HISO 10052:2015

Ambulance Care Summary Interim Standard

CDA templates and data set specification

May 2015

**Document information**

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# Introduction

This standard for interoperability between computer systems defines an ambulance care summary data set and structured clinical document type for communicating patient information collected by ambulance services with other health care providers.

## Purpose

The purpose of this standard is to enable patient information to be communicated interoperably from ambulance services to other health care providers. Structured and coded information is communicated as an ambulance care summary electronic document to support transfer of care. The ambulance care summary can also be made available to the person concerned via a patient portal.

Ambulance services in New Zealand are provided by two ambulance operators: Wellington Free Ambulance and St John Ambulance. Ambulance services provide urgent, emergency and community-based care to their patients. Ambulance officers practise under the delegated authority of the ambulance operator’s medical director.

Ambulance services are implementing a new touchscreen application that enables ambulance officers to record their clinical impressions, observations and interventions in near real time as they provide care to patients.

An ambulance care summary is created to document every clinical contact between an ambulance officer and the patient receiving accident-related or medical care. (An ambulance care summary is not created for non-clinical contacts, such as patient transfers.)

Ambulance care summary documents are served via a clinical data repository to connected clinical workstation, shared care and patient portal systems.

## Scope

This standard defines the subset of information collected by ambulance operators and made available to other health care providers involved in the care of the patient. The ambulance care summary includes patient identity, demographic and clinical information, along with details about the incident.

This information is shared with other health care providers to:

* brief another clinician at transfer of care – for example, when the patient is handed over to a hospital emergency department
* advise the patient’s general practitioner of the clinical contact with the ambulance service.

This standard defines the structure and coding of the ambulance care summary as an HL7 Clinical Document Architecture (CDA) document type. The standard comprises CDA templates and related data element specifications.

The standard also provides the basic structure of Portable Document Format (PDF) representations of the ambulance care summary.

## SNOMED Clinical Terms

SNOMED Clinical Terms is the terminology system used by this standard to represent clinical concepts. References throughout this document are to SNOMED CT specifically.

SNOMED enables precise and actionable health information to be recorded about patients and their care.

Clinical impressions, medications and interventions in this standard are all coded using SNOMED. This is evident in the many data elements that are declared to have a set of SNOMED concepts as their value domain. Where the value domain is enumerated, each SNOMED concept is indicated by its fully specified name.

The SNOMED concepts in this standard are from the SNOMED international release dated January 2015.

## LOINC terms of use

This standard contains material from the *Logical Observation Identifiers, Names and Codes (LOINC)* table and clinical document ontology, which are copyright (c) 1995-2015 Regenstrief Institute Inc. This material can be used without charge but is subject to the LOINC terms of use (http://loinc.org/terms-of-use).

## CDA template and data element specifications

*HISO 10040 Health Information Exchange Architecture* describes the use in New Zealand of standardised XML documents conforming to HL7 Clinical Document Architecture (CDA) as a currency for information exchange. Clinical workstation, clinical data repository and patient portal systems interoperate by exchanging CDA documents via web services.

*HISO 10043 CDA Common Templates* explains the layout of CDA template specifications included in this standard. Named production rules introduce defined sequences of XML elements and attributes. Nested sub elements within each template are indented and the data type or value domain for each data element is specified. HISO 10043 also defines a number of templates that appear in the CDA document header.

Data element specifications will in future be published in an online data dictionary conforming to the HISO-endorsed standard *ISO/IEC 11179 Information Technology – specification and standardisation of data elements, 2004* – which requires that:

* Every data element has a unique name that comprises object class, property and representation terms
* Every data element has a meaningful business definition
* Source standards are identified
* Every data element has a specified value domain.

These rules are observed in the CDA template specifications and supporting material presented.

It is a convention that LOINC codes are used where possible to identify CDA document sections and elements. This is always the case for elements that are observations or measurements of some kind. In the absence of a suitable LOINC code, elements are identified with a SNOMED code.

## New Zealand legislation and regulations

Legislation and regulations relevant to this standard are:

* Health Act 1956
* Health and Disability Commissioner (Code of Health and Disability Services Consumers’ Rights) Regulations 1996
* Privacy Act 1993
* Health Information Privacy Code 1994
* Medicines Act
* Health (Retention of Health Information) Regulations 1996

## **Related documents**

The following documents are relevant to this standard:

* HISO 10011.4 eDischarge Messaging Standard (www.healthitboard.health.govt.nz/standards)
* HISO 10040.4 Clinical Document Metadata Standard (www.healthitboard.health.govt.nz/standards)
* HISO 10043 CDA Common Templates (www.healthitboard.health.govt.nz/standards)
* HISO 10046 Consumer Health Identity Standard (www.healthitboard.health.govt.nz/standards)
* New Zealand Government Customer Information Quality (CIQ) Profiles 31 October 2012, Department of Internal Affairs (http://ict.govt.nz/guidance-and-resources/standards-compliance/nz-government-ciq-profiles)
* National Collections Sport Code Set (www.health.govt.nz/nz-health-statistics)
* New Zealand Universal List of Medicines (NZULM) (www.nzulm.org.nz)
* Design and trial of a new ambulance-to-emergency department handover protocol: ‘IMIST-AMBO’ 2011, BMJ Quality and Safety doi:10.1136/bmjqs-2011-000766
* High Level Requirements for eDischarge, National Information Clinical Leadership Group, June 2010 (www.healthitboard.health.govt.nz)
* Unified Code for Units of Measure (UCUM) (http://unitsofmeasure.org)
* New Zealand Emergency Care Reference Set (www.healthitboard.health.govt.nz/standards)

# Ambulance care summary document

The overall structure of the ambulance care summary is defined by the following CDA document template. Each instance of the ambulance care summary document represents one incident involving one patient.

The CDA document header includes the patient’s identity and demographic details, as well as information about the ambulance operator and the ambulance officer who provided the service.

{ambulance care summary document} 🡪

ClinicalDocument

 realmCode

 code

 @code = NZ

 typeId

 @root = 2.16.840.1.113883.1.3

 @extension = POCD\_HD000040

 templateId

 @root = 2.16.840.1.113883.2.18.7.21.7

 id

 @root (document identifier) : UUID

 code

 @code : LOINC code = 74207-2 (Pre-hospital summary)

 @displayName = "Ambulance care summary"

 title = "Ambulance care summary"

 effectiveTime

 @value (when created) : datetime

 confidentialityCode

 @code = N (medical in confidence)

 languageCode

 @code = en-NZ

 recordTarget

 patientRole

 {ambulance patient}

 {author} (ambulance officer)

 {custodian} (ambulance operator)

 {legal approver} (ambulance medical director)

 {support person}\* (including next of kin)

 {incident}

 {handover}?

 component

 structuredBody

 {patient additional demographics section} (patient age)

 {incident section}

 {complaint history section}

 {clinical impression section}

 {clinical summary section}

 {medical history section}?

 {advice and instructions section}?

 {clinical images section}?

Refer to *HISO 10043 CDA Common Templates* for instructions on how to record the following:

* author – the ambulance officer, identified by the ambulance operator’s computer aided despatch system number for the ambulance officer
* legal approver – the ambulance operator’s medical director, identified by Health Provider Index (HPI) number
* custodian – the ambulance operator, identified by HPI number.

The numbers used to identify ambulance officers are treated for the purposes of this standard as an HPI number subtype and should be coded in that way.

## Patient details

This section describes the data elements that represent the identity and contact details for the patient. Refer also to *HISO 10046 Consumer Health Identity Standard*.

{ambulance patient} 🡪

templateId

 @root = 2.16.840.1.113883.2.18.7.5.2

id

 @extension : NHI number (format AAANNNN)

 @root = 2.16.840.1.113883.2.18.2

{address}\*

{telephone number}\* (and email address etc)

patient

 templateId

 @root = 2.16.840.1.113883.2.18.7.5.1

 name? (when known)

 {person name}

 administrativeGenderCode

 @code (sex) : = F | M | O | U

 @displayName = Female | Male | Other | Unknown

 @codeSystem = 2.16.840.1.113883.2.18.57

 birthTime?

 @value (exact birth date or approximate month or year) : date

### NHI number

National Health Index (NHI) number identifies everyone who receives health and disability services in New Zealand. *HISO 10046 Consumer Health Identity Standard* describes the NHI number format.

An ambulance care summary can only be created for a patient who has an NHI number. Any patient transported who cannot be positively identified is allocated a temporary NHI number by the receiving hospital or medical centre. Ambulance operators record but never allocate temporary NHI numbers.

### Patient name

This section describes the data elements used to capture and store the patient’s name. These elements are all optional in an ambulance setting because the patient might not be positively identified. Such patients will however be allocated a temporary NHI number.

{person name} 🡪

@use : HL7 Name Use = L (legal/official name) | M (maiden name) | N (nickname) | A (alias)

prefix? (title)

given\* (including middle names)

family

Refer to *HISO 10046 Consumer Health Identity Standard* for the data element specifications.

### Patient sex

Patient sex is recorded using the ‘administrativeGenderCode’ element described in *HISO 10043 CDA Common Templates*.

Ambulance operators record patient sex rather than the gender because sex is more often clinically relevant in emergency care.

Refer to *HISO 10046 Consumer Health Identity Standard* for the data element specifications.

### Birth date and patient age

The patient’s age in years, months or days – whichever is appropriate – at the time of the incident is recorded. Age is calculated automatically from the birth date when known, otherwise an estimated value can be recorded.

Refer to *HISO 10043 CDA Common Templates* for instructions on how to record an estimated birth date.

The CDA document header has no element for patient age, which is instead recorded as follows in the body section of the CDA document.

{patient additional demographics section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.111

 code

 @code : LOINC code = 45970-1 (Demographic information section)

 @displayName = "Patient demographics"

 …

 title = "Patient additional demographics"

 text

 table

 tbody

 {additional demographics section text}

 {additional demographics section entries}

The patient’s known or estimated age is recorded.

|  |  |
| --- | --- |
| {additional demographics section entries} 🡪{patient age}{patient age is estimated} | {additional demographics section text} 🡪{patient age text}{patient age is estimated text} |

Patient age can be represented as either a whole number of years, months or days.

|  |  |
| --- | --- |
| {patient age} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 30525-0 (Age) @displayName = "Patient age" … value @xsi:type = PQ @value : integer @unit = a (years) | mo (months) | d (days) | {patient age text} 🡪tr th td (eg "35 years") |

### Patient age is estimated

Whether this is an estimated age is recorded.

|  |  |
| --- | --- |
| {patient age is estimated} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 30525-0 (Age) @displayName = "Patient age is estimated" … value @xsi:type = BL @value : true | false | {patient age is estimated text} 🡪tr th td : Yes | No |

### Address

Ambulance operators collect one address only: the patient’s home address at the time of the incident. Address details are captured in *New Zealand Government CIQ Address Profile* format. Both domestic and overseas addresses can be recorded.

Refer to HISO 10046 Consumer Health Identity Standard for specifications of these data elements:

* Street address line – floor, unit or street address details
* Additional street address line - This line is used to capture street address if floor or unit details have been recorded in the first element. For rural addresses, this line contains the RAPID number where possible and the rural delivery number otherwise.
* Suburb name
* Town/city name
* Post code
* Country code.

### Contact details

Contact details are recorded to help identify the patient and to enable communication post incident:

* Home, work and/or mobile telephone number
* Email address.

The required telephone number format is specified by the International Telecommunication Union standard ITU-T E.123:

* (0N) NNN NNNN – national notation
* +NN NNN NNNN NNNN – international notation.

Telephone numbers in this notation are then prefixed ‘tel:’ for presentation as uniform resource identifiers (URIs) in the CDA document, eg ‘tel:+64 4 816 3681’.

Email addresses are prefixed ‘mailto:’ as URIs, eg ‘mailto:tane.jones@myhealth.health.nz’.

### Next of kin

Next of kin can be recorded using an element in the CDA document header. The person’s name and optionally their relationship to the patient can be recorded.

{support person} 🡪

participant

 @typeCode = IND

 templateId

 @root = 2.16.840.1.113883.2.18.7.5.14

 associatedEntity

 @classCode = NOK (next of kin) | ECON (emergency contact) | CAREGIVER

 code

 @code (relationship to patient) : HL7 personal relationship role type code

 @displayName : text (eg, Mother)

 @codeSystem = 2.16.840.1.113883.5.111

 {address}\*

 {telephone number}\*

 associatedPerson

 {person name}

Refer to *HISO 10043 CDA Common Templates* for more about recording who the patient’s support people are.

### General practitioner

Details of the patient’s general practitioner are not recorded in the CDA document because this information can be obtained at points of care via a web service from the enrolment record held by the NHI system.

## Incident details

Details of the incident and the response by the ambulance service are recorded in the ambulance care summary. The same incident – also known as a case or job – may involve more than one patient. Every incident is recorded in the ambulance operators’ computer aided despatch system operated at three control centres located in Auckland (North), Wellington (Central) and Christchurch (South).

Some incident details are recorded in the CDA document header.

{incident} 🡪

documentationOf

 serviceEvent

 @classCode = PCPR

 id

 @extension : Ambulance master incident number

 @root = 2.16.840.1.113883.2.18.54.8

 effectiveTime

 low

 @value (when call received) : datetime

 high?

 @value (final destination arrival date-time) : datetime

 performer (ambulance operator)

 assignedEntity

 {provider organisation}

Refer to *HISO 10043 CDA Common Templates* for instructions on how provider organisations are denoted in the above.

Disposition type and (if applicable) the destination are also recorded in the CDA document header. Incident number and date and time elements in the following have the same values as the corresponding elements above.

{handover} 🡪

componentOf

 encompassingEncounter

 id

 @extension : Ambulance master incident number

 @root = 2.16.840.1.113883.2.18.54.8

 effectiveTime

 low

 @value (when call received) : datetime

 high?

 @value (final destination arrival date-time) : datetime

 dischargeDispositionCode

 @code : Ambulance disposition code

 @displayName : text (ambulance disposition description)

 @codeSystem = 2.16.840.1.113883.2.18.54.9

 location?

 {health care facility} (receiving facility)

See the section below for the ambulance disposition code set.

Other incident details are recorded in the following body section of the CDA document.

{incident section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.106

 code

 @code : SNOMED code = 134403003 (Urgent referral)

 @displayName = "Incident"

 …

 title = "Incident"

 text

 table

 tbody

 {incident section text}

 {incident section entries}

The coded entries in this section are as follows.

|  |  |
| --- | --- |
| {incident section entries} 🡪{final patient status}{referral pathway} | {incident section text} 🡪{final patient status text}{referral pathway text}{disposition notes text}? |

### Master incident number

Every recorded incident is identified by a master incident number. Master incident numbers are character strings with the format NNNN-N-yyyy/mm/dd, where the components (left to right) are:

* case number (left zero padded)
* communications centre number – ‘1’ for North, ‘2’ for Central and ‘3’ for South
* incident date formatted YYYY/MM/DD

For example, master incident number ‘0027-2-2014/12/25’ denotes case number 27 managed by communications centre ‘2’ (Central) on 25 December 2014.

### Disposition

Disposition is what the ambulance officer decided to do with the patient, either:

|  |  |
| --- | --- |
| * ‘2’ – No treatment
 | * ‘4’ – Treat or assist only
 |
| * ‘3’ – Treat and refer
 | * ‘5’ – Transport
 |

Any other relevant information that should be passed on at handover is recorded as text.

{disposition notes text} 🡪

tr

 th = "Disposition notes"

 td : text

### Receiving facility

The identity of the emergency department, accident and medical centre, rest home or other facility receiving the patient is recorded.

The template defined by *HISO 10043 CDA Common Templates* is used when the HPI facility number is available:

{health care facility} (HPI facility number available) 🡪

…

Otherwise the following template is used:

{health care facility} (HPI facility number not available) 🡪

healthCareFacility

 location

 name : text

 {address}\*

The format of HPI facility numbers is defined by *HISO 10005 Health Practitioner Index Standard*.

### Patient status at destination

Patient status on arrival at the destination is recorded using one of the following controlled terms:

|  |  |
| --- | --- |
| * ‘0. Deceased’
 | * ‘3. Unlikely threat to life’
 |
| * ‘1. Immediate threat to life’
 | * ‘4. No threat to life’
 |
| * ‘2. Potential threat to life’
 |  |

The coded entry in the CDA document is structured as follows.

|  |  |
| --- | --- |
| {final patient status} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 67551-2 (Patient status at destination) @displayName = "Final patient status" … value @xsi:type = ST . : text | {final patient status text} 🡪tr th = "Final patient status" td (eg "2. Potential threat to life") |

### Referral pathway

The onward referral pathway is SNOMED coded as one of the following:

* Referral to general practitioner (procedure) [GP surgery appointment]
* Home visit (procedure) [GP home visit]
* Visit out of hours (procedure) [GP out of hours]
* Referral to dental surgeon (procedure) [Dentist]
* Referral to clinical nurse specialist (procedure) [Nurse specialist]
* Referral to practice nurse (procedure) [Practice nurse]
* Referral to midwife (procedure) [Lead maternity carer]
* Referral to accident and medical service (procedure) [Accident and medical]
* Emergency contraceptive pill follow up (procedure) [ECP follow up]
* Refer to accident and emergency department (procedure) [Emergency department]
* Refer for falls assessment (procedure) [Falls service]
* Refer to mental health worker (procedure) [Mental health team]
* Referral to social services (procedure) [Social services]
* Refer to community physiotherapist (procedure) [Physiotherapy]
* Refer to terminal care consult (procedure) [Palliative team]
* Liaising with police regarding subject (procedure) [Police]

In the above list, the local name for each referral pathway is quoted in square brackets beside the SNOMED fully specified name.

The coded entry in the CDA document is structured as follows.

|  |  |
| --- | --- |
| {referral pathway} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 21979-0 (Planned/next follow up) @displayName = "Referral pathway" … value @xsi:type = CV @code : SNOMED code @displayName : text (SNOMED fully specified name) … | {referral pathway text} 🡪tr th = "Referral pathway" td = "Lead maternity carer" |

The coded entry includes the numeric SNOMED code or concept identifier and the fully specified name for the concept. The corresponding text in the narrative block includes either the SNOMED preferred term or the chosen local name.

# Complaint history section

The complaint history section of the ambulance care summary records the patient’s presenting complaint and the circumstances of the incident that the ambulance service responded to.

{complaint history section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.3.6

 code

 @code : LOINC code = 46239-0 (Chief complaint)

 @displayName = "Complaint history"

 …

 title = "Complaint history"

 text

 table

 tbody

 {complaint history section text}

 {complaint history section entries}

The following elements appear in this section.

|  |  |
| --- | --- |
| {complaint history section entries} 🡪{presenting complaint}{onset datetime}{incident history}?{injury mechanism}?{sports injury}?{road traffic accident}? | {complaint history section text} 🡪{presenting complaint text}{onset datetime text}{incident history text}?{injury mechanism text}?{sports injury text}?{road traffic accident text}? |

## Presenting complaint

The patient’s description of the accident or medical condition that caused them to call the ambulance service is recorded as the presenting complaint. This is recorded as free text because of the variety and informality of terms used.

Common terms are:

|  |  |  |
| --- | --- | --- |
| * ‘Assault’
* ‘Burn’
* ‘Fall’
* ‘Fracture/dislocation’
* ‘Laceration’
* ‘Poisoning’
* ‘Soft tissue injury’
 | * ‘Abdominal pain’
* ‘Back pain (non-traumatic)’
* ‘Cardiac arrest’
* ‘Chest pain’
* ‘Collapse/fainting’
* ‘Diabetic problem’
 | * ‘Fever/infection’
* ‘Palpitations’
* ‘Seizure’
* ‘Shortness of breath’
* ‘Stroke’
 |

The coded entry is structured as follows.

|  |  |
| --- | --- |
| {presenting complaint} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 67570-2 (Chief complaint per dispatch) @displayName = "Presenting complaint" … value @xsi:type = ST . : text | {presenting complaint text} 🡪tr th = "Presenting complaint" td = "Burns to lower body" |

## Onset date and time

The onset date and time of the patient’s condition is recorded. This element appears only when the information was known to the ambulance officer.

|  |  |
| --- | --- |
| {onset datetime} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 11368-8  (Illness or injury onset date and time) @displayName = "Date and time of onset" … value @xsi:type = TS @value : datetime | {onset datetime text} 🡪tr th = "Date and time of onset" td (eg "22/10/2013 03:45") |

## History of incident

The patient’s description of events leading to the ambulance service becoming involved is recorded as free text.

|  |  |
| --- | --- |
| {incident history} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 10154-3 (Chief complaint narrative) @displayName = "History of incident" … value @xsi:type = ST . : text | {history of incident text} 🡪tr th = "History of incident" td |

## Injury mechanism

The mechanism of injury is recorded as free text, using the following terms where possible:

|  |  |  |
| --- | --- | --- |
| * ‘Animal attack/bites’
* ‘Assault’
* ‘Chemical poisoning’
* ‘Excessive cold’
 | * ‘Excessive heat’
* ‘Fall’
* ‘Machinery accidents’
 | * ‘Smoke, fire and flames’
* ‘Road traffic accident’
* ‘Work accident’
 |

The coded entry is structured as follows.

|  |  |
| --- | --- |
| {injury mechanism} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 67494-5 @displayName = "Mechanism of injury" … value @xsi:type = ST . : text | {injury mechanism text} 🡪tr th = "Mechanism of injury" td (eg "Fall") |

## Sports injury

The sport or recreational activity that the patient was participating in at the time of injury is recorded with reference to the National Collections Sport Code Set.

|  |  |
| --- | --- |
| {sports injury} 🡪entry @typeCode = DRIV observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 11372-0 (Injury associated activity) @displayName = "Sports injury" … value @xsi:type = CV @code : National Collections Sport Code Set @displayName : text @codeSystem = 2.16.840.1.113883.2.18.54.10 | {sports injury text} 🡪tr th = "Sports injury" td (eg "Rugby") |

## Road traffic accident

Several additional data elements are recorded for road traffic accidents (RTAs).

|  |  |
| --- | --- |
| {road traffic accident} 🡪{vehicle diagram}{vehicle type}{patient characteristic}{estimated impact speed}{passenger compartment intrusion}{patient ejected}{rollover}{end over end}{air bag deployed}{seat belt or child restraint used}{helmet worn}{self extricated}{patient trapped} | {road traffic accident text} 🡪{vehicle diagram}{vehicle type text}{patient characteristic text}{estimated impact speed text}{passenger compartment intrusion text}{patient ejected text}{rollover text}{end over end text}{air bag deployed text}{seat belt or child restraint used text}{helmet worn text}{self extricated text}{patient trapped text} |

### Vehicle diagram

A vehicle diagram image can be attached to the CDA document and linked into the complaint history section. Diagrams are marked with the position of the patient, direction of travel, point and direction of impact and the damaged area of the vehicle.

See the section on clinical images for the method used to attach image files to the CDA document.

|  |  |
| --- | --- |
| {vehicle diagram} 🡪entry @typeCode = DRIV observationMedia @classCode = OBS @moodCode = EVN @ID : URL (eg "vehicle-diagram-01.png") code @code : SNOMED code = [257445002](http://www.snoflake.co.uk/) (Picture) @displayname = "Vehicle diagram" … value @xsi:type = ED @mediaType : Internet media type (eg "image/png") reference @value : URL (eg "vehicle-diagram-01.png") | {vehicle diagram text} 🡪tr th = "Vehicle diagram"  td (eg "vehicle-diagram-01.png") td renderMultiMedia @referencedObject : URL |

### Vehicle type

The type of vehicle that the patient was travelling in is recorded as one of the following SNOMED concepts:

* Bicycle, device (physical object) [Bicycle]
* Motor bus, device (physical object) [Bus]
* Motorcycle, device (physical object) [Motorcycle]
* Automobile, device (physical object) [Car]
* Truck, device (physical object) [Truck]
* Van (physical object) [Light truck]
* Recreational vehicle (physical object) [Motor home]
* Streetcar, device (physical object) [Tram]
* Trailer (physical object) [Trailer]
* All-terrain vehicle, device (physical object) [All-terrain vehicle]

These concepts are all children of the concept ‘Land vehicle (physical object)’. In each case, the local name quoted in squared brackets may be used in place of the SNOMED preferred term.

|  |  |
| --- | --- |
| {vehicle type} 🡪entry @typeCode = DRIV observation code @code : SNOMED code = [46160005](http://www.snoflake.co.uk/) (Land vehicle) @displayName = "Vehicle type" … value @xsi:type = CV @code : SNOMED code @displayName (fully specified name) : text … | {vehicle type text} 🡪tr th = "Vehicle type" td (eg "Motorcycle") |

### Patient characteristic

The patient characteristic or role in a road traffic accident is recorded as one of the following SNOMED concepts:

* Passenger (person)
* Pedestrian (person)
* Driver of motor vehicle (person) [Driver]
* Rider of motorcycle (person) [Motorcyclist]
* Pillion passenger (person)
* Rider of pedal cycle (person) [Cyclist]
* Person in the transport environment (person) [Other]

The local name quoted in square brackets may be used in place of the SNOMED preferred term in the narrative block.

|  |  |
| --- | --- |
| {patient characteristic} 🡪entry @typeCode = DRIV observation code @code : SNOMED code = [127348004](http://www.snoflake.co.uk/) (Motor vehicle accident victim) @displayName = "Patient characteristic" … value @xsi:type = ST @code : SNOMED code @displayName (fully specified name) : text … | {patient characteristic text} 🡪tr th = "Patient characteristic" td (eg "Driver") |

### Estimated impact speed

The estimated impact speed for road traffic accidents is recorded using one of the following controlled terms:

|  |  |  |
| --- | --- | --- |
| * ‘0 - 20 km/h’
 | * ’40 - 60 km/h’
 | * ‘100 - 150 km/h’
 |
| * ’20 - 40 km/h’
 | * ’60 - 80 km/h’
 | * ‘> 150 km/h’
 |

The coded entry is structured as follows.

|  |  |
| --- | --- |
| {estimated impact speed} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Estimated impact speed" … value @xsi:type = ST . : text | {estimated impact speed text} 🡪tr th = "Estimated impact speed" td |

### Passenger compartment intrusion

Whether passenger compartment intrusion occurred is recorded as a Boolean element.

|  |  |
| --- | --- |
| {passenger compartment intrusion} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Passenger compartment intrusion" … value @xsi:type = BL @value : true | false | {passenger compartment intrusion text} 🡪tr th = "Passenger compartment intrusion" td : Yes | No |

### Patient ejected

Whether patient was ejected from the vehicle is recorded as a Boolean element.

|  |  |
| --- | --- |
| {patient ejected} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Patient ejected" … value @xsi:type = BL @value : true | false | {patient ejected text} 🡪tr th = "Patient ejected" td : Yes | No |

### Rollover

Whether the vehicle rolled over is recorded as a Boolean element.

|  |  |
| --- | --- |
| {rollover} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Rollover" … value @xsi:type = BL @value : true | false | {rollover text} 🡪tr th = "Rollover" td : Yes | No |

### End over end

Whether the vehicle tumbled end over end is recorded as a Boolean element.

|  |  |
| --- | --- |
| {end over end} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "End over end" … value @xsi:type = BL @value : true | false | {end over end text} 🡪tr th = "End over end" td : Yes | No |

### Air bag deployed

Whether the air bag deployed in the accident is recorded as a Boolean element.

|  |  |
| --- | --- |
| {air bag deployed} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Air bag deployed" … value @xsi:type = BL @value : true | false | {air bag deployed text} 🡪tr th = "Air bag deployed" td : Yes | No |

### Seat belt or child restraint used

Whether the patient was wearing a seat belt or appropriate child restraint is recorded as a Boolean element.

|  |  |
| --- | --- |
| {seat belt or child restraint used} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName =  "Seat belt or child restraint used" … value @xsi:type = BL @value : true | false | {seat belt or child restraint text} 🡪tr th =  "Seat belt or child restraint used" td : Yes | No |

In future, an additional data element may record the actual child restraint type used, eg baby capsule, booster seat.

### Helmet worn

Whether the patient was wearing a helmet is recorded as a Boolean element.

|  |  |
| --- | --- |
| {helmet worn} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Helmet worn" … value @xsi:type = BL @value : true | false | {helmet worn text} 🡪tr th = "Helmet worn" td : Yes | No |

### Self-extricated

Whether the patient extricated themselves from the vehicle is recorded as a Boolean element.

|  |  |
| --- | --- |
| {self extricated} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Self extricated" … value @xsi:type = BL @value : true | false | {self extricated text} 🡪tr th = "Self extricated" td : Yes | No |

### Patient trapped

Whether the patient was trapped in the vehicle is recorded as a Boolean element. Trapped means that the patient’s body was entangled or injury prevented the patient from exiting the vehicle, not that they were encased by a locked or non-opening door, for example.

|  |  |
| --- | --- |
| {patient trapped} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 42554-6 @displayName = "Patient trapped" … value @xsi:type = BL @value : true | false | {patient trapped text} 🡪tr th = "Patient trapped" td : Yes | No |

# Clinical impression section

The clinical impression section of the ambulance care summary document includes body diagrams and records the ambulance officer’s impression of the patient’s state. Clinical impressions are represented using selected SNOMED concepts.

{clinical impression section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.107

 code

 @code : LOINC code = 61133-5 (Clinical impression)

 @displayName = "Clinical impression"

 …

 title = " Clinical impression "

 text

 table

 tbody

 {clinical impression section text}

 {clinical impression section entries}

The following elements appear in this section.

|  |  |
| --- | --- |
| {clinical impression section entries} 🡪{body diagram}? (front){body diagram}? (back){primary clinical impression}{secondary clinical impression}\* | {clinical impression section text} 🡪{body diagram text}? (front){body diagram text}? (back){primary clinical impression text}{secondary clinical impression text}\*{clinical impression notes text}? |

## Body diagram

Diagrams of the front and back of the patient’s body are included with the CDA document to show the position of the injuries or complaints.

The ambulance officer marks the position of any abrasion, haemorrhage, burn, laceration, contusion, pain, dislocation, rash, foreign body, swelling, closed fracture, open fracture or tenderness. Different template images are used depending on the patient’s age and sex.

The diagram is saved as an image file and attached to the CDA document. The method of attachment is described in the section on clinical images.

|  |  |
| --- | --- |
| {body diagram} 🡪entry @typeCode = DRIV observationMedia @classCode = OBS @moodCode = EVN @ID : URL (eg "body-diagram-01.png") code @code : SNOMED code = 257445002 (Picture) @displayname = "Picture" … value @xsi:type = ED @mediatype : Internet media type (eg "image/png") reference @value : URL (eg "body-diagram-01.png") | {body diagram text} 🡪tr th = "Body diagram" td (eg "body-diagram-01.png") td renderMultiMedia @referencedObject : URL |

## Primary clinical impression

The ambulance officer records a primary clinical impression by selecting a SNOMED coded medical condition from the New Zealand Emergency Care Reference Set.

Primary clinical impression is a mandatory element in the ambulance care summary.

|  |  |
| --- | --- |
| {primary clinical impression} 🡪entry @typeCode = DRIV observation code @code : LOINC code = 61133-5 (Clinical impression) @displayName = "Primary clinical impression" … effectiveTime low @value : datetime value @xsi:type = CV @code : SNOMED code @displayName : (fully specified name) text … | {primary clinical impression text} 🡪tr th = "Primary clinical impression" td (eg "19/11/2014 13:43:12") td (eg "Chest pain") |

The SNOMED preferred term, a designated SNOMED synonym or an alternative local name is used to record the clinical impression in the narrative block.

## Secondary clinical impression

Any number of secondary clinical impressions can be recorded. These also are represented by SNOMED concepts from the New Zealand Emergency Care Reference Set.

Secondary clinical impressions would be recorded in the case of a stroke causing a fall, for example, or injuries from a motor vehicle accident causing stress that leads to chest pain.

|  |  |
| --- | --- |
| {secondary clinical impression} 🡪entry @typeCode = DRIV observation code @code : LOINC code = [61133-5](http://www.snoflake.co.uk/) (Clinical impression) @displayName = "Secondary clinical impression" … effectiveTime low @value : datetime value @xsi:type = CV @code : SNOMED code @displayName (fully specified name): text … | {secondary clinical impression text} 🡪tr th = "Secondary clinical …" td (eg "19/11/2014 13:43:12") td (eg "Shortness of breath") |

## Clinical impression notes

Any further information the ambulance officer wishes to capture about the patient’s state is recorded as free text in the narrative block.

{clinical impression notes text} 🡪

tr

 th = "Clinical impression notes"

 td : text

# Clinical summary section

The clinical summary section of the ambulance care summary document records the ambulance officer’s observations of the patient and lists any medications administered or interventions performed during the encounter.

{clinical summary section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.108

 code

 @code : LOINC code = 52466-0 (Major procedures)

 @displayName = "Clinical summary"

 …

 title = "Clinical summary"

 text

 table

 thead

 tr

 th = "Time"

 th = "Heart (bpm)"

 th = "BP (mmHg)"

 th = "Resp (/min)"

 th = "GCS"

 th = "ECG"

 th = "Cap refill"

 th = "SPO2 (%)"

 th = "Pain"

 th = "BGL (mmol/L)"

 th = "Temp (deg C)"

 th = "ETCO2 (mmHg)"

 th = "Pupils (mm L/R)"

 th = "Skin"

 tbody

 {clinical summary section text}

 {clinical summary section entry}\*

Observations, medications and interventions are displayed together in a single time sequence as follows.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time** | **Heart (bpm)** | **BP (mmHg)** | **Resp (/min)** | **GCS** | **ECG** | **Cap refill** | **SPO2 (%)** | **…** |
| 11:47 | 136 |  | 48 | 15 |  | (P)2 | 99 |  |
| 11:47  | **salbutamol 5 mg/2.5 mL** - 5 mg nebuliser mask |
| 11:47 | **ipratropium 0.5 mg/2 mL** - 0.5 mg nebuliser mask |
| 11:50 | 120 | 132/90 | 48 | 15 |  | 99 |  |  |
| 11:55 | **salbutamol 5 mg/2.5 mL** - 5 mg nebuliser mask |
| 11:55 | **ipratropium 0.5 mg/2 mL** - 0.5 mg nebuliser mask |
| 11:59 | 125 |  | 36 | 15 |  | 99 |  |  |
| 12:02 | Positioning - comfortable |

The following production rules enable the three types of coded entry – observations, medications and interventions – to be interleaved in this way.

|  |  |
| --- | --- |
| {clinical summary section entry} 🡪{observation entry}{clinical summary section entry} 🡪{medication entry}{clinical summary section entry} 🡪{intervention entry} | {clinical summary section text} 🡪{observation text}{clinical summary section text} 🡪{medication text}{clinical summary section text} 🡪{intervention text} |

## Observations made

Observations made of the following vital signs are recorded:

|  |  |  |
| --- | --- | --- |
| Heart rate | Blood pressure | Respiratory rate |
| Glasgow coma score | Heart rhythm | Capillary refill time |
| SP02 | Pain score | Body temperature |
| Blood glucose level | ETC02 | Pupil reaction |
| Pupil diameter | Skin condition |  |

A coded entry records the date and time of each observation and the measured or calculated value. LOINC codes identify the different observation types. The value domain per observation type allows either a physical quantity with a unit of measure, a scalar number or a SNOMED coded value.

{observation text} 🡪

tr

 td : format HH24:MI (eg "21:57")

 td (heart rate, eg "180")

 td (blood pressure, eg "130/80")

 td (respiratory rate, eg "35")

 td (Glasgow coma score, eg "15")

 td (heart rhythm, eg "Atrial fibrillation")

 td (capillary refill time, eg "4")

 td (SPO2, eg "95")

 td (pain score, eg "4")

 td (body temperature, eg "37.4")

 td (blood glucose level, eg "4.0")

 td (ETCO2, eg "70")

 td (pupil reaction and diameter, eg "5.0 mm right")

 td (skin condition, eg "Flushed complexion")

Any of these observations not made at a given time is represented by an empty cell in the table.

### Heart rate

Heart rate in beats per minute is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8867-4

 @displayName = "Heart rate"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = INT

 @value : integer

 @units = "/min"

### Systolic blood pressure

Systolic blood pressure is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8480-6

 @displayName = "Systolic blood pressure"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = mmHg

Patient position and cuff size are not recorded with the observation.

### Diastolic blood pressure

Diastolic blood pressure is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8462-4

 @displayName = "Diastolic blood pressure"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = mmHg

Patient position and cuff size are not recorded with the observation.

### Respiratory rate

Respiratory rate in breaths per minute is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 9279-1

 @displayName = "Respiratory rate"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = "/min"

### Glasgow coma score

Glasgow coma score – an integer in the range 3 to 15 inclusive – is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 9269-2

 @displayName = "GCS score"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = INT

 @value : integer (range 3..15)

### Heart rhythm

The observed heart rhythm is recorded as one of the following SNOMED concepts:

|  |  |
| --- | --- |
| * Atrial fibrillation (disorder)
* Atrial flutter (disorder)
* Complete atrioventricular block (disorder) [Complete heart block]
* Atrioventricular junctional rhythm (disorder) [Junctional]
* Left bundle branch block (disorder) [LBBB]
* Right bundle branch block (disorder) [RBBB]
 | * Sinus bradycardia (disorder)
* Sinus rhythm (finding)
* Sinus tachycardia (finding)
* Supraventricular tachycardia (disorder) [SVT]
* Ventricular fibrillation (disorder) [VF]
* Ventricular tachycardia (disorder) [VT]
 |

The square bracketed local term can be used in place of the SNOMED preferred term for this data element.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8884-9

 @displayName = "Heart rhythm"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = CV

 @code : SNOMED code

 @displayName : text (SNOMED fully specified name)

 …

### Central capillary refill time

Central (chest) capillary refill time is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 44964-5

 @displayName = "Central capillary refill time"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = sec

### Peripheral capillary refill time

Peripheral (finger) capillary refill time is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 44963-7

 @displayName = "Peripheral capillary refill time"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = sec

### Oxygen saturation

Percentage oxygen saturation in blood (Sp02) is recorded as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 20564-1

 @displayName = "SPO2"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = INT

 @value : integer

 @units = "%"

### Pain score

Pain score – an integer from 0 (no pain) to 10 (severe pain) – is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 72514-3

 (Reported pain severity)

 @displayName = "Pain score"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = INT

 @value : integer (range 0..10)

### Blood glucose level

Blood glucose level measured in millimoles per litre is recorded as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 2339-0

 @displayName = "Blood glucose level"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : decimal (one decimal place)

 @units = "mmol/L"

### Body temperature

Body temperature in degrees Celsius is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8310-5

 @displayName = "Body temperature"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : decimal (one decimal place)

 @units = Cel (Celsius)

### End tidal carbon dioxide concentration

End tidal carbon dioxide concentration (ETCO2) is a percentage recorded as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 19891-1

 @displayName = "ETCO2"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer (percentage 0..100)

 @units = "%"

### Pupil reaction

Pupil reaction to light is a Boolean value recorded for each eye.

Pupil reaction for the left eye is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 29082-5

 (Pupil motoric left eye)

 @displayName = "Pupil reaction left eye"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = BL

 @value : true | false

Pupil reaction for the right eye is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 29081-7

 (Pupil motoric right eye)

 @displayName = "Pupil reaction right eye"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = BL

 @value : true | false

### Pupil diameter

Pupil diameter in millimetres can be recorded for each eye.

Pupil diameter for the left eye is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8640-5

 @displayName = "Pupil diameter left eye"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = mm

Pupil diameter for the right eye is represented as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 8642-1

 @displayName = "Pupil diameter right eye"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = PQ

 @value : integer

 @units = mm

### Skin condition

The observed skin condition is recorded as a SNOMED concept:

|  |  |
| --- | --- |
| * Cyanosis of skin (finding)
* Excessive sweating (finding)
* Flushed complexion (finding)
 | * Skin appearance normal (finding)
* Pale complexion (finding)
 |

The coded entry is structured as follows.

{observation entry} 🡪

entry

 observation

 code

 @code : LOINC code = 46046-9

 @displayName = "Skin condition"

 …

 effectiveTime

 low

 @value : datetime

 value

 @xsi:type = CV

 @code : SNOMED code

 @displayName (SNOMED fully specifie name) : text

 …

## Medications administered

Details of the medications administered to the patient are recorded in the clinical summary section. The medicinal product, dose, route, administration time and any notes are recorded. Coded entries are interleaved in time sequence with observation and procedure details.

{administered medication} 🡪

entry

 @typeCode = DRIV

 substanceAdministration

 @classCode = SBADM

 @moodCode = INT

 text? (notes) : text

 effectiveTime

 low

 @value : datetime (when administered)

 {route}

 {dose}

 {medicinal product}

 {as required medicine}?

The corresponding display element in the narrative block is structured as follows:

{medication text} 🡪

tr

 td (date and time administered, eg "15:19")

 td (medicinal product, dose, route etc, eg "Aspirin 300 mg tablet - 1 tablet")

### Medicinal product

Ambulance officers can administer the patient’s own medicines and certain medicines from the New Zealand Universal List of Medicines (NZULM).

The medicinal product administered is recorded using its New Zealand Medicines Terminology (NZMT) code whenever possible, otherwise the name of the medicine is recorded in the notes field.

Examples of the medicinal products administered by ambulance officers are:

|  |  |
| --- | --- |
| * Adrenaline 1 mg/1 mL
 | * Morphine 10 mg/1 mL
 |
| * Aspirin 300 mg tablet
 |  |

Medicines that have an NZMT code are represented as follows:

{medicinal product} 🡪

consumable

 templateId

 @root = 2.16.840.1.113883.2.18.7.24

 manufacturedProduct

 @classCode = MANU

 templateId

 @root = 2.16.840.1.113883.2.18.7.25

 manufacturedMaterial

 code

 @code : NZMT code

 @displayName (preferred name) : text

 @codeSystem = 2.16.840.1.113883.2.18.26

While medicines that do not have an NZMT code are represented as follows:

{medicinal product} 🡪

consumable

 templateId

 @root = 2.16.840.1.113883.2.18.7.24

 manufacturedProduct

 @classCode = MANU

 templateId

 @root = 2.16.840.1.113883.2.18.7.25

 manufacturedMaterial

 name : text

### Dose administered

The dose of the medication administered is recorded.

Depending on the product, dose can be expressed as either:

* a counted quantity in terms of a unit of use (such as capsule) – which works for any Medicinal Product Unit of Use (MPUU) or Trade Product Unit of Use (TPUU) in a discrete dose form
* a measured quantity in terms of a unit of measure (for mass, volume, flow rate etc) – which is used when (a) the product is in a continuous dose form or (b) a measured quantity is more informational than a counted quantity.

Provided the medicine is specified as an MPUU or a TPUU – concepts that embody unit of use – a dose quantity that is simply a number of tablets, for example, can be expressed as follows:

{dose} (counted) 🡪

doseQuantity

 @value (numeric value) : decimal

Measured quantities are expressed with a UCUM unit of measure code:

|  |  |
| --- | --- |
| * ‘mL’ – millilitre
 | * ‘%’ – percent
 |
| * ‘L’ – litre
 | * ‘L/min’ – litres per minute
 |
| * ‘mcg’ – microgram
 |  |

The template element is structured as follows:

{dose} (measured) 🡪

doseQuantity

 @value (numeric value) : decimal

 @unit : UCUM unit of measure (eg mL)

The two forms of representation can be combined to express both the counted quantity and the equivalent measured quantity.

{dose} (counted and measured) 🡪

doseQuantity

 @value (numeric value) : decimal

doseQuantity

 @value (numeric value) : decimal

 @unit : UCUM unit of measure (eg mL)

### Route of administration

The route of administration is represented using a SNOMED concept:

|  |  |
| --- | --- |
| * Subcutaneous route (qualifier value)
* Oral route (qualifier value)
* Intravenous route (qualifier value)
* Intraosseous route (qualifier value)
 | * Intramuscular route (qualifier value)
* Rectal route (qualifier value)
* Oropharyngeal route (qualifier value)
* Nasal route (qualifier value)
 |

The preferred term is used as the display name attribute in the template.

{route} 🡪

routeCode

 @code : SNOMED code

 @displayName (SNOMED fully specified name) : text

 …

### As required medicine

Refer to *HISO 10041.1 CDA Templates for Medications, Allergies and Adverse Reactions* for instructions on how to indicate that a medicine is intended to be taken as required.

{as required medicine} 🡪

precondition

 …

## Interventions performed

Details of the interventions performed in treating the patient are recorded. This includes the type of procedure and body site, when the intervention was performed and whether it was successful. Defibrillator energy is recorded for certain procedure types. A free text element can be used to capture any other information or comments about the intervention.

{intervention} 🡪

entry

 procedure

 code

 @code : SNOMED code (procedure type)

 @displayName : text

 …

 {procedure qualifier}?

 text? (intervention notes)

 effectiveTime

 low

 @value : datetime (when performed)

 {body site}?

 {intervention successful}?

The corresponding display element in the narrative block is structured as follows.

{intervention text} 🡪

tr

 td (time intervention performed, eg "15:21")

 td (intervention type, parameters etc, eg "Cardioversion 200 J second attempt successful")

### Procedure type

The type of procedure or intervention performed is recorded with reference to a SNOMED concept [local term in square brackets]:

* Manual establishment of airway (procedure) [Airway - manual clear]
* Suction of patient (procedure) [Airway – suction]
* Insertion of oropharyngeal airway (procedure) [Airway – OPA]
* Reduction of dislocation of wrist (procedure) [Limb reduction – wrist]
* Reduction of dislocation of elbow (procedure) [Limb reduction – elbow]
* Dislocated shoulder reduction (procedure) [Limb reduction – shoulder]
* Nasopharyngeal airway insertion (procedure) [Airway – NPA]
* Tracheal intubation through a laryngeal mask airway (procedure) [Airway – LMA]
* Insertion of endotracheal tube (procedure) [Intubation]
* Cricothyroidotomy (procedure) [Airway – cricothyroidotomy]
* Laryngoscopy (procedure) [Airway – laryngoscopy]
* Cardioversion (procedure) [Cardioversion]
* Urinary catheter care management (procedure) [Catheter troubleshooting]
* Incision of thorax (procedure) [Chest decompression]
* Cardiopulmonary resuscitation (procedure) [CPR]
* Direct current defibrillation (procedure) [Defibrillation]
* Intra-osseous infusion (procedure) [Intraosseous infusion (IO)]
* Intravenous therapy (regime/therapy) [Intravenous therapy (IV)]
* Reduction of dislocation of ankle (procedure) [Limb reduction – ankle]
* Other dislocation reduction (procedure) [Limb reduction – other]
* Cardiac pacing (procedure) [Pacing]
* Positive end expiratory pressure reduced (procedure) [PEEP]
* Positioning subject in recovery position (procedure) [Positioning – recovery]
* Positioning patient (procedure) [Positioning – comfortable]
* Placing patient in comfortable position (procedure) [Positioning – semi-recumbent]
* Placing subject in prone position (procedure) [Positioning – prone]
* Rapid sequence induction (procedure) [RSI]
* Application of splint (procedure) [Splint/dressing]
* Gastrointestinal decompression (procedure) [Stomach decompression]
* Application of tourniquet (procedure) [Tourniquet]

### Body site

For certain procedure types the target body site has to be specifed. SNOMED concepts for body structure, laterality and other anatomical relationships are combined for this purpose. For example, the tourniquet procedure type requires a body structure (arm or leg) and laterality (left or right) to be specified.

{body site} 🡪

targetSiteCode

 @code : SNOMED code (body structure)

 @displayName : text (preferred term)

 {laterality}?

 {anatomical relationship}?

Body structures are represented by the following SNOMED concepts [local term in square brackets]:

* Entire second intercostal space (body structure) [Second intercostal]
* Entire fourth intercostal space (body structure) [Fourth intercostal]
* Entire tibia (body structure) [Tibial]
* Entire humerus (body structure) [Humeral]
* Entire hand (body structure) [Hand]
* Entire forearm (body structure) [Forearm]
* Entire skin of antecubital fossa (body structure) [ACF]
* Entire external jugular vein (body structure) [EJV]
* Entire lower limb (body structure) [Leg]
* Entire upper limb (body structure) [Arm]

Laterality is specified as follows.

{laterality} 🡪

qualifier

 name

 @code : SNOMED code

 @displayName (SNOMED fully specified name) = "Laterality (attribute)"

 …

 value

 @xsi:type = CV

 @code : SNOMED code

 @displayName (SNOMED fully specified name) = "Left (qualifier value)" | "Right (qualifier value)"

 …

Laterality applies to these procedure types: chest decompression, intraosseous infusion, intravenous therapy, limb reduction and tourniquet.

Some body sites have a further anatomical relationship qualifier that distinguishes lateral from midclavicular.

{anatomical relationship} 🡪

qualifier

 name

 @code : SNOMED code (= 2722741003)

 @displayName (SNOMED fully specified name) = "Anatomical relationship descriptor"

 …

 value

 @xsi:type = CV

 @code : SNOMED code

 @displayName (SNOMED fully specified name) = "Lateral (qualifier value)" |

 "Midclavicular (qualifier value)"

 …

### Defibrillator energy

The energy used in cardioversion and defibrillation procedures is recorded as a qualifier on the procedure type element.

{procedure qualifier} 🡪

{defibrillator energy}

{defibrillator energy} 🡪

qualifier

 name

 @code : SNOMED code

 @displayName (SNOMED fully specified name) = "Unit of energy (qualifier value)"

 …

 value

 @xsi:type = PQ

 @value : integer = 25 | 50 | 100 | 150 | 200 | 360

 @units : UCUM code = J (joule)

### Intervention success

The success of certain types of intervention is recorded. These interventions include intubation, intravenous therapy, intubation, intraosseous infusion, limb reduction, tourniquet, chest decompression and catheter troubleshooting.

The success or otherwise of the procedure is coded using these SNOMED concepts:

* Unsuccessful (qualifier value)
* Partially successful (qualifier value)
* Successful (qualifier value)

This information attaches to the CDA element for the procedure.

The coded entry is structured as follows.

{intervention success} 🡪

entryRelationship

 @typeCode = COMP

 observation

 @classCode = OBS

 @moodCode = EVN

 code

 @code : SNOMED code

 @displayName (SNOMED fully specified name) = "Success of action"

 …

 value

 @xsi:type = CV

 @code : SNOMED code (as above)

 @displayName (SNOMED fully specified name)

 …

# Medical history section

The medical history section of the ambulance care summary records notes by the ambulance officer on the patient’s relevant medical history, current medications and known allergies and propensity to adverse reactions.

The ambulance officer learns these details directly from the patient or from support people, bystanders, printed documentation, online sources and medicine found at the scene.

‘None’ or ‘Unknown’ is recorded under each heading when appropriate.

{medical history section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.54

 code

 @code : LOINC code = 66480-5

 @displayName = "Medical history"

 …

 title = "Medical history"

 text

 table

 tbody

 {medical history section text}

 {medical history section entries}

The following elements appear in this section.

|  |  |
| --- | --- |
| {medical history section entries} 🡪{last oral intake} | {medical history section text} 🡪{medical history notes text}{medication notes text}{allergy notes text}{last oral intake text} |

## Medical history notes

The patient’s relevant medical history is recorded as free text in this section of the CDA document. If the relevant history is documented in an attached referral letter, this is noted.

{medical history notes text} 🡪

tr

 th = "Medical history notes"

 td : text

## Notes on medications

A list of the patient’s current medications is recorded as free text in the medical history section.

{medication notes text} 🡪

tr

 th = "Medication notes"

 td : text

## Notes on allergies

The patient’s known allergies are recorded as free text in the medical history section.

{allergy notes text} 🡪

tr

 th = "Allergies"

 td : text

## Last oral intake

The date and time of last oral intake is recorded as a coded entry.

|  |  |
| --- | --- |
| {last oral intake} 🡪entry @typeCode = COMP observation @classCode = OBS @moodCode = EVN code @code : LOINC code = 67517-3 @displayName = "Last oral intake" … value @xsi:type = TS @value : datetime | {last oral intake text} 🡪tr th = "Last oral intake" td (eg "15/12/2014 14:00") |

# Advice and instructions section

This section of the ambulance care summary document contains advice and instructions from the ambulance officer to the patient and the patient’s GP.

There are no coded entries in this section and all content appears in the narrative block.

{advice and instructions section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.109

 code

 @code : LOINC code = 74213-0 (Discharge instructions)

 @displayName = "Advice and instructions"

 …

 title = "Advice and instructions"

 text

 table

 tbody

 {advice to patient text}?

 {advice to practitioner text}?

## Advice to patient

Patients who are treated by an ambulance officer but not transported can receive leaflets and other advice. A summary of the advice provided is recorded here in narrative text.

{advice to patient text} 🡪

tr

 th = "Advice to patient"

 td : text

## Advice to GP

This section can also include written advice about the incident from the ambulance officer to the patient’s GP.

{advice to practitioner text} 🡪

tr

 th = "Advice to GP"

 td : text

# Clinical images section

The clinical images section of the ambulance care summary document has links to photographs and videos relating to the incident.

Images captured by ambulance officers include, for example:

* photos of relevant documentation (eg handover document, hospital clinic letter)
* photos from the accident scene to show the injury mechanism
* photos of limbs before splinting
* images of electrocardiogram strips.

Any number of image files may be attached at an ambulance care summary.

The media types supported include: ‘image/jpeg’, ‘image/png’ and ‘video/mpeg’.

{clinical images section} 🡪

component

 section

 templateId

 @root = 2.16.840.1.113883.2.18.7.110

 code

 @code : SNOMED code = [405671001](http://www.snoflake.co.uk/) (Information from images)

 @displayName = "Clinical images"

 …

 title = "Clinical images"

 text

 table

 tbody

 {clinical image text}\*

 {clinical image}\*

Attached image files are linked to the CDA document rather than embedded within it. The CDA document and its attachments are placed in the same MIME package, with reference elements in the CDA document having a URL that references the image file within the package.

|  |  |
| --- | --- |
| {clinical image} 🡪entry @typeCode = DRIV observationMedia @classCode = OBS @moodCode = EVN @ID : URL (eg "clinical-image-01.png") code @code : SNOMED code = [257444003](http://www.snoflake.co.uk/) (Photograph) @displayName : text … value @xsi:type = ED @mediatype : Internet media type (eg "image/png") reference @value : URL (eg "clinical-image-01.png") | {clinical image text} 🡪tr th = "Clinical image"  td (eg "clinical-image-01.png") td renderMultiMedia @referencedObject : URL |

Images attached in this way should be rendered with the other content of the CDA document.

A MIME package containing a CDA document with an attached image is constructed as follows:

MIME-Version: 1.0

Content-Type: multipart/related; boundary="HL7-CDA-boundary";

--HL7-CDA-boundary

Content-Type: application/x-hl7-cda-level-three+xml

…

(CDA document text)

…

--HL7-CDA-boundary

Content-Location: clinical-image-01.png

Content-Type: image/png

Content-Transfer-Encoding: BASE64

…

(Base64-encoded image data)

…

In the above, references in the CDA document to the image part use the value in the image part’s Content-Location field, which can be simply the name of the image file uploaded from the camera.

Refer to RFC 2557 for more information about the Content-Location field.

# Display formats

The content of an ambulance care summary document retrieved from a clinical data repository can be imported into another system or it can be displayed via a clinical workstation to an end user. In the latter case, an XML stylesheet is applied to the CDA document to render an HTML version of the document for display in a web browser.

There are also requirements for PDF versions of the ambulance care summary that are directly displayable:

* PDF version of the ambulance care summary to support transfer of care
* PDF version of the ambulance care summary for the patient’s GP.

These PDF options cater for applications that are not CDA capable.

## PDF document for transfer of care

The PDF document supporting transfer of care corresponds to the IMIST-AMBO handover protocol and its outputs. Fields and sections that are not applicable to the incident are omitted from the PDF document.

The sections of the PDF document are populated as follows.

| IMIST-AMBO handover protocol | PDF document for transfer of care |
| --- | --- |
| Identification of patient | Incident information |
| Patient information |
| Mechanism of injury or medical complaint | Complaint history |
| Injuries or information related to the complaint | Clinical impression |
| Signs and symptoms | Clinical summary |
| Treatment and trends |
| Allergies | Past medical history |
| Medication |
| Background |
| Other information | Advice to patient |
| Advice to GP |
| Media |

## PDF document for advice to GP

The PDF document containing advice from the ambulance service to the patient’s GP follows the structure of a discharge summary (see *High Level Requirements for eDischarge*). Fields and sections that are not applicable to the incident are omitted from the PDF document.

The sections of the two document types correspond as follows.

| eDischarge summary | PDF document for advice to GP |
| --- | --- |
| Episode identification | Incident information |
| Discharge details |
| Patient identification | Patient information |
| Advice to patient | Advice to patient |
| Advice to health practitioner | Advice to GP |
| Presenting complaint | Complaint history |
| Diagnosis/problem list | Clinical impression |
| Medications | Past medical history |
| Allergies/reactions |
| Other information | Clinical summary |