

Health*Connect* Business Architecture

Part 2 –The Health*Connect* Processes

Version 0.7

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Introduction

The HealthConnect Model

The Business Architecture defines the *HealthConnect* functionality from a system and business process perspective without preempting the solution(s). While it is envisaged that the *HealthConnect* ‘system’ will comprise a range of systems with standardisation, compatibility and integration being key, it is currently far from clear what form these systems might take and how the functionality and scope delineation might exist.

Part 1 of the Business Architecture documentation described the context within which the *HealthConnect* ‘system’ would operate. In establishing the requirements that the ‘system’ would need to satisfy (described in Part 3 – Functional and Technical Requirements) it is necessary to:

- outline in detail how users would interact with the *HealthConnect* ‘system’ and
- then to consider how the ‘system’ would respond internally to those interactions to deliver the desired outputs.

These matters are covered in Part 2 of the Business Architecture documentation (this document).

In summary, the *HealthConnect* Business Architecture documentation comprises the following parts, namely:

Part 1 – The *HealthConnect* Context, which sets the boundaries for *HealthConnect* including objectives, scope, principles, stakeholders, privacy/consent issues, relationship with other initiatives as well as issues/risks (this document).

Part 2 - The *HealthConnect* Processes, which describe the major system and business processes of *HealthConnect* together with a scenario based on a patient with diabetes.

Part 3 – The *HealthConnect* Functional and Technical Requirements, which tabulates the ranked individual functional requirements. The technical requirements detail at a high level the system, operational, and standards characteristics.

Attachment A – *HealthConnect* Consent Principles and Possible Models, which discusses the subject of consent and possible consent options. This is an extract from a larger discussion paper on consent currently being developed. The attachment is intended to provide the reader with some sense of the ideas being considered – ie it is not a definitive statement on the consent policy for *HealthConnect*.

Part 2 Processes

This part includes:

- **Scenarios** that describe how *HealthConnect* might work to assist the understanding and interpretation of the more detailed process descriptions that follow. The scenarios are initially described in full. Selected parts of the scenarios are repeated alongside each of the business process descriptions to which that part of the scenario refers;
- the major **business processes** in the form of an analysis of how the *HealthConnect* ‘system’ would integrate into the normal business practices of the key users. These are expressed from the user perspective; and
- the major **system processes** of the *HealthConnect* system in terms of activities that take place, data that is created and stored, and external systems with which the system interacts. These are expressed from the *HealthConnect* system perspective. For example, where the business process has a user ‘lodging’ an Event Summary, the system processes has the system as ‘receiving’ an Event Summary when describing the same activity.

The identification and analysis of users’ interactions with, and individual processes within the *HealthConnect* ‘system’ has been based on the underlying EHR model for *HealthConnect*:

“The EHR model is one that essentially provides for the
systematic collection (at point of care), transfer, storage and retrieval
of clinical and demographic information in the form of event summaries
to be presented, with appropriate authorisation, via meaningful views and reports.”

Introduced Concepts

Development of the business and system process descriptions has identified two key roles, namely management of clinical content and access control. For the purposes of communication these have been referred to as individual Authorities. How these roles would be established would be determined as part of the overall governance model. It may be that different elements could be provided by different organisations. These could be existing entities or newly created ones.

HealthConnect Clinical Authority

The role incorporated into the concept of the HealthConnect Clinical Authority includes responsibility for reviewing, approving and monitoring all clinical aspects of HealthConnect including approving:

- definition of event summaries;
- rules for event summary updates;
- rules for triggers; and
- decision support rules.

Liaising with appropriate external agencies in relation to activities such as definition of event summaries and decision support rules will be required. Decisions will need to take into consideration the business, technical and economic impact of implementation.

The form and structure of the organisation(s) performing the role described above, including membership and full terms of reference, would be defined, if required, as part of the overall governance model. This would include clarifying the relationship to groups such as the professional colleges, the National Institute of Clinical Studies, and Standards Australia.

HealthConnect Access Control Authority

The role incorporated into the concept of the HealthConnect Access Control Authority includes the responsibility for reviewing, approving and monitoring all access aspects of HealthConnect including:

- defining consent options and rules;
- agreeing mechanisms for authorising access;
- approval of research requests;
- monitoring of access audit logs; and
- developing and communicating protocols for the use and disposal of data (legal penalties for breach of conduct must be spelled out).

Decisions will need to take into consideration the business, technical and economic impact of implementation while ensuring the overall integrity of the system in order to engender and maintain public trust in the system.

The form and structure of the organisation(s) performing the role described above, including membership and full terms of reference, would be defined, if required, as part of the overall governance model. This will include details about how an 'access authority' might be established and managed including reasons and justification for existence, aims, composition, funding, security, ethics committee relationship, State/Commonwealth input, professional and consumer input.

It is possible that other groups would implement the Authority's decisions eg an appropriate organisation to manage report requests and design appropriate data extraction tools while ensuring privacy is maintained in a transparent process.

HealthConnect Processes - Scenarios

The scenarios are intended to bring the idea to life in the mind of the reader. It is necessary to assume some elements of the operational features of the consent and access control policies in making the scenario realistic. The reader needs to be cautious in inferring that these assumptions will prove to be correct when these policies are actually finalised.

Diabetes Scenario for HealthConnect

Mr Kevin Stevenson, a 55-year-old male with diabetes mellitus, presents for the first time to a general practitioner's surgery and informs the receptionist that he is feeling extremely unwell. The receptionist asks if he has an existing HealthConnect record (which Kevin does) and the receptionist obtains his authority to access the record. Kevin's demographic and basic health information (i.e. the sort of information normally gathered on any new attendee), including his consent requirements, is obtained from HealthConnect. The receptionist confirms the details and the information is registered into the local practice management system (PMS). Kevin modifies his consent arrangement to include Dr Newton's surgery. The receptionist directs Kevin to the seats in the waiting area.

[If Kevin is not registered in HealthConnect then the receptionist asks him to fill out the usual surgery form for a new client. This includes Kevin's demographic details (name, sex, DOB, address, contact details) and basic health information (his allergy to penicillin, diabetes diagnosis, treatment for depression and recent knee operation) and registers him into the local system. The receptionist gives Kevin a brochure that outlines the scope and benefits of HealthConnect and includes an internet address for further information and contact number for the HealthConnect helpdesk. Kevin advises that he is already familiar with HealthConnect and would like to register. The receptionist helps him complete and sign the registration and consent forms. Kevin selects the standing consent option (ie consent to authorised providers unless otherwise revoked) where access to his HealthConnect record is made available to a nominated list of providers, although he chooses to limit access to information from consultations involving mental health issues to his psychiatrist and general practitioner. He understands that in emergencies this limitation may be overridden but a review of such an action would be undertaken. The collected registration and consent information is sent to HealthConnect from the local system. Following an immediate check for an existing registration Kevin is provisionally registered pending receipt of his signed form and issue of his HealthConnect access control token.]

* * * * *

1st Consultation

The general practitioner, Dr Newton, greets Kevin and directs him to her office. Dr Newton asks Kevin about his present condition. This relates to some pain in his left knee that was recently operated on. She notes from his surgery registration form that he has diabetes and is taking treatment for depression. As this is Kevin's first visit, she decides that it is appropriate to access his HealthConnect record. Kevin has given a standing consent so Dr Newton does not need to seek additional authorisation from Kevin during the consultation. She then requests access to Kevin's records by clicking an icon on her toolbar which automatically transfers Kevin's and her identification details to HealthConnect. As a regular user of HealthConnect she has a permanent connection.

Dr Newton examines his knee and concludes that he has a post operative wound infection. She takes a wound swab for microscopy/culture/sensitivity

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analysis and prescribes an antibiotic and a painkiller. As this is Kevin's first appointment at the surgery it has been booked as a long consult as Dr Newton will take the opportunity to review Kevin's previous health care. His health summary view informs Dr Newton about Kevin's previous test results and his medications (he is currently taking Insulin four times a day and Metformen three times a day). Dr Newton confirms the key elements of the history with Kevin. Dr Newton transfers information from previous health care events to her own practice management system and collects information not already recorded. As part of the National Diabetes Outcomes Quality Review Initiative (NDOQRIN) Dr Newton ensures the minimum data set requirements for diabetes management is complete and populated with recent measurements.

Dr Newton records Kevin's weight and height measurements (BMI) and blood pressure and notices from his record that he has recently had HbA1c and microalbumin/proteinuria tests and had a foot examination. She confirms with him his smoking status, exercise regime, family medical history, allergies, and nutritional information. Armed with this information, Dr Newton reviews existing plans for Kevin's care.. She receives a prompt that Kevin has not had an eye examination for 12 months and writes a referral letter to a local ophthalmologist. She updates her local system with relevant data throughout the consultation.

At the end of the consultation Dr Newton automatically generates an Event Summary for *HealthConnect* by pressing an icon on her toolbar in her practice management system. This opens up a web form that has been populated with data from her practice management system. She reviews what is to be sent and adds a comment regarding the knee pain advising that it was a post operative infection, something that was not readily apparent from the simple diagnostic code. Upon completion, including any authorisation necessary, the event summary gets sent automatically to *HealthConnect*. Information includes event details (participants, location, date and time, etc), the reason for the consultation, and the treatment provided (the script for antibiotics and painkillers).

* * * * *

2nd Consultation

Kevin is at home clearing away building material from his yard when he accidentally slashes his thumb. He decides to return to the same GP surgery to have his thumb sutured. Once Kevin's thumb has been attended to, Kevin informs the doctor that he has an appointment with the ophthalmologist in 2 weeks. Otherwise, Kevin has had no significant treatment since his last visit and Dr Newton decides that viewing Kevin's *HealthConnect* record in this consultation is not warranted. Dr Newton brings up Kevin's local record and notes the suturing of his thumb. As a result of this consultation, an event summary is created and sent to *HealthConnect*. The standing consent is still valid.

* * * * *

A month later, Kevin is admitted to his local Emergency Department suffering with diabetic keto-acidosis (the result of inadequate insulin over an extended period). In giving his history he informs hospital staff that he has diabetes and also that he is registered with *HealthConnect* and while the nurse checks his blood sugar and ketones, the doctor checks his *HealthConnect* record. With Kevin's consent the doctor accesses the complete record and notes his allergy to penicillin, the recent knee operation and infection, eye check and the anti-depressive drug he is taking and concludes that there is no reason to modify the proposed treatment for the keto-acidosis. He discusses Kevin's self-management of his insulin treatment and his depression and advises him to see his general practitioner. When Kevin is discharged, the Emergency Department sends an event summary to *HealthConnect*.

(If Kevin had arrived at the Emergency Department unconscious, and he was not registered with HealthConnect, then it would have taken the medical support team longer to learn about Kevin's full medical history and the possible role of his depression in the management of his insulin regime.)

* * * * *

Upon Kevin's departure from hospital, Dr Newton is sent a notice from HealthConnect, via her preferred communication method of e-mail, informing her of Kevin's Emergency Department visit. She selects the Emergency Department visit view option, reads the event summary and downloads it into her local practice management system.

* * * * *

3rd Consultation

Kevin returns to Dr Newton's surgery a week later. He informs the receptionist that he has changed his address. The receptionist updates the details on the local system and presses a toolbar icon to send the update to HealthConnect.

Together in her office, Dr Newton and Kevin view his HealthConnect record and discuss his recent Emergency Department visit. Kevin's ketoacidosis was the result of a combination of recent factors: the infection in his leg, reduced physical activity and inadequate adjustment of his insulin regime. Dr Newton is very concerned about Kevin's dietary habits and she refers Kevin to a dietician. She also provides some counselling in response to Kevin's management of his depression.

* * * * *

When Kevin initially registered with HealthConnect, he consented to supplying his record to other nominated providers. Prior to the consultations with Kevin, the dietician and the ophthalmologist each access and review his HealthConnect record. Notably neither provider will have access to information regarding his depression and associated treatment. Selected elements of the record are downloaded into the clinicians' local systems and Kevin's HealthConnect record is not accessed during the consultations. An event summary is created by both professionals and posted to HealthConnect.

* * * * *

Dr Newton and the dietician stressed in previous consultations with Kevin the importance of losing weight. A couple of weeks later Kevin accesses HealthConnect through his home computer and records his weight. He also changes the access controls (allowing all his nominated providers access to all parts of his record) and takes this opportunity to review the audit trail informing him of who has accessed his record. While online he receives a reminder that he is due to have an HbA1c test.

Other Scenarios for HealthConnect

There are many types of situations in which HealthConnect would be used. As a contrast another scenario has been defined which involves multiple events within a single encounter. This is detailed below and is included, in square brackets, alongside the business processes. A further scenario covering the process for registering an existing client with HealthConnect is also outlined.

* * * * *

After Kevin, Dr Newton sees Angela who presents with two children, aged 4 and 6. The four-year-old is due for a routine vaccination, as per the reminder letter she received in the mail. The six year-old has a plaster cast on her right arm, and Angela thinks it is due to be removed. And while she is there, Angela wants to check on when her next Pap smear is due and get some refill scripts for her mother who lives with them.

Dr Newton decides to check HealthConnect for details of the 4-year-old's immunisation record, Angela's pap smear record and the grandmother's medication record. Dr Newton electronically records evidence of access approval for the consumer present (Angela) and consent for a minor (4- and 6- year old). She is able to access Angela's mother's record as her mother had previously given authority to Angela.

Dr Newton requests access to the various records. Dr Newton receives a message advising that the grandmother is due for her annual flu-shot. Angela says if you will give her the vaccine, she can get the Blue Nurses to administer it at home, and save her frail mother from an inconvenient trip. Dr Newton records the treatment given to Angela, her children, and her mother in her absence. At the end of the consultation with Angela, event summaries are created automatically for each consumer and sent to HealthConnect.

* * * * *

The next time that Mary, Kevin's wife, who has been attending the surgery for a number of years, presents at the surgery she indicates that she also wishes to register for HealthConnect. The receptionist provides Mary with some further information on HealthConnect and helps her complete the registration form. Mary's demographic and basic health information is extracted from the practice management system and sent to HealthConnect.

Mary is issued with a HealthConnect number and informed that her registration papers would be mailed to her home address. Mary selects a standing consent for all providers involved in her care without specifying individual providers and with no event type restrictions. These are entered through the consent options screen.

HealthConnect Business Processes - A User Perspective

Overview of Business Processes

Critical to the success of HealthConnect is the efficient and seamless integration of the use of HealthConnect into the user's business processes. Analysis of the major business processes of the HealthConnect 'system' has been conducted and presented below diagrammatically. The major processes are:

- A. Registration at place of care – new client
- B. Registration at place of care – existing client
- C. Provider consultation with consumer present
- D. Provider interactions with HealthConnect in the absence of the consumer and vice versa
- E. Secondary uses, eg aggregated data and anonymised unit records
- F. Registration external to place of care

The analysis has concentrated on these business process categories as they have significant work practice implications. There are a variety of other interactions which do not warrant work flow analyses at this stage. These types of interactions include bulk automatic transmission of event summaries from operational systems and databases, eg discharge referrals. There are other processes that are internal to the management of the HealthConnect 'system'. These include bulk registrations, management of rules (consent, triggers, etc).

Link to System Processes

The business process diagrams illustrate the points of interaction with the HealthConnect 'system' through the shaded rectangles. The system processes themselves are described in the section that follows the business process descriptions.

Link to Scenario


Key elements of the scenario described above have been duplicated alongside the business process to which they relate. These are contained in the shaded column of the business process descriptions.

Key to Business Process Diagrams

Unframed text box sets the Context for the business process flow, eg

B2 New client
registered on
HealthConnect

 Rectangles represent the individual activities that comprise the business process flow, eg

 Shaded parts of rectangles provide a cross-reference to the HealthConnect 'system' processes (The system processes are described later in the document)

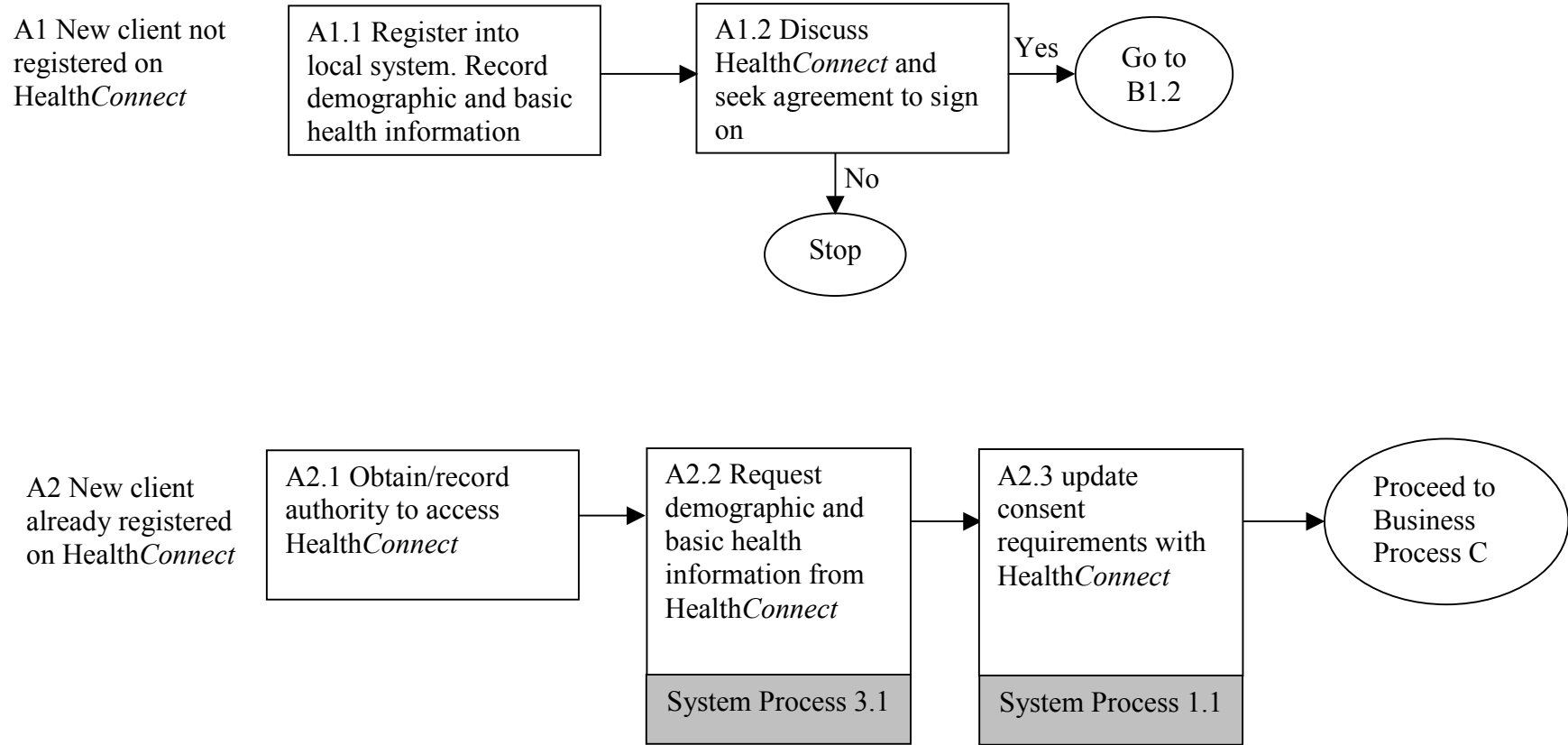
A2.3 Update consent
requirements with
HealthConnect

System Process 1.1

 Ovals provides a pointer to the next business process to be undertaken, eg

Go to
A1.2

Business Process A: Registration at place of treatment – new client*



* The word ‘client’ is used here, rather than ‘consumer’ which is generally used elsewhere, as it refers to the role of a person as seen by the business whose processes are being modelled.

A. Registration at place of care – new client

This process comprises all aspects of managing the registration of a new client attending for health service. The registration process could include a variety of environments, for example:

- Consulting rooms eg general practitioner's office, specialist room
- Reception areas eg general practice surgery front desk; Emergency Department reception; and Hospital admissions desk.

This may be a 2-visit process to allow time for consumers to understand what registering with *HealthConnect* means and to allow time to provide the required evidence of identity.

A1 New client not registered on HealthConnect

A1.1 Register into local system. Record demographic and basic health information

This process involves the normal activities of the site for registering a client and recording demographic and basic health information in the local system.

Over time it is anticipated that *HealthConnect* would influence the type of detail collected but this activity is independent of *HealthConnect*.

A1.2 Discuss HealthConnect and seek agreement to sign on

This process involves activities such as:

- providing the client with information on *HealthConnect* which outlines the scope and benefits of *HealthConnect*, and a summary of obligations and the general conditions of participation in *HealthConnect*;
- answering simple queries the client may have; and
- assisting the client to complete and sign the *HealthConnect* registration and consent forms.

Provider involvement may be required to assist this process.

(this is essentially the same as B1.1)

Business processes B1.2 and B1.3 are then conducted.

Mr Kevin Stevenson, a 55-year-old male with diabetes mellitus, presents for the first time to a general practitioner's surgery and informs the receptionist that he is feeling extremely unwell.

If Kevin is not registered in *HealthConnect* then the receptionist asks him to fill out the usual surgery form for a new client. This includes Kevin's demographic details (name, sex, DOB, address, contact details) and basic health information (his allergy to penicillin, diabetes diagnosis, treatment for depression and recent knee operation) and registers him into the local system.

The receptionist gives Kevin a brochure that outlines the scope and benefits of *HealthConnect* and includes an internet address for further information and contact number for the *HealthConnect* helpdesk. Kevin advises that he is already familiar with *HealthConnect* and would like to register. The receptionist helps him complete and sign the registration and consent forms.

A2 New client already registered on HealthConnect

A2.1 Obtain/record authority to access HealthConnect

This process involves activities such as:

- discussing the value of extending consent to the current provider, possibly providing the client with information on *HealthConnect* which outlines the scope and benefits of *HealthConnect*;
- answering any queries the client may have; and
- recording the client's consent (electronically or on paper where necessary).

Provider involvement may be required to assist this process.

A2.2 Request demographic and basic health information from HealthConnect

This process involves activities such as:

- accessing the *HealthConnect* function that allows for the extraction of registration information by local systems;
- requesting the extraction and transmission of the client's demographic details and basic health information from *HealthConnect*; and
- then loading the local system will data supplied.

A2.3 Update consent requirements with HealthConnect

This process involves activities such as:

- accessing the consent screen for *HealthConnect*;
- confirming the identity of the client;
- entering the updates to the details requested by the client; and
- sending the paper document with consent changes to *HealthConnect* for checking and validation.

(this is essentially the same as B2.3)

Proceed to business process C

The receptionist asks if he has an existing *HealthConnect* record (which Kevin does) and the receptionist obtains his authority to access the record.

Kevin's demographic and basic health information including his consent requirements is obtained from *HealthConnect*. The receptionist asks if any of the details have changed and the details are registered into the local practice management system (PMS).

Kevin modifies his consent arrangement to include Dr Newton's surgery. The receptionist directs Kevin to the seats in the waiting area.

Business Process B: Registration at place of care – existing client

B1 Existing client not registered on HealthConnect

B1.1 Discuss HealthConnect and seek agreement to sign on

No
Stop

Yes

B1.2 Send demographic and basic health information to HealthConnect from local system.

System Process 1.1

B1.3 Record and lodge consent requirements with HealthConnect (including paper trail if necessary)

System Process 1.1

B2 Existing client registered on HealthConnect requiring changes to registration

B2.1 Update local system

B2.2 Send updates to HealthConnect.

System Process 1.1

B2.3 update consent requirements with HealthConnect

System Process 1.1

B3 Existing client registered on HealthConnect no changes required

B3.1 Bring up local record

Proceed to Business Process C

B. Registration at place of treatment – existing client

This process comprises all aspects of managing the registration of a new client attending for treatment. The registration process could include a variety of environments, for example:

- Consulting rooms eg general practitioner's office, specialist room
- Reception areas eg general practitioner surgery front desk; Emergency Department reception; and Hospital admissions desk.

It is anticipated that, once fully operational, most if not all of these processes will be conducted by authorised receptionists/admissions clerks, etc. (concerns that the reception desks may not be private enough need to be addressed). Different levels of security will need to be established to restrict access to registration data while excluding access to detailed clinical information. In the early stages, however, clinicians are likely to be involved in informing the client about *HealthConnect* and in reporting the basic health information.

The ability to record the author of the health information will be important. For example health information provided by the consumer (past medical history, current allergies etc) would need to be flagged as non-clinician provided data, to ensure that this information is used appropriately in determining future treatments.

B1 Existing client not registered on HealthConnect

B1.1 Discuss HealthConnect and seek agreement to sign on

This process involves activities such as:

- providing the client with information on *HealthConnect* which outlines the scope and benefits of *HealthConnect*, and a summary of obligations and the general conditions of participation in *HealthConnect*;
- answering simple queries the client may have; and
- assisting the client to complete and sign the *HealthConnect* registration and consent forms.

Clinician involvement may be required to assist this process.

The next time that Mary, Kevin's wife, who has been attending the surgery for a number of years, presents at the surgery she indicates that she also wishes to register for *HealthConnect*.

The receptionist provides Mary with some further information on *HealthConnect* and helps her complete the registration form.

B1.2 Send demographic/basic health information from local system.

This process involves activities such as:

- accessing the new registration functionality of *HealthConnect*;
- confirming the identity of the client;
- extracting and sending client demographic details and basic health information from the local system (for existing clients this will have been entered during previous presentations; for new clients this will have just been entered);
- checking that the client is not already registered with *HealthConnect* (may just have forgotten);
- providing the consumer with a *HealthConnect* number for identification/authentication checks in the subsequent consultation; and
- confirmation of the registration will be either sent by post directly to the client or collected by the client at an approved agency (eg Medicare Office) This will include any physical devices required, eg Smart card.

A key element included in the client details will be any identifier numbers already allocated (eg State Patient Master Index). These will be used by the system to check against external consumer identification databases and for duplicates.

B1.3 Record and lodge consent requirements with HealthConnect

This process involves activities such as:

- accessing the consent screen for *HealthConnect*;
- confirming the identity of the client;
- entering the details requested by the client; and
- sending any paper document to *HealthConnect* for checking and validation (probably only for new registration).

Mary's demographic and basic health information is extracted from the practice management system and sent to *HealthConnect*.

Kevin's registration and consent information is sent to *HealthConnect* from the local system.

Following an immediate check for an existing registration Kevin is provisionally registered pending receipt of his signed form and issue of his *HealthConnect* access control token.

Mary is issued with a *HealthConnect* number and informed that her registration papers would be mailed to her home address.

Mary selects a standing consent for all providers involved in her care without specifying individual providers and with no event type restrictions. These are entered through the consent options screen.

Kevin selects the standing consent option (ie consent to authorised providers unless otherwise revoked) where access to his *HealthConnect* record is made available to a nominated list of providers, although he chooses to limit access to information from consultations involving mental health issues to his psychiatrist and GP. He understands that in emergencies this limitation may be overridden but a review of such an action would be undertaken.

B2 Existing client registered on HealthConnect requiring changes to registration

B2.1 Update local system

This process involves normal work practice activities required to update the local system details. This might include details such as change of address, or additional medical history details omitted on the initial registration.

B2.2 Send updates to HealthConnect

This process involves activities such as:

- accessing the registration update function of *HealthConnect*;
- confirming the identity of the client; and
- extracting and sending changes to the client demographic details and basic health information from the local system.

These changes will be added to the consumer record with details of the source/time of the change. The historical details will still be retained.

B2.3 Update consent requirements with HealthConnect

This process involves activities such as:

- accessing the consent screen for *HealthConnect*;
- confirming the identity of the client;
- entering the updates to the details requested by the client; and
- sending the paper document with consent changes to *HealthConnect* for checking and validation.

B3 Existing client registered on HealthConnect no changes required

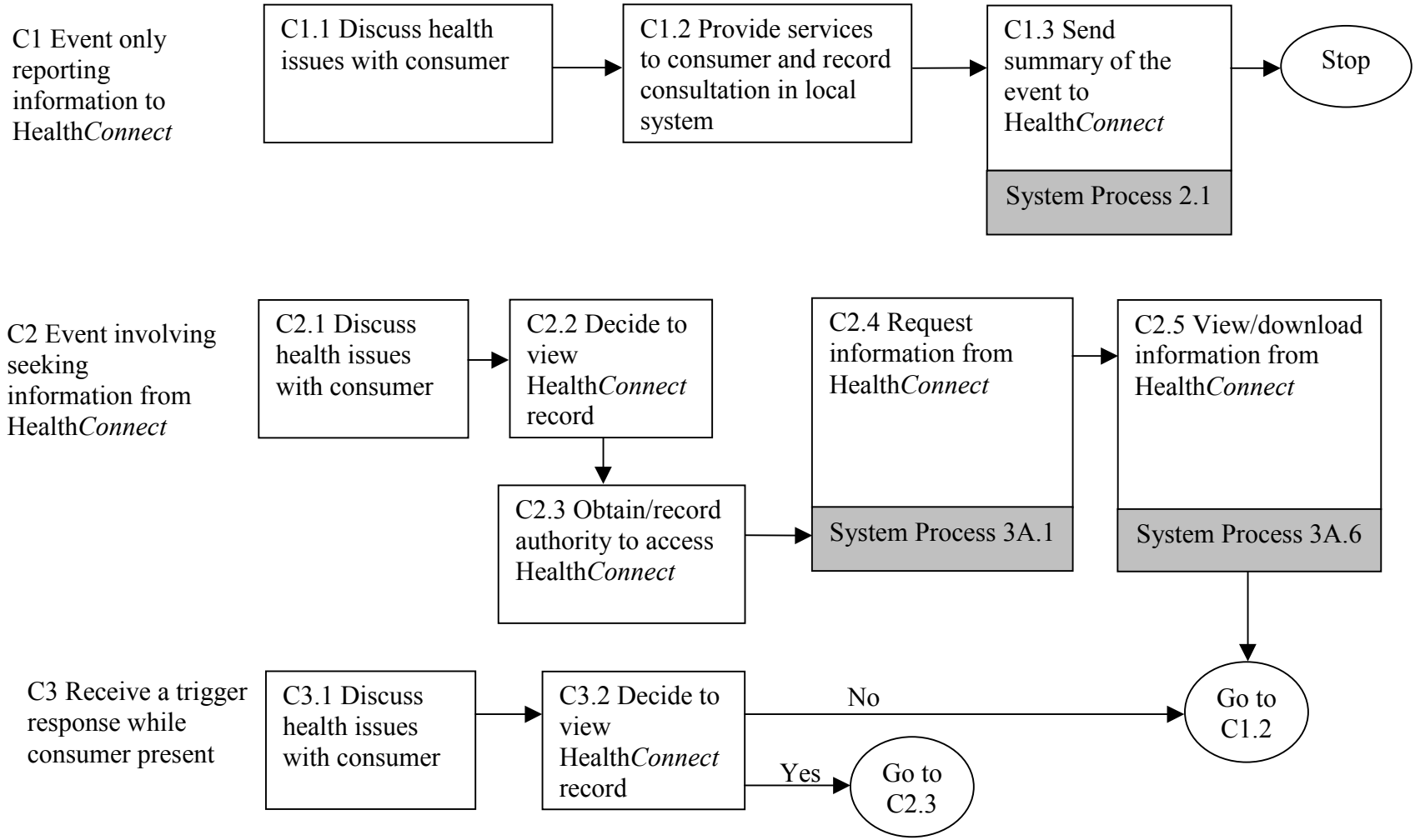
B3.1 Bring up local record

This process involves the normal activities of the site for bringing up the local client record ready for the clinician to review and update during the consultation.

At the third consultation Kevin informs the receptionist that he has changed his address. The receptionist changes the details in the local practice management system.

The receptionist, with Kevin's consent, presses the update registration toolbar icon and the information is sent to *HealthConnect*.

Business Process C: Provider Consultation with consumer present



C. Provider consultation with consumer present

This process comprises activities conducted during a face to face consultation. Examples of this type of process include:

- GP/Specialist consultation;
- Emergency Department consultation; and
- Allied health consultation.

The decision to access the HealthConnect record could be made at any stage of the consultation. The activities are not necessarily sequential.

C.1 Event only reporting information to HealthConnect

C1.1 Discuss health issues with consumer

This process involves typical consultation activities in which the reason for the consultation is explored by the clinician., including;

- determining reason for encounter;
- checking medical history;
- discussion of issues; and
- conducting examination and assessment.

C1.2 Provide services to consumer and record consultation in local system

This process involves activities such as:

- provide/plan care services;
- recording presenting condition/diagnosis;
- recording treatments as appropriate, eg blood pressure;
- producing a prescription; and
- adding clinical notes to the local record.

Local decision-making tools may be used at this point to assist the consultation. This information is recorded in the local system in the normal way.

2nd Consultation

Kevin is at home clearing away building material from his yard when he accidentally slashes his thumb. He decides to return to the same GP surgery to have his thumb sutured. Once Kevin's thumb has been attended to, Kevin informs the doctor that he has an appointment with the ophthalmologist in 2 weeks. Otherwise, Kevin has had no significant treatment since his last visit and Dr Newton decides that viewing Kevin's HealthConnect record in this consultation is not warranted. Dr Newton brings up Kevin's local record and notes the suturing of his thumb.

Dr Newton records Kevin's weight and height measurements (BMI) and blood pressure and notices from his record that he has recently had HbA1c and microalbumin/proteinuria tests and had a foot examination. She confirms with him his smoking status, exercise regime, family medical history, allergies, and nutritional information. Armed with this information, Dr Newton reviews existing plans for Kevin's care. She receives a prompt that Kevin has not had an eye examination for 12 months and writes a referral letter to a local ophthalmologist. She updates her local system with relevant data throughout the consultation.

C1.3 Send summary of the event to HealthConnect

This process involves activities such as:

- accessing event summary generation screen;
- checking the event summary details for completeness (this could be done automatically);
- editing the details prior to submission if required;
- accessing the submit event summary screen for HealthConnect (or this could be done automatically); and
- authorising transmission of the event summary generated (this may involve the consumer).

It is preferable that the event summary be sent at the end of the consultation though this may not always be achievable. Batch updates may be used at sites with poor telecommunications access. The potential impact of the delay in immediately updating the HealthConnect record would have to be assessed on an individual basis.

C2 Event involving seeking information from HealthConnect

C2.1 Discuss health issues with consumer

This process involves typical consultation activities in which the reason for the consultation is explored by the clinician.
(this is essentially the same as C1.1)

At the end of the (first) consultation Dr Newton automatically generates an Event Summary for HealthConnect by pressing an icon on her toolbar in her practice management system. This opens up a web form that has been populated with data from her practice management system. She reviews what is to be sent and adds a comment regarding the knee pain advising that it was a post operative infection, something that was not readily apparent from the simple diagnostic code. Upon completion, including any authorisation necessary, the event summary gets sent automatically to HealthConnect. Information includes event details (participants, location, date and time, etc), the reason for the consultation, and the treatment provided (the script for antibiotics and painkillers).

2nd Consultation

As a result of this second consultation, an Event Summary is created automatically and sent to HealthConnect. The standing consent is still valid.

1st Consultation

The general practitioner, Dr Newton, greets Kevin and directs him to her office. Dr Newton asks Kevin about his present condition and learns he has pain in his left knee which was operated on recently.

[After Kevin, Dr Newton sees Angela who presents with two children, aged 4 and 6. The four-year-old is due for a routine vaccination, as per the reminder letter she received in the mail. The six year-old has a plaster cast on her right arm, and Angela thinks it is due to be removed. And while she is there, Angela wants to check on when her next pap smear is due and get some refill scripts for her mother who lives with them.]

C2.2 Decide to view HealthConnect record

This process involves making the decision to access *HealthConnect*. Reasons might include:

- client is new to the provider and the clinician wishes to review previous healthcare events;
- client informs clinician of events, not previously viewed, which may be of relevance, eg recent inpatient episode, pathology tests requested by another provider; and
- client's health status has changed and the clinician wishes to review historical events.

Many consultations will not include a review of the *HealthConnect* record.

C2.3 Obtain/record authority to access HealthConnect

This process involves activities such as:

- requesting consent from the client to review records, including, if required, discussing the reason for and value of accessing *HealthConnect*;
- confirming identity of the client;
- carrying out any physical requirements to enable access, eg swiping a smart card; and
- recording the consent in the local system.

In certain consent models this step would be automatically satisfied through previously established consent settings.

There will also be functions to cover emergency situations where the consumers or their agents are unable to provide consent. This will be established to comply with the protocols of the privacy framework.

As this is Kevin's first visit, she decides that it is appropriate to access his *HealthConnect* record.

Dr Newton records Kevin's weight and height measurements (BMI) and blood pressure and notices from his record that he has recently had HbA1c and microalbumin/proteinuria tests and had a foot examination. She confirms with him his smoking status, exercise regime, family medical history, allergies, and nutritional information. Armed with this information, Dr Newton reviews Kevin's treatment plan. She receives a prompt that Kevin has not had an eye examination for 12 months and writes a referral letter to a local ophthalmologist.

[Dr Newton decides to check *HealthConnect* for details of the 4-year-old's immunisation record, Angela's pap smear record and the grandmother's medication record.]

Kevin has given a standing consent so Dr Newton does not need to seek additional authorisation from Kevin during the consultation.

[Dr Newton records evidence of access approval for the consumer present (Angela) and consent for a minor (4- and 6- year old). She is able to access Angela's mother's record as her mother had previously given authority to Angela.]

C2.4 Request information from HealthConnect

This process involves activities such as:

- establishing a contact session with *HealthConnect* (logging on?);
- accessing the view function of *HealthConnect*;
- selecting the view type and preferred viewing options required – this may be set up as a preferred default; and
- this will trigger the production/transmission of the EHR view requested through the view.

C2.5 View/download information from HealthConnect

This process involves activities such as:

- accessing the view, clicking on hypertext links to find more detail;
- selecting data to be integrated into the local system records – administration, clinical and decision support systems (some of this may be done automatically with the option to select more detailed information for selected records; and
- closing the contact session with *HealthConnect* (logging off?).

Go to C1.2 i.e. treat and record etc.

Dr Newton then requests access to Kevin's records by clicking an icon on her toolbar which automatically transfers Kevin's and her identification details to *HealthConnect*. As a regular user of *HealthConnect* she has a permanent connection.

[Dr Newton requests access to the various records of Angela and her family]

As this is Kevin's first appointment at the surgery it has been booked as a long consult as Dr Newton will take the opportunity to review Kevin's previous health care. His health summary view informs Dr Newton about Kevin's previous test results and his medications (he is currently taking Insulin four times a day and Metformin three times a day). Dr Newton confirms the key elements of the history with Kevin. Dr Newton transfers information from previous health care events to her own practice management system and collects information not already recorded. As part of the National Diabetes Outcomes Quality Review Initiative (NDOQRIN) Dr Newton ensures the minimum data set requirements for diabetes management is complete and populated with recent measurements.

C3 Receive a trigger response while consumer present

A trigger relating to a previous event might be received as soon as the consumer's HealthConnect record has been accessed, eg a discharge notification that the provider has not yet reviewed. Other triggers might be received as a result of lodging the event summary of the consultation.

C3.1 Discuss health issues with consumer

This process involves typical consultation activities in which the reason for the consultation is explored by the clinician.
(this is essentially the same as C1.1)

C3.2 Decide to view HealthConnect record

This process involves making the decision to access HealthConnect. Reasons might include:

- the trigger raises a concern and the clinician wishes to review historical events.

Go to C2.3

Not all triggers would result in a review of HealthConnect events.

Go to C2.1

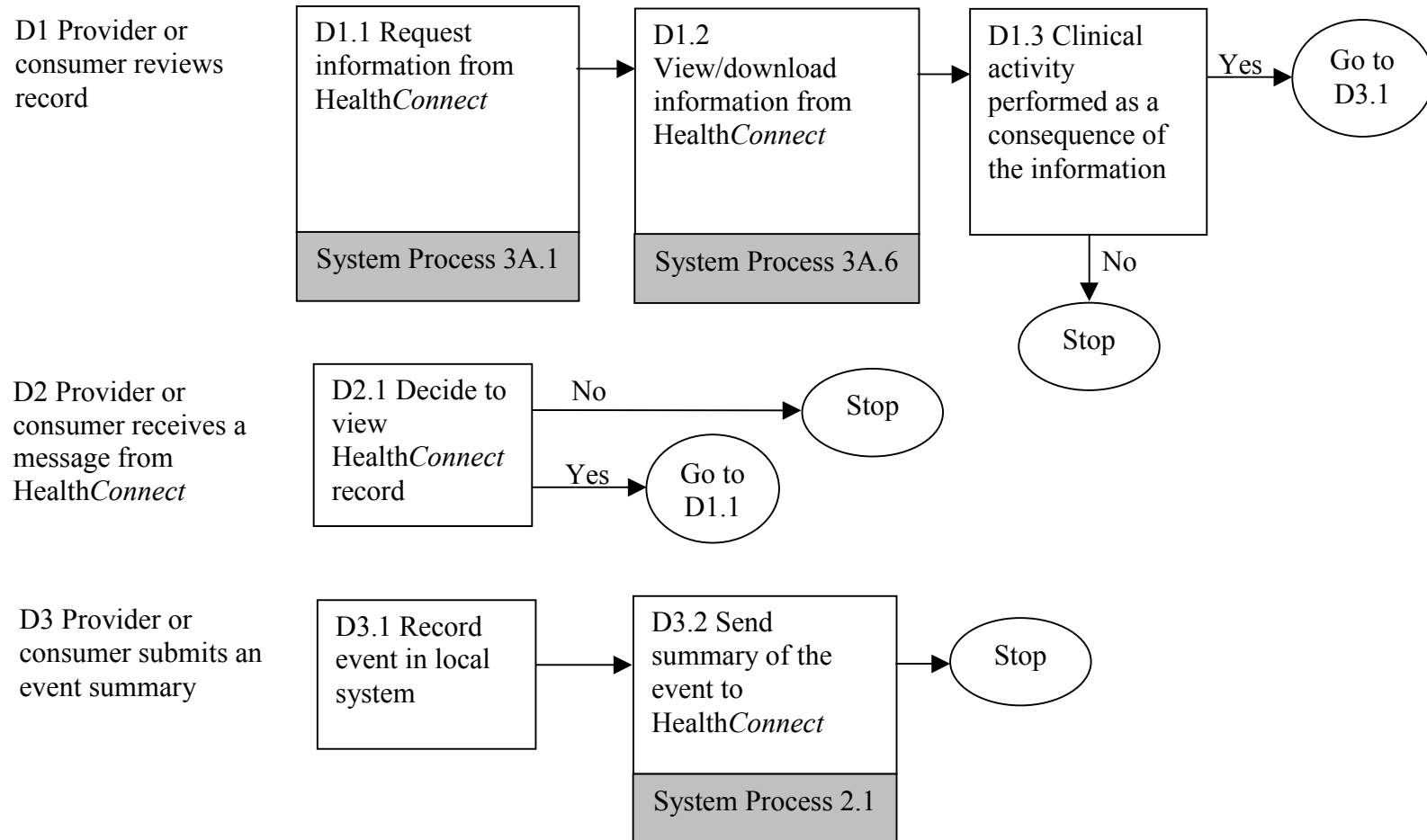
(this is essentially the same as C2.2)

[Dr Newton requests access to the various records. Dr Newton receives a message advising that the grandmother is due for her annual flu-shot. Angela says if you will give her the vaccine, she can get the Blue Nurses to administer it at home, and save her frail mother from an inconvenient trip.]

Covered by C1.1

Covered by C2.2

Business Process D: Provider interactions with HealthConnect in the absence of the consumer and consumer interactions with HealthConnect in the absence of the provider.



D. Provider interactions with HealthConnect in the absence of the consumer or vice versa

This process comprises activities related to accessing individual consumer records outside a consultation. Examples of this type of process include a:

- consumer accessing his or her own record;
- specialist reviewing records prior to a visit to a nursing home;
- general practitioner downloading record prior to consultation;
- an Emergency Department clinician looks up the HealthConnect record for a person that an ambulance officer or general practitioner has advised will be arriving soon;
- pathologist submitting a report;
- Royal Flying Doctor reviewing a record when called out; and
- general practitioner writing a prescription in response to a phone request/downloading HealthConnect view prior to consult.

HealthConnect will only be able to supply information to a provider where a previously established authority exists or covered under emergency access arrangements.

D1 Provider or consumer reviews record

D1.1 Request information from HealthConnect

This process involves activities such as:

- accessing the EHR View function of HealthConnect;
- selecting the view required – this may be set up as a preferred default; and
- triggering the extract/transmission of the information requested.

(this is essentially the same as C2.4)

D1.2 View/download information from HealthConnect

This process involves activities such as:

- accessing the view and clicking on hypertext links to find more detail; and
- selecting data to be integrated into the local system records – both administration and decision support systems (some of this may be done automatically with the option to select more detailed information for selected records).

(this is essentially the same as C2.5)

D1.3 Clinical activity performed as a consequence of the information

This process involves the provider or consumer performing a clinical activity as a consequence of reviewing the HealthConnect information provided, eg consumer performs self test as a result of a note in the record.

<p>When Kevin initially registered with HealthConnect, he consented to supplying his record to other nominated providers. Prior to the consultations with Kevin, the dietician and the ophthalmologist each access and review his HealthConnect record.</p>
<p>Selected records are downloaded into the clinicians’ local systems and Kevin’s HealthConnect record is not accessed during the consultations.</p>
<p> </p>

D2 Provider or consumer receives a message from HealthConnect*

D2.1 Decide to view HealthConnect record

This process involves making the decision to access an individual's HealthConnect record. Reasons might include:

- the message raises a concern and the clinician wishes to review historical events; and
- the message is a discharge notification and the clinician wishes to review the discharge summary.

It is envisaged that the clinician would log onto HealthConnect on a regular basis, for example first thing in the morning to receive relevant messages. Some messages would be sent directly to the consumer or provider and not await the logging on.

Not all messages would result in a review of HealthConnect events. (this is essentially the same as C2.2, C3.2)

*HealthConnect will have the capacity to send messages to participants.

Go to D1.1

D3 Provider or consumer submits an event summary

D3.1 Record event in local system

This process involves activities such as:

- recording pathology results;
- consumer recording self-treatment; and
- general practitioner writing a script in response to phone request.

The use of decision making tools located on the local system may be used at this point.

Upon Kevin's departure from hospital, Dr Newton is sent a notice from HealthConnect, via her preferred communication method of e-mail, informing her of Kevin's Emergency Department visit. She selects the Emergency Department visit view option, reads the event summary and downloads it into her local practice management system.

Dr Newton and the dietician stressed in previous consultations with Kevin the importance of losing weight. A couple of weeks later Kevin accesses HealthConnect through his home computer and records his weight.

This information is recorded in the local system in the normal way.

D3.2 Send summary of the event to HealthConnect

This process involves activities such as:

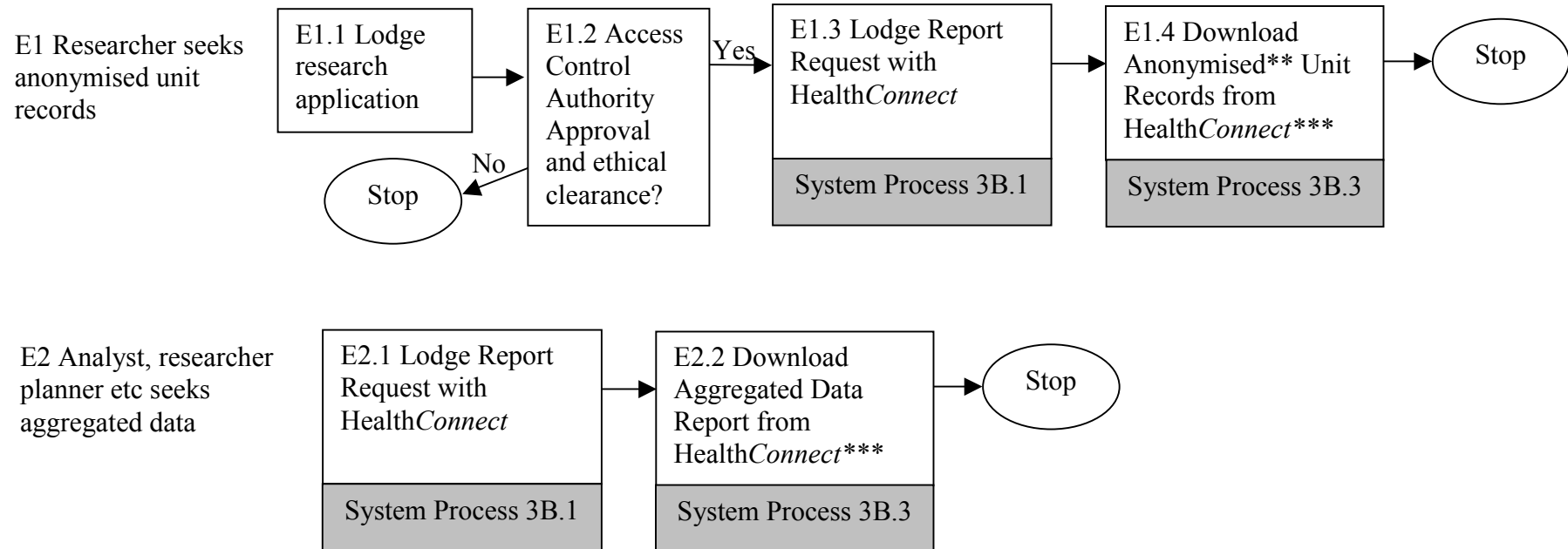
- accessing event summary generation screen;
- checking the event summary details for completeness (this could be done automatically); and
- accessing the submit event summary screen for HealthConnect (this could be done automatically).

(this is essentially the same as C1.3)

<p>Dr Newton and the dietician stressed in previous consultations with Kevin the importance of losing weight. A couple of weeks later Kevin accesses HealthConnect through his home computer and records his weight.</p> <p>The pathologist sends the microscopy/culture/sensitivity results to Dr Newton and also to HealthConnect.</p>

Business Process E: Secondary Uses*

The use of any individual's record for secondary uses would need to be in accordance with the consent policy and their personal consent settings.



*It is anticipated that most secondary uses could be satisfied with confidentialised (ie de-identified) and statistical data.

** Anonymised unit records would have all clearly identifying information such as name, address etc removed. They would still be potentially re-identifiable and consequently require the protections accorded by the consent policy for such information. For instance, only records of those people who had consented to their information being used for research purposes would be used in responding to the request.

***The output of this process would include a report advising that a request had been rejected.

E1 Researchers seeks anonymised unit records

E1.1 Lodge Research Application

This process involves the preparation of a request to the Access Control Authority to undertake research on information held in *HealthConnect*. This application would include sufficient information to enable the Authority to provide ethical clearance and to ensure compliance with access control requirements.

E1.2 Access Control Authority Approval

This process would involve the Access Control Authority determining whether the request satisfies the necessary ethical and access control requirements. The ethical requirements could be those set by the NHMRC or other relevant groups. The Access Control Authority will set the access control requirements to be satisfied.

E1.3 Lodge Report Request with HealthConnect

This process involves activities such as:

- logging onto *HealthConnect*;
- accessing the report request functionality of *HealthConnect*;
- constructing the query;
- triggering the transmission of the request; and
- logging off *HealthConnect*.

E1.4 Download Anonymised Unit Records from HealthConnect

This process involves activities such as:

- receiving notification that the report is available;
- logging onto *HealthConnect*;
- viewing the report*;
- downloading the data into the local system; and
- logging off *HealthConnect*.

*The report would only be compiled from event summaries of people who had consented to their information being used for research purposes. It is assumed that for the main part consent for this type of report would be explicit within the general consent framework. To do otherwise would potentially jeopardise a key function and area of benefit of *HealthConnect*.

E2 Analyst, researcher, planner etc seeks aggregated data

E2.1 Lodge Report Request with HealthConnect

This process involves activities such as:

- accessing the report request functionality of *HealthConnect*;
- constructing the query; and
- triggering the transmission of the request.

(this is essentially the same as E1.3)

E2.2 Download Aggregated Data Report from HealthConnect

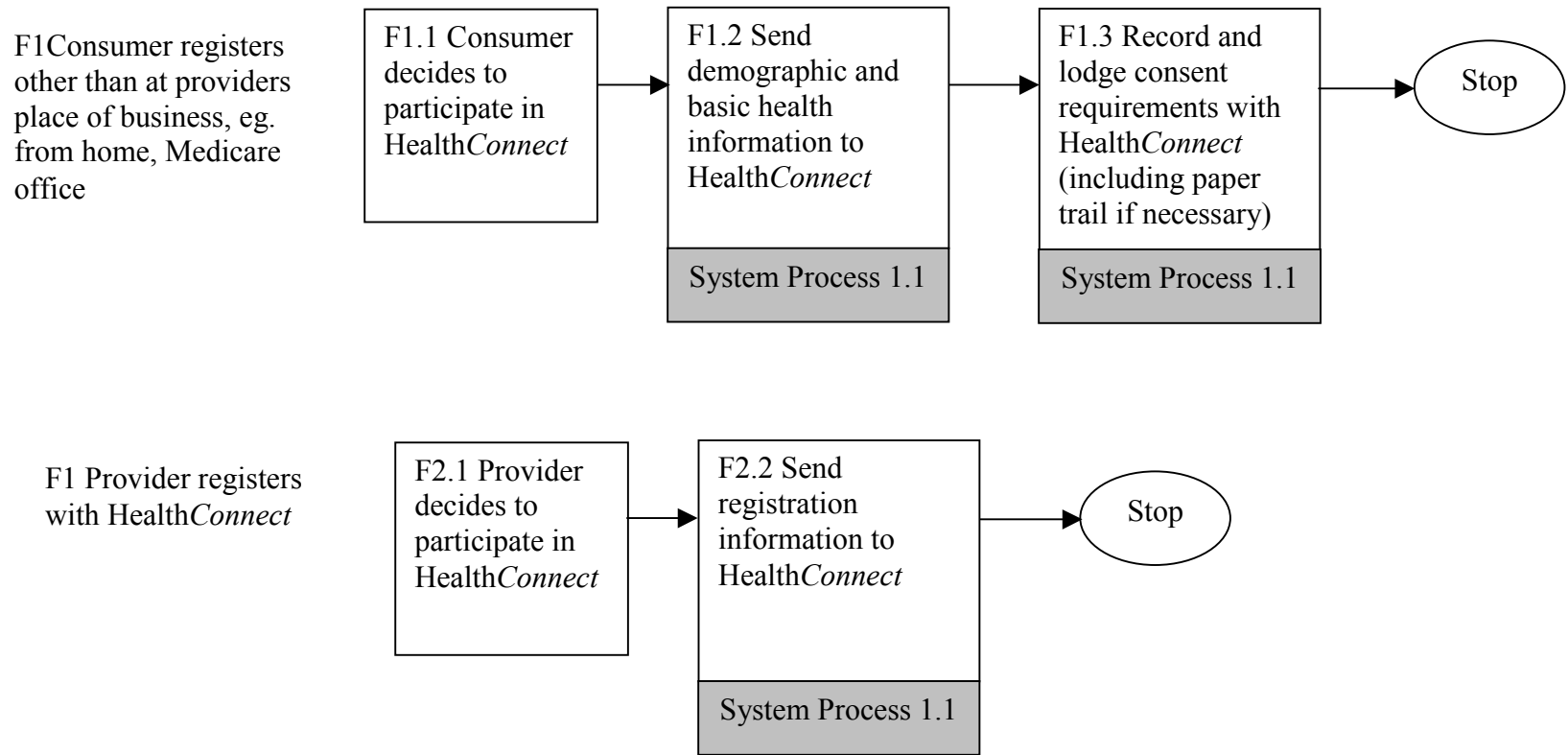
This process involves activities such as:

- receiving notification that the report is available;
- establishing a contact session with *HealthConnect*;
- viewing the report*;
- downloading the data into the analysts system; and
- closing the contact session with *HealthConnect*.

(this is essentially the same as E1.4)

*The report would only be compiled from event summaries of people who had given consent to their information being used for research purposes. It is assumed that, for the main part, consent for this type of report would be included within the general consent to participate. Subject to legislative controls. Such information would only be issued by the Access Control Authority under the strictest protocols. To do otherwise would potentially jeopardise a key function and area of benefit of *HealthConnect*.

Business Process F: Registration External from Place of Care



F Registration External from Place of Care

The mechanisms used to register providers and consumers would also be used to update register information.

F1 Consumer registers other than at providers place of business, eg from home, kiosk, call centre etc.

F1.1 Consumer decides to participate in HealthConnect

This process involves activities such as:

- consumer or agent accesses HealthConnect through an Access Service (possibly via the web, call centres, and kiosks);
- reviews documentation available on line which explains HealthConnect and outlines the scope and benefits of HealthConnect;
- agent provides advice as required (eg Medicare Officer, HealthConnect Help Desk); and
- downloads registration form for signing.

(this is essentially the same as A1.1)

This process also involves recording demographic and basic health information in the Access System.

F1.2 Send demographic and basic health information to HealthConnect

This process involves activities such as:

- accessing the new registration function of HealthConnect;
- this will trigger the extract/transmission of consumer demographic details, other relevant identifying information and basic health information from the Access System;
- checking that the consumer is not already on HealthConnect (may just have forgotten);
- providing the consumer with a HealthConnect number (possibly temporary so that the system can conduct further checking for duplicates etc); and
- confirmation of the registration being sent by post directly to the consumer, or prepared for collection at a nominated agent. This will include any physical devices required, eg smart card.

(this is essentially the same as A1.2)

F1.3 Record and lodge consent requirements with HealthConnect (including paper trail if necessary)

This process involves activities such as:

- accessing the consent screen for HealthConnect;
- entering the consent details required; and
- sending the paper document to HealthConnect for checking and validation.

(this is essentially the same as A1.3)

F2 Provider registers with HealthConnect

F2.1 Provider decides to participate in HealthConnect

This process involves activities such as:

- provider reviews *HealthConnect* documentation available including contractual implications and decides to participate; and
- completes registration form – paper, online, notifies central body.

F2.2 Send registration information to HealthConnect

This process involves activities such as:

- accessing the provider registration function of *HealthConnect*;
- this will trigger the extract/transmission of registration details from the Access System;
- checking that the provider is not already on *HealthConnect* (may have forgotten); and
- confirmation of the registration might be sent by post or perhaps collected by the provider from Office. This will include any physical devices required.

Business Process Issue: Consumer Registration

Consumer registration has a number of key issues to be resolved that include addressing:

- Where should the initial registration be conducted?
- Is the front desk of a GP surgery considered private enough for registration or will it need to be conducted as part of the consultation?
- Can bulk registration be achieved?
- What information will need to be provided to consumers to ensure that they understand the implications of registration?
- Could the registering agent unduly influence consumer choices on consent settings if they have an interest in subsequent use of the information?
- What type of risks/litigation exposure are providers open to by registering consumers on HealthConnect? How can this be best managed?
- What, if any, incentives would be required to achieve the quantity of registrations desired?

Although untested at this stage, it is envisaged that bulk initial registration might be achieved through completion of forms by consumers and submitted at Medicare offices, providers' place of business and by post (possibly by email and the web). These forms would be centrally processed. This registration process would be informed through public education programs, pamphlets, telephone helpdesks (internal and/or call centres) and web information. It is anticipated that a small percentage will wish to discuss some matters with a provider of their choice prior to registering (NB this arrangement may well be different for the trial sites). Should the percentage of registrations involving a provider consultation increase beyond a modest percentage, the increased consultation time and therefore consultation costs will need to be addressed.

Business Process Issue: Consumer Identification

Consumer identification for registration is critical especially as the consumers will be able to access their own records. A number of key issues to be resolved that include addressing:

- What forms of identification will be required - this could become extremely complex?
- How could the issue of identification be managed if online registration were made available? What would the impact of downtime have on business continuity?
- How can the number of duplicate registrations and creation of aliases be minimised, eg efficient searches of the existing registrations, use of external identification systems, use of matching algorithms, allocation of temporary numbers to allow time to check? This is a major problem within hospitals and becomes more challenging as the number of organisations involved become larger.
- How should the merging of records be managed? This is a major issue since mismatched event summaries will cause major data quality problems.

It may be possible for bulk initial registration of inpatients from State Unique Patient Identifiers if the necessary consent were given at the time of registration. In addition this would require significant criteria placed on the connection of a State Unique patient Identifiers before load was conducted. For example:

- How rigorous is the identification process for creating the Unique Patient Identifier
- the State Unique Patient Identifier must have been fully (ie all sites connected) operational for a period of years. This raises timing issues with community, general practitioner, etc., systems being gradually integrated;
- what percentage of potential duplicates are resolved within appropriate time frames (after initial amount addressed);
- Appropriate quality assurance measures in place (ie quality improvement programs, automatch verifications, transaction management, degree of compliance with sites, etc); and
- appropriate business rules and standardisation of registration processes compliance.

Business Process Issue: Authorisation Mechanism

Once the consumer is registered there is a major issue relating to the provision of the authority to access the consumer's EHR. Issues to be addressed include:

- Whether an access tool is required and if so what should it be? Smart cards for example have many issues including cost implications.
- How to design an authorisation process that is effective but simple enough not to adversely impact business practices?
- How do we control authorisation from an individual other than the consumer, eg carer, parent, guardian?
- How do we protect the interests of the consumer, eg the elderly and people with disabilities?
- What would constitute an emergency?

Consumer identification at the time of the event is also critical. Issues include:

- Will a provider be able to simply note that the consumer is known to them?
- Will 'proof of ID' tokens be required. These might include, for example, smart cards.
- What level of identity would be acceptable in an emergency?

Business Process Issue: Change Management

Over time *HealthConnect* will have a major impact on the business processes of providers and will bring fundamental changes and improvements in the provision of health care services. The resultant changes to business processes need to be managed including ensuring that:

- access to *HealthConnect* is as seamless and simple as possible;
- appropriate and widespread communication, education and training is made available so that participants are able to use *HealthConnect* effectively; and
- support is readily available should it be required, though operational focus will be on minimising the need.

Inadequate addressing of these change management issues has the potential to adversely impact buy-in to the concept and realisation of the many benefits that *HealthConnect* is targeting.

The *HealthConnect* Program Office has plans to develop a paper specifically addressing change management issues.

HealthConnect Processes - A System Perspective

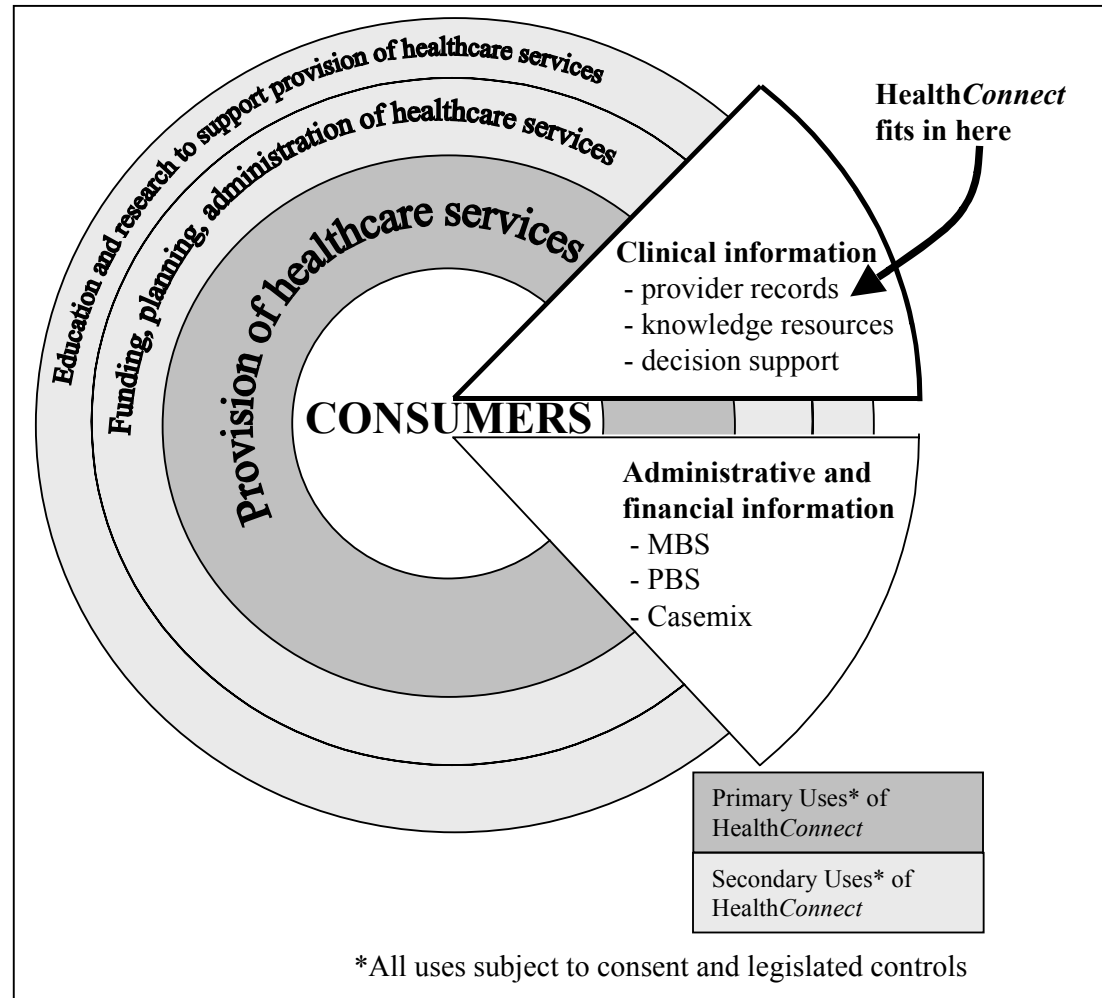
Overview of System Processes

The major system processes of the HealthConnect 'system' are described below using a modelling technique that maps the flow of data into, out off and within the system.

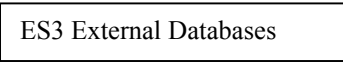

The diagram below describes HealthConnect's place within the wider health care system. The subsequent diagram then looks at the interactions that HealthConnect has with the wider health care system. It places HealthConnect at the centre and shows possible interactions between HealthConnect and external systems, ie the **Context**. This will be particularly important in determining what functionality needs to be provided within HealthConnect and what enhancements and interface development is required in external systems. The governance bodies would establish the rules and conditions under which such interactions would occur.

The third diagram provides details of the key processes within HealthConnect and the flow of data between these processes. The main processes are 1. Manage Participation, 2. Receive and Store Event Summary, and 3. Generate and Deliver EHR View/Report. These three processes are then broken down into their component processes and related data stores in the subsequent diagrams. These component processes are described in detail in the accompanying text. The diagrams also indicate where interfaces to external systems (ES) are required and where processes create significant data stores (DS).

The diagrams and associated descriptions deliberately omit some of the technical and operational activities such as some supporting security processes for clarity. These will be addressed in detail in the development of the system architecture.



Key to Data Flow Diagrams

- Ovals represent the major processes or activities that take place. The names of the processes describe the process briefly. The number indicates the level at which the process first appears, eg the process “2.5 Store Event Summaries” is a component of process “2. Receive and Store Event Summary”.
- Rectangles represent the external systems which provide/receive data from the system. The names of these external systems indicate the type of system being interfaced, eg.  might include the Australia Childhood Immunisation Register.
- Parallel lines represent data stores accessed by different processes. The names of these stores indicate the data stored, eg.  is a data store that contains “Event Summaries”.

HealthConnect Access System

The development of the process descriptions raises the concept of an Access System. The Business Architecture addresses the functionality required for the core HealthConnect ‘system’. There will also be the need to establish mechanisms to access HealthConnect. It is anticipated that specialised HealthConnect Access System(s) will be developed. Software vendors may choose to incorporate some or all of the access mechanisms into their operational systems.

The functions required of the access system are discussed in more detail in Section 5.

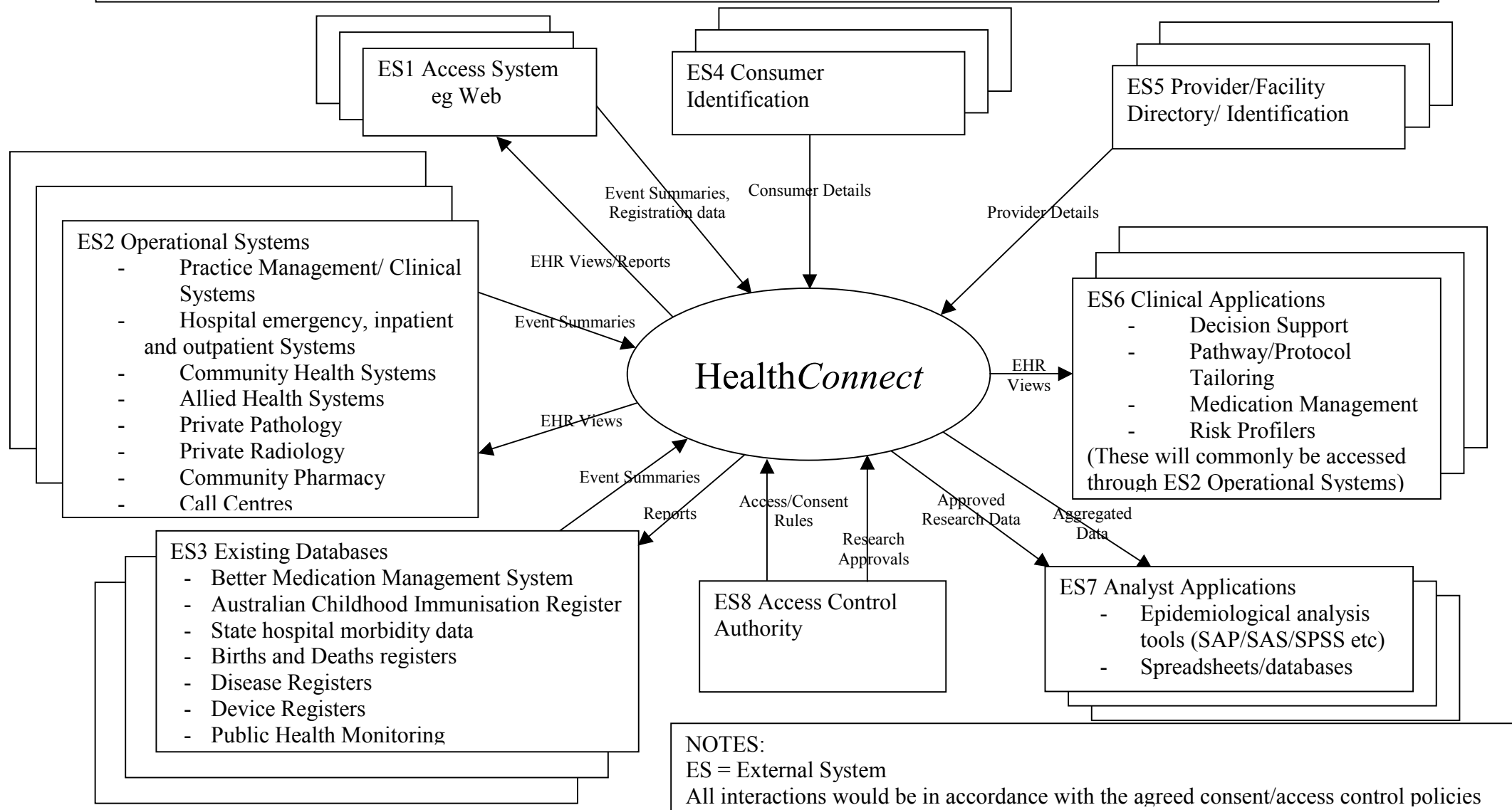
The Access System(s) could be developed on a range of technology platforms. A key requirement will be for them to be easy to access and maintain throughout Australia making web based or similar technologies likely platforms. This issue will be addressed in the System Architecture.

The access functions might include:

- Consumer Registration Screens – initial and updates;
- Provider Registration Screens – initial and updates;
- Consent Screens to create and update consent settings;
- Authority Screens to record individual access authorisation;
- Event Summary Displays – to allow for review and, if appropriate, editing prior to issue;
- EHR View screen - selection of view type (eg GP-Diabetic) and subsequent display; and
- Secondary Uses Report screen– selection of report parameters and display/download.

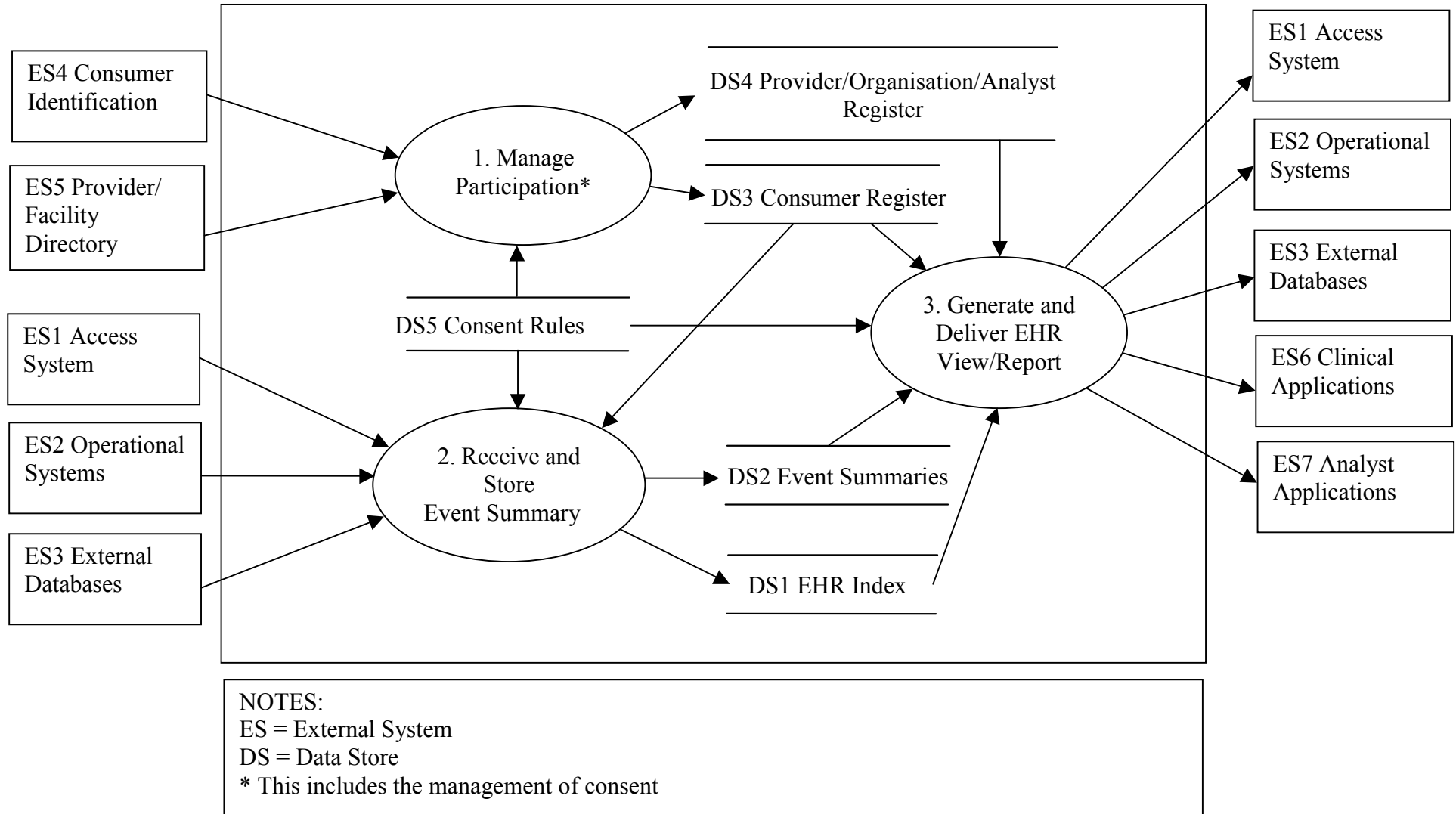
HealthConnect Context Diagram

This diagram describes the environment within which the HealthConnect 'system' would be operating. It shows possible interactions with systems external to the HealthConnect 'system'. It indicates the types of information that could flow between HealthConnect and those other systems. The governance bodies would establish the rules and conditions under which such interactions would occur.

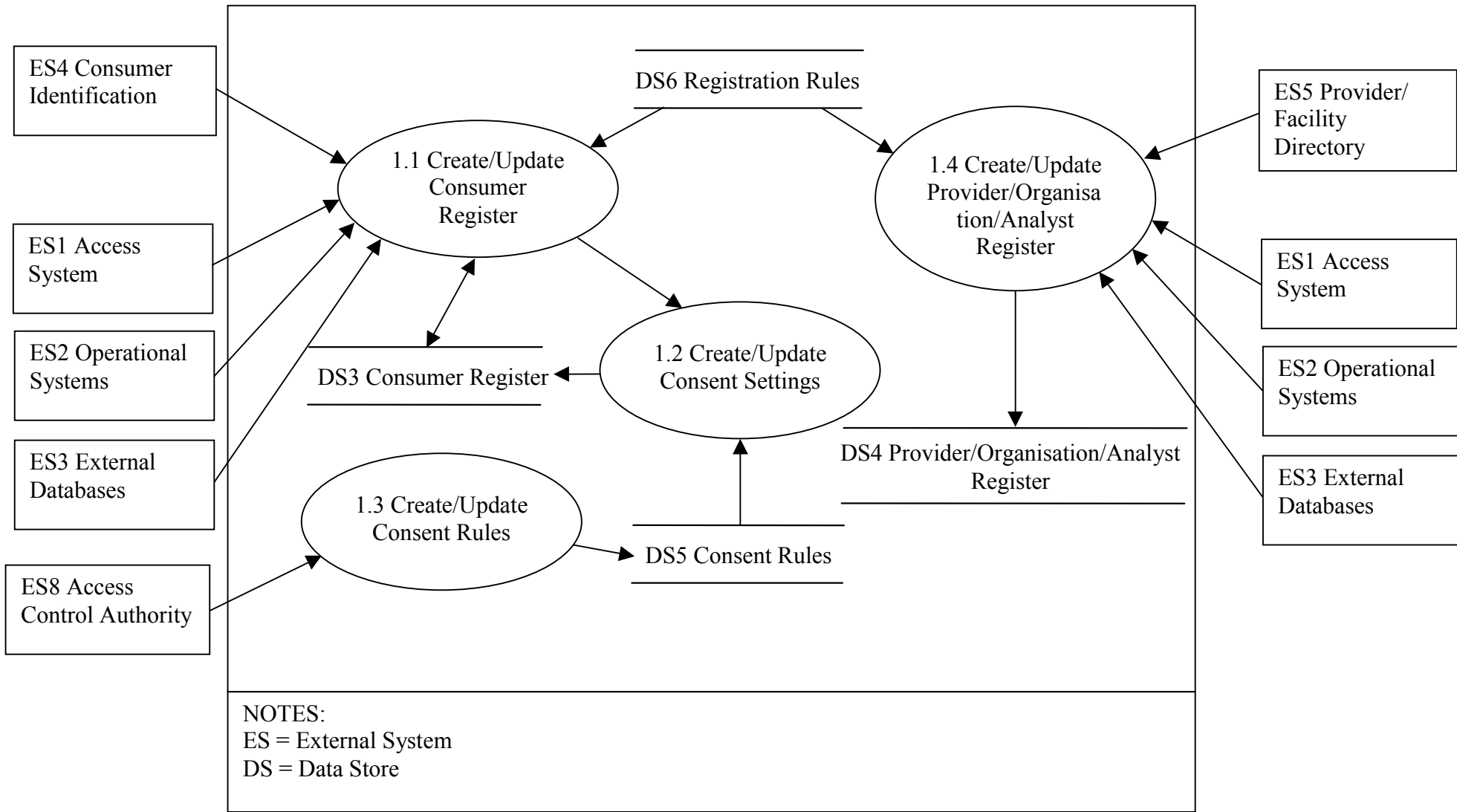


HealthConnect System Overview

This diagram identifies the major processes, key internal data stores and associated flow of data involved in achieving the necessary responses to the interactions with the external systems. Subsequent diagrams describe the major processes in greater detail.



System Process 1- Manage Participation



System Process Descriptions

1 Manage Participation

This process comprises all the aspects of participation management in *HealthConnect*. Fundamental to this process is that it should support the agreed consent policy. The consent policy has not yet been finalised. A discussion paper and consultation process is being progressed in order to inform decisions on the models for consent to be examined in the trial sites. The Business Architecture has to be sufficiently flexible to be able to deliver the consent policy once it has been finalised. An extract from the draft discussion paper has been included as an attachment to this document to provide some context for the functions included in the architecture to support consent.

1.1 Create/Update Consumer Register

This process comprises the registration of consumers for *HealthConnect* including the recording and the maintenance of the information necessary to enable their use of *HealthConnect*:

- ability to record and submit consumer participation information in a number of ways, for example:
 - through the *HealthConnect* Access System(s) data entry mechanism;
 - from operational systems where the information and functionality exists;
 - from external databases with relevant information;
 - from area/state/national consumer identifier databases, where they exist (subject to consent);
- ability to update functionality/messaging for details such as change of address, change of consent details, updates to allergies, etc,
- ability to provide updated registration details so that the providers' operational systems can be updated; and
- ability to record and act on a decision to discontinue participation.

Consumer participation information would include:

- demographic data (eg name, sex, date of birth, address, contact details);
- related parties eg contacts, carers, parent, guardians (identification details and relationship); and
- consent requirements (eg what general form of consent, exceptions to that general form, providers nominated by the consumer).

Medical history details collected at the time of registration (eg known allergies, current alerts and warnings, major diagnoses, key historical events, etc) would be stored as an initial event summary. Either the consumer or a provider could provide this information.

(Refer to DS2 Consumer Register)

1.2 **Create/Update Consent Settings**

This process comprises the registration of consumer consent onto the Consumer Register including:

- access to consumer consent details via the Create/Update Consumer Register process:
 - through a widely accessible Access System, eg web based; and
 - from operational systems/external databases, where the information and functionality exists;
- consent creation function which enables the responses to consumer consent questions to be recorded and the consent settings established; and
- update function which enables changes to consumer question responses/consent settings, reconfirmation of consent, etc according to the consent models.

The types of questions to be asked and the forms to be used will depend on the consent models adopted.

Consent will be included in the initial registration.

1.3 **Create/Update Consent Rules**

This process comprises the establishment and update of consent rules including:

- defining the types of consent options that can be selected, eg by individual provider and/or by classification of event (mental health, etc.); and
- updating consent options including the management of access to records that were established under previous more rigorous consent rules.

(Refer to DS5 Consent Rules)

This would include the definition of rules for withdrawing consent.

This would be an internally controlled process not accessible by individual consumers and providers.

1.4 **Create/Update Provider/Organisation/Analyst Register**

This process comprises the registration of all non-consumer users of *HealthConnect* such as:

- individual providers – general practitioners, specialists, hospital registrars, allied health professionals, community health workers, etc, who would be allowed access to individual consumer records subject to consent;
- organisations, such as Area Health Services, individual hospitals, community health clinics, divisions of general practice and group practices, for supply of information and access to data in accordance with the appropriate rules and processes; and

Draft - For Comment

- non-clinical users, eg planners and researchers, who would be allowed access to data in accordance with the appropriate rules and processes, via the Access Control Authority.

The registration will distinguish between researchers provided with anonymised unit record data versus ‘analysts’ who require only aggregated data from which an individual’s health information cannot be determined. Anonymised unit record data will require appropriate ethical approval and adherence to the privacy regime; aggregated data can be provided to a wider range of individuals subject to the rules of the Access Control Authority.

The process would include:

- ability to capture and submit provider/facility participation information in a number of ways, for example:
 - through a widely accessible Access Systems, eg web based for individual providers;
 - from operational systems – the functionality to register could be incorporated into existing software;
 - from external databases, where the information and functionality exists, eg list of clinicians registered in a hospital patient administration system;
 - from area/state/national provider identifier databases, where they exist, eg HIC register, provider directories; and
- update functionality/update messaging would be established for details such as change of location and change of category details.

Provider participation information would include demographic data, role(s) (eg GP, specialist, emergency department clinician or researcher).

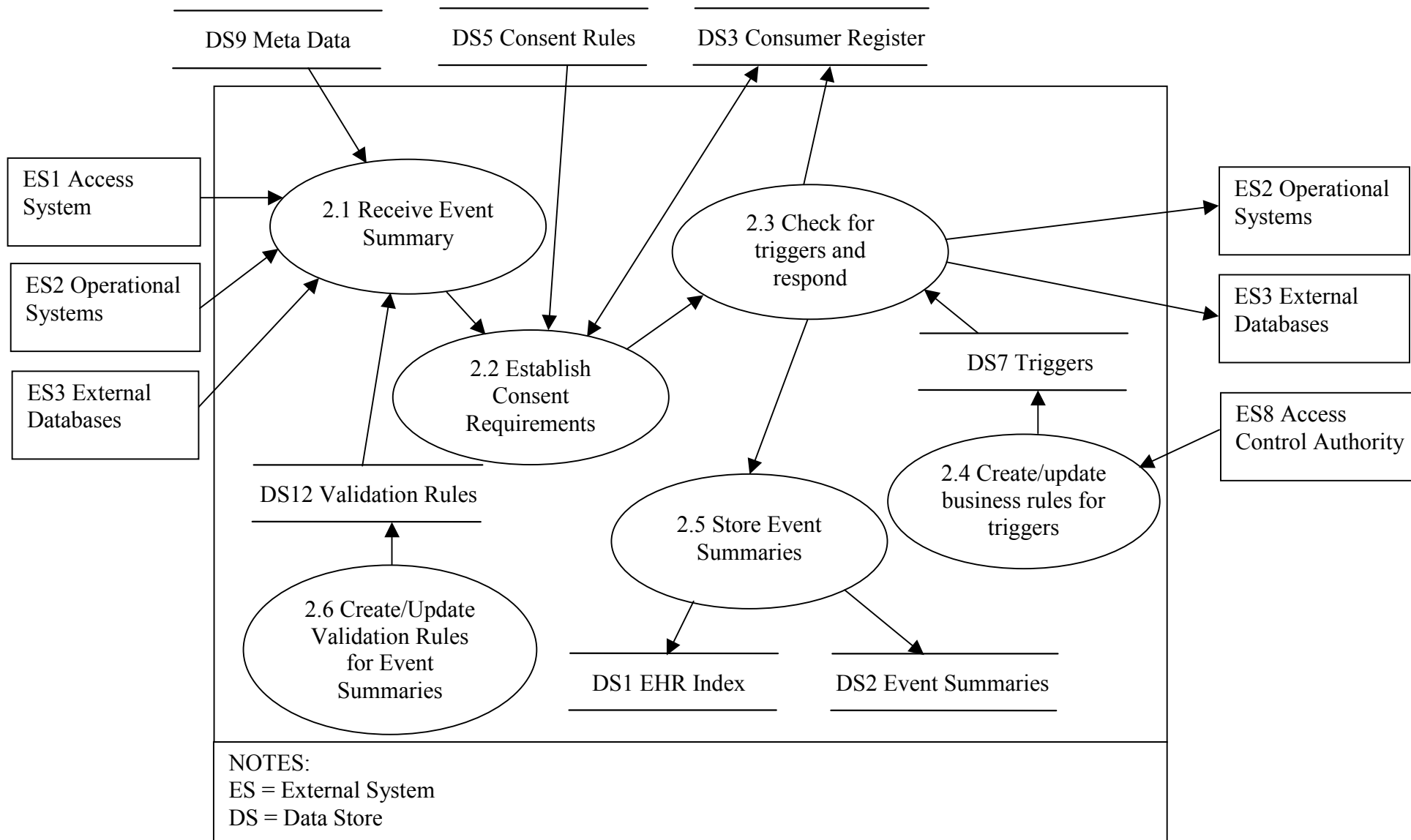
(Refer to DS3 Provider/Organisation/Analyst Register)

It is envisaged that large scale initial registration might be achieved through access to existing provider directories with the completion of forms by the providers to be submitted by post or fax (possibly by email and the web) to ensure consent has been given.

Manage participation issue: Consent models

Consent is a major issue. Consent models, and the strategy for further clarification of consent rules are currently being developed for discussion. The subject of consent and possible consent options is discussed in more detail in the attachment.

System Process 2 – Receive and Store Event Summary



2 Receive and Store Event Summary

This process comprises all the activities involved in HealthConnect receiving and storing of event summaries, initial and updates.

2.1 Receive Event Summary

This process comprises HealthConnect receiving the event summary including:

- receiving the message;
- checking the message for completeness, authorisation/authentication/identification and validity, returning an error message if necessary;
- checking for viruses and other contaminants; and
- sending a confirmation of receipt back to the source system.

Mandatory fields will include:

- provider ID (including multiple providers, eg for Enhanced Primary Care planning events);
- consumer ID (including carers, multiple consumers, eg family counselling);
- date and time of event (duration - optional);
- location of event (including multiple locations, eg for Telehealth);
- event summary type (eg doctor consultation, hospital visit, pathology test, medication dispensing); and
- event summary content.

It is likely that additional fields such as event summary category may be required to assist the management of storing/indexing and access of the records. For example, it may be necessary to perform some logic analysis to identify the event as a mental health event in order to restrict future access.

There may be situations where an update to an event summary is required, eg to fix a typographical error. How this would be handled needs to be investigated and processes established to maintain data integrity and quality.

The source system (eg GP practice management system) will need to develop the functionality to seamlessly extract the relevant information, construct the event summary message in the defined format and authorise its transmission.

Core medical history details collected at the time of registration (eg known allergies, current alerts and warnings, major diagnoses, key historical events, etc) would be stored as an initial event summary.

2.2 Establish Consent Requirements

This process comprises establishing the consent requirements for the individual event summary including:

- recording consent has been given to store the event summary in *HealthConnect*, if required by the consent rules and settings;
- checking whether this type/category of event for this individual consumer can be stored under the consent rules and settings; and
- checking the type/category of the event summary and setting a series of flags, in accordance with the consumer's settings, on the record to ensure that future access is appropriately controlled. These flags are for internal use and will not be visible to *HealthConnect* users.

(Refer to DS3 Consumer Register and DS5 Consent Rules)

2.3 Check for Triggers and Respond

This process comprises checking the event summary details for immediate action. Triggers are a set of rules which say if a certain condition is satisfied perform a defined action. The process includes:

- checking the event details against the set of predefined trigger events;
- constructing and sending the appropriate message – identify relevant recipients, populating the message, and managing the transmission/receipt acknowledgment, etc.; and
- annotating the event summary to indicate when the message was sent/received, how and to whom.

Types of trigger events might include:

- death notification sent to a consumer's nominated GP/specialist;
- birth of a baby sent to interested parties;
- hospital discharge notification, sent to a consumer's nominated GP/specialist;
- implantable device notification sent to database register;
- immunisation; and
- notifiable diseases sent to Public Health Unit/register according to post code of consumer/provider.

(Refer to DS7 Triggers)

2.4 Create/Update Business Rules for Triggers

This process comprises the establishment and update of Business Rules for Triggers including:

- defining the event summary content that fires a trigger;
- defining the actions relevant to the trigger – what message, sent to whom, how, when, etc;
- defining levels of consent required to make the trigger operational;
- defining type of trigger event including differentiating between an ‘action required’ and a ‘for your information’; and
- updating trigger event rules.

These rules will need to clearly define how the trigger is to be identified, when the result of a trigger is delivered, and which people have permission to see the output of a particular trigger.

(Refer to DS7 Triggers)

This would be a centrally controlled process not accessible by individual consumers and providers.

2.5 Store Event Summaries

This process comprises:

- storing the event summary;
- identifying the appropriate consumer EHR Index Entry and adding the event summary descriptions (with URL, consent and other flags);
- checking established lists/fields and adding reference to data from the event summary to the lists/fields as appropriate, eg add a diagnosis or a due date to the basic medical history record; and
- managing the archiving of historical data according to established rules.

(Refer to DS1 EHR Index and DS2 Event Summaries)

A mechanism for handling multiple event summaries for the same event, eg where the summaries are identical, provide different information, provide conflicting information will need to be included

2.6 Create/Update Validation Rules for Event Summaries

This process comprises the establishment and update of Validation Rules for the various types of event summaries including:

- defining the mandatory data fields;
- defining valid ranges and codes for data elements, etc; and
- updating validation rules.

(Refer to DS12 Validation Rules)

The rules associated with the creation of event summaries will require careful thought and consultation and may take some time to finalise and signoff by stakeholders.

Event Summary Issue: Event Summary Definitions

There is a significant amount of work to be undertaken relating to the definition of Event Summaries. It is proposed that the format of the event summaries be kept simple in the short term and allowed to evolve over time. Many providers consulted have indicated that simply knowing that an event took place is extremely valuable. It is suggested that the proposed **HealthConnect Clinical Authority** should approve and control event summary definitions within the boundaries of *HealthConnect*. This is likely to simply consist of ratifying agreed national standards.

Some progress has been made on:

- developing standards for Hospital Discharge Summaries/Referrals;
- medication prescriptions and dispensing reports through BMMS; and
- pathology through the current electronic transmission of results.

This should be reviewed and built on. The trials will provide valuable input to this activity.

Mechanisms for handling multiple types of treatment in a single consultation, where they may impact on subsequent access rights, will have to be developed. For example, a consumer presenting with a cut finger, also discussing his/her depression and seeking a script for treating gonorrhoea in the same consultation may lead to an arrangement where several event summaries are generated at the one event to allow for the control of access to sensitive information such as mental and sexual health matters.

Mechanisms for handling multiple providers at the same event will also have to be developed. This will need to include rules for how to handle discrepancies between the information provided by the providers eg different opinions on the diagnosis or outcomes of the treatment.

Event summaries will also need to contain elements to support care planning such as goals, reminders, careplans etc. How best to incorporate this requires further investigation. However, *HealthConnect* is not intended to replace specialised coordinated care system functionality.

Event Summary Issue: Timing of Receipt of Event Summary

An event summary should ideally be sent to *HealthConnect* as close to the time of the event as is practicable. Relevant issues include:

- Should a pathology result be sent to *HealthConnect* at the same time it is sent to the requestor? If so should it be available for viewing by the consumer or other providers before the requestor has reviewed it? Alternatively should the pathology report be sent to *HealthConnect* by the requestor after they have reviewed it? Or should the pathology result only be sent to *HealthConnect* and the requestor notified?
- GPs and/or their practice management system operations may elect to send event summaries in batch at the end of the day. This may have implications for pharmacies should a person walk out of the GP and into the pharmacy immediately to fill a script.
- Hospital discharge referrals will need to be signed off by the authorised clinician prior to being sent. *HealthConnect* will be dependent of hospital procedures for its timeliness.

Event Summary Issue: Delivery of Event Summaries

There is an issue regarding the pathway that information follows in reaching *HealthConnect* and relevant providers. *HealthConnect* is not intended to replace existing operational communication procedures (eg result of pathology tests being sent to the GP) for those consumers and providers that do not opt-in. In the longer term as there are opportunities to take advantage of the infrastructure upon which *HealthConnect* is based a greater proportion of consumers and providers are expected to opt-in. This would result in providers choosing to send information via *HealthConnect* where currently they send it directly. So for example a pathology result, or hospital discharge summary could be sent directly to *HealthConnect* and a notification sent to the relevant provider. The notification could be sent directly by the issuing organisation or by *HealthConnect* based on information included in the event summary itself.

Event Summary Issue: Archiving of Event Summaries

After a number of years the volume of information in *HealthConnect* could become enormous. Some types of information age faster than others. Even with the ever-increasing capacity to store and rapidly access data archiving of old, rarely used data could provide important performance benefits.

Issues include:

- How long would each type of information be kept online;
- How much archiving could be automated;
- Where would archived be stored;
- How quickly could that data be retrieved if required; and
- How would differing legislative requirements in the Commonwealth, States and Territories affect *HealthConnect* storage, archiving and disposal arrangements?

Event Summary Issue: Collection of initial health history

Key historical information about an individual will need to be incorporated into *HealthConnect* to maximise its effectiveness. Provision has been made for the collection of basic health information about an individual at the time of registration. It is neither clear what information ought to be collected nor how it might be collected. The types of information that are likely to be relevant at the time of initial registration include:

- Medication and food allergies and sensitivities;
- Major past events (eg heart disease, surgery, hip replacement);
- Major diagnoses (eg diabetes, asthma);
- Immunisation record;
- Date of last screening tests (eg pap smear)
- Current medications;
- Current treatments; and
- Family history.

Collection alternatives during registration include:

- drawing information from a person's existing record if registering at a doctor's surgery or other place of care;
- having an agent such as a receptionist or Medicare officer entering information provided verbally by the consumer (this raises major issues of privacy and accuracy).

Once registered other possibilities include:

- with consent, information could be sourced from external systems such as the Australian Childhood Immunisation Register, Cancer registers or State government records (there will be issues around accurate identification and the accuracy of the data collected. Suggesting that a verification step would be required);
- the consumer could enter information online (this raises issues of verification); and
- a provider could record the history and report it as an event summary, (this has cost implications).

Event Summary Issue: Control of Trigger Rules

Most responses to a request for information will be provided as soon as possible. Some requests however, will be for information at a particular future point in time or if a specified event subsequently occurs. Triggers are a means of *HealthConnect* issuing a message if certain conditions are met. Triggers will result in an automated response and as such need to be defined and controlled carefully. It is proposed that the **HealthConnect Clinical Authority** approves and controls triggers and liaises with the Access Control Authority to ensure that consent issues are upheld.

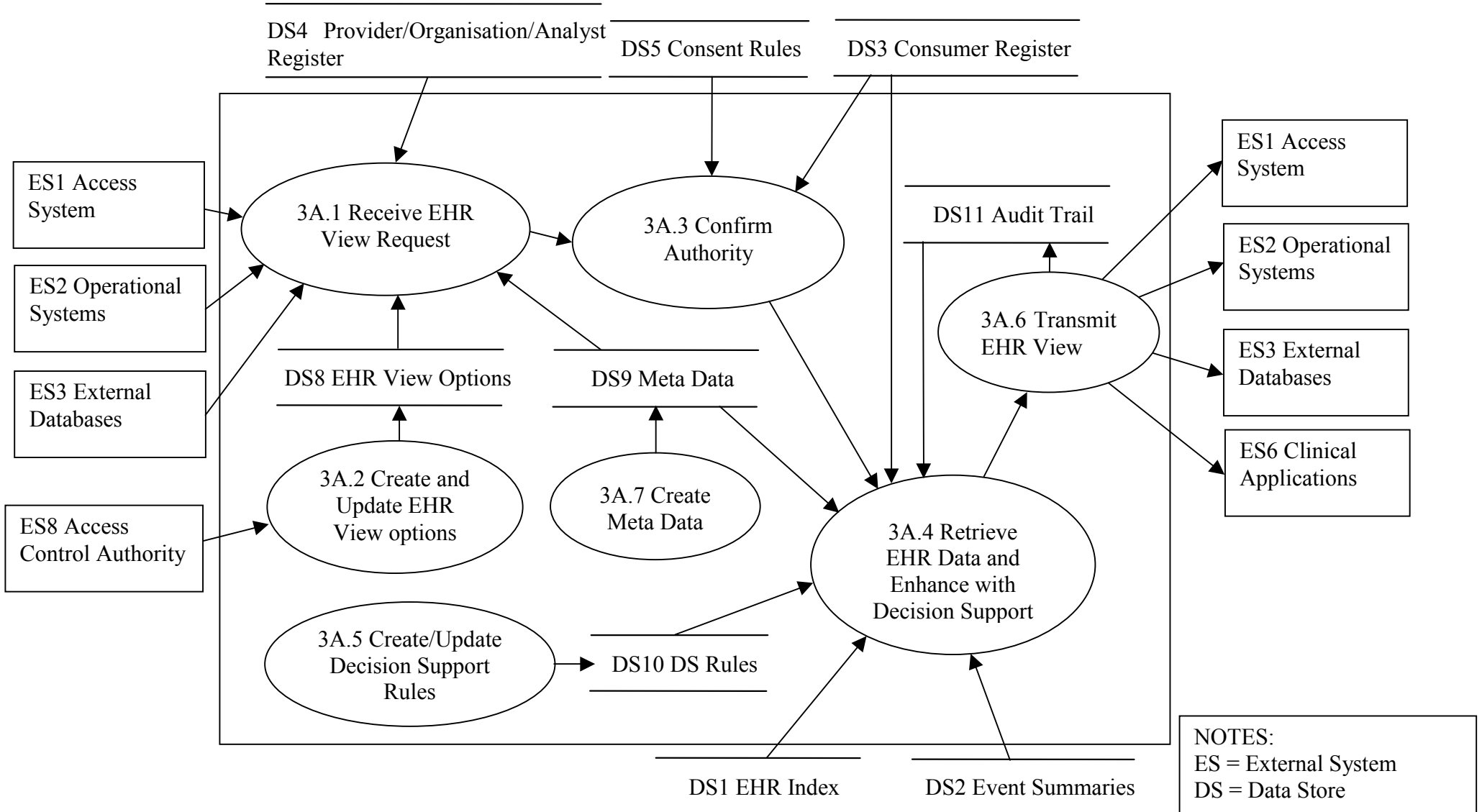
Triggers might be defined:

- by the type of event summary, eg discharge notifications to go to consumer's registered general practitioner;
- as an operational process, eg child's immunisation event to be sent automatically to the Australian Childhood Immunisation Register; and
- through a submission by an interested group to the Clinical Authority.

The process for checking for triggers as described commences upon the arrival of an event summary. Another class of trigger might be the actions performed at a nominated moment in time, eg once a day a report might go a public health monitoring group with total numbers of infectious diseases by region.

Triggers will be limited and kept simple so that they can be tightly managed.

System Process 3A – Generate and Deliver EHR View (Primary Uses)



3A Generate and Deliver EHR View (Primary Uses)

This process comprises the activities involved in the preparation and transmission of information to authorised users.

3A.1 Receive EHR View Request

This process comprises the receipt of a request for HealthConnect data including:

- receiving the view request message;
- checking the message for completeness, authentication, and validity, returning an error message if necessary; and
- sending an acknowledgment back to the source system.

Mandatory fields will include user ID (usually provider ID), view type (eg General Practice Health Summary, Emergency Department Summary etc), and view defining characteristics (eg consumer defining characteristic - usually consumer ID).

The source system may have the ability to develop the request including extracting the relevant information (provider ID, consumer ID or IDs for lists of patients), select the view type, provide the search criteria, and construct the message in the defined format. Alternatively, it may interface with the HealthConnect Access System and pass the required information across.

3A.2 Create and Update EHR View Options

This process comprises the creation and update of the types of views available:

- defining the base components for view types, eg summary medical history, lists of recent consultations, pathology results, etc;
- provision of standard list of view options;
- ability for providers/consumers to customise the view options using the base building blocks; and
- ad hoc queries.

View Options might include options to only display event summaries added after a selected date, eg the last time the provider accessed this consumer's EHR.

(Refer to DS8 View Options)

The creation of the components would be a centrally controlled process. Individual consumers, providers and other users would have flexibility in the linking of these blocks.

3A.3 Confirm Authority

This process comprises confirming that the requestor of the view has the authority to receive it including:

- checking the provider type against the view rules, eg podiatrist not having access to a mental health view; and
- checking consumer consent for the requesting provider – this may be standing order consent for specified providers, for providers directly involved in the care of the consumer, or consent given at the point of care.

The source/access systems will have to incorporate a mechanism for recording consent at the point of care.

3A.4 Retrieve EHR Data and Enhance with Decision Support

This process comprises creation of the view and the subsequent internal analysis including:

- retrieve the appropriate data from the available event summaries;
- create the data view requested; and
- conduct basic analysis, eg highlight critical results, provide warnings of overdue checks/immunisation, etc.

It is envisaged that the level of decision support will be limited in the first instance with the focus being on simple analysis being conducted internally and extracts being exported for more sophisticated decision support. Of the four levels of decision support (described below in key issues) only Level 1 and possibly a little of Level 2 would be applicable. That is:

Level 1 – Decision Support Systems that provide base level categorised information that requires further processing and analysis by users before a decision could be arrived at.

Level 2 – Decision Systems Software that present clinicians with trends of patients changing clinical status and alerts about out of range assessment results and intervention strategies. Clinicians are prompted to review information related to the alerts before arriving at a clinical decision.

3A.5 Create/Update Decision Support rules

This process comprises the establishment and update of the internal decision support rules available:

- defining basic elements of decision support rules;
- provision of an approved set of decision support rules; and
- provision of updates by the HealthConnect Clinical Control Authority.

(Refer to DS10 Decision Support Rules)

3A.6 Transmit EHR View

This process comprises the transmission of the view to the requestor's system including:

- sending the message necessary to:
 - display the view on the desktop technology such as a web browser;
 - download the view into the Operational System (ES2);
 - download the data into a Clinical Application (ES6) for further analysis;
- recording access for audit purposes; and
- checking receipt acknowledgment and resending if required.

(Refer to DS11 Audit Trail)

The external systems will need to be modified to receive and handle the view information.

3A.7 Create Meta data

This process comprises establishing meta data to assist the understanding and interpretation of the individual data items including:

- documenting descriptions of the individual data items and processes;
- providing cross-references to coding lists; and
- establishing cross-references to defined standards.

The creation and update of the meta data will be a central process though it is anticipated that specific organisations would be given responsibility for updating subsections of the meta data. Individual users will be provided view access only.

(Refer to DS9 Meta Data)

View Issue: Support for care planning

The essence of care planning is the preparation and execution of a plan involving one or more future treatment activities intended to achieve a set of desired outcomes, both clinical and personal. There is a wide array of activities that fit this model. At its simplest care planning includes a decision to prescribe a course of antibiotics to clear a bacterial infection and enable the treated individual to return to work. At its most complex it includes the preparation and execution of a binding agreement by a group of care provider organisations to provide an array of services over a period of many months in order to rehabilitate a person with multiple physical and psychological disorders/injuries. In between these two extremes are activities such as the decision by a doctor to refer a person with diabetes to a dietician, ophthalmologist and podiatrist in accordance with a generally agreed evidence-based guideline and a decision to implement a standard care pathway or protocol within a hospital setting to manage the care of a patient.

One of the critical features of care planning at the complex end of the spectrum, such as that which occurs in coordinated care trials, is that the plan is the means of managing resource use and financing. HealthConnect has deliberately kept clear of involvement with financial management as recommended by the Taskforce. Maintaining this distinction while effectively supporting clinical care will be one of the defining characteristics of how HealthConnect supports care planning.

In order to meet the information needs of users, HealthConnect will draw on previously reported event summaries and present partial views of the complete EHR. The key question to be resolved is how the event summary model, which is based on information about past events, can support the process of care planning which is fundamentally about future activities.

The immediate task will be to determine the views that would assist with care planning activities and subsequently identifying what event summaries would supply the required data.

View Issue: Creating and maintaining 'Views' of current information

There will be two types of views presented by HealthConnect. The first will present historical information eg a list of services provided, or a plot of blood results over the last two years. The second is the presentation of information that purports to relate to the present moment such as current medications and treatments, family history and allergies. The first can be characterised as true at the time the data was collected, the second as being true at the time the data is presented.

There is an operational issue and potentially a legal issue as well in this apparently semantic distinction. Presenting historical information merely relies on it being accurate at the time it was collected. Presenting current information requires processes for ensuring it is updated when something changes. The operational issue is how the view is generated when requested. It could be built 'on-the-fly' from data held in event summaries or it could be stored as a separate object that is updated as new data is received. The former may not be sufficiently accurate unless the information necessary to update the view (especially deletion information eg ceased medication) is collected through standard event summaries. The latter may require some policy and process around how, and possibly by whom the stored view is updated.

This issue will be resolved in the development of the System Architecture.

View Issue: Downloading

Providers will be able to download views into their local systems. The individual provider and his/her organisation will then need to take responsibility for controlling the access and distribution of the data. It is likely that, when using such information, the provider will have the responsibility of ensuring the information is still accurate. This may imply a need to check whether any updates to the records have been made since the view was downloaded.

View Issue: Decision Support

It is argued that there are different levels of decision support (defined below). It is anticipated that decision support rules within *HealthConnect* would address some Level 1, and a few Level 2 rules. Other levels of decision support would be supported through *HealthConnect* providing data to specialised decision support tools.

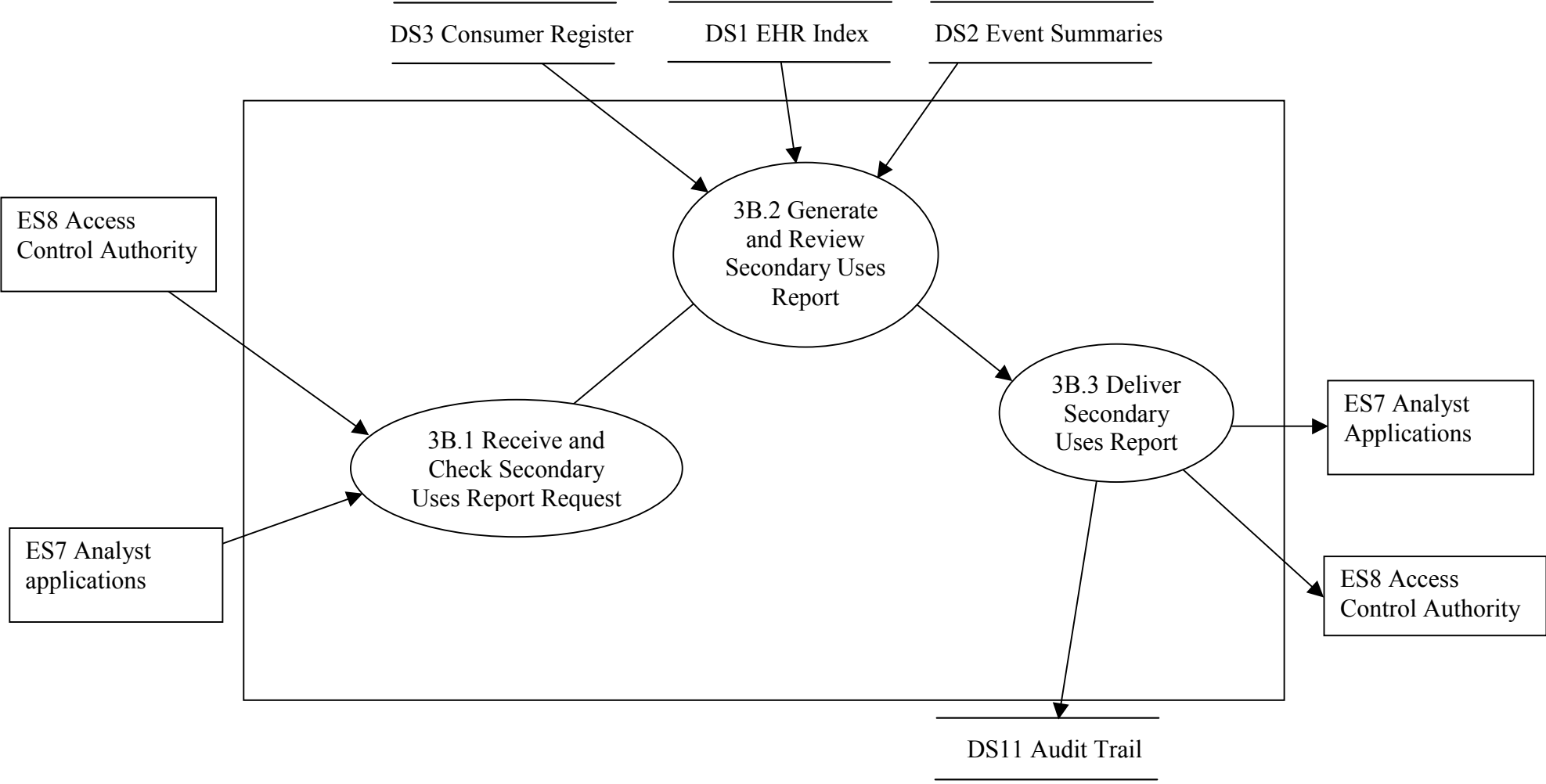
I Level 1 - Decision support provides base level categorised information that requires further processing and analysis by users before a decision could be arrived at.

II Level 2 Decision support presents clinicians with trends of patient's changing clinical status and alerts about out of range assessment results and intervention strategies. Clinicians are prompted to review information related to the alerts before arriving at a clinical decision.

III. Level 3 - Decision support uses deductive inference engines to operate on some knowledge base and automatically generate diagnostic or intervention recommendations based on changing patient clinical condition and the knowledge and inference engines in stored the knowledge base.

IV. Level 4 - Decision support uses more complex knowledge management and inference models such as case-base reasoning, neural networks, or (statistical) discrimination analysis to perform outcome or prognostic predictions. Such systems possess self-learning capabilities and uses fuzzy set formalism and similarity measures or confidence level computation as mechanisms to deal with uncertainties intelligently and accurately.

System Process 3B- Generate and Deliver Report (Secondary Uses)



NOTES:
ES = External System
DS = Data Store

3B Generate and Deliver Report (Secondary Uses)

There is a wide array of possible secondary uses that could be supported by HealthConnect. However, they can largely be satisfied with the production of two types of reports: aggregated data and anonymised unit records (where identifying information is removed). There are important differences in the way these two types of report will need to be handled due to the possibility of inappropriate release of personal information. Aggregated data requests, which are likely to be the more common, could be managed largely on an automated basis with tight checking protocols to ensure that no personal information is released. Anonymised unit record requests, which will come primarily from researchers, would require approval from the Access Control Authority. The terms and conditions under which such approval would be granted would be established as part of the overall consent and access control policy. The task of the Business Architecture is to provide the mechanism to ensure that such requests can be met where they are approved.

3B.1 Receive and Check Secondary Uses Report Request

This process comprises the receipt of a request for HealthConnect data including:

- receiving the report request message;
- checking the message for completeness, authentication, and validity, returning an error message if necessary;
- sending an acknowledgment back to the source system;
- checking if request for aggregated data is likely to reveal personal health information;
- checking if the request is likely to demand significant computing resources to compile; and
- checking that approval from the Access Control Authority exists where necessary, noting that the Access Control Authority will have established rules about anonymising records.

Mandatory fields will include: user ID, report type (eg aggregated data, unit record, linkage), report defining characteristics (eg SQL Query), and approval notice from Access Control Authority (for unit record requests).

The analyst applications may provide the ability to develop the report request including extracting the relevant information (user ID, select the report type, provide the search criteria, construct the required query, and construct the message in the defined format).

3B.2 Generate and Review Secondary Uses Report

This process comprises creation and review of a secondary uses report including:

- identify the appropriate population of consumers;
- eliminate those who have indicated that they do not wish their information to be available for the requested secondary use;
- extract the relevant data from available event summaries;

- create unit records;
- strip identifying information;
- create aggregated data report; and
- check for risk of small cell inference and modify (for instance when the Australian Bureau of Statistics tabulates Census data if a cell contains a number less than 4 they randomly allocate a number from 0 to 3 to avoid the risk of small cell inference – ie the ability to work identify the person).

3B.3 Issue Secondary Uses Report

This process comprises the transmission of the secondary uses report to the requestor's system including:

- sending the message necessary to:
 - display the report on the desktop using a web browser;
 - download report to an Analyst Application for further analysis;
 - download linkage data to the Access Control Authority for subsequent release to a trusted linkage agent, eg ABS, where this conformed to the rules of the Access Control Authority;
- recording access for audit purposes; and
- checking receipt acknowledgment and resending if required.

(Refer to Appendix A - DS11 Audit Trial)

Analyst's applications will need to be modified to receive and handle the report information.

4 Data Store Descriptions

The system process diagrams above refer to a number of data stores. These data stores are not physically separate repositories but databases within the *HealthConnect* system that hold data important to the operation of the system. These data stores hold the major data groupings that will be contained in the *HealthConnect* system. It is recognised that numerous other data stores, for example additional rules and transmission records, would be required for the system to be operational.

Data stored would need to be in compliance with agreed standards, in particular the National Health Data Dictionary.

DS1. EHR Index

The concept of the EHR index has been introduced to reflect the fact that the event summaries will need to be stored in a fashion that enables rapid retrieval of the desired view. It also reflects the assumption that a consumer's event summaries are likely to reside at a number of locations. It is also expected that *HealthConnect* data will be held in a number of regional repositories rather than in a single national database containing all the *HealthConnect* data. The EHR Index may in practice form part of DS2 Event Summary rather than be a separate data store. These type of issues will be determined as part of the Systems Architecture.

The EHR Index concept where and however it is implemented is critical to the operations of storing and accessing event summaries for individual consumers. It will contain the information necessary to be able to locate the consumer's event summaries across the data repositories that form the *HealthConnect* 'system'. It is anticipated that this would contain selected information such that simple views might be possible without the collation of numerous records from across the 'system'. The EHR Index would also need to audit actions such as annotations to the event summary.

Typical data elements will include:

- Consumer ID;
- Agent ID;
- Consumer consent recorded;
- Provider ID;
- Source system ID;
- Location of detailed record;
- Date of event;
- Type of event, eg general practice consultation;
- Sensitivity, eg contains mental health data;
- Life (when to archive); and
- Whether updated/by whom.

DS2. Event Summaries

It is anticipated that there will be a wide range of types of event summaries, all of which will require the development of messaging standards so that the event summaries can be appropriately managed, stored, interpreted and analysed. Types of event summaries might include:

- Hospital discharge referrals;
- Summary of general practice consultations;
- Summary of specialist consultations;
- Pathology investigations;
- Radiology reports – public/private sector (storage of images are not currently being considered);
- Medications (though this may be an integral part of another event, eg discharge medication as part of discharge referral);
- Referrals (this may be an integral part of another event); and
- Basic information about health outcomes (possibly incorporated into other events).

In addition there would be specialised event summaries such as:

- Medical history summary, including relevant family history (this might be created as part of the initial registration);
- Recent medical history (it may be appropriate to separate this out); and
- Careplans.

The event summary definitions will allow for:

- Structured data entries;
- Coded values;
- Numeric values;
- Free text comments; and
- Reference ranges, eg for pathology results.

The event summary would contain all the information necessary to create the EHR index plus details of the event. The table in Part 1 of the HealthConnect Business Architecture listed some of the information types that might be included, namely:

Information type	Generic Event
Event descriptors (mandatory)	Date, Time, Place, Participants, Event Type
Key data gathered	Observations, investigations, tests, signs and symptoms, history, risk factors
Results of Analysis	Condition/Issue/Diagnosis identification,
Health services provided	Treatments commenced, activities undertaken
Future Services ordered/requested	Referrals, orders, prescriptions, requests for assessment
Expected outcomes	Clinical and personal goals, exception planning
Administrative	Consent and security settings, provider/consumer sign off

For a straightforward general practice consultation the event summary might be very short (eg presenting condition, diagnosis, and medication).

DS3. Consumer Register

The Consumer Register will contain information about the consumer that is not event related namely:

Consumer identification:

- consumer ID numbers – unique identifier (this may be obtained from an external registration system) and possibly other identifiers such as; Department of Veterans Affairs etc;
- Agent ID;
- demographic data (eg name, sex, date of birth, address) – this may also be obtained from an external system. If this is the case mechanisms for updating details such as address and keeping the systems synchronised will need to be developed. A history of addresses will be maintained for audit and identification purposes;
- contact details, eg emergency contacts, health care providers, health care proxies etc;
- record of physical ID reviewed, eg driving licence sighted when consumer registered, signed form received by *HealthConnect*; and
- record maintenance details, eg whether records merged.

Additional consumer data:

- relevant religious issues; and
- cultural need and protocols

Consent requirements

- current status of consent, eg date valid from and to, consent withdrawn, revoked;
- person giving consent, eg consumer, carer, parent, guardian;
- authorisation method to create/update consent, eg smart card, signed form;
- general form of consent;
- exceptions to that general form;
- providers nominated by the consumer etc;
- type of access token issued/required for future access; and
- history of consent.

DS4. Provider/Organisation/Analyst Register

The Provider Register will contain information required to identify the provider and determine access rights including:

- Provider identification:
 - provider ID numbers – unique identifier (this may be obtained from an external registration/directory system), other numbers;
 - demographic data (eg name, sex, date of birth, address) – this may also be obtained from an external system. If this is the case mechanisms for updating details such as address and keeping the systems synchronised will need to be developed;
 - provider type(s), eg GP, specialist, hospital registrar, allied health professionals, community health worker;
 - qualifications, official registration details;
 - associated organisations/facilities, eg general practices, division of general practice; and
 - record maintenance details, eg whether records merged.
- Individual data items may have an associated flag to control who and how the data can be viewed, eg home phone numbers not readily available.
- Organisations such as Area Health Services and divisions of general practice would require different information to be stored, eg contact details for individual responsible for HealthConnect usage on behalf of the organisation; evidence that the organisation's privacy and access control policies and procedures are satisfactory; a signed commitment that the organisation will ensure that information supplied by HealthConnect will be properly looked after.

Other users, eg planners and researchers would be allocated an Access Control Authority authorisation number and type.

DS5. Consent Rules

The structure of the Consent Rules data will be determined by the agreed Consent Models and would include data items such as:

- Provider types, eg general practitioner, allied health;
- Facility types, eg general practitioner's surgery so all general practitioners in the surgery could be provided access; and
- Event types, eg mental health.

Combinations of these could be selected by the consumer at the time of registration and modified later as desired.

Standard packages will be defined to simplify the registration process.

DS6. Registration Rules

The structure of the Registration Rules data will differ in detail for Consumer and Provider registration and would include data items such as:

- eligibility criteria;
- acceptable forms of identification;
- evidence to support claimed role, eg medical registration for doctor;
- mandatory fields; and
- acceptable forms of registration by a person other than the consumer, eg if the individual is a minor or requires a guardian.

DS7. Trigger Rules

Certain types of event summaries or data within the event summary will result in actions other than the storing of the event summary. Types of trigger events might include:

- death notification sent to the consumer's nominated GP/specialist;
- birth of a baby sent to interested parties;
- hospital discharge notification, sent to the consumer's nominated GP/specialist;
- reminder alerts, eg pap smear or immunisation overdue;
- implantable device notification sent to database register;
- immunisation sent to the Australian Childhood Immunisation Register; and
- notifiable diseases sent to Public Health Unit/register according to post code of consumer/provider.

The data to be held in the trigger rules will include:

- event types that result in trigger, eg death notification;
- event types/data items/reference ranges etc when event depends on checking value of data item within event;
- event types/data items that would prompt checking of previous events;
- relevant recipients – this could be a database, eg ACIR, consumer nominated GP, all providers with specified consent;
- urgency, eg alert next time recipient accesses consumer record, next time recipient accesses *HealthConnect*, sent by other mechanism (email, fax, SMS message); and
- definition of message, eg wording of death notification.

DS8. EHR View Options

The development of view options will require extensive investigation. It is envisaged that a number of view components will be established and that view options will be developed through selecting combinations of these. Examples of components might include: Demographics Summary/Long, Medical Status Summary (including alerts, current medications etc), Hospital Admissions, and Consultations (all or by type).

The data to be held in the view options will include:

- View option identifier;
- Type and order of view building blocks to be displayed;
- Search parameters, eg date range, event types;
- Access rights/requirements – types of participant able to view the view option and whether additional authorisation required; and
- Any relevant messages, eg warning that the view will take some time to run.

DS9. Metadata

Metadata is data about data. It is used to assist the provision of meaningful, consistent data and the subsequent interpretation of the data. It will include information such as:

- descriptions of the individual functions and data items;
- controlled vocabularies that will be used for any of the data elements;
- warnings about the limitations of the data;
- details of the various codesets and versions used;
- terminology providing definitions and semantic relationships between medical terminologies such as SNOMED/CT, UMLS, GALEN, DOCLE, ICPC2-Plus, ICD-10AM, LOINC, etc; and
- definition of reference ranges.

DS10. Decision Support Rules

It is envisaged that the majority of decision support would be conducted external to *HealthConnect*. Internal decision support would be restricted, at least in the short to medium term, to simple warnings, highlighting of critical results etc.

Some of these may already have been addressed through the trigger actions.

The data to be held in the decision support rules will include:

- data items on Consumer Register to be checked for alerts, eg pap smear overdue;
- event types/data items/reference ranges etc;
- links to appropriate guidelines, protocols; and
- rules for basic trend analyses.

DS11. Audit Trail

The audit trail will contain data elements such as:

- record accessed/attempted access;
- user ID/time/date;
- view option used;
- whether access was successful, and if not why not; and
- method of access.

DS12. Event Summary Validation Rules

The validation rules are required to ensure that event summaries contain the data they are required to contain and are supplied in accordance with the agreed standards. Validation rules would include data items such as:

- Mandatory fields complete; and
- List of acceptable codes, eg facility code, version of codeset is recognised by *HealthConnect* so that interpretation is possible.

Validation rules will be kept to a minimum for individual event summaries, though it is recognised that there will be a large number of event summary types that may require different validation rules.

HealthConnect will to a large extent rely on the provider of the data to check its accuracy. However it is important that:

- data is as complete as possible;
- information is simple to understand and unambiguous;
- codesets are easily understood by users;
- formal standards are used wherever required; and
- data is uniform in terms of core data sets, data definitions, naming, format, coding and classification, terminology and vocabulary.

Tight management of updates to ensure data sets remain compatible will be important. Mechanisms such as attaching the version number of the codeset might be employed but the management/coordination process will still be significant.

HealthConnect Access Mechanisms

It is envisaged that interaction with the HealthConnect 'system' would be achieved through a range of mechanisms including:

- use of a custom developed HealthConnect Access System, which may be available at Medicare Offices, booths, home computers as well as provider sites;
- interfaces with the providers' existing operational systems;
- a combination of interfaces to operational systems and use of the HealthConnect Access System; and
- automated interfaces to external databases.

Interfacing to existing operational systems will require the incorporation of key areas of functionality in these systems, though it is likely that the operational system will achieve some of the functionality through links to the HealthConnect Access System.

Key areas of functionality required to be addressed by either the Access System or other operational systems are listed below. This are marked as either '**Essential**' or '**Optional**' blank indicates not appropriate.

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Functionality Area	Access System	Operational System
Consumer Registration		
Ability to record and submit consumer registration details - demographics, base medical history, consent	Essential	Optional
Ability to search the HealthConnect database to check whether the consumer has already been registered	Essential	Optional
Ability to retrieve and update consumer registration details	Essential	Optional
Ability to create a consumer registration message from the local system. This will contain patient demographics, base medical history and consumer consent (though the latter may be a link to the Access System)		Essential
Ability to record the consumer's HealthConnect number (plus other IDs) and consent status in the local system		Essential
Ability to download the latest registration data from HealthConnect and update local records		Essential
Event Summary Creation		
Ability to create an event summary in the agreed messaging format	Essential	Essential
Ability to record consent given to send the event to HealthConnect, if required		Essential
Ability to view the event summary prior to submission, if required (some events would be sent automatically)	Essential	Optional
Ability to record provider signoff if required	Essential	Optional
Ability to review and amend the event summary prior to submission	Essential	Optional
Ability to record, in the local system, what was actually sent		Essential
Ability to delete data on the event summary if requested by the consumer	Essential	Optional
Ability to add comments/updates to previously submitted summaries and resubmit	Essential	Optional
Retrieve EHR View		
Ability to link through to view request, automatically supplying consumer and provider IDs, etc		Essential
Ability (possibly) to develop the view request incl: extracting the relevant information (provider ID, consumer ID(s) for lists of patients), select the view type, provide the search criteria, construct message in defined format	Essential	Optional
Ability to record consent given at the point of care, if required		Essential
Ability to display the resulting EHR View	Essential	Optional
Ability to link and store selected event summary details against the consumer's local record (this might be achieved on a total event summary basis or individual items of data might be used to populate the local database)		Essential
Ability to receive trigger messages and to alert the provider appropriately	Essential	Essential
Manage Transmissions		
Ability to send the information securely, according to agreed security, encryption standards etc	Essential	Essential
Ability to send/receive acknowledgments of transmission to and from the system to ensure receipt of messages	Essential	
Ability to resend message if necessary	Essential	Optional
Ability to receive and interpret error messages	Essential	Essential
Ability to maintain logs for audit purposes	Essential	Essential

Access Issue: Engagement of Software Vendors

It is unclear whether IT companies operating in Australia have the products and services to deliver the systems required in *HealthConnect* at this time. It is important that an effective communication mechanism be maintained between the IT industry and medical software associations. By direct involvement with industry, the *HealthConnect* Program Office will be able to determine the capacity of industry to deliver key elements of the *HealthConnect* solution.

Issues to be addressed include:

- What is required of the software vendors? What is necessary/optional?
- How can the requirements be minimised? For example, limit data requirements, develop clear standards etc
- Potentially, examine the feasibility of developing a common service to enable external systems to call an Application Program Interface (API) which is parameter driven in order to reduce the size of modifications needed to external systems.

It is recognised that achieving the goal of making *HealthConnect* easy to use and integration seamless will place requirements on operational systems. Vendor involvement and buy-in will be critical.

External Systems Descriptions

ES1. Access System

As indicated above, it is anticipated that in many instances *HealthConnect* will be accessed through interfaces to external systems. There will however be the requirements for a specialised *HealthConnect* Access System(s) to be developed. These Access Systems may be developed and marketed by independent vendors. This system would facilitate access for:

- Consumers at home, at kiosks, etc;
- Providers for functionality not covered by the interface to their operational systems; and
- Registration agents.

The Access System(s) could be developed on a range of technology platforms. A key requirement will be for them to be easy to access and maintain throughout Australia, making web-based or similar technologies likely platforms. This will be addressed in more detail in the Systems Architecture.

ES2. Operational Systems

The long-term vision is that event summaries will be lodged with *HealthConnect* from almost all operational health systems throughout Australia including systems such as:

General Practice/Specialist Systems including:

- Practice Management Systems for information about consumers (demographics), consultation administration (date, type, referral requests), etc; and
- Clinical Systems for key clinical data such as presenting condition, diagnosis and type, eg observations, treatment, outcomes.

The scope of the individual systems will need to be reviewed and interface requirement assessed.

Community Systems including:

- Community Health Systems for service reports/referral details
- Allied Health Systems for service reports/referral details
- Primary Care Systems operating at health clinics in remote locations for mobile providers

Diagnostic Systems including:

- Pathology for results reports
- Radiology for results reports

Hospital Systems including:

- Patient Administration Systems (public and private) for information about admission, discharges, transfers, deaths;
- Emergency Department Systems;
- Pharmacy Systems;
- Pathology Systems;
- Theatre Systems
- Point of Care Clinical Systems;
- Clinical Repositories;
- Outpatient Systems; and
- Discharge Referral Systems.

As HealthConnect requires event summary information, a single interface to a Discharge Referral System which in turn is interfaced to the individual hospital systems may be a solution. This would reduce the potential for consumer records to be populated with excessive detail about the hospital admission.

Pharmacy Systems including:

- Hospital Pharmacy for discharge medication (via BMMS)
- Community Pharmacy for dispensing reports (via BMMS)

Other Systems

There will be a myriad of other systems such as:

- Obstetrics systems
- Home care systems

The trials will concentrate on interfacing to a limited number of types of system, implemented at a small number of local sites, with additional system interfaces being developed over time.

ES3. External Databases

In addition to the operational systems, there is the potential to receive event summaries from and provide specific EHR views to established databases. This would require:

- Event summary definitions specific to the individual would need to be developed;
- Approval would need to be obtained for the databases to provide HealthConnect with these event summaries;
- Arrangements and operational policies and procedures would need to be established; and

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- Over time there is the potential for HealthConnect to be a provider of data to these databases – so a general practice consultation involving immunisation might result in the creation of an immunisation view being sent from HealthConnect to the Australian Childhood Immunisation Register.

Types of databases include:

- Better Medication Management System for medication events and alerts.
- Medical Benefit Systems which could be a valuable source of basic consultation data (who/what/when/by whom) filling an important gap that will take many years to achieve through interfaces to practice management systems
- Pharmaceutical Benefit Systems for simple encounter information
- Australian Childhood Immunisation Register for childhood immunisation records
- State hospital morbidity data
- Births, Deaths and Marriages Databases to receive details of registered deaths
- Disease Registers, eg Cancer Register
- Device Registers, eg Prosthesis Register
- Notifiable Diseases Databases

ES4. Consumer Identification

Ideally HealthConnect would have access to a Consumer Identification System able to provide unique consumer identification on a national basis. This system does not currently exist though there are a range of local and state systems that can provide information that will assist the unique identification of consumers. NSW Health for example is currently establishing inpatient Unique Patient Registers for each Area Health Service; this in turn will be used to create a statewide Unique Patient Register.

The creation and maintenance of Consumer Identification System(s) is considered external to the core HealthConnect functionality.

ES5. Provider/Facility Directory

There are a number of provider/facility registers in existence including:

- the Health Insurance Commission provider database;
- individual discipline databases; and
- state-based directories which are currently being developed.

Ideally, a national provider directory should be established.

As with Consumer Identification the creation and maintenance of Provider/Facility Directory System(s) is considered external to the core HealthConnect functions.

ES6. Clinical Applications

For HealthConnect to realise its potential, interfaces to clinical systems need to be established so that decision support functionality, other than the basic decision support internal to the system, can be supported. Interfaces might include links to:

- Decision Support;
- Clinical Pathway Systems;
- Protocol Management Systems;
- Medication Management Systems;
- Risk Profiling Systems; and
- Referrals/electronic booking systems.

ES7. Analyst Applications

HealthConnect will provide the ability, subject to Access Control Authority approval, to download the selected EHR data into specialist research tools such as:

- Statistical analysis tools (SAP/SAS/SPSS etc); and
- Standard spreadsheets/databases tools.

A specific type of EHR report might be a linkage file to be used for the merging of the data with extracts from other databases via record linkage tools.

ES8. Access Control Authority

The Access Control Authority will require a system(s) to monitor access requests and approval, eg research requests.