

Proposed future operating model for the air ambulance service

We are seeking your feedback on the proposal

Aeromedical Commissioning Programme

14 April 2025

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Foreword

The air ambulance service provides a critical service to New Zealand and is particularly important for our rural communities. It connects people with the health care they need, which may not be available locally or regionally. The service facilitates timely access to care for ill or injured patients, where for time critical conditions, minutes can save lives.

The operating model for the air ambulance sector is currently up for review, and we need your help. We want to hear your feedback on the way the service is provided as described in this document.

This is a proposal based on contributions from doctors, nurses, paramedics, other clinicians from across the sector, aviation specialists, and search and rescue agencies, who formed Design Working Groups and a Clinical and Technical Advisory Group. The feedback we receive will form the basis of recommendations that will go to Health New Zealand – Te Whatu Ora (Health NZ) and Accident Compensation Corporation (ACC) leadership teams for approval.

Important progress has been made in the rotary-wing sector over the last seven years, including improving the fleet and introducing dedicated crew and medical directors. However, to continue to deliver improved patient and community outcomes, we need to make additional changes to both fixed-wing and rotary-wing services and how these resources are deployed. Now is the time to design the air ambulance service that we want to see in the future.

Thank you for contributing to this important work. We eagerly await your feedback.

Ngā mihi,

Martin Hefford

Director Living Well

Health NZ

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Manager Health Sector Engagement
and Performance

ACC

Contents

Foreword	3
Contents	4
Timeline	7
Programme overview	8
Development of the proposed operating model	8
Feedback	8
Structure of this document	8
Providing feedback	9
Next steps	9
More information	9
Air ambulance services	10
Air ambulance operating model	11
Proposed key shifts	12
Operating model summary	13
Service model	13
Funding and investment	15
Assets and infrastructure	16
Workforce	18
Dispatch and coordination	22
Data and digital	24
System governance	25
Section 1: Introduction	29
Section 2: Context	30
2.1 Service overview	30
2.2 Air ambulance system	33
2.3 Scope of air ambulance service	34
2.4 Strategic context	36
2.5 The case for change	38
2.6 Strategic objectives of the Aeromedical Commissioning Programme	39
Section 3: Service model	42
3.1 Purpose	42

3.2 Prompts for feedback	42
3.3 Proposed actions and benefits	42
3.4 Service integration	43
3.5 Patient and whānau engagement	44
3.6 Family, whānau and support people	46
3.7 Journey maps	47
Section 4: Funding and investment.....	51
4.1 Purpose.....	51
4.2 Prompt for feedback	51
4.3 Proposed actions and benefits	51
4.4 Role of community trusts	52
Section 5: Assets and infrastructure.....	54
5.1 Purpose.....	54
5.2 Prompts for feedback	54
5.3 Proposed actions and benefits	54
5.4 Fit for purpose rotary-wing air ambulance assets	56
5.5 Fit for purpose fixed-wing air ambulance assets.....	58
5.6 Fit for purpose infrastructure	59
5.7 Air to road transport.....	61
5.8 Fit out and equipment.....	61
5.9 Procurement of air ambulance equipment.....	63
5.10 Review of air ambulance base locations.....	64
Section 6: Workforce	66
6.1 Purpose.....	66
6.2 Prompts for feedback	66
6.3 Proposed actions and benefits	67
6.4 Crewing model and capability.....	68
6.5 Rotary-wing air ambulance workforce	69
6.6 Fixed-wing air ambulance workforce	72
6.7 Non-dedicated clinical air ambulance crew.....	74
6.8 Training standardisation and currency.....	75
6.9 Support for referring clinicians	78

6.10 Cultural safety	78
6.8 Diverse and representative workforce	78
Section 7: Dispatch and coordination	81
7.1 Purpose.....	81
7.2 Prompts for feedback	81
7.3 Proposed actions and benefits	81
7.4 Role of the function	83
7.5 Overview of the process: pre-hospital response	86
7.6 Overview of the process: inter-hospital transfer	87
7.7 Options for how the function is delivered.....	89
7.8 Enablers of the function.....	91
Section 8: Data and digital	93
8.1 Purpose.....	93
8.2 Prompts for feedback	93
8.3 Proposed actions and benefits	93
8.4 Our vision for data and digital	95
8.5 Technology functions	95
8.6 Data	97
Section 9: System governance	99
9.1 Purpose.....	99
9.2 Prompts for feedback	99
9.3 Proposed actions and benefits	99
9.4 System governance and oversight	100
9.5 Continuous improvement	103
Section 10: Acknowledgements	105
Section 11: Glossary	108
Section 12: References.....	111

Timeline

Establishment of
the air ambulance
service

1950–1970

1950s

Air ambulance services using fixed-wing aircraft transferred critically ill patients in remote areas to larger hospitals.

1960s

Helicopters primarily used for agricultural work began responding to air ambulance emergencies on an ad hoc basis.

1971

First helicopter was launched on the West Coast for surf lifesaving and rescue operations.

1952

Kaitiāia Aero Club operated an air ambulance, first using a Fox Moth aeroplane.

1970

First rescue helicopter trust established in Auckland.

Local delivery of
air ambulance
services

1970–2016

1970s onwards

Local air ambulance trusts were established across the country, delivering services within their regions.

2008

National commissioning for emergency ambulance established on behalf of Ministry of Health and ACC.

1996

National Air Ambulance Network for New Zealand report.

2013

Budget moved from road ambulance providers to National Ambulance Sector Office.

Phase 1:
Reconfiguration of
the air ambulance
service

2016–2022

2016

Launch of phase 1 of Reconfiguration of Air Ambulance Services Project.

2018

Rotary-wing developments:

- Market consolidation.
- First four-year contract for rotary-wing air ambulance.
- Dedicated clinical crew.
- Medical director for each service.
- Improved aviation capability.

2017

National Air Desk initiated for pre-hospital rotary-wing taskings.

2019

Shift to twin engine rotary-wing fleet complete.

2022

Second four-year contract for rotary-wing air ambulance.

Phase 2:
Launch of
Aeromedical
Commissioning
Programme

2022–2026

2022

Aeromedical Commissioning Programme launch and current state assessment.

2025

Aeromedical Commissioning Programme sector consultation.

2024

Aeromedical Commissioning Programme design process launch.

2026

Ten-year contract for rotary-wing air ambulance services commences.

Phase 3:
Delivery of the
future operating
model

2026–2035

1 July 2026

Tranche 1 commences to build the foundations of the operating model. This includes establishing the new dispatch and coordination function.

1 July 2032

Tranche 3 fully implements and embeds the operating model.

1 July 2029

Tranche 2 continues to deliver the next priority changes for the operating model.

Programme overview

New Zealand's air ambulance services began in the 1950s and have been evolving to meet patient and community needs ever since.

In 2016, increasing demand on the service, and changes to the application of the Civil Aviation Authority (CAA) regulations, led to the establishment of a three-phased project to reconfigure the national air ambulance service.

The first phase of this work focused on developments in the rotary-wing air ambulance sector. This included market consolidation, moving to a twin-engine fleet and establishing dedicated air ambulance services with clinical crew and a medical director.

The second phase evolved into the Aeromedical Commissioning Programme, which launched in 2022. The programme goal is to achieve an air ambulance service that is safe, sustainable, equitable and integrated, to deliver improved patient and community health outcomes. The programme covers rotary-wing and fixed-wing air ambulances and associated road ambulance services.

Development of the proposed operating model

Over the last six months, more than 50 people have been involved in designing the proposed operating model outlined in this document. This operating model makes recommendations about how the air ambulance service could function by 2035.

Clinical, aviation and search and rescue representatives from around New Zealand made up three Design Working Groups, with oversight by the programme's Clinical and Technical Advisory Group.

- [Find out more about the Design Working Groups.](#)
- [Find out more about the Clinical and Technical Advisory Group.](#)

The operating model was also informed by local and international research, sector engagement and patient, family and whānau interviews.

Feedback

We would greatly appreciate your feedback on this proposed operating model.

Structure of this document

This document offers three levels of information about the proposed operating model.

- For an overview of key shifts, go to [page 12.](#)
- For high-level information about each component of the operating model, go to [pages 13-26.](#)
- For in-depth information about each component of the operating model, see [pages 27-115.](#)

Providing feedback

**Please provide feedback via the ThoughtExchange platform
between 14 April and 11 May 2025.**

- Engagement is open to anyone with an interest in the New Zealand air ambulance sector.
- You can submit feedback as an individual or group.
- You can provide feedback on the entire document or specific sections.
- You may wish to download the PDF and reflect on the questions before answering. We advise you complete the survey questions in one sitting to ensure your answers are saved.

The questions on ThoughtExchange are divided into three parts.

- Background questions: demographic information including role, occupation, organisation and region. This will take up to 10 minutes.
- Prompts for specific feedback: questions about each component of the operating model. This will take up to 60 minutes. If you do not wish to answer a question, you can press the next button.
- Questions about the overall proposal and priority: general feedback on the proposed operating model and priority for implementation. This will take up to 15 minutes.

This document is best viewed on a desktop computer, so that you can more easily move between the proposed operating model and the ThoughtExchange questions.

In ThoughtExchange, there is a 1,000-character word limit on each answer. If you would like to share additional information, please email it to us at airambulanceteam@tewhatauora.govt.nz.

Next steps

Your feedback will form the basis of recommendations that will go to the Health NZ and ACC leadership teams for approval.

Once the model is approved, we will create a prioritised implementation plan. Implementation is proposed to occur in three tranches from July 2026, with the model fully implemented by 2035.

The operating model will be reviewed regularly to ensure that it remains fit for purpose as the sector evolves.

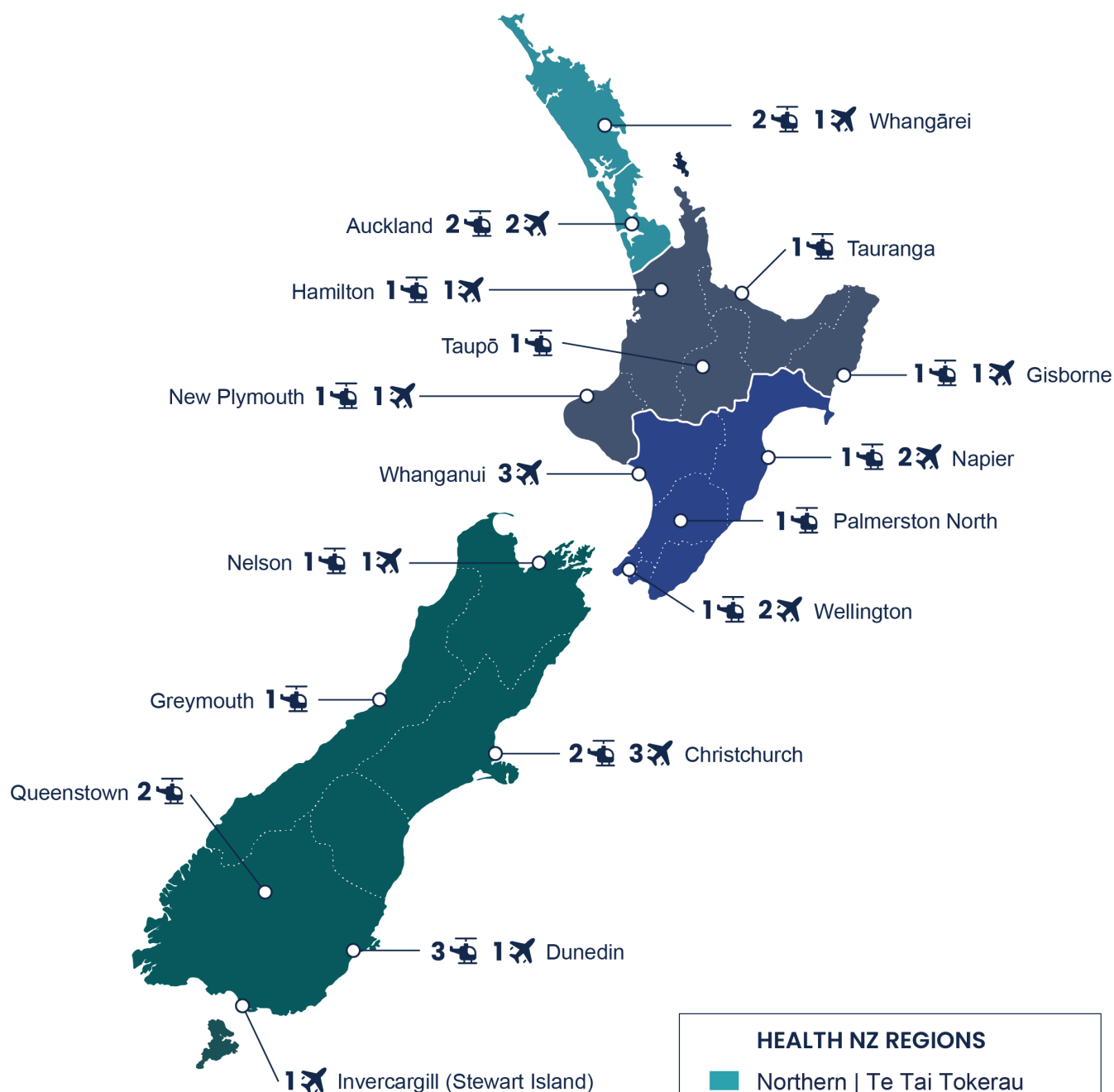
More information

If you are having trouble using ThoughtExchange, or would like more information, please email the Air Ambulance Team at airambulanceteam@tewhatauora.govt.nz. It is important to us that everyone can participate in this consultation.

Thank you for taking the time to review this document and provide considered feedback. We look forward to hearing your thoughts.

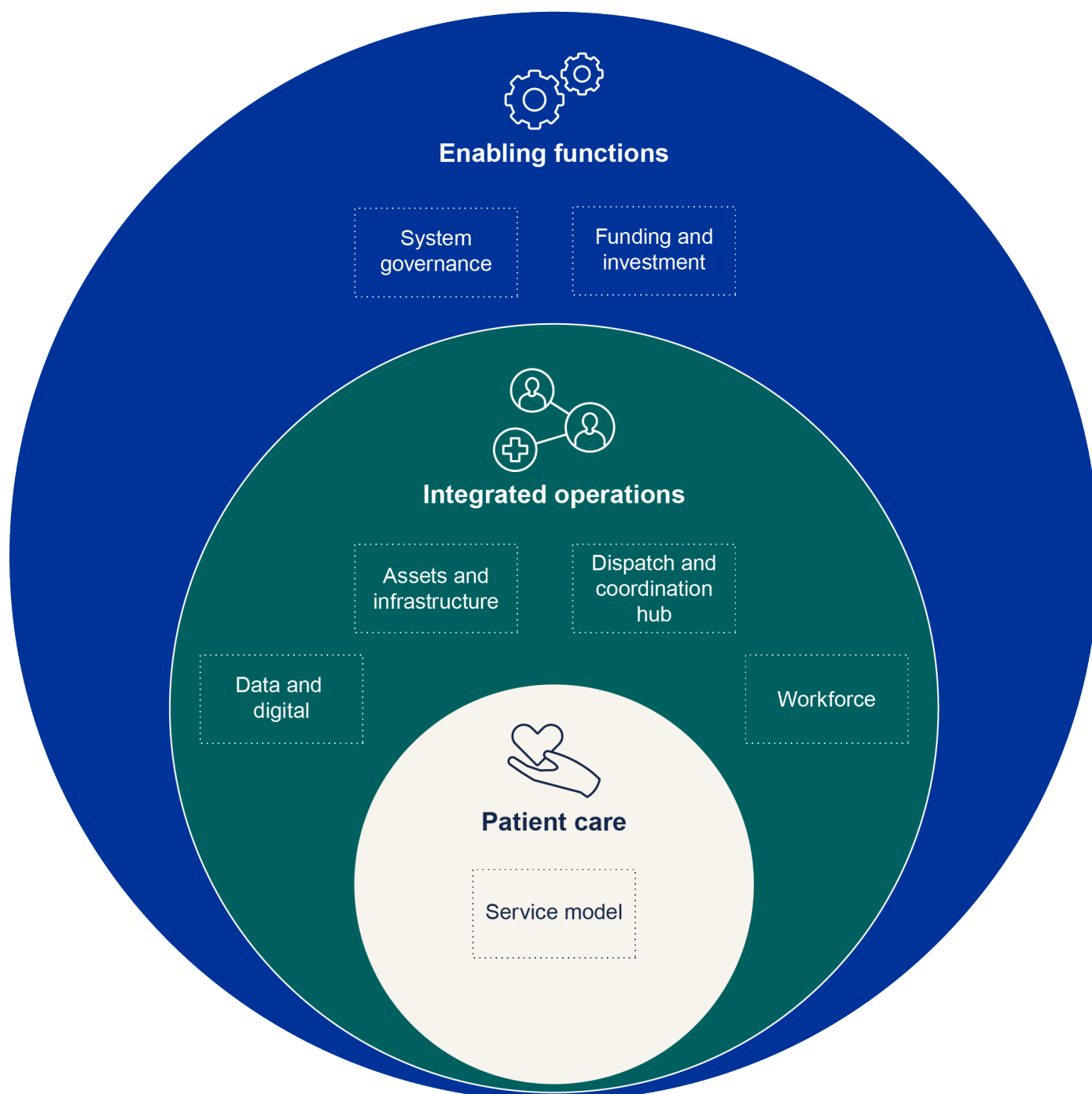
Air ambulance services

This map shows the distribution of air ambulance assets across New Zealand. This map only includes primary rotary-wing assets.



Air ambulance operating model

This is a visual depiction of the air ambulance operating model proposed in this document. It shows the relationships between patient care and key operational and enabling functions.



Proposed key shifts

This table outlines the key shifts required to achieve the proposed operating model for the air ambulance system. These focus on improving patient outcomes, efficiency and sustainability.

Patient care		
Section	Key shifts	Benefits
Service model	<ul style="list-style-type: none"> Improve integration with other ambulance and hospital services. Provide timely access nationwide. Implement a patient-and-whānau-centered approach. 	<ul style="list-style-type: none"> The right response would be delivered at the right time. Patient experience would improve.
Integrated operations		
Section	Key shifts	Benefits
Dispatch and coordination	<ul style="list-style-type: none"> Integrate the dispatch and coordination of all air ambulance responses. Create a single point of contact for air ambulance transport requests. 	<ul style="list-style-type: none"> This approach would optimise the use of air ambulance services. There would be better support for rural clinicians. Administrative workload would reduce.
Workforce	<ul style="list-style-type: none"> Standardise training. Define agreed crewing models and reduce waste due to duplicate crew resourcing. Implement consistent practices and protocols. Deliver culturally safe services. 	<ul style="list-style-type: none"> Service quality and safety would be improved. Clinicians would be used more effectively. Resource management would improve.
Assets and infrastructure	<ul style="list-style-type: none"> Ensure aircraft are modern and reliable. Address ageing assets and infrastructure risks. Standardise equipment. Establish dedicated air to road transfer services in high-volume areas. 	<ul style="list-style-type: none"> Fleet and infrastructure would be fit for purpose. There would be greater equipment interoperability. There would be improved patient experience and increased capacity through more timely transfers.
Data and digital	<ul style="list-style-type: none"> Establish a standardised, transferrable electronic patient record. Improve dispatch and coordination technology. Enable telehealth for rural/remote clinicians to access specialist advice. Develop a repository of service performance data. 	<ul style="list-style-type: none"> Patient information would be more accessible. There would be improved coordination, oversight and access to specialists. This approach would enable more informed service improvement decision making.
Enabling functions		
Section	Key shifts	Benefits
Funding and investment	<ul style="list-style-type: none"> Establish long-term contracts. Standardise commissioning for fixed-wing services. Establish processes to monitor spend. Undertake joint planning with providers. 	<ul style="list-style-type: none"> Pricing and funding would be more predictable. Fixed-wing air ambulance services would be more efficient and of a higher quality. There would be greater visibility of spending.
System governance	<ul style="list-style-type: none"> Establish sector oversight. Drive continuous system improvement. Develop a data framework to support oversight. 	<ul style="list-style-type: none"> This approach would enable system analysis and evidence-based improvement.

Operating model summary

Service model

This section covers service integration, the delivery of air ambulance services, patient voice and the experience of patients, family and whānau. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to [Section 3](#).

Service model proposed actions and benefits

Issue 1: The service is not always integrated between providers. For example, the connection between road and fixed-wing services can cause delays in the patient journey, compromising patient outcomes and the efficient use of clinical resources.

Proposed actions	Benefits
<ul style="list-style-type: none"> Integrate the dispatch and coordination of rotary-wing and fixed-wing air ambulances across pre-hospital responses and inter-hospital transfers. This function would include the air to road transport component. 	<ul style="list-style-type: none"> This approach would enable the right response to the right patient at the right time. Patient experience would improve. Air ambulance resources would be used more effectively.

Issue 2: We do not adequately understand patients' experiences of the air ambulance sector. There are insufficient mechanisms to understand patient voice.

Proposed actions	Benefits
<ul style="list-style-type: none"> Embed accessible mechanisms to understand patient and whānau voice across the air ambulance service. Use these insights to inform service improvements. 	<ul style="list-style-type: none"> Service improvements would be informed by patients' feedback. Continuous improvement would be a core part of the service model. The service would evolve to meet patient needs in a changing environment.

Issue 3: There are inconsistent approaches to involving family, whānau and support people in the patient journey. This could be having a negative impact on patient experience, recovery and clinical outcomes.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish clear and timely communication with families, whānau and support people to explain the situation and next steps. Where possible, build relationships with families, whānau and support people. 	<ul style="list-style-type: none"> Family, whānau and support people would be involved in the air ambulance journey and able to support their loved ones.

We would like your feedback on the following questions.

Question 1:	How could we gather feedback from air ambulance service patients? <u>See section 3.5.1</u>
Question 2:	How could we make the air ambulance experience better for patients' family, whānau and support people? <u>See section 3.6.1</u>
Question 3:	Do you have general feedback on the service model section of the proposed operating model? <u>See section 3</u>

Funding and investment

This section covers the funding and investment required for the service, the role of community trusts and commercial arrangements. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to [Section 4](#).

Funding and investment proposed actions and benefits

Issue 1: Air ambulance contracts are short-term, which prevents long-term planning and investment.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish long-term air ambulance contracts that align with international aviation financing terms. This is being implemented for rotary-wing services and may be implemented over time for fixed-wing services as procurement approaches are determined. 	<ul style="list-style-type: none"> Funding would be more predictable for the sector and joint purchasers.

Issue 2: Fixed-wing services are commissioned by districts and are not connected to a national operating model. This prevents them from being integrated with other ambulance services.

Proposed actions	Benefits
<ul style="list-style-type: none"> Embed an approach to fixed-wing commissioning that leverages district, regional and national strengths. Clearly communicate this approach to the sector. 	<ul style="list-style-type: none"> Fixed-wing air ambulance services would be more efficient and of a consistent quality. Air ambulance services would be better integrated.

Issue 3: There is limited national visibility of how much each hospital spends on air ambulance services, and no consistent mechanism for funding clinical retrieval teams.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish processes to allocate and monitor how much each hospital spends on air ambulance services, including on clinical retrievals teams. 	<ul style="list-style-type: none"> It would be easier to monitor how much each hospital spends on air ambulance services. High-cost assets would be used more appropriately.

Issue 4: There is limited shared and long-term asset and infrastructure planning.

Proposed actions	Benefits
<ul style="list-style-type: none"> Enable joint purchasers and providers to make shared and evidence-based decisions about asset and infrastructure planning and replacement. 	<ul style="list-style-type: none"> Joint purchasers' budget planning and forecasting would be improved. Investment decisions would be guided by evidence. This approach would minimise the investment gap for maintaining a modern, reliable fleet.

We would like your feedback on the following questions.

Question 1: Do you have general feedback on the funding and investment section of the proposed operating model? [See section 4](#)

Assets and infrastructure

This section covers the assets, infrastructure, equipment and fit out required for the air ambulance service. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to [Section 5](#).

Assets and infrastructure proposed actions and benefits

Issue 1: Some assets are not fit for purpose and are critically ageing. This creates aviation and clinical safety risks as well as inequities in the services that are available in each region.

Proposed actions	Benefits
<ul style="list-style-type: none"> Address ageing assets by replacing them with modern, instrument flight rules (IFR) capable aircraft. Reduce the number of types of aircraft used in the national fleet. Standardise rotary-wing and fixed-wing asset types and support this with asset management plans. Define the national capability to respond to critical service delivery use cases. 	<ul style="list-style-type: none"> Fit for purpose, modern and dedicated assets would improve aviation and clinical safety. The air ambulance fleet would be more available and reliable. Assets would be able to service New Zealand's diverse geographies. The assets in use would be models that are still in production, so greater maintenance support would be available.

Issue 2: Some equipment, fit out and supporting systems are not fit for purpose or standardised. This leads to issues with interoperability, certification costs and training.

Proposed actions	Benefits
<ul style="list-style-type: none"> Where possible, standardise air ambulance equipment and fit out. Increase the interoperability across platforms, including air to road transport. 	<ul style="list-style-type: none"> Safety and standardisation would improve. Patient experience would improve. There would be fewer patient transfer delays.

Issue 3: Infrastructure has not been assessed to determine whether it is fit for purpose. Some areas do not have IFR routes, which limits the ability of IFR capable rotary-wing assets to respond in inclement weather.

Proposed actions	Benefits
<ul style="list-style-type: none"> Audit high-traffic and high-risk heliports (including bases) and identify what needs to be done to ensure they are safe and fit for purpose. 	<ul style="list-style-type: none"> Infrastructure, including bases, would be fit for purpose and safe to support air ambulance operations. Aircraft would have the appropriate fuel and payload capacity to cover the area they service.

- Work with the sector to develop a national fuel infrastructure plan, to ensure adequate fuel is available at key locations.
- Implement new priority IFR routes and support the maintenance of existing priority routes.

- Navigation infrastructure would be implemented on priority routes.

Issue 4: Air to road transfers can be slow and delay some fixed-wing and rotary-wing services.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Explore commissioning arrangements for dedicated air to road transfers at high-volume locations. • Have the dispatch and coordination function manage air to road transport as part of the transfer. 	<ul style="list-style-type: none"> • Air to road transfers would support timely air ambulance transfers. This would make fixed-wing air ambulance a more viable option. • Clinical crews would spend less time waiting for road ambulances to arrive. • Hospital clinicians would have reduced logistical management responsibility.

Issue 5: There is limited national future planning about assets and infrastructure.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Develop asset management plans and review these periodically, including when there are significant innovations in the market. • Consult with the air ambulance sector before changing assets related to pre-hospital or inter-hospital services, to ensure that the assets would align with existing equipment. • Review the location of bases and evaluate whether this affects where assets would be required and what types of assets. 	<ul style="list-style-type: none"> • Air ambulance fleet would be aligned with the international aircraft market and would consider significant innovations in the market. • A national fleet management approach would enable better financing arrangements that would reduce the cost of upgrading aircraft in the future.

We would like your feedback on the following questions.

Question 1:	<p>Should there be one or multiple manufacturers of rotary-wing assets?</p> <p><u>See section 5.4.1</u></p> <ul style="list-style-type: none"> • Option 1: Single manufacturer • Option 2: Multiple manufacturers
Question 2:	<p>What should determine where larger rotary-wing aircraft are located?</p> <p><u>See section 5.4.2</u></p>
Question 3:	<p>Should providers share access to training simulators?</p> <p><u>See section 5.6.1</u></p> <ul style="list-style-type: none"> • Option 1: Share use of government-funded rotary-wing and fixed-wing simulators. • Option 2: Share use of fixed-wing simulators but continue with the status quo for rotary-wing simulators. • Option 3: Each rotary-wing and fixed-wing provider to have their own simulator.

Question 4:	Which procurement approach would be most effective for air ambulance equipment? <u>See section 5.9.1</u> <ul style="list-style-type: none"> • Option 1: Providers agree on common equipment and then negotiate with original equipment manufacturers directly. • Option 2: There is a nationally mandated list of minimum equipment for rotary-wing services, fixed-wing services and hospitals to buy separately. • Option 3: The sector develops a nationally mandated list of minimum equipment that is then procured collectively.
Question 5:	Do you have general feedback on the assets and infrastructure section of the proposed operating model? <u>See section 5</u>

Workforce

This section covers the air ambulance crewing model, training, currency, workforce representation and cultural safety. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to **Section 6**.

Workforce proposed actions and benefits

Issue 1: Crewing models and clinical capability are inconsistent across rotary-wing and fixed-wing platforms.

In some locations clinical crews for inter-hospital transfers are dedicated resources, whereas in others they are sourced from on-duty hospital clinical teams.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Have dedicated crewing models for fixed-wing and rotary-wing air ambulances. • Have two clinicians crew pre-hospital responses. In a three-crew model, one of the clinicians could also provide aviation support. The crewing models for rotary-wing and fixed-wing need to be agreed via the Programme. • Have a single clinician (e.g., flight nurse) for fixed-wing inter-hospital transfers of clinically stable patients. This is high-volume work. • Have access to specialist skill sets to respond to highly specialised work (e.g., extracorporeal membrane oxygenation (ECMO), complex intensive care unit (ICU) cases, paediatric intensive care unit (PICU), neonatal intensive care unit (NICU) and alpine rescue cases). 	<ul style="list-style-type: none"> • Having dedicated crewing models would enable training and specialisation in the complex air ambulance environment. • The air ambulance service would be able to access additional specialist skill sets in a timely way to respond to patient needs.

Issue 2: There are varied practices and protocols across the air ambulance sector, which result in unwarranted variation across teams and services.

Proposed actions	Benefits
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<ul style="list-style-type: none"> • Embed standardised air ambulance clinical practice and protocols across the sector. • Ensure that practice and protocols are informed by evidence and best practice. • Embed a fatigue and risk management system aligned with section 4.3 of the New Zealand Aeromedical and SAR Standard. 	<ul style="list-style-type: none"> • There would be greater clinical and aviation safety. • The service would be more consistent. • There would be a clear chain of clinical responsibility through the patient pathway, with formal handovers between services. • This approach would achieve compliance with NZS 8156:2019 and the New Zealand Aeromedical and SAR Standard. • There would be a focus on continuous quality improvement. • The clinical and aviation workforces would be supported by a suitable fatigue and risk management system.
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Issue 3: Clinical and aviation crew training and currency requirements are not standardised. Having a low volume of air ambulance incidents, and limited mobility for clinical crew, could be making it difficult for crew to maintain current skills.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Develop and embed standardised multidisciplinary training across the sector. This would need to be fit for purpose and aligned with key standards and regulations. • Define minimum experience and qualification requirements for the workforce. • Support mobility across platforms and practice contexts (e.g., road/air ambulance) so that clinicians could maintain clinical currency. • To ensure currency, training would be required at specified intervals. 	<ul style="list-style-type: none"> • Introducing training and experience minimum requirements would promote safety and quality across the sector. • This approach would ensure adherence to best practice. • Training would deliver the requirements specified in the New Zealand Aeromedical and SAR Standard.¹ • Training would help to ensure that patients have clinically and culturally safe experiences.

Issue 4: The air ambulance workforce does not reflect the populations that it serves.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Encourage inclusive recruitment and address the barriers to entry. • Create pathways into the workforce for underrepresented groups. 	<ul style="list-style-type: none"> • The patient experience would improve as the workforce would be more representative of the population.

Issue 5: There is inconsistent access to clinical specialists across the air ambulance service.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Enable access to specialist clinical support for rural referring clinicians. 	<ul style="list-style-type: none"> • The dispatch and coordination function would enable connection to clinical specialists where required.

We would like your feedback on the following questions.

Question 1	<p>How many dedicated crew members should each rotary-wing air ambulance have? <u>See section 6.5.1</u></p> <ul style="list-style-type: none"> Option 1: Three crew per rotary-wing air ambulance. Option 2: Four crew per rotary-wing air ambulance.
Question 2:	<p>In a three-crew rotary-wing model, what is the minimum clinical qualification that air crew officers should have? <u>See section 6.5.2</u></p> <ul style="list-style-type: none"> Option 1: Emergency medical technician qualification. Option 2: Paramedic qualification.
Question 3:	<p>What would the optimal clinical crewing model be for rotary-wing air ambulances? <u>See section 6.5.3</u></p> <ul style="list-style-type: none"> Option 1: Either two critical care paramedics (CCPs), or one CCP and one paramedic. Option 2: A CCP and a flight nurse. Option 3: A pre-hospital and retrieval medicine (PHRM) doctor and a paramedic or flight nurse.
Question 4:	<p>Who should rotary-wing air ambulance clinical crew be employed by? <u>See section 6.5.4</u></p> <ul style="list-style-type: none"> Option 1: Health NZ employs clinical crew for rotary-wing air ambulances that are rostered to the service. Option 2: Rotary-wing providers employ their own dedicated clinical crew.
Question 5:	<p>Should rotary-wing crewing models be consistent or variable across different bases? <u>See section 6.5.5</u></p> <ul style="list-style-type: none"> Option 1: Crewing model is consistent across all rotary-wing bases. Option 2: Rotary-wing bases have different crewing models.
Question 6:	<p>What should the minimum dedicated clinical crewing model be for fixed-wing air ambulances? <u>See section 6.6.1</u></p> <ul style="list-style-type: none"> Option 1: Flight nurse. Option 2: Flight nurse and Paramedic/CCP.
Question 7:	<p>Who should fixed-wing air ambulance clinical crew be employed by? <u>See section 6.6.2</u></p> <ul style="list-style-type: none"> Option 1: Health NZ employs clinical crew for fixed-wing air ambulance. Option 2: Fixed-wing providers employ clinical crew directly.
Question 8:	<p>When should ICU clinicians join or replace dedicated crew on air ambulances? <u>See section 6.7.1</u></p>
Question 9:	<p>What skill, experience and qualifications in the air ambulance context would ICU staff who are non-dedicated crew need to undertake air ambulance transfers? <u>See section 6.7.2</u></p>

Question 10:	Should all doctors on air ambulances have PHRM training? <u>See section 6.8.1</u> <ul style="list-style-type: none">• Option 1: All doctors who fly should have PHRM training. This includes dedicated and non-dedicated crew.• Option 2: Doctors who are dedicated crew need to have PHRM training. All other doctors who fly do not need to have PHRM training.
Question 11:	Should training be provided at bases or training centres of excellence? <u>See section 6.8.2</u> <ul style="list-style-type: none">• Option 1: Providers run training at bases.• Option 2: Establish training centres of excellence to support shared learning.
Question 12:	Do you have general feedback on the workforce section of the proposed operating model? <u>See section 6</u>

Dispatch and coordination

This section covers the dispatch and coordination of air ambulance resources for pre-hospital responses, inter-hospital transfers, search and rescue and disaster response. The current issues are outlined, alongside proposed actions and their benefits.

For more information refer to **Section 7**.

Dispatch and coordination proposed actions and benefits

Issue 1: There is limited integration of pre-hospital and inter-hospital responses for rotary-wing and fixed-wing assets.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish a dispatch and coordination function that is responsible for all air ambulance resources (assets and crew). This includes pre-hospital and inter-hospital transfers via rotary-wing, fixed-wing and air to road transport. 	<ul style="list-style-type: none"> Patients would be connected to the right care, in the right way and at the right time.

Issue 2: Nationally, there is limited standardisation of dispatch and coordination processes and tools for inter-hospital transfers. This may contribute to inefficiencies and may not ensure the right response at the right time.

Air ambulances are scarce resources that must be appropriately and efficiently dispatched.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish standardised tasking guidelines that utilise effective and efficient clinical triage to optimise the use of air ambulance resources. Ensure that these guidelines are well understood across the sector. Leverage telehealth to support decision making, or to support rural clinicians caring for people in place. 	<ul style="list-style-type: none"> This approach would dispatch the right clinical crew for the patient's acuity and need. Tasking conflicts would be managed consistently using the agreed guidelines. Patients could remain in place if it was safe or the right thing to do. Rural clinicians would be supported with specialist advice to meet the patient's needs. Patients would be repatriated in a more timely way.

Issue 3: There is poor national visibility of all air ambulance resources, which leads to the inefficient allocation of resources.

Proposed actions	Benefits
<ul style="list-style-type: none"> Provide relevant stakeholders with access to real time information about resources, including assets, location, crewing and availability. 	<ul style="list-style-type: none"> Patients would be connected to the mode of transport that is most appropriate for their acuity and need. People involved with the care pathway would have visibility of requests and transport progress.

Issue 4: Clinicians must use different and complex processes and channels to request air transport.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish consistent processes for requesting air transport, including timely communication with those involved in the transfer. Connect rural clinicians with the specialty appropriate for each case. 	<ul style="list-style-type: none"> The function would be easy to access and engage with. There would be clear and effective communication channels. It would be easy for clinicians to refer patients for inter-hospital transfer. It would be easy to access the specialist advice required for decision making.

Issue 5: Dispatch and coordination has limited independence from the provision of ambulance services.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish a function that is independent from air and road ambulance providers and does not task its own assets. The function effectively manages any perceived or actual conflict of interest. 	<ul style="list-style-type: none"> The system would be more transparent.

We would like your feedback on the following questions.

Question 1:	<p>Should the dispatch and coordination function include clinically escorted road based inter-hospital transfers? <u>See section 7.4.1</u></p> <ul style="list-style-type: none"> Option 1: The function does not coordinate road inter-hospital transfers that require clinical escort. It would refer to existing hospital resources who coordinate road transfers. Option 2: The function coordinates all road inter-hospital transfers that require clinical escort.
Question 2:	<p>How should the dispatch and coordination function be delivered? <u>See section 7.7.1</u></p> <ul style="list-style-type: none"> Option 1: One site would deliver the integrated dispatch and coordination function. Option 2: Two connected sites to deliver the integrated dispatch and coordination function. Option 3: A central hub, responsible for the dispatch decision making for all air ambulance responses, with four regional spokes. Option 4: A site in each of the four Health NZ regions. Each site provides pre-hospital and inter-hospital transfers for the region.
Question 3:	<p>Do you have general feedback on the dispatch and coordination section of the proposed operating model? <u>See section 7</u></p>

Data and digital

This section covers the data and technology required for the air ambulance service. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to [Section 8](#).

Data and digital proposed actions and benefits

Issue 1: There is no standardised, transportable digital patient record to inform decisions along the treatment pathway. This creates system inefficiencies and risks of harm.

Proposed actions	Benefits
Establish the proposed national ambulance electronic Patient Care Record that would be used by all ambulance services and is integrated with hospital patient information systems.	<ul style="list-style-type: none"> Patients would receive improved clinical care. There would be visibility of patients' condition and treatments during travel, which would inform treatment decisions at the destination. This approach would reduce the administrative burden at patient handover. This approach would enable population-level clinical insights to inform service improvement initiatives using a consolidated database.

Issue 2: Dispatch and coordination processes are inconsistent.

Proposed actions	Benefits
Establish a single, integrated dispatch and coordination system for air ambulance resources, which would have access to the ambulance computer-aided dispatch system and telehealth capability.	<ul style="list-style-type: none"> There would be national visibility of assets and staff, which would inform the tasking of all air ambulance and search and rescue jobs. People involved in the care pathway would have visibility of requests and transport progress. Air ambulance resources would be used more efficiently.

Issue 3: Hospitals and the dispatch function have poor visibility of air ambulance movements.

Proposed actions	Benefits
Establish a shared, national dashboard that would provide visibility of air ambulance movements to all parties involved in a patient's care.	<ul style="list-style-type: none"> There would be better coordination of patient care between hospitals.

Issue 4: There are gaps in technology as well as fragmentation of technology and systems between providers and hospitals. This prevents the real time transfer of critical information.

Proposed actions	Benefits
Establish shared, national systems for each key technology function that is government funded.	<ul style="list-style-type: none"> Destination hospitals would be able to monitor patients' condition while they are in transit,

	<p>which would help to inform optimal treatment when they arrive.</p> <ul style="list-style-type: none"> • It would be a cost-efficient way to deliver technology. • Technology would be consistently available, which would improve equity.
Issue 5: There is no ability to consolidate relevant data to measure performance and provide evidence of the impacts of change.	
Proposed actions	Benefits
Connect all systems to a single data repository that would be accessible for research and analysis purposes.	<ul style="list-style-type: none"> • This would inform sector improvements and provide greater confidence in the effectiveness of new investments. • This approach would enable evidence-based decision making to inform changes to clinical pathways and models of care.

We would like your feedback on the following questions.

Question 1:	Which technology functions would be required to support a new operating model? <u>See section 8.5.1</u>
Question 2:	What data and information would we need to monitor and improve the air ambulance service? <u>See section 8.6.1</u>
Question 3:	Do you have general feedback on the data and digital section of the proposed operating model? <u>See section 8</u>

System governance

This section covers the oversight of the air ambulance system. The current issues are outlined, alongside proposed actions and their benefits. For more information refer to **Section 9**.

System governance proposed actions and benefits	
Issue 1: There is no oversight of the overall air ambulance system, including pre-hospital and inter-hospital transfers. There is a lack of formalised and standardised systems and processes. Different segments of the sector currently have overlapping clinical governance, for example road, air and hospitals.	
Proposed actions	Benefits
<ul style="list-style-type: none"> • Establish system oversight for the air ambulance service. • Clarify the roles and responsibilities for system governance and oversight. 	<ul style="list-style-type: none"> • A system view of the air ambulance service would enable the evaluation of patient and community outcomes. • This approach would improve the monitoring of, and response to, risks.

Issue 2: There is no formal approach to continuous improvement within providers and across the sector. The system is siloed and there are no formal mechanisms to share learning or insights. There is limited collaboration between rotary-wing and fixed-wing sectors as well as between road and air ambulance sectors.

Proposed actions	Benefits
<ul style="list-style-type: none"> Encourage a culture of continuous improvement within providers and agencies and across the system. Foster the sharing of learning and information across all air ambulance services and between road and air ambulances. 	<ul style="list-style-type: none"> This approach would support the adoption of innovations by making it easier to test new technologies and ways of operating. Having a view of the whole ambulance system would improve quality and interoperability.

Issue 3: There is a lack of connected data and digital frameworks to support effective system oversight. There is insufficient data to make robust system oversight decisions and to inform system improvements.

Proposed actions	Benefits
<ul style="list-style-type: none"> Develop and embed a data framework across the system. 	<ul style="list-style-type: none"> This would support system oversight. There would be more data and information to inform sector improvements.

We would like your feedback on the following questions.

Question 1: Do you agree with the proposal for system oversight? [See section 9.4.1](#)

Question 2: Do you have general feedback on the system governance section of the proposed operating model? [See section 9](#)

Proposal details

[Section 1: Introduction](#)

[Section 2: Context](#)

[Section 3: Service model](#)

[Section 4: Funding and investment](#)

[Section 5: Assets and infrastructure](#)

[Section 6: Workforce](#)

[Section 7: Dispatch and coordination](#)

[Section 8: Data and digital](#)

[Section 9: System governance](#)

Sections 1 – 2: Introduction and context

Section 1: Introduction

This document is in sections that align with the components of the operating model.

Section	What this includes:
Section 2: context	<ul style="list-style-type: none"> • service overview • scope of the air ambulance service • strategic context • the case for change • strategic objectives of the Aeromedical Commissioning Programme
Section 3: service model	<ul style="list-style-type: none"> • service integration • delivery of air ambulance services • patient voice • experience of family, whānau and support people • journey maps
Section 4: funding and investment	<ul style="list-style-type: none"> • funding from joint purchasers • role of community trusts • commercial arrangements
Section 5: assets and infrastructure	<ul style="list-style-type: none"> • rotary-wing assets and infrastructure • fixed-wing assets and infrastructure • air to road transfers • equipment • fit out
Section 6: workforce	<ul style="list-style-type: none"> • crewing models • training • currency • representation and cultural safety
Section 7: dispatch and coordination	<ul style="list-style-type: none"> • dispatch and coordination of air ambulance resources • integration with search and rescue coordination
Section 8: data and digital	<ul style="list-style-type: none"> • technology • data
Section 9: system governance	<ul style="list-style-type: none"> • oversight for the air ambulance system

Section 2: Context

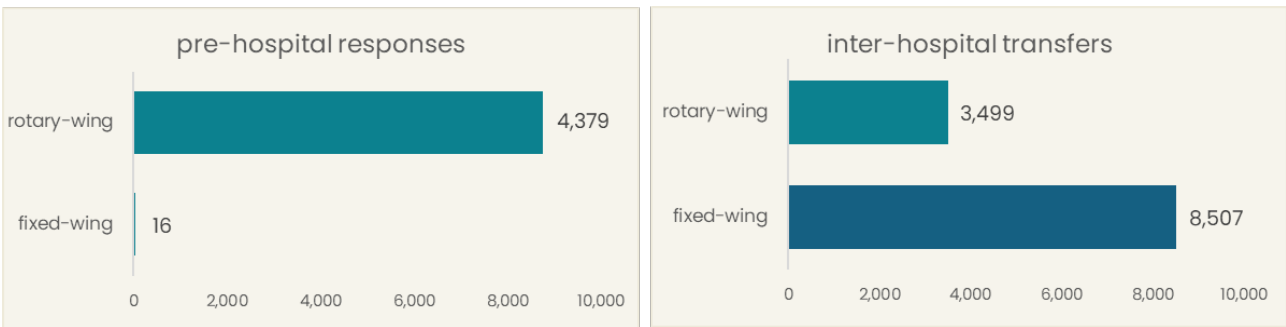
2.1 Service overview

The air ambulance service is a critical component of our healthcare system.

Air ambulance services are jointly commissioned by Health NZ and ACC and are supported by community trusts. The air ambulance service provides clinically supported transport, via rotary-wing and fixed-wing aircraft and air to road transport. The service reduces the incidence of death and mitigates the long-term impacts of medical illness or injury.

Between 1 July 2023 and 30 June 2024, there were 16,401 air ambulance pre-hospital responses and inter-hospital transfers nationwide.² These were delivered by 21 dedicated primary rotary-wing assets and 21 fixed-wing assets.

Figure 1: Total air ambulance transfers



2.1.1 The air ambulance service plays a vital role in ensuring equitable access to health care across the country

The air ambulance service connects people, especially in regional, rural and remote communities, with the health care that they need. Over 900,000 New Zealanders, around 20% of the population, live rurally.³ Rural populations have poorer health outcomes, including higher mortality rates, than urban populations.⁴

The air ambulance service:

- is a reliable platform that gives people access to health care that may not be available to them locally or regionally.⁵ The majority of pre-hospital events, 92%, are from a rural location, with 50% of inter-hospital transfers originating in a rural location⁶
- plays a key role in delivering priority four of the Rural Health Strategy 2023 – supporting rural communities to access health services at a distance⁷
- supports health care access for underserved populations, such as rural Māori, which helps to address inequities.^{8,9} In 27% of rotary-wing transfers the patient's ethnicity was recorded as Māori¹⁰

- is essential in our geographically diverse country where people live over a large rural area and road access can be slow or unreliable.¹¹ In some rural and remote areas, it is challenging for clinicians to quickly access patients in an emergency
- supports responses to emergencies, major incidents and natural disasters, and provides access during significant disruptions to road infrastructure
- has a key role in delivering on Huakina Te Rā, ACC's 10-year strategy, the dual-framed Mana Taurite | Equity goal, for all people to experience accessible services and improved outcomes,
- supports the search and rescue system nationwide. Approximately 95% of helicopter responses to maritime search and rescue are tasked to air ambulance resources.¹²

2.1.2 Air ambulance services facilitate timely access to care

- Air ambulance services reduce transport times, enabling critically ill or injured patients to be transported to appropriate care in a timely way. Air ambulances are equipped to provide high value critical care from when a patient is identified and continues during transport to definitive care.
- Quickly delivering critical care to the scene can improve health outcomes, morbidity and mortality rates and significantly reduce the likelihood of long-term injury or poor health outcomes.
- For time-critical conditions like strokes and heart attacks, minutes can save lives. Air ambulances can significantly reduce the transport time to definitive care. Air ambulances also facilitate urgent inter-hospital transfers to higher levels of care for patients who are critically unwell. For all rotary-wing taskings between 1 July 2023 and 30 June 2024:
 - 5% were code purple (mission is urgent, expected cardiac or respiratory arrest)
 - 55% were code red (mission is urgent, appears life or limb-threatening or time critical condition)
 - 33% were code orange (mission is immediate, serious but not immediately life-threatening).
- Air ambulances enable destination pathways, so that the right care can be provided at the right time and in the right place. This includes stroke, major trauma, ST-elevation myocardial infarction (STEMI) and spinal destination pathways.
- For rotary-wing transfers, the five most reported patient clinical condition categories were trauma, cardiac, stroke, infection and respiratory.
- For fixed-wing transfers, the five most reported patient clinical condition categories were cardiology, medical, surgery, orthopaedic and neurosurgery.

2.1.3 Enables the future hospital and health system

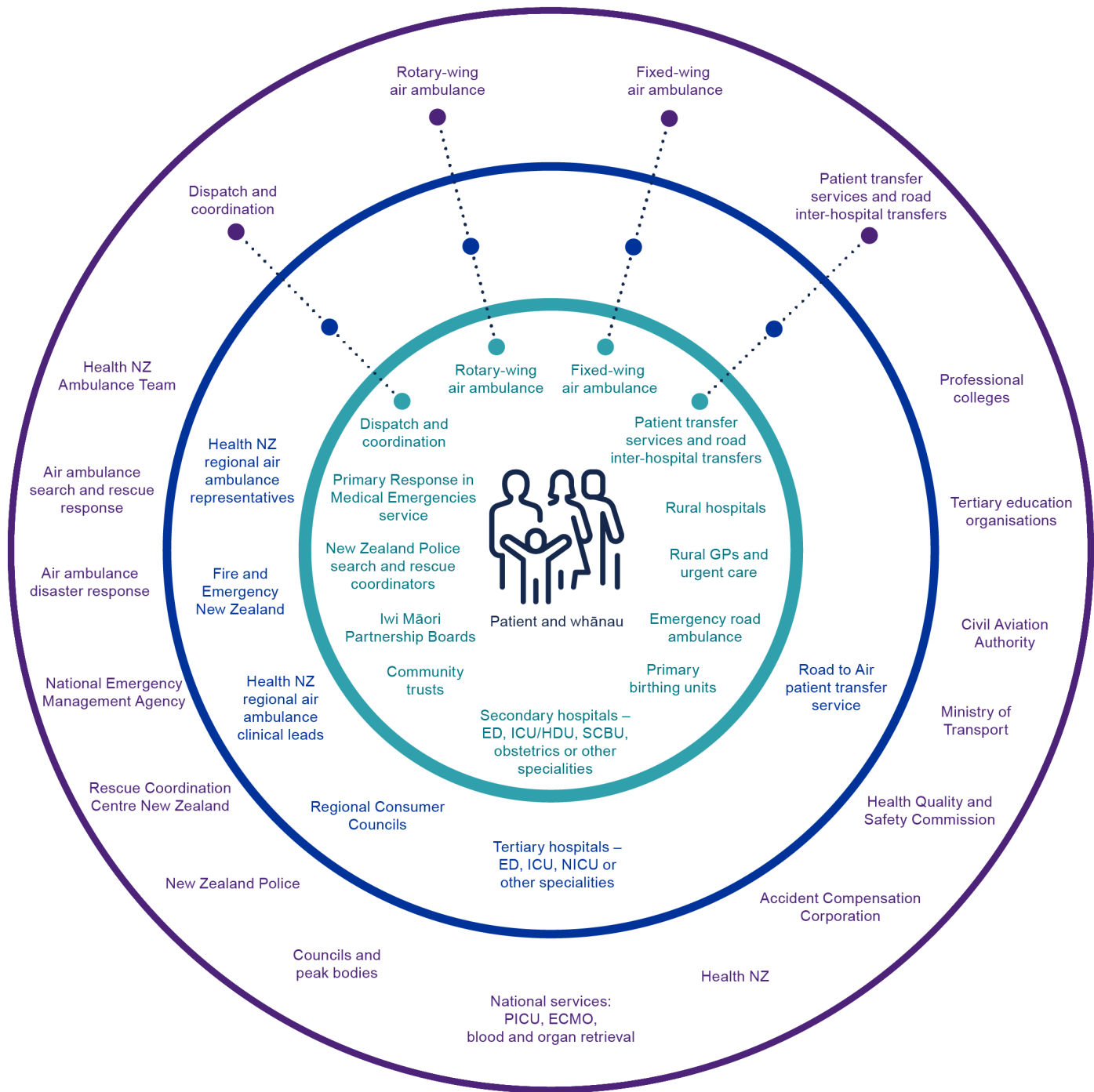
Air ambulance services are a key component of the future health system. They enable a connected health system for a dispersed population.

- Air ambulance services support effective hospital bed management and patient flow nationwide, moving people to the most appropriate location for their care needs, including back to the community.

- Air ambulance services are required to connect people with specialist tertiary and quaternary services. Transporting patients is more sustainable from a workforce and cost perspective than establishing local specialist services across the country. Planning and investment in health services needs to consider the flow-on effect on air ambulance demand and costs.¹³
- New and developing technologies will enable better clinical care to be provided to critically ill or injured patients by the air ambulance service.

2.2 Air ambulance system

This image shows who is involved in, impacted by or connected to air ambulance services in New Zealand.



DOMAINS



National



Regional



District

2.3 Scope of air ambulance service

The air ambulance service includes pre-hospital responses, inter-hospital transfers, search and rescue and disaster response.

2.3.1. Pre-hospital responses

Pre-hospital responses refer to incidents that require an air ambulance response in the community. This includes transport from a primary care or integrated health facility (e.g., GP) to a hospital or other healthcare facility.

Between 1 July 2023 and 30 June 2024, there were 4,395 pre-hospital responses (4,379 on rotary-wing and 16 on fixed-wing). The fixed-wing responses were all from Stewart Island.¹⁴

The air ambulance service complements the road ambulance network. Road ambulance CCPs are based in urban areas (including provincial urban areas) and work in response cars so that they can respond to time-critical incidents. There are no road-based CCPs in rural areas. Although CCPs can reach nearby rural locations by road, most rural areas rely on air ambulances to access this specialised skill set. Pre-hospital responses are currently tasked to air ambulance if they meet one or more of the ANTS criteria: access, number, time or skill. A review of the ANTS criteria is due to be completed in June 2025. The review aims to determine whether ANTS is fit for purpose as a tool for selecting pre-hospital incidents for rotary-wing air ambulance dispatch.

In the pre-hospital environment, there is often limited patient information to inform the response, therefore dedicated clinical crews need to have sufficient clinical capability.

Locations of pre-hospital responses.

- 92% of pre-hospital responses are from a rural location.¹⁵
- For rotary-wing pre-hospital responses, the top three destinations were to Dunedin Hospital (519), Waikato Hospital (517) and Christchurch Hospital (501).¹⁶

2.3.2 Inter-hospital transfers

Inter-hospital transfers involve transferring a patient from a hospital with a level 2 (rural hospital) or higher emergency department to a higher level of care, or back to their domicile hospital or community healthcare facility.

Between 1 July 2023 and 30 June 2024, there were 12,006 inter-hospital transfers (8,507 on fixed-wing and 3,499 on rotary-wing).¹⁷

With inter-hospital transfers there is more certainty about the condition of the patient. Therefore, there is a greater ability to match the patient's clinical need with clinical skill, and there may be a choice about whether or when the transfer occurs.

Locations of inter-hospital transfers.

- For rotary-wing inter-hospital transfers, the top three referral locations were Lakes District Hospital (335), Whangārei Hospital (323) and Southland Hospital (219). The top three

transfer destinations were Waikato Hospital (706), Dunedin Hospital (680) and Auckland City Hospital (506).¹⁸

- For fixed-wing inter-hospital transfers, the top three originating locations were Wellington Hospital (1,286), Hastings Hospital (959) and Taranaki Base Hospital (739).¹² The top three transfer destinations were Wellington Hospital (1,628), Hastings Hospital (1,201) and Waikato Hospital (692).¹⁹

National Travel Assistance Scheme

The National Travel Assistance Scheme is not within the scope of this programme but is important to note as it relates to transport in the health system. The National Travel Assistance Scheme arranges and funds eligible travel for patients to access specialist care in another region, or to return home.²⁰ This can include travel on commercial flights. If a patient does not meet the criteria for the scheme, they are required to arrange their own transport and source an alternative means of funding.

2.3.3 Search and rescue

The air ambulance service plays a significant role in responding to maritime search and rescue missions and also supports Land Search and Rescue.

New Zealand does not have a dedicated search and rescue air fleet. This is unlikely to change, therefore the air ambulance service will continue to support search and rescue responses. The future operating model must also meet the needs of the search and rescue service.

Search and rescue representatives participated in the design process to ensure the needs of this service are captured. The Health NZ Ambulance Team is committed to collaborating with search and rescue to deliver the required capability and improve integration with air ambulance functions.

2.3.4 Disaster response

The air ambulance service provides support to disaster responses in collaboration with the lead agency, for example the National Emergency Management Agency or the Rescue Coordination Centre New Zealand. This can include supporting emergency evacuations and relocations and providing connection where infrastructure is impacted (e.g., air bridges). During a disaster response additional inter-hospital transfers or bespoke patient pathways can be enacted to facilitate patient flow.

2.3.5 Eligibility

Foreign nationals in New Zealand

The Health and Disability Services Eligibility Direction 2011 sets out the eligibility criteria for publicly funded health and disability services in New Zealand.²¹ The groups of people who meet the criteria defined in the Direction can receive some or all of publicly funded health and disability services. For foreign nationals, eligibility is largely based on immigration status.

People who are not ordinarily resident in New Zealand but have ACC cover for a personal injury, are eligible for ACC-funded air ambulances for all pre-hospital events and inter-hospital transfers within 24 hours. Funding beyond 24 hours is considered on a case-by-case basis.

New Zealand nationals overseas

New Zealand nationals overseas are not covered by Health NZ.²² All New Zealand patient repatriations from overseas are funded privately via private insurance or support from family, friends or the community. If a New Zealand national does not have insurance, there is currently no public avenue or funding available to repatriate them.

ACC does provide cover for accidents that occur overseas, but only to people who ordinarily reside in New Zealand and only in limited situations.²³

2.4 Strategic context

2.4.1 Government Policy Statement on Health 2024–2027

The Government Policy Statement sets out five priority areas for the health system.

- Access – ensuring that all New Zealanders have equitable access to the healthcare services they need, no matter where they live.
- Timeliness – making sure that all New Zealanders can access healthcare services in a prompt and efficient way.
- Quality – ensuring that New Zealand's health care and services are safe, easy to navigate, understandable and welcoming to users and continuously improving.
- Workforce – having a skilled and culturally capable workforce who are accessible, responsive and supported to deliver safe and effective health care.
- Infrastructure – ensuring that the health system is resilient and has the digital and physical infrastructure it needs to meet people's needs now and in the future.

This programme delivers on all five priority elements. The operating model seeks to enable timely health care access across the country, improve the quality of the air ambulance service, improve the skill and cultural capability of the workforce and build future-focused physical and digital infrastructure.

2.4.2 Pae Ora (Healthy Futures) Act 2022

This programme aligns with the Pae Ora (Healthy Futures) Act 2022, which states that 'everyone will have equitable access to high-quality emergency and specialist care when they need it, wherever they live.'²⁴ This includes ensuring the system is consistent and people can access the care they need from the hospital networks, through ambulance and air transport, and telehealth consultations.'

The Pae Ora (Healthy Futures) Act 2022 requires the Ministry of Health to develop seven health strategies to set the direction for a system that is equitable, accessible, cohesive and people centred.²⁵ These strategies are:

- New Zealand Health Strategy
- Pae Tū: Hauora Māori Strategy
- Te Mana Ola: The Pacific Health Strategy
- Health of Disabled People Strategy
- Women's Health Strategy
- Rural Health Strategy
- Mental Health and Wellbeing Strategy (in development).

The key recommendations for how the sector can deliver on these health strategies are:

- Cultural safety: provide culturally safe and respectful interactions by training the workforce to understand and respond to culturally safe practices.
- Inclusive and accessible communication: ensure that information is clear, culturally relevant and available in accessible formats to support diverse communities, including those with disabilities.
- Family and whānau involvement: prioritise family and whānau involvement in decision making around care and how services are delivered. Deliver holistic care that aligns with cultural and community needs, especially for Māori and Pacific people.
- Workforce diversity and leadership: increase representation and leadership opportunities in the health workforce, to ensure that the workforce reflects the communities it serves.
- Research and data: there is a significant gap in understanding how the air ambulance service is used by certain populations. Collect data and research on how to improve services for these communities.
- Feedback and continuous improvement: establish accessible and diverse feedback mechanisms, ensuring that patient and family or whānau input is heard, acted upon and used to drive continuous quality improvement in the healthcare system.

2.4.3 Huakina Te Rā

This programme also aligns with ACC's strategy Huakina Te Rā, which has dual-framed goals – Mana Taurite | Equity, Ringa Atawhai | Guardianship and Oranga Whānau | safe and resilient communities.²⁶ The air ambulance strategic objectives stem from the Huakina Te Rā vision for a thriving Aotearoa with equitable and safe and resilient communities at the core, and a focus on service integration to efficiently support people, whānau and communities to get the right services, at the right time.

2.4.4 Rural health equity

The proposed future operating model has been informed by the document Rural Health Equity Through Principles of Considered Design.²⁷ These principles seek to address inequitable health

outcomes for those living in rural areas and to ensure that new service designs are appropriate for the rural context.²⁸

2.5 The case for change

This section outlines the case for changing the national air ambulance service.

There are currently significant challenges

There are challenges across the air ambulance system – air ambulance assets are critically ageing, there is a lack of integration across transport modes, the dispatch and coordination system is fragmented and there are disparate clinical crewing models. These issues contribute to increased aviation and clinical risk and negatively impact service capacity. There is a real opportunity to improve the service and deliver improved outcomes for patients and communities.

Increasing reliance on air ambulance to connect the health system

As our healthcare system continues to experience workforce shortages and centralises specialist resources, there is an increasing reliance on air ambulance services. There is growing demand for rotary-wing air ambulances, particularly for inter-hospital transfers (there was a 55% increase over four years from contract year 2020).²⁹ For the service to be financially sustainable there needs to be effective demand management and the optimal utilisation of resources.

The sector is ready for change

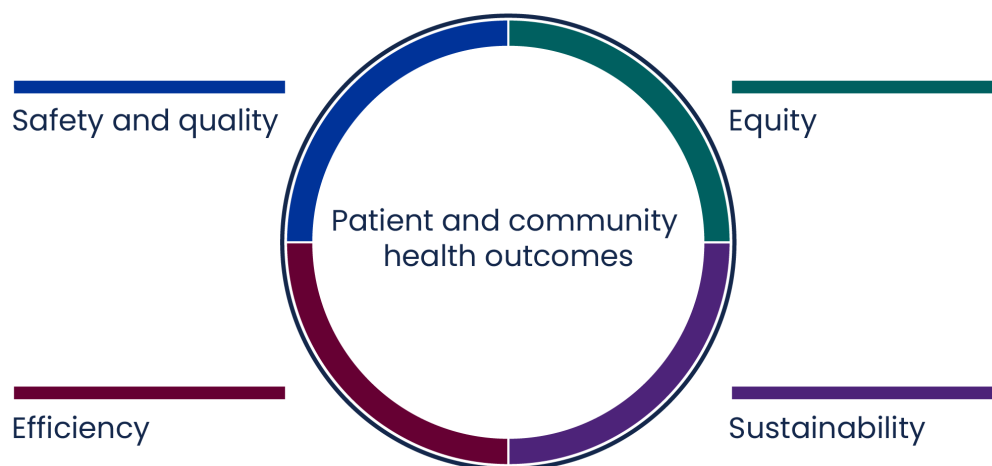
There is significant appetite for change, building on previous work that focused on rotary-wing pre-hospital services. The air ambulance sector is very engaged in designing a new operating model that will deliver improved patient and community outcomes.

Long-term planning is required

The air ambulance service currently has short-term contracts, which limits investment opportunities, effective planning and service delivery. To improve the sector, there needs to be long-term planning that aligns with aviation best practices. By acting now, we can address significant challenges and set the foundation for improvements over the next decade.

2.6 Strategic objectives of the Aeromedical Commissioning Programme

This programme has four strategic objectives that aim to improve patient and community health outcomes. These are safety and quality, equity, sustainability and efficiency. We will develop indicators to measure progress towards these strategic objectives in the detailed design stage.



2.6.1 Safety and quality

Enhance aviation and clinical safety and quality to deliver excellence across the air ambulance system.

- Modernise fleet and infrastructure to increase reliability and responsiveness.
- Utilise simulators and modern training technology to increase capability.
- Prioritise equipment and fit out interoperability to increase safety.
- Standardise practice and protocols to improve clinical and aviation safety.
- Ensure training is fit for purpose, aligned with key standards, regulations and supports currency.
- Drive innovation, evaluate new technologies and adopt them for service improvement.
- Leverage data collection to provide insights into targeted improvements.
- Establish air ambulance sector oversight to share learning and best practice.
- Foster continuous improvement to promote excellence.
- Connect with other emergency services to determine joint ways of working.

2.6.2 Equity

Improve equity of access, experience and outcomes.

- Distribute resources, including clinical capability, assets, infrastructure and equipment to support equitable patient outcomes.
- Integrate feedback loops with patients and communities to incorporate their insights into service improvements.

- Provide clinical support to rural and remote clinicians, and first responders.
- Develop a culturally safe service for patients, family, whānau, support people and workforce.
- Support the workforce to be increasingly representative of the populations it serves.
- Embed Te Tiriti o Waitangi across the system and build understanding of what it means in practice.
- Track equity of outcomes and identify disparities in access and experiences, informing targeted interventions.

2.6.3 Sustainability

Create a service that is supported by long-term planning and can adapt to evolving community needs.

- Establish a predictable and sustainable funding and commissioning model.
- Enable the system with long-term contracts, aligned with aviation best practice.
- Develop and maintain long-term fleet management plans.
- Decrease sector emissions by increasing simulator use and exploring low-emission options such as sustainable aviation fuel and improved technology.
- Ensure the air ambulance system is responsive to changes in the health sector.
- Conduct long-term workforce planning for the sector.
- Nurture a just culture of learning that promotes continuous improvement.
- Establish a demand management function to ensure the sustainability of the service.
- Monitor and adapt to changing population and demographic needs.
- Foster innovation, research and implement new medical advancements.

2.6.4 Efficiency

Develop a high performing, integrated system to optimise the use of air ambulance resources.

- Establish an integrated dispatch and coordination function.
- Integrate rotary-wing and fixed-wing air ambulance services.
- Base transport decisions on patient needs.
- Integrate with hospital bed management systems to support patient flow.
- Ensure the crewing model supports interoperability and efficiency.
- Enable the best use of hospital resources by ensuring people receive care at the most appropriate location.
- Ensure resource distribution provides efficient response times across the country.
- Explore new technologies to optimise processes and ways of working.
- Use evidence and data to inform improvements to service delivery.

Section 3:

Service model

Section 3: Service model

3.1 Purpose

This section summarises the service model component of the operating model, including:

- prompts for feedback
- proposed actions and benefits
- service integration
- patient, family and whānau engagement
- family, whānau and support people
- journey maps.

3.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on key topics.

Question 1:	How could we gather feedback from air ambulance service patients? <u>See section 3.5.1</u>
Question 2:	How could we make the air ambulance experience better for patients' family, whānau and support people? <u>See section 3.6.1</u>
Question 3:	Do you have general feedback on the service model section of the proposed operating model?

3.3 Proposed actions and benefits

Service model proposed actions and benefits	
Issue 1: The service is not always integrated between providers. For example, the connection between road and fixed-wing services can cause delays in the patient journey, compromising patient outcomes and the efficient use of clinical resources.	
Proposed actions	Benefits
<ul style="list-style-type: none"> • Integrate the dispatch and coordination of rotary-wing and fixed-wing air ambulances across pre-hospital responses and inter-hospital transfers. This function would include the air to road transport component. 	<ul style="list-style-type: none"> • This approach would enable the right response to the right patient at the right time. • Patient experience would improve. • Air ambulance resources would be used more effectively.
Issue 2: We do not adequately understand patients' experiences of the air ambulance sector. There are insufficient mechanisms to understand patient voice.	
Proposed actions	Benefits

<ul style="list-style-type: none">• Embed accessible mechanisms to understand patient, family and whānau voice across the air ambulance service. Use these insights to inform service improvements.	<ul style="list-style-type: none">• Service improvements would be informed by patients' feedback.• Continuous improvement would be a core part of the service model. The service would evolve to meet patient needs in a changing environment.
Issue 3: There are inconsistent approaches to involving family, whānau and support people in the patient journey. This could be having a negative impact on patient experience, recovery and clinical outcome.	
Proposed actions	Benefits
<ul style="list-style-type: none">• Establish clear and timely communication with families, whānau and support people to explain the situation and next steps.• Where possible, build relationships with families, whānau and support people.	<ul style="list-style-type: none">• Family, whānau and support people would be involved in the air ambulance journey and able to support their loved ones.

3.4 Service integration

The key recommendations for improving integration are:

- **Integrated dispatch and coordination:** Combine the dispatch and coordination functions for rotary-wing and fixed-wing air ambulances across pre-hospital responses and inter-hospital transfers. This function would include the air to road transport component of the service.
- **Clinical integration:** Create clear patient pathways that integrate rotary-wing and fixed-wing air ambulance services, where beneficial to the patient and system.
- **Operational integration (interoperability):** Standardise loading systems and equipment within providers (and across providers and airframe types where possible) to improve the safety of patient transfers between services and asset types.
- **Air to road transport integration:** Commission dedicated air to road transport capability where there is sufficient demand. In areas with lower demand, improve the operational integration of air to road transport that is non-dedicated.
- **Digital integration:** Collect patient information in a standardised digital form across their service pathway. Have a central repository of digital patient information to inform monitoring, reporting and service improvement.

3.5 Patient and whānau engagement

Current state

Rotary-wing providers currently seek feedback from patients via forms available on their websites. Unfortunately, these forms are used infrequently, which suggests that patients are not aware of the forms or able to access them easily. Some of the rotary-wing sector also seek feedback from patients through base open days, social media communications and surveys, however these approaches have not been embedded into operations yet.³⁰

By contrast, fixed-wing providers do not seek direct feedback from patients about their air ambulance experiences. The clinical capability and direction for fixed-wing air ambulance services mostly comes from hospitals, so these providers believe that it would be inappropriate for them to contact patients themselves, and that hospitals would be best placed to do this. Fixed-wing providers do not retain patient data.

Ambulance Team patient engagement

The Health NZ Ambulance Team engaged with patients to inform the proposed future operating model. This consisted of one-hour virtual interviews with people who had used the air ambulance service in the three to six months prior. This included their family, whānau or support people where available.

The key themes from this engagement are outlined below. These have been deidentified and are not intended to guide the performance management of existing providers. The key limitations of this work are that the sample size was small, it relied on postal responses, it excluded participants aged under 18 and, in some cases, patients were not conscious during transport.

- Participants were extremely grateful to use the air ambulance service. In the pre-hospital environment, most participants acknowledged that the primary focus was on lifesaving treatment, and many stated that they would not have survived without the service.
- Participants and their support people strongly valued clear communication and timely information. They particularly appreciated a good bedside manner, humour and compassion.
- Many participants did not get adequate notice of the timeframe for their inter-hospital transfer. For example, some people only found out that they would be transferred when a stretcher and flight nurse appeared in their room. While patients appreciated that advance notice was not always possible, this is something that was important to them and should be improved where feasible.
- Participants called for better coordination and collaboration between services, including better use of facilities, especially for loading. One participant recounted being unloaded in high winds on the open tarmac, when they could see an empty flight hangar nearby.
- For inter-hospital transfers, participants mentioned having delays in transfers. This was either due to waiting for other patients, uncertainty around transport decisions or long wait times for the air to road transport component.

- Some participants expressed a fear of flying but felt reassured by crews' efforts to ease their concerns. In the pre-hospital environment, winching was particularly stressful for some participants.
- Multiple participants said that pain management, or the lack of, was key to their experience. A new mother had to walk up steps into a fixed-wing aircraft, which was very painful, when loading support and better pain management could have improved their experience.
- Some participants requested clearer communication about the drugs administered. At the time of the interview, some were still unclear about why they were administered certain drugs by the air ambulance.
- Participants appreciated the care and empathy shown by staff, especially when staff from a pre-hospital response returned to check on them in hospital. Participants acknowledged that this was not always possible.
- One participant expressed discomfort at sharing space with patients of the opposite gender and had not been given any choice.
- There was strong support for the service to be fully government funded, and acknowledgment of the positive work that the service does in the community.^{31, 32}

Health Quality and Safety Commission

The Health Quality and Safety Commission (HQSC) Code of Expectations emphasises the importance of patient engagement in health services to improve service quality and embed continuous improvement.³³ By listening to patient needs and preferences, and empowering them with information about their care, air ambulance services can incorporate feedback into service improvements.

We recommend the following approaches to future air ambulance service engagement, based information from the sector and the HQSC.

- **Improve accessibility:** Simplify feedback forms and ensure that they are easy to access on all platforms, including mobile phones, to encourage greater participation. For feedback from patients, consider QR codes, an open communication platform that allows users to share their feedback and experiences or an open group meeting for previous patients.
- **Define key populations:** Focus on ensuring we hear from populations of need, as defined in the Pae Ora Strategies. Be specific about who we would like feedback from and why. This will determine the most appropriate way to collect information.
- **Outreach programmes:** Implement outreach programmes to educate patients about how to provide feedback and the importance of their input. Identify where patients could provide feedback on aspects of their journey.
- **Feedback loop:** Establish a clear process for how feedback will inform improvements, to reassure users that their voices will be heard and valued. This transparency can foster trust and encourage ongoing participation from users.
- **Integrate feedback into decision making:** Ensure that there is resource available to analyse, interpret and act on feedback and that insights gathered are actionable and relevant. Implement changes that enhance service delivery and patient care.

- **Collaborative partnerships:** Partner with community organisations to help bridge gaps between services and priority populations. This would create a more inclusive approach to feedback.
- **Sensitivity:** Direct engagement needs to be led by properly trained staff. Traumatic experiences can be brought up through patient engagement, for example, as some patients were unconscious for their interaction with the service. Processes must also be in place for engaging with neonatal and paediatric intensive care units, and any engagement or outreach with this cohort must be done in consultation with these services.
- **Regular review and analysis:** Increase data capture, including the time to intervention and time to required level of care. Regularly review and analyse feedback to identify common themes and areas for improvement. Increase reporting to reduce information asymmetry.
- **Functional outcome measurement:** Periodically use objective instruments to measure functional outcomes and patient reported outcome measures. This must occur in partnership with relevant clinical networks, for example the major trauma network.

3.5.1 Question 1: How could we gather feedback from patients of the air ambulance service?

3.6 Family, whānau and support people

The findings below are informed by Health NZ Ambulance Team surveys and engagement with the Regional Consumer Councils.

- **Family involvement:** Participants emphasised the importance of their families, whānau and support people being involved in their air ambulance experience. Some participants were more concerned about their family's experience than their own, often thinking about how their loved ones were coping.
- **Communication:** Communication with families, whānau and support people was crucial, particularly, explaining the plan of action clearly and without jargon. One family was not told which hospital their loved one was being transported to and had to ring around all hospitals in the area to clarify. Another participant, who was accompanied by family members whose first language was not English, noted the extra burden of having to translate while dealing with a significant injury.
- **Prioritisation of clinical outcomes:** All participants understood that, in a pre-hospital emergency, the priority was getting to hospital. They acknowledged that family members usually could not accompany them, and there was no expectation for this to change.
- **Separation from children:** For new mothers, being able to travel with their baby was a top priority. One participant was transported to her baby separately days later, which was not a positive experience.
- **Relationship building:** It was important to patients that the air ambulance crew took time to build a relationship with their family, whānau or support people, especially in an inter-hospital context where there was often more time.

- **Accommodation:** Participants mentioned concerns about access to accommodation for family, whānau and support people, and many were grateful for assistance from charities such as the Ronald McDonald House.
- **National Travel Assistance:** Many participants recommended a review of the National Travel Assistance Scheme to better address transport burdens.

3.6.1 Question 2: How could we make the air ambulance experience better for patients' family, whānau and support people?

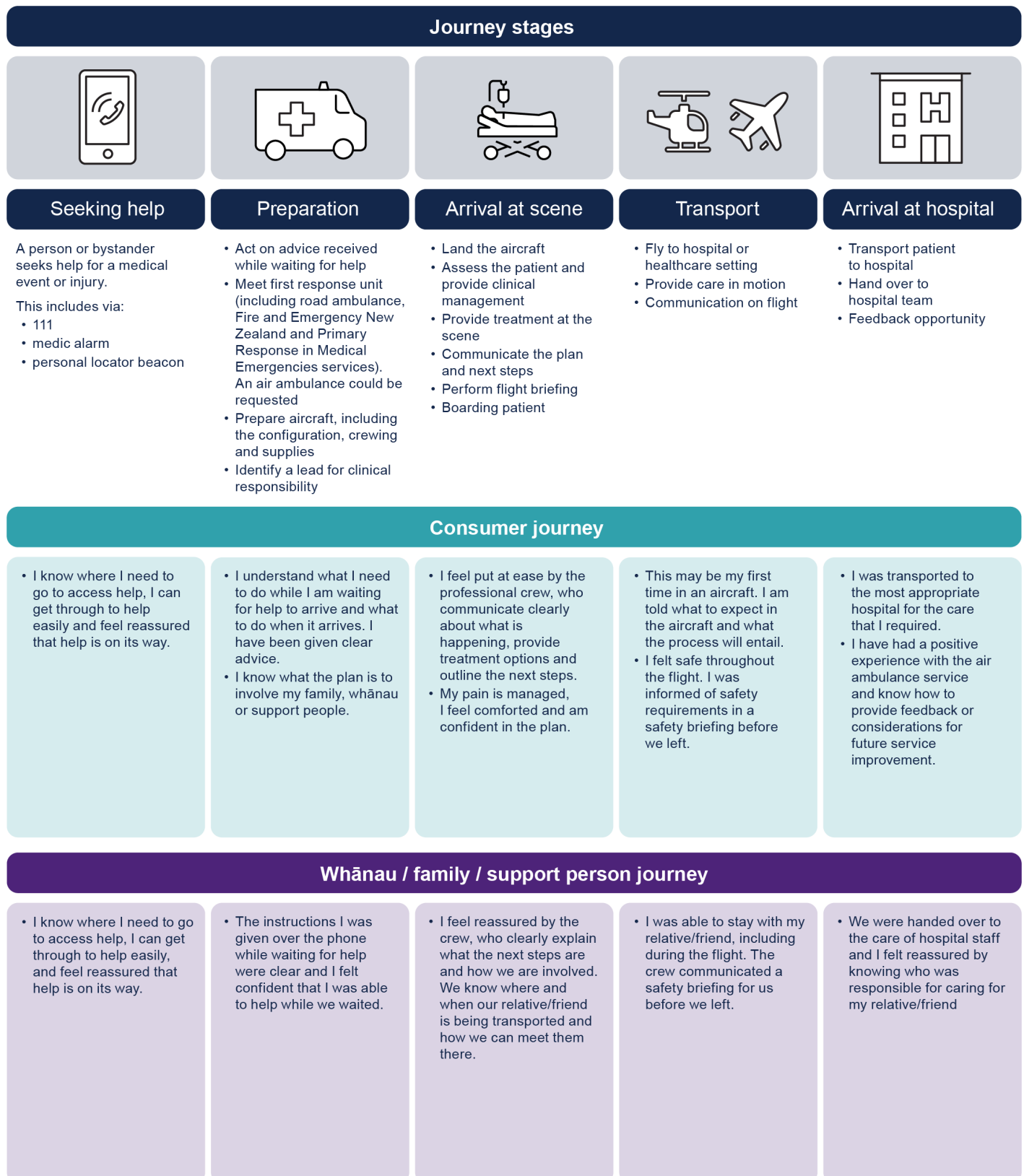
3.7 Journey maps

We have documented what patient, family, whānau and support person journeys would look like under the proposed operating model. These are shown below for pre-hospital responses and inter-hospital transfers.

Each journey is shown in a journey map, which is a tool to document the experience of a service. These maps focus on the experience of patients, family, whānau and support people. They are not process maps and do not aim to provide operational detail. Instead, they build an understanding of how people will hopefully feel as they interact with the air ambulance service.

3.7.1 Pre-hospital journey map

This is a journey map for pre-hospital responses in the proposed future operating model. This shows how a pre-hospital response is to be experienced by patients and their family, whānau or support people.



3.7.2 Inter-hospital journey map

This is a journey map for inter-hospital transfers in the proposed future operating model. This shows how an inter-hospital transfers is to be experienced by patients and their family, whānau or support people.

Journey stages



Preparation

- Identify that transfer is required
- Identify that transfer by air ambulance is most appropriate
- Triage patient and undertake assessment and diagnostics
- Decide to relocate the patient
- Communicate the plan and next steps
- Wait for transfer
- Prepare the aircraft, including the configuration, crewing and supplies



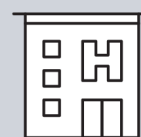
Arrival of transport

- Transport mode arrives
- Land the aircraft
- Transport patient to aircraft
- Perform flight briefing
- Boarding patient



Transport

- Transport patient to hospital or healthcare setting (including road transfer, depending on transport option)



Arrival at hospital

- Transport patient to hospital
- Hand over to receiving hospital team
- Feedback opportunity

Consumer journey

- I feel fully informed about why I need to be transferred and how this will support my treatment or recovery. I feel that this is the right decision for me.
- This may be my first time in an aircraft. I am told what to expect in the aircraft and what the process will entail.

- I feel well briefed about the flight, what to expect and what it will be like.
- I am well informed of the health and safety procedures and am put at ease regarding the flight.
- I know what the plan is to involve my family, whānau or support people.

- I felt safe throughout the flight. I was informed of safety requirements in a safety briefing before we left.
- Clinicians understand my care requirements and I am comfortable and pain free within the flight.
- I am aware that the crew may not be able to talk to me at certain points of the flight (if applicable).

- It was clear to me when I was handed over to the new hospital team and who was caring for me at each step.

Whānau / family / support person journey

- I have been informed by the hospital of the need for a transfer and I understand why this is required. I have been given the option of travelling with my relative/friend if appropriate.
- I know what to expect and what the process will entail.
- I have information on support available, including travel and accommodation supplements.

- I was able to stay with my relative/friend throughout the transfer, or, I understand where and when the relative/friend is being transported and how I can meet them there or provide support.

- I have been informed about any changes to the destination, so I know where I need to go to meet my relative/friend.

- I understand which hospital my relative/friend has been transported to and where I can find them.
- I understand what supports are available, including how I can get appropriate accommodation.

Section 4: Funding and investment

Section 4: Funding and investment

4.1 Purpose

This section summarises the funding and investment component of the operating model, including:

- proposed actions and benefits
- role of community trusts.

4.2 Prompt for feedback

We would like your feedback on the following question.

Question 1: Do you have general feedback on the funding and investment section of the proposed operating model?

4.3 Proposed actions and benefits

Funding and investment proposed actions and benefits

Issue 1: Air ambulance contracts are short-term, which prevents long-term planning and investment.

Proposed actions	Benefits
<ul style="list-style-type: none">• Establish long-term air ambulance contracts that align with international aviation financing terms. This is being implemented for rotary-wing services and may be implemented over time for fixed-wing services as procurement approaches are determined.	<ul style="list-style-type: none">• Funding would be more predictable for the sector and joint purchasers.

Issue 2: Fixed-wing services are generally commissioned by districts and are not connected to a national operating model. ACC and Health NZ also commission fixed wing services within a defined timeframe. This fragmented commissioning approach limits integration with other ambulance services.

Proposed actions	Benefits
<ul style="list-style-type: none">• Embed an approach to fixed-wing commissioning that leverages district, regional and national strengths. Clearly communicate this approach to the sector.	<ul style="list-style-type: none">• Fixed-wing air ambulance services would be more efficient and of a consistent quality.• Air ambulance services would be better integrated.

Issue 3: There is limited national visibility of how much each hospital spends on air ambulance services, and no consistent mechanism for funding clinical retrieval teams.

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish processes to allocate and monitor how much each hospital spends on air ambulance services, including on clinical retrievals teams. 	<ul style="list-style-type: none"> It would be easier to monitor how much each hospital spends on air ambulance services. High-cost assets would be used more appropriately.

Issue 4: There is limited shared and long-term asset and infrastructure planning.

Proposed actions	Benefits
<ul style="list-style-type: none"> Enable joint purchasers and providers to make shared and evidence-based decisions about asset and infrastructure planning and replacement. 	<ul style="list-style-type: none"> Joint purchasers' budget planning and forecasting would be improved. Investment decisions would be guided by evidence. This approach would minimise the investment gap for maintaining a modern, reliable fleet.

4.4 Role of community trusts

Community trusts play an important role in supporting the air ambulance service, leading community fundraising and providing sponsorship for their local air ambulance services. Currently, there are both volunteer and professional trusts.

We acknowledge the support and long-standing contribution of these trusts.

Community trusts have provided feedback on how they would like the air ambulance sector to evolve, and what role they would like to have in the future model. This includes:

- being the direct connection to communities
- understanding the local community's need for the service and representing the community's voice
- enhancing services and investing in innovation
- funding research and development
- supporting the infrastructure required for the air ambulance service.

We will work with community trusts and communities to shape what this involvement looks like in the future operating model.

Section 5: Assets and infrastructure

Section 5: Assets and infrastructure

5.1 Purpose

This section summarises the assets and infrastructure component of the operating model, including:

- prompts for feedback
- proposed actions and benefits
- fit for purpose air ambulance assets
- fit for purpose infrastructure
- air to road transport
- fit out and equipment
- review of air ambulance base locations.

5.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on key topics.

Question 1:	Should there be one or multiple manufacturers of rotary-wing assets? <u>See section 5.4.1</u>
Question 2:	What should determine where larger rotary-wing aircraft are located? <u>See section 5.4.2</u>
Question 3:	Should providers share access to training simulators? <u>See section 5.6.1</u>
Question 4:	Which procurement approach would be most effective for air ambulance equipment? <u>See section 5.9.1</u>
Question 5:	Do you have general feedback on the assets and infrastructure section of the proposed operating model?

5.3 Proposed actions and benefits

Assets and infrastructure proposed actions and benefits

Issue 1: Some assets are not fit for purpose and are critically ageing. This creates aviation and clinical safety risks and inequities in the services that are available in each region.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Address ageing assets by replacing them with modern, IFR capable aircraft. • Reduce the number of types of aircraft used in the national fleet. • Standardise rotary-wing and fixed-wing asset types and support this with asset management plans. 	<ul style="list-style-type: none"> • Fit for purpose, modern and dedicated assets would improve aviation and clinical safety. • The air ambulance fleet would be more available and reliable. • Assets would be able to service New Zealand's diverse geographies.

- Define the national capability to respond to critical service delivery use cases, including search and rescue, ECMO, PICU and NICU.

- The assets in use would be models that are still in production, so greater maintenance support would be available.

Issue 2: Some equipment, fit out and supporting systems are not fit for purpose or standardised. This leads to issues with interoperability, certification costs and training.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Where possible, standardise air ambulance equipment and fit out. • Increase the interoperability across platforms, including air to road transport. 	<ul style="list-style-type: none"> • Safety and standardisation would improve. • Patient experience would improve. • There would be fewer patient transfer delays.

Issue 3: Infrastructure has not been assessed to determine whether it is fit for purpose. Some areas do not have IFR routes, which limits the ability of IFR capable rotary-wing assets to respond in inclement weather.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Audit high-traffic and high-risk heliports (including bases) and identify what needs to be done to ensure that they are safe and fit for purpose. • Work with the sector to develop a national fuel infrastructure plan, to ensure that adequate fuel is available at key locations. • Implement new priority IFR routes and support the maintenance of existing priority routes. 	<ul style="list-style-type: none"> • Infrastructure, including bases, would be fit for purpose and safe to support air ambulance operations. • Aircraft would have the appropriate fuel and payload capacity to cover the area they service. • Navigation infrastructure would be implemented on priority routes.

Issue 4: Air to road transfers can be slow and delay some fixed-wing and rotary-wing services.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Explore commissioning arrangements for dedicated air to road transfers at high-volume locations. • Have the dispatch and coordination function manage air to road transport as part of the transfer. 	<ul style="list-style-type: none"> • Air to road transfers would support timely air ambulance transfers. This would make fixed-wing air ambulance a more viable option. • Clinical crews would spend less time waiting for road ambulances to arrive. • Hospital clinicians would have reduced logistical management responsibility.

Issue 5: There is limited national future planning about assets and infrastructure.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Develop asset management plans and review these periodically, including when there are significant innovations in the market. • Consult with the air ambulance sector before changing assets related to pre-hospital or inter- 	<ul style="list-style-type: none"> • Air ambulance fleet would be aligned with the international aircraft market and would consider significant innovations in the market. • A national fleet management approach would enable better financing arrangements that

hospital services, to ensure that the assets would align with existing equipment.

- Review the location of bases and evaluate whether this affects where assets would be required and what types of assets.

would reduce the cost of upgrading aircraft in the future.

5.4 Fit for purpose rotary-wing air ambulance assets

Current rotary-wing assets	Recommended future rotary-wing assets
Airbus Helicopters H145	Airbus Helicopters H145
AgustaWestland AW169	AgustaWestland AW169 / Airbus Helicopters H160
Airbus Helicopters EC145	
MBB/Kawasaki BK117	
Sikorsky S-76 C++	

Models for rotary-wing air ambulance service:

- A programme is currently underway to replace ageing rotary-wing aircraft, to prevent the sudden and sustained degradation of air ambulance services.³⁴ It is planned that all existing aged rotary-wing aircraft will have been replaced by the 2027/28 financial year. From 1 July 2028, the rotary-wing fleet will comprise of AgustaWestland AW169s and Airbus Helicopters H145s.
- A single kind of helicopter will not be able to meet the varied geographical and operational needs. Complex inter-hospital transfers and search and rescue missions require specialist crew and equipment, so a larger helicopter model may be more appropriate than the Airbus Helicopters H145. Rotary-wing assets need to be able to operate in diverse environments and reach locations that are remote, for example, being able to reach 50 nautical miles offshore. The fleet also needs to possess certain capabilities that are critical for service delivery. This includes wet winching for search and rescue missions, ECMO, PICU, bariatric³⁵ and high-consequence infectious disease patients.
- The recommendation is that the rotary-wing fleet has two models, the Airbus Helicopters H145 and either the AgustaWestland AW169 or Airbus Helicopters H160. These models are likely to support emergency medical services operations. The future air ambulance fleet should have models that are still in production and will continue to be supported.
- Smaller helicopters, such as the Airbus Helicopters H135, may be more cost-effective, but are best suited to shorter trips. These assets are unlikely to be appropriate for all air ambulance work, so would add complexity and are not recommended for the future model.
- New innovations are likely to appear between now and 2035. These should be assessed for their viability and potential use by the service.

5.4.1 Question 1: Should there be one or multiple manufacturers of rotary-wing assets?

As two rotary-wing models are recommended, do you support having a single manufacturer or multiple manufacturers?

Option 1	Option 2
Single manufacturer considerations	Multiple manufacturers considerations
<ul style="list-style-type: none"> There would be greater interoperability and equipment compatibility across services. Using simulators for the aviation and clinical workforce would reduce training costs and improve safety. Streamlining maintenance procedures could offer economies of scale and other benefits. This approach would bring the spare parts supply chain closer to New Zealand, which would reduce maintenance delays. Standardisation across the fleet would support redundancy for surge capacity, for example for emergency management responses. There could be common supplemental type certificates for medical fit outs. Standardised training would increase the mobility of staff between bases. This approach could result in risks related to supply chain, parts availability and pricing. 	<ul style="list-style-type: none"> This approach would mitigate the risk of fleet being unavailable. If a specific model had operational, Airworthiness Directive or supply chain issues this approach would ensure service availability. This approach would allow access to innovations developed by other manufacturers. This approach could increase the cost of compliance and certification. Having multiple fleet types would increase training requirements and require multiple simulator types to meet all needs.

5.4.2 Question 2: What should determine where larger rotary-wing aircraft are located?

Two helicopter models have been recommended – the Airbus Helicopters H145 and either the AgustaWestland AW169 or Airbus Helicopters H160. What should determine where the larger helicopters are located?

Dedicated fleet:

- We recommend the rotary-wing aircraft continue to be a dedicated fleet. This would allow the aircraft to be fitted out with air ambulance equipment, without having to balance the needs of other roles the aircraft may fill. Additional non-dedicated aircraft could be used for maintenance cover and surge capacity.

Ownership models:

- Joint purchasers will work with providers to develop an ownership model that is resilient, sustainable and cost-effective.

- To modernise the fleet in the short-term, a mixture of leased and owned models is required. Rotary-wing leases often include the provision of spare parts and/or maintenance, whereas ownership models require providers to complete their own maintenance activities.

Asset replacement:

- Rotary-wing aircraft should ideally be replaced every 10 years. Aircraft should ideally not be used after 20 years of age as the maintenance demands and costs increase significantly. It is easier to access maintenance for aircraft models that are still in production.
- Second-hand aircraft can be more affordable than new ones but can have maintenance challenges and gaps in technology. They can also require modifications to meet interoperability and standardisation requirements. By contrast, new aircraft offer superior performance and warranty coverage.

5.5 Fit for purpose fixed-wing air ambulance assets

Summary of fixed-wing models considered:

Current fixed-wing assets	Recommended future fixed-wing assets
King Air B200	King Air B200
King Air B350	King Air B350
Jet Capability (these are used for air ambulance in exceptional cases)	Jet Capability, for example PC24 (to be determined)
Britten-Norman BN-2A	
King Air C90	

Fixed-wing models:

- Having a standardised fleet would increase efficiency and interoperability. Although assets of different sizes would be required to meet varying operational demands, each aircraft would need to have capacity for at least two stretchers.
- The recommended models are King Air B200 and King Air B350, as they are both well-supported in Australasia and therefore are more reliable and have greater maintenance support. In addition, two to four smaller jets, such as the Pilatus PC-24, could supplement the King Air B200 and King Air B350. These could be based in key hubs such as Auckland and Christchurch and be used for long-range operations. There needs to be further analysis to determine whether this is viable given volumes, and if so, to confirm where these assets should be located.
- By 2035, all fixed-wing aircraft need to include a cargo door. Safe and efficient loading systems are required for all fixed-wing aircraft.

- King Air C90, Britten-Norman BN-2A and older piston engine aircraft are outdated and unsuitable for future use.
- In the future there could be a new electric fleet or other new models which would be suitable to deliver the service. The suitability of these assets would need to be assessed at the appropriate time.⁵

Dedicated fleet:

- We recommend that most of the fleet are dedicated aircraft. This would allow the aircraft to be fitted out with air ambulance equipment, without having to balance the needs of other roles the aircraft may fill. Additional shared aircraft could be used for jet capability, maintenance cover and surge capacity.

Asset replacement:

- The future model would ideally have aircraft that are new or less than 10 years old and have under 12,000 flight hours. Aircraft are commercially viable for 10-15 years, and maintenance costs typically increase after 10,000-12,000 flight hours. However, the service would still be considered safe and reliable if it had aircraft that were up to 25 years old and had up to 20,000 flight hours.
- As a comparison, Australian contracts typically require new aircraft, and these are run for 10 years.

5.6 Fit for purpose infrastructure

Simulation and training infrastructure:

- Simulator training is crucial for maintaining pilot competency and crew resource management. For the rotary-wing sector, there is currently one Airbus H145 flight navigation procedures trainer (FNPT) and one AgustaWestland AW169 FNPT. Two more Airbus H145 FNPTs have been ordered.
- For rotary-wing aircraft, access to FNPT fixed-base simulators should be prioritised as they are highly beneficial to staff training. These assets need to be available to rotary-wing providers. Full motion (level D) simulation is not required.
- For the fixed-wing sector, providers currently use simulators in Australia. To improve training capability, King Air simulators need to be available in New Zealand for fixed-wing providers.

5.6.1 Question 3: Should providers share access to training simulators?

We would like your feedback on whether access to simulators should be shared.

Option 1	Option 2	Option 3
Share use of government-funded rotary-wing and fixed-wing simulators.	Share use of fixed-wing simulators but continue with the status quo for rotary-wing simulators.	Each rotary-wing and fixed-wing provider to have their own simulator.
Considerations		
<ul style="list-style-type: none"> There would be greater economies of scale if multiple providers accessed each simulator. Having a more standardised fleet would enable this approach. The location(s) of the simulators would need to be agreed, so regional travel could still be required. This approach would only be viable if multiple providers used the simulators. Contractual mechanisms may be required to ensure use. 	<ul style="list-style-type: none"> Fixed-wing providers would have greater standardisation in training. 	<ul style="list-style-type: none"> Some providers have existing simulators in locations that suit their operations. It would be complex to organise access to the shared resources.

Navigation infrastructure

- For rotary-wing, we recommend identifying priority new IFR routes required. This will inform a detailed plan for investment required, which will also consider maintenance costs.
- It has been recommended that the government funds and owns IFR routes as crucial public infrastructure. We must work collaboratively with providers to understand impacts on current IFR routes.
- For fixed-wing, work in the sector is underway to introduce a satellite-based augmentation system by 2028. This will enhance navigation, particularly in remote areas.
- A review of the location and quality of weather stations is required to support navigation.

Fuel infrastructure

- We recommend that a national fuel infrastructure plan is developed, and places services at key locations to fuel both air ambulance and search and rescue missions.

Helipads and heliports

- We recommend that helipads and heliports across the country are assessed, with an initial focus on heliports that are used more frequently or have higher risks. From here, the key

actions required to bring each heliport or helipad to an acceptable level of risk can be identified. Next, an audit of community helipads and heliports should be undertaken to assess and ensure an acceptable level of risk.

- Heliport design requirements should be considered from the outset for new builds and the upgrade of hospital sites. These should not require a road component for rotary-wing missions.

Airfield and airports

- We recommend assessing airfields and airports to identify risks with this infrastructure. This would include, but not be limited to, lighting, access to facilities, refuelling systems, hangars, runway length and condition. Then, the key actions required to support each airfield or airport and bring them to an acceptable level of risk could be identified.

Data and digital

- A key component of modern aircraft is the underlying data and digital infrastructure. This is discussed further in the data and digital section of this document.

5.7 Air to road transport

We recommend that air to road transport is integrated within the air ambulance service and coordinated as part of the transfer by the dispatch and coordination function.

We recommend exploring whether it would be appropriate to have dedicated vehicles at high-volume airfields and airports, to ensure that the service is available when required. In areas with low volumes there would continue to be non-dedicated air to road transfer services.

Air to road transport vehicles should have capacity for the team, one or two stretchers and equipment (e.g., incubators and ECMO equipment).

5.8 Fit out and equipment

Standardising the fit out of aircraft would increase the interoperability and efficiency of equipment. For example, different aircraft have hard points in different locations, which prevents the compatibility and interoperability of stretchers. Our key recommendations are that:

- Each aircraft model is fit out in a consistent way, including the configuration of predefined hard points. This is best done when fleet are being replaced, so that consistent configurations can be installed, including predefined hard points. Standardised fit outs would also make each subsequent fit out cheaper.
- Address issues with the current challenges around complexity and length of the certification process, including exploring options for supplementary type certification where this is more efficient.
- Ensure that dedicated air to road transfer services have hard points and restraints that are compatible with air ambulance stretchers and power supplies.

- Ensure that non-dedicated air to road transfer services are compatible with equipment. The dispatch and coordination function would have visibility of each vehicle's capability and would use this information to make tasking decisions.

Where possible, we recommend standardising the equipment used in air ambulance services, to:

- enhance the consistency of patient care
- minimise the risk of errors
- improve operational safety to an acceptable level of risk
- improve efficiency
- simplify maintenance and logistical processes, so that operators can manage their inventories more efficiently
- reduce the need to swap equipment during transfer
- reduce certification costs across the sector
- allow for flexibility in which air asset is dispatched.

While standardisation is preferred, when it is not possible to standardise fit out or equipment, the focus should be on maximising interoperability and compatibility. This would ensure that different kinds of equipment could be used across all vehicle types. The dispatch and coordination function would need to have visibility of equipment and compatibility issues, to make informed tasking decisions.

5.9 Procurement of air ambulance equipment

5.9.1 Question 4: Which procurement approach would be most effective for air ambulance equipment?

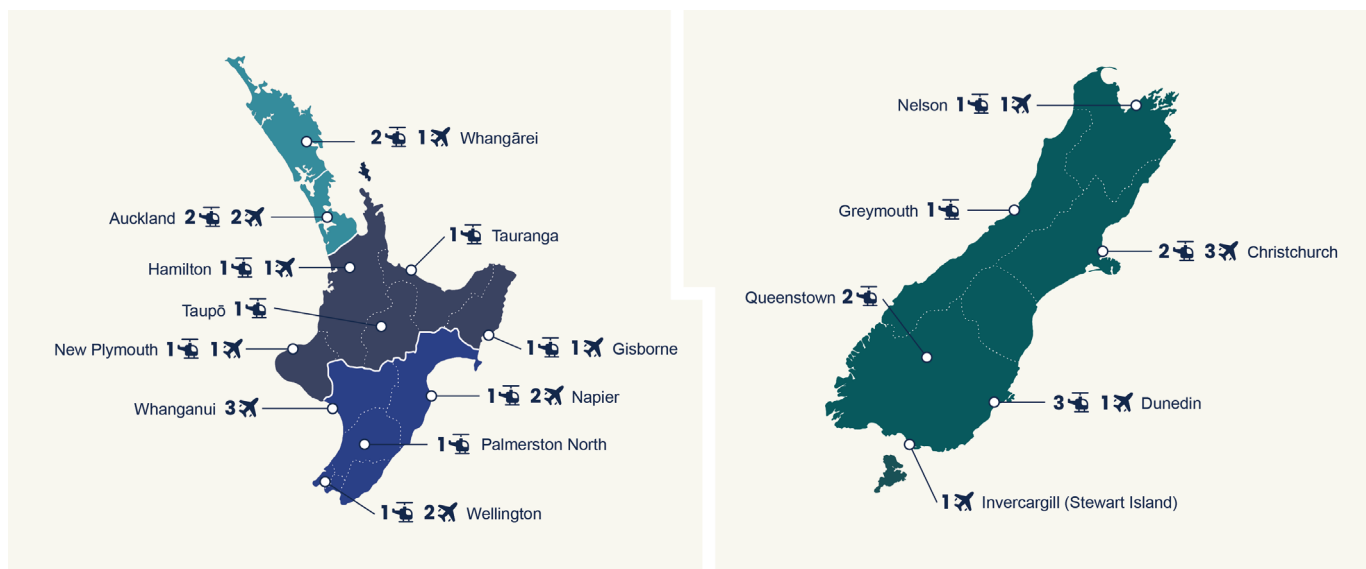
We would like feedback on three different approaches to procurement.

Option 1	Option 2	Option 3
Providers agree on common equipment and then negotiate with original equipment manufacturers directly.	There is a nationally mandated list of minimum equipment for rotary-wing services, fixed-wing services and hospitals to buy separately.	The sector develops a nationally mandated list of minimum equipment that is then procured collectively.
Considerations		
<ul style="list-style-type: none"> Providers would identify which pieces of equipment should be standardised. This would not interfere with provider operations and autonomy. Equipment would only be standardised and interoperable if such items were selected by providers. There could be unexpected costs for hospitals if new equipment was required. There would be a missed opportunity to achieve financial benefits through scale. This approach would require collaboration and agreement across the sector. 	<ul style="list-style-type: none"> Series certification would be possible for equipment. Providers or staff may prefer, or only be trained to use, certain kinds of equipment. There would be a missed opportunity to achieve financial benefits through scale. This would require experts to compile a nationally mandated list of minimum equipment. The agreed list would need to be updated periodically and consider and incorporate new technologies. 	<ul style="list-style-type: none"> Type certification would be possible for equipment. This approach could be more time-consuming if it relies on national procurement processes. This would require a funding model that supported capital investment over long-term contracts. This would require experts to compile a nationally mandated list of minimum equipment. The agreed list would need to be updated periodically and consider and incorporate new technologies. Resources would be required for the collective procurement process.

5.10 Review of air ambulance base locations

Where air ambulance bases are located significantly affects service delivery and asset and infrastructure planning. The current location of air ambulance bases is shown on the map below.

Figure 2: Rotary-wing and fixed-wing base locations



Changing a base is disruptive and requires strong rationale, significant community engagement and a detailed business case to secure funding. For a new base to be a viable investment, it needs to have an operational life of at least 30 years.

The next phase of work will include a review of air ambulance base locations.

- The review will assess the number, distribution and type of aircraft nationwide.
- Hospital Campus Planning work is currently defining the national locations of specialities and the health workforce. The distribution of health and ambulance capability would be a factor when determining the future locations of bases.
- Data on air ambulance volume and demand would inform the review.
- Demand analysis would be conducted to best align resources to demand.

Some rotary-wing bases have an immediate sustainability risk, which will be addressed via Health NZ Ambulance Team operations.

Section 6: Workforce

Section 6: Workforce

6.1 Purpose

This section summarises the workforce component of the operating model, including:

- prompts for feedback
- proposed actions and benefits
- crewing model and capability
- training standardisation and currency
- support for referring clinicians
- cultural safety
- diverse and representative workforce.

6.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on key topics.

Question 1:	How many dedicated crew members should each rotary-wing air ambulance have? <u>See section 6.5.1</u>
Question 2:	In a three-crew rotary-wing model, what is the minimum clinical qualification that air crew officers should have? <u>See section 6.5.2</u>
Question 3:	What would the optimal clinical crewing model be for rotary-wing air ambulances? <u>See section 6.5.3</u>
Question 4:	Who should rotary-wing air ambulance clinical crew be employed by? <u>See section 6.5.4</u>
Question 5:	Should rotary-wing crewing models be consistent or variable across different bases? <u>See section 6.5.5</u>
Question 6:	What should the minimal dedicated crewing model be for fixed-wing air ambulances? <u>See section 6.6.1</u>
Question 7:	Who should fixed-wing air ambulance clinical crew be employed by? <u>See section 6.6.2</u>
Question 8:	When should ICU clinicians join or replace dedicated crew on air ambulances? <u>See section 6.7.1</u>
Question 9:	What skill, experience and qualifications in the air ambulance context would ICU staff who are non-dedicated crew need to undertake air ambulance transfers? <u>See section 6.7.2</u>
Question 10:	Should all doctors on air ambulances have pre-hospital and retrieval medicine training? <u>See section 6.8.1</u>
Question 11:	Should training be provided at bases or training centres of excellence? <u>See section 6.8.2</u>
Question 12:	Do you have general feedback on the workforce section of the proposed operating model?

6.3 Proposed actions and benefits

Workforce proposed actions and benefits

Issue 1: Crewing models and clinical capability are inconsistent across rotary-wing and fixed-wing platforms.

In some locations clinical crews for inter-hospital transfers are dedicated resources, whereas in others they are sourced from on-duty hospital clinical teams.

Proposed actions	Benefits
<ul style="list-style-type: none"> Have dedicated crewing models for fixed-wing and rotary-wing air ambulances. Have two clinicians crew pre-hospital responses. In a three-crew model, one of the clinicians could also provide aviation support. The crewing models for rotary-wing and fixed-wing need to be agreed as part of this programme of work. Have a single clinician (e.g., flight nurse) for fixed-wing inter-hospital transfers of clinically stable patients. This is high-volume work. Have access to specialist skill sets to respond to highly specialised work (e.g., ECMO, complex ICU cases, PICU, NICU and alpine rescue cases). 	<ul style="list-style-type: none"> Having dedicated crewing models would enable training and specialisation in the complex air ambulance environment. The air ambulance service would be able to access additional specialist skill sets in a timely way to respond to patient needs.

Issue 2: There are varied practices and protocols across the air ambulance sector, which result in unwarranted variation across teams and services.

Proposed actions	Benefits
<ul style="list-style-type: none"> Embed standardised air ambulance clinical practice and protocols across the sector. Ensure that practice and protocols are informed by evidence and best practice. Embed a fatigue and risk management system aligned with section 4.3 of the New Zealand Aeromedical and SAR Standard. 	<ul style="list-style-type: none"> There would be greater clinical and aviation safety. The service would be more consistent. There would be a clear chain of clinical responsibility through the patient pathway, with formal handovers between services. This approach would achieve compliance with NZS 8156:2019 and the New Zealand Aeromedical and SAR Standard.¹ There would be a focus on continuous quality improvement. The clinical and aviation workforces would be supported by a suitable fatigue and risk management system.

Issue 3: Clinical and aviation crew training and currency requirements are not standardised.

Having a low volume of air ambulance incidents, and limited mobility for clinical crew, could be making it difficult for crew to maintain current skills.

Proposed actions	Benefits
<ul style="list-style-type: none"> Develop and embed standardised multidisciplinary training across the sector. This would need to be fit for purpose and aligned with key standards and regulations. Define minimum experience and qualification requirements for the workforce. Support mobility across platforms and practice contexts (e.g., road/air ambulance) so that clinicians could maintain clinical currency. To ensure currency, training would be required at specified intervals. 	<ul style="list-style-type: none"> Introducing minimum requirements for training and experience would promote safety and quality across the sector. This approach would ensure adherence to best practice. Training would deliver the requirements specified in the New Zealand Aeromedical and SAR Standard. Training would help to ensure that patients have experiences that are clinically and culturally safe.

Issue 4: The air ambulance workforce does not reflect the populations that it serves.

Proposed actions	Benefits
<ul style="list-style-type: none"> Encourage inclusive recruitment and address the barriers to entry. Create pathways into the workforce for underrepresented groups. 	<ul style="list-style-type: none"> The patient experience would improve as the workforce would be more representative of the population.

Issue 5: There is inconsistent access to clinical specialists across the air ambulance service.

Proposed actions	Benefits
<ul style="list-style-type: none"> Enable access to specialist clinical support for rural referring clinicians. 	<ul style="list-style-type: none"> The dispatch and coordination function would enable connection to clinical specialists where required.

6.4 Crewing model and capability

Rotary-wing and fixed-wing air ambulances require both clinical and aviation crew.

Clinical crew provide the care patients require during transport, within their scope of practice. This can include doctors, paramedics, flight nurses, midwives and other health professionals.

Aviation crew refers to all non-clinical crew and includes pilots and air crew officers (ACO). It also includes ground-based crew such as flight operations managers, load masters, engineers, quality and safety managers and base managers. Multiple roles can be held by the same person, for example an individual can be both a crew member and winch operator.

There can also be specialist crew on search and rescue taskings, including rescue swimmers and alpine rescue teams.

6.5 Rotary-wing air ambulance workforce

Rotary-wing air ambulances provide pre-hospital responses to the community and time-critical inter-hospital transfers. Between 1 July 2023 and 30 June 2024, these air ambulances delivered 4,379 pre-hospital responses and 3,499 inter-hospital transfers.³⁶ The three most reported diagnostic categories for these transfers were trauma (1,429), cardiac (1,044) and stroke (539).³⁷

6.5.1 Question 1: How many dedicated crew members should each rotary-wing air ambulance have?

We would like feedback on the number of dedicated rotary-wing air ambulance crew.

Option 1	Option 2
<p>Three crew per rotary-wing air ambulance</p> <p>Crewing:</p> <ul style="list-style-type: none">• Pilot• Crew member with dual aviation and clinical responsibilities• Clinician• Flexibility for fourth seat	<p>Four crew per rotary-wing air ambulance</p> <p>Crewing:</p> <ul style="list-style-type: none">• Pilot• Crew member• Clinician• Clinician
Considerations	
<ul style="list-style-type: none">• The fourth seat could be used to meet specific requirements of the mission. This could include additional clinical crew (e.g., flight nurses or medical passengers), trainee aviators or family.• At times, the dual function crew member could need to prioritise aviation tasks and would be unable to support the primary clinician with care. This could put patients at clinical risk.• There is debate about whether aviation experience and training or clinical experience and qualifications would be more important for the dual function role.• To date, there is no evidence of overt patient harm in New Zealand as a result of the three-person model.• There would be a greater range due to a lower payload.• If an ACO is not available, it could be challenging during periods of high pilot workload.	<ul style="list-style-type: none">• Two dedicated clinicians would support clinical care.• The four-person model would be able to manage complex aviation and complex patient conditions concurrently.• This would enable the hiring of co-pilots who required mentoring to become captains.• A dedicated crew member would have a safety-focused role. They would support the pilot and assist with loading and aviation tasks.• This approach would retain the existing workforce of specialist crew members.• This approach would limit the flexibility of the fourth seat for additional medical passengers or training. It could still be possible to carry medical passengers, depending on the payload.• It could be challenging for non-lead clinicians to maintain currency without additional training/supervision.

6.5.2 Question 2: In a three-crew rotary-wing model, what is the minimum clinical qualification that air crew officers should have?

We would like feedback on what the minimum clinical qualification should be for dual role crew members in a three-person model.

Option 1	Option 2
Emergency medical technician qualification	Paramedic qualification
Considerations	
<ul style="list-style-type: none"> Some ACOs in the three-crew model operate with the emergency medical technician qualification. There have not been any adverse events related to this model since 2018. This would reduce the clinical capability and capacity from the four-crew model. Emergency medical technicians could be trained to assist lead clinicians with a range of technical tasks. 	<ul style="list-style-type: none"> There would need to be a phased transition to enable upskilling. Bespoke training could be required, to teach staff who have specialist aviation knowledge the necessary clinical skills. There could be challenges with maintaining currency. There would be fewer opportunities for autonomous practice. There would be greater clinical capability and capacity.

6.5.3 Question 3: What would the optimal clinical crewing model be for rotary-wing air ambulances?

We would like feedback on three options for rotary-wing air ambulance dedicated crewing. Each option could be utilised in different locations, based on mission characteristics, incident volumes, the available workforce and other factors.^{38,39} More information about the potential locations for different crewing options is covered in Question 6. For these options to be feasible clinicians could require additional training over time.

We recommend that for all crewing options, a defined minimum level of training, clinical capability and experience is required to work in the air ambulance context.⁴⁰ Air ambulance is a highly specialised area with unique challenges, and evidence suggests that dedicated teams have improved outcomes compared to ad hoc teams. Clinicians need to be familiar with protocols, roles, responsibilities and equipment, and to work within their scope of practice.⁴¹

Option 1	Option 2	Option 3
Either two CCPs, or one CCP and one paramedic.	A CCP and a flight nurse.	A pre-hospital and retrieval medicine doctor and a paramedic or flight nurse.
Considerations		
<ul style="list-style-type: none"> This would provide a career pathway for paramedics to become CCPs, enabling the 	<ul style="list-style-type: none"> These staff would have versatile skills to cover both pre-hospital and inter-hospital work. 	<ul style="list-style-type: none"> These staff would have versatile skills to cover both pre-hospital and inter-hospital work.

<ul style="list-style-type: none"> development of an appropriate number of CCPs. CCPs are currently the lead clinicians in the pre-hospital context for 20 out of 21 primary rotary-wing assets, and in the road ambulance context. The team would only have one skill set. It would not be multidisciplinary. 	<ul style="list-style-type: none"> Most flight nurses would require additional training and experience to work in a pre-hospital environment. This would provide an additional career pathway for experienced flight nurses. It could be difficult to find sufficient flight nurses who are interested in the pre-hospital field. This would provide a multidisciplinary team. 	<ul style="list-style-type: none"> Doctors in the team at base could facilitate training and knowledge sharing. This would provide a multidisciplinary team. This could be a better approach for high-volume main centres that deliver both pre-hospital and inter-hospital transfers.
Examples		
<ul style="list-style-type: none"> Air Ambulance Victoria (three-person crew).ⁱ 	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> New South Wales, Queensland, South Australia and Canberra air ambulances.

6.5.4 Question 4: Who should rotary-wing air ambulance clinical crew be employed by?

We would like feedback on options for the future employment of dedicated rotary-wing air ambulance clinical crew who are on base. Currently, rotary-wing providers employ their own clinical crew. This can depend on the crewing model selected above. For example, for option 2, a flight nurse may be employed by Health NZ and a CCP may be employed by the provider.

Aviation crew will continue to be employed by providers. Air ambulance services that employ clinical crew should have effective clinical governance and leadership, including a medical director.

Option 1	Option 2
Health NZ employs clinical crew for rotary-wing air ambulances that are rostered to the service.	Rotary-wing providers employ their own dedicated clinical crew.
Considerations	
<ul style="list-style-type: none"> Providers would have less control over the workforce. The clinical workforce would have greater mobility across different platforms and bases. 	<ul style="list-style-type: none"> Providers would have greater control of the workforce. Each platform would be able to respond in a timely way. It could be difficult to ensure mobility across different platforms if different providers were employing their own staff.

ⁱ Victoria uses a three person crew model with a single flight Critical Care Paramedic and a crewperson with technical skills to support for all pre-hospital and the majority of inter-hospital transfers. They are almost always supported clinically by road clinical crew at scene for pre-hospital responses. For some complex inter-hospital transfers, a doctor joins the existing crew.

6.5.5 Question 5: Should rotary-wing crewing models be consistent or variable across different bases?

A related consideration is the location of different crewing models. We would like feedback on the idea of having a hub and spoke model.

Option 1	Option 2
Crewing model is consistent across all rotary-wing bases.	There are differing crewing models depending on base location. Some bases (hubs) could be in high-volume locations or major centres and have different crewing to regional bases (spokes), with lesser volumes.
Considerations	
<ul style="list-style-type: none">The service provided across the country would be equitable.Depending on the crewing model, it could be difficult to sustain the same workforce in each area.This would help to prevent the perception that different parts of New Zealand have air ambulance services of differing qualities.	<ul style="list-style-type: none">Hubs would better support flexible multidisciplinary crewing models across platforms.Hubs in major centres would better support crewing models with certain capability.This approach could align with having training centres of excellence.It would be more difficult to maintain currency in the spokes.

6.6 Fixed-wing air ambulance workforce

In the proposed future model, fixed-wing air ambulances would provide inter-hospital transfers and pre-hospital responses where appropriate. Between 1 July 2023 and 30 June 2024, fixed-wing air ambulances delivered 8,507 inter-hospital transfers. These were for retrievals, escalations of care and repatriations. For those transfers, the top three reported diagnostic categories were cardiology, medical and surgery.

We recommend that two aviation crew members are rostered on each fixed-wing aircraft, in line with CAA requirements.

6.6.1 Question 6: What should the minimum dedicated clinical crewing model be for fixed-wing air ambulances?

We acknowledge that single clinician (e.g., flight nurse) fixed-wing transfers occur for patients who are clinically stable. This work is high frequency and accounts for the majority of repatriations.

We would like feedback on dedicated clinical crewing options for fixed-wing air ambulances. These crew would be dedicated and rostered to the service. Each option could be utilised in different locations, based on mission characteristics, incident volumes, the available workforce and other factors.

Option 1	Option 2
Overview for dedicated fixed-wing crew	
<ul style="list-style-type: none"> Flight nurse. 	<ul style="list-style-type: none"> Flight nurse. Paramedic/CCP.
Considerations	
<ul style="list-style-type: none"> A large proportion of fixed-wing transfers are currently managed by a flight nurse. Additional crew would be required for unplanned tasking. 	<ul style="list-style-type: none"> This would enable two patients who require one-on-one care to be transferred at the same time. This crew could attend inter-hospital transfers and pre-hospital responses. This would be enabled by co-locating with rotary-wing. Paramedic/CCP scope may not be required for repatriations, which is high-volume work.

6.6.2 Question 7: Who should fixed-wing air ambulance clinical crew be employed by?

We would like feedback on options for the employment of fixed-wing air ambulance clinical crew.

Currently, some fixed-wing providers employ clinical staff directly and these costs are charged to Health NZ. Other fixed-wing air ambulances are staffed by Health NZ flight teams and/or specialist retrieval services and these costs are not always captured.

Aviation crew will continue to be employed by providers directly. Air ambulance services that employ clinical crew should have effective clinical governance and leadership, including a medical director.

Option 1	Option 2
Health NZ employs clinical crew for fixed-wing air ambulance.	Fixed-wing providers employ clinical crew directly.
Considerations	
<ul style="list-style-type: none"> Flight clinicians would be embedded in the hospital environment, increasing currency for inter-hospital transfers. This could delay some fixed-wing transfers as clinicians would need to travel to base. This would limit the use of fixed-wing for pre-hospital responses. Providers would have less control over the workforce. Fixed-wing clinical crew could have competing demands from the hospital. This approach would simplify clinical governance arrangements. 	<ul style="list-style-type: none"> This would enable a timely response to pre-hospital events. Each platform would be able to respond in a timely way. Fixed-wing clinical crew could be less connected to hospitals, potentially leading to greater training requirements. It could be difficult to ensure mobility across different platforms if different rotary-wing and fixed-wing providers were employing their own staff.

- There would be greater clinical workforce mobility across different platforms and bases.

6.7 Non-dedicated clinical air ambulance crew

Specialist clinicians to undertake specialist transfers

Specialist clinicians are required for specialist transfers, for example to transfer ECMO, PICU and NICU patients.⁴² This is across both rotary-wing and fixed-wing air ambulance.

These teams would continue to be based within the hospital and be collected enroute to pre-hospital responses and inter-hospital transfers. This would not change regardless of crewing models chosen.

Specialist teams would need to undergo training about the air ambulance context as they are regularly involved with the air ambulance service.

ICU clinicians

On average, 66% of rotary-wing inter-hospital transfers are crewed by dedicated clinical crew from the provider. The remaining 34% are crewed by a combined provider and hospital clinical crew or a hospital clinical crew.⁴³ Currently, hospital clinicians can replace air ambulance clinicians on inter-hospital transfers, which results in air ambulance clinicians being left at the base.

For both rotary-wing and fixed-wing, some complex and high acuity ICU-level transfers may need to be done by ICU clinicians.⁴⁴ In these cases, ICU clinicians would be collected from the hospital.

6.7.1 Question 8: When should ICU clinicians join or replace dedicated crew on air ambulances?

We would like feedback on when ICU clinicians should join or replace dedicated crew on air ambulance. Depending on the patient's needs, this could include an additional flight nurse, ICU registrar, SMO or consultant.

6.7.2 Question 9: What skill, experience and qualifications in the air ambulance context would ICU staff who are non-dedicated crew need to undertake air ambulance transfers?

Currently, ICU staff with different skills, experience and qualifications work on air ambulances. This includes ICU nurses, registrars, SMOs and consultants, depending on the patient's needs. We would like feedback on the level of skill, experience and education required in the air ambulance context for non-dedicated ICU staff.

Medical passengers

Medical passengers are anyone required to assist or care for patients who are in transit, as part of their role and on an irregular basis.⁴⁵ For example, a midwife or neurosurgeon.

Transporting a medical passenger for their expert medical assistance should be considered if it would be immediately lifesaving. However, the risk of placing these untrained personnel in an unfamiliar transport environment would need to be balanced with the likely benefit to the patient.⁴⁶

Search and rescue

For search and rescue taskings, specialist skill sets are often required. We recommend that in the future operating model there is real time information about the capability available across the country.

Once a person has been rescued, the priority can transition to providing clinical care. It is often unclear whether a person requires clinical care until they are rescued, so the balance of rescue capability and clinical care in the dedicated crew model needs to be considered.

The dispatch and coordination function would work with the search and rescue coordination agency to determine the crewing required. Pathways need to be created for how to add search and rescue crew to missions and ensure integration.

6.8 Training standardisation and currency

All air ambulance crew require training for the specialised air ambulance environment. The proposed model suggests that all crew receive multidisciplinary training, and that each profession receives training specific to their scope of practice or duties.

Currency

Air ambulance staff must maintain currency. This would be enabled by having dedicated training time, funding for training and a currency regime that provided opportunities to demonstrate competency for required skills. For clinicians, this could include the ability to rotate through other relevant clinical environments (e.g., hospitals or road ambulances) with the aim of demonstrating required skills.

New Zealand Aeromedical and SAR Standard

The New Zealand Aeromedical and SAR Standard should be applied to the air ambulance service.⁴⁷ The 2024 version of the standard refers to medical passengers, which incorporates non-dedicated clinical crew. This should be read alongside the Ambulance Standard NZS 8156:2019, which provides more detail on clinical crewing.

Multidisciplinary training requirements for air ambulance

We recommend establishing two multidisciplinary training programmes to promote interdisciplinary learning and professional development. One programme would cater to all clinical and aviation air ambulance crew, including dispatch and coordination, and the second to all flight clinicians.

Research supports multidisciplinary training and training as a cross-functional team.⁴⁸ Additionally, aviation physiology, Crew Resource Management and aviation safety are relevant to all clinical and aviation crew.⁴⁹ Training programmes could be informed by current provider training, the PHRM curriculum,⁵⁰ university aeromedical retrieval papers, the College of Air and Surface Transport

Nurses (COASTN) Aeromedical Retrieval Course⁵¹ and international courses adapted for New Zealand.

Flight nurses

We recommend that minimum standards, experience and currency are defined for flight nurses. The College of Air and Surface Transport Nurses' National Entry, Education, Training and Maintenance Criteria for Aeromedical Nurses in New Zealand should be reviewed to ensure that it defines appropriate entry criteria for becoming a nurse in the air ambulance sector.⁵²

There must be dedicated funding and time to enable all flight nurses to access regular air ambulance training.

Flight paramedics and flight critical care paramedics

We recommend that minimum standards, experience and currency are defined for paramedics and CCPs working in the air ambulance context. These would be above the existing qualifications and requirements for road ambulance.

There is support for flight paramedics and CCPs to undertake additional postgraduate level study. The current qualifications are generic and do not reflect the air ambulance environment. Therefore, we recommend that postgraduate study is reviewed and amended to make sure that it meets the needs of flight paramedics and CCPs. Minimum requirements for postgraduate level study should also be agreed.

Specialist teams

Specialist teams, such as ICU, NICU, ECMO and PICU clinicians involved in air ambulance, must have a minimum level of aviation training. This would be enabled by having increased funding and time for education. Medical passengers would not need to complete this training.

6.8.1 Question 10: Should all doctors on air ambulances have pre-hospital and retrieval medicine training?

We would like feedback on whether all doctors who fly need to have the pre-hospital and retrieval medicine (PHRM) qualification. This will only apply to dedicated crew if option 3 is recommended in section 6.5.3. This postgraduate diploma is open to doctors specialising in emergency medicine, anaesthetics, rural and remote medicine, intensive care medicine and general practice.

Option 1	Option 2
All doctors who fly should have PHRM training. This includes dedicated and non-dedicated crew.	Doctors who are dedicated crew need to have PHRM training. All other doctors who fly do not need to have PHRM training.
Considerations	
<ul style="list-style-type: none"> Doctors with PHRM training are better able to be operationally safe in an air ambulance environment. 	<ul style="list-style-type: none"> Requiring doctors to have PHRM training could create barriers to accessing expertise in a timely way.

- This would allow for flexibility and the agile re-tasking of pre-hospital, search and rescue and inter-hospital transfer work.
- PHRM training covers air ambulance operational and clinical considerations.
- Using doctors without PHRM training would support skill-specific inter-hospital transfers.
- Doctors would be paired with crew who are operational and aviation specialists (e.g., flight CCPs).

6.8.2 Question 11: Should training be provided at bases or training centres of excellence?

We would like feedback on whether training should be given by providers at bases, or there should be training centres of excellence. The training centres could be supported by online learning resources that are available nationwide.

Option 1	Option 2
Providers run training at bases.	Establish training centres of excellence to support shared learning.
Considerations	
<ul style="list-style-type: none">• This would provide greater flexibility for providers to train staff when it suited.• Some training would be region-specific and not applicable nationwide (e.g., training for alpine environments).• The costs of travel and establishing the new operating model would be lower.	<ul style="list-style-type: none">• This approach would support consistency across the air ambulance workforce, promoting training to a defined standard.• This would enable collaboration across regions and across the sector.• The training centres would need to be used by all providers.• Training would need to be aligned with emergency services' approaches (e.g., Royal New Zealand Police College).• Establishing training centres of excellence would have greater set-up costs.

Air crew officers

We recommend that a training programme or qualification for ACOs is developed and endorsed by New Zealand's air ambulance sector. Currently, ACO training varies by provider and there is no formal qualification.

Pilots

The New Zealand Aeromedical and SAR Standard defines requirements for pilots. We recommend that the future operating model supports mentoring in the live environment, to attract pilots from different professional backgrounds who may require mentoring to become captains. The future model would need to support air ambulance career pathways and safely introduce new staff into the air ambulance environment.

Standardised training requirements for the aviation workforce

Aviation training requires access to rotary-wing and fixed-wing simulators in New Zealand. Without simulator access in New Zealand, training occurs overseas or in a live setting, which has

limitations in terms of cost, sustainability, availability and the ability to perform dangerous manoeuvres. For more information about simulators and our recommendations, please refer to the assets and infrastructure section.

6.9 Support for referring clinicians

We recommend that a dispatch and coordination function becomes the referral point for all clinician air ambulance requests. The function would be easy to access and staffed by those who have clinical and air ambulance training. They would support referring clinicians to initiate transport in a timely way and could connect them to specialist clinical support.

6.10 Cultural safety

There is growing recognition of how important cultural safety, at the clinician and organisational levels, is to achieving equitable health outcomes.⁵³ Cultural safety is where individuals reflect on their own biases and how those biases influence their decision making, rather than just learning cultural knowledge. To enable the air ambulance workforce to build cultural safety and measure progress, we suggest the following changes.

- Create organisational buy-in, including ensuring that cultural safety is supported at board and management levels.
- Engage family, whānau and support people in decision-making processes and patient care.
- Embed cultural safety principles in organisational values.
- Integrate cultural safety as part of practice.
- Embed reflective practices about interactions with patients and track progress.
- Access online and flexible training packages that are developed for the sector.
- Provide regular updates to keep cultural safety principles at the forefront of practice.
- Engage meaningfully with iwi and community.
- Create systems for receiving feedback from patients and whānau so that the effectiveness of cultural safety training and interactions can be evaluated.
- Promote a culture of continuous learning and reflection on cultural issues. This could include workshops, seminars and access to resources on cultural safety.

6.8 Diverse and representative workforce

There is limited national data on the current air ambulance sector workforce, but it probably does not reflect the populations that it serves.⁵⁴ For example, 27% of rotary-wing patients identify as Māori, but the workforce does not reflect this statistic.⁵⁵

To recruit and retain a diverse and representative workforce, we recommend:

- supporting and encouraging inclusive recruitment campaigns that actively seek applications from diverse groups
- creating pathways (e.g., internships and scholarships) into the workforce for underrepresented groups

- addressing the barriers to the healthcare and aviation sectors that Māori and Pacific people face, such as a lack of representation in senior leadership roles
- considering mentorship initiatives for underrepresented groups within the workforce, with a focus on long-term retention and fostering a sense of belonging
- providing opportunities for ongoing professional development, including leadership training, for staff from underrepresented groups. This would help to ensure that they are represented in senior leadership roles
- including diversity training in onboarding processes and offering regular training to all staff, to ensure that they understand the importance of a diverse workforce and cultural safety.

Section 7: Dispatch and coordination

Section 7: Dispatch and coordination

7.1 Purpose

This section summarises the dispatch and coordination component of the operating model, including:

- prompts for feedback
- proposed actions and benefits
- role of the function
- overview of the process
- options for how the function is delivered
- enablers of the function.

7.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on key topics.

Question 1:	Should the dispatch and coordination function include clinically escorted road based inter-hospital transfers? See section 7.4.1
Question 2:	How should the dispatch and coordination function be delivered? See section 7.7.1
Question 3:	Do you have general feedback on the dispatch and coordination section of the proposed operating model?

7.3 Proposed actions and benefits

Dispatch and coordination proposed actions and benefits	
Issue 1: There is limited integration of pre-hospital and inter-hospital responses for rotary-wing and fixed-wing assets.	
Proposed actions	Benefits
<ul style="list-style-type: none"> Establish a dispatch and coordination function that is responsible for the dispatch and coordination of all air ambulance resources (assets and crew). This includes pre-hospital and inter-hospital transfers via rotary-wing, fixed-wing and air to road transport. 	<ul style="list-style-type: none"> Patients would be connected with the right care, in the right way and at the right time.
Issue 2: Nationally, there is limited standardisation of dispatch and coordination processes and tools for inter-hospital transfers. This may contribute to inefficiencies and may not ensure the right response at the right time. Air ambulances are scarce resources that must be appropriately and efficiently dispatched. ^{56,57,58}	

Proposed actions	Benefits
<ul style="list-style-type: none"> Establish standardised tasking guidelines that utilise effective and efficient clinical triage to optimise the use of air ambulance resources. Ensure that these guidelines are well understood across the sector. Leverage telehealth to support decision making, or to support rural clinicians caring for people in place. 	<ul style="list-style-type: none"> This approach would dispatch the right clinical crew for the patient's acuity and need. Tasking conflicts would be managed consistently using the agreed guidelines. Patients could remain in place if it was safe or the right thing to do. Rural clinicians would be supported with specialist advice to meet the patient's needs. Patients would be repatriated in a more timely way.
Issue 3: There is poor national visibility of all air ambulance resources, which leads to the inefficient allocation of resources.	
Proposed actions	Benefits
<ul style="list-style-type: none"> Provide relevant stakeholders with access to real time information about resources, including assets, location, crewing and availability. 	<ul style="list-style-type: none"> Patients would be connected to the mode of transport that is most appropriate for their acuity and need.⁵⁹ People involved with the care pathway would have visibility of requests and transport progress.
Issue 4: Clinicians must use different and complex processes and channels to request air transport.	
Proposed actions	Benefits
<ul style="list-style-type: none"> Establish consistent processes for requesting air transport, including timely communication with those involved in the transfer. Connect rural clinicians with the specialty appropriate for each case. 	<ul style="list-style-type: none"> The function would be easy to access and engage with. There would be clear and effective communication channels. It would be easy for clinicians to refer patients for inter-hospital transfer. It would be easy to access the specialist advice required for decision making.
Issue 5: Dispatch and coordination has limited independence from the provision of ambulance services.	
Proposed actions	Benefits
<ul style="list-style-type: none"> Establish a function that is independent from air and road ambulance providers and does not task its own assets. The function effectively manages any perceived or actual conflict of interest. 	<ul style="list-style-type: none"> The system would be more transparent.

7.4 Role of the function

The role of the integrated dispatch and coordination function:

- Dispatch and clinically coordinate all air ambulance pre-hospital responses and inter-hospital transfers across all rotary-wing and fixed-wing air ambulance services, to ensure that clinically appropriate resources are dispatched. This would include dedicated air to road transport where required (e.g., a road ambulance between the airport or landing zone and hospital), or connecting with road ambulance dispatchers where this service is provided by road ambulance providers.
- Integrate with search and rescue coordination centres. This would include integrating systems, communication and real time visibility of assets.
- Contribute to disaster management preparedness and response, working in the command and control environment.

In this role, the function would:

- Determine the most appropriate resources (asset mode and crew), based on quality patient information and clinically led decision making.
- Determine dispatch priority based on patient clinical information and the overall workload. A small number of inter-hospital transfers are more time-critical than skill-critical (e.g., STEMI). These transfers would be tasked to the most responsive team that can safely manage the patient.
- Connect to the Emergency Ambulance Communications Centre to ensure that air ambulance responses to pre-hospital events are timely.
- Foster collaborative relationships with referring clinicians to support the timely acceptance of patients. The function would have authority to place a patient with a receiving hospital as a last resort.
- Contribute data and representatives to air ambulance system oversight.
- Consider the opportunity cost of dispatch decisions. For example, preserving assets so that they would be available to respond to more urgent tasking in the area or to respond to specialist jobs that require certain assets or crew.
- Develop effective business continuity plans, support major incidents and scale up to respond to disaster events. During a major incident this function would be connected to the command and control environment.
- Have high levels of audit and governance, supported by consistent data collection and data management.

In addition, for inter-hospital transfers the function would:

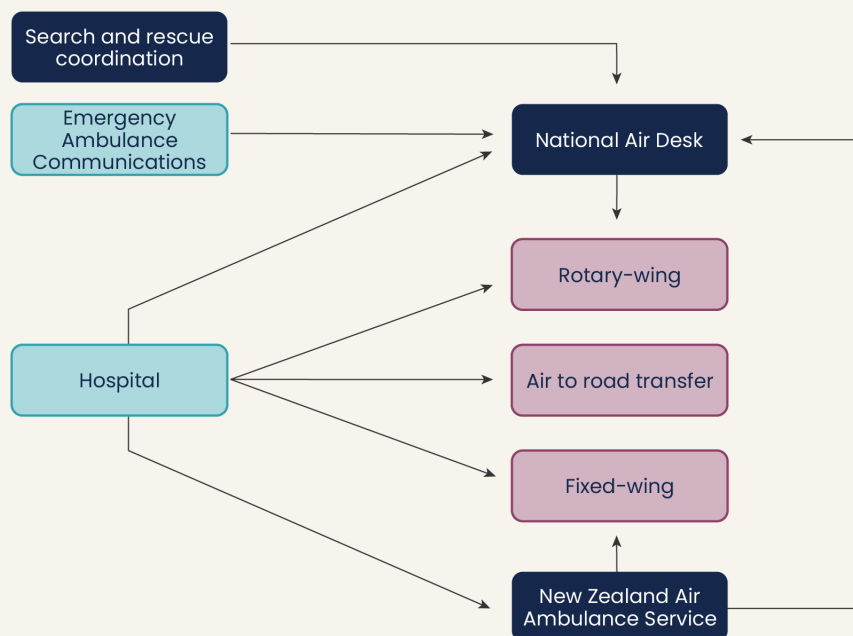
- Coordinate all repatriations and retrievals, including escalations of care.
- Confirm that the receiving clinician had accepted the patient, so that patients do not arrive without their knowledge.
- Facilitate teleconferences with the appropriate clinicians from the referring and receiving hospitals.

- Work with hospital staff to manage repatriations.
- Note: clinician to clinician consultations that occur outside the function and result in a decision to transfer a patient will still follow the dispatch and coordination referral process.

Function governance:

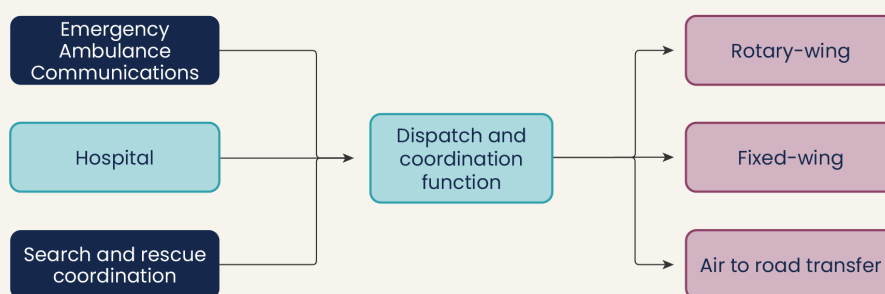
- The function will be governed by representatives from across the air ambulance system, including each of the four Health NZ regions.
- How the function will be governed will be determined in the detailed design phase of this work.

Current state of dispatch and coordination function



* New Zealand Air Ambulance Service can contact the National Air Desk to organise rotary-wing transfers for some regions.

Future state of dispatch and coordination function



* This view excludes road inter-hospital transfers as this is part of consultation.

7.4.1 Question 1: Should the dispatch and coordination function include clinically escorted road based inter-hospital transfers?

Many patient transfers could be completed by either road or air, and a variety of factors determine which is most appropriate in the scenario (e.g., inclement weather conditions). The function will determine which patient transfers would be more appropriate by road than air.

The function would not have a role in patient transports where clinical supervision is not required (e.g., transfer buses, health shuttles or hospital to hospital transfers without clinical supervision). These would continue to be managed as per the current state.

We would like feedback on whether the dispatch and coordination function should include road inter-hospital transfers that require clinical escort.

Option 1	Option 2
The function does not coordinate road inter-hospital transfers that require clinical escort. It would refer to existing hospital resources who coordinate road transfers.	The function coordinates all road inter-hospital transfers that require clinical escort.
Considerations	
<ul style="list-style-type: none">• This approach maintains the focus of the function on the air ambulance service as a specialist service.• Hospital resources could be better placed to coordinate road inter-hospital transfers alongside other road transfers.• Processes to refer to existing hospital resources could be complex and time consuming.	<ul style="list-style-type: none">• This would consider all modes of transport.• This would allow all road and air inter-hospital transfers to happen via one phone number.• This approach would significantly increase the scope and workload of the function.• This approach would detract from the air ambulance service’s specialist nature, as the majority of taskings would not be considered for air ambulance.

7.5 Overview of the process: pre-hospital response

This table provides a high-level overview of how the dispatch and coordination function would manage pre-hospital responses.

High-level process			
Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> A person or bystander seeks help for a medical event or injury. This includes via: <ul style="list-style-type: none"> 111 personal medical alarm personal locator beacon GP referral Ambulance communication centre triages the request Meet the first response unit (including road ambulance, Fire and Emergency New Zealand and Primary Response in Medical Emergencies services) Ambulance staging Prepare aircraft, including the configuration, crewing and supplies 	<ul style="list-style-type: none"> Land the aircraft Assess the patient and provide clinical management Develop a transport plan and communicate the next steps Perform flight briefing Load patient 	<ul style="list-style-type: none"> Transport patient to hospital or other healthcare setting (this may include an air to road transport component) Provide care in motion Communication on flight 	<ul style="list-style-type: none"> Hand over to hospital Feedback

High-level process for dispatch and coordination function

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> Confirm the need for an air ambulance Conduct a clinical triage to understand the urgency and time or skill requirements of the transfer Rapid dispatch where required Decide the mode of transport Develop a transport plan Consult with search and rescue coordination agency as required Adjudicate between competing requests Dispatch an air asset Dispatch the appropriate crew Flight following Provide live time updates and communicate if diversion or change is required Provide reliable access to appropriate clinical advice and support 	<ul style="list-style-type: none"> Provide live time updates and communicate if diversion or change is required Support the clinician at the scene, if required 	<ul style="list-style-type: none"> Flight following Provide live time updates and communicate if diversion or change is required 	<ul style="list-style-type: none"> Receive notification that the asset is available

High-level process for receiving hospital

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Receive notification from the function that the air ambulance has arrived at patient Receive access to patient information 	<ul style="list-style-type: none"> Receive access to patient information, including estimated arrival time 	<ul style="list-style-type: none"> Receive notification from the function that the patient has arrived Receive access to patient information

7.6 Overview of the process: inter-hospital transfer

This table provides a high-level overview of how the dispatch and coordination function would interact with inter-hospital transfers. This includes both repatriations and retrievals.

High-level inter-hospital transfer process

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> Undertake an assessment and diagnostics Identify that transfer is required Triage the transfer based on information from the referring hospital Identify that transfer by air ambulance is appropriate and confirm transport mode Communicate about the plan and next steps Prepare the patient for transfer Prepare the aircraft, including the configuration, crewing and supplies 	<ul style="list-style-type: none"> Land the aircraft Transport patient to aircraft (if applicable) Assess patient and provide additional clinical preparation for transfer Perform flight briefing Load patient 	<ul style="list-style-type: none"> Transport patient to hospital (this may include an air to road transport component) Provide care in motion 	<ul style="list-style-type: none"> Hand over to hospital Feedback

High-level process for referring hospital

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> Call function to request transfer Provide an initial assessment of how urgent and time or skill critical the transfer is, and clinical crewing requirements Participate in teleconference discussions with the relevant specialists as required Prepare and package the patient for transport 	<ul style="list-style-type: none"> Receive access to appropriate clinical advice and support 	<ul style="list-style-type: none"> Receive notification of progress from the function 	<ul style="list-style-type: none"> Receive notification of progress from the function

High-level process for dispatch and coordination function

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> Review the triage from referring hospital to understand the urgency and clinical crewing requirements of the transfer Rapid dispatch when required Organise teleconferences between the referring and receiving hospitals Adjudicate between competing requests Confirm the availability of a bed at the receiving hospital Decide the mode of transport Develop a transport plan and identify opportunities to optimise the use of assets across the entire workload Dispatch an air asset Dispatch appropriate crew 	<ul style="list-style-type: none"> Flight following Provide live time updates and communicate if a diversion or change is required Provide reliable access to appropriate clinical advice and support 	<ul style="list-style-type: none"> Flight following Provide live time updates and communicate if a diversion or change is required Provide reliable access to appropriate clinical advice and support 	<ul style="list-style-type: none"> Receive notification that the asset is available



High-level process for receiving hospital

Preparation for response	Arrival of air ambulance	Transport	Arrival at hospital
<ul style="list-style-type: none"> Participate in teleconference discussions with the relevant specialists as required Confirm that the patient has been accepted 	<ul style="list-style-type: none"> Receive notification of progress from the function Receive access to patient information 	<ul style="list-style-type: none"> Receive notification of progress from the function Receive access to patient information 	<ul style="list-style-type: none"> Receive notification from the function that the patient has arrived Receive access to patient information

7.7 Options for how the function is delivered

We would like feedback on how the dispatch and coordination function should be delivered for air ambulance services.

7.7.1 Question 2: How should the dispatch and coordination function be delivered?

	Option 1 – one site
Overview	<ul style="list-style-type: none"> One site would deliver the dispatch and coordination function. Redundancy would be managed using virtual capability. This approach aligns with that of comparable jurisdictions, such as New South Wales, Victoria and South Australia.
Benefits	<ul style="list-style-type: none"> This approach delivers full integration of rotary-wing, fixed-wing and air to road resources across all inter-hospital transfers and pre-hospital responses. This approach would provide a single channel for all requests for air ambulance transport. There would be more efficient resourcing and management structures. Dispatch processes would be applied consistently nationwide. Developing team performance, culture and resilience could be easier with all staff based at a single site.
Challenges	<ul style="list-style-type: none"> There could be limited function resilience and greater risk during a disaster. It could be difficult to recruit and retain staff with specialist knowledge outside the site location. It could be difficult to maintain up-to-date local and regional knowledge.
	Option 2 – two sites
Overview	<ul style="list-style-type: none"> Two connected sites. The same function would be delivered across each site. Either each site manages different geographic locations, or both sites manage all workload like Emergency Ambulance Communications Centres. Each site provides redundancy to manage the whole system, supported by virtual capability. This approach aligns with that used in comparable jurisdictions, such as Queensland.
Benefits	<ul style="list-style-type: none"> This approach would provide the benefits of option 1 while mitigating the resilience risks. This approach would broaden the potential recruitment pool, compared to option 1. Developing team performance, culture and resilience would be easier than a regionalised model.
Challenges	<ul style="list-style-type: none"> This approach provides some risk that resources and function at each site could be duplicated, so clear roles and responsibilities and robust communication channels are required. It could be difficult to allocate workload and ensure the continuity of information. It could be difficult to recruit and retain staff with specialist knowledge outside the site locations.



Option 3 – hub and spoke

Overview

A central hub with four regional spokes. A central hub would be responsible for:

- the dispatch decision making for all air ambulance responses, including the mode of transport and crew for air ambulance dispatches
- national oversight of patient flow.

There would be four spokes, one in each of the Health NZ regions. Each spoke would be responsible for:

- receiving patient information from referring clinicians
- managing patient flow through the region
- providing specialist clinical support to referring clinicians
- referring inter-hospital transfers to the hub for dispatch decisions.

Benefits

- This approach would increase access to, and the application of, regional knowledge and promote a regional view of patient flow.
- This approach could increase the recruitment and retention of staff with specialist knowledge outside of main centres.

Challenges

- This approach would not fully integrate pre-hospital and inter-hospital transfers on a national level.
- This approach reduces national oversight – increasing the risk that the patient with the highest need is not prioritised for a response.
- It could be difficult to coordinate transfers across regions at a spoke level. For example, Nelson would need to work with 'spokes' in the South Island and Central Region to manage patient flow.
- This may result in unwarranted variation in decision making and process across regions.



Option 4 – distributed across regions

Overview

- A site in each of the four Health NZ regions. Each site provides pre-hospital and inter-hospital transfers for the region based on consistent processes.
- One of the four sites would take a national oversight, function governance and reporting role on behalf of the other sites.

Benefits

- This approach could increase resilience.
- This approach could help to recruit and retain staff with specialist knowledge outside of main centres.
- There could be greater access to and application of regional knowledge.

Challenges

- This approach does not deliver national integration of pre-hospital rotary-wing, inter-hospital transfer and pre-hospital response dispatch and coordination.
- This would fragment the current national approach for pre-hospital responses.
- This would remove national oversight, increasing the risk that the patient with the highest need is not prioritised for a response.
- This risks unwarranted variation in processes across regions. Regions may continue to be siloed and disconnected.
- This approach would involve considerable duplication of resources and function, including specialist resources.
- Demand and workload could vary by region.

7.8 Enablers of the function

Below is a list of the enablers of the dispatch and coordination function.

Assets	<ul style="list-style-type: none"> Assets that are fit for purpose and in resilient location(s). Suitable locations are yet to be determined.
Workforce	<ul style="list-style-type: none"> A multidisciplinary workforce. Positive relationships across the sector, including with clinicians, providers and across agencies and organisations. Additional work to understand how aviation experts could be involved in the dispatch and coordination function. Workforce induction and training. Access to appropriate specialised advice. Processes for clinicians to maintain clinical currency.
Funding and investment	<ul style="list-style-type: none"> Sufficient funding for the function. This would need to be determined based on which delivery option is selected.
Process	<ul style="list-style-type: none"> Standard operating procedures. Connection to emergency communications centres to deliver pre-hospital responses in a timely way. Pre-hospital and inter-hospital tasking guidelines (note: a review of ANTS criteria is underway).⁶⁰ Conflict management guidelines for tasking. Safety Management Systems. A business continuity plan. Connectedness in a major incident and emergency.
Data and digital	<ul style="list-style-type: none"> Access to the computer-aided ambulance dispatch system. Tools to support dispatch, potentially using artificial intelligence.^{61,62,63} Technology that is integrated across providers and hospitals, so that live time updates can be provided on transfer progress and expected arrival times at hospital. Technology that enables timely connection to search and rescue agencies.⁶⁴ Connection to integrated operations centres. Access to telehealth, which is embedded into the system. Improved data collection and sharing, which is supported by centralised reporting. Effective communication channels such as video and conference calling. Visibility of the assets and crew available nationwide.
Governance	<ul style="list-style-type: none"> Governance for the dispatch and coordination function. Audit processes for the dispatch and coordination function. Data and information to support system oversight.

Section 8:

Data and digital

Section 8: Data and digital

8.1 Purpose

This section summarises the data and digital component of the future operating model, including:

- prompts for feedback
- proposed actions and benefits
- our data and digital vision
- technology functions
- data.

8.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on key topics.

Question 1:	Which technology functions would be required to support a new operating model? <u>See section 8.5.1</u>
Question 2:	What data and information would we need to monitor and improve the air ambulance service? <u>See section 8.6.1</u>
Question 3:	Do you have general feedback on the data and digital section of the proposed operating model?

8.3 Proposed actions and benefits

Data and digital proposed actions and benefits

Issue 1: There is no standardised, transportable digital patient record to inform decisions along the treatment pathway. This creates system inefficiencies and risks of harm.

Proposed actions	Benefits
Establish the proposed national ambulance electronic Patient Care Record that would be used by all ambulance services and is integrated with hospital patient information systems.	<ul style="list-style-type: none"> • Patients would receive improved clinical care. • There would be visibility of patients' condition and treatments during travel, which would inform treatment decisions at the destination. • This approach would reduce the administrative burden at patient handover. • This approach would enable population-level clinical insights to inform service improvement initiatives using a consolidated database.

Issue 2: Dispatch and coordination processes are inconsistent.

Proposed actions	Benefits
Establish a single, integrated dispatch and coordination system for air ambulance resources, which would have access to the ambulance computer-aided dispatch system and telehealth capability.	<ul style="list-style-type: none"> There would be national visibility of assets and staff, which would inform the tasking of all air ambulance and search and rescue jobs. People involved in the care pathway would have visibility of requests and transport progress. Air ambulance resources would be used more efficiently.

Issue 3: Hospitals and the dispatch function have poor visibility of air ambulance movements.

Proposed actions	Benefits
Establish a shared, national dashboard that would provide visibility of air ambulance movements to all parties involved in a patient's care.	<ul style="list-style-type: none"> There would be better coordination of patient care between hospitals.

Issue 4: There are gaps in technology as well as fragmentation of technology and systems between providers and hospitals. This prevents the real time transfer of critical information.

Proposed actions	Benefits
Establish shared, national systems for each key technology function that is government funded.	<ul style="list-style-type: none"> Destination hospitals would be able to monitor patients' condition while they are in transit, which would help to inform optimal treatment when they arrive. It would be a cost-efficient way to deliver technology. Technology would be consistently available, which would improve equity.

Issue 5: There is no ability to consolidate relevant data to measure performance and provide evidence of the impacts of change.

Proposed actions	Benefits
<ul style="list-style-type: none"> Connect all systems to a single data repository that would be accessible for research and analysis purposes. 	<ul style="list-style-type: none"> This would inform sector improvements and provide greater confidence in the effectiveness of new investments. This approach would enable evidence-based decision making to inform changes to clinical pathways and models of care.

8.4 Our vision for data and digital

Our re-envisioned approach to data and digital seeks to:

- enable equitable access to air ambulance and ambulance services across all districts and regions
- reduce clinicians' administrative workload while improving patient safety and outcomes
- support effective clinical care closer to patients' homes and communities, wherever practical and possible
- recognise the value of sharing information across the system
- align technology solutions across the air ambulance system to support the new operating model established by this programme
- prioritise patient and staff privacy and confidentiality.

We expect to achieve this vision through the following key changes:

- consolidate platforms to improve the cost efficiency of technology
- enhance the visibility of care, missions and transfers
- standardise dispatch and coordination processes
- share information across the system to improve patient outcomes
- provide specialist clinical support to rural and remote clinicians through telehealth
- collect, consolidate and analyse data to support service planning
- work in collaboration with the sector to develop key technology functions.

8.5 Technology functions

8.5.1 Question 1: Which technology functions would be required to support a new operating model?

Function	Key requirements
1. Asset and crew visibility A system that would track the real time status of assets and crew across the country to determine availability and suitability for dispatch.	<ul style="list-style-type: none"> • All relevant air ambulance information would need to be available to the dispatch and coordination function and be integrated with the search and rescue tasking agency. • The system would need to be accessible remotely. • Relevant information would need to be available to those involved in the patient care journey. • There would need to be appropriate alternatives in case the system fails.

		<ul style="list-style-type: none"> It would need to be quick and easy for users to collect status and availability information.
2. Electronic medical record/patient care record	<p>A system that:</p> <ul style="list-style-type: none"> would provide access to relevant clinical information about a patient could be updated by ambulance staff could be digitally transferred so that patient handovers to other providers and hospitals would be simple and efficient. <p>Hospitals and community health providers would need to be able to access relevant clinical information in the system.</p>	<ul style="list-style-type: none"> All relevant clinicians would need to have access to key patient clinical records and be able to update these. The system would need to work when out of cellular network coverage, even if in a limited capacity. The system would need to provide access to relevant historical information from primary and secondary care. The system would need to be able to integrate with ambulance monitoring devices (e.g., cardiac monitors) so that information could be shared with hospital specialists.
3. Telehealth support	<p>A system that would help clinicians to seek advice for the care of their patients and to confirm whether they need to be transferred to another hospital.</p>	<ul style="list-style-type: none"> There would need to be adequate clinical resourcing to support this function. Clinicians would need to be able to access the system, including accessing medical records (e.g., diagnostic tests).
4. Patient clinical and logistical coordination	<p>A system that would allow staff supporting the patient transfer to access relevant information to coordinate patient care on their journey to or between hospitals.</p>	<ul style="list-style-type: none"> The system would need to be accessible to providers and relevant hospital clinicians. The aim would be to reduce the burden on rural clinicians and ensure that everyone has the right information at the right time.
5. Dispatch and coordination	<p>A system that would facilitate the request and dispatch of all air ambulance resources.</p>	<ul style="list-style-type: none"> The system would need to be accessible remotely. The service would need to be accessible by phone and internet. The system would need to have information on health facility capability and capacity, noting that this would need to be verified with the hospital prior to transfer. The system would need to connect to the computer-aided dispatch system for pre-hospital responses.
6. Data consolidation	<p>A system that would consolidate the data collected from other relevant systems.</p> <p>This would most likely be the Health NZ national data warehouse as it</p>	<ul style="list-style-type: none"> The system would need to protect patient confidentiality while also allowing authorised providers, agencies and clinicians to analyse data.

already consolidates most health-related data into a single location. This system would enable analysis, measurement and evidence-based service planning.

- The system would need to inform air ambulance system oversight and be able to measure patient outcomes and efficiency.

8.6 Data

8.6.1 Question 2: What data and information would we need to monitor and improve the air ambulance service?

The data we need to collect would guide the types of systems we would need and how much integration and sharing would be required between providers.

Data	Description
1. Electronic medical records/ambulance patient care records	<ul style="list-style-type: none"> • This would involve the collection and consolidation of patient medical information into a single location to enable analysis. • It would require ambulance-related care records to be captured electronically without double entry.
2. Crewing types and availability	<ul style="list-style-type: none"> • This would be the collection of information about air ambulance crew, including skill set, rostering and timesheet information. It would need to include people who are employed by providers and those who are employed by Health NZ.
3. Asset availability	<ul style="list-style-type: none"> • This would be the collection of information related to the availability of air ambulance assets, including location and maintenance (planned or unplanned) status.
4. Mission and dispatch records	<ul style="list-style-type: none"> • This would be the collection of information about requested and dispatched missions, so that decision-making processes could be audited. • These records would provide visibility of the unmet demand across pre-hospital and inter-hospital transfers.
5. System oversight	<ul style="list-style-type: none"> • This would be the collation and consolidation of air ambulance clinical records, clinical outcomes and operational information. This would enable the effectiveness of air ambulance services to be measured, which would inform oversight of the system.

Section 9:

System governance

Section 9: System governance

9.1 Purpose

This section summarises the system governance component of the operating model, including:

- prompts for feedback
- proposed actions and benefits
- system governance and oversight
- continuous improvement.

The establishment of an air ambulance system governance and oversight function will be informed by the HQSC framework for clinical governance.⁶⁵

9.2 Prompts for feedback

We would like your feedback on this section as a whole, as well as on one key topic.

Question 1:	Do you agree with the proposal for system oversight? See section 9.4.1
Question 2:	Do you have general feedback on the system governance section of the proposed operating model?

9.3 Proposed actions and benefits

System governance proposed actions and benefits	
<p>Issue 1: There is no oversight of the overall air ambulance system, including pre-hospital and inter-hospital transfers. There is a lack of formalised and standardised systems and processes. Different segments of the sector currently have overlapping clinical governance, for example road, air and hospitals.</p>	
Proposed actions	Benefits
<ul style="list-style-type: none"> • Establish system oversight for the air ambulance service. • Clarify the roles and responsibilities for system governance and oversight. 	<ul style="list-style-type: none"> • A system view of the air ambulance service would enable the evaluation of patient and community outcomes. • This approach would improve the monitoring of, and response to, risks.
<p>Issue 2: There is no formal approach to continuous improvement within providers and across the sector. The system is siloed and there are no formal mechanisms to share learning or insights. There is limited collaboration between rotary-wing and fixed-wing sectors as well as between road and air ambulance sectors.</p>	
Proposed actions	Benefits

- Encourage a culture of continuous improvement within providers and agencies and across the system.
- Foster the sharing of learning and information across all air ambulance services and between road and air ambulances.

- This approach would support the adoption of innovations by making it easier to test new technologies and ways of operating.
- Having a view of the whole ambulance system would improve quality and interoperability.

Issue 3: There is a lack of connected data and digital frameworks to support effective system oversight. There is insufficient data to make robust system oversight decisions and to inform system improvements.

Proposed actions	Benefits
<ul style="list-style-type: none"> • Develop and embed a data framework across the system. 	<ul style="list-style-type: none"> • This would support system oversight. • There would be more data and information to inform sector improvements.

9.4 System governance and oversight

Current state

The air ambulance system has multiple levels of governance and oversight. Clinical governance holds accountability for the quality of care provided and for improving patient experience and outcomes.⁶⁶ This is detailed below.

Area	Overview of current governance and oversight
Air ambulance system	Governance and oversight for the air ambulance system is distributed across a number of Health NZ functions regionally and nationally.
Rotary-wing sector	The National Aeromedical Oversight Group oversees the rotary-wing sector. This includes dispatch and coordination and pre-hospital and inter-hospital rotary-wing transfers.
Fixed-wing sector	There is no overarching governance of the fixed-wing sector.
Air to road transport	Clinical governance either comes from the provider of the fixed-wing service or the hospital, depending on which service supplied the clinical team.
Providers	<p>All road ambulance and rotary-wing providers have their own governance, including clinical governance.</p> <p>By contrast, fixed-wing providers have varying levels of governance. Some fixed-wing providers do not have clinical governance as the clinical teams are provided by hospitals.</p> <p>NZS 8156:2019 has requirements for provider governance and management.⁶⁷ In order to maintain their air operator certificates, providers also need to comply with governance and management requirements from the CAA.⁶⁸</p>

Hospitals	Hospitals provide their own clinical governance over flight teams and inter-hospital road transfers that are clinically crewed by hospital staff.
Ambulance Governance Group	The Ambulance Governance Group provides governance for the commissioning function of the Health NZ Ambulance Team. No changes are recommended to the Ambulance Governance Group.
Ambulance Sector Quality and Safety Forum	<p>This forum is facilitated by the Health NZ Ambulance Team. Representatives from air and road ambulance providers attend and submit adverse event reports covering themes and quality improvements in response to patient harm.</p> <p>The forum identifies and addresses trends in adverse events across the ambulance sector but does not provide operational oversight.</p> <p>Currently, the forum does not include hospital representatives but is seeking one from the Hospital and Specialist Services division of Health NZ.</p>

Proposed future oversight for the air ambulance system

We recommend establishing a multi-disciplinary system oversight group for air ambulance services, comprised of sector representatives. This will be facilitated by the Health NZ Ambulance Team.

The role of the system oversight group would be to:

- develop a data-driven, evidence-based view of the national air ambulance service from a performance and quality perspective. This could be informed by clinical governance and oversight activities and the HQSC clinical governance framework⁶⁹
- foster shared learning across services from analytical insights, evidence and experiences
- provide advice on service improvements, new clinical practices and technology integration
- contribute to industry standard reviews
- monitor and highlight system risks, including using system-level mechanisms to learn and continually improve care.⁷⁰

How would it work?

- Secretariat support would come from the Ambulance Team, Health NZ. Adequate resources would be required to support the data collection and analysis required for discussions.⁷¹
- System oversight would not replace the governance of individual providers or agencies.
- The group would not be decision makers or budget holders. They would have influence by making recommendations to the Ambulance Governance Group via the Health NZ Ambulance Team.
- The group would initially focus on the air ambulance system but would have links to road oversight activity.
- A data and digital framework, including data definitions and collection methods, would be developed to support effective oversight.

- Having the same metrics and measures across all providers would enable consistent data to be compiled and shared across the system. This would allow for a national view of the standard of care.
- The group would be supported by existing tools and guidelines. This would include CAMTS international accreditation standards or the GAMUT international benchmarking tool, which uses consistent care metrics across providers.^{72,73}
- There would be a greater focus on how systems, structures and processes of care affect patient outcomes.⁷⁴
- There would be additional measurement of the effectiveness, impact and need for interventions throughout the patient journey.⁷⁵

9.4.1 Question 1: Do you agree with the proposal for system oversight?

Overview	<ul style="list-style-type: none"> • One oversight group for the air ambulance system, which would cover both clinical improvement and operations.
Considerations	<ul style="list-style-type: none"> • There would need to be dedicated time to discuss all air ambulance responses. • The Health NZ Ambulance Team would ensure that there was integration with road ambulance. • The oversight group would need to allow for aviation and clinical collaboration for air ambulance.

Providers

- Providers would continue to have their own clinical and organisational governance.
- Providers would continue to be obliged to follow NZS 8156:2019 and CAA regulations, and to meet their contractual expectations.
- Fixed-wing providers that employ clinical crew would have clinical governance. This is discussed in the workforce section of the appendix.

Hospitals

- The proposed future state would better connect hospitals to the air ambulance sector.
- Hospitals would provide their own clinical governance to clinicians involved in air ambulance services.
- The proposed model would include hospital stakeholders in system oversight.
- Hospitals would need to notify the air ambulance system oversight group of adverse events related to air ambulance transfers. The relevant air ambulance provider must be involved in these discussions.

Patients

Patients, their families, whānau and support people are currently not engaged with system oversight. The next phase of this work would need to define how patients and whānau could be active partners involved in oversight and improvement activities. This could involve working with

the Regional Consumer Councils to identify patients and whānau who have a desire to participate in oversight or governance activities.

9.5 Continuous improvement

Technology, the aviation industry, health services and providers' capabilities will change over time. The future model must encourage a culture of continuous improvement within providers and agencies and across the system.⁷⁶ This could include:

- establishing multiple ways for the sector to connect, including online conferences, case study discussions and webinars
- providing access to international evidence, research and best practice, as well as capacity to develop research and evidence in New Zealand
- enabling effective knowledge sharing, which is key for system innovation^{77, 78}
- testing new models and ways of operating. Sharing lessons to avoid duplication of effort and slower adoption
- ensuring that the learning system is multidisciplinary and values the skill sets of different professionals
- creating robust frameworks for the ongoing clinical professional development of air ambulance clinicians and crew
- developing formal feedback loops to enable learning and improvement following patient harm.

Section 10 – 12: Acknowledgements, glossary and references

Section 10: Acknowledgements

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If you are part of a specialty group that is interested in the design of the air ambulance service, but has not been involved in the process to date, please reach out to us via email:

AirAmbulanceTeam@TeWhatuOra.govt.nz





Section 11: Glossary

Terminology	Definition
Accident Compensation Corporation (ACC)	Accident Compensation Corporation is a Crown entity and a joint purchaser for the air ambulance service in New Zealand. ACC is responsible for administering the country's universal no-fault accidental injury scheme.
Air ambulance	This covers rotary-wing and fixed-wing air ambulance. This refers to the mode of transport, inclusive of equipment and crewing.
Air ambulance service	The service delivered by air ambulance providers. This includes all supporting infrastructure, operations and capabilities.
Air operator certificate (AOC)	Air operations are conducted under the authority of an air operator certificate.
Air to road transport	The component of an air ambulance transport that occurs by road from an airport, airfield or helipad to a healthcare facility and vice versa.
ANTS Criteria	<p>The criteria for dispatching a rotary-wing resource for a pre-hospital response. The criteria have four categories: access, number, time and skill.</p> <p>Access: where it is not feasible for a road ambulance to access the patient.</p> <p>Number: where the number of patients at the scene exceeds capacity of road resources.</p> <p>Time: where the patient has a clinical condition with a time-dependent need for transport to definitive care and an air ambulance will result in a clinically significant timesaving in arrival at definitive care and this is expected to improve patient outcome.</p> <p>Skill: where the patient has a clinical condition with a time-dependent need for specific skills, and an air ambulance will result in a clinically significant timesaving in skills reaching the patient and this is expected to improve the patient's outcome.</p>
Civil Aviation Authority (CAA)	The Civil Aviation Authority is a Crown entity and is responsible for the regulatory oversight of aviation safety in New Zealand.
Dedicated crew	Air ambulance crew who are rostered onto the air ambulance service and located on base.
Definitive care	Care that conclusively manages a patient's condition.
ED	Emergency department.
Emergency Ambulance Service	The Emergency Ambulance Service includes all components of the emergency ambulance system – the Emergency Ambulance Communications Centres, Emergency Road Ambulance Services and Emergency Air Ambulance Services. This includes all pre-hospital air ambulance responses and time-critical inter-hospital transfers.

Extracorporeal membrane oxygenation (ECMO)	Extracorporeal membrane oxygenation is a method of providing prolonged cardiac and respiratory support to people whose heart and lungs are unable to sustain life.
Flight navigation procedures trainer	A training device which represents the flight deck/cockpit environment, including the equipment and computer programmes necessary to represent an aircraft or class of aeroplane in flight operations. ⁷⁹
Full motion (Level D)	Level D simulators are the most advanced category of flight simulators, equipped with high-fidelity, full motion systems that can mimic a wide array of flight conditions and scenarios.
HDU	High dependency unit.
Health New Zealand – Te Whatu Ora (Health NZ)	Health New Zealand – Te Whatu Ora is a Crown agent established under Pae Ora (Healthy Futures) Act 2022.
Health Quality and Safety Commission (HQSC)	The Health Quality and Safety Commission is a government agency that works with health and disability providers and patients to improve safety and quality.
Heliport	Any defined area of land or water, and any defined area on a structure, intended or designed to be used either wholly or partly for the landing, departure and surface movement of helicopters.
ICU	Intensive care unit.
Instrument flight rules (IFR)	Instrument flight rules are rules and regulations to govern flight in conditions where using visual references to guide flight is not safe.
Inter-hospital transfer	Transfers that involve transferring a patient from a hospital with a level 2 (rural hospital) or higher emergency department to a higher level of care, or back to their domicile hospital or community healthcare facility. In this document, inter-hospital transfers include interfacility transfers – air ambulance transfers from community healthcare facilities to a hospital with a level 2 emergency department and above, and repatriations.
Medical passenger	Medical passengers are anyone required to assist or care for patients while in transit, as part of their role and on an irregular basis.
National Air Desk	A coordination and tasking function which provides oversight, dispatch and clinical support functions to the rotary-wing air ambulance service.
NICU	Neonatal intensive care unit.
Non-dedicated crew	Air ambulance crew who are not located on base but are regularly involved in air ambulance transfers where required.
Original equipment manufacturers	An original equipment manufacturer is a company that produces parts and equipment that may be marketed by another company.
Patient and client	Patient is used to describe end users of services. The term patient includes ACC clients, who are receiving support from ACC.

Patient transfer services	Patient transfer service is a road-based service and includes transfers to and from scheduled hospital treatments, between hospital and aged care facilities and to and from hospice inpatient units. It is a pre-booked service and does not include clinical supervision or support.
PHRM	Pre-hospital and retrieval medicine. This training program is open to emergency medicine, anaesthetists, intensive care medicine, the rural and remote Medicine, and the general practitioners.
PICU	Paediatric intensive care unit.
Pre-hospital event	<p>An event in the community that requires an emergency ambulance response. This includes patients within a primary care or integrated health facility (e.g., GP), hospital without a level 2 (rural hospital) emergency department or above, or residential care facility.</p> <p>These notifications come through the Emergency Ambulance Communications Centre via 111.</p>
Pre-hospital response	<p>A response to a pre-hospital event that requires transporting a patient to a hospital or other healthcare facility. When this occurs in the air ambulance context this response is by an air ambulance.</p> <ul style="list-style-type: none"> • This includes responses where an air ambulance may not reach the scene. • This includes responses where the air ambulance reaches the scene but does not transport the patient. • This includes responses where the air ambulance reaches the scene and transports the patient to a healthcare facility.
Safety management system	A safety management system is a systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures. ⁸⁰
SCBU	Special care baby unit.
STEMI	STEMI (ST-elevation myocardial infarction) is a heart attack caused by a sudden and prolonged blockage of blood supply to the heart.
Supplemental type certification	A supplemental type certification is issued by the CAA to approve a design change to an aircraft, engine or propeller. The approval process is overseen by the CAA to ensure that safety requirements are still met and that no apparent unsafe conditions are introduced. ⁸¹

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