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## **e-Discharge Summary**

### **Solution Design**

Version 1.1 - 30 August 2010

Final

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# Document information

## Change history

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# Preface

## Document purpose

This Solution Design document serves as the technical anchor-point for the Discharge Summary package, and builds upon the context-related discussion of the Business Requirements Specification and the Core Information Components.

The Discharge Summary package describes the specifications and guidelines for consideration by implementers when developing interoperable Discharge Summary solutions within the Australian healthcare community.

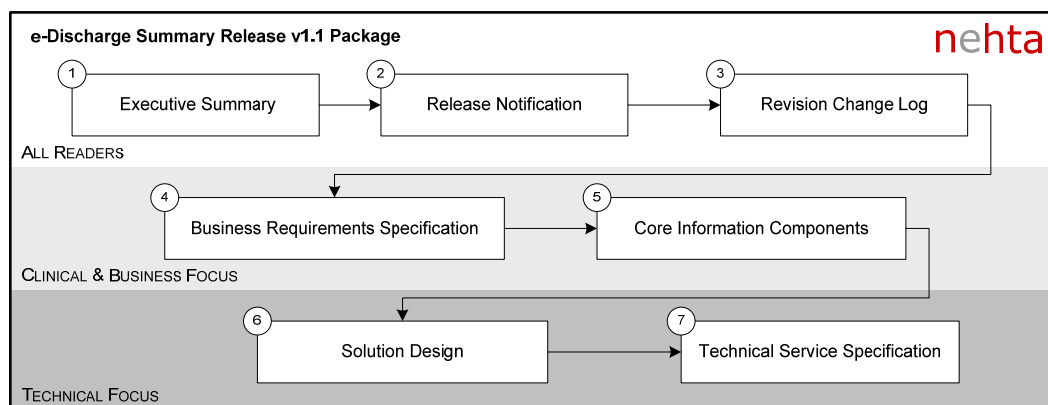
## Intended audience

This document is intended for all interested stakeholders including:

- early adopter hospitals and health departments in the process of planning, implementing or upgrading discharge summary systems;
- software vendors developing discharge summary system products;
- early Adopter GP desktop software vendors;
- senior managers and policy makers, clinical experts, Health Information Managers, IT operations and support teams, and system integrators; and
- technical and non-technical readers.

## Document map

The following diagram represents the relationship between this document and others within the Discharge Summary package.



**Figure 1: e-Discharge Summary package document map**

The Solution Design defines Today, Tomorrow and Future solution states supported by the Business Requirements Specification. The Core Information Components document defines the minimum set of data groups and elements that are recommended for implementation in any system that creates and transfers discharge summary information within Australia.

## Context

Today, state and territory jurisdictions are at varying stages of developing and deploying electronic discharge summary systems. They are maintaining

their own indexes/directories of service providers and have embraced an array of methods for enabling access to discharge summaries.

In the future, it is envisaged that the discharge summary will be initiated at admission and be pre-populated with a wide variety of structured data from information systems related to Personally Controlled Electronic Health Record (PCEHR), and could include incoming referrals, emergency department and existing pre-admission systems. Distribution lists will be pre-populated with accurate identification of the patient's usual and referring clinicians through the use of unique, national healthcare identifiers allocated by the Healthcare Identifiers (HI) Service, while the Endpoint Location Service (ELS) will subsequently provide the electronic addresses of these recipients. Clinical data will be structured, based on Australian data modelling standards, with source systems using Australian terminology standards. The security and integrity of discharge summary messages will be enhanced by the use of approved secure messaging and the National Authentication Service for Health (NASH) authentication services. Consumers will have the ability to create customised presentations of discharge summary information and incorporate selected data into recipient clinician systems, including the Summary Health Profile (SHP).

The Discharge Summary package defines a business solution (comprising a number of standards, specifications and guidelines) to support the transition to this future state. This document provides an overview of this business solution and includes details about:

- A Structured Document Template – defining the core information present in a discharge summary.
- Exchange Formats – describing the way information is electronically formatted so that both sending and receiving systems can interpret it accurately.
- Terminology - defining both the meaning of structural data components and the appropriate values that may populate those components.
- Web Services - the message transport technologies that provide secure and reliable message delivery.
- Authentication and Security - a security framework and architecture for discharge summary solutions, including secure transmission techniques and the use of digital credentials.
- Information Exchange Architecture - the approaches to electronic discharge summary exchange, based on the technical capabilities of both the sending and receiving parties.
- Presentation – the human reader interactions and how the discharge summary document is rendered.

Given NEHTA's focus on e-health interoperability, this document is not intended to encompass or describe a complete discharge summary solution, but seeks to build opportunities for validated consensus between stakeholders.

## Scope

The scope of this Discharge Summary package covers the standardisation and electronic distribution of core discharge summary information that is relevant in the majority of discharge summary scenarios.

## Objectives

The primary objectives used to measure the solution outcomes for this release are:

- The adoption of clinical content specifications and corresponding exchange formats.
- The adoption of Web service messaging solutions designed to streamline existing business functions involving electronic information exchange.
- The early adoption of clinical content specifications, prior to the full implementation of national infrastructure services.
- The early adoption of national infrastructure services, such as the HI Service, NASH and ELS, when available.
- The identification of clearly defined migration paths to assist partners during adoption, and alignment with the package specifications.

## **Definitions, acronyms and abbreviations**

While a considerable portion of this document discusses technical content, efforts have been made to make this document more generally accessible. Wherever possible, non-technical language has been used, jargon explained, and a comprehensive list of definitions, acronyms and abbreviations is available on page 47.

## **References and related documents**

For a list of all referenced documents, see the References section on page 50.

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# 1 Introduction

## 1.1 Overview

A discharge summary is a document produced during a patient's stay in hospital and issued when or after a patient leaves the care of the hospital. It can be created for either admitted or non-admitted patients. The primary recipients of the discharge summary are healthcare providers who were providing the patient care prior to the hospital admission and will provide care to patient after discharge.

NEHTA is developing specifications and guidelines for secure and interoperable exchange of healthcare information for the Australian healthcare community. This package is one of the deliverables from NEHTA.

This Discharge Summary package is focused on the electronic creation, delivery and receipt of discharge summaries, encompassing the core set of information relevant in the majority of discharge summary scenarios.

It is important to note that this document aims to assist readers in understanding the overall Discharge Summary package. The information provided here is background information and is non-normative in nature i.e. not enforced through the certification process. This document does not aim to specify the exact interaction model nor all the software components required to support the internal processing or generation of a discharge summary document.

To enable interoperability, the Discharge Summary Technical Service Specification and CDA implementation guide contains normative conformance points that must be satisfied by each implementation of the NEHTA Discharge Summary package. Normative conformance points specify the criteria that must be met to be compliant with NEHTA specifications.

### 1.1.1 Discharge summary definition

A discharge summary is currently defined as "A collection of information about events during care by a provider or organization" [AS4700.6(Int)2007].

It comprises of a document produced during a patient's stay in hospital, as either an admitted or non-admitted patient, and issued when or after a patient leaves the care of the hospital.

Its primary function is to support the 'continuity of care' as the patient returns to the care of their community healthcare provider(s). The primary recipients of the discharge summary are healthcare providers who were providing the patient care prior to the hospital stay, including:

- The patient's usual GP (or primary healthcare service, such as an Aboriginal Community Controlled Health Service);
- The referring clinician (e.g. private specialist);
- Residential Aged Care Facility where the patient usually resides; and
- Other health professionals who will be involved in the patient's post-discharge care.

Within this primary function, the purpose of the NEHTA Discharge Summary package is to:

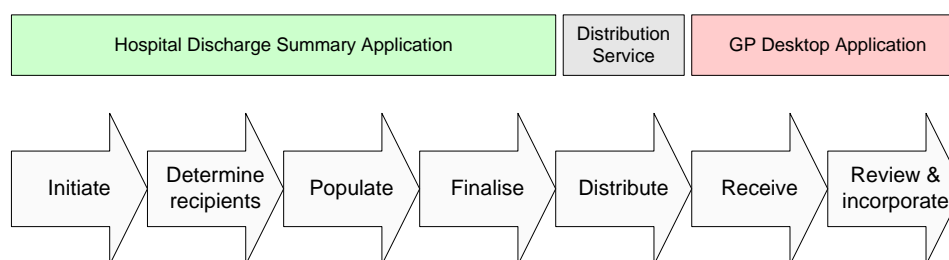
- Assist and improve clinician-to-clinician communication; and
- Enable system-to-system communication of semantically interoperable data.

The secondary functions of the discharge summary include:

- providing summary information regarding an earlier admission on the re-presentation of the patient to acute care;
- use by clinical coders when coding a patient record;
- providing the patient with a record of their hospital admission and care; and
- inclusion in a Personally Controlled Electronic Health Record (PCEHR).

### 1.1.2 Discharge summary process

The process of producing and disseminating discharge summaries generally follows a logical sequence that is common, even though the details will vary between different hospitals and jurisdictions.



**Figure 2 Discharge summary process**

The following key steps occur within this overall process:

- The initiation of the discharge summary via a business rule, and incorporation of pre-admission information from relevant sources, including administration, Emergency Department and/or referral systems;
- An initial distribution list is derived from admission and referral details and associated with recipient identities and addresses from a common provider directory service;
- The population of the discharge summary with electronically supplied structured data, based on common terminology standards;
- Electronic certification of the discharge by the originating organisation;
- Secure distribution via the nominated transmission mode, including intermediary store, and the forwarding and processing of acknowledgment or failure messages;
- The decryption, authentication and acknowledgement of the receipt of the discharge summary information; and
- Clinician review and incorporation of discharge summary information into the recipient system's electronic medical record in machine-interpretable form.

## 1.2 Scope

The scope of this release of the Discharge Summary package includes discharge summaries that are:

- focused on a clinical discharge summary that supports continuity of patient care;
- compiled upon the discharge of a patient from acute care into the community, primarily to be sent to a GP but potentially allowing the same content to be sent to other relevant recipients;

- covering the complete length of stay in acute care, from initial admission to final discharge into the community;
- including any current and relevant pre-existing clinical details recorded during the acute care episode; and
- including details of the patient, acute care facility and treating doctors, as required to identify the participating parties.

The scope of this release of the Discharge Summary package excludes discharge summaries that:

- include an attached 'Summary Health Profile', or considers their future implementation;
- are functionally-specific to the transfer of care, as required by a 'Referral';
- are compiled upon the transfer of a patient between units within the acute care setting (i.e. Transfer Summary);
- relate to patients being admitted for dialysis, same day radiotherapy and other procedures involving repetitive one day admissions; and
- concern administrative notifications (e.g. admission and discharge notifications).

In addition, this package release excludes in-development national infrastructure services.

### 1.3 Goals

The discharge summary solution is designed to drive the adoption of open standards and specifications that collectively:

- support secure, private, and robust interoperability, enabling rapid exchange of more accurate and reliable discharge summary information to patients and clinicians, thereby promoting the delivery of patient care;
- facilitate improved communication of patient information between acute hospitals, general practitioners and specialists to support the continuum of care for patients;
- supply care providers with timely access to patient discharge information in ways that support the care management process; and
- improve clinical and administrative efficiency.

The primary objectives that will be used to measure the solution outcomes for the first release are:

- the adoption of Web service architectures designed to streamline existing business functions, involving electronic information exchange using existing identifiers;
- the early adoption of clinical content specifications, prior to the full implementation of national infrastructure services, including the ability to:
  - gather and store discharge summary information locally to facilitate future electronic information exchanges based on a defined content template;
  - send standard terminology in conjunction with content templates and interchange formats;
  - receive, validate and process terminology in conjunction with content templates and interchange formats, automatically integrating this information into the receiving system where appropriate; and
  - migrate to national infrastructures such as the HI Service, NASH and ELS.
- improvements in decision support facilitation, locally and nationally.

## 1.4 Key benefits

Planned safety and quality-related benefits associated with the implementation of a national Discharge Summary package include:

- Reduced transcription errors and increased efficiencies in the timely, electronic distribution of quality information as a result of streamlined work processes, automatic population of demographic information and relevant clinical data from the information systems.
- Reduced errors and increased efficiencies in the timely distribution of the correct information being sent to the correct providers.
- Reduced patient readmission rates due to adverse events through the timely and accurate sharing of patient information (e.g. current medications, allergies, adverse event lists, etc.) between hospitals and GPs by providing access to safe, consistent and unambiguous data at the point of care.
- The provision of timely, accurate, structured discharge planning information to GPs, enabling reliable execution of discharge instructions and reducing the risk of hospital readmission resulting from non-adherence to discharge instructions.

## 1.5 Dependencies

The table below outlines the dependencies for the solution.

Item	Description
1.	<p>The discharge summary initiative is reliant on the following national e-health foundation initiatives to provide an agreed consistent technical solution to enable the exchange of discharge summary information:</p> <ul style="list-style-type: none"> <li>the HI Service – for unique, national identifiers (commenced 1 July 2010); and</li> <li>NASH - for strong authentication services.</li> </ul> <p>N.B. Interim solutions may need to be developed until these foundation services are available.</p>
2.	<p>The development and availability of nationally-agreed terminology reference sets for each data element in the discharge summary message specification. Additional requirements include:</p> <ul style="list-style-type: none"> <li>the logical reference model and its relationship to the Structured Document Template (SDT) and terminology;</li> <li>effective relationships between the discharge summary terminology, the feeder systems, and terminology mappings;</li> <li>terminology common to multiple packages and agreement as to how this is structured (e.g. headers and shared data groups);</li> <li>the migration path to post-coordination, including guidance on the representation of qualifiers, and the use of structure or pre-coordination;</li> <li>exchange format mapping and translation tools; and</li> <li>implementation guides for terminology and the SDT.</li> </ul>
3.	<p>The definition of Web services and connectivity specifications from the NEHTA Secure Messaging initiative.</p>
4.	<p>Specific discharge summary projects and initiatives. NEHTA's role is to ensure that it works with vendors, hospitals and health departments at the appropriate point in time to ensure that the jurisdiction solutions are aware of, and able to comply with, the national specifications for the exchange of discharge summary information.</p>
5.	<p>The discharge summary solution needs to reflect the National e-Health Strategy to ensure that it remains aligned.</p>

**Table 1: Solution dependencies**

## 2 Solution states

### 2.1 Today

All state and territory jurisdictions are currently deploying various state and territory-wide electronic discharge summary systems, and their projects are at differing stages of development.

Most projects focus upon the assimilation of discharge information from disparate hospital systems in order to reduce manual processing and to generate more consistent, higher quality data that can be re-used (e.g. if a patient is re-admitted). They also seek to provide a basis for the monitoring and analysis of the overall efficiency and effectiveness of discharge processes. Some existing projects are explicitly designed to provide data feeds into a form of electronic health record (e.g. PCEHR), while this is simply implied as a future option in others.

Initial distribution of many of the discharge summaries generated via these projects is likely to be via fax. This is due to the lack of alternate, existing, and sufficiently-secure communication systems that meet jurisdictional standards regarding authentication. In addition, summary distribution is out-of-scope for some of the discharge summary projects. Consequently, NEHTA's secure messaging and NASH initiatives are likely to be significant facilitators of the system-to-system communication of discharge summaries into the future.

Where system-to-system communication is planned or underway, discharge information tends to be sent to an 'in tray' in the GP's desktop application in a form that can be readily viewed or printed by the GP. The majority of the state and territory-wide projects are sending or intend to send information as blocks of text inside HL7 V2 messages. Many of these projects are not initially focusing on the use of data that is significantly structured, or conforms to an interchangeable standard. This is partly due to the limitations in the feeder systems (e.g. lack of medication management systems inside hospitals). More substantially, the perceived difficulties in coordinating the data mapping between the sending and receiving systems may be restraining development. Experience to date - involving projects in which incoming data has been assimilated into GP systems at the patient record level - suggests that vendors and systems differ significantly in their methodology and execution and, furthermore, that individual practices use these solutions idiosyncratically.

However, the data content used in jurisdictional projects is thought to be reasonably consistent with NEHTA's initial specifications, affirming the potential value of the current initiative for a national consensus on interoperable discharge summary processes.

For example, jurisdictions seeking to implement electronic discharge summaries have accepted the need to maintain their own indexes/directories of healthcare providers. They have also embraced an array of methods for enabling access to discharge summaries, including messaging ('push'), portals and electronic health records ('pull').

Additional issues raised by jurisdictional stakeholders include:

- The argument that NEHTA should adopt international standards where practical, given that:
  - much health software is imported, and changing it to meet local standards is very costly;
  - if relevant international standards are in place, vendors are in an improved position to develop software that meets Australian needs more 'natively'; and
  - the additional argument could be forwarded that the focus of NEHTA's implementation activities therefore needs to be on vendors and standards organisations.
- The evaluation that there may be reluctance on the part of some medical staff to use electronic discharge systems, raising issues of long-term sustainability, arising from:
  - unfamiliarity and fear of change; and
  - concerns about increased/shifted workload or the generation of increasingly large documents with irrelevant content (i.e. change management is clearly a crucial element for discharge summary projects).
- The observation that significant numbers of patients are admitted via Emergency Departments and, given some information crucial to discharge summaries (e.g. usual GP) is collected at admission, hospital-wide consistency of data capture is required if additional work processes (e.g. the capture of missing information) are to be avoided.

## 2.2 Tomorrow and the future

The following table shows the possible evolution of business and technology services in each of the logical steps for the business processes described in Section 3 as the community moves between the 'tomorrow' and 'future' solution states.

Step	Tomorrow	Future
Initiate discharge summary	<p>Discharge summaries will be initiated by mixed manual and electronic processes.</p> <p>A limited range of pre-admission information is available electronically for inclusion.</p>	<p>Discharge summaries will be initiated at (pre)admission by sophisticated business rule software.</p> <p>Admission notification will be automatically sent to patient's usual and referring clinicians.</p> <p>Health summaries may be available on the PCEHR if the patient has one.</p>
Assign recipients	<p>Provider IDs used within the PAS may be derived from a different directory (manual/electronic) to that used by the discharge summary application, logically requiring re-confirmation of recipient identity.</p> <p>Multiple maintenance procedures are required to assure the currency of</p>	<p>Discharge summary distribution lists will be pre-populated with accurate identification of the patient's usual and referring clinicians, members of coordinated care teams and any shared repositories where a patient record exists.</p> <p>Higher quality and more current data is enabled, via single registration of providers within directories, and a standardised</p>

Step	Tomorrow	Future
	<p>provider directories.</p> <p>Recipient types are restricted to GPs, some private specialists and some aged care facilities.</p> <p>Multiple local provider directories must be consulted (i.e. provider IDs in varying formats with various access requirements).</p>	<p>maintenance process.</p> <p>Use of a single national healthcare identifier consistent format and access).</p>
Populate discharge summary	<p>Weak integration of source systems for discharge summary information.</p> <p>Mixture of manual and electronic data population from hospital systems.</p> <p>Most electronic discharge summary data is not fully structured (i.e. stored as text or composite data rather than as data elements that are machine readable and unambiguous.</p> <p>Source systems use multiple, competing, not-necessarily compatible data standards and terminologies.</p>	<p>Deeper integration of hospital business processes such as medications ordering and appointment scheduling, reducing the need for manual additions to the discharge summary and enhancing data quality and safety.</p> <p>Clinical data becomes structured, with source systems using Australian terminology standards (i.e. SNOMED CT) reducing need for manual mapping. This would enable better semantic clarity, subject to the precision of the terms in the terminology or reference set.</p>
Finalise	<p>Limited ability to influence the presentation of the discharge summary to highlight key features. Any such capability likely to be manually driven.</p>	<p>Use of NASH to strongly assert the identity of the document author.</p> <p>Ability to create customised presentation style sheets, prompted by intelligent business rules, which aid rapid interpretation of discharge summaries by recipient clinicians.</p>
Distribute	<p>Many discharge summaries will continue to be sent by mail, fax or email.</p> <p>Local directories are used for addressing details with the associated overhead in maintaining multiple instances.</p> <p>Uncoordinated distribution of various types of hospital messages such as discharge summaries,</p>	<p>ELS provides the recipient's endpoint address. NASH asserts the authenticity of this endpoint.</p> <p>Discharge summaries may be sent directly, or recipients notified, and then discharge summaries may be electronically viewed or retrieved from a hospital portal.</p> <p>The patient may view the discharge summary from their PCEHR if they opt to have one.</p>

Step	Tomorrow	Future
	referral requests, co-ordinated care plans.	
Receive	<p>Recipient business processes must be able to handle receipt of discharge summaries in a variety of formats. Processes are a mixture of manual and electronic.</p> <p>Discharge summary to EMR import process is manual or semi-automated, as it generally relies on patient demographic matching due to the inconsistent use of patient identifiers.</p>	<p>Discharge summaries are received in consistent formats, without delay.</p> <p>Automatic importing of discharge summaries into the recipient's PCEHR is enabled (if the patient has given consent), through the use of unique and consistent national individual healthcare identifiers.</p>
Process	<p>Improved presentation, but no ability to vary the presentation based on the message content or context.</p> <p>Data within the discharge summary increasingly conforms to SNOMED CT terminology standards but is not semantically interoperable with receiving systems.</p> <p>Most data from discharge summary not extracted or stored as structured data.</p>	<p>Rich presentation of the summary to highlight key or changed data.</p> <p>Processing of the discharge summary improves timely decision making by the recipient clinician</p> <p>Data from the discharge summary can be incorporated as semantically interoperable structured data within the recipient system and use electronic decision support to identify inconsistencies and anomalies.</p> <p>Discharge summaries are linked to source systems so recipients may access more details in a discharge summary section if desired.</p> <p>Within electronic health records, data from the discharge summary is incorporated into the Summary Health Profile with inconsistencies being identified for human resolution. In addition, issues such as contextual integrity of clinical data and the reconciliation of different versions of discharge summary should see the use of caution and the enforcement of strict review processes.</p> <p>Receiving patient record systems have the ability to process and integrate multiple versions of a discharge summary (e.g. interim and final</p>

Step	Tomorrow	Future
		discharge summaries).

**Table 2: Tomorrow and Future solution states**

## 3 Business view

### 3.1 Business context

#### 3.1.1 Introduction

This section describes the healthcare business context in Australia as it applies to the generation, distribution and receipt of electronic discharge summaries.

A recent Australian Institute of Health and Welfare report totals 756 public and 561 private hospitals in Australia who will potentially be a source, and some 22,589 (20,029 FTE) primary care practitioners who will likely be a recipient of discharge summaries. Furthermore, there are about 8.1 million hospital separations per year in Australia, of which around 57% would be same-day admissions [AIHW-AHS2010]. Note that many same-day admissions (e.g. patients who are admitted for dialysis, same day chemotherapy and other procedures involving repetitive same-day admissions) would not normally require a discharge summary.

#### 3.1.2 Statutory and regulatory requirements

Unlike the pathology or medication sub-sectors, there are currently no specific national/state legislative or regulatory requirements for discharge summaries. However, a number of position statements from peak, state and national bodies are available (e.g. the Australian Medical Association), jurisdictions maintain their own policies, and individual hospitals and area health services possess more detailed policies.

The Australian Council on Healthcare Standards (ACHS) for hospital accreditation processes provides three standards related to discharge summaries:

- that service providers receive timely information about patients discharged into their care;
- the results of investigations follow the patient through the referral system; and
- that discharge information is discussed with the patient and a written discharge summary is provided to them.

Four associated performance measures are suggested within ACHS documentation [ACHS-EG2006]:

- proportion of patients who receive a discharge summary at the time of discharge;
- proportion of discharge summaries completed at the time of discharge;
- proportion of patients who have a final discharge summary recorded in the medical record within X weeks of hospital discharge (i.e. where X weeks is determined by the organisation); and
- proportion of consumers who are satisfied with their discharge instructions (Not in scope for this release).

As such, the ACHS' existing standards provide no guidance as to the content of the discharge summary or the class of patients which should or should not trigger the production of a discharge summary.

### 3.1.3 Stakeholder interests

It is considered that the interests of each of the key stakeholder groups participating in the electronic generation, distribution and receipt of discharge summaries are as follows.

*Hospitals* (as organisations) want to:

- Reduce length of stay and 'bed-block' by streamlining patient discharge processes.
- Reduce re-admission rates of patients through reduction of adverse events.
- Increase the patient care in the community through better sharing of information with GPs and other community care providers.

However, they do not want to:

- Increase the time spent by hospital clinical staff on non-clinical or administrative duties.

*Hospital clinicians* want to:

- Ensure discharge summaries reach the correct recipient(s) and are sent securely, both within the hospital's systems and networks and across external networks.
- Avoid manual rewriting of information by electronically incorporating as much relevant data as possible from appropriate, existing sources, including both clinical and administrative information, and follow-up outpatient bookings.
- Be able to provide a copy of the discharge summary to the patient at time of discharge.

However, they do not want to:

- Spend more time preparing an electronic discharge summary than is currently spent preparing a handwritten summary.
- Accept tasks currently handled by administrative or support staff due to discharge process changes.

*Community GPs* (as organisations) want to:

- Reduce overhead administrative work involved when attending to a patient.
- Improve the patient care in the community through better sharing of information with hospitals and other community care providers.

However, they do not want to:

- Increase the time spent by clinical staff on non-clinical or administrative duties.

*Community GPs* (as individuals) want to:

- Know that their consumer was admitted and discharged, and why, before the patient's next presentation.
- Be assured of more complete and accurate information, especially for priority data (e.g. changes in medication, follow up action, etc.).
- See timely and reliable delivery (i.e. less time spent chasing missing/late discharge summaries).
- Be assured that the discharge summary is from the ostensible source organisation and has not been altered during transmission.
- Incorporate atomic data directly from the discharge summary into their own EMR without rekeying.

However, they do not want to:

- Accept tasks currently handled by administrative or support staff due to discharge process changes.
- Be obliged to recursively read long discharge summaries to identify relevant information.
- Find that data from the discharge summary is being incorporated into their EMR without explicit review and acceptance by the GP.

*Healthcare individuals* want to:

- Ensure their nominated primary healthcare provider is in possession of all relevant information regarding their hospital stay upon their next presentation.
- Maintain control of which parties receive and have subsequent access to their personal health information.
- Be confident that their information will be protected from inappropriate or unauthorised access.

However, they do not want to:

- Experience uncertainty about which medication they should be taking due to confusion or lack of clear information flow between the hospital clinician and the nominated primary healthcare provider.
- Repeat information they reasonably expect the nominated primary healthcare provider to already possess.
- Undergo unnecessary tests and investigations.
- Experience an adverse event, requiring another hospital visit (e.g. due to a test not being conducted).

## 3.2 Roles and services

This section lists the logical roles and services involved in the generation, distribution and receipt of the electronic discharge summary. Further detail on the listed roles and services can be obtained from the Business Requirements Specification [DS-BRS2010].

### 3.2.1 Roles

- Patient
- Author
- Contributor
- Authoriser
- Administrator
- Distributor
- Clinical Manager
- Clinician
- Records Manager

### 3.2.2 Services

- Clinical Information System
- Distribution Service
- Authentication Service
- Discharge Summary Service
- Healthcare Identifiers Service
- Master Patient Index

## 3.3 Clinical safety

### 3.3.1 Australian Charter of Healthcare Rights

On 22 July 2008, Australian Health Ministers endorsed the Australian Charter of Healthcare Rights [RIRACHR2008], which was developed by the Australian Commission on Safety and Quality in Healthcare. The Charter summarises the basic rights that patients and consumers are entitled to receive when accessing healthcare services throughout Australia. These rights concern Access, Safety, Respect, Communication, Participation, Privacy and Comment. Patients and healthcare providers are entitled to a safe, secure and supportive healthcare environment. Patients have the right to expect that safe care and treatment will be provided upon each encounter with the healthcare system.

Healthcare providers should provide effective continuity of care for their patients and health service organisations should establish systems that promote patient safety.

With regards to communication, [RIRACHR2008] provides the following:

To obtain the best possible health outcomes the exchange of information between patients, consumers and staff must be full and open.

Additionally, healthcare providers should:

Ensure the appropriate transfer of information when care is handed over to another healthcare provider.

### 3.3.2 General practice and public hospital integration

The AMA's position on discharge communication is described in its Position Statement on General Practice and Public Hospital Integration [AMAPS2006] which highlights the following:

Continuity is a key tenet of quality care. In Australia, general practitioners are the primary providers of continuous care for patients. Disruptions to continuity of care can, however, occur when healthcare services are also delivered to the patient through another provider, such as a hospital.

High quality continuity of care requires that the care provided by hospitals be well coordinated with the patient's general practitioner.

The increasing use of early discharge by the hospital sector highlights the critical need to improve GP hospital integration. Early discharge strategies have shifted acute care, with its associated complexity, to general practice.

Where several providers contribute to the care of a patient, access to meaningful and appropriate information is absolutely necessary to maintain quality continuity.

Appropriate integration of general practice and public hospital can lead to improved patient health outcomes through better clinical management, improved continuity of care and reduced readmissions.

Accordingly, the AMA has called for a number of actions, including:

- The compulsory provision of timely, useful, detailed, legible, accurate and comprehensive discharge information to general practitioners, as a condition of hospital accreditation.
- The development of an Australian Standard that informs hospitals and GPs of the minimum information sharing required on admission and discharge.
- Significant and meaningful investment by hospitals in information and communication technology that focuses on the opportunities provided by existing GP connectivity to promote the secure, appropriate and efficient transfer of health information.
- Change management programs and policy settings that encourage high quality discharge communications.

### 3.3.3 Implications for the solution

The implementation of a national Discharge Summary package can meet the above strategic imperatives in the following ways.

	General Safety and Quality Requirements	Implications for Solution
1.	The information in the summary concerns the correct patient.	National healthcare identifiers will offer assurances that the correct patient identification/matching occurs at all points. For example, from record creation (i.e. collection of feeder system data) to eventual receipt (GP software record matching).
2.	The summary is delivered to the correct recipients.	National healthcare identifiers will ensure that the summary is delivered to the correct recipients (via HI service).  Consequently, the patient and carer(s) are provided with summaries, at the appropriate times.
3.	Delivery by the correct method in the correct format.	Delivery into an interoperable provider desktop via a secure, private and robust national connectivity service.  The summary is issued in a format supporting the reuse of structured data (e.g. CDA).
4.	The summary is completed at the correct time.	As a minimum, a discharge summary must be available to the community clinician prior to the next presentation of the patient.  Ideally, a summary is completed and distributed when the patient leaves the hospital.  Such synchronisation requires technological and human systems to be in place, with appropriate management processes.
5.	The summary embodies accurate information.	Clinical content is of high quality, being accurate and complete but also succinct.  It displays a high degree of legibility, including the avoidance of non-standard acronyms.  Staff safety is enhanced via the transmission of relevant alerts (e.g. conditions which could pose a risk to uninformed carers).  Amended versions are clearly identified as such.
6.	The way the summary presents information is acceptable.	Standardised presentation.  Critical elements are appropriately

	General Safety and Quality Requirements	Implications for Solution
		highlighted and sequenced. The presentation of information avoids visual overload. Abnormal pathology result flags are preserved.

**Table 3: Policy Requirements and Implications**

## 4 Information view

This section describes the Information View of a discharge summary solution, which is aligned with NEHTA's specifications. It is divided into the following sections:

1. *Introduction*, describing the four levels of information sharing in the context of a discharge summary environment.
2. *Information Flows*, describing the flow of information occurring when a discharge summary is distributed.
3. *Information Components*, providing an overview of the information components involved in the distribution of a discharge summary.
4. *Discharge Summary Design*, providing an overview of the reference model, data types, archetypes, templates and information components used in a NEHTA-aligned discharge summary.
5. *Message Formats*, describing the recommended exchange formats to be used when distributing discharge summaries.

### 4.1 Introduction

An Information Architecture instance describes how to exchange information successfully and what information should be exchanged.

Walker et al. define four levels of healthcare information sharing, which serve as an effective basis for describing data exchange in this context [TVOHCIEI2005].

Level	Description
1.	Non-electronic data exchange using postal mail, telephone, etc.
2.	Machine transportable data limited to non-electronic manipulation. Examples include fax, scanned documents, portable document format (PDF).
3.	Machine organised data that requires manual translation between incompatible vocabularies, proprietary data formats, or unstructured content.
4.	Machine-interpretable data transmission utilising structured messages from standardised and coded vocabularies.

**Table 4: Levels of healthcare information sharing**

In an electronic discharge summary environment, the ultimate goal is to exchange information such that the systems at each end of the exchange can consistently and reliably interpret the meaning of the exchange. This is known as semantic interoperability. Due to a lack of consensus within the sector, full semantic interoperability is not currently possible, so every step that is taken towards this goal is significant.

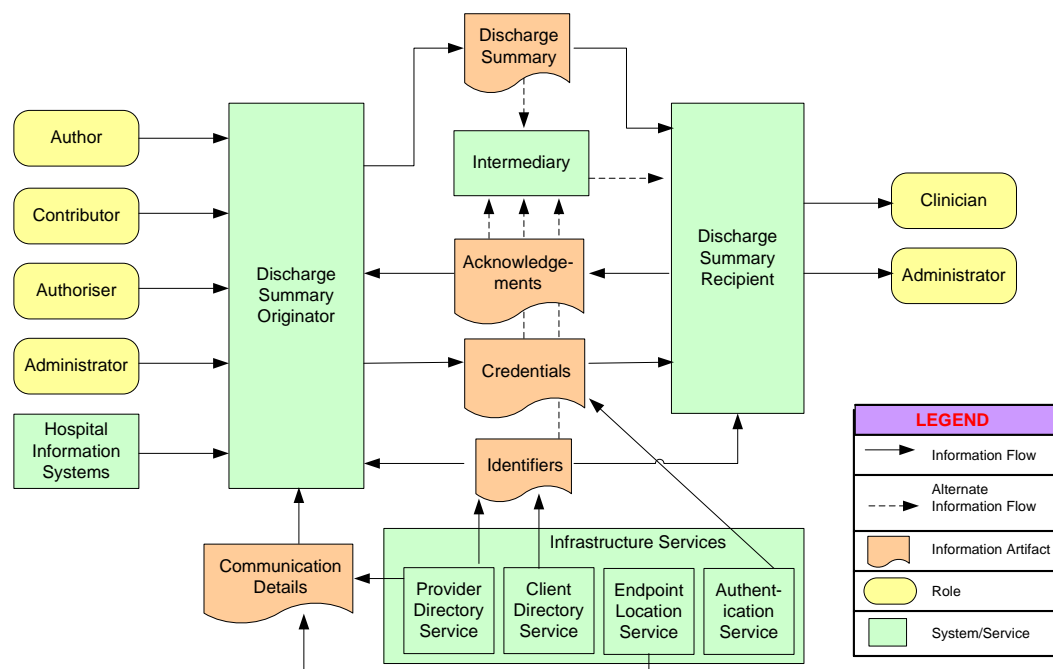
The most common first step involves a Level 2 exchange of documents that are only human readable (i.e. a text document or a PDF file). This allows for secure transfer of information from human to human but not from machine to machine.

The next step is to use a messaging format that allows for atomic representation of the discharge summary data elements such that a computer can take data elements and import them directly into its own database. This Level 3 exchange allows functional interoperability across machine-to-machine boundaries, where the structures of the data are agreed upon, even if the underlying meaning (semantics) of the data may not be.

The final step allows for a true semantic (or meaningful) exchange of information. Human-to-human semantic exchange is well established, however creating consistent and unambiguous meaning between two or more machines requires significant consensus, preparation and effort. Although some standards and specifications designed to enable this type of interoperability currently exist, implementation of these standards is at the earliest stages.

## 4.2 Information flows

The following diagram gives an overview of the information flows that may occur when a discharge summary is electronically distributed to a discharge summary recipient.



**Figure 3 Discharge summary information flows**

This diagram includes the main information artefacts, systems/services and participant roles involved in the electronic distribution of discharge summaries, and the information flows between these.

The information artefacts involved include:

- The Discharge Summary
- Acknowledgements
- Credentials
- Identifiers
- Communication Details

The systems/services involved include:

- Discharge Summary Originator
- Hospital Information Systems
- Intermediary
- Discharge Summary Recipient
- Infrastructure Services, including:
  - Healthcare Identifiers Service
  - Endpoint Location Service

- Authentication Service.

The participant roles involved include:

- Author
- Contributor
- Authoriser
- (Originator) Administrator
- Clinician
- (Recipient) Administrator

Please note that while the patient is a central participant in the discharge process (e.g. providing consent for the discharge summary to be distributed), allowing them to directly interface with the discharge summary system is currently out of scope.

### 4.3 Information components

#### 4.3.1 Overview

The key information components used in a discharge summary solution are shown in the high-level class diagram, below.

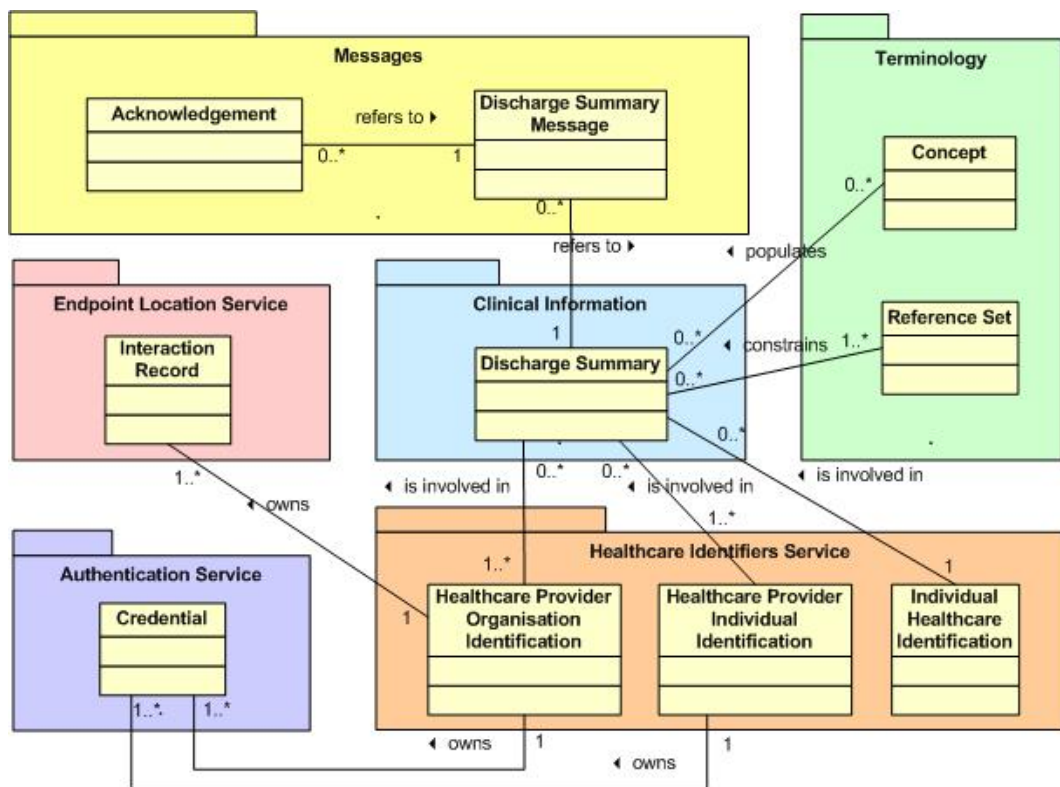


Figure 4 Information component overview

This diagram groups the key information components into logical categories (represented as separate UML 'packages'), and shows the relationships between these components. The key information components shown here include:

- The Discharge Summary (Clinical Information)
- Concepts and Reference Sets (Terminology)
- Acknowledgements and Discharge Summary Messages
- Healthcare Provider Identifiers - Individual (HPI-I), Healthcare Provider Identifiers - Organisation (HPI-O) and Individual Healthcare Identifiers (IHI)
- Interaction Record (Endpoint Location Service)
- Credentials (Authentication Service)

These information components will be discussed in more detail in the following subsections.

### 4.3.2 Discharge summary

A discharge summary is a document generated upon the discharge of a patient from hospital, which contains key information that may be useful in the continuity of care of a patient. Each discharge summary may have multiple versioned instances, and may be distributed to more than one recipient.

In order to achieve 'Level 4' semantic information sharing, discharge summaries must use (among other components) a common clinical terminology to describe information, such as diagnoses, procedures, and medications.

For more information about the design of a discharge summary instance, please refer to Section 4.4 (Discharge Summary Design).

### 4.3.3 Terminology

#### 4.3.3.1 Background

One prerequisite for the safe exchange of clinical information between healthcare providers is the establishment of a common, coded clinical language (i.e. clinical terminology). The concepts and descriptions (i.e. terms) used in clinical communications that describe diagnoses, procedures, therapies, medications, and other clinical ideas must be accurately and consistently interpreted by all participating health IT systems and the clinicians that interact with them.

#### 4.3.3.2 SNOMED CT

The SNOMED CT®<sup>1</sup> is a hierarchical and polymorphic structure of medical nomenclature, defined as concepts.

SNOMED CT has been recommended by NEHTA and endorsed by the state, territory and Commonwealth governments of Australia as the basis for a national clinical terminology standard to be used across the nation's strategic health information solutions. SNOMED CT is now available at no charge for use in Australia, under NEHTA's licensing arrangements with the International Health Terminology Standards Development Organisation (IHTSDO). Australian parties seeking to obtain a free licence should apply at the <http://nehta.org.au/aht> Website.

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<sup>1</sup> SNOMED CT® is a registered trademark of the International Health Terminology Standards Development Organisation.

NEHTA aims to refine, improve, extend and focus SNOMED CT to meet the needs of Australian healthcare consumers and healthcare practitioners. The Australian-specific extensions to SNOMED CT are anticipated to cover an increasing number of terminology domains over time. However, initial priorities have been defined to cover areas such as medications, adverse reactions, pathology, problems/diagnoses and clinical interventions. Ongoing priorities will be defined through stakeholder consultation and NEHTA's assessment of benefits and its capacity to support ongoing releases. The Australian release of SNOMED CT (SCT), inclusive of Australian content will be known as 'SNOMED Clinical Terms – Australian Extension' abbreviated to SCT-AU.

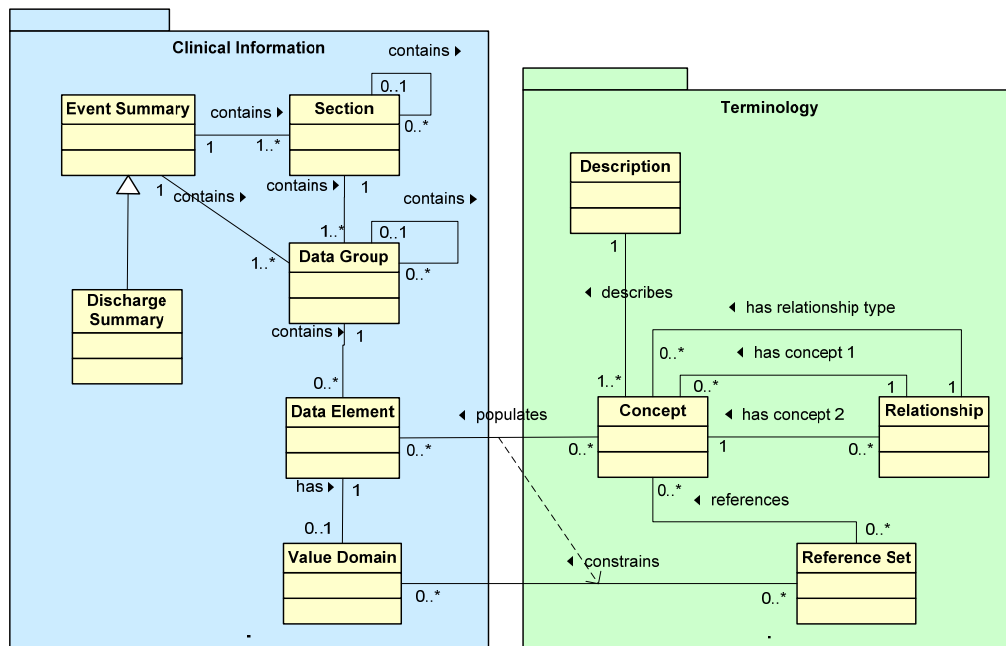
With this in mind, SCT-AU will be used, wherever suitable, to define coded terms used within a discharge summary sent by a Discharge Summary Originator to a Discharge Summary Recipient. The adoption of SNOMED CT as the standard ensures a consistent language is available to record, store, retrieve and aggregate clinical data.

#### 4.3.3.3 Terminology binding

The Discharge Summary Core Structured Document Template [DS-SDT2009] describes and constrains the contents of a discharge summary sent by a Discharge Summary Originator to a Discharge Summary Recipient. This specification also identifies those data elements which either can, or should, use terminology values to populate them. Data elements of this kind (or their codeable components) are identified by the data type 'CodeableText' or 'CodedText'.

Each of these 'codeable' data elements has a value domain, which will be bound (i.e. restricted) to specific terminology value sets, called Reference Sets which define the possible set of concepts that may be used to populate the associated data element. Whilst the current version of the structured document template [DS-SDT2009] does define a number of distinct Value Domains, more will become available over time as development in this area progresses.

The diagram in Figure 4 shows the common structure of all Event Summaries (e.g. Discharge Summary), and the relationship of its components with those of Terminology. In particular, it shows the relationship between the Data Elements and the Concepts which populate them, and the relationship between the Value Domains and the Reference Sets which constrain their valid values. The dashed arrow, between these two relationships, represents a constraint; specifically, that Concepts populating a particular Data Element must be referenced by the Reference Set which itself constrains that Data Element's Value Domain.



**Figure 5 Discharge summary report terminology binding**

### 4.3.4 Messages

The relevant message is the following type:

- Discharge summary message
  - This message is used to send the contents of the discharge summary (as described in Section 4.4) from the Discharge Summary Originator to the Discharge Summary Recipient. In addition to the discharge summary itself, this message also includes appropriate metadata about the sending process (e.g. date/time sent, sending system, etc.).

Please note that additional messages may be required if an Intermediary is used between the Discharge Summary Originator and the Discharge Summary Recipient.

### 4.3.5 Identification

#### 4.3.5.1 Overview

The healthcare system relies on the unique and accurate identification of individuals and organisations, particularly when relating current patient status to previous care or observations, and to support the communication between healthcare providers in either manual or computer-based information environments. Within the healthcare service delivery community, the process of positively identifying healthcare individuals involves matching data supplied by those individuals against data held by healthcare providers.

To this end, three types of identification are required:

- Individual Healthcare Identifiers (IHI)
- Healthcare Provider Identifier - Individual (HPI-I)
- Healthcare Provider Identifier - Organisation (HPI-O)

To support this identification process, NEHTA has secured the services of Medicare Australia to design and build Australia’s first national healthcare identification service. The resulting Healthcare Identifiers (HI) Service will provide the requisite identification service for the people and organisations involved in healthcare across Australia. Initially, however, it is assumed that

jurisdictional and local system identifiers including Medical Record Numbers (MRNs), Unique Patient Identifiers (UPIs) and the national healthcare identifiers (HIs) will coexist. In the longer term, IHIs, HPI-Is and HPI-Os are expected to replace these local identifiers, providing a more consistent and interoperable approach to identification.

#### 4.3.5.2 Identifiers in discharge summaries

A discharge summary uses healthcare identifiers (and other identification data) for a number of purposes, including the identification of:

- The patient
- The facility involved in the delivery of healthcare to the patient
- The document author
- The document authoriser/approver
- The recipients of the document
- The responsible health professional at the time of discharge
- Other health professionals involved in the hospital episode
- The patient's nominated healthcare provider
- The service provider of an arranged service.

Three distinct types of information components are required to support these identification requirements, namely:

- Individual Healthcare Identifiers (IHI)
- Healthcare Provider Identifiers - Individual (HPI-I)
- Healthcare Provider Identifiers - Organisation (HPI-O)

For more information about IHIs, HPI-Is and HPI-Os and the HI Service, please refer to HI Service - Concept of Operations [HI-CO2010].

#### 4.3.6 Interaction record

An Endpoint Location Service (ELS) is a relatively simple directory of technical services for message exchange. It allows a system in the e-health community to locate electronic services offered by a healthcare provider organisation for particular service categories. These categories broadly correspond to business services and may include the clinical message type and/or terminology employed.

An ELS contains one or more interaction records, each of which is associated with exactly one Healthcare Provider Organisation. Each interaction record contains an associated service and reference to one or more required certificates.

Data in an ELS is structured as follows:

- Healthcare Provider Organisation
  - Interaction
    - Service Category
    - Service Interface
    - Service Endpoint
    - Provider Identifier
    - Set of Certificates to be used for service invocation

For more information about interaction records and the ELS please refer to Standards Australia's Endpoint location service [TR 5823—2010].

## 4.4 Discharge summary design

### 4.4.1 Overview

Establishing consistency among the meaning of relevant data items, terminologies and data types is an essential prerequisite to the sharing and exchange of clinical patient information at 'Level 4' of Conceptual Interoperability theory. Level 4 - Pragmatic Interoperability refers to an environment where interoperating systems are aware of the data and the context for the information is being exchanged. This is particularly important in an environment where multiple physical implementations of this information exchange exist.

With this in mind, NEHTA's Discharge Summary Specification is based on an implementation-independent logical design (referred to as the 'Logical Record Architecture') that incorporates multiple levels, including:

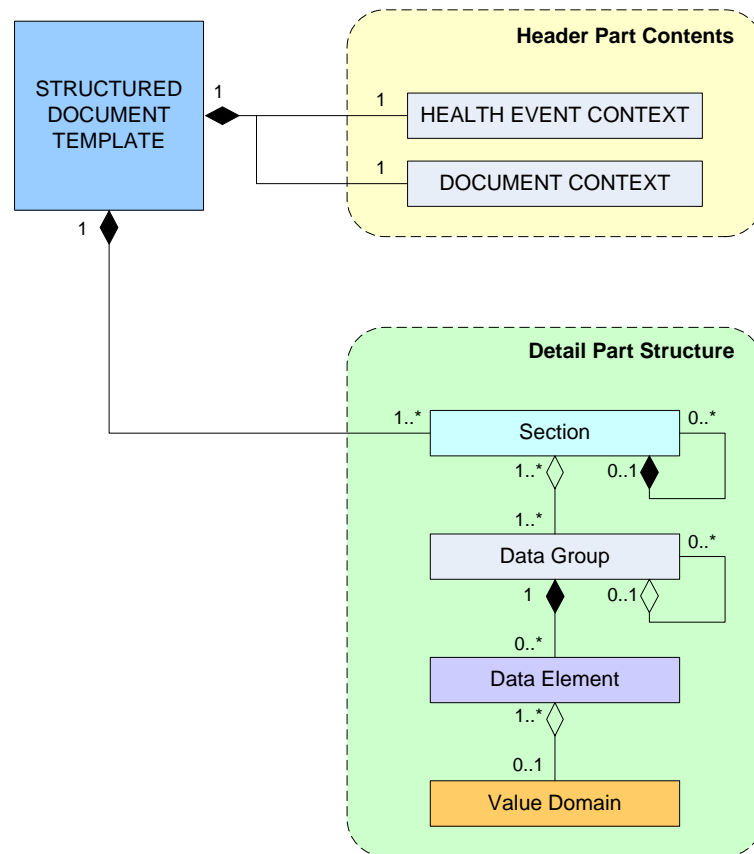
- A logical reference model, which specifies the structure, constraints and metadata that are common across all healthcare domains.
- Abstract data types, which define the type of data that can be recorded in a particular data element.
- Archetypes, which are re-usable, formal models of a clinical concept.
- Templates, which specify how archetypes are combined, constrained and bound to terminology for a particular document, message or screen, in a way that conforms to the logical reference model.
- Terminology, which can define both the meaning of a data item, and the valid values that are allowed to populate the data item.
- Information Components, which are a set of nationally agreed data items, for either Core or Specialty-Specific discharge summaries, independent of exchange or presentation formats.

In the following sections, each of these levels is described in more detail, with the exception of Terminology, which was described previously in Section 4.3.3.

### 4.4.2 Logical reference model

NEHTA uses a two-level modelling approach, which incorporates a logical reference model at one level, and clinical archetypes at the other. The logical reference model specifies the structure, constraints and metadata that is common across all healthcare domains. The same logical reference model is used by Discharge Summaries, Pathology Result Reports, e-Prescriptions and other types of Structured Documents.

The following diagram shows a high level view of the logical reference model used to define all Structured Document Templates (SDTs).



**Figure 6 Logical reference model for structured document templates**

For more information on the logical reference model, refer to [DSSDTGFU].

#### 4.4.3 Data types

At its lowest level, the logical reference model also defines the set of valid data types that may be used to record data in each data element. The data types used by NEHTA's logical reference model comply with [ISO21090-2008] and include:

- Boolean
- CodeableText
- CodedText
- DateTime
- Duration
- Dynamic
- Encapsulated Data
- Integer
- Link
- Quantity
- QuantityRatio
- QuantityRange
- RealNumber
- Text
- TimeInterval
- Unique Identifier

#### 4.4.4 Archetypes

At the second level of NEHTA's two-level modelling approach are clinical archetypes. Archetypes are re-usable, formal models of a clinical concept. At a technical level, they describe the constraints that should be applied to the logical reference model when describing a particular clinical concept.

NEHTA uses archetypes during the SDT development process to ensure that shared clinical concepts are modelled consistently across domains. For example, a medication item is modelled using a clinical archetype that contains maximal content and structure to enable its use in most clinical scenarios, including prescribing, dispensing, notification and administration. It can then be reused (with additional context-specific constraints) in a number of different SDTs, including the e-Prescription SDT and the Discharge Summary SDT.

#### 4.4.5 Templates

Templates specify how archetypes are combined, constrained and bound to terminology for a particular document, message or screen, in a way that conforms to the logical reference model. Please note that the word 'Template' is used here to refer to a presentation/layout-independent representation of the data structures.

The discharge summary Structured Document Template (SDT) describes the structure of - and constraints upon - a discharge summary. More specifically, the SDT names the complete set of data elements that may be used interoperably in a valid Discharge Summary Instance, together with their structure, definition, data type and constraints (including occurrence frequency, value domains and conditions of use). As such, the SDT defines the maximal set of data items which may be used to facilitate interoperability. Each discharge summary system may choose a subset of these data items for implementation, and then extend this set with additional data that supports specific local requirements. Please note that although these extensions may be safely interpreted at the local level (subsequent to negotiation and agreement), a consistent interpretation of these items at a national level should not be assumed.

For more information on the discharge summary SDT please refer to [DS-SDT2009].

#### 4.4.6 Information components

The 'Core Information Component' document provides a summary of the nationally-agreed data items recommended for use in discharge summary systems, as endorsed by the healthcare community in Australia. As with SDTs, these information components are a logical set of data items for exchange and, as such, are independent of any particular exchange format or presentation.

The Core Information Components define the minimum set of data items that are recommended for implementation in any system that creates and transfers discharge summary information in Australia. For more information please refer to [DS-CIC2010].

All data items included in the Core component document are represented in the more detailed SDT. The SDT will provide a consistent logical definition of each of these data items, including details of its position in the data structure, its data type and its terminology value domain (where appropriate).

## 4.5 Message formats

NEHTA describes the discharge summary content structure independently of any individual exchange format, thereby providing flexibility to map the information model to various message and document formats.

This degree of decoupling allows implementers the flexibility to choose from a library of common, exchange format mapping specifications to suit their requirements, while still conforming to the NEHTA content structure.

In the short term, recipient GP Desktop applications will require the ability to extract key atomic data elements (such as patient identifiers or patient demographics) in order to associate the discharge summary with a particular patient's electronic medical record in the GP Desktop's database.

In the future, practitioners may choose to select individual elements or sections of a discharge summary (e.g. Discharge Medications) and have these populate particular parts of their local patient record. This level of functionality requires the exchange of structured message formats and GP Desktop systems that can process the information atomically.

Suitable discharge summary message formats should:

- Incorporate the data elements described in the SDT without loss of data.
- Be recognised as an e-health messaging standard suitable for use within the discharge summary context.
- Offer both structured and unstructured information representation.
- Be relatively easy to integrate into software packages.

### 4.5.1 Clinical Document Architecture (CDA)

HL7 CDA is NEHTA's preferred exchange format for discharge summaries. It provides atomic representation of information using XML and can be rendered in HTML viewers (such as Web browsers) when used with an appropriate style sheet.

A possible barrier to CDA adoption is that it is a relatively new standard and there are few discharge summary implementations currently supporting this format. To help assist in the transition of existing systems, NEHTA will also define a mapping specification from NEHTA's Structured Document Template to at least one HL7 v2.x message type, as an interim solution.

### 4.5.2 HL7 v2.x

The current interim Australian Standard for exchanging Discharge, Referral and Health Record messaging (AS4700.6:2007) is HL7 v2.5, a healthcare application protocol accredited as a Standard by the American National Standards Institute (ANSI).

Australia already has an existing base of healthcare organisations that use the HL7 protocol to exchange information between different computer application systems. HL7 v2.3.1 REF messages are currently in relatively widespread use for exchanging discharge summaries in Australia.

There is, however, a wide variety of discharge summary information that cannot be exchanged using a standard HL7 v2.x REF message in a way that preserves the structure and semantic meaning of the data. Therefore, it is expected that HL7's Clinical Document Architecture (CDA) will increasingly be used for new applications that offer more sophisticated uses of the exchanged data.

## 5 Technical view

The Technical View describes the technologies NEHTA recommends when third parties develop interoperable discharge summary software components and key technical characteristics, in light of business requirements. This section is divided into the following sections:

1. *Introduction*, describing the messaging infrastructure and message formats used in discharge summary environments.
2. *Authentication and Security*, providing a security framework and architecture for discharge summary solutions, information regarding secure transmission techniques, and the use of digital certificates.
3. *Web Services*, describing the use of industry-standard message transport technologies that provide secure and reliable message delivery.
4. *Information Exchange Architecture*, outlining the approaches to electronic discharge summary exchange based on the technical capabilities of both the sending and receiving parties.
5. *Presentation*, describing human reader interactions and how the discharge summary document is rendered.

The Discharge Summary Technical Service Specification document [DS-TSS2010] outlines the endpoints, their corresponding interfaces and conformance points for the transfer of an electronic discharge summary. Additionally, it provides implementation-level information, whereas this solution design document describes the technical details at a higher level.

### 5.1 Introduction

To date, electronic discharge summary messaging has been limited to small groups involving individual health departments and a number of GPs, which have negotiated to send and receive discharge summaries in a specific messaging format and method of electronic communication.

Typically, this electronic exchange involves the use of an intermediary secure messaging provider, which provides a permanent point of presence on the network for health departments to send encrypted discharge summary documents and temporary storage of these documents. General Practices using such services employ a software application installed at their practice to fetch and decrypt discharge summaries from the service. The resulting document is then imported into the GP Desktop application.

Currently it is common practice to format discharge summaries to appear as a pathology report inside a HL7 pathology message. The reason for this is that most GP Desktop applications have supported electronic pathology results for some time and that the message format is reasonably well understood and defined.

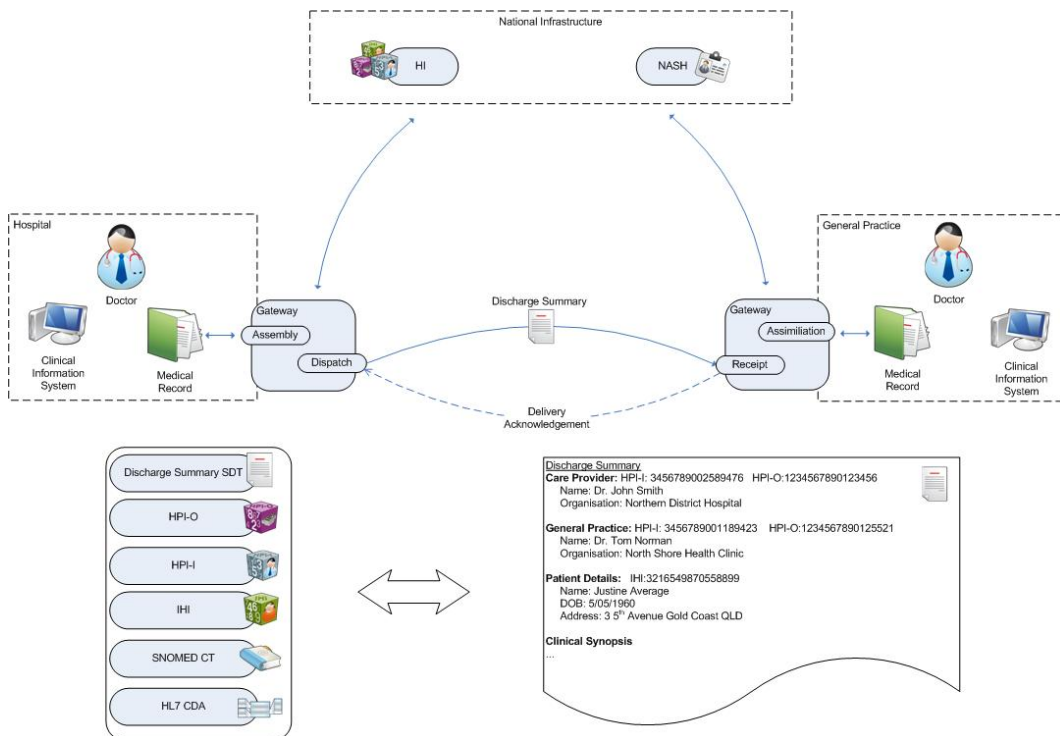
### 5.2 High level architecture

The following section describes the system architecture or logical design that defines the structure and behaviour of the solution. It identifies the major software components, their attributes, and the interactions between them.

The system architecture described supports the use cases and requirements set out for this package. It is not, however, intended to be a complete 'blueprint' for building discharge summary solutions; rather, the intent is to focus on the messages exchanged (i.e. system interoperability).

It should be noted that the interaction model shown within the following sections are logical in nature, and their realisation within physical implementation will vary from vendor to vendor.

The following figure illustrates the primary solution components for a discharge summary being sent from a hospital to a general practice.



**Figure 7 Discharge summary high level component model**

The discharge summary will contain the clinical information for the episode of care. Some of this information can be automatically populated by the hospital discharge summary system. The discharge summary system may retrieve data from other clinical information systems, as well as accept additional information manually entered by hospital staff. The structure of the document conforms to the NEHTA discharge summary structured document template and is transformed into an HL7 CDA document in accordance with the NEHTA Discharge Summary CDA implementation guide.

The discharge summary document will also contain the national healthcare identifiers for the discharging facility and nominated primary receiving healthcare facility HPI-O, the individual providers HPI-I and the healthcare individual IHI. Standard terminology, SNOMED-CT will also be used within the SDT.

The recipient's Web service is invoked for the transfer of the NEHTA compliant discharge summary. Upon receiving the discharge summary, the recipient's ICT infrastructure submits a transport acknowledgement to the sender.

The Discharge Summary Technical Service Specification [DS-TSS2010] document should be consulted to identify what interfaces and operations need to be implemented to support the above illustrated architecture.

## 5.3 Authentication and security

### 5.3.1 Security framework

There are four key elements to an aligned security framework, as below.

#### 5.3.1.1 Authentication

Authentication is the act of establishing or confirming that someone (or, in the case of a machine participant, something) is authentic; that is, the claims made by or about the thing are true. This might involve confirming the identity of a person who is attempting to access a computer application, or assuring that the identity of a person (or entity) sending a discharge summary can be verified.

In the case of a discharge summary, there is usually a need for strong authentication. GPs and specialists often make clinical decisions based on the contents of such documents, and will therefore require sufficient assurances that a discharge summary originated from an appropriate source.

#### 5.3.1.2 Authorisation

Authorisation is concerned with the process of restricting access to specific resources, and making them selectively available to parties permitted to use them.

In the discharge summary context, it is expected that hospital discharge summary systems will implement access controls to ensure that users can only perform duly-authorised actions. Using the same credential, it is expected that the receiving system will implement satisfactory access mechanisms to prohibit unauthorised access and action.

#### 5.3.1.3 Confidentiality

Confidentiality is the obligation not to disclose information. In a discharge summary context, this is mainly concerned with making sure that only authorised persons can view the content of the discharge summary.

This can be achieved by encrypting the content of the document as it is transported, providing a high degree of assurance that third parties who may intercept the message cannot read it.

Once the discharge summary message is received and decrypted at the recipient's practice, it is expected that GP Desktop applications will implement access controls that only allow the discharge summary to be readable by the clinician to whom it is addressed.

#### 5.3.1.4 Non-repudiation

Non-repudiation is the concept of ensuring that a party to a contract or communication cannot refute the validity of their signature on a document or the sending of a message that they initiated. Although this concept can be applied to any communication, by far the most common application is in the verification and trust of handwritten signatures.

The most common method of asserting the origin of electronic information is through digital certificates encrypted by correlated private/public keys. Consequently, signed data can, with reasonable certainty, be accepted as having originated from a party who was in possession of the private key corresponding to the signing certificate at the time of signing.

### 5.3.2 Security requirements

Discharge summary systems and GP Desktop applications - like most information systems - generally authenticate the identity of the user by prompting for a user name and password. This authentication practice is well understood and accepted by most computer users.

Once authenticated, the application typically imposes access controls limiting the functions the user may perform based on that user's role, for example:

- In a hospital discharge summary system, only certain authorised clinicians may finalise the discharge summary
- In the GP Desktop application, accessing discharge summary content is limited to individuals authorised to open the patient's medical record.

The discharge summary system will sign the discharge summary message using the *organisation's* digital credential. This provides the recipient with an assurance that the message originated from that organisation, and implies that the sending organisation has asserted the identity of the individual who released the discharge summary (generally through the username and password challenge/response process described above).

This is considered a weaker form of authentication, and does not provide the same degree of non-repudiation available if the sender signed the message using an individual credential.

Similarly, in a setting involving the use of organisational credentials, the discharge summary message will be encrypted using the recipient organisation's digital credential. Decryption of the message will be performed by software, and after that point it is the responsibility of GP Desktop application security mechanisms to ensure that only authorised individuals can view the discharge summary.

Using individual digital credentials for encryption is problematic in situations where the private key holder is unavailable and the document must be viewed by another individual.

There are several barriers inhibiting increased uptake of individual credential use within hospital environments including:

- No current national infrastructure that supports healthcare organisations in the issuance of identity credentials to their staff
- Smartcard readers are not widely deployed within the healthcare sector
- It is unclear if, when, or how commercial off-the-shelf products might support the use of individual credentials and/or smartcard readers.

#### 5.3.2.1 Intermediaries

One of the requirements for discharge summaries is that the message contents are signed and encrypted by the sender in a way that can only be decrypted by the ultimate recipient. This allows third party intermediaries to temporarily receive and store discharge summary messages without appreciable risk to the confidentiality of discharge summary content.

## 5.4 Web services

Web service technologies are industry standards that provide secure, reliable message delivery. NEHTA recommends Web services as the mechanism for communication in Australia's e-health environment.

Web service standards by themselves are insufficient to ensure that different systems can be integrated to exchange information. The reason for this is that these standards are very flexible, allowing them to be implemented in potentially-incompatible ways.

Nevertheless, with consensus and preparation, Web service profiles can be developed to provide clear definitions to enable interoperable solutions.

Consequently, Standards Australia Committee IT-014, Health Informatics has developed the Australia Technical Specification: E-Health Web Services Profiles [ATS 5820—2010]. This specification defines a common set of mechanisms to enable interoperability in the Australia E-Health environment.

The specification defines the following:

- Web Services Specification
- Transport
- Protocol
- Metadata
- Security

Please refer to E-Health Web Services Profile Technical Specification [ATS 5820—2010] for a comprehensive list of conformance points in relation to Web services.

Please refer to Discharge Summary Technical Service Specification [DS-TSS2010] for the Web services required to support the transfer of discharge summaries.

#### **5.4.1 Web Services specification**

The Web Service specification describes the relevant service contract (e.g. behaviour, data structures and messaging policies). To be compliant with the Australia Technical Specification, Web services must be specified in Web Services Description Language (WSDL) version 1.1.

The Web Services Description Language (WSDL) is a machine-readable form for describing the function of a Web service and the way it is invoked. The description can be used as part of the formal documentation of the service, and it can also be used as input for development tools and programs.

#### **5.4.2 Transport**

The transport section of Web services standards defines the communication protocols used to exchange data between Web services end points. To be compliant with the Australian Technical Specification: E-Health Web Services Profiles [ATS 5820—2010], Hypertext Transfer Protocol (HTTP) version 1.1 needs to be adopted.

HTTP v1.1 was specified in the technical specification for its support of Web services that uses an interactive paradigm. It is important to note that HTTP1.1 supports non-interactive style Web services as well. While it is acknowledged that the majority of messaging currently conducted in health is non-interactive, it is expected that interactive applications/services will become more prevalent in the future.

### 5.4.3 Protocol

SOAP is a protocol for exchanging messages with a Web service using XML. This protocol provides a framework to represent service functions, the high-level structure of input data, and the result content of a function. The specific descriptions of a particular service function and associated content are represented separately. SOAP is the fundamental Web service.

The E-Health Web Services Technical Specification requires all Web service specifications to use SOAP 1.2 as the Web services protocol. SOAP 1.2 is a W3C recommendation. Although widely used, SOAP version 1.1 is only a de facto standard and is not a W3C recommendation.

### 5.4.4 Metadata

WS-Addressing 1.0 is specified by the E-Health Web Services Profile Technical Specification [ATS 5820—2010] to carry the addressing data in a SOAP message. The specification also requires the use of WS-Addressing Action, WS-Addressing MessageID and WS-Addressing in SOAP requests/responses/faults.

WS-Addressing defines the mechanism for identifying messages and endpoints. The information is used to process messages. WS-Addressing is a W3C recommendation and is a common mechanism for addressing in Web services.

### 5.4.5 Security

The Australia Technical Specification: E-Health Web Services Profiles provides two profiles for securing Web services: the TLS security profile and the WS-Security profile.

Transport Layer Security (TLS) is a protocol for establishing a secured channel for communications. It is used to encrypt the data for confidentiality. It is also used to authenticate one or both parties.

TLS is a widely accepted and implemented protocol but TLS on its own does not provide end to end security. End to end security is provided by encapsulating sensitive information within a Secured Payload that can exist outside of the secured communication channel of TLS.

The Web Services Security specification (WS-Security) specifies features which support the secure exchange of SOAP message. It provides mechanisms for preserving the confidentiality and integrity of messages through the use of encryption and digital signatures.

Unlike TLS which secures the connection, WS-Security has the added capability to secure portions of a message through the application of XML encryption.

WS-Security provides flexible support for PKI and other forms of encryption by specifying general methods allowing security tokens of different types to be attached to messages. Various tokens can be attached to the message substantiating the senders claim to a particular identity which can then be examined by the Web service to confirm the source of the communication.

## 5.5 Payload encryption and signing

Confidentiality is a key requirement of discharge summary activity, and as such, all electronic communication should be encrypted. Virtual Private Networks (VPN) and Transport Layer Security (TLS) go some way to achieving this (secure connection); however they do not provide a mechanism to ensure the security of the payload.

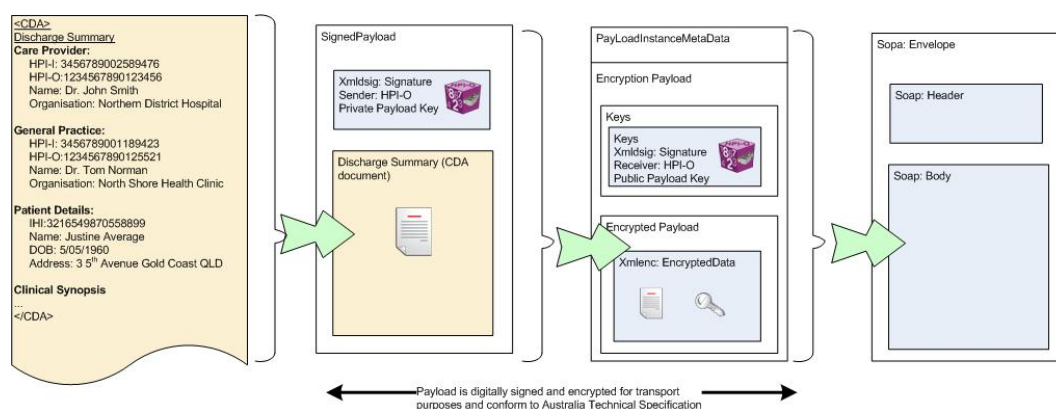
The most widely used and recognised approach to securing payload involves use of Public Key Infrastructure (PKI). This allows for signing and encryption. Consequently only the intended recipient can view the discharge summary and have confidence in message integrity.

Standards Australia Committee IT-014, Health Informatics has developed the Australia Technical Specification: E-Health XML Secured Payload Profiles [ATS 5821—2010]. This specification defines mechanisms for representing signed and encrypted XML data. The specification defines the following:

- Signed Container Profile
- Encrypted Container Profile
- XML Signature Profile
- XML Encryption Profile

Please refer Australia Technical Specification: E-Health XML Secured Payload Profiles [ATS 5821—2010] for a comprehensive list of conformance points in relation to payload encryption and signing.

The following diagram illustrates the payload signing and encryption process.



**Figure 8 Messaging signing and encryption**

### 5.5.1 Signed container profile

The signed container profile represents an XML payload that is digitally signed using the XML signature profile. It provides the additional mechanism to include an XML element to represent the payload and one or more signatures on that payload. This enables the recipient of an E-Health message to confirm the integrity of the message.

### 5.5.2 Encrypted container profile

The Encrypted Container Profile represents an XML payload that is encrypted using the XML Encryption Profile. It provides the additional mechanism to include an XML element to represent the encrypted XML as well as one or more encrypted keys. This enables the use of one or more private keys to decrypt the payload and ensuring the confidentiality of the message.

### 5.5.3 XML Signature profile

The XML signature profile detailed in the E-Health XML Secured Payload Profiles specification [ATS 5821—2010] defines signature (`ds:signature`) and not the representation of the signed payload. XML signatures utilise asymmetric encryption method where a public key and a private key is involved.

A signature is used to validate the sender of the message. A signature is the digest value resulted from the application of the sender's private key to a transformed XML fragment. Upon receiving the message, the recipient will apply the sender's public key to the transformed XML fragment. Identity of the sender is verified if the checksums are the same.

#### **5.5.4 XML encryption profile**

The XML encryption profile detailed in the E-Health XML Secured Payload Profiles Technical Specification defines the encrypted data (xenc:EncryptedData) and the encrypted key (xenc:EncryptedKey).

Payload encryption is required to adopt the symmetric encryption method to achieve higher levels of efficiency. A session key is used to encrypt the payload. The session key is transferred to the receiver utilising asymmetric encryption (i.e. the receiver's public key is used to encrypt the symmetric key by the sending party, allowing the receiver to decrypt the session key using their corresponding private key).

### **5.6 X.509 Certificates**

#### **5.6.1 National Authentication Service (NASH)**

The National Authentication Service for Health (NASH) will ultimately provide the PKI infrastructure for the healthcare sector. It establishes a framework for provisioning of highly trusted, digital credentials (certificates).

Digital credentials may be requested with the registration of every HPI-O or HPI-I. These credentials may be used for the purposes of authentication and securing e-health transactions.

For more information about NASH, please refer to the NEHTA Blueprint [NBP2010].

### **5.7 Information exchange architecture**

#### **5.7.1 Secure message delivery**

The E-Health Secure Message Delivery Technical Specification [ATS 5822—2010] defines the endpoints and interfaces required to support the exchange of e-health messages. The technical specification requires the recipient to provide the sender with an acknowledgement. In addition, the recipient of the message must be identified during message assembly.

Discharge summary senders (hospitals) are typically large organisations with a permanent point of presence on the network and are capable of hosting "always on" Web services. By contrast, the discharge summary recipients may not have a permanent network connection or the IT infrastructure to host Web services. Thus, the discharge summary will typically be received through a secure message service provider who is able to host and maintain Web services.

For discharge summary receivers who do not have the infrastructure to host Web services, three entities (sender, receiver and receiver intermediary) are involved in the exchange of discharge summary. Only two entities (sender and receiver) are involved for organisations that have the capability to host Web services.

Each entity will need to host its own endpoint, implementing one or more interfaces.

### 5.7.1.1 Recipient host web services

If the Recipient hosts Web services, then the Sender can send the document directly to the Recipient.

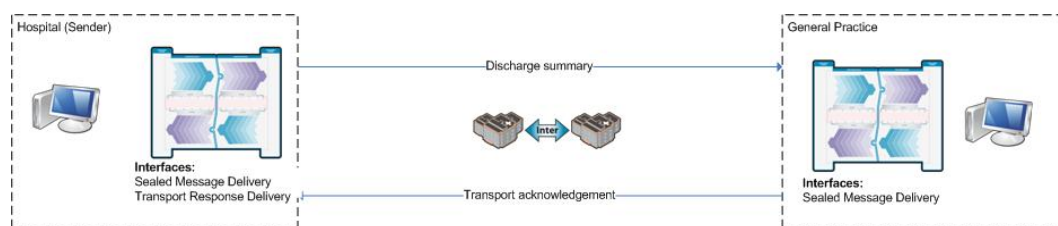
In this scenario there is no requirement for an Intermediary.

The sender endpoint will be expected to implement the following interfaces:

- Sealed Message Delivery
- Transport Response Delivery

The receiver endpoint will be expected to implement the following interface:

- Sealed Message Delivery



**Figure 9 Direct delivery**

### 5.7.1.2 Recipient does not Host Web Services

A different architecture is involved where recipients of discharge summaries do not have the capability of hosting Web services. Thus messages are received via a receiver intermediary.

For this implementation, the Recipient will poll permanently connected services (a nominated Intermediary, or all locations upon which reports may be hosted for the Recipient in question), and invokes the Retrieve operation to obtain the document from the document store (i.e. the store may be hosted by the Sender).

The sender endpoint will be expected to implement the following interfaces:

- Sealed Message Delivery
- Transport Response Delivery

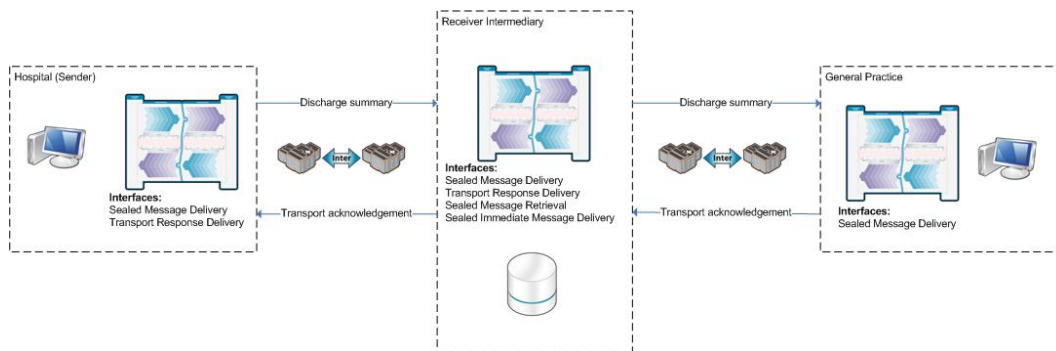
The receiver endpoint will be expected to implement the following interface:

- Sealed Message Delivery

The receiver intermediary endpoint will be expected to implement the following interface:

- Sealed Message Delivery
- Sealed Message Retrieval
- Transport Response Delivery
- Sealed Immediate Message Delivery

The receiver intermediary may be deployed in different locations. It can be deployed at a third party location or inside the receiver's DMZ. The behaviour and functionality of the intermediary remains the same.



**Figure 10 Receiver intermediary**

## 5.8 Presentation

A significant portion of this Discharge Summary package describes aspects of the standardised information model, message formats, message transport and enabling infrastructure necessary to achieve interoperability between computer systems. This section deals with the presentation of electronic discharge summaries to human readers with particular focus on the end recipient (i.e. GP or specialist).

Currently, electronic discharge summary document exchanges generally utilise HL7 V2 message formats or document formats such as RTF or PDF. Many document formats (including PDF) provide rich formatting capabilities and afford the sender a high degree of control over the layout and presentation of content. However document formats are not designed to describe individual data elements as atomic units of information and therefore cannot support semantic interoperability.

Message formats such as HL7 structure information atomically, with defined data types, constraints, and specified coding systems or terminology sets. However, message formats generally do not stipulate the presentation of the information.

Discharge summaries are complex documents containing tables, lists, conditionally-highlighted alerts and word-processed text blocks. These elements will be organised into section hierarchies and other groupings. The optimal presentation of a discharge summary depends on several factors including:

- Discharge summary content structure or profile (e.g. paediatric care having different information requirements compared to a mental health inpatient episode).
- Factors affecting clinical safety (e.g. appropriate flagging of alerts, allergies, and ceased medications).
- Recipient requirements based on their medical specialty.
- Adoption of the discharging hospital's 'corporate' identity including logos, letterhead and typeface.

Clinical Document Architecture (CDA) is a HL7 standard that has been developed specifically to represent clinical documents such as discharge summaries. CDA is based on the HL7 Reference Information Model (RIM) and uses XML as its serialisation technology; as such, it is designed to be both human-readable and machine-processable.

HL7 CDA provides an accurate representation of NEHTA's discharge summary SDT and for these reasons, CDA is NEHTA's preferred discharge summary message exchange format.

When used in combination with an appropriate style sheet, CDA content can be transformed into HTML and rendered in a standard Web browser or HTML viewer - similar to an Internet Web page. The following example is a fragment from a sample CDA discharge summary.

```
<ClinicalDocument xsi:schemaLocation="urn:hl7-org:v3 xsd/hl7/CDA.xsd">
  <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
  <id root="62-25483521"/>
  <code code="11488-4" codeSystem="2.16.840.1.113883.6.1" codeSystemName="SNC"
  <effectiveTime value="20080904162531"/>
  <confidentialityCode code="N" codeSystem="2.16.840.1.113883.5.25"/>
  <languageCode code="en-AU"/>
  <setId root="62-25483521"/>
  <versionNumber value="1"/>
  - <recordTarget>
  - <patientRole>
    <id root="urn:xml-gov-au:nehta:data:UhiIhi:1.0" extension="8003610000000000"
    - <addr>
      <streetName>6 Plymouth St</streetName>
      <city>Gumdale</city>
      <postalCode>4154</postalCode>
      <state>QLD</state>
      <country>Australia</country>
    </addr>
    - <patient>
      - <name>
```

Figure 11 Example CDA Discharge summary

CDA content is then combined with a style sheet, like the following example, to produce an HTML version.

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- Stylesheet requires an XSLT 2.0 compliant processor -->
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" x
  org:v3" exclude-result-prefixes="cda xsl">
  <xsl:output method="html" />
- <!--
  The entry point for the stylesheet
-->
- <xsl:template match="/cda:ClinicalDocument">
- <xsl:variable name="patientName">
  - <xsl:call-template name="FormatName">
    <xsl:with-param name="name" select="cda:recordTarget/cda:patientRole/cda:
  </xsl:call-template>
  </xsl:variable>
- <xsl:variable name="createDate">
  - <xsl:call-template name="FormatDate">
    <xsl:with-param name="date" select="cda:effectiveTime/@value" />
  </xsl:call-template>
  </xsl:variable>
- <html>
  <style type="text/css">margin:0; padding:0;</style>
  - <head>
  - <title>
```

Figure 12 Example style sheet

Once HTML is produced, it can be rendered in a standard Web browser, as shown in the following example.

## Discharge Summary - Mr John Smith - 04 Sep 2008

Episode Summary		Patient Details		GP Details	
Episode ID:	62-25483521	Name:	Mr John Smith	GP:	
Date Admitted:	01 Sep 2008	IHI:	8003610000000000	Address:	Level 2, B 4101
Date Discharged:	01 Sep 2008	DOB:	11 May 1988	Practice:	Vivian Saç
Version No:	1	Gender:	Male		
Summary Status:	Final	Address:	6 Plymouth St, Gumdale, QLD 4154		

Synopsis and Recommendations	Clinical Synopsis
Adverse reactions and Alerts	
Problems and Diagnoses	Recommendations To GP
Procedures	GP to remove the staples on day 10-14. A follow up Orthopaedic output recommence at GP's discretion. Please arrange a follow up appointment outcomes are being met.
Medications	Recipients
Investigations	
Follow up	

**Figure 13 CDA rendered as HTML**

The separation between structured content (CDA) and formatting (style sheet) offers flexibility to standardise presentation through a template approach. Style sheets may originate from different sources; the following table lists the advantages and disadvantages of each approach.

Style Sheet Source	Advantages	Disadvantages
Standardised National style sheet.	Promotes a standardised approach to discharge summary presentation.	Does not support the localisation needs of hospitals.  Does not provide customised presentation to meet the individual recipient requirements.
Sent with discharge summary.	Content and its presentation can be localised to meet the needs of each hospital/health department and/or medical specialty or service  Style sheets can be dynamically generated based characteristics of the discharge summary or recipient requirements. This powerful capability can be used to improve clinical safety.	GP/Specialist will be burdened with multiple formats, increasing proportionally as the number of hospitals/health departments with which they interact also increases.
Supplied by GP Desktop Vendor.	GP/Specialist can pick their preferred layout from a library shipped with the product  Sophisticated products will allow users to customise the layout to suit their preferences.	When a discharge summary deviates from the standardised format the style sheet may not properly render it (if at all).

**Table 5      Style sheet sources**

Consequently, the following approach may be considered:

- Hospitals will be encouraged to distribute a style sheet with the CDA message that can be used by the recipient to render the discharge summary:
  - Sophisticated discharge summary systems could dynamically generate a style sheet specific to each discharge summary and/or the recipient's requirements
- GP Desktop applications provide the option to render the discharge summary using the hospital supplied style sheet
- GP Desktop vendors may differentiate their product by supplying a library of style sheets or style sheet builders that the user can use to override the default formatting.

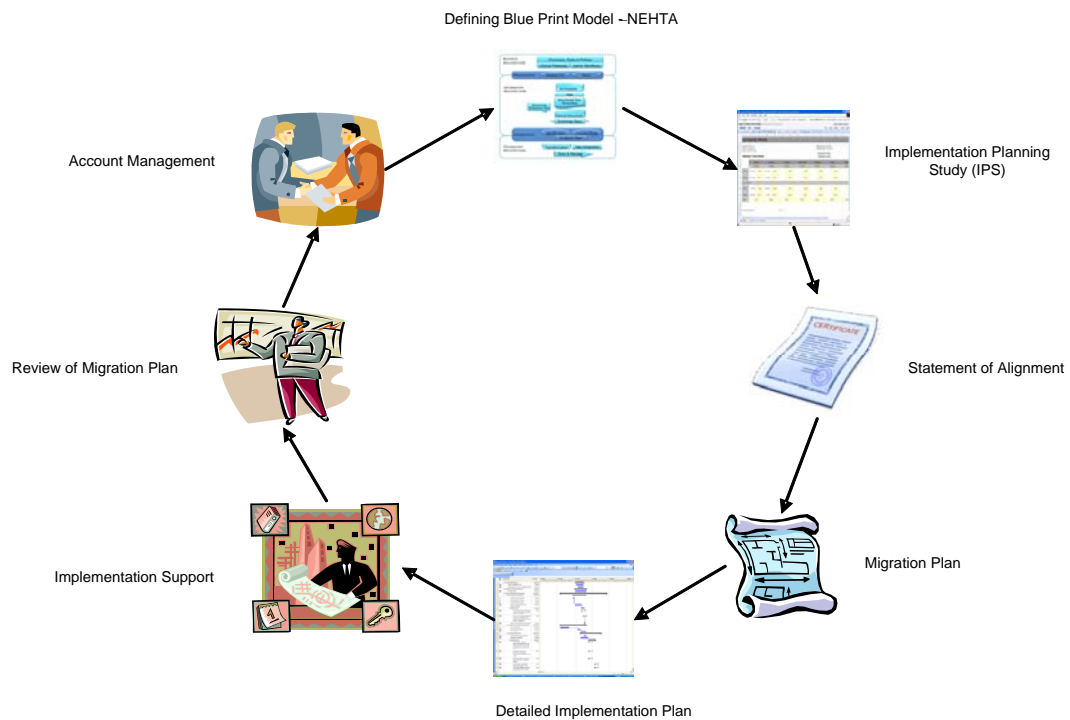
## 6 Implementation approach

NEHTA's work program is focused on the development of a nationally-interoperable framework for e-health and facilitated adoption of national specifications, which supports the framework by establishing collaborative relationships with early adopter partners and associated vendor and service providers.

With a number of jurisdictions and healthcare providers currently working towards the introduction of territory and state-wide discharge summary systems, NEHTA is providing validated guidance and advice on implementation of a national standards-based approach.

Given that discharge summary system projects in jurisdictions and healthcare providers are at varying stages, ranging from planning to implementation, NEHTA is using a repeatable implementation strategy, which allows for an iterative approach to allow for the uptake of NEHTA specifications in a managed and structured manner over a period of time.

The implementation strategy being employed to facilitate this collaborative approach comprises eight phases. These phases are illustrated in the following diagram.



**Figure 14 Implementation strategy phases**

Implementers are invited to contact NEHTA for more detailed discussions.

# 7 Conformity assessment

Conformity assessment is a demonstration that specified requirements relating to a product, process or software are fulfilled. Conformity is a general term that includes:

- Conformance of medical software to technical specifications (e.g. for message interchange formats).
- Compliance of a deployed medical software system and business processes with operational requirements.

The development of schemes for conformity assessment is guided by an assessment of the risks accompanying implementations of the discharge summary specifications. Risks include:

- Privacy risks; the unauthorised collection, use and disclosure of personal health information.
- Information security risks; breaches of confidentiality, integrity and the availability of personal health information and/or critical health information.
- Safety risks; physical or mental harm to patients and healthcare providers.
- Operational risks; incompatible technology, obsolescence, inability to meet service levels, lack of skilled human resources.
- Business risks; legal liability, compliance with legislation and mandated standards, procurement challenges and inability to achieve expected benefits.

Conformity assessment schemes are created to mitigate these risks and specify the assessment process and activities, including:

- Who should undertake assessment activities (i.e. first-party, second-party or third-party).
- Assessment methods.
- Test scenarios and test cases, and means of testing or inspection.
- The type of assessment bodies to be involved.

Two conformity assessment schemes will apply to the Discharge Summary specifications:

1. Discharge Summary Operational Compliance Inspection Scheme  
This scheme will document the procedures for inspecting an operational discharge system for adherence with the Discharge Summary specifications. Inspection is a process of professional judgement applied to an operational system and the relevant business processes.
2. Discharge Summary Software Conformance Assessment Scheme  
This scheme will document how a discharge system will be tested for conformance to the technical specifications for the Discharge Summary message formats.

The Discharge Summary specifications reference e-health infrastructure components such as Healthcare Identifiers, Secure Message Delivery, HL7 clinical terminology datasets and other enablers listed in Section 9 of this document. Therefore the assessment schemes will include the processes for assessing conformity with the e-health infrastructure components referenced by the Discharge Summary specifications.

For more information on the Discharge Summary conformity assessment schemes, please contact the NEHTA Conformance, Compliance and Accreditation group at [cca@nehta.gov.au](mailto:cca@nehta.gov.au).

## 8 Privacy principles

NEHTA has developed an overarching privacy management framework to ensure that its initiatives comply with all relevant privacy law requirements and meet community expectations regarding 'privacy protection'.

Information privacy protection in Australia is legislated under various Commonwealth and State/Territory statutes. These govern the collection and handling of personal information, including personal health information, in the public and private sectors. Information privacy legislation seeks to provide individuals with some control over the collection and handling of their personal information by balancing competing public interests between the individual's right to privacy and the benefits of the free flow of information.

The shared sources of most Australian privacy legislation means it is possible to analyse and extract a common set of privacy principles for the handling of health information, as outlined in the table below. These common privacy principles, based on the National Privacy Principles (NPP) found in the *Privacy Act 1988* (Cwlth) [PA1988], seek to capture the major requirements found in the various privacy laws, administrative instructions and standards in place across Australia.

The following table outlines compliance statements aligned with the National Privacy Principles, useful at the beginning stages of a privacy analysis. This table is provided as a high level summary only; each organisation will be required to ensure its own practices comply with relevant privacy legislation.

Privacy Principles		General Requirements
1.	Collection	Collection is necessary; and consent is obtained or collection authorised by or under law; and individuals are notified of the collection.
2.	Use and Disclosure Primary Purpose	Any use and disclosure of information that is not directly related to the primary purpose for which it was collected, or within an individual's reasonable expectation, would require the patient's consent before it may be used and disclosed.
	Use and Disclosure Secondary Purpose	A patient's information should only be used and disclosed for the purpose for which it was collected unless:  The patient has consented, or  The secondary purpose is related to the primary purpose and a person would reasonably expect such use or disclosure, or circumstances arise relating to public interest such as law enforcement and public or individual health or safety.
3.	Data Quality	Health care providers must take reasonable steps to ensure the personal information they collect, use or disclose in relation to discharge summaries is accurate, complete and up to date.
4.	Data Security	Health care providers must take reasonable steps to protect the personal information they hold from misuse and loss and from unauthorised access, modification and disclosure
5.	Openness	Health care providers should have a policy document that clearly sets out information handling practices and should make this available to anyone who asks.
6.	Access and Correction	On request and excluding certain circumstances, health care providers and organisations should provide an

Privacy Principles		General Requirements
		individual access to their personal health information. Upon request of the individual, and where reasonable, health information collected about an individual may be corrected.
7.	Identifiers	Health service providers are prohibited from adopting Commonwealth identifiers except in prescribed circumstances.
8.	Anonymity	Health service providers have obligations to make available to individuals the option of not identifying themselves when entering transactions with the provider, wherever this is lawful and practicable
9.	Transborder Data Flows	Health service providers have obligations when transferring personal information outside Australia. Information should only be transferred to a recipient overseas in circumstances where the information will have appropriate protection.

**Table 6 Privacy principles**

# Definitions

This section explains the specialised terminology used in this document.

## Shortened terms

This table lists abbreviations and acronyms in alphabetical order.

Term	Description
ACHS	Australian Council on Healthcare Standards
AIHW	Australian Institute of Health and Welfare
CA	Certificate Authority
CC	Core Connectivity
CDA	Clinical Document Architecture
CDMS	Client Directory Management System
CI	Clinical Information
CIS	Clinical Information System
CT	Clinical Terminology
DVA	Department of Veteran Affairs
EHR	Electronic Health Record
ELS	Endpoint Location Service
EMR	Electronic Medical Record
FTE	Full Time Employee
GDP	Gross Domestic Product
GP	General Practitioner
HI	Healthcare Identifiers
HL7	Health Level Seven
HPI-I	Healthcare Provider Individual Identification
HPI-O	Healthcare Provider Organisation Identification
HTML	Hyper Text Markup Language
HTTP	HyperText Transfer Protocol
ICT	Information and Communication Technology
IHI	Individual Healthcare Record
IHTSDO	International Health Terminology Standards Development Organisation
IPS	Implementation Planning Study
IT	Information Technology
MRN	Medical Record Number
NASH	National Authentication Service for Health
NEHTA	National E Health Transition Authority
NPP	National Privacy Principles
OCA	Operational Certificate Authority

Term	Description
PCEHR	Personally Controlled Electronic Health Record
PDF	Portable Document Format
PKI	Public Key Infrastructure
SCT	SNOMED-CT
SDT	Structured Document Template
SIL	Service Instance Locator
SNOMED-CT	Systemised Nomenclature of Medicine, Clinical Terminology
SSL	Secure Socket Layer
TLS	Transport Layer Security
UML	Unified Modelling Language
UPI	Unique Patient Identifier
VPN	Virtual Private Network
WSDL	Web Services Description Language
XML	Extensible Markup Language

## Glossary

This table lists specialised terminology in alphabetical order.

Term	Description
Admitting doctor	The clinician, with the appropriate delegated authority, who decides that a patient should be admitted to the hospital.
Author	The medical officer chiefly responsible for completing the discharge summary.
Authoriser	The clinician responsible for authorising the release and distribution of the discharge summary.
Business Architect	A Business Architect is anyone looks at the way work is being directed and accomplished, and then identifies, designs and oversees the implementation of improvements that are harmonious with the nature and strategy of the organisation. Source: <a href="http://www.businessarchitects.org">http://www.businessarchitects.org</a>
Contributor	Other clinical staff who can complete specific sections of the Discharge Summary.
Development Team	The Developer writes the code for the specifications that the Development leads provide. Source: <a href="http://www.developer.com">http://www.developer.com</a>
Discharge summary administrator	Responsible for the non-technical administration of the discharge summary system and processes.
Distribution list	List of all planned unambiguously recipients of a discharge summary instance.
Distributor	Can distribute discharge summaries that have already been finalised and distributed. Typically this would be Medical Records staff who receive requests from GPs.
Electronic Signature	An electronic signature refers to a form of authentication for the Web services and includes signed certificates.
Endpoint	Where a Web service connects to the network. Source: <a href="http://www.looselycoupled.com/glossary/endpoint">http://www.looselycoupled.com/glossary/endpoint</a>

Term	Description
Exception list	List of discharge summaries received by a Practice that have anomalies that need to be resolved through human intervention.
Interim discharge summary	A discharge summary released to provide information to recipients with the understanding that the information contained may not be complete and is subject to change/amendment.
Interoperability	The ability of software and hardware on multiple machines from multiple vendors to communicate. Source: <a href="http://foldoc.org/interoperability">http://foldoc.org/interoperability</a>
Non-admitted Patient	Patients who are admitted for dialysis, same day radiotherapy and other procedures involving repetitive one day admissions would not normally require a discharge summary are referred to as non-admitted patients.
Persistent Data	Persistent Data denotes information that is infrequently accessed and not likely to be modified. It out lasts the execution of a particular program.
Referral	The act of initiating care transfer, from the provider making the referral to the receiver.
Solutions Architect	The Solutions Architect is typically responsible for matching technologies to the problem being solved. Source: <a href="http://www.developer.com">http://www.developer.com</a>
Summary Health Profile	A standard specification of demographic and health/clinical data contents used to capture information about the health status of a patient at a specific point-in-time. It is intended to provide crucial health status information to facilitate the delivery of safe, quality care to the patient, especially in unplanned/emergency situations.
Technical Architect	The technical architect is responsible for transforming the requirements into a set of architecture and design documents that can be used by the rest of the team to actually create the solution. Source: <a href="http://www.developer.com">http://www.developer.com</a>
Treating doctor	The clinician responsible chiefly responsible for the care of the patient during an inpatient episode.
Worklist	List of discharge summaries currently assigned to a particular clinician.

# References

At the time of publication, the document versions indicated are valid. However, as all documents listed below are subject to revision, readers are encouraged to also seek out the most recent versions of these documents.

## Package documents

The documents listed below are part of the suite delivered in the Discharge Summary package.

Discharge Summary package Documents			
[REF]	Document Name	Publisher	Link
[DS-ES2010]	e-Discharge Summary Release v1.1 – Executive Summary v1.0	NEHTA 2010	<a href="http://www.nehta.gov.au/e-communications-in-practice/edischarge-summaries">http://www.nehta.gov.au/e-communications-in-practice/edischarge-summaries</a>  Open menu: e-Discharge Summary package 1.1
[DS-RN2010]	e-Discharge Summary Release v1.1 – Release Notification v1.0		
[DS-BRS2010]	e-Discharge Summary Release v1.1 – Business Requirements Specification v1.0		
[DS-SD2010]	e-Discharge Summary: Solution Design v1.1		
[DS-CIC2010]	e-Discharge Summary Release v1.1 – Core Information Components v1.0		
[DS-TSS2010]	e-Discharge Summary: Technical Service Specification v1.1		

## References

The documents listed below are non-package documents that have been cited in this document.

Reference Documents			
[REF]	Document Name	Publisher	Link
[ACHS-EG2006]	'EQUIP Guide (Evaluation and Quality Improvement Program)', 2006, Sydney, Australia.	The Australian Council on Healthcare Standards	<a href="http://www.achs.org.au/EQUIP4/">http://www.achs.org.au/EQUIP4/</a>
[AIHW-AHS2010]	Australian Institute of Health and Welfare 2010. Australian hospital statistics 2008–09. Health services series no. 17. Cat. no. HSE 84. Canberra:	Australian Institute of Health and Welfare	<a href="http://www.aihw.gov.au/publications/index.cfm/title/11173">http://www.aihw.gov.au/publications/index.cfm/title/11173</a>
[AMAPS2006]	AMA Position Statement, General Practice and Public Hospital Integration	AMA 2006	<a href="http://www.ama.com.au/node/2501">http://www.ama.com.au/node/2501</a>
[AS4700.6(Int)2007]	Interim Australian Standard, Implementation of Health Level Seven (HL7) v2.5, Part 6: Referral, discharge and health record messaging	Standards Australia	<a href="http://infostore.saiglobal.com/store/">http://infostore.saiglobal.com/store/</a>  (Search "AS 4700.6(Int)-2007")
[CPIS2008]	Concepts and Patterns for Implementing Services v2.0	NEHTA 2008	<a href="http://nehta.gov.au/connecting-australia/secure-messaging">http://nehta.gov.au/connecting-australia/secure-messaging</a>  Open menu at bottom of Web page: 'Secure Messaging

Reference Documents			
			Technical Publications and Specifications'
[DISC-SCTAU]	Terminology Release – March 2009, comprising: Discharge Summary Terminology Cover Note Discharge Summary Terminology Release Note SCT-AU Reference Sets Library for Discharge Summary SDT v0.7 SCT-AU Reference Set Implementation Guide SCT-AU Distribution Files - Discharge Summary SCT-AU Terminology Viewer - Discharge Summary AMT Reference Set Analysis - Discharge Summary	NEHTA 2009	Apply for a free licence to access documentation at NEHTA's 'Terminologies for the Australian Health Sector' Web site: <a href="https://nehta.org.au/aht">https://nehta.org.au/aht</a> Once you obtain access, click the 'Downloads' link, and then click 'Discharge Summary Terminology' for a file list. You may also use the search engine with the document titles (at left), selecting 'Exact phrase' filtering, and remembering to choose the latest revision available.
[DS-SDT2009]	Discharge Summary - Core, Structured Document Template (20090807) (v2.0)	NEHTA 2009	<a href="http://www.nehta.gov.au/connecting-australia/terminology-and-information/clinical-information-mi">http://www.nehta.gov.au/connecting-australia/terminology-and-information/clinical-information-mi</a> Open menus at bottom of Web page.
[DSSDTGFU]	Data Specifications and Structured Document Templates - Guide For Use v1.0 (20090522)	NEHTA 2009	<a href="http://www.nehta.gov.au/connecting-australia/terminology-and-information/clinical-information-mi">http://www.nehta.gov.au/connecting-australia/terminology-and-information/clinical-information-mi</a> Open 'Clinical Information Support Material' menu at bottom of Web page.
[TR 5823—2010]	Australia Standard - Technical Report: Endpoint location service	Standard Australia Committee IT-014 Health Informatics	<a href="http://www.e-healthstandards.org.au/Home/Publications.aspx">http://www.e-healthstandards.org.au/Home/Publications.aspx</a>
[ATS 5820—2010]	Australia Technical Specification - E-Health Web Services Profiles	Standard Australia Committee IT-014 Health Informatics	<a href="http://www.e-healthstandards.org.au/Home/Publications.aspx">http://www.e-healthstandards.org.au/Home/Publications.aspx</a>
[ATS 5821—2010]	Australia Technical Specification - E-Health XML Secured Payload Profiles	Standard Australia Committee IT-014 Health Informatics	<a href="http://www.e-healthstandards.org.au/Home/Publications.aspx">http://www.e-healthstandards.org.au/Home/Publications.aspx</a>
[ATS 5822—2010]	Australia Technical Specification - E-Health Secure Message Delivery	Standard Australia Committee IT-014 Health Informatics	<a href="http://www.e-healthstandards.org.au/Home/Publications.aspx">http://www.e-healthstandards.org.au/Home/Publications.aspx</a>
[HI-CO2010]	HI Service Concept of Operations Version 2.0— 8 June 2010, Release – Final	NEHTA 2010	<a href="http://www.nehta.gov.au/connecting-australia/healthcare-identifiers">http://www.nehta.gov.au/connecting-australia/healthcare-identifiers</a> Open menu: Concept of Operations

Reference Documents			
[ISO21090- 2008]	Draft International Standard ISO/DIS 21090 Health Informatics - Harmonized data types for information exchange	ISO 2008	<a href="http://www.iso.org">http://www.iso.org</a> Search for title keywords within all document categories (i.e. in-development).
[NBP2010]	NEHTA Blueprint	NEHTA 2010	<a href="http://www.nehta.gov.au/about-us/nehta-blueprint">http://www.nehta.gov.au/about-us/nehta-blueprint</a>
[PA1988]	'Privacy Act 1988', (Cwlth) Australian Government	Office of Legislative Drafting and Publishing, Attorney General's Department, Canberra	<a href="http://www.comlaw.gov.au/comlaw%5Cmanagement.nsf/lookupindexpagesbyid/IP200401860?OpenDocument">http://www.comlaw.gov.au/comlaw%5Cmanagement.nsf/lookupindexpagesbyid/IP200401860?OpenDocument</a>
[RIRACHR2008]	Roles in Realising the Australian Charter of Healthcare Rights (brochure)	Australian Commission on Safety and Quality in Healthcare 2008	<a href="http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/com-pubs_ACHR-pdf-01-con/\$File/17388-roles.pdf">http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/com-pubs_ACHR-pdf-01-con/\$File/17388-roles.pdf</a>
[TVOHCIEI2005]	Jan Walker, Eric Pan, Douglas Johnston, Julia Adler-Milstein, David W. Bates, and Blackford Middleton, 2005, The Value Of Healthcare Information Exchange And Interoperability	Health Affairs 2005	<a href="http://content.healthaffairs.org/cgi/content/full/hlthaff.w5.10/DC1">http://content.healthaffairs.org/cgi/content/full/hlthaff.w5.10/DC1</a>

## Related reading

The documents listed below may provide further information about the topics discussed in this document.

Related Documents			
[REF]	Document Name	Publisher	Link
[IF2007]	Interoperability Framework v2.0	NEHTA 2008	<a href="http://www.nehta.gov.au/">http://www.nehta.gov.au/</a> Search "interoperability 2.0".

## Key contacts

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