



NHIN Trial Implementations Use Case Requirements Document

Use Case Title: Medication Management

Workgroup: Medication Management Work Group

Version: Version 1.0: April 30, 2008

Description:

This document describes the Workgroup's interpretations of the Priority Information Exchanges identified by the ONC in the NHIN Trial Implementations Priority Information Exchanges document, dated March 31, 2008 for the Medication Management Detailed Use Case, dated June 18, 2007. ONC designated three Priority Information Exchanges in Scenario 1, Inpatient Medication Reconciliation, and two Priority Information Exchanges in Scenario 2, Ambulatory Medication Management.

The Workgroup understands that the clinical activities to be demonstrated in these Priority Information Exchanges include:

- Scenario 1: Inpatient Medication Reconciliation
 - Gathering and documenting information on current medications, allergies, medication intolerances
 - Ordering new medications or modifications to existing medications that are to be continued
 - Communicating information at discharge to the next provider of care
- Scenario 2: Ambulatory Medication Management
 - Gathering and documenting information on current medications, allergies, medication intolerances
 - Electronic transmission of prescriptions for the patient to the pharmacy

The Workgroup has made the assumption that in both scenarios, the gathering of information on current medications, allergies and medication intolerances will also include information about the patient that is acquired via interview when presenting for care. This Alternative Action is referenced in the Medication Management Detailed Use Case.

Priority Information Exchanges:

The Priority Information Exchanges designated by ONC for this use case are listed below and reference the Medication Management Detailed Use Case document date, www.hhs.gov/healthit/documents/UseCaseMM.pdf.

Page 13, Scenario 1 Inpatient Medication Reconciliation

Priority Info. Exchanges	Use Case Description
Information Exchange #3	Consumer self-reported information and additional information are accessed and gathered electronically via health information exchange.
Information Exchange #6	New discharge prescriptions are communicated to an outpatient pharmacy.
Information Exchange #7	Clinician provides medication, allergy, and other information to patient and next provider of care.

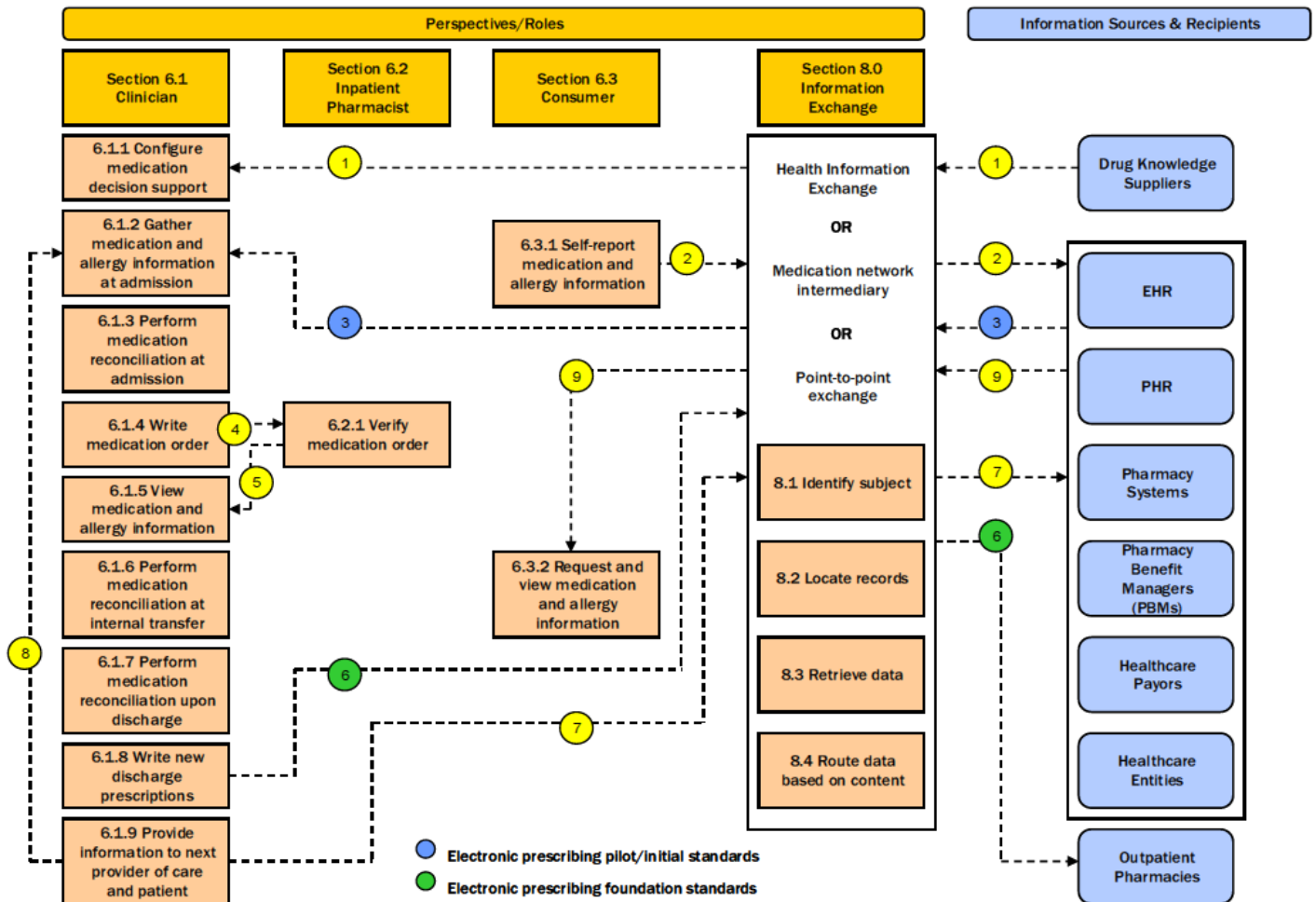
To the extent there is an inter HIE exchange, the summary document, as defined by Core Services, which includes medication history and allergy, will be used.



NHIN Trial Implementations Use Case Requirements Document

6.0 Scenario 1: Inpatient Medication Reconciliation

Figure 6-1. Inpatient Medication Reconciliation



- Scenario Flows**
- 1 Information from drug knowledge suppliers supports medication screening for contraindications and other decision support.
 - 2 Consumer self-reports allergies and use of any medications.
 - 3 Consumer self-reported information and additional information are accessed and gathered electronically via health information exchange.
 - 4 Medication order is transmitted to the in-hospital pharmacy.
 - 5 Pharmacy verification and fill status notification are communicated.
 - 6 New discharge prescriptions are communicated to an outpatient pharmacy.
 - 7 Clinician provides medication, allergy, and other information to patient and next provider of care.
 - 8 Current medication, allergy, and other information is communicated from Emergency Department Information System (EDIS) to Hospital EHR.
 - 9 Consumer requests and views medication and allergy information.



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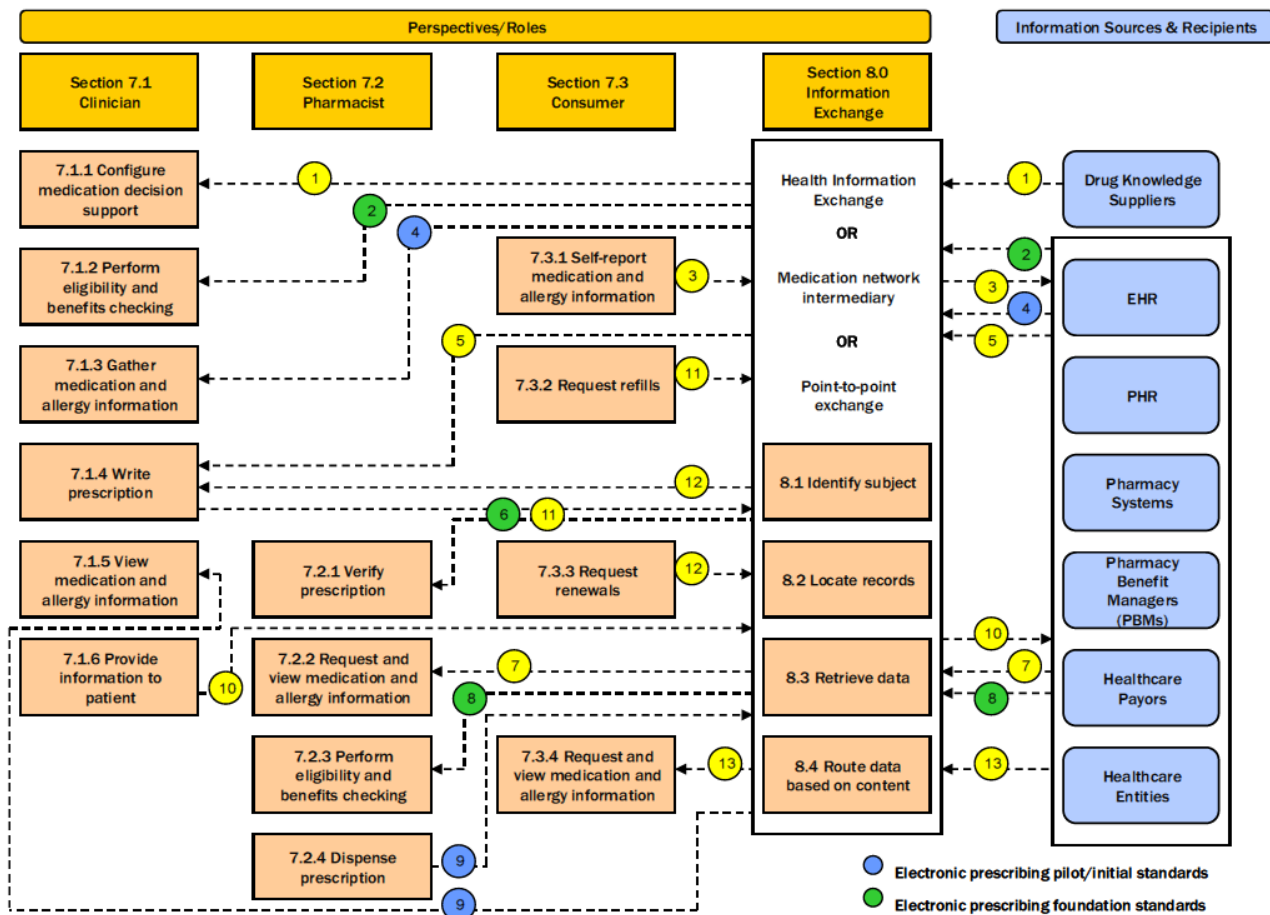
Page 22, Scenario 2 Ambulatory Medication Management

Priority Info. Exchanges	Use Case Description
Information Exchange #4	Consumer self-reported information and additional information are accessed and gathered electronically via health information exchange.
Information Exchange #6	Prescriptions for the patient are transmitted to a pharmacy.

ONC would like this scenario to include retrieving medication and allergy information across NHIes. The Priority Information Exchange flows are those that follow numbers 4 and 6 in this diagram.

7.0 Scenario 2: Ambulatory Medication Management

Figure 7-1. Ambulatory Medication Management





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Scenario Flows

- 1 Information from drug knowledge suppliers supports medication screening for contraindications and other decision support.
- 2 Clinician queries for eligibility and pharmacy benefits.
- 3 Consumer self-reports allergies and use of any medication.
- 4 Consumer self-reported information and additional information are accessed and gathered electronically via health information exchange.
- 5 Clinician accesses formulary information.
- 6 Prescriptions for the patient are transmitted to a pharmacy.
- 7 Pharmacist requests and views medication and allergy information.
- 8 Pharmacist confirms the consumer's eligibility for services, including pharmacy benefits, and views formulary considerations.
- 9 Pharmacist communicates pharmacy verification and fill status notification to update ambulatory EHRs.
- 10 The medication list, prescription, allergy information, and instructions are communicated to the patient.
- 11 Consumer requests refills.
- 12 Consumer requests renewals.
- 13 Consumer requests and views medication and allergy information.



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Requirements:

High-level requirements needed in order to effectively demonstrate the five priority information exchanges are as follows:

Inpatient Medication Reconciliation Scenario

Priority Information Exchange #3

- The ability to collect medication and allergy information from one or more electronic sources as well as from non-electronic sources (patient or proxy)
- The ability to collect over-the-counter drug information, vitamins and supplements either electronically or from the patient or proxy
- The ability for a clinician to view this information and determine the current medication list
- The ability to store this current information in the patient's hospital records

Priority Information Exchange #6

- The ability to, either electronically or on paper, generate new prescriptions and deliver them to the patient or pharmacy
- The ability to update the patient's hospital record to reflect these prescriptions
- The ability for the clinician to receive and consider contraindication information in the generation of these prescriptions

Priority Information Exchange #7

- The ability to communicate patient allergy information, the outpatient medication list captured at admission, annotated with the current status of each medication, and new discharge prescriptions to the next provider of care upon discharge
- The ability to provide the same information directly to the patient upon discharge

Ambulatory Medication Management Scenario

Priority Information Exchange #4

- The ability to collect medication and allergy information from one or more electronic sources as well as from non-electronic sources (patient or proxy)
- The ability to collect over-the-counter drug information, vitamins and supplements either electronically or from the patient or proxy
- The ability for a clinician to view this information and determine the current medication list
- The ability to store this current information in the patient's medical record.

Priority Information Exchange #6

- The ability to, either electronically or on paper, generate new prescriptions and deliver them to the patient or pharmacy
- The ability to update the patient's EHR to reflect these prescriptions
- The ability for the clinician to receive and consider contraindication information in the generation of these prescriptions



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Use Case Requirements Document

Key Assumptions:

- A. These use cases assumes a user/healthcare clinician is an authenticated user within a community trusted network.
- B. 'System' could be reasonably interpreted as H.I.S., portal application, E.H.R., etc.
- C. The infrastructure defined to connect 'systems' to the NHIE is in place and has been tested and demonstrated prior to the implementation of this use case.
- D. An established network and policy infrastructure exists to enable consistent, appropriate, and accurate information exchange across clinician systems, pharmacies and NHIEs. This includes, but is not limited to methods to:
 - Identify and authenticate users
 - Enforce data access authorization policies
 - Identify and determine providers of care
 - Correctly match patients across systems
- E. The process to find the cross reference id exists.
- F. Security and privacy policies, procedures and practices are commonly implemented to support acceptable levels of patient privacy and security.
- G. NHIE responds and updates the HIE system.
- H. Legal and governance issues regarding data access authorizations, data ownership, and data use are in effect.
- I. All NHIEs participating in the demonstration for these priority information exchanges will agree to a set of test data. The data will be fabricated or anonymized and persisted to the applicable NHIEs repositories and available to the NHIN.
- J. Consumers permissions are taken into consideration..
- K. These use cases assume the developing presence of electronic systems such as Electronic Health Records (EHRs), ePrescribing tools, Personally Controlled Health Records (PCHRs), and other local or web-based solutions.
- L. Clinicians securely access patient allergy and medication data either through an EHR system (local or remote) or a clinical data system.
- M. Appropriate standards protocols; patient identification methodology; consent; privacy and security procedures; coding, vocabulary and normalization standards have been agreed to by all relevant participants.
- N. The information consists of discrete data elements, these can be coded to one or multiple terminologies.
- O. The possibility exists for some data to be available only as an image and such an image could be presented to the clinician for viewing. However, it can not be integrated into a list of medications or a database.
- P. Although the clinician has a choice between printing paper prescriptions and transmitting electronic prescriptions, these use cases assume transmission of electronic prescriptions.
- Q. Medication and allergy information from other sources may arrive as free text (i.e., not coded). Such medication and allergy information may be displayed to the user for viewing. However, only coded information is suitable for use in decision support systems.



NHIN Trial Implementations Use Case Requirements Document

- R. The Data Content Requirements (Section 2.2) for each priority information exchange describe data elements that, although desirable, will not likely all be available, dependent upon the sources of information and the specifics of a particular implementation. It is expected that further discussion with other workgroups (i.e., Core Content) will be necessary to finalize a minimum acceptable data set.

- S. To the extent there is an inter HIE exchange, the summary document as defined by Core Services which includes medication history and allergy, will be used.

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Use Case Requirements Document

Use Case Scenario: Inpatient Medication Reconciliation

Information Exchange #3 – (Reference 6.1.2):

Gather medication and allergy information at admission

1 Information Exchange Workflow

1.1 Workflow Steps and Description

HIE identifies the patient. It uses a look-up service to locate any additional identifiers for the patient.

HIE sends queries to external information sources. (These include: H.I.S., EHR, Pharmacy Systems, PBMs, Payors, other Healthcare Entities.)

External information sources verify patient's identity, and gather all applicable information in an internal process.

External information sources deliver a response back to the HIE.

HIE receives each response, converts it from received format to an internal format, translates codes, and indexes each item. Not all responses are codable and indexable (see Assumptions discussion, below).

HIE aggregates the information (from diverse sources) into a single unified representation. (The most likely representation is expected to be a list of medications. However, other representations may also be necessary at this point: for example, a list of allergies). Further processing may occur. Filters may exclude repetitive information, may exclude very old information, may exclude sensitive personal information.

HIE outputs the information in a standard format

HIE delivers the information to the clinician's information system; where it is cached.

Clinician logs into his/her order entry application (or other portal). Clinician selects the patient. A session is started for that patient. The cached medication and allergy information is loaded into the session.

Clinician views medications and allergies. The clinician may have a choice of how to view information. (For example, the clinician may choose to view dispensed medications vs. prescriptions/orders).



NHIN Trial Implementations Use Case Requirements Document

Step	Workflow Description	Functional Capabilities	Actors Involved
1	Log on		User
2	Select Patient Index and enter Patient Identifying Info	The user/healthcare clinician will enter information to identify the patient and query the system eMPI to locate possible matches. The user/healthcare clinician will select the correct patient from a generated list. The home NHIE will locate the patient within its master patient index and check consumer permissions.	User
3	List possible matches		User
4	Select correct patient		User
5	Process Patient Cross Reference ID	Data Services: Subject-data matching capabilities Subject Discovery	Home/Requesting NHIE
6	Send query for documents with Patient ID	Data Services: Summary patient record exchange	Home/Requesting NHIE
7	Process query within external NHIE	Query for Documents	NHIN
8	NHIN participants return consented document list	If the consumer permission is set to allow sharing of data, the NHIE will query its own registry for documents and send a query for documents to the NHIN. The responding NHIEs will check for the patient within their own registries, check consumer permissions and if permission has been granted, send a list of available documents to the requesting NHIE. The requesting NHIE will display a list of all available documents to the user.	NHIN
9	System displays consented document list to user		User
10	User views medication and allergy history		User



NHIN Trial Implementations

Use Case Requirements Document

1.2 Use Case References (e.g. Events/Actions)

Code	Description	Comments
6.1.2	Event: Gather medication and allergy information at admission	
6.1.2.1	Action: Request available medication and allergy information in interoperable electronic form.	Upon admission to the Emergency Department or the hospital, the clinician gathers information about the patient's current medication and allergies from several sources. Consumer self-reported prescription, over-the-counter (OTC) medication, vitamins, implanted medication infusion devices, and herbal and other supplements may also be available from the patient's PHR, as well as information about allergies, intolerances, side effects, sensitivity responses, adverse effects and similar reactions in addition to accompanying information (e.g., nature of reaction, severity of reaction, and source of information). Additional available information could be gathered electronically via health information exchange, from hospital EHRs, ambulatory EHRs (such as from a Primary Care Physician (PCP)), long-term care EHRs, and other sources (such as pharmacy systems, PNIs, PBMs, Payors, etc.) that hold information about the patient. A generalized process for matching patients is described in Appendix A: Arbitrating Identities. A generalized process for access control is described in Appendix A: Create and Maintain Access Control Lists. Ideally, this information should be provided in an integrated view without duplications that can be used during the stay and communicated at discharge. In each case, the information source (e.g., authoritative clinical source, administrative source, or patient) should also be captured.
6.1.2.1a	Alternative Action: Request available medication and allergy information in viewable electronic form.	Upon admission, the clinician views summary medication information from external sources
6.1.2.1b	Alternative Action: Request available medication and allergy information via interview	Upon admission, the clinician and support staff gather medication and allergy information by interviewing the patient, patient's family, significant others, and/or caregivers – and in some instances, by contacting the patient's Primary Care Physician (PCP).



NHIN Trial Implementations Use Case Requirements Document

Code	Description	Comments
6.1.2.2	Action: View consolidated available medication and allergy information.	After information is gathered from multiple sources, the clinician views the information in a consolidated format to gain the most comprehensive view of the patient's current medication and allergy information. Clinicians require the ability to view medication and allergy information throughout the hospital stay.
6.1.2.3	Action: Select current medication and allergy information	After viewing the information on the patient's current medications and allergies, the clinician makes determinations regarding which information will be stored in the hospital EHR as the current medications at admission. Factors taken into account include duplication, currency, relevance to current clinical context, and data source.
6.1.2.4	Action: Incorporate current medication and allergy information.	The clinician executes the necessary steps to store current medication and allergy information in the patient's hospital records. This compiled list of verified, current medication information constitutes the outpatient medication list. This list will be available for viewing throughout the hospital stay (including during medication ordering, dispensing, and administration), in addition to being reviewed and communicated upon discharge.



NHIN Trial Implementations

Use Case Requirements Document

2 Information Exchange Requirements

2.1 Triggers

- A user accesses a clinical system
- User initiates a patient index search
- User selects patient
- A query for documents function is triggered within the NHIE

2.2 Data Content Requirements

The data content described in this section is desirable, but not all required. Further vetting, with workgroups focused on the selection of specific elements, is necessary to determine a minimum data set.

Patient identifying information

- Name
- Medical Record Number
- Institution
- Date of Birth
- Gender
- Social Security Number
- Street Address
- Zip Code (some information sources require only zip code, and not entire address)

Medication information

- Medication Name
- NDC
- Other drug terminology code
- Dose form
- Dose strength
- "Signatura" instructions
- Quantity
- Number of refills
- Date dispensed
- Dispensing pharmacy
- Date prescribed
- Prescribing clinician
- Allergy information
- Substance
- Description of the adverse effect or allergy

2.3 Other unique requirements

Other requirements may include integration with hospital portals, PHRs, CPOE.



NHIN Trial Implementations Use Case Requirements Document

Use Case Scenario: Inpatient Medication Reconciliation

Information Exchange #6:

New discharge prescriptions are communicated to an outpatient pharmacy

1 Information Exchange Workflow

1.1 Workflow Steps and Description

HIE identifies the patient. It uses a look-up service to locate any additional identifiers for the patient.

Clinician logs into his/her order entry application (or other portal). Clinician selects the patient. A session is started for that patient. The cached medication and allergy information is loaded into the session.

Clinician views medications and allergies. The clinician may have a choice of how to view information. (For example, the clinician may choose to view dispensed medications vs. prescriptions/orders).

Physician uses either system generated clinical alerts or information he is viewing to write appropriate Discharge medication.

Script is either generated electronically to the pharmacy (6.1.8.3) or paper is created and handed to the patient (6.1.8.3a)

Step	Workflow Description	Functional Capabilities	Actors Involved
1	Clinical decision to write prescription		Clinician and Consumer
2	Login; begin session		Clinician
3	Select patient	Enter patient identifying information; or select patient from a list of choices	Clinician
4	View available medications & allergies	View medications & allergies contained in the clinician's application (obtained in previous information exchange workflows)	Clinician
5	Enter prescription	Fields of prescription may include the following: drug name, strength, dose form, instructions, quantity, number of refills, indication, comments	Clinician



NHIN Trial Implementations Use Case Requirements Document

Step	Workflow Description	Functional Capabilities	Actors Involved
6	Respond to Clinical Decision Support	Clinician's application provides decision support before, during, and after prescription writing. Most commonly, decision support warnings interrupt prescription writing if contraindications are detected. Clinician may choose to override warning alerts.	Clinician
7	Sign prescription		Clinician
8	Update EHR with prescription	Clinician's application (i.e., local EHR) may store a record indicating that a prescription was completed and signed. Alternatively, such a record may be stored in a distant EHR, accessible through the Health Information Exchange. Storing a record of the prescription is a different step from actually transmitting the prescription.	Clinician's local EHR (or Health Information Exchange)
9	Route prescription to receiving system	Clinician's application sends out the prescription. Depending on implementation, the prescription may be routed indirectly (through a Health Information Exchange or Pharmacy Network Intermediary). Less commonly, the prescription may be routed directly to a pharmacy. Clinician's application must identify the pharmacy to enable routing.	Clinician and Health Information Exchange
10	Receiving system processes prescription	Receiving system accepts the prescription. After further steps, the receiving system may respond to the clinician's application with an acknowledgement that the prescription was received.	Health Information Exchange or Pharmacy Network Intermediary
11	Medications are communicated to Patient	The patient is provided with discharge instructions that would include a list of discharge medications. Medications are prescribed and are waiting at the pharmacy of choice	Clinician Patient



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Use Case Requirements Document

1.2 Use Case References (e.g. Events/Actions)

Code	Description	Comments
6.1.8	Write new discharge prescriptions.	
6.1.8.1	Prescribe new medications at discharge. Can include clinical alerts, verification of eligibility, formulary and pharmacy benefits	Use of E-RX
6.1.8.2	Consider contraindication information.	The clinician receives and considers contraindication information while writing new discharge prescriptions.
6.1.8.3	Communicate information to pharmacy	Prescriptions communicated to an external pharmacy
6.1.8.3a	Communicate information to patient. Alternatively, these prescriptions could be paper prescriptions that are handed to the patient.	List of meds given to patient.

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NHIN Trial Implementations

Use Case Requirements Document

2 Information Exchange Requirements

2.1 Triggers

- A user accesses a clinical system
- User initiates a patient index search
- User selects patient
- A query for documents function is triggered within the NHIE

2.2 Data Content Requirements

The data content described in this section is desirable, but not all required. Further vetting, with workgroups focused on the selection of specific elements, is necessary to determine a minimum data set.

Patient identifying information

- Name
- Medical Record Number
- Institution
- Date of Birth
- Gender
- Social Security Number
- Street Address
- Zip Code (some information sources require only zip code, and not entire address)

Medication information

- Medication Name
- NDC
- Other drug terminology code
- Dose form
- Dose strength
- "Signatura" instructions
- Quantity
- Number of refills
- Date dispensed
- Dispensing pharmacy
- Date prescribed
- Prescribing clinician
- Allergy information
- Substance
- Description of the adverse effect or allergy

2.3 Other unique requirements

N/A



NHIN Trial Implementations

Use Case Requirements Document

Use Case Scenario: Inpatient Medication Reconciliation

Information Exchange #7:

Clinician provides medication, allergy, and other information to patient and next provider

1 Information Exchange Workflow

1.1 Workflow Steps and Description

HIE identifies the patient. It uses a look-up service to locate any additional identifiers for the patient.

Clinician logs into his/her order entry application (or other portal). Clinician selects the patient. A session is started for that patient. The cached medication and allergy information is loaded into the session.

Clinician views medications and allergies. The clinician may have a choice of how to view information. (For example, the clinician may choose to view dispensed medications vs. prescriptions/orders).

Step	Workflow Description	Functional Capabilities	Actors Involved
1	Update EHR with prescription	Clinician's application (i.e., local EHR) may store a record indicating that a prescription was completed and signed. Alternatively, such a record may be stored in a distant EHR, accessible through the Health Information Exchange for view by next provider of care.	Clinician's local EHR (or Health Information Exchange)
4	Medications are communicated to Patient	The patient is provided with discharge instructions that would include a list of discharge medications. Medications are prescribed and are waiting at the pharmacy of choice	Clinician Patient



NHIN Trial Implementations

Use Case Requirements Document

1.2 Use Case References (e.g. Events/Actions)

Code	Description	Comments
6.1.9	Provide information to the next provider of care and patient	Discharge meds held in HIE through the discharge summary as well held in HIE t
6.1.9.1	: Communicate medication and allergy information to the next provider of care.	Next provider of care views history in HIE either via discharge summary or medications held in e-prescribing summary.
6.1.9.2	Communicate medication and allergy information to the patient Along with other discharge instructions	List of meds and other discharge instructions are given to patient

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NHIN Trial Implementations

Use Case Requirements Document

2 Information Exchange Requirements

2.1 Triggers

- A user accesses a clinical system
- User initiates a patient index search
- User selects patient

2.2 Data Content Requirements

The data content described in this section is desirable, but not all required. Further vetting, with workgroups focused on the selection of specific elements, is necessary to determine a minimum data set.

Patient identifying information

- Name
- Medical Record Number
- Institution
- Date of Birth
- Gender
- Social Security Number
- Street Address
- Zip Code (some information sources require only zip code, and not entire address)

Medication information

- Medication Name
- NDC
- Other drug terminology code
- Dose form
- Dose strength
- "Signatura" instructions
- Quantity
- Number of refills
- Date dispensed
- Dispensing pharmacy
- Date prescribed
- Prescribing clinician
- Allergy information
- Substance
- Description of the adverse effect or allergy

2.3 Other unique requirements

N/A



NHIN Trial Implementations

Use Case Requirements Document

Use Case Scenario: Ambulatory Medication Management

Information Exchange #4 :

Consumer self reported information and additional information are accessed and gathered electronically via health information exchange.

1 Information Exchange Workflow

1.1 Workflow Steps and Description

- For the use case demonstration, we will focus on a clinician's ability to access an electronic tool to request and view an individual's current medication and allergy information that may be available across the National Health Information Network (NHIN).
- The information will include data self-reported by the individual in a Personally Controlled Health Record (PCHR) and information available from clinical sources.
- The clinician will be affiliated with a National Health Information Exchange (NHIE) and the NHIE will send a request for data to all NHIEs participating in the exchange.
- Both the requesting and responding NHIEs will perform subject identification, check consumer permissions, query for documents, retrieve documents, and log the transaction in an audit file as part of the demonstration.
- The data to be exchanged will include data elements from module 6 (Allergies and Drug Sensitivities) and module 8 (Medications) of the Summary Patient Record specifications defined by the Core Services Content Workgroup.
- Health Information Exchange delivers the information to the clinician's information system.
- Clinician logs into his/her order entry application (or other portal) and views an aggregated medication and allergy information.



NHIN Trial Implementations Use Case Requirements Document

Step	Workflow Description	Functional Capabilities	Actors Involved *	Use Case Reference
1	Log on to EHR or Practice Management System	User and Subject Identity Management Services	Clinician EHR Registration Personnel PMS	7.1.3.1
2	Enter Patient Identifying Information	Registration or the clinician will enter information to identify the patient. The EHR/ PMS will query its home NHIE to locate the patient. The home NHIE will locate the patient within its master patient index and check consumer permissions.	Clinician EHR Registration Personnel PMS	7.1.3.1
3	Process Patient Cross Reference ID Query		EHR ePrescribing Tool	7.1.3.1
4	Send Patient ID Query to NHIE		EHR ePrescribing Tool Home/Requesting NHIE	7.1.3.1
5	Process Patient Cross Reference ID Query	Data Services: Subject-data matching capabilities	Home/Requesting NHIE	7.1.3.1
6	Return NHIE's Patient ID	Subject Discovery	Home/Requesting NHIE EHR/ ePrescribing Tool	7.1.3.1
7	Send query for documents with Patient ID	Data Services: Summary patient record exchange	EHR ePrescribing Tool Home/Requesting NHIE	7.1.3.1
8	Process query within NHIE registry	Query for Documents	Home/Requesting NHIE	7.1.3.1
9	Send query for documents to NHIN	The NHIE will query its own registry for documents and send a query for documents to the NHIN, including external information sources. If the consumer permission is set to allow sharing of documents the home NHIE will return documents. The responding NHIEs will check for the consumer within their own registries, check consumer permissions and if permission has been granted, send a list of available documents to the requesting NHIE. The requesting NHIE systems will be provided a list of available consented documents.	Home/Requesting NHIE NHIN/Responding NHIEs	7.1.3.1
10	NHIN participants process query within their own registries		NHIN/Responding NHIEs	7.1.3.1
11	NHIN participants return consented Information		NHIN/Responding NHIEs Home/Requesting NHIE	7.1.3.1
12	NHIE sends consented document list to EHR/ CPOE		Home/Requesting NHIE EHR/ ePrescribing Tool	7.1.3.2
13	Consented document list is available to Home NHIE/ EHR or CPOE		EHR ePrescribing Tool Home/Requesting NHIE	7.1.3.2

* Actors involved are NHIE centric and the involved actors vary from NHIE to NHIE



NHIN Trial Implementations Use Case Requirements Document

Step	Workflow Description	Functional Capabilities	Actors Involved *	Use Case Reference
14	Clinician selects documents to retrieve or CPOE executes an automated request for documents	Data Services: Summary patient record exchange Retrieve Documents	Clinician EHR ePrescribing Tool	7.1.3.3
15	EHR or CPOE sends a retrieve documents request to NHIE	The clinician will select documents to review or the CPOE will execute an automated request for documents to review. The requesting NHIE will then send a request to retrieve documents to the responding NHIEs that have consented documents for the patient and retrieve documents from their own document repository. The requesting NHIE will then display the aggregated view of the consented documents to the clinician who can then view the documents.	EHR ePrescribing Tool Home/Requesting NHIE	7.1.3.3
16	Process retrieve documents within NHIE repository		Home/Requesting NHIE	7.1.3.3
17	Send retrieve documents request to applicable responding NHIEs		Home/Requesting NHIE NHIN/Responding NHIEs	7.1.3.3
18	Responding NHIEs process retrieve document request within their repositories		NHIN/Responding NHIEs	7.1.3.3
19	Send consented documents to requesting NHIE		NHIN/Responding NHIEs Home/Requesting NHIE	7.1.3.3
20	Requesting NHIE sends all consented documents to EHR or CPOE		Home/Requesting NHIE EHR ePrescribing Tool	7.1.3.3
21	EHR or CPOE displays aggregated view of consented documents to clinician		EHR ePrescribing Tool Clinician	7.1.3.4
22	Clinician views medication and allergy history		Clinician	7.1.3.4

* Actors involved are NHIE centric and the involved actors vary from NHIE to NHIE



NHIN Trial Implementations Use Case Requirements Document

1.2 Use Case References (e.g. Events/Actions)

Code	Description	Comments
7.1.3	Event: Gather medication and allergy information	
7.1.3.1	Action: Request available medication and allergy information in interoperable electronic form.	Trigger is created (typically the arrival of patient for a visit) and sent to Health Information Exchange. Health Information Exchange queries available external information sources. Health Information Exchange receives and aggregates this information, and may provide further processing (such as filtering). Health Information Exchange delivers information to the clinician's application (portal, or CPOE application)
7.1.3.1a	Alternative Action: Request available medication and allergy information in viewable electronic form.	When discrete data elements are not available, only some of the above steps can be performed. The Health Information Exchange can still collect images (such as scanned images of a handwritten list of medications), and can provide those to the clinician's application. However, other processing (aggregation, filtering) can not occur
7.1.3.1.b	Alternative Action: Request available medication and allergy information via interview.	The information assembled electronically must be assumed to be incomplete, to some degree. Therefore, a non-electronic source of information (usually the patient, but possibly the patient's family, or the patient's own written list) must be queried. Note that this action has a somewhat limited scope (query of information) and does not imply a full medication reconciliation process.
7.1.3.2	Action: View consolidated available medication and allergy information.	This may include actions taken by the clinician's application. For example, the clinician's application may cache the information provided to it by the Health Information Exchange, until the clinician actually logs in for a session. At the time the information is loaded into the session and displayed to the clinician.
7.1.3.3	Action: Select current medication and allergy information.	This typically refers to the clinician's decision to choose which of several data sources to consider. It implies that the HIE has collected information from several external sources (e.g., pharmacy sales records, PBM claims records, list of CPOE prescriptions). The clinician may choose to focus on dispensing data, and not on prescribing data, in order to have a more accurate view of what the patient is actually taking.
7.1.3.4	Action: Incorporate current medication and allergy information.	Some clinicians may have their own EHR, and maintain their own list of medications. Then they will copy the information obtained from the HIE into their own EHR. However, other clinicians may not have their own EHR; or they may have an EHR, but not maintain a list of medications themselves. (Typically, they will rely on the information provided by the HIE each and every time they need to view a medication list). Then these clinicians will not copy the information obtained from the HIE.



NHIN Trial Implementations

Use Case Requirements Document

2 Information Exchange Requirements

2.1 Triggers

- The initial trigger for this information exchange is the individual when the individual decides to initiate a health care encounter.
- The information exchange will begin with the trigger event of either a clinician accessing an ambulatory EHR system or registration personnel accessing a practice management system.
- The clinical care event will initiate a patient identification query.
- After a patient has been identified and permissions verified, a query for documents function will be triggered within the NHIE and sent to the NHIN, including external information sources.
- After either the clinician selects documents to view or the execution of an automated request by the CPOE to select documents to view a retrieve documents function will be triggered within the requesting NHIE and sent to the NHIN.
- When documents are received by the requesting NHIE the EHR or CPOE system will aggregate the medication and allergy information from multiple sources for the clinician to view.
- The clinician will be required to be logged into the EHR or CPOE to view the medication and allergy information.



NHIN Trial Implementations

Use Case Requirements Document

2.2 Data Content Requirements

The data content described in this section is desirable, but not all required. Further vetting, with workgroups focused on the selection of specific elements, is necessary to determine a minimum data set.

The data that will be exchanged between NHIEs must conform to the requirements of the Core Services Content workgroup for the Summary Patient Record – module 6 Allergies and Drug Sensitivities and module 8 Medications

Patient identifying information

- Name
- Medical Record Number
- Institution
- Date of Birth
- Gender
- Social Security Number
- Street Address
- Zip Code (some information sources require only zip code, and not entire address)

Medication information

- Medication Name
- NDC
- Other drug terminology code
- Dose form
- Dose strength
- “Signatura” instructions
- Quantity
- Number of refills
- Date dispensed
- Dispensing pharmacy
- Date prescribed
- Prescribing clinician

Allergy information

- Substance
- Description of the adverse effect or allergy

2.3 Other unique requirements

Other requirements may include integration with hospital portals, PCHR, CPOE.

The demonstration of this use case will include data that has been developed by the NHIN participants, fabricated or anonymized where applicable.

HITSP and IHE compliant interfaces for NHIE to NHIE data and document sharing.



NHIN Trial Implementations

Use Case Requirements Document

Use Case Scenario: Ambulatory Medication Management

Information Exchange #6:

Prescriptions for the patient are transmitted to a pharmacy

1 Information Exchange Workflow

1.1 Workflow Steps and Description

Clinician decides to write prescription.

Clinician logs into order entry application, and begins a session.

Clinician selects patient by entering patient identifying information.

Clinician views available medication and allergy information for that patient, which may affect decision.

Clinician enters prescription. Typically, a prescription may consist of several components, each of which are entered into different fields of a form. (For example, the name of the medication may be entered into one field, the strength of the medication may be entered into another field.)

Application provides decision support if contraindications are detected (warning alerts to block the prescription, or to modify its fields). Clinician may choose to override warning alerts. Typical examples of contraindications may include: prescribed medication triggers a drug-drug interaction with a previously prescribed medication; or, prescribed medication triggers a drug-allergy interaction with an allergy recorded for that patient.

Clinician decides whether to print prescription, or to send it electronically. If electronically, clinician must add information to identify the desired pharmacy.

Clinician finalizes and signs prescription.

Application updates its "Prescriptions" records. If this is the clinician's own local EHR application, the "Prescriptions" records are updated there. If the "Prescriptions" records are stored in a EHR which is part of a larger system, the update is made through the HIE.

Prescription is electronically routed from order entry application to a receiving system, which may be a health information exchange or a pharmacy network intermediary.

Receiving system (health information exchange or pharmacy network intermediary) receives and processes prescription. The receiving system may send an acknowledgement back to the ordering application.



NHIN Trial Implementations Use Case Requirements Document

Step	Workflow Description	Functional Capabilities	Actors Involved
1	Clinical decision to write prescription		Clinician and Consumer
2	Login; begin session		Clinician
3	Select patient	Enter patient identifying information; or select patient from a list of choices	Clinician
4	View available medications & allergies	View medications & allergies contained in the clinician's application (obtained in previous information exchange workflows)	Clinician
5	Enter prescription	Fields of prescription may include the following: drug name, strength, dose form, instructions, quantity, number of refills, indication, comments	Clinician
6	Respond to Clinical Decision Support	Clinician's application provides decision support before, during, and after prescription writing. Most commonly, decision support warnings interrupt prescription writing if contraindications are detected. Clinician may choose to override warning alerts.	Clinician
7	Sign prescription		Clinician
8	Update EHR with prescription	Clinician's application (i.e., local EHR) may store a record indicating that a prescription was completed and signed. Alternatively, such a record may be stored in a distant EHR, accessible through the Health Information Exchange. Storing a record of the prescription is a different step from actually transmitting the prescription.	Clinician's local EHR (or Health Information Exchange)
9	Route prescription to receiving system	Clinician's application sends out the prescription. Depending on implementation, the prescription may be routed indirectly (through a Health Information Exchange or Pharmacy Network Intermediary). Less commonly, the prescription may be routed directly to a pharmacy. Clinician's application must identify the pharmacy to enable routing.	Clinician and Health Information Exchange
10	Receiving system processes prescription	Receiving system accepts the prescription. After further steps, the receiving system may respond to the clinician's application with an acknowledgement that the prescription was received.	Health Information Exchange or Pharmacy Network Intermediary



NHIN Trial Implementations

Use Case Requirements Document

1.2 Use Case References (e.g. Events/Actions)

Code	Description	Comments
7.1.4	Event: Write prescription	
7.1.4.1	Action: Consider formulary.	Physician may want to read or search through a formulary prior to writing a prescription. However, it is more likely that the physician will use an electronic prescribing application, and that this electronic prescribing application will incorporate some degree of formulary decision support. Therefore, the physician may actually start writing the prescription (i.e., entering the fields in an order form), and only at that point will formulary decision support rules execute. Formulary decision support may warn that the desired prescription is excluded, or has restrictions or quantity limits.
7.1.4.2	Action: Write prescription(s).	Typically, physician enters free text into fields of an order form, or selects from a choice list. Includes: drug name, strength, dose form, instructions, quantity, number of refills, indication, comments. Some decision support may be applicable at this step (e.g., what tablet strengths are available)
7.1.4.3	Action: Consider contraindication information.	Decision support rules execute as soon as the name of the prescription is entered, or as soon as inappropriate strength is entered, or when the prescription has been completed. Typically, warnings are generated if a contraindication is detected (drug-drug interaction, drug inappropriate for age, pregnancy, disease, abnormal lab). Warnings may be overridden.
7.1.4.4	Action: Sign prescription.	Typically the last step taken by the clinician in this information exchange. All decision support has occurred prior to this step. At this point the clinician may move on to other tasks. The prescribing application must still perform several tasks to complete the prescription (electronic transmission, or printing). It is likely that a prescription may list multiple different medications, and one signature suffices for all the medications (except for controlled substances)
7.1.4.5	Action: Communicate information to pharmacy.	Requires pharmacy identifying information (e.g., pharmacy name, network identifier, pharmacy address, fax number). A pharmacy network intermediary may have a lookup table with routing information, dependent on the identifiers provided by the clinician's application.
7.1.4.5a	Alternative Action: Communicate information to pharmacy using paper or fax.	If pharmacy identifying information is not available, or if prescriber decided not to transmit electronically, then the default action is printing. Printing a prescription on paper, and then putting it in a fax machine is not equivalent to electronic transmission.



NHIN Trial Implementations

Use Case Requirements Document

2 Information Exchange Requirements

2.1 Triggers

The Trigger for this information exchange is the **clinician**, usually as a consequence of a discussion with a patient or a patient's representatives.

The clinician logs into a computerized order entry application, or electronic prescribing application, with the intent of writing a prescription. This may occur during or immediately after a patient visit. It may also occur separately from a patient visit, perhaps following a phone call with the patient or with a pharmacist.

2.2 Data Content Requirements

The data content described in this section is desirable, but not all required. Further vetting, with workgroups focused on the selection of specific elements, is necessary to determine a minimum data set.

Patient identifying information

- Name
- Medical Record Number
- Institution
- Date of Birth
- Gender
- Social Security Number
- Street Address
- Zip Code

Prescription

- Date
- Medication Name
- Code
- Dose Form
- Strength
- "Signatura" Instructions
- Quantity
- Refills

Prescriber information

- Name
- DEA number
- Institution
- Office Address
- Office Phone

Pharmacy information

- Name
- Address
- NCPDP identifier



NHIN Trial Implementations

Use Case Requirements Document

Note that this data must conform to the requirements of the Core Services Content workgroup (to be developed).

2.3 Other unique requirements

Other requirements may include integration with hospital portals, PHRs, CPOE.

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