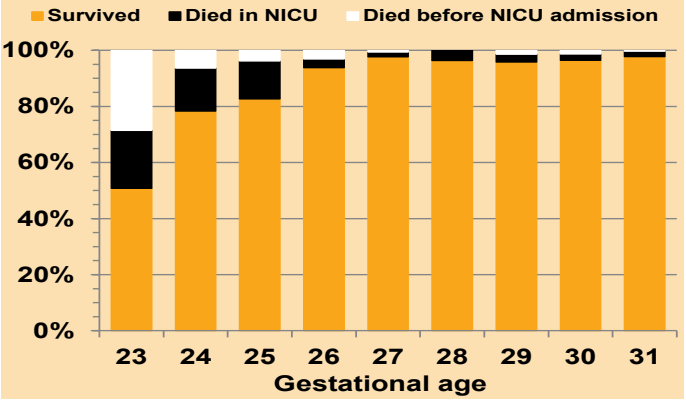


Figure 8.41 Survival of live inborn pēpi admitted to NICU 2014-2023 (n=1373)

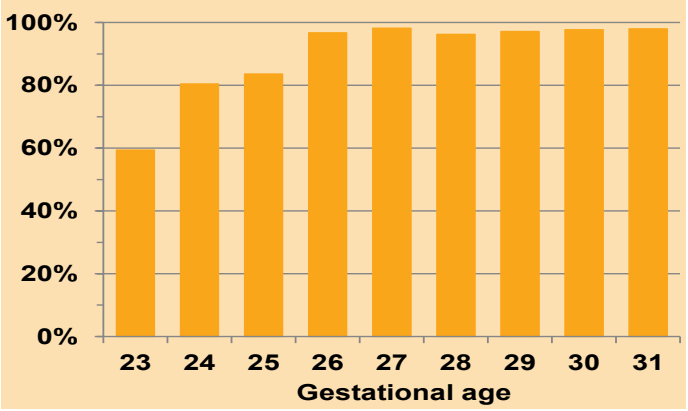


Figure 8.42 Survival at 24-25 weeks gestation (admitted to NICU) compared with ANZNN data NWH 1995-2023

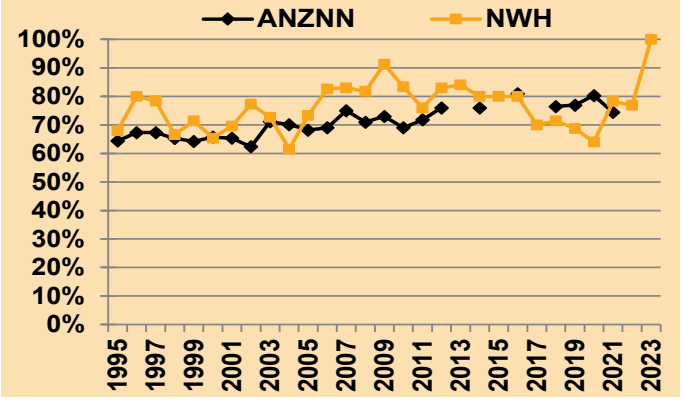
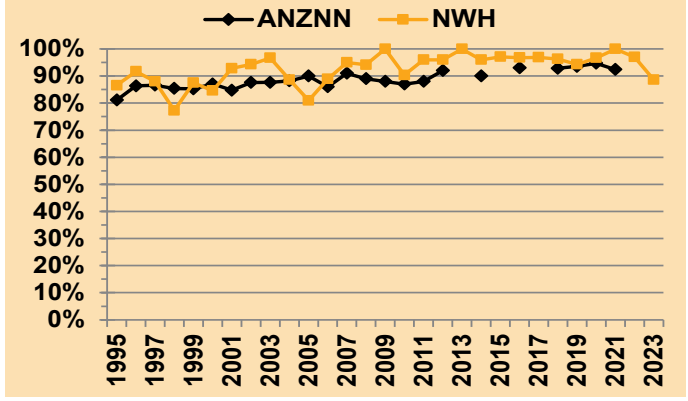


Figure 8.43 Survival at 26-27 weeks (admitted to NICU) compared with ANZNN data NWH 1995-2023



8.6.4 Cystic periventricular leukomalacia (PVL)

Cystic periventricular leukomalacia, especially if extensive and/or bilateral can be associated with severe neurodevelopmental disabilities. Our rates of cystic PVL have been low over the years. In 2023, two pēpi had evidence of cystic PVL on day 28 head ultrasound scans. Both pēpi were born at <30 weeks' gestation and in both cases, there was an antenatal diagnosis of twin to twin transfusion syndrome.

8.6.5 Retinopathy of prematurity (ROP) benchmarked with ANZNN

The rates of significant (Stage 3 or 4) ROP have remained stable over the years and are comparable to the ANZNN data. NICU screens pēpi <30 weeks' gestation or <1250 g birthweight for ROP whereas many other units screen pēpi <31 weeks' gestation or <1250 g.

115 eligible pēpi completed their ROP screen in 2023. Fifty-eight pēpi had no retinopathy of prematurity, 14 had stage 1, 31 had stage 2 and 12 pēpi had stage 3 ROP. No pēpi were diagnosed with stage 4 ROP in 2023. Five pēpi received treatment for ROP while in NICU – four with intravitreal anti-vascular endothelial

Figure 8.44 Stage 3-4 ROP at 24-27 weeks NWH 1995-2023

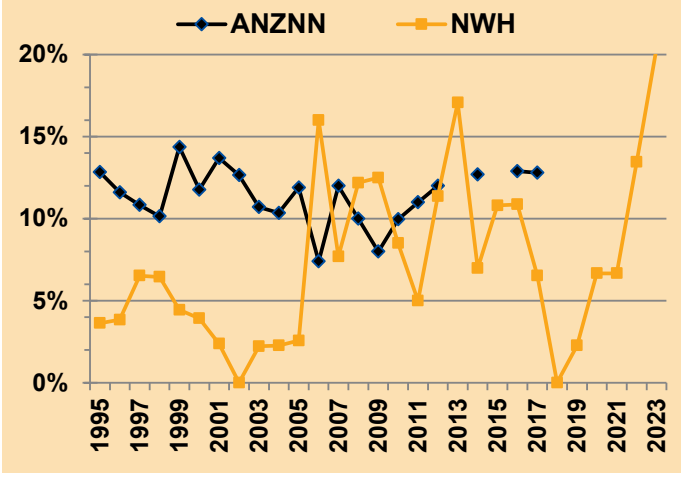
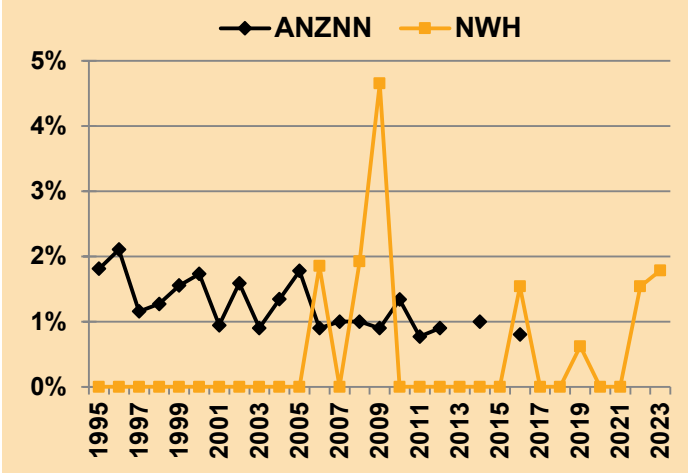


Figure 8.45 Stage 3-4 ROP at 28-31 weeks NWH 1995-2023



growth factor injection and 1 pēpi received bilateral Laser therapy for stage 3 ROP. Rates of severe grades of ROP (stages 3-4) have remained low overall in pēpi born >28 weeks' gestation; the rate in pēpi born <28 weeks' gestation varies widely from year to year, likely related to smaller overall numbers in this group.

8.6.6 Chronic lung disease (CLD) benchmarked with ANZNN

Chronic lung disease is an important clinical outcome, particularly in the very preterm population. Although a variety of definitions exist in the literature, the graphs below have consistently used a rate defined by 'a continued need for any form of respiratory support (supplemental oxygen and/or assisted ventilation) at 36 weeks' postmenstrual age. ANZNN also uses this definition in its reports. The graphs below give the outline of CLD in NWH NICU compared with ANZNN since 1995 (ANZNN data are missing for a number of years). It has been previously noted that changes in the target oxygen saturation levels were associated with changes in rates of CLD. In the late 1990s, target levels were increased only then to fall in 2002 with the presentation of the BOOST trial of oxygen saturation in CLD. Between 2005 and 2011 there were no discernible major trends in the incidence of CLD. However, in 2010 the SUPPORT trial reported a higher risk of death if oxygen saturation was targeted in the range 85-89% compared with 91-95% so there has once again been a shift upwards in rates of lung disease defined by ongoing use of respiratory support or supplementary oxygen. This trend has been shown in the other ANZNN units.

The rates of chronic lung disease in all pēpi born less than 32 weeks' gestation has remained high with an increasing trend over the last few years. Some ANZNN data, especially for recent years, are missing so it is not possible to say if other units are seeing similar trends. From 2016, ANZNN has been collecting data for pēpi born at < 28 weeks gestation on chronic lung disease measured quantitatively to determine physiological chronic lung disease status and to provide a comparable indicator of lung disease severity regardless of NICU practices (modified from Quine et al. 2006 Arch Dis Child Fetal Neonatal Ed 91:F409 and Walsh et al. 2004 Pediatrics 114:1305). The outcomes are yet to be fully reported by ANZNN. 2023 cases of CLD are as per ANZNN pre-2016 definition. An issue with the diagnosis of CLD is that treatment determines the diagnosis so changes in practice, such as changes in respiratory support or oxygen saturation targets, alters the 'incidence' of CLD. From 2010, there has been an

Figure 8.46 Chronic lung disease at 24-27 weeks NWH 1995-2023

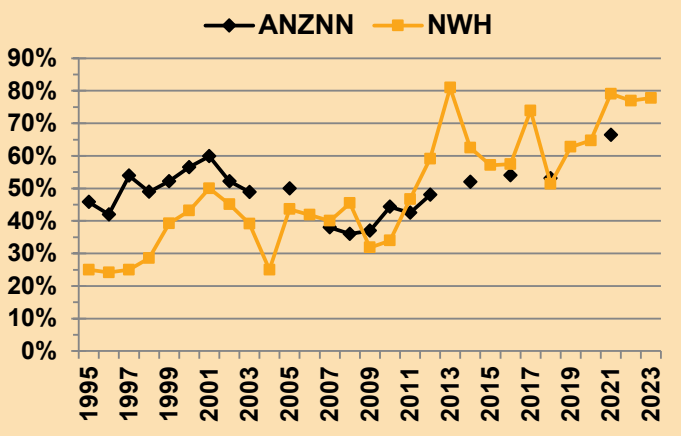
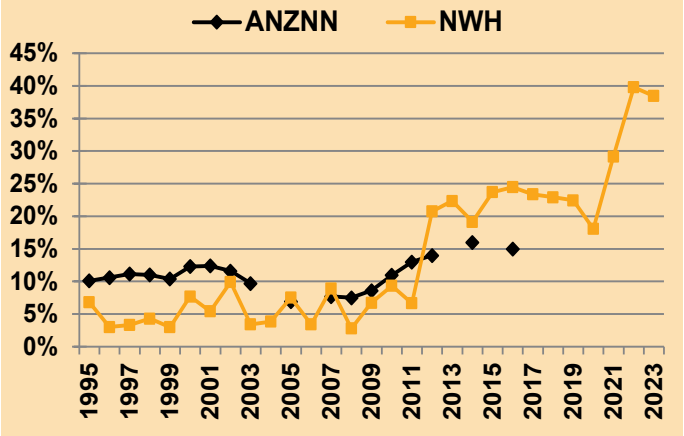


Figure 8.47 Chronic lung disease at 28-31 weeks NWH 1995-2023



increase in the rates of chronic lung disease, with up to 80% of pēpi born <28 weeks being diagnosed with CLD at 36 weeks gestation. Many of these pēpi are on respiratory support (high flow or CPAP) without supplemental oxygen, suggesting contribution from the airway as well as lungs. As noted earlier, use of CPAP has continued to increase over the recent years, which would contribute to higher rates of CLD in pēpi who continue to need this support beyond 36 weeks' postmenstrual age. Many pēpi are transferred to their local special care unit before 36 weeks' gestation and local unit variations in practice may also be a contributing factor. Some of the rise in CLD rates may also be explained by an increase in survival in <28 weeks gestation pēpi.

High rates of CLD are an ongoing concern. This is regularly reviewed within the service and is one of the reasons for implementation of a clinical practice guideline to standardise weaning pēpi off respiratory support in NICU.

8.6.7 Necrotising enterocolitis (NEC) benchmarked with ANZNN

The benchmarking figure (8.48) below compares NEC rates for pēpi born < 28 weeks' gestation from NWH and the ANZNN. Moderate variability in rate due to small numbers has been typical. However, probiotic use was introduced in 2011 initially as part of a clinical trial and later as a standard treatment for infants below 1500g or 32 weeks' gestation so it is important to continue to observe local NEC rates closely. Data for individual NEC cases by gestation and birth weight are given in Tables 8.30 and 8.31 and it is notable that the rates of NEC have remained low following the introduction of probiotics. Two different types of probiotics have been used in NICU over the years due to supply issues. Two preterm pēpi were diagnosed with NEC among inborn pēpi, In addition to this, 2 outborn pēpi were transferred for management of NEC.

8.6.8 Patent Ductus Arteriosus (PDA) (all pēpi)

In 2023, a total of 7 pēpi were medically treated for a symptomatic patent ductus arteriosus and no pēpi was treated with surgical ligation. Three pēpi were treated with Indomethacin only, another three pēpi were treated with Paracetamol and one pēpi was treated with both Indomethacin and Paracetamol. There has been a reduction in the number of pēpi treated with medical and/or surgical interventions to close PDA in view of recent evidence suggesting no long term benefits of treatment.

8.6.9 Pneumothorax needing drainage (all pēpi)

In 2023, 9 pēpi developed pneumothorax requiring treatment with chest drain insertion. Three pēpi were born at preterm (<30 weeks') gestation and developed pneumothorax as a complication of severe respiratory distress syndrome. The other 6 pēpi were born >31 weeks' gestation.

8.6.10 Postnatal corticosteroids (ANZNN pēpi)

These data are on the use of postnatal corticosteroids to treat CLD. Data on steroid use to facilitate extubation, associated with upper airway oedema are excluded. The denominator used in the figures is the number of pēpi alive at 1 week of age. In 2023, a total of 17 pēpi were treated with postnatal steroids. All pēpi treated with postnatal steroids were born at less than 28 weeks' gestation. Pēpi born < 26 weeks' gestation or with birthweight <750 g are most likely to receive treatment with postnatal dexamethasone. The total number of pēpi in this group is small which explains the year to year variation. There is an intention to use steroids rationally and at the lowest required dose, often to facilitate extubation to CPAP in extremely preterm pēpi who are still ventilated beyond 7-10 days of age.

Figure 8.48 Necrotising enterocolitis (NEC) in ANZNN assigned pēpi under 28 weeks gestation compared with the incidence in ANZNN 1995-2023

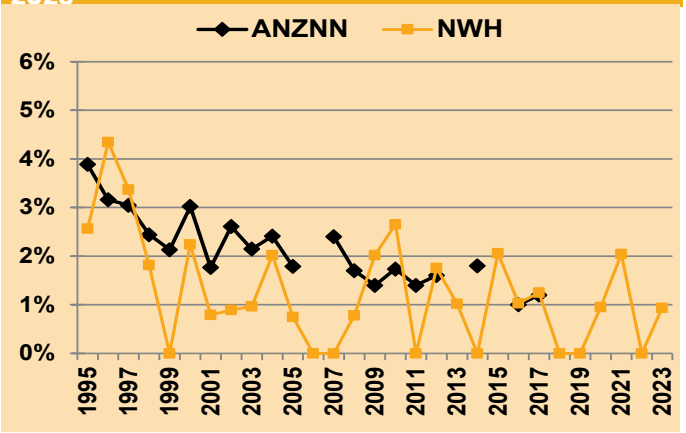


Figure 8.49 Percentage receiving postnatal dexamethasone by gestational age (ANZNN alive at one week <30wks) NWH 1995-2023

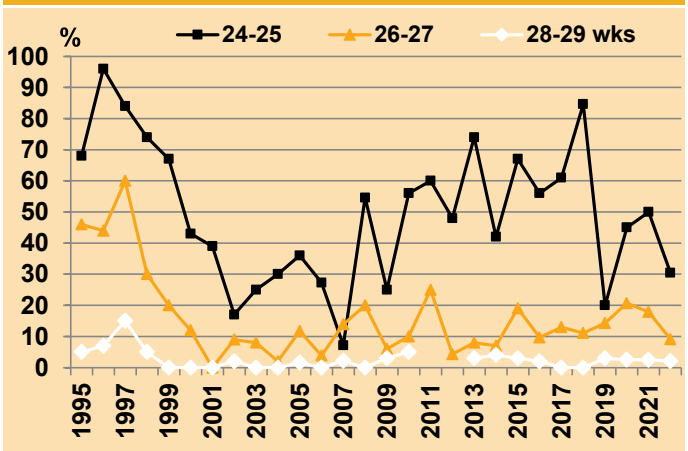
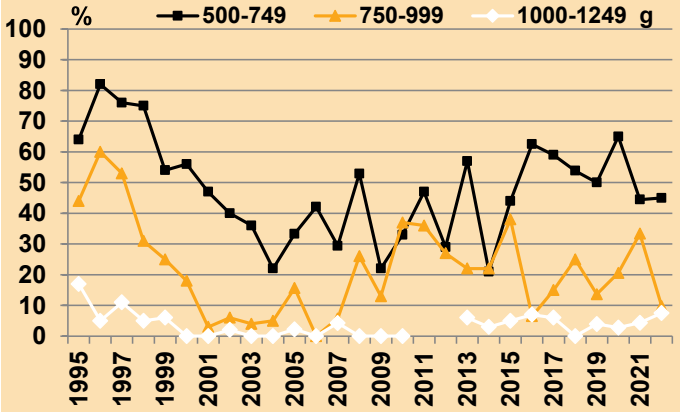


Figure 8.50 Percentage receiving postnatal dexamethasone by birth weight (ANZNN alive at one week <1250g) NWH 1995-2023



8.6.11 Data tables: Survival

Table 8.25 Numbers of survivors by gestational age of pēpi <32 weeks gestation 2023

Gestation (weeks)	20	21	22	23	24	25	26	27	28	29	30	31
Born alive in NWH*	1	3	4	1	7	15	12	22	18	27	19	35
Died at birth in NWH	1	3	3	1	0	0	0	0	0	0	2	0
Born alive at NWH and admitted to NICU	0	0	1	0	7	15	12	22	18	27	17	35
Born alive at NWH and survived			0	0	7	15	10	22	16	26	17	35
Outborn admitted and survived					3	3	4	3	1	5	2	5

*using NICU definition excluding BBA

8.6.12 Data tables: Retinopathy of Prematurity

Table 8.26 Retinopathy of prematurity by birth weight in pēpi surviving to 36 weeks gestation (ANZNN assigned pēpi) 2023

Birth Weight (g)	N	Unknown/not examined	None	Stage 1	Stage 2	Stage 3	Stage 4
Total	171	57	57	14	31	12	0
<500	2	0	0	0	2	0	
500-749	11	0	0	0	3	8	
750-999	31	0	10	7	10	4	
1000-1249	40	0	30	3	7	0	
1250-1499	46	25	14	2	5	0	
1500-1999	36	27	3	2	4	0	
2000-2499	5	5	0	0	0	0	

Table 8.27 Retinopathy of prematurity by gestational age in pēpi surviving to 36 weeks' gestation (ANZNN assigned pēpi) 2023

Gestation (wks)	N	Unknown/not examined	None	Stage 1	Stage 2	Stage 3	Stage 4
Total	171	57	57	14	31	12	0
24-25	23	0	3	3	9	8	
26-27	31	0	14	5	9	3	
28-29	47	1	28	5	12	1	
30-31	56	46	9	0	1	0	
>31	14	10	3	1	0	0	

8.6.13 Data tables: Chronic lung disease

Table 8.28 Chronic lung disease by birth weight (inborn pēpi <1500gms) 2023

Birth Weight (g)	Inborn <1500g	Dead by 36 wks/28days	Alive at 36 wks	CLD	CLD/ livebirth admissions %	CLD/ survivors to 36 wks %
	n					
Total	128	8	120	63	49	53
<500	2	0	2	2	100	100
500–749	14	3	11	10	71	91
750–999	33	3	30	22	67	73
1000–1249	38	1	37	19	50	51
1250–1499	41	1	40	10	24	25

Table 8.29: Chronic lung disease by gestational age (inborn pēpi <32 weeks) 2023

Gestation (weeks)	Inborn <32wks	Dead by 36 wks/28 days	Alive at 36 wks	CLD	CLD/ livebirth admissions	CLD/ survivors to 36 wks %
	N				%	
Total	153	8	145	74	48	51
<24	1	1	0	0	0	
24–25	22	0	22	20	91	91
26–27	34	4	30	20	59	67
28–29	45	3	42	21	47	50
30–31	51	0	51	13	25	25

8.6.14 Data tables: Necrotising enterocolitis

Table 8.30 Necrotising enterocolitis (NEC) by birth weight ANNZN <1500g 2019–2023

Weight (g)	2019			2020			2021			2022			2023		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total	135	2	1	135	4	3	136	3	2	150	8	5	138	2	1
<500	2	0	0				2	1	50	1	0	0	2	0	0
500–749	19	1	5	24	2	8	18	1	6	22	1	5	14	0	0
750–999	22	1	5	37	1	3	25	0	0	42	3	7	34	1	3
1000–1249	51	0	0	36	0		46	1	2	40	2	5	41	0	0
1250–1499	41	0	0	38	1	3	45	0	0	45	2	4	47	1	2

Table 8.31 Necrotising enterocolitis by gestational age ANNZN <32wks 2019–2023

Gestation (weeks)	2019			2020			2021			2022			2023		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total	155	2	1	167	4	2	153	3	2	170	9	5	166	2	1
<24	6	1	17	7	1	14	4	1	25	7	0	0	1	0	0
24–25	16	1	6	25	2	8	23	1	4	26	3	12	23	1	4
26–27	35	0	0	30	0		28	0	0	33	3	9	35	0	0
28–29	34	0	0	40	1	3	41	1	2	49	1	2	50	1	2
30–31	64	0	0	65	0		57	0	0	55	2	4	57	0	0

8.6.15 Data tables: Pneumothorax

Table 8.32 Pneumothorax requiring drainage by birth weight (<1500g) 2019-2023

Birth weight (g)	2019			2020			2021			2022			2023		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total <1500g	143	1	1	152	4	3	148	5	3	165	1	1	150	2	1
<500	2						2	1	50	1	0	0	2	0	0
500-749	19	1	5	26	2	8	19	2	11	28	0	0	18	1	6
750-999	25			43	1	2	35	1	3	46	0	0	39	1	3
1000-1249	53			41	1	2	47	0	0	43	0	0	42	0	0
1250-1499	44			42	0		45	1	2	47	1	2	49	0	0

Table 8.33 Pneumothorax requiring drainage by gestation (all pēpi <32wks) 2019-2023

Gestation (weeks)	2019			2020			2021			2022			2023		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
Total <32wks	164	1	1	184	5	3	167	5	3	184	2	1	179	3	2
<24	6	0		7	1	14	5	1	20	8	0	0	1	0	0
24-25	17	1	6	28	2	7	25	2	8	32	0	0	28	1	4
26-27	39	0		34	1	3	34	0	0	36	0	0	41	1	2
28-29	37	0		47	0		44	2	5	51	1	2	51	1	2
30-31	65	0		68	1	1	59	0	0	57	1	2	58	0	0

8.6.16 Data tables: Postnatal corticosteroids

Table 8.34 Inborn pēpi receiving postnatal corticosteroids by birth weight 2023 (pēpi alive at 1 week and less than 1500g)

Birth weight (g)	N	n	%
Total	125	17	14
500-749	14	9	64
750-999	31	6	19
1000-1249	37	1	3
1250-1499	41	0	0

Table 8.35 Inborn pēpi <32 weeks receiving postnatal corticosteroids by gestational age 2023 (pēpi alive at 1 week)

Gestation (weeks)	N	n	%
Total	149	17	11
<24	1	0	0
24-25	22	13	59
26-27	33	4	12
28-29	42	0	0
30-31	51	0	0

8.7 Immunisation

8.7.1 Hepatitis B

In 2023, no pēpi whose mother was Hepatitis B surface antigen positive was admitted to NICU.

8.7.2 BCG

Since 2018, no pēpi have been given BCG vaccination whilst in the neonatal unit. There has previously been an interruption of BCG vaccine supply due to a global shortage. BCG vaccine is available now and eligible pēpi are routinely referred to Public Health at the time of discharge.

8.7.3 Infrarix Hexa and Prevenar at 6 weeks

In 2023, 97 pēpi were in NICU when due their 6 week immunisations. Eighty-three pēpi received their immunisations on time. One pēpi had their immunisation delayed by 10 days due to being unwell at 6 weeks of age. Of the 14 pēpi who did not receive their immunisations at 6 weeks of age, only two pēpi remain unimmunised due to parental choice. All other pēpi were eventually immunised. The commonest reason for deferral was pēpi being transferred to their local unit at 6 weeks' of age and immunisations being delayed until after transfer. One parent elected to immunise their pēpi at 6 weeks corrected age (after discharge

from neonatal unit) and a small number of pēpi were referred for home-based vaccination after discharge from their local unit.

8.7.4 Infrarix Hexa and Prevenar at 3 months

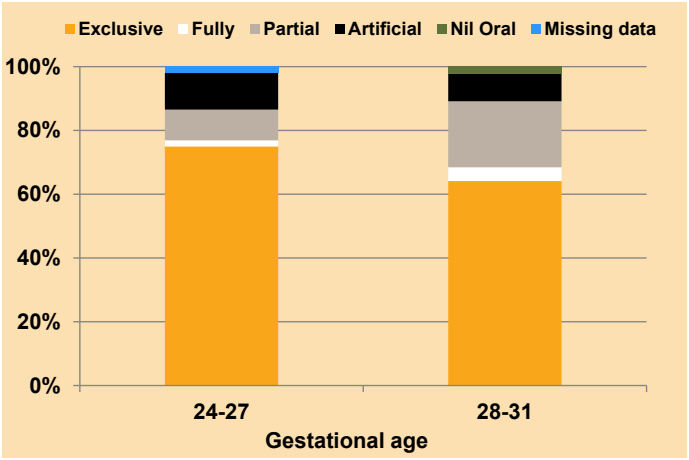
In 2023, 26 pēpi were in NICU at 3 months of age. Pēpi who are still in the neonatal unit at 3 months of age are generally pēpi who were born extremely preterm and/or had permaturity-related complications, which may have affected the timing of their 6 week immunisation. Twenty pēpi received their 3 month immunisations at or around 3 months of age. Three pēpi were transferred to their local hospitals at around 3 months of age and received their immunisations after transfer. Three pēpi were outborn. Two pēpi were undergoing surgery at 3 months of age and had their immunisations delayed and another pēpi was transferred for review by Starship team and had only just received their 6-week immunisations the week prior to transfer.

8.8 Infant Feeding (inborn)

Data are presented on pēpi admitted to the NICU from 24- 31 weeks old who were either discharged to the postnatal ward or to home. Note it is a standard of care for VLBW infants to receive human milk fortifier, which is classified as a breast milk substitute. For the purposes of this report VLBW infants who only receive breast milk and fortifier are classified as exclusive breastfeeding. The majority of pēpi born <32 weeks and discharged home (or to postnatal ward) were either exclusively or fully breast feeding at the time of discharge.

The newborn service strives to achieve a high rate of breastfeeding across the range of gestational age groups. However, there are on-going and different challenges for the different groups of pēpi. Preterm pēpi born < 28 weeks gestation may be in hospital for 3 or more months and optimal neonatal growth can be for a challenge for some of these pēpi, especially for pēpi with other complications of prematurity. In addition, mothers may have to express milk for many weeks before pēpi is ready to breastfeed, often at times of considerable stress, especially if pēpi is unwell. Some mothers are unable to maintain their supply up to the time of discharge despite input and support from staff but nevertheless have provided valuable breastmilk earlier in the neonatal course. Other situations where exclusive breastfeeding may not be possible are when the mother is unwell and not able to express sufficient milk to maintain supply for a relatively mature pēpi or in cases of multiple births where a mother may not have enough supply initially for all pēpi to receive exclusive breast milk feeds. Our unit participated in the DIAMOND trial which studied different nutrition approaches in late preterm pēpi. This study did not identify a particular nutrition approach as being superior to other approaches. Supporting mothers to establish breast feeding prior to discharge and continuing breast feeding for at least 6 months is important for long term health of mother and pēpi.

Figure 8.51 Method of feeding at discharge from NICU by gestational age 2023



8.8.1 data tables: Infant Feeding

Table 8.36 Method of feeding at discharge from NICU by gestational age and birth weight 2023 (in-born)

	Total	Exclusive		Fully		Partial		Artificial		Nil Oral		Missing data	
	N	n	%	n	%	n	%	n	%	n	%	n	%
Total	734	323	44	88	12	80	11	53	7	10	1	180	25
Gestation (weeks)													
20-23	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
24-27	52	39	12.1	1	1.1	5	6.3	6	11.3	0	0.0	1	0.6
28-31	92	59	18.3	4	4.5	19	23.8	8	15.1	2	20	0	0.0
32-36	257	97	30.0	40	45.5	29	36.3	20	37.7	1	10	70	38.9
37-40	317	123	38.1	41	46.6	23	28.8	19	35.8	7	70	104	57.8
>41	16	5	1.5	2	2.3	4	5	0	0.0	0	0.0	5	2.3

Birth weight (g)													
<500	2	2	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
500-749	11	6	1.9	1	1.3	3	3.8	1	1.9	0	0.0	0	0.0
750-999	30	21	6.5	0	0.0	4	5.0	5	9.4	0	0.0	0	0.0
1000-1249	37	27	8.4	1	1.3	7	8.8	1	1.9	0	0.0	0	0.0
1250-1499	41	27	8.4	4	4.5	4	5.0	6	11.3	0	0.0	0	0.0
1500-1999	128	52	16.1	15	17.0	19	23.8	9	17.0	2	20.0	31	17.2
2000-2499	107	34	10.5	9	10.2	15	18.8	12	22.6	0	0.0	37	20.6
2500-2999	116	45	13.9	21	23.9	9	11.3	9	17.0	1	10.0	31	17.2
3000-3999	219	100	31.0	29	33.0	17	21.3	6	11.3	6	60.0	61	33.9
>=4000	43	9	2.8	8	9.1	2	2.5	4	7.5	1	10.0	19	10.6

8.9 Neonatal deaths prior to NICU discharge among pēpi admitted to NICU in 2023

In 2023, 15 inborn pēpi and 6 outborn pēpi died in NICU. Nine inborn pēpi were born at preterm gestation (23 – 31 weeks). Three pēpi died from infection. The cause of death for the other 6 pēpi included underlying genetic or other anomalies. Of the term born pēpi who died, severe HIE was the underlying cause in two while other pēpi had underlying genetic or congenital anomalies. There were 6 outborn pēpi who died in NICU. The age at the time of death ranged from 5 to 48 days of age. Two extremely preterm born pēpi who were transferred for surgical review died as a result of their underlying surgical conditions.

8.10 Child Development Unit

8.10.1 Follow up at 2 years (corrected) of children under 1500 grams born in 2021

One hundred and thirty-seven infants born in 2021 who weighed less than 1500 grams (very low birth weight) were cared for in the Newborn Service and survived to hospital discharge.

Follow up data was obtained for 68 children (50% retrieval). Information was not obtained, or not provided in this report, for 69 children for the following reasons:

- 30% of the cohort children were lost to follow up because of
- living overseas (7 children) and
- 34 children were living in other New Zealand centres.

In addition:

- The families of 7 children could not be traced (5%)
- Five parents declined follow up (4%)
- One child died post-discharge
- Two children were excluded for medical reasons
- Five children were excluded because of a diagnosis of Autistic Spectrum Disorder (ASD)
- Eight families did not attend their appointments and were not contactable on attempted follow up.

Of the 68 children for whom results were obtained ("Data cohort") 63 children received individual assessment at the Child Development Unit ("CDU"). The Bayley Scales of Infant and Toddler Development-IV were administered by a registered psychologist as close as possible to the child reaching two years (corrected age). Neurological examinations were carried out by paediatricians. Results for a further 5 children were obtained from paediatricians, psychologists and neurodevelopmental therapists outside of the CDU.

The demographic distribution of this data cohort (N=68) is as follows:

- 22 children (32%) weighed less than 1000 grams at birth
- 34 (50%) had a gestational age of between 23 and 28 weeks
- 15 children (22%) were SGA at birth

From the information gathered, children were placed into outcome categories; a description of these categories is presented in Table 8.37.

Table 8.38 presents the results, using these outcome categories, for the 68 children tested at 2 years of age (corrected).

The distribution of the children within each Category is presented by gestational age (Table 8.39) and by birthweight (Table 8.40).

The distribution by Category for this 2021 (2 year) cohort is compared with NWH outcomes since 2001 in Figure 8.52.

Figure 8.53 presents a comparison of the distribution by Category for babies weighing under 1000 grams at birth, from 2001 to 2021.

Review of 2 Year Results

Retrieval rates for the total cohort of 2 year olds born in 2021 are low, at 50%. Investigations indicate that of the children not seen by our Service, approximately one third (30%) either resided elsewhere or moved out of region after discharge.

Results derived from such a small number of children, n=56, and from a low retrieval rate may not represent the outcomes of the entire cohort.

Results presented for children for whom data was obtained show that:

- Three percent of this population presented with severe disabilities (Category I).
- Seventy-eight percent of our 2 year old ildren presented with Full Scale IQ scores in the average range (Categories III and IV).
- Evidence is suggestive that gestational age and birthweight appear to be factors in determining outcomes for premature babies born under 35 weeks gestation.
- Of interest is the unusually high percentage of children who were diagnosed with Autistic Spectrum Disorder ("ASD"). This represents just on 10% of the total cohort. In addition a further four children presented with features of ASD but had no diagnosis at the time of testing, and the limited results obtained from these four children were excluded.

Figure 8.52 Outcome at 24 months (corrected age) of children <1500g birthweight born 2001-2021 NWH

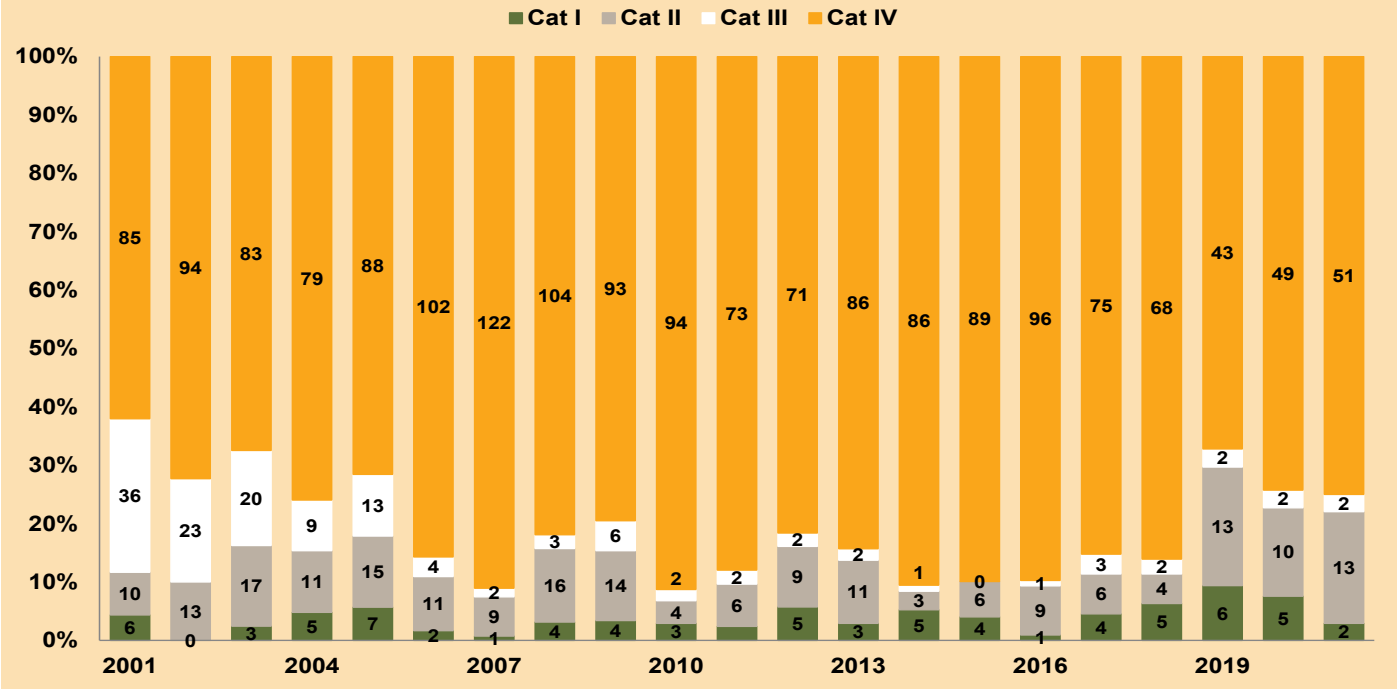


Figure 8.53 Outcome at 24 months (corrected age) of children <1000g birthweight born 2001-2021 NWH

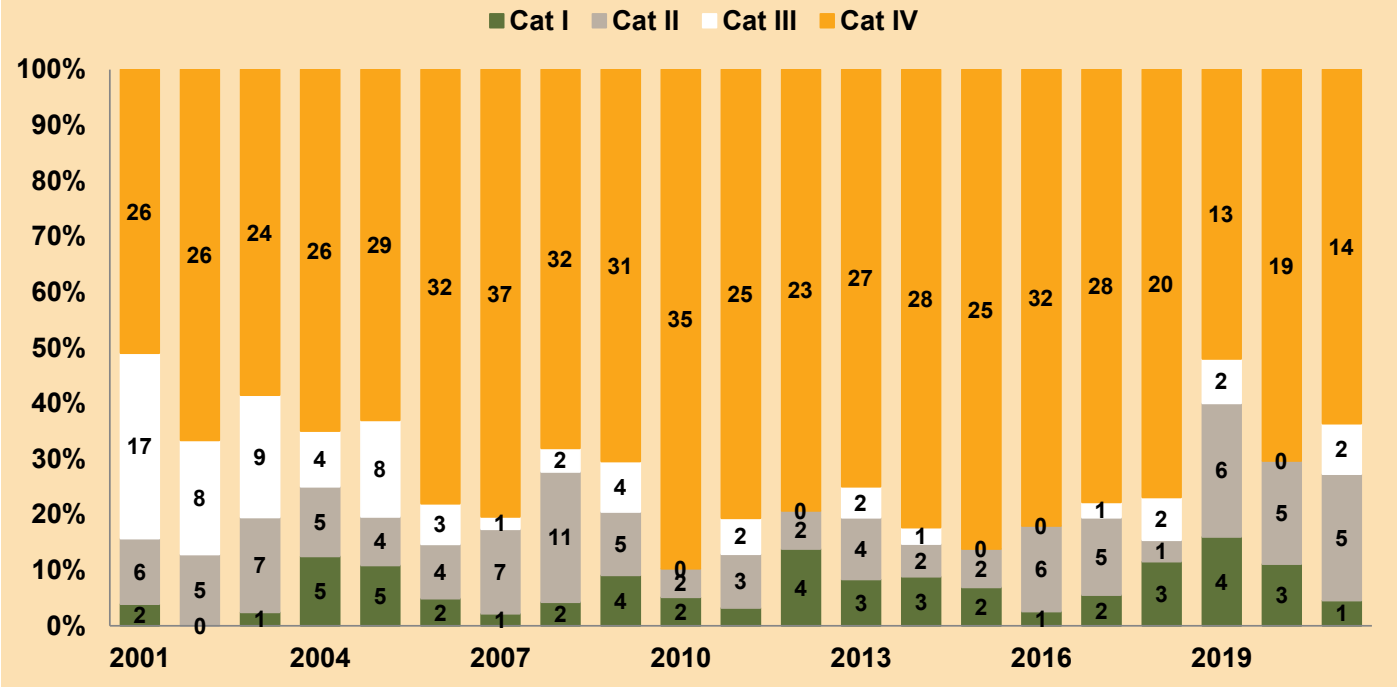


Table 8.37 Outcome categories for infants under 30 months of age		
Category I	**(Severe disability): one or more of the following**	
	(i)	Sensorineural deafness (requiring hearing aids)
	(ii)	Bilateral blindness
	(iii)	Severe cerebral palsy
	(iv)	Developmental delay (Bayley* Cognitive Score 2 or more standard deviations below mean)
Category II	**One or more of the following**	
	(i)	Bayley* Cognitive Score between 1 & 2 standard deviations below mean
	(ii)	Mild-moderate cerebral palsy without developmental (cognitive) delay
	(iii)	Impaired vision requiring spectacles
	(iv)	Conductive hearing loss requiring aids
Category III**	**Presence of tone disorder or motor delay**	
		Bayley* Motor Score more than 1 standard deviation below mean (but Cognitive score within average range)
Category IV	**Normal development**	
	(i)	No apparent tone disorder
	(ii)	No apparent developmental delay (Bayley* Cognitive and Motor Scores within average range or above)

Note: Outcome categories modified from Kitchen et al, 1984, 1987.

*Bayley Scales of Infant & Toddler Development IV – all scores adjusted for gestational age.

**Category III is included to signal that a number of preterm infants tested at an early age have minor tone disorders or motor delay.

These may improve as the children mature with age and experience.

Table 8.38 Outcome categories at 2 years (corrected) for children under 1500g born in 2021 (n=68) NWH		
	Number	**Description**
Category I	2 (3%)	Two children with full scale IQ scores greater than 2 standard deviations below the mean.
Category II	13 (19%)	10 children with Cognitive scores between 1 and 2 standard deviations below the mean.
		One child was diagnosed with mild-moderate CP.
		1 child with Cognitive scores within the average range and with spectacles, a club foot and motor delays.
Category III	2 (3%)	2 children with Bayley* Motor Scores more than 1 standard deviation below mean and Cognitive scores within average range.
Category IV	51 (75%)	Children with no apparent tone disorders and no apparent developmental delay.

Table 8.39 Outcome of children <1500g born in 2021 at 2 years (corrected) by gestational age groups (n=68) NWH			
Gestational age (weeks)			
Outcome Category	**23 - 28 weeks**	**29 - 35 weeks**	**Total**
	n= 34	**n=34**	**n= 68**
	n (%)	**n (%)**	**n (%)**
I	0 (0)	2 (6)	2 (3)
II	9 (26)	4 (12)	13 (19)
III	2 (6)	0 (0)	2 (3)
IV	23 (68)	28 (82)	51 (75)

Table 8.40 Outcome of children <1000g born in 2021 at 2 years (corrected) by birthweight groups (n=68) NWH

Birthweight (grams)					
Outcome Category	<1000g		1000 – 1499g		Total
	n=22		n=46		n=68
	n	(%)	n	(%)	n (%)
I	1	(4)	1	(2)	2 (3)
II	5	(23)	8	(17)	13 (19)
III	2	(9)	0	(0)	2 (3)
IV	14	(64)	37	(80)	51 (75)

8.10.2 Development at 4 years of age in children born in 2019 with birthweight under 1500g

One hundred and twenty-four children born in 2019 who weighed less than 1500 grams were cared for in the Newborn Service and survived to hospital discharge.

At four years of age data was obtained for 54 children (44%). Information was not able to be obtained for 70 children for the following reasons:

- 1 child died post-discharge
- 1 child was excluded for medical reasons.
- 4 children were unable to be tested for behavioural reasons. None of these children had any other diagnosis at the time of testing.
- A further 64 children were not tested either because:

  ~they were unable to be traced (8 children)

  ~ parents declined follow up (6 children)

  ~they were living overseas (4 children)

  ~they were living in other New Zealand centres (25) children, equating to 23% of the total cohort).

  ~ 12 children were diagnosed with Autistic Spectrum Disorder

  ~ A further 9 children were not brought to scheduled appointments.

It is our usual practice to request developmental information from other centres where children live outside of Auckland. Most children in other regions have, however, been discharged from follow-up by approximately age 2 years if there are no developmental concerns, so that there is limited information available at the 4 year level for children living at a distance.

The demographic profile of the 54 children in our data cohort is as follows:

- 15 (28%) infants weighed less than 1000g at birth
- 26 infants (48%) had a gestational age between 23 and 28 weeks
- 6 children (11%) were identified as being SGA at birth. This compares with 19 SGA children (15%) of the total four year cohort of 124 children born in 2018.

Of the 54 children for whom outcome data was obtained, 51 attended at the CDU and were individually assessed by a registered psychologist. Data was obtained from other sources (Paediatric review) for 3 children who did not live locally. Psychologist assessment at our service involved interviewing parents and administering standardised tests for cognitive and motor skills. Tests administered were the Wechsler Preschool and Primary Scale of Intelligence, 4th edition, Australian and New Zealand ("WPPSI") and the Vineland Adaptive Behaviour Scales – Third Edition (2016)

The results for all 54 children are presented in Outcome Categories as described in Table 8.41.

Using these Categories the results for the 54 children are presented in Table 8.42.

Figure 8.54 provides a comparison of the distribution by Category of the (above) 2019 cohort with outcomes for the birth years 2001 to 2018.

The distribution of the children in these categories is presented below in Tables 8.43 and 8.44 comparing Outcome Categories by Gestational Age (Table 8.43) and then by Birthweight (Table 8.44).

Review of 4 year results

Retrieval rates for the total cohort of 4 year olds born in 2019 are low, at 44%. Investigations indicate that of the children not seen by our Service, just under half (41%) either resided elsewhere or moved out of region after discharge.

Results derived from such a small number of children, n=54, and from a low retrieval rate may not be representative of the larger cohort.

Results presented for the children for whom data was obtained show that:

- No children in this population presented with severe disabilities (Category I).
- Eighty-seven percent of our 4 year old children presented with Full Scale IQ scores in the average range (Categories III and IV).
- Our data is in keeping with the observation that gestational age is a factor in determining outcomes for premature babies born under 35 weeks gestation: 77% of children born 23-28 weeks gestation presented with normal development, compared to 89% born at 29-35

weeks.

- Birthweight is more strongly associated with positive outcomes: 60% of children born weighing under 1000g had scores within the normal range, compared to 92% of children born weighing 1000 to 1400g.
- Of interest is the unusually high percentage of children who were diagnosed with Autistic Spectrum Disorder ("ASD"). This represents just on 10% of the total cohort. In addition a further four children presented with features of ASD but had no diagnosis at the time of testing, and the limited results obtained from these four children were excluded. Information on the incidence of autism in the wider NZ population is variable but reportedly at approximately 2% [1,2].

Summary

Babies weighing less than 1500 grams at birth are identified in the literature as being at risk for developmental problems.

Follow up data achieved by our Service for two year olds born in 2021 and for four year olds born in 2019 is markedly limited by poor retrieval rates (50% and 44% respectively). For these cohorts, results obtained indicate that developmental progress is pleasing, with 75% of two year olds and 83% of four year olds presenting with normal development or IQ scores and normal tone.

These are positive outcomes but more compelling and reliable results can only be achieved by improved retrieval rates. A significant proportion of each age group is outside of the ADHB region and this necessarily limits our access. Nevertheless our Service is reviewing procedures with a goal of improving retrieval rates for those children who are domiciled within our follow up region.

[1] Altogether Autism. (2023). https://www.altogetherautism.org.nz

[2] Autism spectrum disorder/Takiwātanga: An Integrated Data Infrastructure-based approach to autism spectrum disorder research in New Zealand - Scientific Figure on ResearchGate. https://www.researchgate.net/figure/The-Integrated-Data-Infrastructure-Source-Statistics-New-Zealand_fig1_343020556

Figure 8.54 Outcome at 4 years of children <1500g birthweight born 2001-2019 NWH

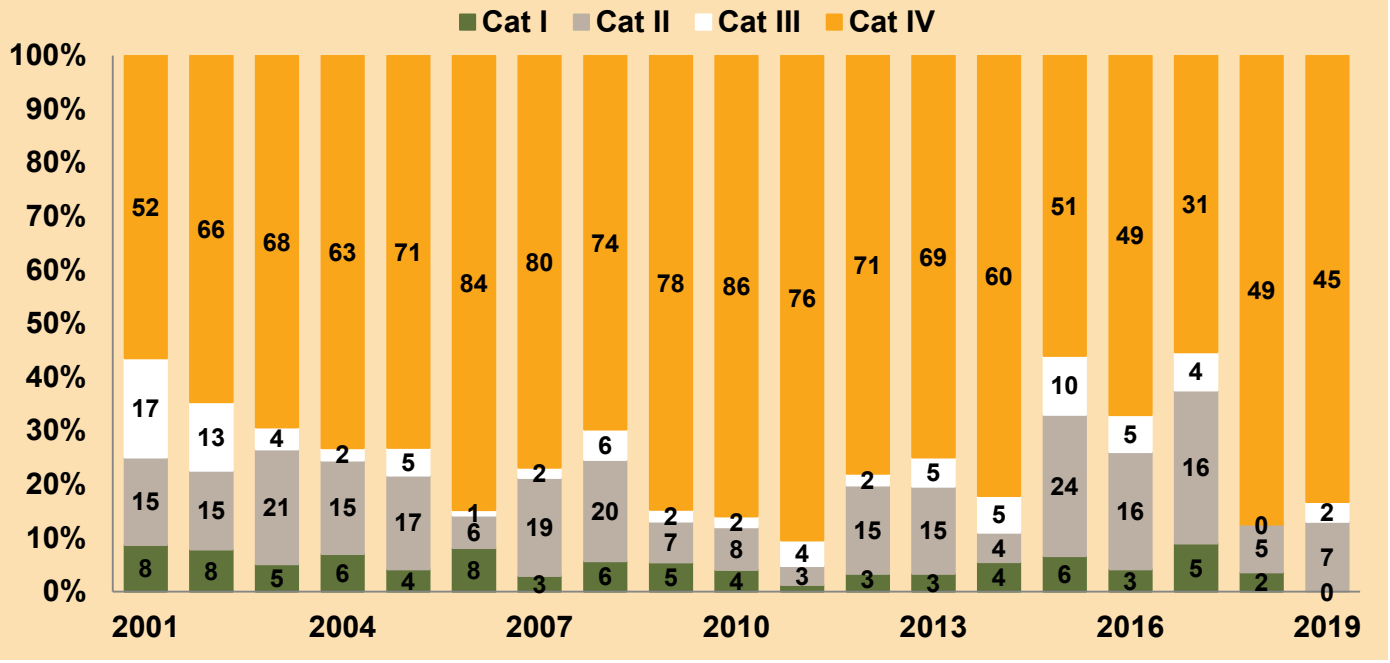


Table 8.41 Outcome categories at 4 years

Category I	**(Severe disability): one or more of the following**	
	(i)	Sensorineural deafness (requiring hearing aids)
	(ii)	Bilateral blindness
	(iii)	Severe cerebral palsy
	(iv)	WPPSI Full Scale IQ score 2 or more standard deviations below mean
Category II	**One or more of the following:**	
	(i)	Mild-moderate cerebral palsy
	(ii)	WPPSI Full Scale Score between 1 & 2 standard deviations below mean.
Category III		Motor Skills† Standard Score more than one standard deviation below mean

Category IV	**Normal development i.e. none of the above**

* The Wechsler Preschool and Primary Scale of Intelligence, 4th edition, Australian and New Zealand

† Vineland Adaptive Behavior Scales, 2016: Motor Skills Domain.

Table 8.42 Outcome categories at 4 years for children under 1500g born 2019 (n=54)

	Number	Description
Category I	**0 (0%)**	1 child with multiple issues including GDD, CP and epilepsy.
		1 child with a FSIQ more than 2 standard deviations below the mean.
Category II	**7 (13%)**	6 children with FSIQ scores between 1 and 2 standard deviations below the mean, but with normal Motor scores
		1 child with FSIQ between 1 and 2 standard deviations below the mean and who wears hearing aids.
Category III	**2 (4%)**	2 children with normal FSIQ scores but with Motor scores more than one standard deviation below the mean.
Category IV	**45 (83%)**	Children with no apparent tone disorders and no apparent developmental delay.

Table 8.43 Outcome of children <1500g born in 2019 at 4 years by gestational age groups (n=54) NWH

	Gestational age (weeks)					
Outcome Category	**23 - 28 weeks**		**29 - 35 weeks**		**Total**	
	n= 26		**n=28**		**n= 54**	
	n	**%**	**n**	**%**	**n**	**%**
I	0	0	0	0	0	0
II	4	15	3	11	7	13
III	2	8	0	0	2	4
IV	20	77	25	89	45	83

Table 8.44 Outcome of children <1500g born in 2019 at 4 years by birthweight groups (n=54) NWH

	Birthweight (grams)					
Outcome Category	**<1000g**		**1000 – 1499g**		**Total**	
	n=15		**n= 39**		**n= 54**	
	n	**%**	**n**	**%**	**n**	**%**
I	0	0	0	0	0	0
II	4	27	3	8	7	13
III	2	13	0	0	2	4
IV	9	60	36	92	45	83

9

CHAPTER 9

PERINATAL AND MATERNAL MORTALITY AND SEVERE MATERNAL MORBIDITY

ŪPOKO 9

TE MATEROTO ME TE MATEA TE WHAEA

Commentators
Dr Jason Waugh
Sarah Mace
Dr Lynn Sadler

9.1 Perinatal and perinatal related mortality rates

Dr Jason Waugh

Key Findings

- Perinatal related mortality rate rose from 13.9/1000 in 2022 to 15.6/1000 in 2023
- Perinatal related mortality rates remain higher than pre-COVID levels in 2019 – we have not seen a return to pre-COVID levels of mortality.
- The rate of perinatal post-mortem investigation (33%) is fairly static despite actively encouraging this investigation for the past 5 years.

When I arrived at National Womens in 2018 we delivered 6481 women and in 2023 we delivered 5700. Across that time period we have had many challenges and yet we now have a higher perinatal related mortality rate than we had then!! How could this be?

The immediate impact of COVID has been discussed in this chapter in previous reports. Our data are very similar to those of other health care systems which saw a sharp rise in perinatal related mortality in 2020 and 2021 and whilst we are past the peak the tail seems to be longer than expected. The international consensus related to non-direct deaths from COVID was that our changes in the delivery of antenatal care (i.e. more tele-medicine; more virtual consultations and changes to care pathways within hospitals) led to less patient contact and a greater likelihood that clinical presentations would either be missed or delayed and as such morbidity and mortality rose.

So what can we draw from the data we have in this years' report and the trends that we are seeing since the pre-COVID period? From the data in chapter 4 there can be little doubt that the demographics of our population suggest that generally the women we care for are more high risk. They are older, both as primips and multips, have higher BMIs, and are more commonly not of NZ European background. There is also a decline in the number of women who birth with us who domicile in our catchment area, though numbers from other Auckland areas do not seem to be increasing.

So what are we now not doing that perhaps we did better in 2018? Is it simply that we have retained some of our COVID practices that were a necessity then but now we do for other reasons. Are we still doing telemedicine appointments for some of our appointments because our service is overwhelmed with more complex referrals? Are we doing more virtual consultations to manage patient flow where decisions regarding management such as induction are concerned?

There can also be little doubt that Te Whata Ora's maternity services are currently under intense pressure nationwide. Staff shortages both medical, midwifery and allied health are forcing us to adopt care pathways that many feel are either a compromise on best practice, inequitable, or at times unsafe. The time has come to focus on all aspects of how we provide care. Assuming our population will continue to become more at risk, that more of our women will domicile further from our area as cost of living pushes them away, and assuming we want to keep our birth numbers up, we need to be able to provide safe care.

Sometimes it's easy to see innovation and change as only a positive thing. It can be easy to measure "efficiency" as an improvement in wait times or in terms of the number of referrals triaged but if the actions we take do have an impact on health outcomes which are rare we may have to wait years to detect them. Is it then too late to change what are now embedded changes that have determined new workforce models. And what of that workforce? Have we impacted on the training and experience of our doctors and midwives over the past 5 years and if so what impact on students of medicine and midwifery who are our next generation of recruits.

Whether it's a blood pressure or urinalysis that doesn't get done because of telehealth, or a fetal medicine referral that gets a virtual plan because of a shortage of appointment time, or an induction decision that's deferred without patient contact, we have to consider that the collective impact of these changes might be a small but preventable change to significant health outcomes, none more so than the tragedy of a perinatal death.

Figure 9.1 Perinatal related mortality, fetal death, and neonatal mortality rate, and Māori perinatal related mortality rate 1991-2023 NWH

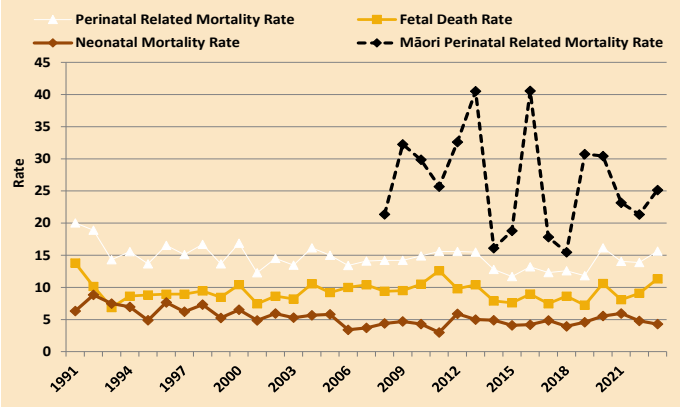


Figure 9.2 Perinatal related mortality risks(/1000 pregnancies) by gestation 2006-2023

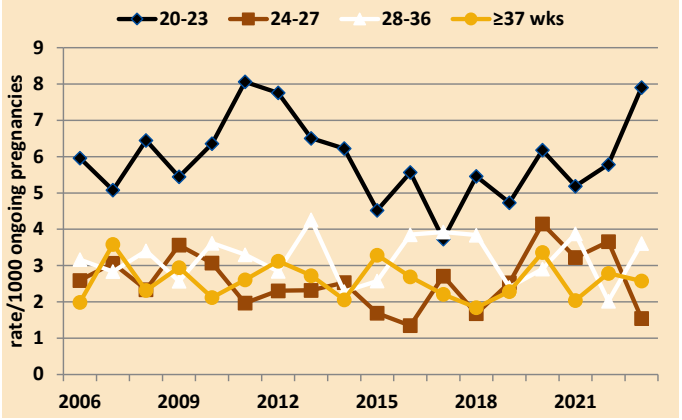


Figure 9.3 Cause specific perinatal related mortality for Māori and non-Māori 2014-2023 (with 95% CIs)

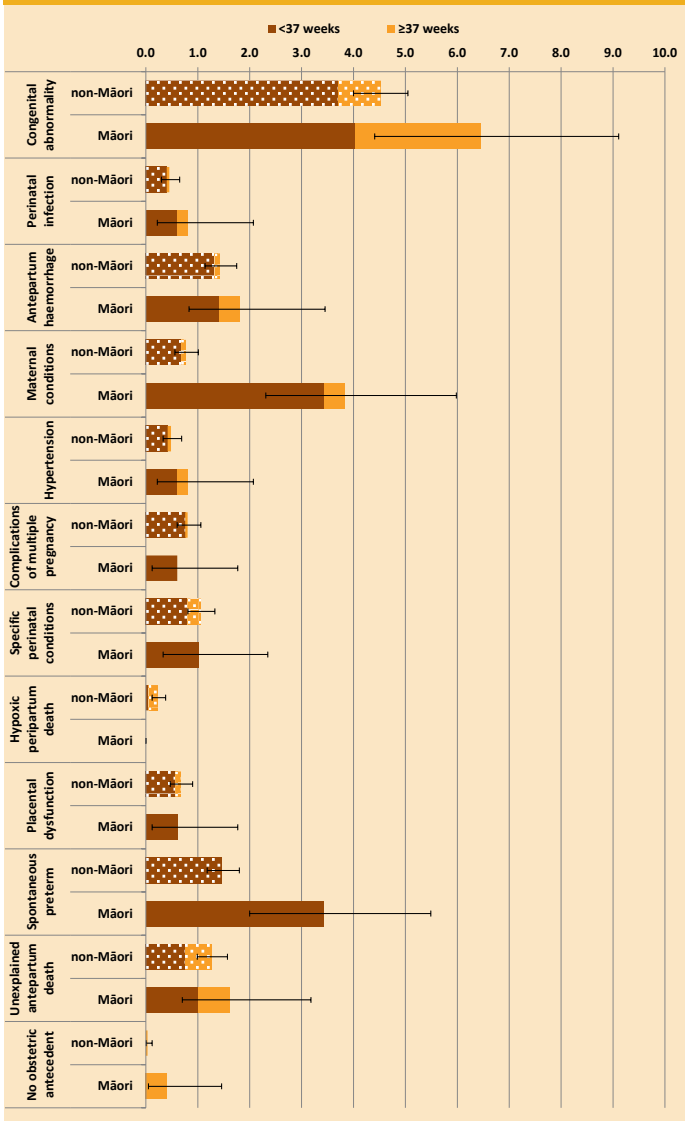
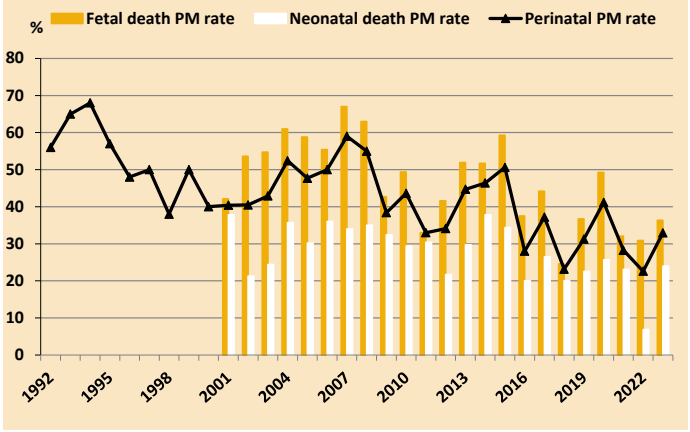


Figure 9.4 Post-mortem rates NWH 1992-2023



9.1.1 Data tables: Neonatal Deaths

Table 9.1 Neonatal deaths by neonatal classification (PSANZ-NDC) and gestational age at birth NWH 2023

	Total neonatal deaths n= 25		< 37 weeks n= 18		≥ 37 weeks n= 7	
	n	%	n	%	n	%
Congenital abnormality	12	48	6	33	6	86
Periviable infants	8	32	8	44	0	0
Cardio-respiratory disorders	0	0	0	0	0	0
Neonatal infection	3	12	3	17	0	0
Neurological	2	8	1	6	1	14
Gastrointestinal	0	0	0	0	0	0
Other	0	0	0	0	0	0

9.1.2 Data tables: Postmortem

Table 9.2 Inborn and BBA deaths NWH 2014–2023

		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Fetal death	**20–22 wks**	25	17	16	15	19	19	21	18	22	28
	23–24 wks	8	9	9	5	9	7	15	8	9	13
	25–26 wks	11	1	6	6	4	4	6	7	8	2
	27–28 wks	2	5	5	1	2	3	5	7	2	2
	29–38 wks	13	12	25	19	20	14	12	10	9	17
	>38 wks	1	10	5	6	3	2	8	3	5	4
Total fetal deaths		60	54	66	52	57	49	67	53	55	66
Neonatal deaths	**Early neonatal deaths (<7 days)**	23	24	26	20	23	23	27	30	20	20
	Late neonatal deaths (7–27 days)	9	6	7	8	6	8	8	9	9	5
Total neonatal deaths		37	29	31	34	25	31	35	39	29	25
Total deaths		97	83	97	86	83	80	102	92	84	91
Perinatal mortality rate/1000		11.7	9.9	12.2	11.2	11.7	9.6	14.9	12.7	12.4	14.8
Perinatal related mortality rate/1000		12.8	11.7	13.2	12.3	12.6	11.8	16.2	14.0	13.9	15.6
Perinatal related mortality rate (excluding lethal & terminated fetal abnormalities)		7.5	9.3	9.1	9.1	7	6.4	11.2	8.4	9.4	9.5

Table 9.3 Perinatal related loss and locality of residence NWH 2023

Locality of residence	TOP		Stillbirth		Neonatal death		Perinatal related death	
	n= 36		n= 34		n= 21		n= 91	
	n	%	n	%	n	%	n	%
Auckland	23	64	22	65	9	43	54	59
Counties Manukau	6	17	3	9	2	10	11	12
Waitemata	4	11	5	15	5	24	14	15
Northland	0		0	0	2	10	2	2
Other	3	8	4	12	3	14	10	11

Table 9.4 Gestational age and perinatal related mortality NWH 2023

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	n= 5821		n= 66			n= 25			n= 91		
	n	%	n	%	FD risk*	n	%	NND rate‡	n	%	Perinatal related mortality risk†
<24 weeks	46	0.8	37	56.1	6.4	9	36.0	1000.0	46	50.5	7.9
24–27 weeks	63	1.1	7	9.6	1.2	2	8.0	NC	9	9.9	1.6
28–31 weeks	109	1.9	10	15.2	1.8	5	20.0	50.5	15	16.5	2.6
32–36 weeks	450	7.7	4	6.1	0.7	2	8.0	NC	6	6.6	1.1
37–40 weeks	4,771	82.0	8	12.1	1.6	6	24.0	1.3	14	15.4	2.7
>41 weeks	382	6.6	0	0.0	NC	1	4.0	NC	1	1.1	NC

* Fetal Death Risk = number of fetal deaths per 1000 pregnancies remaining in utero
† Perinatal-Related Mortality Rate = number of perinatal related deaths per 100 births
‡ Neonatal Death Rate = number of deaths per 1000 live births
NC = Not calculated if n < 3

Table 9.5 Multiple births and perinatal related mortality 2023

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	N=5821		n=66			n=25			n=91		
	n	%	n	%	FD rate*	n	%	NND rate‡	n	%	Perinatal related mortality rate†
Singleton	5581	95.9	60	90.9	9.8	22	88.0	4.0	82	90.1	14.7
Multiple	240	4.1	6	9.1	25.0	3	12.0	12.8	9	9.9	37.5

* Fetal Death Rate = number of fetal deaths per 1000 births
† Perinatal-Related Mortality Rate = number of perinatal related deaths per 100 births
‡ Neonatal Death Rate = number of deaths per 1000 live births
NC = Not calculated if n < 3

Table 9.6 LMC at birth and perinatal mortality 2023

	Births		Fetal deaths			Neonatal deaths			Total perinatal related deaths		
	N= 5821		n= 66			n= 25			n= 91		
	N	%	n	%	FD rate*	n	%	NND rate‡	n	%	Perinatal related mortality rate†
Self-employed Midwife	2,765	47.5	30	45.5	9.8	12	48.0	4.4	42	46.2	15.2
Private Obstetrician	1,625	27.9	10	15.2	6.2	1	4.0	NC	11	12.1	6.8
Hospital midwifery	1,115	19.2	16	24.2	14.3	6	24.0	5.5	22	24.2	19.7
NW Diabetes	106	1.8	1	1.5	NC	1	4.0	NC	2	2.2	NC
NW MFM	184	3.2	6	9.1	32.6	2	8.0	NC	8	8.8	43.5
Unbooked	26	0.4	3	4.5	115.4	3	12.0	130.4	6	6.6	230.8

Unbooked = not registered with an LMC prior to labour
* Fetal Death Rate = number of fetal deaths per 1000 births
† Perinatal-Related Mortality Rate = number of perinatal related deaths per 100 births
‡ Neonatal Death Rate = number of deaths per 1000 live births
NC = Not calculated if n < 3

Table 9.7 Perinatal death by Perinatal Death Classification 2023

	Fetal deaths			Neonatal deaths			Total		
	n=66			n=25			n=91		
	n	%	Rate*	n	%	Rate‡	n	%	Rate*
Congenital abnormality	22	33.3	3.8	12	48.0	2.1	34	37.4	5.8
Perinatal infection	1	1.5	NC	1	4.0	NC	2	2.2	NC
Hypertension	4	6.1	0.7	0	0.0	NC	4	4.4	0.7
Antepartum haemorrhage	2	3.0	NC	0	0.0	NC	2	2.2	NC
Maternal conditions	10	15.2	1.7	3	12.0	0.5	13	14.3	2.2
Multiple pregnancy	3	4.5	0.5	2	8.0	NC	5	5.5	0.9
Specific perinatal conditions	2	3.0	NC	0	0.0	NC	2	2.2	NC
Hypoxic peripartum death	0	0.0	NC	1	4.0	NC	1	1.1	NC
Fetal growth restriction/placental dys-function	5	7.6	0.9	1	4.0	NC	6	6.6	1.0
Spontaneous preterm	9	13.6	1.5	5	20.0	0.9	14	15.4	2.4
Unexplained antepartum death	8	12.1	1.4	0	0.0	NC	8	8.8	1.4
No obstetric antecedent	0	0.0	NC	0	0.0	NC	0	0.0	NC

* Rate = per 1000 births
‡ Rate = per 1000 live births
NC = Not calculated if n < 3

Table 9.8 Maternal characteristics and perinatal related mortality NWH 2023

	Births		Fetal deaths			Neonatal deaths			Perinatal related deaths		
	N=5821		n=66			n=25			n=91		
	n=	%	n=	%	rate*	n=	%	rate‡	n=	%	rate†
Maternal ethnicity (prioritised)											
Māori	517	8.9	8	12.1	15.5	5	20.0	9.8	13	14.3	25.1
Pacific	783	13.5	10	15.2	12.8	3	12.0	3.9	13	14.3	16.6
Indian	847	14.6	14	21.2	16.5	2	8.0	2.4	16	17.6	18.9
Other Asian	1439	24.7	14	21.2	9.7	6	24.0	4.2	20	22.0	13.9
MELAA	263	4.5	2	3.0	NC	3	12.0	11.5	5	5.5	19.0
Other European	579	9.9	8	12.1	13.8	1	4.0	NC	9	9.9	15.5
NZ European	1393	23.9	10	15.2	7.2	5	20.0	3.6	15	16.5	9.8
Parity											
Nullipara	2855	49.0	39	59.1	13.7	14	56.0	5.0	53	58.2	18.6
Multipara	2966	51.0	27	40.9	9.1	11	44.0	3.7	38	41.8	12.8
Maternal age											
≤25	568	9.8	7	9.6	12.3	8	32.0	14.3	15	16.5	26.4
26-34	3213	55.2	35	53.0	9.9	11	44.0	3.5	46	50.5	14.3
≥35	2040	35.0	24	36.4	11.8	6	24.0	3.0	30	33.0	14.7
Maternal smoking at booking											
Currently smoking	252	4.3	3	4.5	11.9	1	4.0	NC	4	4.4	15.9
Not smoking	5569	95.7	63	95.5	11.3	24	96.0	4.4	87	95.6	15.6
Maternal BMI (WHO)											
<18.5	184	3.2	0	0.0	NC	1	4.0	NC	1	1.1	NC
18.5-24.99	2731	46.9	27	40.9	9.9	10	40.0	3.7	37	40.7	13.5
25-29.99	1463	25.1	18	27.3	12.3	5	20.0	3.5	23	25.3	15.7
30-34.99	750	12.9	11	16.7	14.7	4	16.0	5.4	15	16.5	20.0
35-39.99	343	5.9	6	9.1	17.5	3	12.0	8.9	9	9.9	26.2
≥40	314	5.4	1	1.5	NC	1	4.0	NC	2	NC	6.4
Missing	36	0.6	3	4.5	83.3	1	4.0	NC	4	4.4	111.1
NZDep 2013 (quintile)											
1 (least deprived)	1015	17.4	14	21.2	13.8	3	12.0	3.0	17	18.7	16.7
2	1177	20.2	11	16.7	9.3	9	36.0	7.7	20	22.0	17.0
3	1218	20.9	10	15.2	8.2	3	12.0	2.5	13	14.3	9.7
4	1035	17.8	14	21.2	13.5	4	16.0	3.9	18	19.8	17.4
5 (most deprived)	1374	23.6	16	24.2	11.6	6	24.0	4.4	22	24.2	16.0
Missing	2	0.0	1	1.5	NC	0	0.0	NC	1	1.1	NC

* Stillbirth Rate = number of stillbirths per 1000 births
‡ Neonatal Death Rate = number of neonatal deaths per 1000 live births
† Perinatal-Related Mortality Rate = number of stillbirths and neonatal deaths to 27 days per 1000 births
NC = Not calculated if n < 3

Table 9.9 Postnatal transfer deaths (pēpi born elsewhere who transferred to NWH for postnatal care) 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	N	N	N	N	N	N	N	N	N	N
Early neonatal deaths(<7 days)	3	2	1	1	2	3	2	3	1	1
Late neonatal deaths (7–27 days)	1	2	1	1	3	2	0	1	3	3
Total neonatal deaths	4	4	2	2	5	5	2	4	4	4

Table 9.10 Perinatal full post-mortem rates (%) 2014–2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Perinatal post-mortem (%)	46	51	28	37	23	31	41	28	23	33

Table 9.11 Classification of perinatal-related death (PSANZ-PDC) 2019–2023

Classification (PSANZ-PDC)	2019		2020		2021		2022		2023	
	N=80		N=102		N=92		N=84		N=91	
	n	%	n	%	n	%	n	%	n	%
Congenital abnormality	36	45	31	30	38	41	22	26	34	37
Perinatal infection	3	4	3	3	2	2	1	1	2	2
Hypertension	3	4	12	12	1	1	1	1	4	4
Antepartum haemorrhage	6	8	7	7	5	5	2	2	2	2
Maternal conditions	5	6	13	13	8	9	6	7	13	14
Complications of multiple pregnancy	5	6	7	7	10	11	5	6	5	5
Specific perinatal conditions	5	6	1	1	1	1	3	4	2	2
Hypoxic peripartum death	0		3	3	1	1	2	2	1	1
Placental dysfunction	0		1	1	9	10	8	10	6	7
Spontaneous preterm	7	9	11	11	13	14	24	29	14	15
Unexplained antepartum death	10	13	11	11	4	4	10	12	8	9
No obstetric antecedent	0		2	2	0	0	0	0	0	0

Table 9.12 Classification of death among terminations of pregnancy 2023

Classification (PSANZ-PDC)	Termination of pregnancy	
	n=36	
	n	%
Congenital abnormality	16	44
Perinatal infection	1	3
Maternal conditions	10	28
Multiple pregnancy	2	6
Specific perinatal conditions	1	3
Placental dysfunction	3	8
Spontaneous preterm	3	8

Table 9.13 Perinatal related deaths by classification and gestational age 2023

	Total deaths		Preterm (<37 weeks)		Term (≥ 37 weeks)	
	n=91		n=76		n=15	
	n	%	n	%	n	%
Congenital abnormality	34	37	27	36	7	47

Perinatal infection	2	2	2	3	0	0
Hypertension	4	4	4	5	0	0
Antepartum haemorrhage	2	2	2	3	0	0
Maternal conditions	13	14	13	17	0	0
Multiple pregnancy	5	5	5	7	0	0
Specific perinatal conditions	2	2	1	1	1	7
Hypoxic peripartum death	1	1	0	0	1	7
Placental dysfunction	6	7	4	5	2	13
Spontaneous preterm	14	15	14	18	0	0
Unexplained antepartum death	8	9	4	5	4	27
No obstetric antecedent	0	0	0	0	0	0

9.2 Education Points

Sarah Mace

Perinatal loss investigations

- Reminder that placentas should be sent to histology in a timely manner. Delay can result in freezer burn which interferes with investigations.
- The use of MRI to assist with post mortem investigations as a non-invasive investigation is being considered.
- Histiocytic intervillositis: Rare histopathological lesion in the placenta associated with poor outcomes, including IUGR. High recurrence rate. If diagnosed, placenta from subsequent pregnancies should be sent to histology.

Peri-viable gestations

- Ideally all consultations with family should be conducted with both NICU and obstetric teams present to ensure clarity for whānau.
- Recommended to use the term 'peri-viable', instead of 'pre-viable' or 'non-viable'.

Vaginal birth after Caesarean (VBAC)

- Ensure all risks and benefits adequately discussed for mother and baby.
- Be aware that monitoring in labour does not guard against uterine rupture, there is no warning sign.

Maternal and fetal health

- Important to recommend flu vaccine to all women. Women can get a free flu vaccination at any stage of pregnancy.
- Group B Streptococcus (GBS) identified in urine should always be treated in pregnancy.
- The power of parent cuddles in NICU was emphasised, particularly in the context of palliative care.

Accessibility

- Issues identified regarding access to interpreters. Need for further interpreting services acknowledged.
- Acuity has resulted in delays for patients being seen by Maternal Fetal Medicine (MFM). This is a National issue for the service.

Communication & documentation

- Community midwives should be regularly updated about labour and delivery details, discharges, and other relevant outcomes.
- All staff should ensure the correct date/time is displayed on CTG machines and printouts.

Analgesia

- Women in significant pain requiring further analgesia (e.g. sevredol) should be assessed for possible labour and transferred to delivery suite promptly if needed.

9.3 Maternal Mortality

In 2023 there were no maternal deaths among wāhine who birthed, or were booked to birth, at NWH.

9.4 Maternal Morbidity

Dr Lynn Sadler

These data are extracted by queries from Badgernet and the hospital discharge coding dataset.

Emergency peripartum hysterectomy

Emergency peripartum hysterectomy is defined as hysterectomy performed for complications related to pregnancy within six weeks of birth, when that pregnancy resulted in birth at NWH at or beyond 20 weeks gestation. Planned hysterectomy for morbidly adherent placenta is included but planned hysterectomy for malignancy is excluded.

There were six peripartum hysterectomies performed among people birthing at Te Toka Tumai in 2023, five histologically confirmed to be associated with placenta accreta spectrum, and the sixth expected but not confirmed on histology. All cases occurred at or after Caesarean Section, and five had a history of at least one prior Caesarean Section. The proportion of birthing people with a history of previous Caesarean Section at Te Toka Tumai is 19.1% of all births and 37.4% of multiparous births.

Ruptured uterus

Four patients were diagnosed with ruptured uteri associated with birth in 2023. Uterine rupture and dehiscence cases are individually checked by an obstetrician with an interest in the area (Kira Brent) to be consistent with RCOG and RANZCOG definitions:

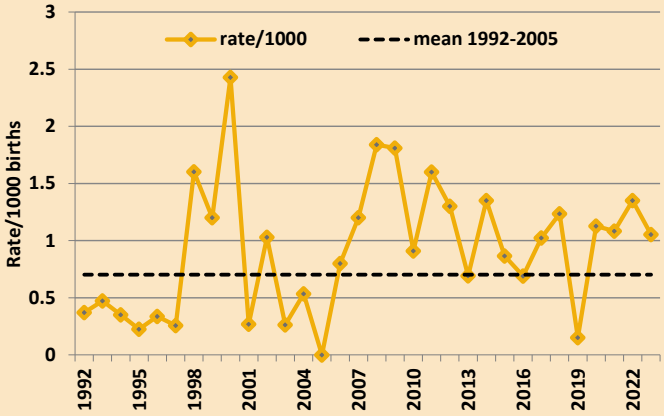
Uterine rupture: A disruption of the uterine muscle extending to and involving the uterine serosa or disruption of the uterine muscle with extension into bladder or broad ligament.

Uterine scar dehiscence: A disruption of the uterine muscle with intact uterine serosa.

Admission to an intensive care unit

Among people birthing at ACH in 2023, there were 38 patients admitted to DCCM or CVICU (25 to DCCM, 14 to CVICU, and 1 spent time in both) during pregnancy or within 6 weeks postnatally. Eleven wāhine were first admitted antenatally and 31 spent some time in CVICU or DCCM after birth.

Figure 9.5 Emergency peripartum hysterectomy rates/1000 births NWH 1992-2023



9.4.1 Data tables: Maternal Morbidity

Table 9.14 Severe maternal morbidity rates (among births at NWH) 2019-2023

Diagnosis	2019	2020	2021	2022	2023
	N=6660	N=6212	N=6462	N=5925	N=5700
	n (/1000)	n (/1000)	n (/1000)	n (/1000)	n (/1000)
Emergency peripartum hysterectomy	1 0.2	7 1.1	7 1.1	8 1.4	6 1.1
Ruptured uterus	3 0.5	4 0.6	1 0.2	2 0.3	4 0.7
Amniotic fluid embolism	0	1 0.2	1 0.2	0 0.0	0 0.0
Eclampsia	2 0.3	1 0.2	1 0.2	0 0.0	1 0.2
Admission to DCCM/CVICU	36 5.4	44 7.1	33 5.1	47 7.9	38 6.7

DCCM = Department of Critical Care Medicine
CVICU = Cardiovascular Intensive Care Unit

10

CHAPTER 10

GYNAECOLOGY

ŪPOKO 10

MĀTAI AHUATANGA WĀHINE

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10.1 Colposcopy

Dr Deralie Flower

The data presented in this section come from data entered into the Solutions Plus database by clinicians and support staff. The data have been checked against appointments recorded in the PHS outpatient services management system.

The most significant change to cervical screening, arguably since the national screening program started in 1990, was the introduction of HPV-based screening in September 2023. Most importantly, this includes the availability of a self-swab HPV test for most screening participants. Our department, along with colposcopy services nationwide, was excited to see this new era take shape, and looks forward to the anticipated equity gains that will occur as a result.

Due to the vastly different screening program and referral criteria, the previous cQuIP standards are in urgent need of revision, as many are no longer applicable - with most participants no longer having referral cytology.

The 2023 data therefore represent a mix of screening program colposcopy occurrences and there is no simple way to differentiate between screening which occurred before the new HPV based program and that which occurred afterward. The data are simply presented here for completeness, noting that the 2024 data will be more representative of the new program.

Key Findings

- There were 1,179 initial cervical colposcopies performed in the department in 2023
- The service employs 16 colposcopists, each averaging 74 new cases per year, which is well above the NCSP and cQuIP standards)
- LLETZ procedure numbers have reduced by 40% since 2015, with the average number of procedures per clinician now falling to 11 (from 15 in 2021). This has implications for maintenance of skills and for training of registrars. The reduction in treatments is attributable both to vaccination and to conservative management of CIN2 in those under the age of 30.
- The locality of residence data show a larger proportion of referrals from Waitemata than previously, this is due to collaboration with this department to provide assistance with their waitlist.
- The department has procured a LLETZ simulator and also is involved in supporting one of our registrars to develop new simulation material
- C-QuIP standards: all standards are met, with the exception of diagnostic standard 2, which relates to biopsy rates after referral with high grade cytology. This is similar to previous years' results, which have shown that the reason for non-biopsy was normal colposcopy, and these patients' results are reviewed at MDM. The recent upgrade to Solutions Plus has included "normal colposcopy" as a reason for this, enabling simplified audit in future. There has been an increase in the correlation of high grade colposcopy with histology, which is pleasing, particularly in a setting of reducing prevalence of high grade disease.
- 44/171 LLETZ treatments were under general anaesthesia, meaning that 74% of LLETZ were performed under local anaesthesia, similar to previous data in the last decade and is an improvement on the 2022 data which had shown a fall to 66%. A medical student audit showed that the reason for general anaesthesia was adequately documented in all cases.
- The colposcopy department has continued to be involved in primary HPV screening research, and in the development and revision of the new NCSP guidelines.
- Important data to examine in the 2024 report will be the impact of self-testing on the quality of colposcopy. The vast majority of colposcopies in our department are now done without a cytology report available, and there is very little experience in large screening programs in the sensitivity and specificity of colposcopy in this situation.

10.1.1 Data tables: Colposcopy

Table 10.1 Referral cytology or HPV among wāhine presenting for initial colposcopy NWH 2023

	Initial Visit	
	N=	1179
	n	%
Low Grade	481	40.8
Positive/detected HrHPV test only + abnormal smear	259	22.0
High Grade	159	13.5

HPV 16/18	95	8.1
Positive/detected HrHPV test only	92	7.8
Clinical Reasons only	63	5.3
Other Reason	25	2.1
Suspicious of invasive cancer	5	0.4

Table 10.2 Histology of biopsy among wāhine presenting for initial colposcopy NWH 2023

	Initial Visit	
	N=	**1179**
	n	**%**
Invasive	6	0.5
High Grade	190	16.1
Low Grade	266	22.6
Dysplasia NOS	10	0.8
HPV	20	1.7
Inflammation	20	1.7
Insufficient sample	10	0.8
Normal	78	6.6
No biopsy taken	563	47.8

HPV = Human Papilloma Virus

Table 10.3 Cervical treatment NWH 2023

	2023	
	N=	**194**
	n	**%**
LLETZ	171	88.1
Cold knife cone	20	10.3
Hysterectomy	0	0.0
Other	4	2.1

LLETZ = Large Loop Excision of the Transformation Zone

Table 10.4 C-QuIP Standards for Colposcopy 2023

				2022			2023		
	Standard	**Numerator**	**Denominator**	**n**	**N**	**%**	**n**	**N**	**%**
Quality standards for Diagnostic Colposcopists									
1	Maintaining skill levels: Each practitioner is required to undertake 75 colposcopies in each 3 year period (SMOs only).	Number of SMOs who have completed 75 colposcopies in past 3 year period	Number of SMOs working in colposcopy service	16	16	100	16	16	100
2	≥95% of women with HG cytology have punch or excisional biopsy.	Number of women referred with HG cytology who have a punch or excisional biopsy within 6 months (exclude pregnant women)	Number of women seen in 2023 with HG cytology	249	287	86.8	204	240	85.0
3	≥90% of biopsies are suitable for histological interpretation	Number of satisfactory histology biopsies	Number of biopsies in 2023	530	533	99.4	606	616	98.4
4a	Correlation of high grade colposcopic diagnosis with histological findings - no standard given	Number of women with high grade histology (CIN2/3 or cancer) within 6 months of HG colposcopy diagnosis (exclude pregnant women)	Number of women with high grade colposcopic finding in 2023	89	148	60.1	96	150	64.0
4b	Correlation of high grade cytology diagnosis with histological findings - no standard given	Number of women referred with HG cytology who have high grade histology (CIN2/3 or cancer) within 6 months (exclude pregnant women)	Number of women seen in 2023 with HG cytology	120	287	41.8	111	240	46.3
Quality standards for Therapeutic Colposcopists									
1a	100% of treatments should have a histology sample	Number of women treated in 2023 who have histology performed prior to or at treatment	Number of women who are treated	191	191	100.0	194	194	100
3	Histology among women treated in 2023 shows high grade changes (≥80%)	Number of women treated in 2023 who have high grade changes at punch biopsy within 6 months of treatment or on treatment specimen	Number of women who are treated	169	191	88.5	169	194	85.6

Note: the data for treatment provided here is based on the number of treatments, not the number of women treated.

Table 10.5 Histological diagnosis (biopsy at initial colposcopy) by referral smear cytology NWH 2023

Referral smear cytology	Total Colposcopies	Histological diagnosis															
		No Biopsy		Invasive		High grade		Low Grade		Dysplasia NOS		Inflammation		HPV		Insufficient Sample		Normal	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	1179	563	47.8	6	0.5	190	16.1	266	22.6	10	0.8	20	1.7	20	1.7	10	0.8	78	6.6
Invasive	6	1	16.7	3	50.0	2	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
High Grade	183	31	16.9	2	1.1	94	51.4	39	21.3	3	1.6	1	0.5	1	0.5	1	0.5	7	3.8
Low Grade	731	380	52.0	0	0.0	64	8.8	188	25.7	3	0.4	15	2.1	16	2.2	6	0.8	51	7.0
Atypical glandular	8	1	12.5	0	0.0	3	37.5	1	12.5	0	0.0	0	0.0	0	0.0	0	0.0	1	12.5
Unsatisfactory	5	2	40.0	0	0.0	0	0.0	0	0.0	0	0.0	1	20.0	0	0.0	0	0.0	2	40.0
Other	19	9	47.4	1	5.3	0	0.0	5	26.3	1	5.3	0	0.0	0	0.0	1	5.3	1	5.3
Normal	80	65	81.3	0	0.0	3	3.8	4	5.0	0	0.0	2	2.5	0	0.0	1	1.3	5	6.3
No Smear	147	74	50.3	0	0.0	24	16.3	29	19.7	3	2.0	1	0.7	3	2.0	1	0.7	11	7.5

Table 10.6 Cervical histology findings by colposcopic diagnosis (at initial colposcopy if satisfactory*) NWH 2023

Colposcopic diagnosis	Total Colposcopies	Histological diagnosis															
		No biopsy Taken		Invasive		High grade		Low Grade		Dysplasia NOS		Inflammation		HPV		Insufficient Sample		Normal	
	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	1027	447	43.5	3	0.3	185	18.0	254	24.7	10	1.0	17	1.7	18	1.8	8	0.8	70	6.8
Invasive	1	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
High grade	155	6	3.9	3	1.9	95	61.3	39	25.2	3	1.9	0	0.0	1	0.6	2	1.3	5	3.2
Low grade	409	38	9.3	0	0.0	81	19.8	192	46.9	6	1.5	13	3.2	16	3.9	5	1.2	49	12.0
Condyloma/inflammation	4	0	0.0	0	0.0	1	25.0	0	0.0	1	25.0	2	50.0	0	0.0	0	0.0	0	0.0
Other	11	0	0.0	0	0.0	1	9.1	1	9.1	0	0.0	0	0.0	0	0.0	1	9.1	6	54.5
Normal	425	392	92.2	0	0.0	3	0.7	19	4.5	0	0.0	0	0.0	1	0.2	0	0.0	9	2.1

Definition for SatisColp: a colp is "satisfactory" if TZ Seen = "Fully seen ectocervix (Type 1) and Limits of lesion visible = "yes" or TZ seen = "Fully seen in endocervical canal (Type 2)" and Limits of lesion visible = "yes"

Table 10.7 Demographic details of wāhine having an initial colposcopic examination in NWH 2015-2023

	2019		2020		2021		2022		2023	
	N=1117		N=1087		n=1092		n= 1055		n= 1179	
	n	%	n	%	n	%	n	%	n	%
Ethnicity										
Māori	84	7.5	82	7.5	96	8.8	73	6.9	103	8.7
Pacific	88	7.9	91	8.4	98	9.0	81	7.7	104	8.8
Indian	56	5	57	5.2	55	5.0	61	5.8	68	5.8
Other Asian	212	19	202	18.6	238	21.8	221	20.9	278	23.6
MELAA	47	4.2	47	4.3	46	4.2	67	6.4	69	5.9
Other					4	0.4	2	0.2	0	0.0
European	628	56.2	608	55.9	555	50.8	550	52.1	557	47.2
Age (yrs)										
<20	0		1	0.1	1	0.1	0	0	1	0.1
21-25	171	15.3	157	14.4	51	4.3	80	7.6	51	4.3
26 -30	224	20.1	237	21.8	234	19.8	233	22.1	234	19.8
31-40	381	34.1	353	32.5	430	36.5	391	37.1	430	36.5
41-50	183	16.4	153	14.1	200	17.0	168	15.9	200	17.0
51-60	92	8.2	109	10	157	13.3	103	9.8	157	13.3
>60	66	5.9	77	7.1	106	9.0	80	7.6	106	9.0
Smoking										
Yes	114	10.2	111	10.2	74	6.3	74	7.0	74	6.3
No	767	68.7	712	65.5	809	68.6	592	56.1	809	68.6
Unknown	236	21.1	264	24.3	296	25.1	389	36.9	296	25.1
Locality of residence										
Auckland	1049	93.9	1031	94.8	992	84.1	989	93.7	992	84.1
Counties Manukau	24	2.1	17	1.6	15	1.3	18	1.7	15	1.3
Waitematā	36	3.2	27	2.5	166	14.1	37	3.5	166	14.1
Other	8	0.7	12	1.1	6	0.5	11	1.0	6	0.5

Table 10.8 Cervical treatments NWH 2019-2023

	2019		2020		2021		2022		2023	
	N=202		N=211		n= 235		n= 191		n= 195	
	n	%	n	%	n	%	n	%	n	%
LLETZ	187	92.6	194	91.9	218	92.8	170	89	171	87.7
Cold knife cone	11	5.4	11	5.2	12	5.1	15	7.9	20	6.2
Hysterectomy	1	0.5	1	0.5	1	0.4	1	0.5	0	0.0
Other	3	1.5	5	2.4	4	1.7	5	2.6	4	2.1

10.2 Faster Cancer Treatment

Dr Cindy Ooi

The Faster Cancer Treatment (FCT) target is a Manatū Hauora benchmark requiring at least 90% of women diagnosed with gynaecological malignancy to receive their treatment within 62 days from receipt of referral. Referrals should be triaged as High Suspicion of Cancer (HiSCan) and be seen within two weeks. Reasons for breach of this target are categorised into "Patient Choice", "Clinical Consideration" and "Lack of Capacity".

For the period of January-December 2023, 50 wāhine triaged as HiSCan with a confirmed diagnosis of gynaecological malignancy were tracked. Of these, 38% were Pasifika wāhine, 35% European and 26%

Asian. The overall adjusted performance was 54.1%. Compared to the corresponding period in 2022, a total of 56 women with confirmed gynaecological malignancy were tracked, and the overall adjusted performance was 85%.

From March 2023, the FCT Clinical Nurse Specialist (CNS) FTE was increased from 0.5 to 1.0 FTE to meet the increased FCT needs. The role is currently shared by two nurses. Not only do they play a pivotal role in supporting the clinicians and clinic schedulers, they are a main point of contact for wāhine in the HiSCan pathway. Another essential role is prospective data collection of HiSCan-triaged wāhine, which is used to inform service delivery. This also facilitates audit of the clinic outcome to ensure ongoing delivery of wāhine-centred care. Please refer to the report in the following section.

There were challenges in 2023, which affected our FCT performance. The delayed triaging time of referrals due to inadequate triaging FTE and lack of capacity of first specialist appointments (FSA) meant that wāhine were seen late in the HiSCan pathways. There had been an increasing number of HiSCan-triaged wāhine over the last 2 years, with no matched increase in clinic capacity. Additionally, there had not been adequate cover for planned leave. Limited gynae theatre capacity also resulted in delays in achieving diagnosis and providing treatment. External factors included significant shortage of pathology and radiology capacity. Consequently, this led to a significant decline in our FCT performance. These factors reflected the ongoing challenges of limited resources and staff shortages across the different services, compounded by population growth, and increasing complexity of patients. These issues were not unique to gynaecology. We have implemented strategies to address some of these issues. Additional triaging FTE had been allocated in the latter part of 2023 to improve triaging delay. We had implemented additional clinics, including in the weekends. Expression of interest for extra regular clinics had been advertised. The FCT team continued to engage closely with the operations and scheduling team to ensure clinics and surgical lists were optimized.

Outcome of HiSCan Wāhine seen in FSA 2023

In 2023, there were 462 new HiScan-triaged wāhine. Of these, 306 (66%) were seen in the HiSCan-dedicated Rapid Access Clinic (RAC) and Abnormal Uterine Bleeding (AUB) clinic, and 156 (34%) in

Figure 10.1 Ethnicity of HiSCan wāhine in 2023

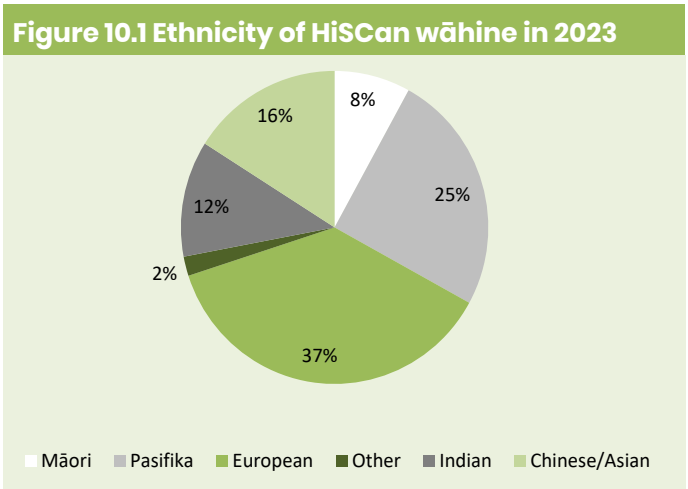
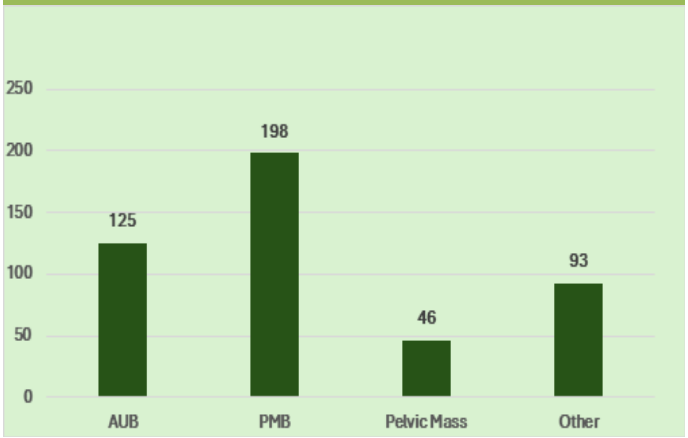
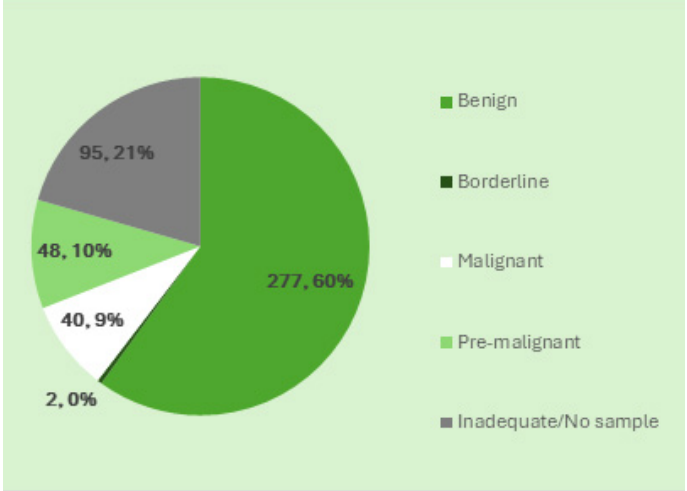


Figure 10.2 Referral reason for HiSCan FSA 2023



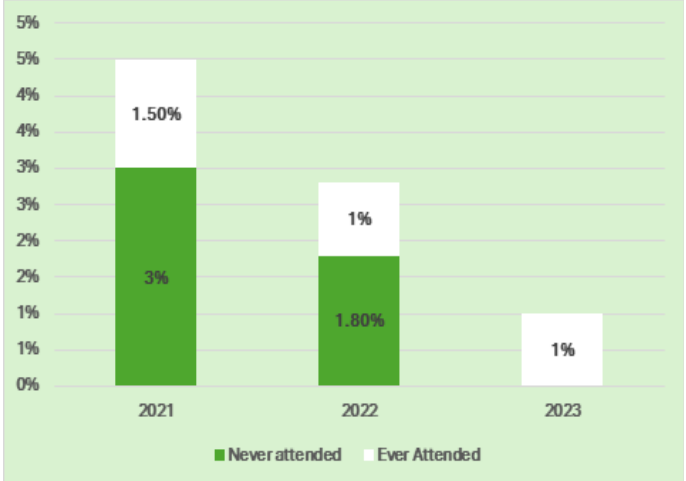
AUB = Abnormal Uterine Bleeding
PMB = Post-Menopausal Bleeding

Figure 10.3 Outcome of HiSCan wāhine seen in FSA 2023



FSA = First Specialist Appointment

Figure 10.4 Rate of Missed FSA Appointment in RAC 2023



General Gynaecology clinic. RAC and AUB clinics offer an outpatient hysteroscopy service for both diagnostic and treatment procedures.

The ethnicity of these wāhine is as shown figure 10.1.

Based on their recorded addresses as matched to the NZDep2018 Index of Deprivation Scale [1], the mean NZ Deprivation Score for these women was 6, where 1 indicates the least deprivation and 10 the highest deprivation.

The range of time from referral to FSA was 2-144 days. The median time from referral to FSA was 19 days.

Of these referrals, 378 (82%) were from primary care, 61 (13%) from Te Toka Tumai non-gynae service, and the remaining 23 (5%) from public and private gynaecology.

The referral reasons are shown in Figure 10.2.

A total of 235 outpatient hysteroscopies were performed for HiSCan-triaged wāhine. Of these, 4 (1.7%) proceeded to have a hysteroscopy under general anaesthesia. The main reasons for this were the finding of endometrial lesion(s), which was deemed inappropriate to be resected in the outpatient setting, and the need for further sampling to achieve diagnosis. The outpatient hysteroscopy rate was 79%, while the successful outpatient hysteroscopy rate was 89%.

Of the 462 HiSCan FSAs, 40 wāhine had malignancy. 30 had endometrial cancer, 3 had uterine cancers, 2 had Mullerian tract cancers, 3 ovarian cancers, 1 cervical cancer, and 1 had synchronous endometrial and ovarian cancers. The overall outcome is depicted in Figure 10.3.

Only a very small number of wāhine missed their scheduled FSA appointments to the RAC and AUB clinics. The below figure shows a direct comparison to previous years. We were not able to capture this data for HiSCan-triaged wāhine scheduled for general gynaecology clinic.

The missed FSA appointment rate was 1%, compared to 2.8% in 2022. All wāhine attended their subsequent appointments. The very low missed appointment rate is encouraging and reflected the collaborative mahi amongst the FCT team and cultural-specific services, specifically Kaiarahi Nahi and Pacific Care Navigators in minimising barriers, improving engagement and providing a more equitable access especially for Māori and Pasifika wāhine.

[1] Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation, Final Research Report, December 2020. Wellington: University of Otago

10.3 Gynaecologic oncology (GO) surgical services

Dr Lois Eva

The data in this section are extracted from a standalone Gynaecologic Oncology (GO) clinical database (including details of all cases referred to multidisciplinary review (MDM) or for surgery, and details of all surgeries undertaken by the GO team), the hospital CMS database, and the theatre database (PIMS).

Te Toka Tumai is the largest of the three Aotearoa New Zealand GO centres, providing care for over half the population of Aotearoa New Zealand. We continue to provide surgical services for, and lead the coordination of, the MDM for the eight regions of the Northern and Midland Cancer networks.

Staffing: The national planning document "It takes a team" (MoH 2014) suggested that 6-7 SMO FTE were required in 2014. This document predicted numbers with time, but appears to have underestimated the volume of Gynaecological cancers by 20% when comparing the 2021 predicted volumes to actual volumes. With the current population it is estimated we should have 7-8 SMO FTE.

We started 2023 with 3.0 and by the end of 2023 we have 4.0 SMO FTE, although due to sabbatical leave this year have functioned at 3.0 for most of the year.

10.3.1 Gynaecological Oncology Multidisciplinary Meetings (MDM)

MDM Workload

The MDM workload has continued to rise in 2023. There were 1275 new referrals to the MDM in 2023. This is a 5% increase in referrals from the previous year and the highest workload since the database was established.

Total number of MDM discussions increased 8% from 2592 in 2022 to 2804, averaging 54 patient discussions per week (over 52 weeks), which is a sharp rise from the slow increase in previous years.

At the end of 2023 the multidisciplinary team consisted of 1.8 MDM coordinators, four gynaecological oncologists, three medical oncologists, two radiation oncologists, four gynaecological pathologists, four gynaecological radiologists and three Clinical Nurse Specialists (two surgical and one medical), one GO Fellow plus junior staff. The previous pathology restrictions have remained in place with early stage endometrial cancer and molar pregnancies only being notated post operatively.

The ongoing challenge of an electronic referral and management system for the MDM continues, as the project to deliver a product continued into a 4th year. Progress has currently been confounded by the removal of funding following the Te Whatu Ora national changes.

Referral Patterns

Referrals from all 8 regions, with the exception of Bay of Plenty, have increased, but there is no change in the proportions of referral from each area, or of type of tumour.

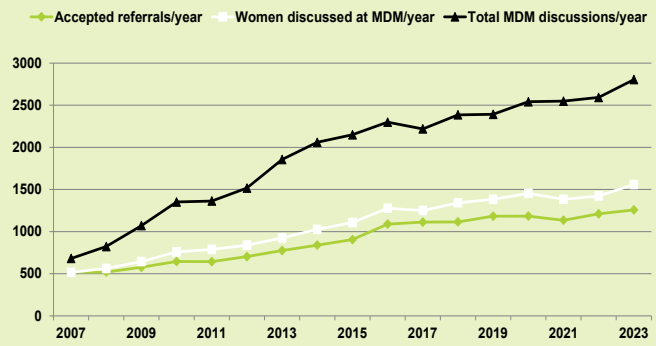
Endometrial cancer referrals have increased by 30%, reflecting the global rise, likely due to increasing

rates of obesity. The number of higher stage higher grade endometrial cancers who have staging surgery with GO has increased significantly by 50%, with Pacific wāhine remaining overrepresented. There remains a high number of young wāhine presenting with endometrial cancer, with 17% of endometrial cancer presenting before the age of 45. This data remains a concern as this trend is continuing from previous years.

Cervical cancer numbers have increased by 18%, possibly due to the increased detection following the introduction of primary HPV screening in 2023.

Referrals to MDM for other tumour types have remained stable.

Figure 10.5 Referrals and Multidisciplinary meetings (MDMs) 2007-2023



Provision of timely care

The Gynaecology tumour stream is the only MDM that functions 52 weeks per year, however the proportion of MDM discussions occurring within two weeks from referral has fallen from 36% to 29%, although the proportion discussed within 2 weeks remains stable at 85%. This reflects the ability of referring units to complete all investigations and have reports required prior to discussion, due to local capacity or delays in reporting of imaging.

The number of wāhine seen for First Specialist Appointment (FSA) within a week from the MDM has improved from 47.4% to 54.2%, and the proportion seen within 14 days has increased to 72%. All wāhine are offered an appointment the day following the MDM, but not all take up this offer. A proportion of referrals are seen outside the recommended period as they are not urgent e.g. risk reducing surgery and interval debulking surgery where appointments are timed with chemotherapy cycles.

The New Zealand Gynaecological Cancer Group recommendation is that patients are offered surgery within two weeks of their first specialist appointment (FSA). Despite introduction of 10 hour operating lists, the proportion of wāhine receiving surgery within 2 weeks has fallen dramatically from 71% to 33%. The proportion receiving surgical treatment within a month has remained stable at over 90%. Despite SMOs internally covering lists during leave and taking on additional operating if the waiting lists grew, as predicted, it appears that the increased surgical demand has now outstripped the resource available, both in terms of SMO FTE and operating theatre availability.

10.3.2 Gynaecological Oncology surgeries

This section describes the surgery and short term outcomes of wāhine undergoing inpatient surgery in 2023 under the care of the GO team.

Surgical output increased significantly by 15% with 548 operations performed (on 530 wāhine) in 2023, up from 476 the year before. The proportion of cancer surgeries remains constant making up 85% of our workload, with 5% pre invasive disease and 10% suspicious on imaging but ultimately benign. This shows that the triaging of workload is appropriate with general gynaecology retaining complex benign surgery.

International recommendations are that a Gynae Oncologist should manage approximately 80 surgical cases per year, which means, our SMOs are delivering nearly double this each. Patients are becoming more complex and the physical toll is not sustainable long term.

Endometrial Cancer

There was a 50% increase in endometrial cancer surgery compared to the previous year from 120 to 182 cases, reflecting the global rise in endometrial cancer. These patients often have multiple comorbidities and rising obesity leads to longer anaesthetic and surgical time. We offer nodal staging regardless of BMI but these surgeries for BMI 50-80 are technically and logistically challenging. We have aimed to improve equity of care and decrease surgical morbidity by offering minimal access surgery and sentinel nodes as the default for apparent early endometrial cancer. Our minimal access surgery (MIS) rate for all endometrial cancer has dropped in 2023 to 60% from 74% the previous year, however we have had an increase in open debulking surgery for more extensive disease, which was not common previously. Our conversion rate from MIS to open was 2.9%. With the rise in obesity, particularly associated with endometrial cancer, the move to robotic surgery would have advantages, both for the patient and the longevity of the surgical team.

Ovarian, tubal and peritoneal cancers

Radical surgery for ovarian and tubal cancers accounts for nearly 40% of total surgical activity, with nearly half of cases (N=65) having advanced (Stage 3/4) disease, which are resource intensive, with a proportion requiring 2 procedures, with laparoscopy initially to assess resectability.

For wāhine with advanced (stage 3/4) cancers treated with surgery in 2023, 62% received primary debulking surgery, and 38% received neoadjuvant chemotherapy and interval debulking surgery (IDS), which is an increase in primary debulking rates compared to 45% in the previous year. The complete resection rates to no residual disease increased to 90% for primary debulking whilst stable at 85% for IDS. However this has come with an increase in the bowel resection rate from 12.5% overall to 32%, with similar rates for primary and interval surgery.

Secondary debulking rates have also increased by 50% from 12 to 18 in the year, reflecting the change in international practice.

When benchmarked against the Australian National Gynae-oncology Register (NGOR) data we have the highest surgical volume in Australasia and the highest debulking rates.

The proportion of wāhine with advanced (stage3/4) ovarian cancer (N=113) who did not receive surgery remained stable at 42% (N=48). We have seen an increase in patients declining treatment or seeking alternative treatment (N=15) and this was the largest group of those that did not receive surgery. A further 12 were unfit for any treatment or died before chemotherapy, two were unfit for surgery and two died on chemotherapy. Five progressed on chemotherapy, one was not referred back and the remaining 11 were considered inoperable due to distribution or extent of disease or minimal response to neoadjuvant chemotherapy.

Of those patients who did not get to surgery, 52% died within the year.

Cervical and vulval cancers

The number of cervical and vulval cancers treated surgically has increased, with a 50% increase in surgically managed cervical cancers and 10% increase in vulval cancers. The increase in cervical surgery could be due to increased detection of cancers in previously unscreened or underscreened wāhine following the introduction of self sampling primary HPV screening in 2023.

There is a trend towards more radical surgery and the most common indication for pelvic exenteration in our unit is recurrent vulval cancer.

Complications

Complication rates have remained stable and acceptable with visceral injury rates of 1.1%. Return to theatre rates remain stable and low at less than 2%.

The transfusion rates have fallen, probably reflecting the increased proportion of endometrial cancer surgeries, which do not have high blood loss. Wāhine undergoing interval debulking surgery for advanced tuboovarian cancer continue to have the greatest rate of intraoperative bleeding and post operative complications, with increased rates of ileus and transfusion, likely reflecting their premorbid status whilst on chemotherapy and the extent of radical surgery. There was 1 post-operative death in 2023, following extensive surgery for recurrent cancer.

We still cannot report survival data, which we consider a fundamental requirement for a Cancer Centre. Long term and patient reported outcomes are still unable to be collected or measured, and despite our debulking rates for ovarian cancer consistently outperforming units in Australia, we are unaware as to whether this is producing a survival advantage.

Summary/Implications

The highlight of the year was the appointment of Dr Silipa Naiqiso as a SMO. She previously was our Fellow and had also trained in Sydney and Perth and we are delighted that she has come home and is a major asset to our department.

The most striking area of this year was the 15% increase in surgical activity and the 50% increase in endometrial cancer surgeries. This fits with the global epidemic of endometrial cancer and is unlikely to reverse any time soon. This means we should plan for increasing numbers and rising levels of obesity and new ways of working sustainably need to be developed. We have struggled to recruit and retain SMOs and robotic surgery is becoming standard practice in the world and we need to be able to compete.

The access to timely surgery is paramount for cancer care and it is disappointing that only 33% are achieving the NZGCG standard and this has more than halved in the past year. This indicates that we have hit capacity with the SMO FTE and theatre availability that we have. Our current demand has outstripped our resources and investment for both population growth and rise in cancer rates is needed.

The MDM workload has had a sharp 8% rise this year and this is unlikely to change, and also seems to be driven by the increase in endometrial cancer referrals.

Our surgical complications are low and consistent, our ovarian debulking rates are excellent when benchmarked against both regional and international standards, and the push for minimal access surgery in obese people remains, although would be helped further with the addition of robotic surgery.

The department has continued academic output with publications, and national and international conference presentations. The department was top recruiter for the vulval sentinel node trial which closed at the end of 2023, with nearly a third of the participants recruited from Auckland and there are ongoing research projects across all tumour types.

Members of the department continue to participate on the NCSP guidelines group for primary HPV screening, CGO training committee, PSRH, RANZCOG national teaching faculty, IGCS training development committee, ASCCP committee, Nominating Committee and teaching faculty of ISSVD, IGCS Education Committee, Anatomy of Complications teaching faculty, editorial boards of the Journal of Lower Genital Tract Disease and South African Journal of Gynae Oncology and are regular reviewers for multiple journals.

In summary, the workforce crisis continues within Gynae Oncology, with increasing clinical demands, and despite the enormous mahi from the department, it is likely that limits have been reached. Focus on recruitment and retention with investment in training, with sufficient resource is paramount, as the service is highly vulnerable.

10.3.3 Data tables: Gynaecologic oncology (GO) surgical services

Table 10.9 Time from first referral to first MDM (first MDM in 2023)*

	2022		2023	
	N= 1063		N= 1067	
	n	%	n	%
<7 days	383	36.0	312	29.2
7–14 days	536	50.4	594	55.7
>14 days	144	13.5	161	15.1

*Referrals have to be accepted, excludes molar pregnancy and referred for prophylaxis surgery.

Table 10.10 Time from first MDM to first GO Clinic appointment (clinic in 2023)*

	2022		2023	
	N=367		N=367	
	n	%	n	%
<7 days	174	47.4	199	54.2
7–14 days	62	16.9	65	17.7
>14 days	121	33.0	102	27.8
Clinic before MDM	10	2.7	1	0.3

*This table includes first clinic appointment which happed in 2023, referral have to be accepted, molar pregnancy and referred for prophylaxis surgery are excluded.

To make first MDM and first clinic appointment relevant (after the first referral), women who had surgery for recurrence are excluded (hard to know if the clinic is for recurrence based on data stored in the databases)

Table 10.11 Time from first clinic visit to primary surgical treatment (surgery in 2023)*

	2023	
	N= 317	
	n	%
<14 days	104	32.8
14 - 31 days	184	58.0
>31 days	29	9.1

*Primary treatment only, excludes brachytherapy, surgery for prophylaxis, molar pregnancy, and women who had surgery before a clinic visit or without clinic

Table 10.12 Te Toka Tumai Gynaecologic Oncology MDM workload: Referrals and MDM discussions 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	n	n	n	n	n	n	n	n	n	n
All referrals (by year of referral)										
Accepted	839	905	1089	1112	1115	1183	1184	1134	1211	1275
Referral reason (accepted only)										
Molar pregnancy	76	59	55	60	69	58	44	58	47	50
Consideration of prophylactic surgery	15	15	6	5	23	4	8	6	3	0
Other	748	831	1028	1047	1023	1121	1132	1070	1161	1225
Referrals proceeding to MDM (accepted referrals only)										
Had MDM	818	878	1065	1105	1086	1180	1174	1124	1203	1269
No MDM	21	27	24	7	29	3	10	10	8	6
Total wāhine discussed at MDM by year (irrespective of referral date)	1026	1105	1277	1250	1342	1383	1454	1383	1423	1559
Total MDM reviews per year	2060	2138	2299	2219	2386	2392	2541	2548	2592	2804

Table 10.13 Demographic characteristics of women discussed at MDM in 2023 by primary site

	Total		Ovarian		Peritoneum/ Fallopian Tube		Endometrium		Uterus		Cervix		Vulva		Vagina		Placenta		Non-gynae cancer/un-known	
	N=	1559	N=	485	N=	54	N=	628	N=	54	N=	148	N=	64	N=	17	N=	56	N=	52
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Registered in 2023	1145	73.4	350	72.2	41		463	73.7	36	66.7	110	74.3	40	62.5	11	64.7	52	92.9	41	78.8
Ethnicity																				
Māori	271	17.4	91	18.8	6	10.1	113	18.0	9	16.7	23	15.5	6	9.4	6	35.3	9	16.1	5	9.6
Pacific	272	17.4	62	12.8	6	10.1	163	26.0	6	10.1	18	12.2	1	1.6	3	17.6	8	14.3	4	7.7
Asian	251	16.1	80	16.5	5	9.3	90	14.3	18	33.3	29	19.6	3	4.7	0	0.0	21	37.5	0	0.0
MELAA	17	1.1	6	1.2	1	1.9	2	0.3	2	3.7	5	3.4	0	0.0	0	0.0	1	1.8	35	67.3
European	748	48.0	246	50.7	36	66.7	260	41.4	19	35.2	73	49.3	54	84.4	8	47.1	17	30.4	0	0.0
Age																				
≤25	46	3.0	28	5.8	1	1.9	3	0.5	2	3.7	2	1.4	0	0.0	0	0.0	8	14.3	2	3.8
26-35	140	9.0	37	7.6	1	1.9	37	5.9	3	5.6	26	17.6	3	4.7	0	0.0	31	55.4	6	10.5
36-45	211	13.5	66	13.6	1	1.9	64	10.2	14	25.9	40	27.0	5	7.8	0	0.0	15	26.8	10	19.2
46-55	340	21.8	115	23.7	8	14.8	136	21.7	22	40.7	31	20.9	12	18.8	4	23.5	2	3.6	10	19.2
56-65	324	20.8	107	22.1	14	25.9	154	24.5	7	13.0	18	12.2	12	18.8	2	10.8	0	0.0	10	19.2
66-75	282	18.1	71	14.6	18	33.3	148	23.6	1	1.9	17	10.5	10	15.6	7	41.2	0	0.0	13	25.0
>75	216	13.9	61	12.6	12	22.2	86	13.7	5	9.3	14	9.5	22	34.4	4	23.5	0	0.0	0	0.0
Locality																				
Te Toka Tumai	275	17.6	82	16.9	8	14.8	111	17.7	12	22.2	29	19.6	11	17.2	3	17.6	8	14.3	8	15.4
Counties Manu-kau	386	24.8	107	22.1	9	16.7	181	28.8	15	27.8	37	25.0	8	12.5	1	5.9	20	35.7	16	30.8
Waitematā	337	21.6	103	21.2	12	22.2	127	20.2	10	18.5	33	22.3	14	21.9	1	5.9	21	37.5	1	1.9
Northland	121	7.8	34	7.0	4	7.4	50	8.0	5	9.3	14	9.5	8	12.5	4	23.5	1	1.8	7	13.5
Bay Of Plenty	131	8.4	45	9.3	7	13.0	48	7.6	6	10.1	9	6.1	3	4.7	3	17.6	3	5.4	6	10.5
Waikato	201	12.9	76	15.7	10	18.5	69	10.0	4	7.4	18	12.2	15	23.4	2	10.8	1	1.8	2	3.8
Lakes	70	4.5	25	5.2	2	3.7	26	4.1	2	3.7	6	4.1	4	6.3	2	10.8	1	1.8	1	1.9
Tairawhiti	26	1.7	9	1.9	1	1.9	12	1.9	0	0.0	0	0.0	1	1.6	1	5.9	1	1.8	1	1.9
Other	12	0.8	4	0.8	1	1.9	4	0.6	0	0.0	2	1.4	0	0.0	0	0.0	0	0.0	0	0.0

Table 10.14 Demographic characteristics of women undergoing surgery by the gynaecology oncology team in 2023 by primary site (excludes surgery for complications)

	Total		Ovarian		Peritoneum/ Fallopian Tube		Endometrium		Uterus		Cervix		Vulva		Vagina		Non-gynae cancer/unknown	
	N=530		n=170		n=27		n=182		n=8		n=68		n=58		n=4		n=12	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ethnicity																		
Māori	84	15.8	29	17.1	5	18.5	34	18.7	3	37.5	8	10.8	2	3.4	2	50.0	1	8.3
Pacific	76	14.3	19	10.2	2	7.4	39	21.4	1	12.5	10	14.7	3	5.2	1	25.0	1	8.3
Other Asian	74	14.0	23	13.5	3	10.1	27	14.8	1	12.5	13	19.1	4	6.9	0	0.0	2	16.7
MELAA	9	1.7	1	0.6	1	3.7	1	0.5	0	0.0	5	7.4	1	1.7	0	0.0	0	0.0
European	287	54.2	98	57.6	16	59.3	81	44.5	3	37.5	32	47.1	48	82.8	1	25.0	8	66.7
Age (yrs)																		
≤25	6	1.1	4	2.4	1	3.7	0	0.0	0	0.0	1	1.5	0	0.0	0	0.0	0	0.0
26-35	36	6.8	6	3.5	0	0.0	6	3.3	0	0.0	20	29.4	4	6.9	0	0.0	0	0.0
36-45	62	10.7	22	12.9	0	0.0	11	6.0	2	25.0	20	29.4	4	6.9	0	0.0	2	16.7
46-55	110	20.8	51	30.0	4	14.8	32	17.6	4	50.0	6	8.8	8	13.8	0	0.0	5	41.7
56-65	121	22.8	41	24.1	7	25.9	46	25.3	2	25.0	11	16.2	11	19.0	0	0.0	3	25.0
66-75	109	20.6	26	15.3	10	37.0	55	30.2	0	0.0	7	10.3	7	12.1	3	75.0	1	8.3
>75	86	16.2	20	10.8	5	18.5	32	17.6	0	0.0	3	4.4	24	41.4	1	25.0	1	8.3
Locality																		
Te Toka Tumai	110	20.8	30	17.6	3	10.1	29	15.9	1	12.5	26	38.2	17	29.3	1	25.0	3	25.0
Counties Manukau	99	18.7	32	18.8	3	10.1	36	19.8	3	37.5	12	17.6	10	17.2	0	0.0	3	25.0
Waitematā	128	24.2	37	21.8	6	22.2	51	28.0	1	12.5	13	19.1	14	24.1	0	0.0	5	41.7
Northland	43	8.1	14	8.2	3	10.1	12	6.6	0	0.0	8	10.8	4	6.9	2	50.0	0	0.0
Bay Of Plenty	35	6.6	13	7.6	5	18.5	11	6.0	1	12.5	2	2.9	2	3.4	0	0.0	1	8.3
Waikato	78	14.7	33	19.4	5	18.5	27	14.8	2	25.0	3	4.4	8	13.8	0	0.0	0	0.0
Lakes	26	4.9	7	4.1	1	3.7	12	6.6	0	0.0	3	4.4	3	5.2	0	0.0	0	0.0
Other	11	2.1	4	2.4	1	3.7	4	2.2	0	0.0	1	1.5	0	0.0	1	25.0	0	0.0

Table 10.15 Malignant status prior to and after surgery by primary site among all surgical procedures performed by the gynaecology oncology team in 2023 (excluding surgery for complications and brachytherapy) (some women will have more than one surgery)

	Total		Ovarian		Peritoneum/ Fallopian		Endometrium		Uterus		Cervix		Vulva		Vaginal		Non-gynae cancer/ unknown	
	N=548		N=187		N=28		N=184		N=9		N=51		N=72		N=4		N=12	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Reason for surgery																		
Diagnostic	70	12.8	38	20.3	2	7.1	6	3.3	0	0.0	10	19.6	10	13.9	1	25.0	3	25.0
Primary treatment	393	71.7	114	61.0	14	50.0	166	90.2	7	77.8	39	76.5	43	59.7	3	75.0	6	50.0
Interval debulking	27	4.9	15	8.0	10	35.7	2	1.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Recurrence	51	9.3	16	8.6	2	7.1	9	4.9	1	10.1	2	3.9	19	26.4	0	0.0	2	16.7
Open and close	7	1.3	4	2.1	0	0.0	1	0.5	1	10.1	0	0.0	0	0.0	0	0.0	1	8.3
Diagnosis (prior to surgery)																		
Benign	24	4.4	16	8.6	0	0.0	1	0.5	2	22.2	0	0.0	5	6.9	0	0.0	0	0.0
Premalignant	46	8.4	7	3.7	0	0.0	1	0.5	0	0.0	16	31.4	22	30.6	0	0.0	0	0.0
Malignant	397	72.4	106	56.7	23	82.1	181	98.4	3	33.3	29	56.9	41	56.9	3	75.0	10	83.3
Prophylactic	5	0.9	4	2.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	8.3
Unknown	76	13.9	54	28.9	5	17.9	1	0.5	4	44.4	6	10.8	4	5.6	1	25.0	1	8.3
Diagnosis (after surgery)																		
Benign	60	10.9	37	19.8	0	0.0	1	0.5	5	55.6	7	13.7	8	10.1	0	0.0	1	8.3
Premalignant	22	4.0	0	0.0	0	0.0	1	0.5	0	0.0	8	15.7	13	18.1	0	0.0	0	0.0
Malignant	466	85.0	150	80.2	28	100.0	182	98.9	4	44.4	36	70.6	51	70.8	4	100.0	11	91.7

Table 10.16 Malignant status prior to and after surgery by year 2018-2023 among all surgical procedures performed by the Gynaecology Oncology team (excluding surgery for complications and brachytherapy) (some wāhine will have more than one surgery included)

	2019		2020		2021		2022		2023	
	n=525		n=496		N=497		N=476		N=548	
	n	%	n	%	n	%	n	%	n	%
Reason for surgery										
Diagnostic	41	7.8	85	17.1	53	10.7	94	19.7	70	12.8
Primary treatment	385	73.3	325	65.5	353	71.0	291	61.1	393	71.7
Interval debulking	40	7.6	38	7.7	51	10.3	48	10.1	27	4.9
Recurrence	59	10.2	59	10.9	35	7.0	40	8.4	51	9.3
Unknown	0		2	0.4	5	1.0	3	0.6	7	1.3
Diagnosis (prior to surgery)										
Benign	18	3.4	10	2	13.0	2.6	18	3.8	24	4.4
Pre-malignant	57	10.9	49	9.9	41.0	8.2	38	8.0	46	8.4
Malignant	341	65	314	63.3	310.0	62.4	324	68.1	397	72.4
Prophylactic	7	1.3	7	1.4	8.0	1.6	5	1.1	5	0.9
Unknown	102	19.4	116	23.4	125.0	25.2	91	19.1	76	13.9
Diagnosis (after surgery)										
Benign	63	12	54	10.9	66.0	13.3	55	10.6	60	10.9
Pre-malignant	32	6.1	28	5.6	28.0	5.6	19	4.0	22	4.0
Malignant	429	81.7	412	83.1	401.0	80.7	402	84.5	466	85.0
Molar pregnancy	0	0.0	0	0.0	0	0.0	0	0.0	0	0

Table 10.17 Surgical debulking and bowel surgery at primary, interval and recurrence surgery for ovarian, fallopian tube and peritoneum cancer 2023

	Total		Primary treatment				Interval debulking				Surgery for recurrence	
			stage 1/2		stage 3/4		stage 1/2		stage 3/4			
	N= 143		N= 60		N= 40		N= 0		N= 25		N= 18	
	n	%	n	%	n	%	n	%	n	%	n	%
Residual disease												
None	134	93.7	60	100.0	36	90.0	0	0	21	84.0	17	94.4
<1cm	8	5.6	0	0.0	4	10.0	0	0	4	16.0	0	0.0
≥1cm	1	0.7	0	0.0	0	0.0	0	0	0	0.0	1	5.6
Bowel surgery												
Yes	31	21.7	5	8.3	13	32.5	0	0	8	32.0	5	27.8
No	111	77.6	55	91.7	27	67.5	0	0	17	68.0	12	66.7

Table 10.18 Clinical outcomes/complications among inpatient surgeries performed by the Gynaecological Oncology team by cancer status 2023 (n=-surgeries)

	Premalignant/ Benign	Malignant					
	Total	Total	Diagnostic surgery	Primary treatment	Interval debulking	Surgery for recurrence	Open and close
	N=82	N=466	N=50	N=335	N=27	N=48	N=6
Complication	n %	n %	n %	n %	n %	n %	n %
Intra-operative complications							
Anaesthetic complication	0 0.0	2 0.4	0 0.0	2 0.6	0 0	0 0.0	0 0
>1000ml blood loss	5 6.1	49 10.5	0 0.0	32 9.6	9 33.3	8 16.7	0 0
Bowel injury	0 0.0	3 0.6	0 0.0	1 0.3	0 0.0	2 4.2	0 0
Bladder injury	0 0.0	5 1.1	0 0.0	4 1.2	0 0.0	1 2.1	0 0
Ureteric injury	1 1.2	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0
Other	2 2.4	9 1.9	2 4.0	5 1.5	0 0.0	2 4.2	0 0
Post-operative complications							
Transfusion	9 10.0	77 16.5	6 12.0	46 13.7	19 70.4	5 10.4	1 16.7
Febrile morbidity	3 3.7	29 6.2	2 4.0	20 6.0	1 3.7	5 10.4	1 16.7
Wound infection	1 1.2	31 6.7	1 2.0	21 6.3	3 10.1	6 12.5	0 0.0
Thromboembolism	0 0.0	3 0.6	1 2.0	1 0.3	1 3.7	0 0.0	0 0.0
Cardiovascular	1 1.2	3 0.6	0 0.0	3 0.9	0 0.0	0 0.0	0 0.0
Gastro-intestinal	4 4.9	29 6.2	0 0.0	17 5.1	7 25.9	4 8.3	1 16.7
Urinary retention	3 3.7	27 5.8	0 0.0	25 7.5	1 3.7	1 2.1	0 0.0
Return to theatre within 6 wks	3 3.7	10 2.1	1 2.0	7 2.1	1 3.7	1 2.1	0 0.0
Readmission with complication within 6 wks	3 3.7	52 10.2	6 12.0	34 10.1	4 14.8	7 14.6	1 16.7
Death	0 0.0	1 0.2	0 0.0	0 0.0	0 0.0	1 2.1	0 0.0

Table 10.19 Clinical outcomes/complications among inpatient surgeries with malignancy (n=surgeries) performed by the Gynaecological Oncology team by year (2019-2023)

	2019		2020		2021		2022		2023	
	N=429		N=413		N=400		N= 399		N= 466	
	n	%	n	%	n	%	n	%	n	%
Intra-operative complications										
Anaesthetic Complication			2	0.5	2	0.5	2	0.5	2	0.4
>1000mls blood loss	13	3	24	5.8	32	8.0	35	8.8	49	10.5
Bowel injury	6	1.4	6	1.5	9	2.3	7	1.8	3	0.6
Bladder injury	2	0.5	1	0.2	2	0.5	5	1.3	5	1.1
Ureteric injury	1	0.2	1	0.2	0	0.0	4	1.0	0	0.0
Other	22	5.1	11	2.7	25	6.3	9	2.3	9	1.9
Post-operative complications										
Transfusion	51	10.9	58	14	76	19.0	92	23.1	78	16.7
Febrile morbidity	22	5.1	19	4.6	19	4.8	33	8.3	29	6.2
Wound infection	14	3.3	9	2.2	31	7.8	33	8.3	31	6.7
Thromboembolism	3	0.7	2	0.5	7	1.8	4	1.0	3	0.6
Cardiovascular	3	0.7	2	0.5	3	0.8	4	1.0	3	0.6
Gastro-intestinal	15	3.5	23	5.6	38	9.5	17	4.3	29	6.2
Urinary retention	30	7	17	4.1	15	3.8	17	4.3	27	5.8
Return to OT within 6 weeks	13	3	7	1.7	6	1.5	10	2.5	9	1.9
Readmission with complication within 6 weeks	34	7.9	35	8.5	39	9.8	42	10.5	52	10.2
Death	0		0	0.0	1	0.3	3	0.8	1	0.2

10.4 Abortion

Ines Blaj, Dr Mahesh Harilall

Abortion is the most performed procedure in gynaecology. The Abortion Legislation Act 2020 has changed the way abortion care can be provided in New Zealand. With improved access and transformation of the model of care nationally, early medical abortion (EMA) is more common than surgical abortion. A new model of care, which rapidly evolved at Epsom Day Unit (EDU) following law reform and the restrictions during the Covid pandemic in 2020, is now embedded into clinical practice. During 2023 EDU provided the majority of first trimester abortion care in Metro Auckland. Second trimester surgical abortions are provided as a contracted specialist service for several DHBs, predominantly within upper North Island. Wāhine from Te Toka Tumai Auckland undergoing second and third trimester medical abortions are cared for as inpatients on the Gynaecology Ward (less than 20 weeks) or on Women's Assessment Unit for later gestations.

10.4.1 First trimester regional service

At EDU, 2745 first trimester abortions were performed in 2023, a 15% reduction compared to 2022, most likely due to Auckland Medical Aid Centre (AMAC) commencing a DHB contract in April 2021 to also provide publicly funded first trimester abortions in the region. Over one decade (2014-2023) the total number of abortions has fallen by 29% consistent with a national trend due to access to funded long acting reversible contraceptives (LARCs).

Wāhine aged 25-29 years undergo the most abortions. Early medical abortion (EMA) rates, for gestations 9 weeks and under, were already increasing in 2019 (Figure 11.2) and have continued to trend upwards proportionally across all ethnicity groups (Figure 11.2), accelerating after abortion law reform in 2020. EMA in 2023 accounts for 55.7% of first trimester abortions, with no increase from 2022, and 25% in 2019 pre-law change. Our figures benchmark well against national EMA rates.

The increasing EMA rate is attributable to several factors facilitated by abortion law reform. Delays to access are minimised with earlier presentations due to self-referral and telehealth. Self-administration of abortion medication at home has improved acceptability of EMA with more choice about timing and location.

Medical abortion rates amongst Pacific (47.5%) have increased by about 2% in the last year, and rates among Māori (47.1%) have dropped by 0.7%, but lag behind highest rates reported for Asian (60%) and European (59%).

EDU recruited 200 women for a multicentre international randomised controlled trial during 2021/2022 investigating very early medical abortion (VEMA) offered prior to definitive evidence of an intrauterine location (Pregnancy with unknown location (PUL)). Preliminary data supports VEMA as efficacious and safe compared to standard management with final results and recommendations anticipated to impact on first trimester care in future.

All wāhine are counselled at EDU about contraception post abortion. Initiation of long-acting reversible contraception (LARC) at the time of abortion reduces abortion return rates1. LARC is convenient, acceptable and safe when provided immediately after an abortion. Copper IUCD, Mirena IUS and Jadelle are all funded devices and free when fitted at the time of an abortion or through Te Toka Tumai community LARC Clinics. Uptake of LARCs remains low among those choosing EMA compared to surgical abortion.

Nationally, provision of contraception at the time of the abortion procedure fell in 2020. This was thought to be due to increasing EMA and telehealth abortion, which requires for patients to attend a separate contraception appointment after the abortion for intrauterine LARC.

10.4.2 Second trimester surgical service

In 2023, 266 wāhine at 13-18 weeks gestation had second trimester surgical procedures by contracted private gynaecologists (whom have facility access at Greenlane Clinical Centre).

A training and succession plan has commenced to ensure future workforce capability, governance, and

Figure 10.6 First trimester medical termination rate by DHB of residence and ethnicity 2023

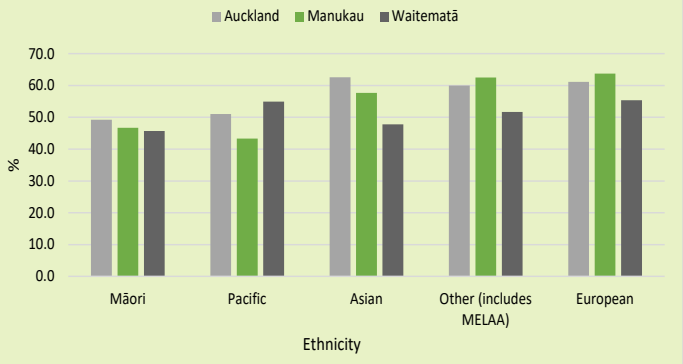
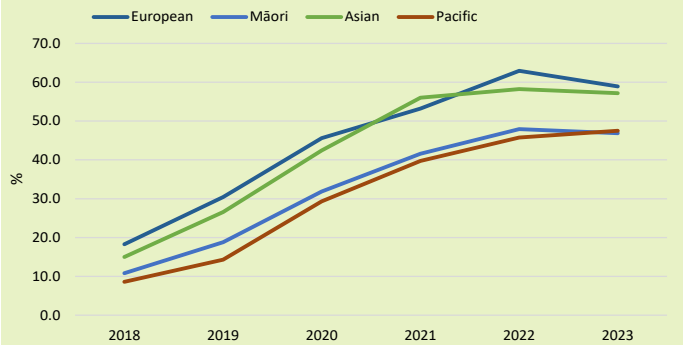


Figure 10.7 First trimester medical termination rate among first trimester TOP by ethnicity NWH 2017-2023



a sustainable service for the greater Auckland and the upper North Island region. In 2022, 213 Wāhine needed second trimester surgical procedures, representing a 20% increase in 2023.

10.4.3 Second trimester medical service

Forty-seven women had a medical termination of pregnancy/induction of labour as an inpatient between 12 and 20 weeks in 2023. As evidence supports we administer Misoprostol by the buccal route instead of vaginal. This route has the same efficacy, is less invasive with fewer gastrointestinal side effects, and is therefore more acceptable for wāhine.

In 2023, seven (15%) of women required manual removal of the placenta and four (9%) required evacuation of retained products. Three women needed a blood transfusion.

Eighty-five percent of women were managed either as day stay or required one night in hospital in 2023, which is a stable trend. The majority (64%) only required 1-2 doses of misoprostol.

The indications for second trimester medical abortion/induction under 20 weeks remain stable; fetal anomaly (47%), intrauterine fetal demise (28%), and premature rupture of membranes (13%).

10.4.4 Future access to abortion care in the greater Auckland area

A publicly funded national abortion telehealth Service "DECIDE"[1] providing abortion access through Family Planning Association was fully operational in November 2022, with a contract with The Womens Clinic joining other Aotearoa New Zealand providers, offering telehealth early medical abortion, aiming to improve equity of access[2]. The impact of this national initiative on Epsom Day Unit will be better reflected in 2023 data. Counties Manukau has recently set up an EMA service. It is still too early to see whether this service will affect numbers of wāhine accessing services at Te Toka Tumai. Our data show that half of Counties women choose early medical abortions, and this proportion may increase if travel is not required. It is important surgical abortion remains a choice with 53% of women choosing this option, including a reasonable proportion under 9 weeks who do not want EMA, and wish to have immediate LARC provision.

[1] DECIDE - National Abortion Telehealth Service (2022) www.tewhatuora.govt.nz/for-the-health-sector/abortion-services/ decide-national-abortion-telehealth-service

[2] Roberts H, Silva M, Xu S (2010) Postabortion contraception and it's effects on repeat abortions in Auckland, New Zealand. https://doi. org/10.1016/j.contraception.2010.03.003

10.4.5 Data tables: Abortion

10.20 Number of first trimester terminations EDU 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	N	N	N	N	N	N	N	N	N	N
Total number of terminations	3842	3603	3501	3648	3645	3550	3605	3583	3224	2745

10.21 Number of counselling sessions EDU 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	N	N	N	N	N	N	N	N	N	N
Post op counselling	33	28	36	47	57	49	60	76	55	48
Pregnancy option counselling	66	63	47	40	45	54	119	174	156	113
Declines %	3.4	2.4	2.5	1.9	2	2.3	1.2	0.4	0.3	0.8

10.22 Demography and characteristics of wāhine attending EDU NWH 2019-2023

	2019		2020		2021		2022		2023	
	n=3550		n=3605		n=3583		n=3224		n=2745	
	n	%	n	%	n	%	n	%	n	%
Ethnicity										
Māori	634	17.9	545	15.1	573	16.0	615	19.1	526	19.2
Pacific	653	18.4	606	16.8	614	17.1	602	18.7	529	19.3
Asian	1163	32.8	1243	34.5	1180	32.9	986	30.6	916	33.4
Other*	97	2.7	110	3.1	86	2.4	79	3.5	71	2.6
European	1003	28.3	1096	30.4	1127	31.5	941	29.2	701	25.5
Unknown	0	0.0	1	0.0	3	0.1	1	0.0	2	0.1
Age										

≤ 19	307	8.6	283	7.9	270	7.5	269	8.3	239	8.7
20 – 24	847	23.9	826	22.9	840	23.4	795	24.7	628	22.9
25 – 29	918	25.9	959	26.6	882	24.6	825	25.6	684	24.9
30 – 34	781	22	751	20.8	825	23	690	21.4	587	21.4
35 –39	508	14.3	581	16.1	537	15	465	14.4	418	15.2
≥40	189	5.3	205	5.7	229	6.4	180	5.6	189	6.9
Gestation (weeks) at Termination										
6	208	5.9	526	14.7	890	25	1000	31.1	1015	37.0
7	726	20.5	853	23.7	826	23.1	661	20.5	542	19.7
8	902	25.4	899	24.9	781	21.8	638	19.8	493	18.0
9	586	16.5	484	13.4	392	10.9	306	9.5	224	8.2
10	503	14.2	378	10.4	296	8.2	242	7.5	171	6.2
11	324	9.1	234	6.5	194	5.4	203	6.3	128	4.7
12	246	6.9	183	5.1	159	4.4	137	4.3	141	5.1
13	55	1.6	48	1.3	44 **	1.2	37	1.2	31	1.1

*Other includes MELAA (Middle Eastern, Latin American, and African)

** In 2021, 1 termination of pregnancy at 14 weeks was documented

10.23 Medical and surgical first trimester terminations by ethnicity and DHB of residence 2023 (includes terminations in EDU, GSU, and ACH)

	Auckland			Counties Manukau			Waitematā			Other DHB			Total		
	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%
Māori	66	64	49.2	129	113	46.7	101	85	45.7	7	5	41.7	303	267	46.8
Pacific	71	74	51.0	178	136	43.3	46	56	54.9	0	1	100.0	295	267	47.5
Asian	110	184	62.6	176	240	57.7	94	86	47.8	3	1	25.0	383	511	57.2
Other (includes MELAA)	14	21	60.0	6	10	62.5	14	15	51.7	0	1	100.0	34	47	58.0
European	89	140	61.1	66	116	63.7	153	190	55.4	8	7	46.7	316	453	58.9
Total	350	483	58.0	555	615	52.6	408	432	51.4	18	15	45.5	1331	1545	53.7

S = Surgical TOP M = Medical TOP M% = Medical TOP%

Table 10.24 Medical and surgical first trimester terminations by age and ethnicity 2023 (includes terminations in EDU, GSU, and ACH)

Age (yrs)	Māori			Pacific			Asian			Other (includes MELAA)			European			TOTAL		
	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%	S	M	M%
<20	51	26	33.8	39	30	43.5	13	20	60.6	2	1	33.3	35	43	55.1	140	120	46.2
20-24	83	77	48.1	90	99	52.4	31	66	68.0	5	7	58.3	78	134	63.2	287	383	57.2
25-29	85	91	51.7	67	74	52.5	86	126	59.4	10	11	52.4	85	107	55.7	333	409	55.1
30-34	54	51	48.6	56	33	37.1	99	179	64.4	7	77	91.7	50	77	60.6	266	417	61.1
35-39	22	17	43.6	29	23	44.2	94	128	57.7	9	8	47.1	48	68	58.6	202	244	54.7
≥40	8	8	50.0	14	8	36.4	60	56	48.3	1	5	83.3	20	26	56.5	103	103	50.0
Total	303	270	47.1	295	267	47.5	383	575	60.0	34	109	76.2	316	455	59.0	1331	1676	55.7

S=Surgical TOP M=Medical TOP M% = Medical TOP% of all

Table 10.25 Characteristics of wāhine undergoing second trimester medical TOP/induction NWH 2019–2023

	2019		2020		2021		2022		2023	
	N=49		N=49		N=47		N=35		N=47	
	n	%	n	%	n	%	n	%	n	%
Locality of residence										
Auckland	42	86	43	88	41	87	29	83	39	83
Counties Manukau	4	8	1	2	3	6	0	0	2	4
Waikato	1	2	1	2	0	0	0	0	0	0
Waitematā	1	2	4	8	3	6	4	11	3	6
Other	1	2	0	0	0	0	2	6	3	6
Indication for termination of pregnancy/induction										
Fetal anomaly	23	47	18	37	19	40	13	37	22	47
Intrauterine death	11	22	17	35	15	32	9	26	13	28
Maternal mental health	7	14	8	16	7	15	8	23	6	13
Spontaneous rupture of membranes	8	16	6	12	6	13	5	14	6	13
Gestation (wks)										
12				0	0	0	1	3	3	6
13	2	4	4	8	3	6	3	9	2	4
14	6	12	9	18	12	26	5	14	13	28
15	9	18	6	12	4	9	3	9	4	9
16	7	14	6	12	7	15	6	17	4	9
17	10	20	11	22	4	9	5	14	8	17
18	8	16	5	10	6	13	4	11	4	9
19	7	14	8	16	10	21	5	14	9	19
20			0	0	1	2	2	6	0	0
21							1	3	0	0

Table 10.26 Clinical details and outcomes of second trimester medical TOP/induction NWH 2019–2023

	2019		2020		2021		2022		2023	
	N=49		N=49		N=47		N=35		N=47	
	n	%	n	%	n	%	n	%	n	%
Mifegynae	42	86	44	90	47	100	35	100	44	94
Vaginal misoprostol (800mg)	1	2	2	4	1	2	2	6	0	0
Buccal misoprostol (800mg)	45	92	46	94	43	91	32	91	43	91
Misoprostol (400mg) (oral or buccal)										
Not given	10	20	11	22	7	15	14	40	8	17
1 dose	16	33	19	39	17	36	7	20	18	38
2 dose	6	12	5	10	10	21	9	26	12	26
3 doses	6	12	5	10	6	13	1	3	3	6
≥ 4 doses	11	22	9	18	7	15	4	11	6	13
Syntocinon infusion	2	4	1	2	2	4	1	3	2	4
Manual removal of placenta	8	16	8	16	6	13	5	14	7	15
Retained products of conception (requiring ERPOC)	3	6	2	4	4	9	1	3	4	9
Transfusion	3	7	1	2	4	9	1	3	3	6
Nights in hospital										

0	19	39	25	51	18	38	15	43	24	51
1	23	47	17	35	20	43	14	40	16	34
2-3	7	14	6	12	9	19	3	9	4	9
>3			1	2	0	0	3	9	3	6

10.5 General Gynaecology Inpatient Surgery

Dr Saman Moeed

The data in this section relate to gynaecologic surgeries performed by the general gynaecology team. For the most part these data are only routinely collected for surgeries on level 9 at Auckland City Hospital (ACH). Urogynaecology, who collect data at Auckland Hospital and Greenlane Surgical Centre, is an exception to this.

During 2023, the Women's Health Intelligence Team, Sara Chavali, and Ines Blaj retrospectively entered gynaecology inpatient surgery data for the last two months of 2021 and for 2022 to complete the missing data in the 2021 and 2022 reports. This data, along with 2023 data, is included in this report.

Surgeries performed by the Gynaecologic Oncology team are collected in a separate database and are presented in Section 10.2.

The numbers relate to episodes of surgery rather than individuals. Some individuals had more than one surgical episode in the year and all episodes are included. As more than one procedure may occur at a single operation, it may appear that numbers are not consistent within this section.

Definitions

Where surgical complications are given, these relate to the following definitions:

Intra-operative injury to internal organs. Injury to bladder, bowel, ureter, major blood vessel or other.

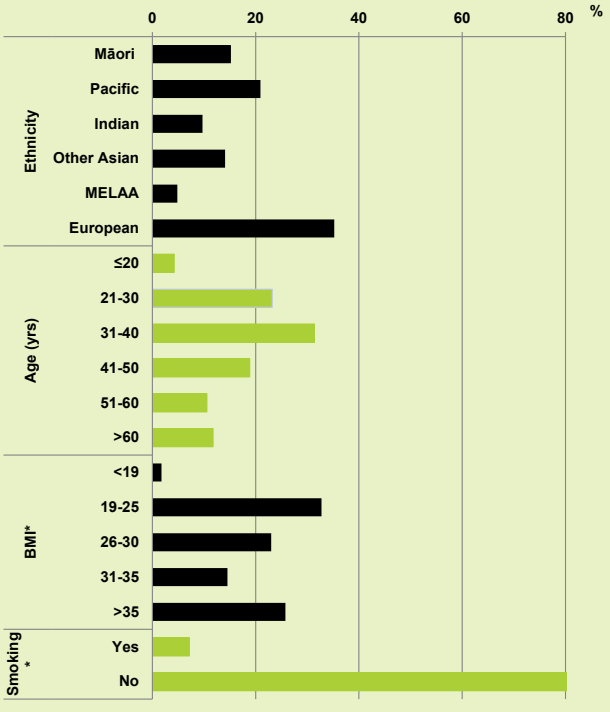
Significant post-operative infection. Any infection (defined by evidence of wound dehiscence or wound collection, pelvic abscess, or fever >39o C) occurring as a result of surgery.

Readmission. Readmission to hospital (hospital stay of 3 hours or more) for a reason related to the surgical procedure within 6 weeks of surgery. From 2015, total readmissions have included planned and unplanned readmissions, but the number of unplanned readmissions is also identified separately.

Other significant complications. Includes gastrointestinal complications (ileus, bowel obstruction), fistulae.

Any complication. Any or more than one of the above complications, including any readmission related to the surgical procedure.

Figure 10.8 Demographic details of wāhine having inpatient primary surgery performed by the general gynaecology team at ACH 2023



*BMI missing for 28 women and smoking status was missing for 69 women

In 2023, a focus on data entry into the Dendrite gynaecology surgery database resulted in improved data collection, specifically for surgery performed in Level 9 theatres. Thanks go to Ines Blaj, Sara Chavali, the Women's Health Intelligence team and the Ward 97 ward clerks for retrospectively adding data from 2021 and 2022, and to the specialists and RMOs who entered the data for surgery performed in 2023.

Key findings

- Gynaecological surgical complication rates have remained stable.
- Blood transfusion rates have remained stable, and we are yet to see an impact from implementation of a new IV iron guideline and Patient Blood Management initiatives. Access to IV iron for gynaecology patients awaiting surgery remains an issue.
- Improving equitable access to care was a focus for Te Toka Tumai in 2023, particularly patients waiting more than 250 days for care. Through collaboration with Patient Administration Services and Kaiārahi Nahi and Pacific navigators, the proportion of wāhine Māori undergoing benign gynaecology surgery has increased, with 15.2% in 2023, compared to 11.3%

in 2019.

- The total number of hysterectomies increased to 219 in 2023, having been stable for the previous four years. The trend of laparoscopic hysterectomies outnumbering abdominal hysterectomies continues, supported by the Minimally Invasive Gynaecology Service's growth.

Figure 10.9 Complications of surgery among inpatient primary surgeries performed by the general gynaecology team by timing of surgery at ACH 2023

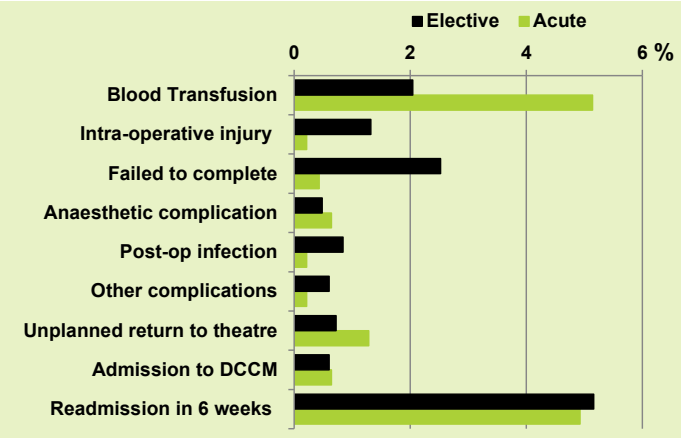
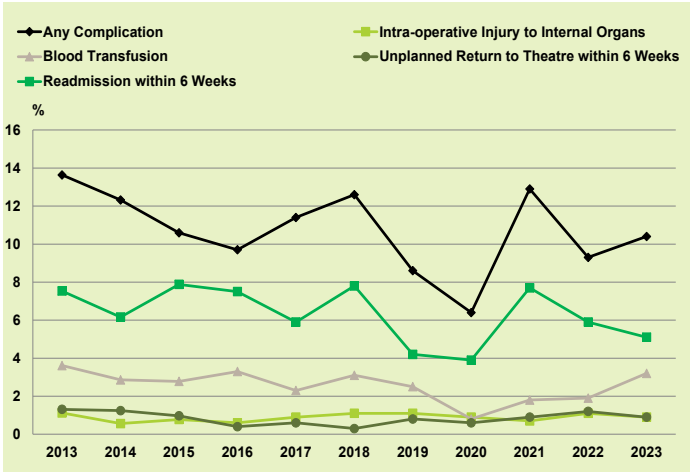


Figure 10.10 Complications of surgery among inpatient primary surgeries performed by the general gynaecology team at ACH 2013-2023



10.5.1 Data tables: General Gynaecology Inpatient Surgery

Table 10.27 Primary surgical procedure and timing of surgery among primary surgeries performed by the general gynaecology team at ACH 2023

	Total		Acute		Elective	
	N= 1300		n= 467		n= 833	
	N	%	n	%	n	%
Ovarian and/or tubal surgery	210	16.2	113	24.2	97	10.6
Hysterectomy	210	16.2	3	0.6	207	24.8
Evacuation retained products conception	156	12.0	153	32.8	3	0.4
Hysteroscopy	153	10.8	12	2.6	141	16.9
Diagnostic laparoscopy	103	7.9	53	10.3	50	6.0
Surgical termination of pregnancy	97	7.5	23	4.9	74	8.9
Urogynaecology procedure	86	6.6	0	0.0	86	10.3
Endometriosis surgery	68	5.2	1	0.2	67	8.0
Fibroid embolisation	18	1.4	0	0.0	18	2.2
Other uterine/cervical	108	8.3	51	10.9	57	6.8
Other vulval procedure	32	2.5	32	6.9	0	0.0
Other	59	4.5	26	5.6	33	4.0

Table 10.28 Intra-operative injury at primary surgery among inpatient primary surgeries performed by the general gynaecology team NWH 2019-2023

	2019		2020		2021		2022		2023	
	N= 1256		N= 1245		N=1257		N=1167		N=1300	
	n	%	n	%	n	%	n	%	n	%
Bladder	3	0.2	2	0.2	1	0.1	0	0.0	4	0.3
Bowel	6	0.5	6	0.5	4	0.3	7	0.6	2	0.2
Ureter	2	0.2	0	0.0	0	0.0	0	0.0	0	0.0
Major blood vessel	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0

Uterine perforation			2	0.2	2	0.2	0	0.0	5	0.4
Other	1	0.1	1	0.1	2	0.2	3	0.3	1	0.1
Total	13	1.0	11	0.9	9	0.8	10	0.9	12	1.0

Table 10.29 Complications of surgery among primary surgeries performed by the general gynaecology team by timing of surgery at ACH 2023

	Acute admission		Elective admission	
	N= 467		N= 833	
	n	%	n	%
Any complication	49	10.5	86	10.3
Failure to complete planned procedure	2	0.4	21	2.5
Intra operative injury to internal organs	1	0.2	11	1.3
Significant post op infection	1	0.2	7	0.8
Anaesthetic complication	3	0.6	4	0.5
Other significant complication	1	0.2	5	0.6
Thromboembolic complication	0	0.0	2	0.2
Unplanned return to theatre in 6 weeks	6	1.3	6	0.7
Admission to DCCM	3	0.6	5	0.6
Readmission in 6 weeks	23	4.9	43	5.2
Postop complication	20	4.3	31	3.7
Planned re-admission	1	0.2	5	0.6
Other, please specify	2	0.4	7	0.8
Transfusion	24	5.1	17	2.0

Table 10.30 Post-operative complications among primary inpatient surgeries by primary surgical procedures performed by the general gynaecology team at ACH 2023

	Total	Any complication		Failure to complete planned procedure		Intra-operative injury to internal organs		Blood transfusion		Significant post-op infection		Unplanned return to theatre in 6 weeks		Readmission in 6 weeks		Anaesthetic complications		Thrombo-embolic complication		Other significant complications		Admission to DCCM	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	1300	135	10.4	23	1.8	12	0.9	41	3.2	8	0.6	12	0.9	66	5.1	7	0.5	0	0.0	6	0.5	8	0.6
Hysterectomy	210	30	14.3	0	0.0	5	2.4	3	1.4	5	2.4	2	1.0	23	10.0	0	0.0	0	0.0	1	0.5	2	1.0
Ovarian and /or tubal surgery	210	24	10.4	2	1.0	2	1.0	6	2.9	1	0.5	3	1.4	13	6.2	2	1.0	0	0.0	2	1.0	5	2.4
Evacuation retained products of conception	156	16	10.3	0	0.0	0	0.0	12	7.7	0	0.0	3	1.9	5	3.2	0	0.0	0	0.0	0	0.0	0	0.0
Hysteroscopy	153	16	10.5	12	7.8	2	1.3	2	1.3	0	0.0	0	0.0	4	2.6	3	2.0	0	0.0	0	0.0	0	0.0
Diagnostic laparoscopy*	103	13	12.6	3	2.9	0	0.0	5	4.9	0	0.0	0	0.0	6	5.8	1	1.0	0	0.0	0	0.0	1	1.0
Surgical termination of pregnancy	97	2	2.1	0	0.0	1	1.0	0	0.0	0	0.0	1	1.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Urogynaecology procedure	86	7	8.1	2	2.3	1	1.2	0	0.0	2	2.3	1	1.2	4	4.7	0	0.0	0	0.0	2	2.3	0	0.0
Endometriosis surgery	68	7	10.3	2	2.9	0	0.0	1	1.5	0	0.0	1	1.5	4	5.9	0	0.0	0	0.0	0	0.0	0	0.0
Fibroid embolisation	18	5	27.8	0	0.0	0	0.0	5	27.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other uterine/ cervical	108	10	9.3	1	0.9	1	0.9	6	5.6	0	0.0	0	0.0	3	2.8	1	0.9	0	0.0	1	0.9	0	0.0
Other vulval procedure	32	1	3.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	3.1	0	0.0	0	0.0	0	0.0	0	0.0
Other	59	4	6.8	1	1.7	0	0.0	1	1.7	0	0.0	1	1.7	2	3.4	0	0.0	0	0.0	0	0.0	0	0.0

Definitions of complications:
Intraoperative injury to internal organs: Injury to bowel, bladder, ureter, major blood vessel, or other.
Significant post-op infection: Any infection (defined by evidence of would dihiscence or wound collection, pelvic abscess, or fever >39ºC.
Readmission: Readmission to hospital (hospital stay of 3 hours or more) for a reason related to the surgical procedure occurs within 6 weeks of surgery.
Readmission in 6 weeks: Includes planned re-admission.
Other significant complications: Includes gastrointestinal complications (ileus, bowel obstruction), fistulae.

Table 10.31 Primary indication for primary gynaecologic surgery at ACH 2019-2023										
	2019		2020		2021		2022		2023	
	N=1256		N=1245		N=1257		N=1167		N=1300	
	n	%	n	%	n	%	n	%	n	%
Abnormal bleeding, non-pregnant	270	21.5	260	20.9	266	21.2	196	16.8	248	19.1
Miscarriage	100	8.0	140	10.2	111	8.8	116	9.9	131	10.1
Abortion	100	8.0	121	9.7	126	10.0	106	9.1	113	8.7
Urogynaecology / prolapse	126	10.0	76	6.1	84	6.7	93	8.0	111	8.5
Ovarian cyst	116	9.2	94	7.6	102	8.1	127	10.9	116	8.9
Abscess	83	6.6	40	3.2	60	4.8	64	5.5	59	4.5
Pain, cause unknown	97	7.7	90	7.2	86	6.8	72	6.2	108	8.3
Cancer / Pelvic mass	36	2.9	35	2.8	35	2.8	80	6.9	83	6.4
Endometriosis	74	5.9	84	6.7	102	8.1	58	5.0	81	6.2
Ectopic pregnancy	86	6.8	87	7.0	62	4.9	80	6.9	96	7.4
Infertility	29	2.3	31	2.5	31	2.5	24	2.1	19	1.5
Anatomical anomalies of the genital tract	8	0.6	18	1.4	35	2.8	12	1.0	12	0.9
CIN/VIN/VAIN	20	1.6	22	1.8	13	1.0	13	1.1	7	0.5
Polyps/endometrial sampling	39	3.1	39	3.1	28	2.2	46	3.9	42	3.2
Other, please specify	72	5.7	108	8.7	116	9.2	80	6.9	74	5.7

Table 10.32 Demographic details of wāhine having gynaecologic primary surgery by the general gynaecology team at ACH 2019-2023										
	2019		2020		2021		2022		2023	
	N=1256		N=1245		N=1257		N=1167		N=1300	
	n	%	n	%	n	%	n	%	n	%
Ethnicity										
Māori	142	10.3	150	12	149	10.9	166	14.2	198	15.2
Pacific	257	20.5	208	16.7	226	18.0	228	19.5	272	20.9
Indian	108	8.6	138	10.1	98	7.8	94	8.1	126	9.7
Other Asian	175	13.9	177	14.2	183	14.6	165	14.1	183	14.1
MELAA	41	3.3	47	3.8	53	4.2	63	5.4	63	4.8
European	532	42.4	524	42.1	548	43.6	449	38.5	458	35.2
Not stated	1	0.1	1	0.0	0	0.0	2	0.2	0	0.0
Age (years)										
≤20	50	4	72	5.8	59	4.7	67	5.7	55	4.2
21-30	286	22.8	302	24.3	285	22.7	295	25.3	302	23.2
31-40	390	31.1	431	34.6	400	31.8	357	30.6	408	31.4
41-50	244	19.4	200	16.1	227	18.1	196	16.8	245	18.8
51-60	137	10.9	115	9.2	132	10.5	105	9.0	137	10.5
>60	149	10.9	125	10	154	12.3	147	12.6	153	10.8
BMI										
<18.5	22	1.8	25	2	6	0.5	17	1.5	23	1.8
18.5-24.99	413	32.9	320	25.7	58	4.6	248	21.3	426	32.8
25-29.99	292	23.2	175	14.1	60	4.8	180	15.4	299	23.0
30-34.99	200	15.9	98	7.9	42	3.3	103	8.8	189	14.5
≥35	306	24.4	207	16.6	27	2.1	187	16.0	335	25.8
Missing	23	1.8	420	33.7	161	12.8	432	37.0	28	2.2

Smoking status										
Currently smoking	154	12.3	86	6.9	24	1.9	65	5.6	93	7.2
Not currently smoking	1080	86	766	61.6	342	27.2	722	61.9	1138	87.5
Unknown	22	1.8	392	31.5	891	70.9	380	32.6	69	5.3

Table 10.33 Complications of gynaecology surgery performed at ACH 2019-2023

	2019		2020		2021		2022		2023	
	N=1256		N=1245		N=1257		N=1167		N= 1300	
	n	%	n	%	n	%	n	%	n	%
Total complications	107	8.6	79	6.4	138	12.9	109	9.3	135	10.4
Blood transfusion	31	2.5	10	0.8	19	1.8	22	1.9	41	3.2
Intra-operative injury to internal organs	13	1.1	11	0.9	8	0.7	13	1.1	12	0.9
Failure to complete planned surgery	9	0.7	9	0.7	20	1.9	12	1	23	1.8
Anaesthetic complications	6	0.5	2	0.2	6	0.6	5	0.4	7	0.5
Significant post-operative infection	7	0.6	0	0.0	10	0.9	5	0.4	8	0.6
Other significant complications	3	0.2	4	0.3	6	0.6	2	0.2	6	0.5
Unplanned return to theatre in 6 weeks	10	0.8	7	0.6	10	0.9	14	1.2	12	0.9
Admission to DCCM	5	0.4	4	0.3	5	0.5	3	0.3	8	0.6
Readmission in 6 weeks	52	4.2	49	3.9	82	7.7	69	5.9	66	5.1
Postop complication	34	2.7	38	3.1	67	6.3	55	5.2	51	3.9
Planned re-admission	5	0.4	5	0.4	10	0.9	3	4.7	6	0.5
Other, please specify	13	1.1	6	0.5	5	0.5	11	0.9	9	0.7

10.6 Hysterectomy

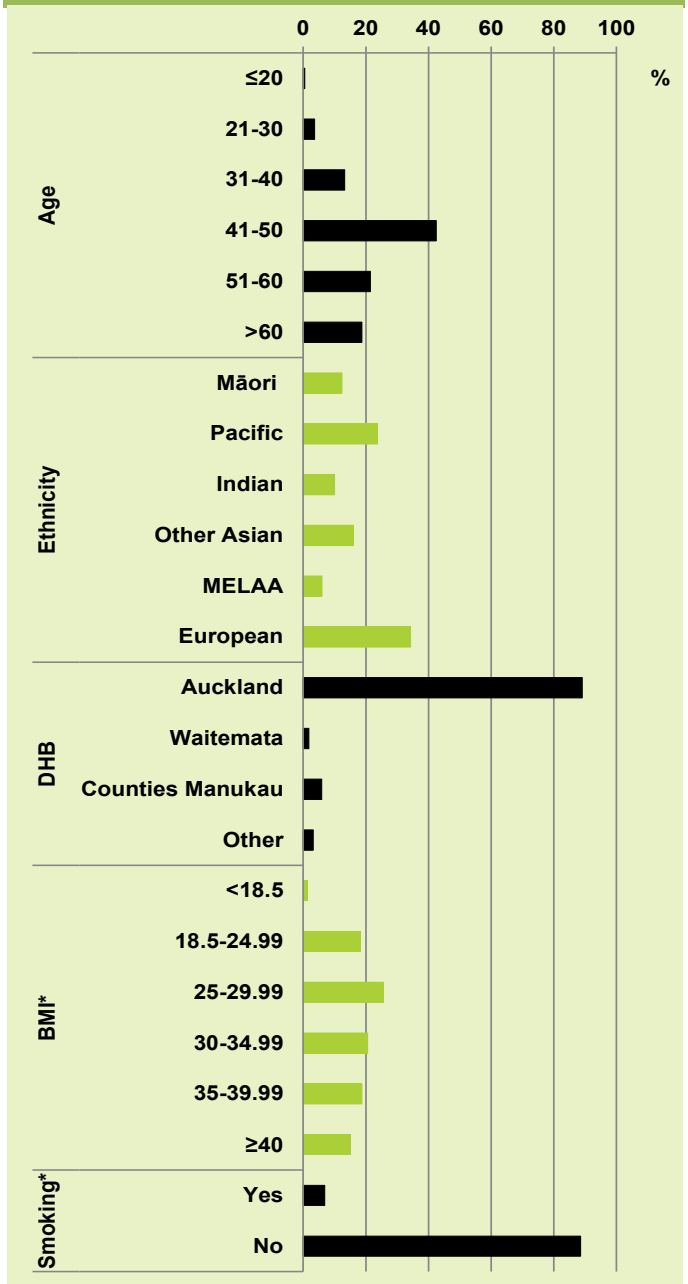
Dr Michael Wynn-Williams

This section includes only hysterectomies performed by the general gynaecology surgical team from Ward 97. It does not include hysterectomies performed by the Gynaecologic Oncology team, or hysterectomy cases done from another hospital ward or under the care of other services (e.g. urology).

Key Findings

- There were 219 hysterectomies performed under the benign gynaecology teams in 2023. This is increased from 154 in the previous year and may be due to increased availability of the minimally invasive option.
- The proportion of wāhine undergoing hysterectomy by vaginal and abdominal approach in 2023 continued to trend downward from previous years.
- The indication for hysterectomy in 2023 was similar to previous years, with abnormal uterine bleeding still the most common.
- The length of hospital stay overall for hysterectomy has remained at 2 days. Minimally invasive hysterectomy (including laparoscopic and vaginal hysterectomy) length of stay average is 2 days and abdominal hysterectomy is 4 days.
- Total complication rates in 2023 were reduced compared to those 2021 and 2022 at 13.7%. The post-operative infection rate has remained unchanged (2.3% in 2023 and 1.3% in 2022), which remains lower than the high of 9.1% in 2015. The rate of return to theatre was lower at 0.9% compared to 2021 (4.0%) and 2022 (4.5%). The rate of readmissions in the first six weeks has trended downwards from 15.5% in 2021 to 10.5% on 2023, although it remains higher than in 2019 and 2020 when postoperative nurse led clinics were first introduced in the service. The rate of blood transfusion remains low at 1.4% although is

Figure 10.11 Characteristics of patients undergoing hysterectomy by the general gynaecology team at ACH 2023



* BMI of 1 woman is missing
* Smoking status of 10 women is missing

variable from year to year.

Summary / Implications

Supporting equitable public access to minimally invasive hysterectomy, both laparoscopic and vaginal, has been an ongoing aim of the department. This has included collegial surgical support for specialists and ongoing education and adherence to evidence-based guidelines.

Over the last 5 years, more wāhine continue to be offered a minimally invasive approach to hysterectomy with a subsequent reduction in the length of stay. There has been a reduction in intraoperative complications but the cause and significance of this is unclear over the last three years.

In 2023 Clinical Nurse Specialist roles were introduced to the Minimally Invasive Gynaecology Service (MIGS) and the Urogynaecology Service. This has led to a refinement of the nurse led clinics at day 7-14 post operatively for all hysterectomies and laparotomies that were initially established in September 2018. These new roles initially appeared to have a positive impact on post-operative readmissions although these were higher in 2021-2023 compared to 2019-2020. These data need ongoing review.

In 2024, the MIGS team will introduce a day-stay hysterectomy program running out of the Greenlane Surgical Unit (GSU). The program aims to free up resources on Level 9 at the Grafton site and reduce patient length of stay. Day-stay hysterectomy is well established as an evidence-based standard of care in the USA and is being rolled out in the UK, Europe, and Australia. The MIGS Clinical Nurse Specialist role is key to the success of this program. This is the first such program to be established in Te Whatu Ora.

Figure 10.12 Complications of surgery among wāhine undergoing hysterectomy performed by the general gynaecology team at ACH 2013-2023

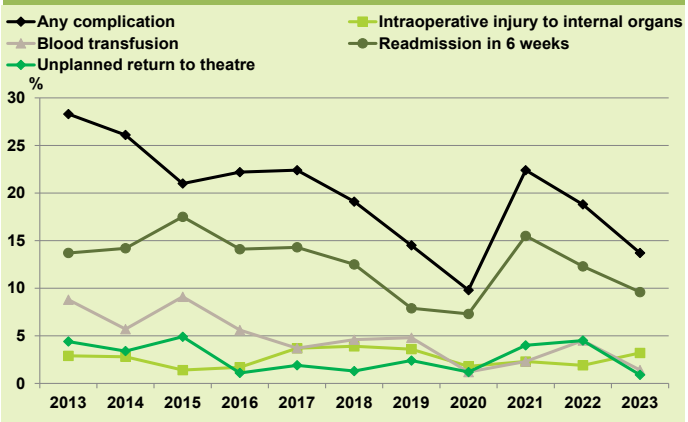
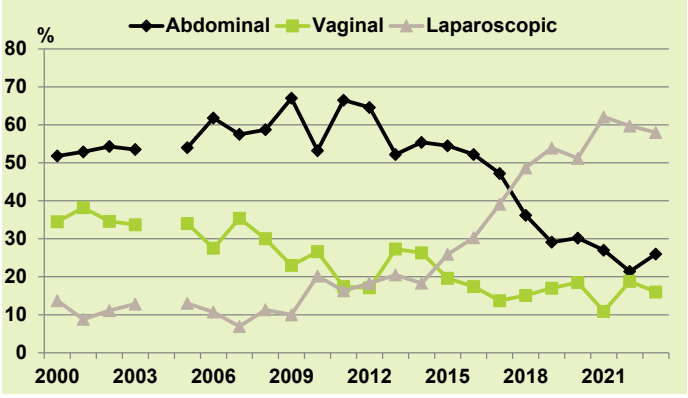


Figure 10.13 Route of hysterectomy among hysterectomies performed by general gynaecologists at ACH 2000-2023



10.6.1 Data tables: Hysterectomy

Table 10.34 Characteristics of wāhine undergoing hysterectomy by the general gynaecology team at ACH 2019-2023

	2019		2020		2021		2022		2023	
	N= 165		N= 162		N= 174		N= 154		N= 219	
	n	%	n	%	n	%	n	%	n	%
Age (years)										
<20	2	1.2	1	0.6	1	0.6	1	0.6	1	0.5
21-30	3	1.8	5	3.1	1	0.6	3	1.9	8	3.7
31-40	23	13.9	19	10.7	27	15.5	19	12.3	29	13.2
41-50	67	40.6	71	43.8	73	42.0	61	39.6	93	42.5
51-60	40	24.2	35	21.6	40	23.0	35	22.7	47	21.5
>60	30	18.2	31	19.1	32	18.4	35	22.7	41	18.7
Ethnicity										
Māori	16	9.7	9	5.5	17	9.8	23	14.9	27	12.3
Pacific	35	21.2	32	19.8	36	20.7	27	17.5	52	23.7
Indian	15	9.1	18	10.1	19	10.9	14	9.1	22	10.0
Other Asian	25	15.2	24	14.8	23	13.2	22	14.3	35	16.0
MELAA	5	3	3	1.9	11	6.3	7	4.5	8	3.7
European	69	41.8	76	46.9	68	39.1	61	39.6	75	34.2
Locality										
Auckland	149	90.3	143	88.3	151	86.8	134	87.0	195	89.0
Waitematā	9	5.5	7	4.3	8	4.6	7	4.5	4	1.8
Counties Manukau	4	2.4	5	3.1	7	4.0	6	3.9	13	5.9
Other	3	1.8	7	4.3	8	4.6	7	4.5	7	3.2
BMI										
<18.5	2	1.2	2	1.2	1	0.7	1	0.6	3	1.4
18.5-24.99	39	23.6	36	22.2	5	2.9	32	20.8	40	18.3
25-29.99	45	27.3	35	21.6	21	12.1	30	19.5	56	25.6
30-34.99	32	19.4	18	10.1	10	5.7	22	14.3	45	20.5
35-39.99	20	12.1	22	13.6	5	2.9	11	7.1	41	18.7
≥40	21	12.7	13	8.5	23	13.2	21	13.6	33	15.1
Missing	6	3.6	36	22.2	109	62.6	37	24.0	1	0.5
Smoking										
Currently	13	7.9	13	8	0.6	0.7	9	5.8	15	6.8
Not currently	147	89.1	115	66	37.9	31.9	111	72.0	194	88.6
Unknown	5	3	34	107	61.5	67.4	34	22.0	10	4.6

Table 10.35 Complications of surgery among wāhine undergoing hysterectomy performed by the general gynaecology team at ACH 2019-2023

	2019		2020		2021		2022		2023	
	N=165		N=162		N= 174		N= 154		N= 219	
	n	%	n	%	n	%	n	%	n	%
Any complication	25	15.2	16	9.8	39	22.4	29	18.8	30	13.7
Blood transfusion	8	4.8	2	1.2	4	2.3	7	4.5	3	1.4
Intra-operative injury	7	4.2	3	1.8	4	2.3	3	1.9	5	2.3
Anaesthetic complications	0	0.0	0	0.0	1	0.6	2	1.3	0	0.0

Significant post-operative infection	3	1.8	0	0.0	5	2.9	2	1.3	5	2.3
Other significant complications	3	1.8	1	0.6	5	2.9	1	0.6	1	0.5
Unplanned return to theatre	3	1.8	2	1.2	7	4.0	7	4.5	2	0.9
Admission to DCCM	2	1.2	0	0.0	2	1.1	2	1.3	2	0.9
Readmission to hospital	13	7.9	12	7.3	27	15.5	19	12.3	23	10.5
Planned readmissions	1	0.6	1	0.6	3	1.7	0	0.0	4	1.8
Postop complications	10	6.1	10	6.1	22	12.6	18	10.7	14	6.4
Other	2	1.2	1	0.6	1	0.6	1	0.6	5	2.3
Failed to complete planned surgery	2	1.2	0	0.0	0	0.0	0	0.0	0	0.0

Table 10.36 Surgical details of hysterectomies performed by the general gynaecology team at ACH 2019-2023

	2019		**2020**		**2021**		**2022**		**2023**	
	N=165		**N=162**		**N= 174**		**N= 154**		**N= 219**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Approach										
Laparotomy	47	28.5	46	28.4	45	25.9	27	17.5	53	24.2
Total laparoscopic hysterectomy	77	46.7	81	50	99	56.9	80	51.9	120	54.8
Laparoscopic assisted vaginal	12	7.3	2	1.2	9	5.2	12	7.8	7	3.2
Laparoscopic converted to laparotomy	1	0.6	3	1.9	2	1.1	6	3.9	4	1.8
Vaginal	28	17	30	18.5	19	10.9	29	18.8	35	16.0
Timing of surgery										
Elective	162	98.2	156	96.3	168	96.6	151	98.1	215	98.2
Acute	3	1.8	6	3.7	6	3.4	3	1.9	4	1.8
Primary indication for surgery										
Abnormal bleeding, non-pregnant	71	43	73	45.1	70	40.2	48	31.2	88	40.2
Cancer /pelvic mass	25	15.2	19	10.7	25	14.4	47	30.5	47	21.5
Urogynaecology / prolapse	26	15.8	27	16.7	20	10.5	29	18.8	32	14.6
Pain, cause unknown	10	6.1	8	4.9	10	5.7	6	3.9	17	7.8
Endometriosis	12	7.3	20	12.3	26	14.9	11	7.1	16	7.3
Ovarian cyst	2	1.2	4	2.4	2	1.1	2	1.3	6	2.7
Other	19	10.5	11	6.8	21	12.1	11	7.1	13	5.9
ASA rating										
1	49	29.7	20	12.3	17	9.8	23	14.9	50	22.8
2	87	52.7	77	47.5	29	16.7	67	43.5	142	64.8
3	23	13.9	17	10.5	11	6.3	24	15.6	26	10.9
4	1	0.6	1	0.6	1	0.6	0	0.0	1	0.5
5	0		0		0	0.0	0	0.0	0	0.0
Missing	5	3	47	28.7	116	66.7	40	26.0		
LENGTH OF STAY (days)	**Median(IQR)**		**Median(IQR)**		**Median(IQR)**		**Median(IQR)**		**Median(IQR)**	
All hysterectomies	**2(2-3)**		**2(1-4)**		**2(2-4)**		**2(1-3)**		**2(1-3)**	
By approach										
Abdominal	3 (2-3)		3.5 (3-4.8)		4 (3-5)		3 2-4)		3 (2-4)	
Laparoscopic	2 (1-2)		2 (1-2)		2 (1-3)		2 (1-2)		2 (1-2)	
Vaginal	2 (2-3)		2 (2-3)		3 (2-5)		2 (2-3)		2 (2-3)	

Table 10.37 Route of hysterectomy among hysterectomies performed by the general gynaecology team ACH 2019-2023

	2019		2020		2021		2022		2023	
	N=165		N=162		N=174		N=154		N=219	
	n	%	n	%	N=	%	N=	%	n	%
Abdominal	48	29.1	49	30.2	47	27.0	33	21.4	57	26.0
Vaginal	28	17	30	18.5	19	10.9	29	18.8	35	16.0
Laparoscopic	89	53.9	83	51.2	108	62.1	92	59.7	127	58.0

10.7 Gynaecology Laparoscopic Procedures

Dr Tin Lok Chiu

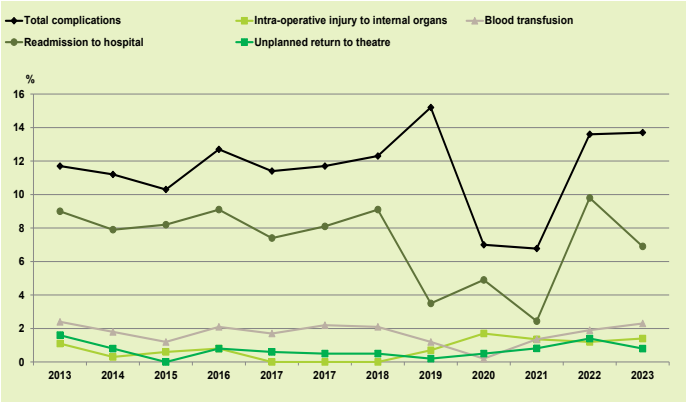
This section includes laparoscopic procedures performed by the general gynaecology surgical team. It includes all surgeries where laparoscopy was performed, including where laparoscopy was not the primary procedure.

Procedures performed by the gynaecologic oncology team are presented in section 10.3.

Key Findings

- 2023 had the highest number of laparoscopic cases since 2019 at 506
- Around two thirds of laparoscopic cases are planned elective procedures (67.8%)
- Most common elective procedures remain hysterectomy and endometriosis surgery
- Ectopic pregnancy remains most common reason for acute laparoscopic surgery
- Most complication rates appear stable since 2019, although readmission to hospital was significantly less common from 2019-2021 than before or after.

Figure 10.14 Complications of primary inpatient gynaecologic laparoscopic surgery at ACH 2013-2023



10.7.1 Data tables: Gynaecology Laparoscopic Procedures

Table 10.38 Complications of primary gynaecologic laparoscopic surgery at ACH 2023

	Total	
	N=	506
	n	%
Any Complication	56	10.1
Blood transfusion	14	2.8
Intra operative injury	7	1.4
Failure to complete procedure	7	1.4
Anaesthetic complication	2	0.4
Significant post-operative infection	2	0.4
Unplanned return to theatre	4	0.8
Admission to DCCM	4	0.8
Other significant complications	2	0.4
Readmission to hospital	35	6.9
Post op complications	24	4.7
Planned re-admission	4	0.8

Other		7	1.4

Table 10.39 Primary procedure and indication by timing of surgery for inpatient laparoscopic surgery under general gynaecology at ACH 2023

	Surgery in 2023	Acute admission		Elective admission	
	N	n	%	n	%
Primary procedure					
Total	506	163	32.2	343	67.8
Ovarian/tubal	179	100	55.9	79	44.1
Diagnostic laparoscopy	102	53	52.0	49	48.0
Endometriosis surgery	67	1	1.5	66	98.5
Hysterectomy	128	0	0.0	128	100.0
Other	30	9	30.0	21	70.0
Primary indication					
Total	506	163	32.2	343	67.8
Endometriosis	78	1	1.3	77	98.7
Ovarian cyst	92	44	47.8	48	52.2
Ectopic pregnancy	88	86	97.7	2	2.3
Pain, cause unknown	93	24	25.8	69	74.2
Abnormal bleeding	67	1	1.5	66	98.5
Infertility	11	0	0.0	11	100.0
Cancer/Pelvic mass	45	0	0.0	45	100.0
Other	32	7	21.9	25	78.1

*excluding procedures under the gynaecologic oncology team

Table 10.40 Complications of inpatient laparoscopic surgery under general gynaecology at ACH 2019–2023

	2019		2020		2021		2022		2023	
	N=426		N=411		N= 369		N=419		N= 506	
	n	%	n	%	n	%	n	%	n	%
Any complications	29	6.8	29	7.1	25	6.8	57	13.6	56	10.1
Blood transfusion	5	1.2	1	0.2	5	1.4	8	1.9	14	2.8
Intra-operative injury to internal organs	3	0.7	7	1.7	4	1.1	5	1.2	7	1.4
Failure to complete planned surgery	4	0.9	3	0.7	6	1.6	4	1	7	1.4
Anaesthetic complications	1	0.2	1	0.2	1	0.3	3	0.7	2	0.4
Significant post-operative infection	2	0.5	0	0.0	3	0.8	1	0.2	2	0.4
Unplanned return to theatre	1	0.2	2	0.5	3	0.8	6	1.4	4	0.8
Admission to DCCM	0	0.0	1	0.2	2	0.5	1	0.2	4	0.8
Other significant complications	1	0.2	0	0.0	2	0.5	1	0.2	2	0.4
Readmission to hospital	15	3.5	20	4.9	9	2.4	41	9.8	35	6.9
Post op complications	7	1.6	15	3.6	8	2.2	34	8.1	24	4.7
Planned readmission	2	0.5	1	0.2	0	0.0	1	0.2	4	0.8
Other	6	1.4	4	1	1	0.3	6	1.4	7	1.4

10.8 Urogynaecology

Dr Carolyn Bilbrough

The Urogynaecology section includes surgeries undertaken by the dedicated Urogynaecology team, and concentrates on operative procedures rather

than clinic throughput or urodynamic investigations as only surgical data are systematically collected.

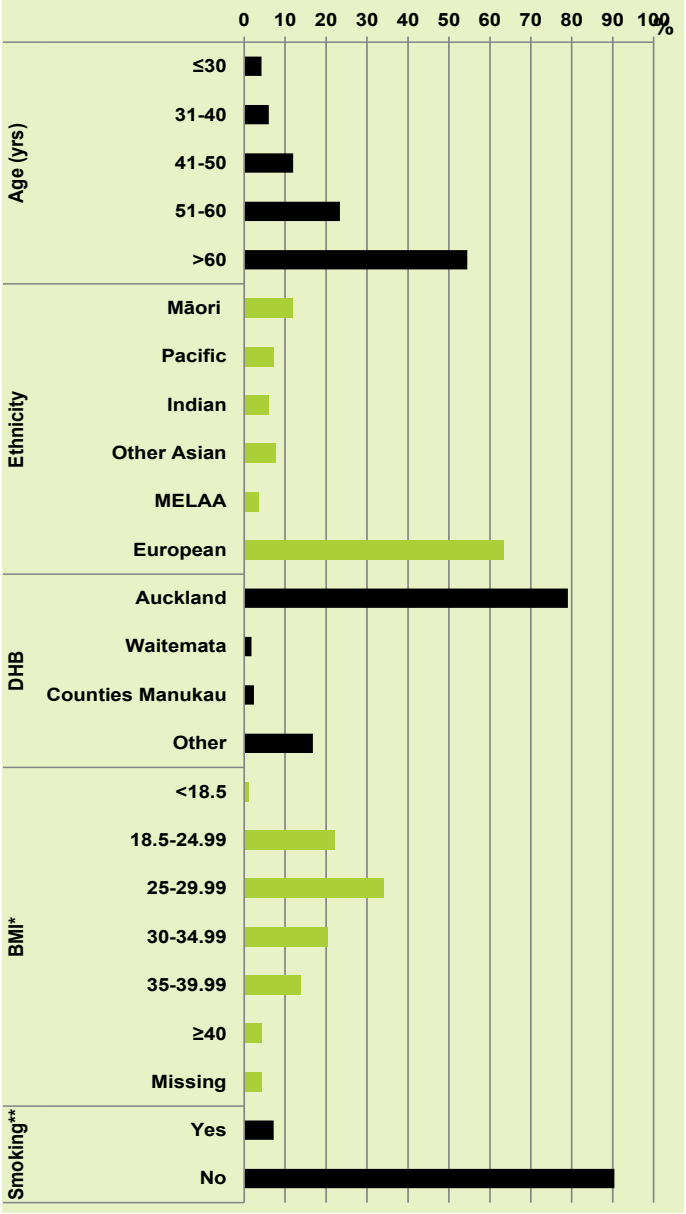
From 2012, urogynaecology procedures were categorised as: TVT, mesh repair, prolapse repair or urogynaecology other. Urogynaecology-other procedures are grouped together and include operations such as cystoscopy, Botulinum toxin injection into the bladder muscle, vaginal mesh removal, mid-urethral sling release or removal, bladder instillation and cystoscopy.

In 2022 and 2023, data are included on surgeries performed by the Urogynaecology team at Auckland City Hospital and at Greenlane Surgical Unit (GSU); these are presented in table 10.41 in separate columns.

Key findings

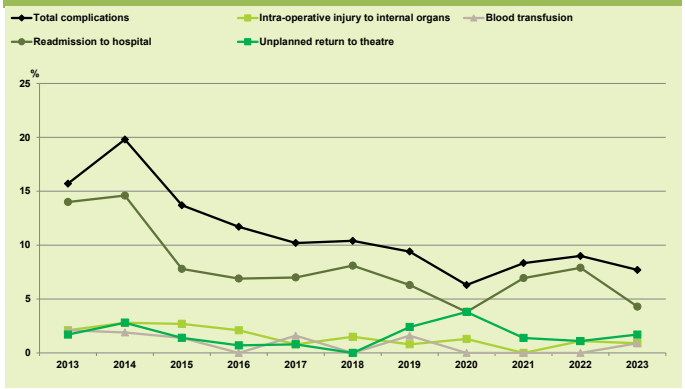
- In 2023 there were 117 urogynaecology procedures performed at Te Toka Tumai and 50 at Greenlane Surgical Unit (GSU). This shows a gradual increase in throughput of procedures since the decrease caused by the Covid-19 pandemic affecting previous years.
- > 70% of women operated on were over the age of 50 years which is consistent with the known increase in prolapse incidence after the menopause.
- Other demographics were similar to previous years except for a slight decrease in the proportion of European patients operated on in favour of more Indian and Pacific women
- Average hospital stay remained stable at 2 days for inpatients operated on at Auckland Hospital where the more major surgeries are performed and 6 hours for patients having day stay or more minor procedures at GSU.
- Complication rates were 2% at GSU and 7.7% at Auckland.
- The only complication recorded at Greenlane Surgical unit was a patient who went into bronchospasm during intubation, and she recovered well.
- Among the more major surgeries at Auckland Hospital there was one patient who required a blood transfusion and return to theatre from the recovery room due to internal bleeding after vaginal hysterectomy, which was then secured, followed by an uncomplicated recovery.
- There was one bladder injury that was recognised at the time of surgery, repaired, and cystogram a week later showed a well healed bladder.
- A second return to theatre was for post-operative bowel obstruction that had failed to settle with conservative management. The initial abdominal surgery had been abandoned due to extensive adhesions from previous surgery and a vaginal prolapse repair performed instead. She also required readmission for diarrhoea and vomiting approximately a week after discharge.
- There has been a big drop in readmissions this year with a total of only five. One was planned for a catheter removal. Most patients requiring this are referred to the District Nurses for catheter removal in the community.
- The other readmissions were for deep vein

Figure 10.15 Demography of wāhine undergoing primary inpatient urogynaecology surgery at ACH 2023



* Missing BMI for 7 women
** Missing smoking status for 3 women

Figure 10.16 Complications of primary inpatient urogynaecologic surgery procedures at ACH 2013-2023



thrombosis diagnosed 10 days post operation, wound infection, urine infection and the above-mentioned diarrhoea and vomiting.

- The only other complication that does not fit under the usual headings was a patient who had a period of asystole on arrival to recovery requiring CPR. Further investigations as to a cause were negative and recovery was otherwise uneventful.

10.8.1 Data tables: Urogynaecology

Table 10.41 Demography of wāhine undergoing primary urogynaecology surgery ACH 2019-2023

	2019		2020		2021		2022				2023			
							ACH		GSU		ACH		GSU	
	N=126		N=78		N=95		N= 89		N= 33		N= 117		N= 50	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age (years)														
< 30	0	0.0	0	0.0	2	2.1	1	1.1	3	9.1	2	1.7	2	4.0
31-40	12	9.5	3	3.8	9	9.5	3	3.4	2	6.1	8	6.8	2	4.0
41-50	23	18.3	16	20.5	15	15.8	11	12.4	6	18.2	11	9.4	11	22.0
51-60	28	22.2	15	19.2	13	13.7	20	22.5	7	21.2	22	18.8	17	34.0
>60	63	50.0	44	56.5	56	58.9	54	60.7	15	45.5	74	63.2	18	36.0
Ethnicity														
Māori	12	9.5	8	10.3	4	4.2	7	7.9	6	18.2	10	8.5	9	18.0
Pacific	9	7.1	4	5.1	4	4.2	4	4.5	1	3.0	11	9.4	1	2.0
Indian	11	8.7	5	6.4	3	3.2	6	6.7	0	0.0	9	7.7	1	2.0
Other Asian	8	6.3	4	5.1	10	10.5	8	9.0	2	6.1	10	8.5	3	6.0
MELAA	0	0.0	1	1.3	6	6.3	0	0.0	3	9.1	4	3.4	2	4.0
European	86	68.3	56	71.8	68	71.6	64	71.9	21	63.6	73	62.4	34	68.0
Locality														
Auckland	97	77.0	65	83.3	79	83.2	71	79.8	29	87.9	92	78.6	40	80.0
Waitematā	4	3.2	1	1.3	1	1.1	2	2.2	0	0.0	1	0.9	2	4.0
Counties Manukau	3	2.4	2	2.6	2	2.1	2	2.2	0	0.0	4	3.4	0	0.0
Other	22	17.5	10	12.8	13	13.7	14	15.7	4	12.1	20	17.1	8	16.0
BMI														
<18.5	0	0.0	0	0.0	1	1.1	2	2.2	1	3.0	1	0.9	1	2.0
18.5-24.99	28	22.2	15	19.2	8	8.4	21	23.6	8	24.2	30	25.6	7	14.0
25-29.99	47	37.3	13	16.7	13	13.7	27	30.3	6	18.2	39	33.3	18	36.0
30-34.99	35	27.8	14	17.9	9	9.5	16	18.0	9	27.3	25	21.4	9	18.0
35-39.99	7	5.6	7	9	3	3.2	10	10.2	2	6.1	17	14.5	6	12.0
≥40	9	7.1	9	10.4	8	8.4	5	5.6	0	0.0	5	4.3	2	4.0
Missing	0		20	25.6	53	55.8	8	9.0	7	21.2	0	0.0	7	14.0
Smoking														
Currently smoking	11	8.7	3	3.8	3	3.2	6	6.7	1	3.0	109	93.2	42	84.0
Not currently smoking	114	89.8	58	73.2	35	36.8	76	85.4	27	81.8	7	6.0	5	10.0
Missing	2	1.6	17	21.8	57	60.0	7	7.9	5	15.2	1	0.9	3	6.0
Length of stay (days)														
(median (IQR))	2(1-3)		2(1-3)		2(1-3)		2(1-3)		0.2(0.2-0.4)		2(1-3)		0.2(0.2-0.3)*	

*equal to 6(5-7) hours

Table 10.42 Complications of primary urogynaecologic surgery procedures at ACH 2019-2023

	2019		2020		2021		2022				2023			
							ACH		GSU		ACH		GSU	
	N=	127	N=	78	N=	95	N=	89	N=	37	N=	117	N=	50
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total complications	12	9.4	5	6.4	8	8.4	8	9.0	0	0.0	9	7.7	1	2.0
Blood transfusion	2	1.6	0	0.0	0	0.0	0	0.0	0	0.0	1	0.9	0	0.0
Intra-operative injury to internal organs	1	0.8	1	1.3	0	0.0	1	1.1	0	0.0	1	0.9	0	0.0
Failure to complete planned surgery	1	0.8	0	0.0	0	0.0	1	1.1	0	0.0	2	1.7	0	0.0
Anaesthetic complications	1	0.8	0	0.0	1	1.1	0	0.0	0	0.0	0	0.0	1	2.0
Significant post-operative infection	0	0.0	0	0.0	3	3.2	0	0.0	0	0.0	2	1.7	0	0.0
Unplanned return to theatre	3	2.4	3	3.8	1	1.1	1	1.1	0	0.0	2	1.7	0	0.0
Admission to DCCM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other significant complications	0	0.0	1	1.3	1	1.1	0	0.0	0	0.0	2	1.7	0	0.0
Readmission to hospital	8	6.3	3	3.8	7	7.4	7	7.9	0	0.0	5	4.3	0	0.0
Post-operative complication	6	4.7	2	2.6	5	5.3	7	7.9	0	0.0	4	3.4	0	0.0
Planned readmission	1	0.8	0		2	2.1	0	0.0	0	0.0	1	0.9	0	0.0
Other	1	0.8	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Length of stay (days)														
(median (IQR))	2 (1-3)		2 (1-3)		2 (1-3)		2 (1-3)		0.2 (0.2-0.4)		2 (1-3)		0.2 (0.2-0.3)*	

*equal to 6(5-7) hours

10.9 Fertility Plus

Jeanette Mackenzie, Cindy Farquhar

Table 10.46 summarises the 2023 results of IVF/ICSI autologous cycles (wāhine having their own fresh eggs used for insemination) and resultant embryos transferred, including data from private and public funded cycles. Our results are benchmarked against the ANZARD (Australian and New Zealand Assisted Reproduction) Database which records all treatment cycles for Australia and New Zealand.

The data in Table 10.46 represent women of all ages. Donor/recipient, surrogacy and PGT cycles are not included.

The data collection for all accredited fertility clinics allows individual units to make their own comparisons against the figures for all patients in Australasia undergoing treatment in any given year. As a comparison group for our 2023 data, we have been able to use the data from the ANZARD Report for 2021 (the most recently published ANZARD data).

IVF/ICSI cycles

A total of 495 cycles were started and there were 466 (94%) with an egg collection.

Donor egg cycles

In 2023, there were eleven egg collections for egg donors.

There have been thirty-three frozen embryo transfers of embryos made with donor eggs of which fourteen have clinical pregnancies.

Surrogacy cycles

There were seven people offering to be surrogates who undertook nine embryo transfers of which six had clinical pregnancies.

Embryo Donation

There were two embryo donor recipients who underwent embryo transfers who did not achieve a pregnancy.

Stopped cycles

The definition of a 'stopped cycle' is one in which the cycle starts (with treatment designed to stimulate the ovaries) but it is stopped before an egg collection takes place. Our 5% stopped cycle rate is under the ANZARD benchmark of 11%. One cycle was stopped due to over-response as this woman was considered to have a high risk of severe ovarian hyperstimulation syndrome (OHSS) to have an egg collection. We had two hospitalisations for OHSS in 2023 (0.4%). All women were managed conservatively.

A large proportion of stopped cycles were for poor ovarian response (19 from 29 stopped cycles). In most women poor response is based on poor ovarian reserve which is not amenable to treatment. Women with poor ovarian reserve who

do not respond to maximal gonadotrophins can be offered oocyte donation.

No embryo transfer

Forty-four percent of cycles had a fresh embryo transfer, and this is on par with the 40% ANZARD benchmark for 2021.

Reasons for 'freeze-all' cycles include progesterone levels ≥6 nmol/L (n=15) (allows for transfer in a later cycle when the endometrial synchrony is better), women at risk for severe OHSS (n=111) (transfer in a later cycle reduces OHSS risk). Endometrial anomalies such as polyps on ultrasound were a reason for freeze-all in seventeen women.

Forty three women of the 466 undergoing egg collection did not develop embryos. Six women had no eggs collected (this is always a potential risk in women with a low response and only a couple of follicles). Of the 21 women who had no fertilization of their eggs, the majority were women who had very few or very poor quality eggs. Unexpected failed fertilization of good numbers of apparently good quality eggs is a rare event.

Pregnancies

As single embryo transfer and freeze all cycles have become more common, the outcome of the fresh embryo transfer cycle, the traditionally expressed standard outcome measure, is assuming less relevance as a key performance indicator. Of more relevance is the cumulative live birth rate per woman undergoing IVF stimulation, of healthy singleton babies at term, when all embryos from both fresh and thaw are transferred from one initiated cycle. The cumulative pregnancy rate from egg collections in 2022 is 42%. Treatment in 2022 from all types of cycles resulted in the live birth of 240 babies, 132 females and 108 males.

Single embryo transfer

Although single embryo transfer had been introduced at Fertility Plus in 2006 for public cycles, it was only in the second half of 2014 that a single embryo transfer policy was introduced regardless of funding. In 2014 Fertility Plus had a multiple birth rate of 6.5% but in 2023 the multiple pregnancy rate was 0.6% which is similar to the rate for natural pregnancies. There were no multiple pregnancies from fresh transfers but two of the 315 pregnancies were twins from all the thaw cycle transfers in 2023.

Intrauterine Insemination (IUI)

The 2023 ongoing pregnancy rate for less than 35 year olds was 13.6% (18/132) and for 35 to 40 year olds was 7.7% (12/155). No one over the age of 41 had an ongoing pregnancy. The 2023 ongoing pregnancy rate for donor insemination was 10% per insemination cycle (2/20).

10.9.1 Data tables: Fertility Plus

Table 10.43 Ethnicity of patients receiving fertility treatment 2021-2023

	2021		2022		2023	
	N=878		N=815		N=796	
	n	%	n	%	n	%
Māori	26	3.0	28	3.4	36	4.5
Pacific	45	5.1	53	6.5	41	5.2
Asian	413	47.0	391	48.0	392	49.2
MELAA	30	3.4	32	3.9	30	3.8
European	356	40.5	300	36.8	289	36.3
Other ethnicity	8	0.9	11	1.3	8	1.0

Table 10.44 Fertility preservation 2023

	Patients 2023 N=39		
	N. Frozen	Mean No. Oocytes	Range
Oocyte Freeze	35	12	1-51 (oocytes)
Embryo Freeze	4	11	2-6 (embryos)

Table 10.45 Fertility Plus IVF cycle outcomes 2019-2023 (compared to ANZARD benchmark data 2021)

	IVF/ICSI cycles		IVF/ICSI cycles		IVF/ICSI cycles		IVF/ICSI cycles		IVF/ICSI cycles	
	2019		2020		2021		2022		2023	
	n	%	n	%	n	%	n	%	n	%
Number of cycles started	534		539		486		439		495	

Number of cycles stopped	41	8.8	96	18	39	8	36	8	29	5.8
ANZARD Benchmark for % cycles stopped										11
Reasons for stopped cycles										
Over response	3	0.5	1	0.2	3	0.6	3	0.7	1	0.2
Poor response	27	5	39	7.3	28	5.8	22	5	19	3.8
Other (including patient choice)	17	3.2	16	3	8	1.6	11	2	9	1.8
COVID Level 4 Lockdown			40	7.5						
Number of cycles reaching oocyte pick up (OPU)	487	91	441	82	447	92	403	92	466	94
Number of cycles with fresh embryo transfer	290	60	275	62	259	53	194	44	220	44
ANZARD Benchmark for cycles reaching transfer										40
Reasons for no transfer										
Freeze all cycle	148	30	134	30.4	155	34.6	169	42	203	44
Egg vitrification	14		18		19		18		35	
Elevated progesterone	20		6		12		14		15	
OHSS risk	30		82		97		103		111	
Agonist trigger (combined with OHSS risk in 2021)	69		n/a		n/a		n/a		n/a	
Endometrial (needing surgery)	4		15		12		14		17	
Fertility preservation- embryos	2		3		3		8		5	
COVID Level 4 Lockdown	4		0		0		0		0	
Other	9		6		12				20	
No eggs	5		4	0.9	7	1.6	7	1.7	6	1.3
No fertilisation	13		17	3.9	20	4.4	17	4	21	4.5
Other	31		11		6	1.3	16	3.9	16	3.4

Table 10.46 Fertility Plus Ongoing Pregnancy Rates 2021-2023

	2021		2022		2023		ANZARD Benchmark for Live Birth 2021
	n	%	n	%	n	%	
Ongoing pregnancy rate/ Cycle started (fresh transfer only)	76	15.6	43/270	16	68/292	23	20
Ongoing pregnancy rate/ OPU (fresh transfer only)	76	17	43/234	18.4	68/263	26	24
Ongoing pregnancy rate/ fresh embryo transfer	76	29.3	43/194	22	68/220	31	33
IVF/ICSI cycles Single Embryo Transfer (SET) rate– all ages	258	99	194	100	222/222	100	
Twinning							**RTAC Guidelines**
From DET	0	0	0	0	0	0	<10%
From SET (monozygotic)	0	0	0	0	0	0	<10%
Thaw cycles							
Ongoing pregnancy rate per thaw (Blastocyst)	158	33	156/439	36	219/551	40	32
Single embryo transfer rate thaw cycles	3	99.4	438	99.7	569/574	99.1	95
Twinning rate from embryo thaw cycles	2	2	2	1.1	2/243	0.8	<10
Admission for OHSS	4		4	0.9	2	0.4	0.4

11

CHAPTER 11

APPENDIX

ŪPOKO 11

KUPU ĀPITI

11.1 Methodology

Maternity data

Description of māmā and pēpi included in the Annual Clinical Report

The maternity section of this Annual Clinical Report includes data pertaining to māmā giving birth to pēpi at and beyond 20 weeks gestation at NWH during the 2023 calendar year or, if prior to arrival, due to unplanned birth at home or en route (BBA = born before arrival), and the pēpi of these māmā.

Data sources

Maternity data for years prior to 2001 were collected into the AMSIS (Auckland Maternity Services Information System) database. For this report, most data for the years prior to 2001, included in tables and figures to demonstrate time trends, have been obtained from previous Annual Clinical Reports, rather than from source data.

From April 30 2022 to current, maternity data were extracted from Badgernet.

Data was extracted from the Titan database (ICD-10 coded data on hospital discharges), supported by the Business Intelligence Unit, and from the PIMS-theatre database and was used to check the accuracy of some maternity data.

The majority of registration data for māmās with self employed lead maternity caregivers (LMCs) were shared by LMCs and entered into Healthware and Badgernet by one administrator.

Data quality (Badgernet)

In 2022 with the introduction of Badgernet there were challenges with understanding how the user used the database and where and how data could be extracted. This was a hugely demanding process. The user did not have familiarity with the database and this resulted in gaps in data. Over time Women's Health Intelligence have refined the process for checking data on a daily and monthly basis.

Early 2023 WHI introduced a document to support the checking of the daily birth list which has resulted in more complete data. On a monthly basis, cleaning breastfeeding status and reconciliation with Birthcare numbers is undertaken. Further in depth data cleaning is undertaken as time allows. Cleaning has included completing missing data and checking out of range and inconsistent data. These cleaning strategies have been focused around priority areas for reporting and areas where cleaning could be efficiently completed within the resource available. Further details of variables cleaned are provided below. NWH acknowledges that these cleaning efforts, whilst extremely time consuming, are not exhaustive. On occasion, it became apparent during analysis that further cleaning was required and this was performed on an ad hoc basis and may not be included in the list provided. Services or individuals wishing to use the NWH data for further analysis should be aware that areas not mentioned may not have been cleaned. For further advice please contact the WHI team.

The introduction of comprehensive computerised clinical records (CRIS, 3M, Concerto, Eclair and Impax (Radiology PACS System)) by Te Toka Tumai has enhanced data collection, checks on data integrity and clinical audit tremendously.

Authorised clinical staff can access the complete clinical record electronically so that no clinical record is lost and the delays inherent in the old paper-based system are avoided.

No data dictionary is currently available for Badgernet data.

In 2023 Badgernet which had been owned by Clevermed was sold to System C, an international computer company.

Maternity SPINE Phase 1

In 2023 Te Whatu Ora rolled out the electronic transfer of data from the software which is used by self employed practitioners (EXPECT and SOLUTIONS PLUS) in Badgernet. At this stage only limited booking data is transferred electronically and also data relating to the LMC screen. There have been some bugs in the software which impacted the Circle of care page and resulted in additional data cleaning.

The SPINE is managed by Te Whatu Ora Health New Zealand, not Badgernet.

Newborn Data

Data in the Newborn section pertain to all pēpi admitted to and cared for at the NWH Neonatal Intensive Care

Unit(NICU) if born during the 2022 calendar year. This includes pēpi transferred from other units or home. Data for this report have been extracted from a stand-alone SQL database for neonatology.

NICU data are collected prospectively by the Resident Medical Officers and Nurse Specialists – Advanced Neonatal Practitioners working on the NICU. The neonatal database is used to produce problem lists, flow sheets and letters which also ensure checks of data integrity throughout a pēpi's stay. Further data are collected and accuracy checked for the Australia and New Zealand Neonatal Network (ANZNN).

An updated version of the neonatal database was introduced in June 2017.

Newborn Data Quality

Additional checks of the accuracy of the data (including checking clinical records and some original radiology) are made in preparing the annual report and prior to sending the data to ANZNN. Data in the NICU database is checked against the Healthware and Badgernet database for birthweight, Apgar score, gestation and length of stay. Images were checked on all serious adverse outcomes (IVH, PVL, ROP, NEC, death). Laboratory and clinical records were checked on all possible or definite septicaemias or meningitides. Records were checked when the data entered in different fields in the database appeared inconsistent. Maternal and neonatal records of all pēpi with encephalopathy or neonatal seizures were reviewed.

Gynaecology data

Data sources

General gynaecologic surgery data were obtained from a stand-alone Access database before 2019, from Healthware, for 2019 - October 2021 and from Dendrite from October 2022 onwards..

Dendrite was introduced in October 2021 and a huge effort was undertaken in 2023 to complete the data for 2022 and 2023. The Urogynaecology data has been well documented in Dendrite for surgeries which occurred in both Te Toka Tumai and Greenlane Surgical Unit (GSU and are therefore reported in this report.

Fertility Plus data were extracted and reported by the

service from their Artemis database system, and Epsom Day Unit data were extracted from the PHS system. The data presented in the Colposcopy section arise from data collected from 2009-2011 into Healthware and data collected into the (Solutions Plus) Colposcopy database from July 2012. Data are not included for the transition period from January-July 2012. In late Feb/ early March 2023, the colposcopy database was upgraded which resulted in a change in views of the 2022 data. Data extraction was made more difficult. In built reports in the database were proven to not be accurate, and this was reported to the vendor.

The data in the Gynaecologic Oncology section have been obtained from an Access database recording gynaecologic oncology MDM reviews and inpatient surgeries among women cared for by the gynaecologic oncology service.

Data Quality

The data in the general gynaecology and gynaecologic oncology surgery databases were compared to surgeries entered in the PIMS theatre database and to hospital discharge coded surgeries which are stored in the Titan data warehouse to identify missing, inconsistent and out of range data. Inconsistencies were clarified by review of clinical case records. Clinical review of individual cases where complications occurred was also undertaken by clinicians responsible for individual surgical areas. The definitions used in these databases can be viewed onthe shared computer drive at N:\Groups\O and G Projects\Gynaecology Surgical Cases Database\Update and N:\Groups\Gynae Oncology\Database.

All non Gynaecology surgeries were excluded. Urogynaecology data was checked against PIMS theatre for completeness of urogynaecology surgeries which occurred in GSU and Te Toka Tumai level 9 theatre. It is possible that urogynaecology surgeries undertaken by general gynaecologists are not included.

Analytical and statistical methods

All data have been extracted and analyzed using SQL, Access, Excel, Python and STATA17. Tables are formatted with either column or row percentages as indicated. Statistical testing is occasionally included.

Data cleaning queries (Badgernet data)

The following is a list of the data cleaning and validation queries which were carried out for the production of this report. This list is not exhaustive and some further ad hoc cleaning was carried out during analysis. In comparison to the Healthware data, the amount of cleaning was initially reduced due to source data not being available for checking.

LMC information/plan/circle of care

- Check all LMC have correct Care type, Lead maternity carer type, Lead maternity carer.
- If Te Toka Tumai is LMC check named midwife and team is complete.
- Check all unbooked women that LMC screen is correct.
- Ethnicity is Not Stated or Other.
- Previous Caesarean: If indication for Caesarean Section = repeat Caesarean, previous Caesar=yes and parity is > 0.
- BMI (Body Mass Index): Calculated from earliest weight recorded, as weight (kg)/height(m)2. If BMI <17 or >40, check height and weight or any mismatch of data.
- Check missing membrane rupture method
- Check missing reason for membrane rupture.
- Check for duplicate pregnancy
- Check for APH, placenta praevia in Titan and update risk sheet.
- Check for chronic hypertension, gestational hypertension, pre-eclampsia and eclampsia in Titan and update risk sheet.
- Check for Diabetes in Titan and update risk sheet.
- Check for eclampsia.
- Check indication for CS is APH, placenta praevia then update risk sheet.
- Check indication for CS is hypertension then update risk sheet.
- Check IOL indication APH, placenta praevia then update risk sheet.
- Check IOL indication hypertension then update risk sheet.
- Check IOL indication diabetes then update risk sheet.
- Check if Reason for ARM is Inudction add a induction tab.
- Checked ONSET of LABOUR field is induction , add a IOL screen.
- Check for Induction if time of of 1st stage is > 12 hours before time of birth.
- Check IOL has an Indication.
- Check Time of IOL is before birth.
- Check if membrane rupture time is ARM and time is > 5hrs before birth.
- Check all indications for IOL which are OTHER and reclassify where appropriate.
- Check membrane rupture ARM but mode of birth is CS.
- Check missing ARM time.
- Check membrane rupture at time of CS but Mode of Birth not CS.
- Check Membrane rupture time after birth.
- If reason for CS is failed induction check there is a induction screen.
- Smoking, check all women have smoking status at booking.
- If Birth method is breech, then presentation is breech.
- Birth Presentation is null, check presentation.
- Ensure all CS have a grade (1-4).
- Check all CS Grade 1-3 have a dilatation at time of CS.
- Check all CS have an indication for CS.
- Check all CS who have a reason for CS as OTHER and reclassify those which are able to be reclassified.
- Check reason for CS is malpresentation, check presentation.
- Check for missing CS operation note.
- Check for missing baby presentation.
- Grade 4 CS check onset of labour.
- In labour CS but no labour established.
- Check missing onset labour.
- Blood loss is missing.
- Check Blood loss against PIMS theatre.

- Check all duplicate blood loss screens.
- Check Titan and PIMS for blood transfusion, update Badgernet.
- Vaginal Birth & Lacerations is Null.
- If Instrumental Birth (Forceps, ventouse) then check for Episiotomy.
- Check against Titan for 3rd/4th degree tear.
- Check against Titan for episiotomy.
- Mortality screen was checked for missing PDC and NDC, stage of death, and termination.
- CMS was checked against Badgernet for deceased pēpi.
- Check risk sheet if admission to ward is for Diabetes, hypertension or APH.
- Check consistancy of māmā and pēpi mode of birth.
- Check risk sheet for reason OTHER and reclassify if appropriate.
- Check multiple births are entered in the risk sheet with a classification of type of birth.
- Check ECV in risk sheet but no ECV form.
- ECV in AN assessment but no ECV form.
- Breast Feeding pēpi Unknown from feeding update form.
- Check for inconsistencies in BF data eg can not change from Partial to Exclusive BF.
- Blood loss >2500, no blood transfusion.
- Check Blood Transfusion which occurred before birth.
- Titan is checked for uterine rupture, amniotic fluid embolism, pulmonary embolism, peripartum hysterectomy, placenta accreta/ percreata/increta.

Pēpi

- Birth weight – check if <400g or >5kg.
- Missing sex.
- If gestation <35 weeks, check birth weight if >2500g.
- If gestation >35 weeks, check birth weight if <2500g.

Gestation: check if < 20wks or > 44 wks.

- Neonatal database gestation to derived gestation > 1 week difference. (Because of the incomplete reconciliation of data sets, there may be a minimal number of cases where gestation varies in reporting of the neonatal and maternity data.)
- Gestational Age (Immediate Newborn Assessment) Is Null.
- Missing Apgars.
- Live birth with Apgars 1min or Apgars 5 min of 0.

Data Checks with Other Sources

- CMS/ Coding data to ensure correct birth numbers.
- Neonatology database; fields checked include Birthweight, Gestation, Apgars & Days in NICU.
- PIMs theatre data checked against Healthware for epidural and GA, blood loss, operative vaginal birth and CS.
- Titan coding data cross checked with Healthware for hypertension, APH, diabetes, perineal trauma, mode of birth, General anaesthetic, manual removal of placenta, PPH blood transfusion.

BN gestation to Neonatal database

- Check that babies less than 28 weeks gestational age have the same gestation in Badgernet
- Check that babies with a gestational age of 28-36 weeks have a difference in gestation of 1 week or less in Badgernet
- Check that babies with a gestational age of >=37 weeks have a difference of <= 2 weeks

BN apgars to Neonatal database

- Check that babies with apgars of <7 are the same in both databases
- Check for any missing apgars

BN birthweight to Neonatal database

- Babies birthweight of <1500gms should be the same in both databases
- Babies birthweight of > 10gms difference in both databases should be checked.

11.2 Abbreviations

ABA	American Board of Anaesthesiologists
ACH	Auckland City Hospital
ACL	Anticardiolipin antibody
ACHS	Australian Council Healthcare Standards
AMOSS	Australasian maternity outcomes surveillance system
AMSIS	Auckland Maternity Services Information System
ANA	Antinuclear antibody
ANZNN	Australia and New Zealand Neonatal Network
APH	Antepartum haemorrhage
ARM	Artificial rupture of membranes
ASA	American Society of Anaesthesiologists
AUT	Auckland University of Technology
BBA	(Baby) Born Before Arrival (not a planned home birth)
BFHI	Baby Friendly Hospital Initiative
BI	Business Intelligence
BMI	Body mass index
BP	Blood Pressure
BPD	Bronchopulmonary dysplasia
CDU	Child Development Unit
CHD	Congenital Heart Disease
CI	Confidence Interval
CLD	Chronic lung disease
CPAP	Continuous positive airways pressure
CRIS	Clinical Records Information System
CS	Caesarean section

CVA	Cerebro Vascular Accident
CVS	Chorionic villus sampling
DAU	Day Assessment unit
DBP	Diastolic blood pressure
DCCM	Department of Critical Care Medicine
DCDA	Dichorionic diamniotic twin
DHB	District Health Board
DIC	Disseminated intravascular coagulopathy
DNA	Did not attend
DORV	Double outlet right ventricle
DRG	Diagnosis related groups
ECMO	Extra Corporeal Membrane Oxygenation
EDU	Epsom Day Unit
ENND	Early neonatal death
ERPOC	Evacuation of retained products of conception
FFN	Fetal Fibronectin
FH	Fetal heart
FTE	Fulltime equivalent
GA	General anaesthetic
GDM	Gestational diabetes mellitus
GH	Gestational hypertension
GLH	Green Lane Hospital
GO	Gynaecologic oncology
GP	General Practitioner
GPH	Gestational proteinuric hypertension
GROW	Gestation Related Optimal Weight software
GSU	Greenlane Surgical Unit
GTT/ OGTT	Oral Glucose Tolerance Test
Hb	Haemoglobin
HbA1c	Glycosylated haemoglobin
HDU	High Dependency Unit
HELLP	Hemolysis, Elevated Liver Enzymes, Low Platelets
HFOV	High frequency oscillatory ventilation
HIE	Hypoxic ischaemic encephalopathy
HiFlow	High flow air oxygen
HIV	Human Immunodeficiency Virus
HMD	Hyaline Membrane Disease
HPV	Human papilloma virus
ICH	Intracerebral haemorrhage
ICSI	Intracytoplasmic sperm injection
IDDM	Insulin dependent diabetes mellitus
INDO	Treated with indomethacin
INO	Inhaled nitrous oxide
IOL	Induction of labour
IPPV	Intermittent positive pressure ventilation
IUD	Intrauterine death
IVF	In vitro fertilisation
IVH	Intraventricular haemorrhage
KPI	Key performance indicator
LB	Live birth
Ligate	Ligate Surgical ligation of PDA
LLETZ	Large loop excision of the transformation zone
LMC	Lead Maternity Carer
LMP	Last menstrual period
LNND	Late neonatal death
LSCS	Lower segment Caesarean section
LSIL	Low-grade squamous intraepithelial lesion
LV	Left ventricle
MAS	Meconium aspiration syndrome
MCDA	Monochorionic diamniotic twin
MCMA	Monochorionic monoamniotic twin
MDM	Multidisciplinary meeting
MFM	Maternal Fetal Medicine
MSU	Midstream urine
N/R	Not resuscitated
NAS	Neonatal abstinence syndrome
NEC	Necrotising enterocolitis
NFD	Not further defined
NICU	Neonatal Intensive Care Unit
NIDDM	Non-insulin dependent diabetes mellitus
NPSU	National perinatal statistics unit (Australia)
NSU	National screening unit
NWH	National Women's
NZBFA	Breast Feeding Authority
OP	Occiput posterior
OPU	Oocyte pick up
PCR	Protein Creatinine ratio
PDA	Patent ductus arteriosis
PE/PET	Pre-eclampsia

11.3 Definitions

Impact of Badgernet on definitions

On 30 April 2022, the Badgernet electronic maternity record replaced the previous Healthware record at Te Toka Tumai. Therefore the data for the 2022 year includes 4 months data from Healthware and 8 months from Badgernet. There are some differences in the Badgernet data collection compared to that from Healthware. This has required some changes in the way data is presented in this report. As far as possible, data has been aligned between the two systems. Where this was not possible, new definitions have been applied and this will lead to some artificial changes in trends over time. Further specific detail on some of the changes in definitions due to the need to align data between Heathware and Badgernet are given below:

Induction of Labour

- The variable for induction of labour was constructed in the following way in 2022: Induction was assumed to have been undertaken if (1) any induction cycles were completed in Badgernet (2) labour was reported to commence by successful induction (3) indication for ARM was reported as induction of labour (4) reason for Caesarean was failed induction.
- In some cases, there was an attempted induction of labour followed by an Emergency prelabour CS. Failed induction of labour leading to CS is now categorised in "onset of birth" as "Emergency CS prior to labour" rather than as "induced labour" (as it was previously) to increase national consistency.
- We are unable to report use of syntocinon in labour again in 2023; data on use of syntocinon for augmentation, and the dilatation at which it was commenced, are not easily accessible in Badgernet.

Pregnancy/Birth

- Onset of birth does not include a category for planned CS (which previously included all preplanned CS, whether undertaken in labour or pre-labour). Categories are spontaneous onset, induced-successful, and CS before labour (including failed induction).
- Mode of birth includes new definitions for elective and emergency CS.
- Elective CS is only reported where a CS was planned AND executed on an elective operating list (grade is Category 4). If a planned CS is undertaken on an acute list or after the onset of spontaneous labour this is included as an emergency CS (urgency is Category 1, 2, or 3).
- In this report there is no documentation of the total proportion of CS which were planned (in previous reports called "elective CS"). In future we plan to report data on the total proportion of planned CS, and on whether these were ultimately executed as planned or as emergency CS.
- In summary, CS is reported in 2023 in onset of birth as those that were undertaken before labour (whether planned or emergency or failed induction), and in mode of birth as elective CS (those that were planned and executed as a planned (category 4) CS) and emergency CS (those that were planned and executed acutely, or unplanned (prelabour, following failed induction, or following onset of spontaneous or induced labour)).

Anaesthesia

- Data for regional analgesia were also difficult to extract in 2023, due to the introduction of Badgernet, the roll-out of SaferSleep to capture in theatre regional anaesthesia, the introduction and variable functioning of a (Ro)bot system to report data to Badgernet, and an incomplete change to anaesthetist documentation practices to enable collection of data on regional anaesthesia inserted in the Labour and Birthing Suite.
- Ultimately, data for regional anaesthesia were obtained from Badgernet and SaferSleep.
- When we have used the term regional in 2023, this means any of epidural, combined spinal and epidural (CSE), or spinal anaesthesia. Data were not adequate to separate type of regional analgesia/ anaesthesia.

Alphabetical list of definitions used in this Report

Antepartum haemorrhage (APH)

Antepartum haemorrhage in Healthware data includes vaginal bleeding from any cause at or beyond 20 weeks during pregnancy and labour.

Antepartum haemorrhage in Badgernet data includes vaginal bleeding from any cause during pregnancy and labour. This variable was derived from pregnancy risks antepartum and intrapartum.

Augmentation of labour

Describes use of oxytocin or artificial rupture of membranes to accelerate established labour.

Born Before Arrival (BBA)

A baby Born Before Arrival (BBA) is a pēpi whose māmā fully intended to have pēpi in hospital but had pēpi on route to hospital, or as a unplanned home birth. BBA is not a planned home birth.

Breastfeeding

Exclusive breastfeeding

The infant has never, to the knowledge of the māmā, had any water, formula or other liquid or solid food. Only breast milk, from the breast or expressed, and prescribed (as per Medicines Act 1981) medicines have been given from birth.

Fully breastfeeding

The infant has taken breast milk only, no other liquids or solids except a minimal amount of water or prescribed medicines, in the past 48 hours.

Partial breastfeeding

The infant has taken some breast milk and some infant formula or other solid food in the past 48 hours.

Artificial feeding

The infant has had no breast milk but has had alternative liquid such as infant formula with or without solid food in the past 48 hours.

Early NeoNatal Death (ENND)

Death of a live born pēpi in the first week of life before completion of 7 days of life.

Elective Caesarean section (Badgernet)

An elective Caesarean is defined as a Caesarean which was scheduled in advance and undertaken on an elective list. If a booked Caesarean section was performed after the onset of labour, or undertaken on an acute list, this is

included as an emergency Caesarean.

Ethnicity

Ethnicity is collected at each hospital registration with the standard census 2001 question. The ethnicity used in this report represents the most recent response by an individual to the ethnicity question, and so may not be the ethnicity given at the time of birth admission. Up to three options are input into the CMS (Case Management System) database. In preparing the data for this report, each māmā has been allocated to a single ethnic group. When more than one ethnic group is recorded, the prioritised ethnicity system has been used.

The most summarised (Level 1) prioritisation is as follows: Māori, Pacific peoples, Asian, MELAA (Middle Eastern, Latin American, African), other groups except NZ European, NZ European. To this, we have added 'Other European' and separated 'Indian' from Asian, the former because it is a large group in our population and the latter because the obstetric risk profile of Indian māmās is significantly different from the remaining women in the Asian grouping. In the majority of figures in this document, NZ European and Other European are combined. Level 2 prioritisation is given in Table 11.1.

Table 11.1 Level 2 Priorisation of ethnicity [1]

Priority order	Ethnic Group Description
1	Māori
2	Tokelauan
3	Fijian
4	Niuean
5	Tongan
6	Cook Island Māori
7	Samoan
8	Other Pacific Island
9	Pacific Island NFD (Not Further Defined)
10	South East Asian
11	Indian
12	Chinese
13	Other Asian
14	Asian NFD
15	Latin American / Hispanic
16	African
17	Middle Eastern
18	Other
19	Other European
20	European NFD
21	NZ European

[1] Ministry of Health. 2017 Ethnicity Data Protocols. Wellington: Ministry of Health. (available online at https://www.health.govt.nz/publication/hiso-100012017-ethnicity-data-protocols)

Fetal Death

Pēpi of at least 20 weeks gestation at issue, or at least 400 grams birth weight if gestation is unknown, born without any signs of life.

Gestation (Badgernet)

Badgernet calculates a best estimate of gestation in weeks and days based on agreed EDD and date of birth. We assume that the same conventions are used with regard to LMP, USS, and clinical override as previously in Healthware. Care should be taken with gestation for stillbirths which is calculated as estimated gestation at death in utero rather than gestation at birth for the purpose of calculating customised birth weight centile. During analysis it was discovered that Badgernet used date of in utero death to calculate gestation at birth for stillbirths. This was corrected in the analysis dataset and the issue reported to Badgernet vendor for fixing.

Gestational Diabetes (GDM)

At NWH, a diagnosis of GDM is made based on any of the following criteria:

- HbA1c 41-49mmol/mol - called GDM/ underlying prediabetes at our hospital
- or 50g polycose result >11.0mmol/L
- or 75g OGTT result of fasting equal to or greater than
- 5.5mmol/L (not greater than)
- or 2 hour glucose equal to or greater than 9.0mmol/L (not greater than)
- or elevated capillary glucose measures on testing (our hospital criteria)

Capillary glucose criteria:

- fasting capillary glucose level (over several days) >5.0mmol/L
- or 2 hours post meal (from start of eating) capillary glucose levels averaging >6.0mmol/L or more than one individual result >6.5mmol/L

Home birth

Where māmā plans in advance to birth at home.

Hypertension

Gestational hypertension

Gestational hypertension (GH) is a blood pressure SBP ≥140 and or DBP ≥90 mmHg on two or more consecutive occasions at least 4 hours apart or one measurement SBP ≥170 and or DBP ≥110 mmHg. (Te Toka Tumai Clinical Practice). A rise of 30 (systolic) or 15 (diastolic) from booking may be of clinical relevance, but is not used to make a diagnosis.

Preeclampsia

The new onset of hypertension occurs after 20 weeks' gestation and before 5 weeks postpartum (in a woman who had normal blood pressure before 20 weeks' gestation) or

superimposed on pre-existing hypertension and one or more of the following also develop as new conditions:

1. Proteinuria – spot urine protein:creatinine ratio ≥30 mg/mmol or ≥2+ on dipstick testing confirmed by a protein creatinine ratio test.
2. Other maternal organ dysfunction: – renal insufficiency (creatinine >90 umol/L, urine output of <80mL/4hr) – liver involvement – (elevated transaminases (ALT & AST) – at least twice upper limit of normal} right upper quadrant or epigastric abdominal pain). Note normal ranges are: ALT 0-30 u/L and AST 10-50 u/L – neurological complications (eg, eclampsia, altered mental status, blindness, stroke or, more commonly, hyperreflexia when accompanied by clonus, severe headaches and persistent visual scotomata) haematological complications (thrombocytopenia – platelet count below 100 x 109/L, haemolysis).
3. Uteroplacental dysfunction (fetal growth restriction).

*At NWH, in lieu of further definition in the national guideline this is taken to mean SGA <10th customised birthweight centile at birth. HOWEVER, in the case of super-imposed preeclampsia in women with chronic hypertension, SGA <10th birthweight centile is INSUFFICIENT evidence, and requires the presence of an element of 1. or 2. above.

Chronic hypertension (CH)

Diastolic BP > 90mmHg at booking or a medical history of essential hypertension. Includes women with superimposed preeclampsia if these are not categorised separately.

Superimposed pre-eclampsia

The development of preeclampsia in a woman with chronic hypertension.

Eclampsia

Convulsions associated with gestational hypertension, usually after the onset of preeclampsia. Convulsions are not due to any other cause such as epilepsy.

Hypertension data were derived in Badgernet from current pregnancy, intrapartum and postpartum risks, and from indication for induction in 2022. Rates were considerably lower than unual despite this approach.

Infant Death

Death of a pēpi born alive before the age of one year.

Large for Gestational Age (>90th customised centile)

Birth weight greater than 90th percentile for gestation, gender, ethnicity, maternal height, weight, age and parity, calculated using the GROW customised birth centile calculator.

Late Neonatal Death (LNND)

Death of a pēpi after the 7th day and before completion of 28 days of life.

Lead Maternity Carer (LMC)

The Lead Maternity Carer is the practitioner or caregiver service selected by the woman to have the legal, professional and practical responsibility for ensuring the woman and her pēpi are given clinically appropriate care.

National Women's LMC services

- Community Midwives are the LMC for women who either self-refer or are referred to NWH for maternity care. This includes women cared for by the community diabetes team. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. Labour and birth care is provided by NWH core Labour and Birthing Suite midwives.
- It was not possible to separate care provided by other hospital midwifery services (eg. Middlemore) from care provided by the Te Toka Tumai midwifery service, and so from 2022 these are all included under "Hospital midwifery"
- Diabetes Midwives are the LMC for women who are referred to the Diabetes Service for secondary/tertiary and LMC care. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. The Diabetes Midwives are not the LMC for all women referred to this service as some women will have an Independent LMC.
- Medical Midwives are the LMC for women who are referred to the Medical Service for secondary/tertiary and LMC care. These women have complex medical needs. The midwives provide continuity of antenatal and postnatal care to women who live in NWH geographical boundary. The Medical Midwives are not the LMC for all women referred to this service as some women will have an Independent LMC.
- Te Manawa o Hine are a team of Māori midwives employed by Te Toka Tumai providing care for Māori women.

Self-employed LMC services

- Independent midwife.
- General Practitioner (arranges private or hospital midwifery care).
- Private Obstetrician (arranges private or hospital midwifery care).

Other LMC services

- Other Hospital: women may be transferred to NWH but remain with their original LMC. This LMC might be another Hospital LMC and/or a non-NWH access holder (e.g. a private obstetrician or independent midwife without access rights at NWH or a homebirth midwife without access rights at NWH). From 2022, these women are included under "Hospital care" if they are under the primary care of a Hospital team, or a self employed midwife or private obstetrician in any analyses where LMC is used.
- Unbooked are women who present at NWH, usually in labour or pre-labour, and who do not have an LMC.

Live birth

Birth of a pēpi showing signs of life. In this report, live births are only included if ≥20 weeks' gestation at birth or ≥400g if gestation unknown.

Maternal age

Defined as māmā's age at her pēpi's birth.

Mode of birth for multiple pregnancies

For analyses where the denominator is māmās, mode of birth is represented as the mode of birth of the pēpi requiring most intervention. Mode of birth has been prioritised as emergency Caesarean, elective Caesarean, forceps, ventouse, vaginal breech, then spontaneous vertex birth.

Onset of Birth in Badgernet

Categories are spontaneous onset, induced-successful, and CS before labour (including failed induction).

Neonatal hypoglycaemia

Blood glucose < 2.3mmol/L.

Neonatal Death

Death of a live born pēpi before completion of 28 days of life.

Neonatal Death Rate

Early and late neonatal deaths per 1000 live births.

New Zealand Deprivation index (NZDep2018)

An area-based measure of socioeconomic deprivation derived from variables from the Census of Population and Dwellings 2018. The score is assigned according to most recently recorded maternal place of residence and is presented as a decile or quintile. Increasing deciles of deprivation, from least deprived (decile 1) to most deprived (decile 10), are associated with higher mortality and rates of many diseases (Atkinson, Salmond and Crampton, 2014).

Census area unit level data are used throughout this report.

NICU admission days

Length of stay in NICU is based on hours from admission to discharge, added across all admissions. One day stay in NICU is equivalent to 24 hours.

Parity

The number of times a woman has given birth to a live born pēpi of any birth weight or gestation or to a stillborn infant at or after 20 weeks' gestation or where the infant weighed 400g or more if gestation is unknown. Multiple birth adds only one to parity total.

Parity is a derived variable in Badgernet. Errors were found in this system variable and so a new derived variable created using the maternal obstetric history provided. This was also the case for previous Caesarean section.

Perinatal Mortality Rate (PMR)

Fetal and early neonatal deaths per 1000 total births

Perinatal Related Mortality Rate (PRLR)

Fetal and early and late neonatal deaths per 1000 total Births

Postnatally (or newly) Diagnosed Type 2 Diabetes

Type 2 diabetes diagnosed by postnatal test (oGTT or HbA1c) in a woman diagnosed with gestational diabetes (GDM) during pregnancy.

Postpartum haemorrhage (PPH)

Primary PPH is ≥500mls blood loss from the genital tract within the first 24 hours of birth. Secondary PPH is ≥500mls blood loss from the genital tract after 24 hours up to 6 weeks postpartum.

PSANZ-PDC (Perinatal Society of Australia and New Zealand Perinatal Death Classification)

Identifies the single most important factor which led to the chain of events which resulted in a perinatal death. Note that the classification system was changed in 2017 and the new system applies to perinatal deaths from 2018 onwards.

PSANZ-NDC (Perinatal Society of Australia and New Zealand Neonatal Death Classification)

Used in addition to the PSANZ-PDC to identify the single most important factor in the neonatal period which caused a neonatal death.

Small for gestational age (SGA) (customised)

Birthweight less than 10th percentile for gestation, ethnicity, maternal height, weight, age, parity and baby sex calculated using the GROW customised birth centile calculator (Perinatal Institute).

Standard primipara

A woman with

- no prior birth ≥20 weeks,
- aged 20–34 years at index birth,
- with a singleton pregnancy,
- cephalic presentation,
- gestation 37–41 completed weeks,
- pēpi not small for gestational age (customised centile ≥10th),
- no medical disease, defined as no history of cardiac disease, renal disease, mental health disorder, SLE, HIV infection, CVA/TIA, diabetes or hypertension,
- no gestational diabetes in index pregnancy,
- no pregnancy associated hypertensive disease in index pregnancy,
- no antepartum haemorrhage during index pregnancy.

Vaginal birth after Caesarean section (VBAC)

Vaginal birth in a pregnancy where any previous birth was by Caesarean section

Very Low Birth Weight

Birth weight less than 1500g.