U.S. Department of Health and Human Services
Office of the National Coordinator for Health Information Technology

Medication Management
Detailed Use Case

June 18th, 2007

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1.0 Introduction

1.1 Use Case Description

In January 2007, the American Health Information Community (AHIC) approved a recommendation to develop a use case addressing medication management. Intended to facilitate access to necessary medication and allergy information for both providers and consumers when healthcare is sought and delivered, the Medication Management Use Case has the potential to improve medication management through increased information exchange. In specific terms:

- Clinicians will be better supported if more complete information and real-time feedback concerning potential contraindications such as drug-drug and drug-allergy interactions are available;
- Patients will have better access to information about the medications they are taking and will have more involvement in their healthcare; and
- In addition to health benefits, medication management will be better supported when clinicians have more information available about prescription benefits, effective electronic exchange supports the prescribing process, and consumers can request prescription renewals and refills online.

The Medication Management Use Case describes the information flows, issues, and system capabilities that apply to the multiple organizations participating in medication management. This use case was developed to support the many stakeholders who are active in the development and implementation of electronic health records and health information exchange including those engaged in activities related to standards, interoperability, harmonization, architecture, policy development, and certification.

This use case has been developed by the Office of the National Coordinator for Health Information Technology (ONC) with opportunities for review and feedback by interested stakeholders within both the private and public sectors. To facilitate this process, the use case will be developed in two stages:

- The **Prototype Use Case**, which describes the flows of the use case at a high level and facilitates initial discussion with stakeholders; and
- The **Detailed Use Case**, which documents all of the events and actions within the use case at a detailed level.

This document is the Detailed Use Case.

1.2 Scope of the Use Case

One of the goals of the AHIC is improving medication management to promote patient safety and support relevant aspects of the medication management cycle with better interoperability and efficiency. To support this, the Medication Management Use Case focuses on patient medication and allergies information exchange, and the sharing of that information between consumers, clinicians (in multiple sites and settings of care), pharmacists, and organizations that provide health insurance and provide pharmacy benefits.

This use case describes medication management in two settings. First, the inpatient setting includes medication reconciliation and ordering along with other supporting interactions in the hospital. Second, the ambulatory setting addresses access to current medication and allergy information and support for electronic prescribing in this environment. Many needs within these two settings overlap, but this separation was useful in emphasizing some aspects that are particular to each. The use case is focused on information flows that can be most significantly improved in the near term by increased interoperability.

This use case recognizes the uniqueness and complexity of medication management and other activities in the long-term care setting. While not all long-term care needs can be addressed explicitly in this use case, medication management areas are highlighted where the existing considerations may also be appropriate for long-term care.

This use case assumes the developing presence of electronic systems such as Electronic Health Records (EHRs), ePrescribing tools, Personal Health Records (PHRs), and other local or Web-based solutions supporting consumers and clinicians, while recognizing the issues and obstacles associated with these assumptions. This approach helps promote the development of longer-term efforts.

A key component of this use case is its relation to an existing federal initiative on ePrescribing undertaken by the Centers for Medicare & Medicaid Services (CMS). Demonstration projects for this initiative have been undertaken in multiple environments, and they are governed by existing government regulations. The ePrescribing initiative requires that the following transactions conform to the foundation standards required for implementation by January 1, 2006 for all electronic prescribing under Part D of the Medicare Modernization Act (MMA):

- Transactions between prescribers (who write prescriptions) and dispensers (who fill prescriptions) for new prescriptions; refill requests and responses; prescription change requests and responses; prescription cancellation, request and response; and related messaging and administrative transactions;

- Eligibility and benefits queries and responses between prescribers and Part D sponsors; and

- Eligibility queries between dispensers and Part D sponsors.

MMA required CMS to implement pilot projects to test additional standards. These additional standards apply to transactions involving:

- Formulary and benefit information;
- Medication history;
- Fill status notification;
- Structured and codified SIG;
- Clinical drug terminology (RxNorm and other terminology systems); and
- Prior authorization.

The ePrescribing transactions have been included in the Medication Management Use Case in order to:

- Demonstrate the need for compatibility between the standards adopted for the ePrescribing transactions and other medication-related information exchange transactions;
- Provide a context for identifying the types of information being exchanged in the workflow steps leading up to and following the ePrescribing transactions; and
- Provide a context for complementary standards harmonization, architecture, policy development, and certification activities.

2.0 Use Case Stakeholders

Figure 2-1. Medication Management Use Case Stakeholders Table

Stakeholder	Working Definition
Clinicians	Healthcare providers with patient care responsibilities, including physicians, advanced practice nurses, physician assistants, nurses, and other credentialed personnel involved in treating patients.
Consumers	Members of the public who may receive healthcare services. These individuals may include: caregivers, patient advocates, surrogates, family members, and other parties who may be acting for, or in support of, a patient in the activities of receiving healthcare.
Drug Knowledge Suppliers	Organizations that maintain and provide reference information on drugs that is used to provide clinical content in pharmacy systems and EHRs. Drug reference information provides the clinical content for medication screening for possible contraindications such as drug-drug, drug-allergy, or drug-diagnosis interactions and inappropriate dosing. It also can provide assistance in selecting appropriate medications and quick access to monographs and other reference information. Drug Knowledge Suppliers can also provide new warnings, prescribing limitations, similar communications, and patient education information.
Health Information Exchange (HIE)	A multi-stakeholder entity that enables the movement of health-related data within state, regional, or non-jurisdictional participant groups.
Healthcare Entities	Organizations that are engaged in or support the delivery of healthcare. These organizations could include hospitals, ambulatory clinics, long-term care facilities, community-based healthcare organizations, employers/occupational health, school health, dental clinics, psychology clinics, care delivery organizations, and other healthcare facilities.
Healthcare Payors	Insurers, including health plans, self-insured employer plans, and third party administrators, providing healthcare benefits to enrolled members and reimbursing provider organizations. As part of this role, they provide information on eligibility and coverage for individual consumers, as well as claims-based information on consumer medication history. Case management or disease management may also be supported.
Medication Network Intermediaries (MNIs)	These entities support the healthcare process by accomplishing communication among providers, pharmacies, and pharmacy benefits managers or payors as needed for medication dispensing and reimbursement. In this role, they are both a conduit for communication and a source of information on aspects of medication management such as medication prescription history, dispensing status, and pharmacy benefits. This stakeholder group includes Pharmacy Network Intermediaries, ePrescribing Network Intermediaries, clearinghouses, and similar organizations.
Patients	Members of the public who receive healthcare services.
Pharmacists	Health professionals and clinicians who are licensed to prepare and dispense medication pursuant to the request of authorized prescribers. The practice of pharmacy includes, but is not limited to, the assessment, monitoring, and modification of medication and the compounding or dispensing of medication. Direct care activities that pharmacists can perform at times include patient education, patient assessment, consultation, and support for medication use.

Stakeholder	Working Definition
Pharmacy Benefit Managers (PBMs)	These entities manage pharmacy benefits on behalf of payors, interacting with pharmacies and providers via a medication network intermediary. As part of this role, they can provide information on pharmacy benefits available to an individual consumer and an individual consumer's medication history.
Public Health Agencies (local/state/federal)	Local, state, and federal government organizations and personnel that exist to help protect and improve the health of their respective constituents.

3.0 Issues and Obstacles

Realizing the full benefits of health information technology capabilities is dependent on overcoming a number of issues and obstacles in today's environment. Inherent in this use case is the premise that some of these will be addressed through health information technology standardization and harmonization activities, policy development, health information exchange networks and other related initiatives.

Confidentiality, Privacy, Security, and Data Access

Consumer data confidentiality and privacy. Access to personal health information from EHRs and PHRs needs to be accomplished in a confidential and secure manner that complies with privacy requirements and respects consumer decisions regarding access to their information. Policies, implementation mechanisms, and supporting technologies are needed to accomplish this objective. Conversely, when a consumer denies access to information, it could cause a negative impact on care if the clinician or pharmacist is not privy to that information. In addition, in an emergency care setting, a "break the glass" capability may be required to allow access to medication information when consumers are unconscious or unable to participate in decisions about their care.

Security and data access. Personal health information must be appropriately secured whenever it is stored, transmitted, or disposed of by any person or entity that has been given authorization to access, view, use, and/or disclose that information. Health information at rest and during an exchange should meet security standards in areas such as node authentication, identity credentials, document integrity, access controls, audit trail, non-repudiation, and consistent time tracking. Mechanisms are also needed to allow authorized access to patient information and secure data transfers based on established authentication procedures. In particular, where information is to be passed across multiple organizations or geographic regions, these procedures will require further development and harmonization.

In some cases, existing legislation may act as an obstacle to full implementation of electronic medication management. Currently, for example, ePrescribing or electronic filling of controlled substances is not permissible.

Access logging exchange. The ability to create an integrated view of who has accessed the consumer's information across multiple markets and timeframes may be challenging without standards for access-related information and for exchanging this information among networks. In order to create access and disclosure logs for consumers to review, mechanisms need to be present which can create, manipulate, and condense full audit logs that contain information from multiple organizations, geographic regions, or health information exchanges.

Medication Management Interoperability

The exchange of medication-related information across systems, sites, and settings of care is constrained today by the lack of agreed-upon standards for sharing of information concerning medications and allergies. Near-term improvements are achievable with sharing of unstructured information for viewing. Integrating external information into EHRs along with locally captured information (e.g., into an allergy or medication list) is a goal that will require standardized terminology and messages. An integrated, local view of this information is sought to support planned medication management capabilities.

Standardized terminology for medication. Although the elements of a prescription or inpatient medication order are widely accepted, there is not agreement on a single vocabulary standard for each element or for a fully structured and codified SIG. Today, system interoperability is frequently accomplished through data translation and data mapping, and these efforts are frequently hampered by a lack of common granularity in describing medications. Additional efforts on vocabulary and messaging standards may help to minimize the need for these activities. Also, particular attention needs to be paid to the multiple forms in which a given medication is dispensed. These differences need to be considered during medication reconciliation as well as medication dispensing activities.

Standardized terminology for allergies to medication, drug intolerances, and other allergies. Agreement is needed on the specific vocabulary to be used to document allergies and intolerances, as well as on the elements for accompanying information (e.g., nature of reaction, severity of reaction, and source of information). In addition, agreement is needed on the distinctions among allergies, intolerances, side effects, sensitivity responses, adverse effects, and other similar reactions.

Patient Identification, Lookup, and Matching

Providers would benefit from the ability to accurately identify and access a breadth of patient records for each patient. Necessary for this is identifying the patient of interest, as well as unambiguously matching patients with their data.

Medication History

The terms “medication history,” “medication list,” and “medication profile” are sometimes used inconsistently. The Joint Commission requires that “current medications” be addressed during medication reconciliation, but leaves precise definition to healthcare providers. In some clinical situations, additional historical information may be clinically important, even if the medication is not current (e.g., a recent one-time medication). Developing a consensus about the criteria to be used in assembling medication information from external sources is important for all stakeholders.

Based on feedback received regarding the definition and parameters that would meet clinical needs, medication history information in different contexts could include:

- Current medications (to include medications currently taken by the patient (both prescribed medications and over-the-counter medications, vitamins, herbals, supplements, etc.) and medications for which there is an active prescription) as currently captured during patient interviews;
- Medications for which records exist and there is an active lifetime clinical interest due to the potential relevance for current treatment (e.g., radioactively labeled medications, chemotherapy); and
- Medications prescribed within the past 12 months.

Providers may also benefit from access to information regarding the date the prescription was written, the date the prescription is filled, and whether there are any refills remaining. For a medication list, entries should include the medication name, dose, route, frequency, indication, and last dose information.

EHR Data

There are gaps in the design of some EHR systems for fully describing medication management information in the standardized terms needed for interoperability. Similarly, medication-related processes often are not uniformly structured and use non-standardized nomenclature for some elements. Lack of implemented standards in this area makes it difficult to support multiple sources of EHR data being merged within a single environment to support medication management.

Clinical Decision Support

One goal for managing medication information in EHRs is to promote patient safety and quality care by using clinical decision support tools that can support medication ordering, prescribing, and dispensing in several different ways. One is by screening for contraindications such as drug-drug and drug-allergy interactions and potential errors in dosing (such as those due to patient weight considerations). Effective contraindication screening will be facilitated by tools that are supported by standardized vocabularies for describing medication and allergies. In addition, medication alerts that are too frequent or inappropriate compromise the value of this support to clinicians. Clinical decision support tools can also assist clinicians in selecting appropriate treatment based on indication/diagnosis, provide quick access to monographs and other reference information, and aid in decreasing or eliminating the ordering of duplicate drugs or therapeutic categories.

Use of clinical decision support is hampered by the complexity of integrating the medication-related content provided by a drug knowledge supplier into the EHR.

Terminology standards and standardized schemas for the interactions between the EHR and knowledge content during medication ordering would make the set-up process less customized and result in more effective screening of medication orders/prescriptions for potential contraindications.

4.0 Use Case Perspectives

The Medication Management Use Case focuses on the electronic capture of information about patient medication and allergies from multiple sources, and the communication of that information between consumers, clinicians (in multiple sites and settings of care), and pharmacists. The perspectives included in the use case are intended to indicate roles and functions, rather than physical locations. Each is described below:

- ***Clinician***

  The clinician perspective includes healthcare providers with patient care responsibilities including physicians, advanced practice nurses, physician assistants, nurses, and other credentialed personnel involved in the prescribing/ordering of medications and/or medication reconciliation.

- ***Pharmacist***

  The pharmacist perspective includes licensed health professionals who prepare, dispense and support the use of medication pursuant to the request of authorized prescribers. This perspective includes hospital pharmacists who dispense medication for patients admitted to the hospital and pharmacists in institutional and community and mail order pharmacies who dispense medications to outpatients and patients/residents of other care settings.

- ***Consumer***

  The consumer perspective includes members of the public who may receive healthcare services in ambulatory and inpatient environments. Consumers may be assisted by family members and other parties who provide support for medication management.

These perspectives are the focus of the events described in the following scenarios.

5.0 Use Case Scenarios

The Medication Management Use Case focuses on two scenarios, inpatient and ambulatory care, in which availability and exchange of complete information on patient medication and allergies would increase both patient safety and care efficiency.

5.1 Scenario 1: Inpatient Medication Reconciliation

This scenario is focused on aspects of inpatient medication management including the formal process of medication reconciliation. Patients are at risk during transitions in care across settings, services, providers, or levels of care. Medication reconciliation documents the efforts made to assemble and consider information on current medications and patient allergies during these transitions.

Briefly stated, medication reconciliation occurs at patient admission, discharge, and transfer (e.g., to another level of care in the hospital or to another hospital). This includes:

- Gathering and documenting information on current medications, allergies, and medication intolerances;
- Deciding and documenting which medications are to be continued or discontinued;
- Ordering new medications or considering modifications to existing medications that are to be continued (with consideration of the patient's outpatient medication list);
- Communicating information to the next provider(s) of care at each transition within the hospital (e.g., change of setting, service, level of care, provider);
- Communicating information at discharge to the next provider(s) of care; and
- Communicating discharge information to the patient.

This scenario includes several additional medication management events in addition to medication reconciliation.

5.2 Scenario 2: Ambulatory Medication Management

This scenario addresses access to current medication and allergy information and support for electronic prescribing in the ambulatory environment and includes:

- Gathering and documenting information on current medications, allergies, and medication intolerances;
- Performing eligibility and benefits checking; and

- Communicating the current medication list, prescriptions, allergy information, medication information, and care instructions to the patient.

It also focuses on prescription management, prescription writing, prescription transmittal to a pharmacy, and consumer-generated requests for prescription refills and renewals.

This scenario focuses on providing clinicians and pharmacists with information about each patient's medications and allergies not just from local documentation, but also from:

- Other ambulatory clinicians;
- Hospitals, long-term care facilities, or other care settings from which the patient has been previously discharged;
- Organizations that manage prescription- or insurance- related information; and
- Patients, whose self-reported information may be recorded in PHRs or other electronic sources.

6.0 Scenario 1: Inpatient Medication Reconciliation

Figure 6-1. Inpatient Medication Reconciliation

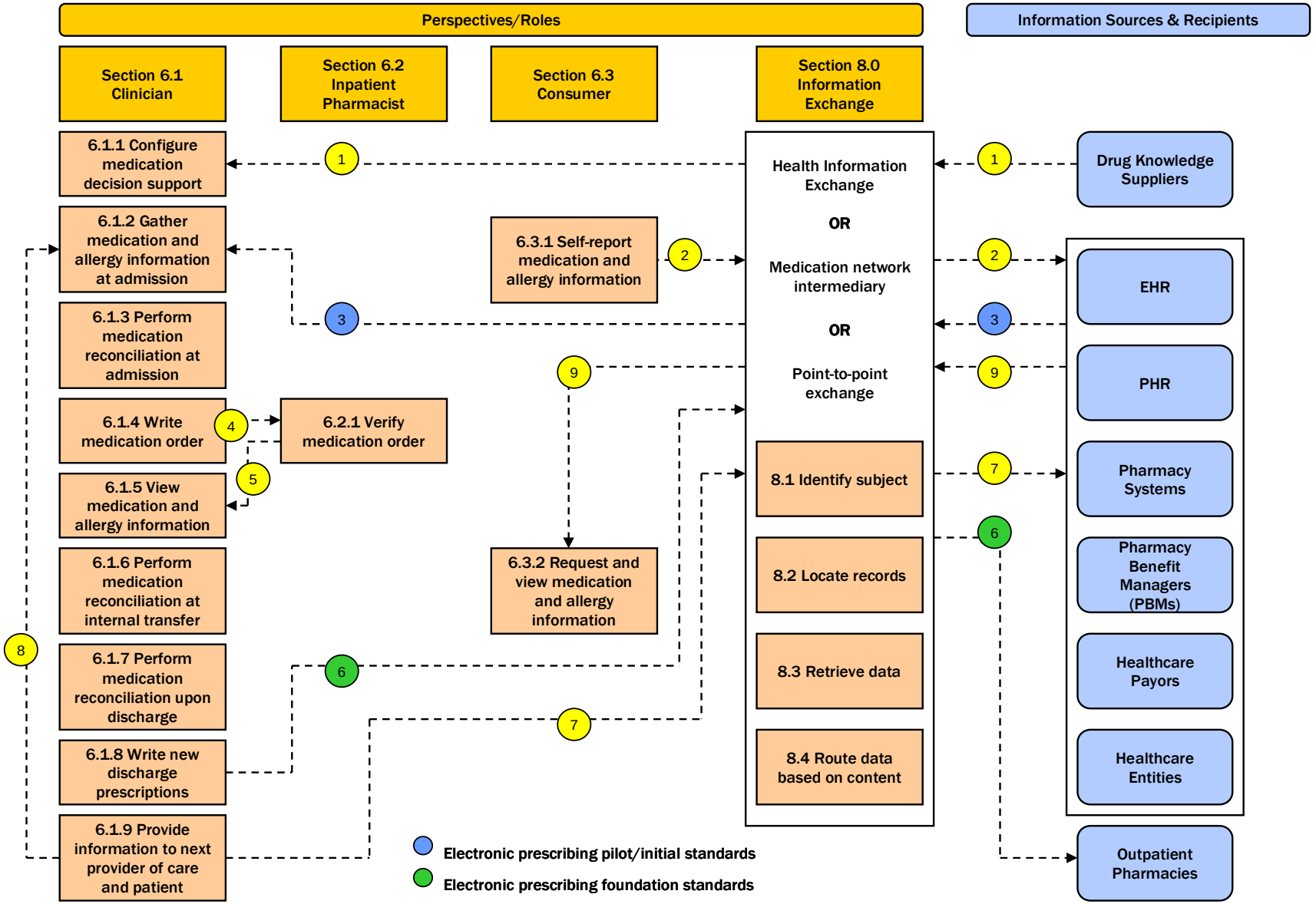


Figure 6-2. Inpatient Medication Reconciliation Scenario Flows

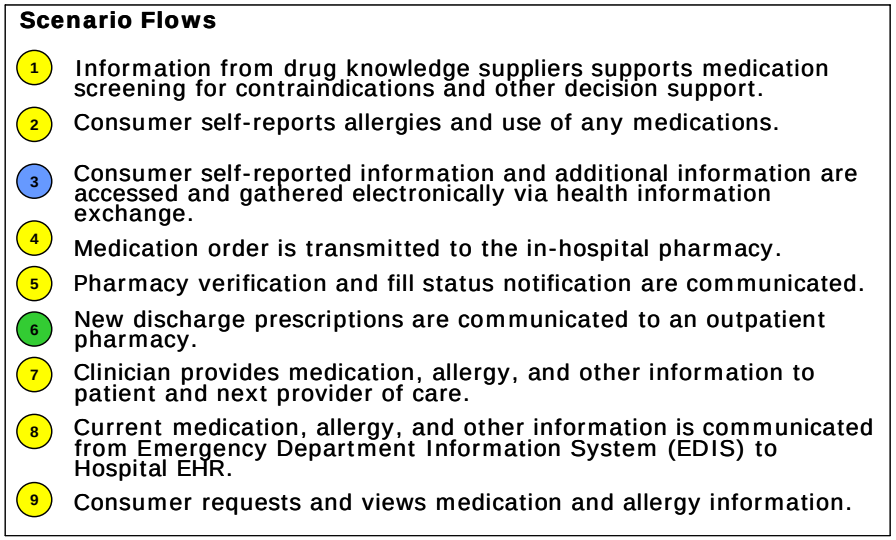


Figure 6-3. Inpatient Medication Reconciliation, Clinician Perspective Events and Actions Table

Code	Description	Comments
6.1.1	**Event:** Configure medication decision support	
6.1.1.1	**Action:** Receive information from drug knowledge suppliers.	Vendors and other sources provide data tables and reference information to support medication screening for contraindications and other decision support capabilities. These act in conjunction with, and are integrated into, the hospital EHR. These tools can also be used in a long-term care setting. A generalized process is described in Appendix A: Provisioning for Secondary Use.
6.1.1.2	**Action:** Inform the hospital EHR.	The EHR could utilize data tables and other information from the drug knowledge supplier. Clinicians and pharmacists support implementing this capability for the organization. The process of setting up clinical decision support relies on standard vocabularies for medications, prescriptions, and allergies, and standards for the communications between the EHR knowledge source(s) and application(s).

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).
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.

Code	Description	Comments
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.
6.1.3	**Event:** Perform medication reconciliation at admission	
6.1.3.1	**Action:** Review current medication list.	The clinician reviews the current medication list (gathered in the previous event) upon direct admission to the hospital (e.g., admission based on a scheduled surgery, a transfer from a long-term care facility, or a transfer from an ambulatory setting, etc.).
6.1.3.1a	**Alternative Action:** Review current medication list from ED admission.	Admission to the hospital also could be via the Emergency Department (ED). In this case, initial medication reconciliation occurs at admission to the ED and again (possibly in more depth) at admission to the hospital.
6.1.3.2	**Action:** Determine medications to continue or discontinue.	The prescribing clinician determines the appropriate medication regime for the patient during their hospital stay.
6.1.3.3	**Action:** Document medication reconciliation.	The clinician documents the decisions made regarding medications. In an EHR, once the decisions have been documented, the physician signs via electronic signature.
6.1.4	**Event:** Write medication order	
6.1.4.1	**Action:** Write medication order.	The clinician writes medication orders at admission and during the patient's inpatient stay. This could be accomplished using the Computerized Provider Order Entry (CPOE) application of the inpatient EHR and could be supported by medication decision support for recommended indications, dosing, and access to reference information. Some medication orders involve patient-specific variables for proper dosing such as weight for pediatric populations and patient's age, renal function, and other patient-specific information for geriatric populations.
6.1.4.2	**Action:** Consider contraindication information.	The clinician writing medication orders could receive prompts and advisory messages about potential drug-drug interactions, drug-diagnosis considerations, drug-renal function contraindications, patient allergies, potential errors in dosing, and other issues that may lead to adverse drug events. The clinician may also have access to relevant reference information.
6.1.4.3	**Action:** Sign medication order.	Once the clinician signs a new medication order, the patient's medication list is updated.

Code	Description	Comments
6.1.4.4	**Action:** Communicate medication order to integrated pharmacy system.	After the medication order is written and signed, it is electronically transmitted to the inpatient pharmacy system which is frequently closely integrated with the CPOE and other applications of the inpatient EHR.
6.1.4.4a	**Alternative Action:** Communicate medication order to a separate, in-house hospital pharmacy system.	The medication order is communicated to a hospital pharmacy system that may exist as a separate application but is directly interoperable with the hospital EHR.
6.1.4.4b	**Alternative Action:** Communicate medication order to external pharmacy system.	The medication order is communicated to an external pharmacy that is completely separate from the organization's EHR.
6.1.5	**Event:** View medication and allergy information	
6.1.5.1	**Action:** Review current medication list.	During the hospital stay, clinicians and pharmacists involved in the patient's care need to be able to view information on the patient's current medications including those that were documented during medication reconciliation at admission and other medications ordered during the stay. In order to be current, the information also includes pharmacist verification status and any order modifications made by the pharmacist.
6.1.5.2	**Action:** Review current allergy information.	During the hospital stay, clinicians and pharmacists involved in the patient's care need to be able to view information on the patient's allergies to medications, foods, and environmental allergens, 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). This includes the list assembled from the patient and external sources at admission and any updates documented during the patient's hospital stay.
6.1.6	**Event:** Perform medication reconciliation at internal transfer	
6.1.6.1	**Action:** Review current medication list.	During the hospital stay, medication reconciliation will also occur during transfers within the hospital to a different level of care (e.g., between intensive care and acute care) and transitions of care (e.g., nursing or emergency department shift change). This could include a transfer from the Emergency Department to a hospital admission. This process is similar to medication reconciliation at admission, but current medications are already available in the patient's current hospital medical record.
6.1.6.2	**Action:** Determine medications to continue or discontinue.	The prescribing clinician determines the appropriate medication regime for the patient post-transfer by reviewing which current medications should be continued and which should be discontinued.

Code	Description	Comments
6.1.6.3	**Action:** Document medication reconciliation.	The clinician documents the decisions made during medication reconciliation. In an EHR, once the decisions have been documented, the physician signs via electronic signature.
6.1.7	**Event:** Perform medication reconciliation upon discharge	
6.1.7.1	**Action:** Review current medication and allergy list.	The clinician reviews the patient's current medication and allergy list in the inpatient EHR, as well as the "outpatient medication list" as compiled at admission. The information needed to support this process could be available in the patient's hospital medical record or EHR based on medication reconciliation at admission and order writing (CPOE) during the stay.
6.1.7.2	**Action:** Determine medications to continue or discontinue.	The prescribing clinician pays particular attention to the outpatient medication list and which of these should be resumed or discontinued. Any necessary new prescriptions written are also considered.
6.1.7.3	**Action:** Document medication reconciliation.	The clinician documents the decisions made about which outpatient medications to resume and any new prescriptions for discharge medications. In the EHR, this is documented electronically and signed via electronic signature.
6.1.8	**Event:** Write new discharge prescriptions	
6.1.8.1	**Action:** Prescribe new medications at discharge.	The clinician writes any new prescriptions required following the hospital stay. This process could be supported by clinical decision support for recommended indications, dosing, and access to reference information. The clinician could benefit from the ability to verify patient eligibility, formulary access, and pharmacy benefits coverage to minimize overall medication costs. Clinicians could use an electronic prescribing function (e.g., an ePrescribing tool, an ambulatory EHR, or a hospital or long-term care EHR with ambulatory prescribing functionality) to write these prescriptions electronically. These prescriptions immediately update the information being compiled on discharge medications for medication reconciliation.
6.1.8.2	**Action:** Consider contraindication information.	The clinician receives and considers contraindication information while writing new discharge prescriptions.
6.1.8.3	**Action:** Communicate information to pharmacy.	Discharge prescriptions may be communicated to an external pharmacy.
6.1.8.3a	**Alternative Action:** Communicate information to patient.	Alternatively, these prescriptions could be paper prescriptions that are handed to the patient.

Code	Description	Comments
6.1.9	**Event:** Provide information to the next provider of care and patient	
6.1.9.1	**Action:** Communicate medication and allergy information to the next provider of care.	At the conclusion of the hospital stay, a patient could return to the care of their primary care physician (PCP) and/or medical specialist(s), be transferred from Emergency Department to hospital admission (if it is not handled as an internal transfer), or be transferred into the care of another healthcare facility (e.g., a long-term care facility). The information communicated includes current information on patient allergies (including new allergies documented during the hospital stay) and the outpatient medication list captured for the patient at admission, annotated as to which ones are to be resumed or discontinued, as well as any new discharge prescriptions.
6.1.9.2	**Action:** Communicate medication and allergy information to the patient.	Along with other discharge instructions, the patient could be given the outpatient medication list captured at admission, annotated as to which ones are to be resumed or discontinued, as well as any new discharge prescriptions. The information could also include up-to-date information about the patient's documented allergies. Typically, the information would be hand-written or printed out from the hospital EHR. It could also be communicated to the patient's PHR. The patient may also be provided with relevant medication guides or patient information sheets.

Figure 6-4. Inpatient Medication Reconciliation, Pharmacist Perspective Events and Actions Table

Code	Description	Comments
6.2.1	**Event:** Verify medication order	
6.2.1.1	**Action:** Receive a medication order signed by a clinician via the hospital EHR.	An inpatient pharmacist receives medication orders. The order may be transmitted to a pharmacy application through several alternative actions as described in the clinician's perspective for writing a medication order.
6.2.1.2	**Action:** "Verify" the order.	The pharmacist reviews each order for potential contraindications as well as consistency with hospital policies about medications and hospital formulary. The pharmacist may be assisted by clinical decision support in the pharmacy application.
6.2.1.3	**Action:** Make revisions to orders, as necessary.	Based on the review, a pharmacist may revise the order (often after consulting with the clinician) to adjust the dose or substitute another medication.
6.2.1.4	**Action:** Return information on verification status and any order changes.	After a medication order is verified, information on verification status and any order modifications could be incorporated into the EHR for access by clinicians involved in the patient's care. Information could include medication lot number, expiration date, and quantity dispensed.

Figure 6-5. Inpatient Medication Reconciliation, Consumer Perspective Events and Actions Table

Code	Description	Comments
6.3.1	**Event:** Self-report medication and allergy information	
6.3.1.1	**Action:** Use a PHR to self-report information on medications and allergies.	The consumer could use a PHR to record information about the use of prescribed medications, over-the-counter medications, vitamins, herbal and other supplements, and other medication information. The consumer could likewise self-report allergies, including allergies to medications as well as any environmental and food allergens, 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). This information could be available to a clinician via retrieval from the consumer's PHR or provided automatically to the clinician based on the consumer's preferences. A generalized process for access control is described in Appendix A: Create and Maintain Access Control Lists.
6.3.2	**Event:** Request and view medication and allergy information	
6.3.2.1	**Action**: Request available medication and allergy information.	The consumer requests available medication and allergy information via their PHR. This information may have been self-reported earlier, or may be derived from their clinicians' EHR systems, a PBM system, a pharmacy system, other authoritative clinical sources and/or administrative data sources. Information obtained from some sources may be obtained at the time of the consumer request or may have been previously "pushed" to the patient's PHR. A generalized process for matching patients is described in Appendix A: Arbitrating Identities.

Code	Description	Comments
		Consumers would additionally benefit from the ability to permit designated clinicians, pharmacists, and other individuals (e.g., family members) to request and view information in their PHR (a.k.a., proxy access).
6.3.2.2	**Action:** View available medication and allergy information.	After information is gathered from multiple sources, the consumer could view it in a consolidated format via their PHR.

7.0 Scenario 2: Ambulatory Medication Management

Figure 7-1. Ambulatory Medication Management

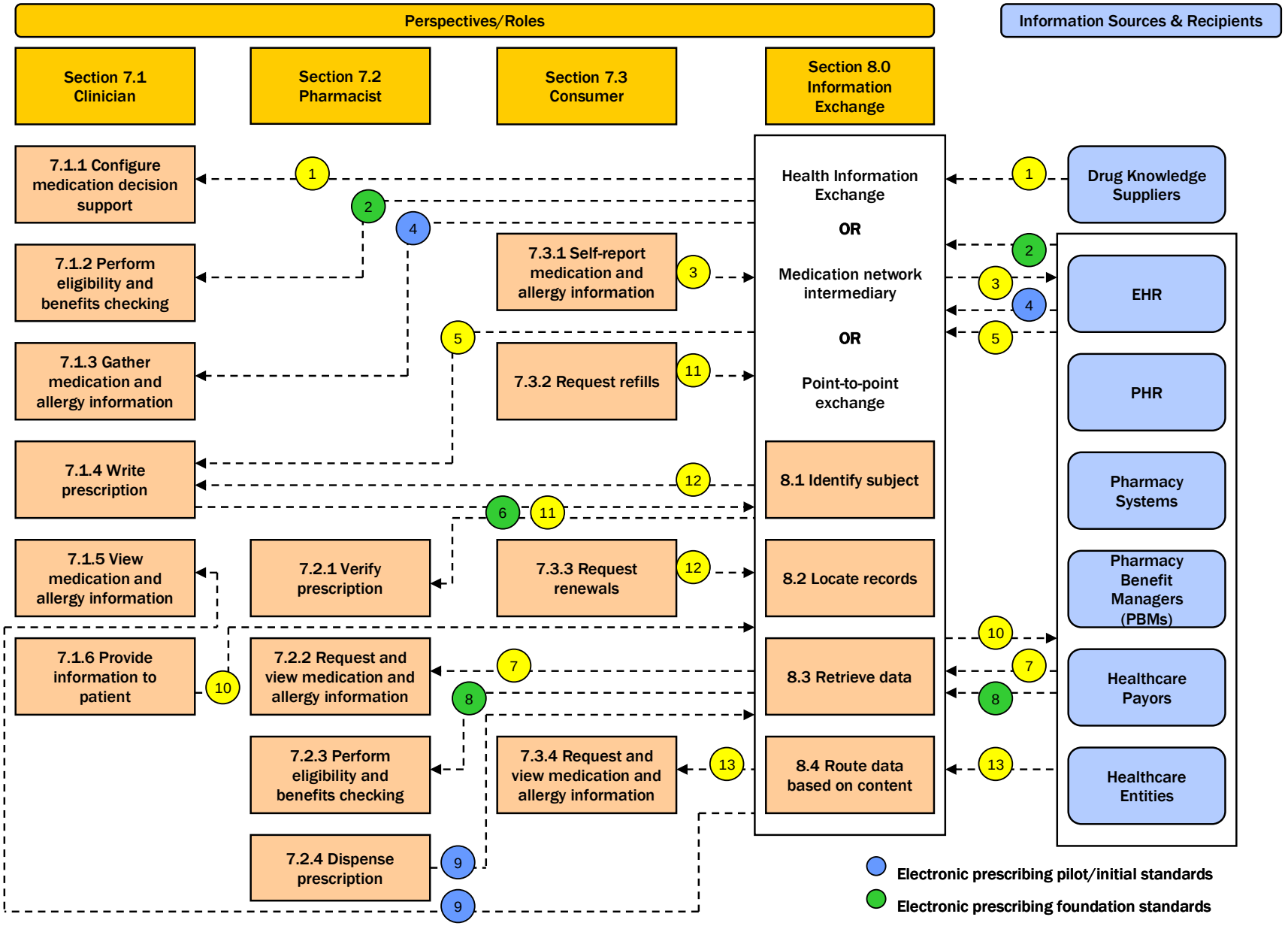


Figure 7-2. Ambulatory Medication Management Scenario Flows

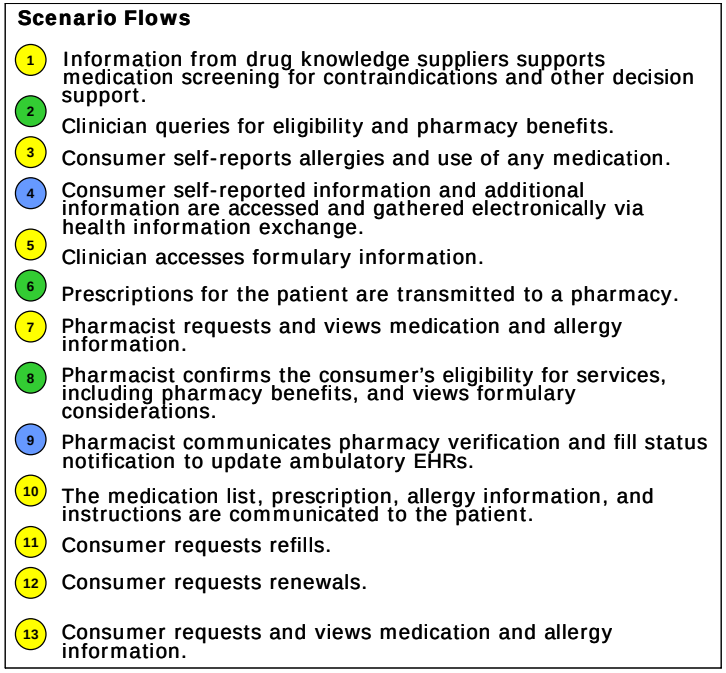


Figure 7-3. Ambulatory Medication Management, Clinician Perspective Events and Actions Table

Code	Description	Comments
7.1.1	**Event:** Configure medication decision support	
7.1.1.1	**Action:** Receive information from drug knowledge suppliers.	Vendors and other sources provide data tables and reference information to support medication screening for contraindications and other decision support capabilities. These act in conjunction with, and are integrated into, the ambulatory EHR. These tools may also support pharmacists in their roles. A generalized process is described in Appendix A: Provisioning for Secondary Use.
7.1.1.2	**Action:** Inform the ambulatory EHR.	The EHR could utilize data tables and other information from the drug knowledge supplier. The process of setting up clinical decision support would benefit from standard vocabularies for medications, prescriptions, and allergies as well as standards for the communications between the EHR and the knowledge source(s) and application(s).

Code	Description	Comments
7.1.2	**Event:** Perform eligibility and benefits checking	
7.1.2.1	**Action:** Check patient eligibility.	The patient's eligibility for services, including pharmacy benefits, needs to be confirmed. Direct query for eligibility and pharmacy benefits information from a pharmacy system, PBM, or Payor directly, and/or through health information exchange or a Medication Network Intermediary may exist. This event may also support the long-term care setting. A generalized process for patient matching is described in Appendix A: Arbitrating Identities.
7.1.2.2	**Action:** Check pharmacy benefits information.	Information on the patient's pharmacy benefits and formulary obtained during this step may be useful for prescribing. Similarly, patient- and condition- specific formulary information may be obtained during prescription writing.
7.1.3	**Event:** Gather medication and allergy information	
7.1.3.1	**Action:** Request available medication and allergy information in interoperable electronic form.	To make decisions about care, the clinician would benefit from a complete view of the patient's current medications and allergies as well as past access to a medication. A patient may have a PCP, as well as one or more specialists, all of whom may be writing medication prescriptions for the patient. Many external sources can supplement the information available locally on the medications and allergies: EHRs of other PCPs and specialists in the community, the EHR in a hospital from which the patient was recently discharged, PBMs, and organizations involved in communication of prescriptions and claims. Consumer self-reported prescription, over-the-counter (OTC) medication, vitamins, implanted medication infusion devices, and herbal and other supplements, may 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). Ideally, information from these sources should be provided in an integrated view, without duplications, that can be easily incorporated into the EHR in codified form. In each case, the information source (e.g., authoritative clinical source, administrative source, or patient) should also be captured. A generalized process for patient matching is described in Appendix A: Arbitrating Identities. A generalized process for access control is described in Appendix A: Create and Maintain Access Control Lists.
7.1.3.1a	**Alternative Action:** Request available medication and allergy information in viewable electronic form.	The clinician views summary medication information from multiple sources.
7.1.3.1b	**Alternative Action:** Request available medication and allergy information via interview.	In today's environment, clinicians frequently ask the patient, patient's family, significant others, and/or caregivers about medications that are not documented locally. This action could be beneficial even if medication information is obtained through alternate means as another data source for clinicians to consider.
7.1.3.2	**Action:** View consolidated available medication and allergy information.	The clinician views the information to gain a comprehensive view of the patient's medication and allergy information.
7.1.3.3	**Action:** Select current medication and allergy information.	The clinician determines which information from external sources should be stored in the ambulatory EHR.

Code	Description	Comments
7.1.3.4	**Action:** Incorporate current medication and allergy information.	After appropriate analysis and selection, the clinician executes the necessary steps to store this information in the patient's ambulatory health record.
7.1.4	**Event:** Write prescription	
7.1.4.1	**Action:** Consider formulary.	Clinicians would benefit from the ability to access and consider patient-specific pharmacy benefit information for pharmacy benefits, Medicare part D, and formulary information as they make prescribing decisions to minimize overall medication costs. [This information may have been obtained previously based on an earlier eligibility request.] This information may be provided by pharmacy systems, PBMs, or Payors and may be provided directly or through the use of a Medication Network Intermediary. Formulary considerations are also relevant in the long-term care setting.
7.1.4.2	**Action:** Write prescription(s).	The clinician writes prescriptions based on the treatment plan developed during the patient encounter or in response to requests from patients for prescription renewals. The clinician writes prescriptions using an ambulatory EHR. This process could be supported by clinical decision support for recommended indications, dosing, and access to reference information. Some medication orders involve patient-specific variables for proper dosing such as weight for pediatric populations and patient's age, renal function, and other patient-specific information for geriatric populations.
7.1.4.3	**Action:** Consider contraindication information.	The ambulatory EHR or ePrescribing tool can contribute to medication safety through the use of clinical decision support tools that help clinicians avoid adverse drug events through prompts and advisory messages about potential drug-drug interactions, drug-diagnosis considerations, drug-renal function contraindications, patient allergies, potential errors in dosing, and other issues that may lead to adverse drug events. The clinician may also have access to relevant reference information.
7.1.4.4	**Action:** Sign prescription.	Once the clinician signs a new prescription, the patient's medication list is updated.
7.1.4.5	**Action:** Communicate information to pharmacy.	An ePrescribing tool or an ambulatory EHR could communicate electronic prescriptions to the patient's preferred pharmacy. A pharmacy may also be affiliated with a clinician's ambulatory office (with integrated prescribing and pharmacy functions). Prescription changes and cancellations could also be transmitted to the pharmacy in a similar manner. Clinician prescribers (and clinics) may also give patients access to no-cost (free) medications that would need to be correctly captured in the EHR medication prescription record.
7.1.4.5a	**Alternative Action:** Communicate information to pharmacy using paper or fax.	In cases where electronic communication to pharmacy is not offered, or if the system is currently unavailable, a traditional paper prescription, printed prescription, or fax could be used to communicate the prescription information.
7.1.5	**Event:** View medication and allergy information	
7.1.5.1	**Action:** Review current medication list.	During the ambulatory visit, clinicians and pharmacists involved in the patient's care need to be able to view information on the patient's current medications. In order to be current, the information could also include fill status so that the clinician can confirm that the patient has access to the medication.

Code	Description	Comments
7.1.5.2	**Action:** Review current allergy information.	During the ambulatory visit, clinicians involved in the patient's care need to be able to view information on the patient's allergies to medications, foods, and environmental allergens, 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).
7.1.6	**Event:** Provide information to patient	
7.1.6.1	**Action:** Communicate current medication list, prescriptions, allergy information, and care instructions to the patient.	The medication list, new prescriptions, allergy information, and instructions should be communicated to the patient. This information could also be communicated to their PHRs from the ambulatory EHR. The patient may also be provided with relevant medication guides or patient information sheets.

Figure 7-4. Ambulatory Medication Management, Pharmacist Perspective Events and Actions Table

Code	Description	Comments
7.2.1	**Event:** Verify prescription	
7.2.1.1	**Action:** Verify prescription.	The prescription is processed in a series of steps including receipt of order, checking for possible contraindications using medication decision support tools, and prescription verification. The pharmacist may also communicate with the prescribing clinician where questions exist and prescription changes are appropriate. An electronic request for a prescription refill could also be initiated by a consumer via their PHR.
7.2.2	**Event:** Request and view medication and allergy information	
7.2.2.1	**Action**: Request available medication and allergy information.	The pharmacist requests available medication and allergy information. This information may be derived from sources a PBM system and/or a pharmacy system. A generalized process for matching patients is described in Appendix A: Arbitrating Identities.
7.2.2.2	**Action:** View available medication and allergy information.	After information is gathered from multiple sources, the pharmacist could view the information in a consolidated format.
7.2.3	**Event:** Perform eligibility and benefits checking	
7.2.3.1	**Action**: Check patient eligibility.	In the pharmacy, the consumer's eligibility for pharmacy benefits is confirmed, along with information about patient financial responsibility and formulary. A patient's eligibility for service could be confirmed by communicating identifying patient information to a payor. This communication could be accomplished through an HIE, PBM, or MNI. Drug utilization review could also be accomplished during this event. This activity is also relevant for the long-term care setting.
7.2.3.2	**Action**: Check pharmacy benefits information.	Once patient eligibility is confirmed, the patient's pharmacy benefits information can be viewed and considered during dispensing. In some situations, medication claims processing may be intertwined with benefits and eligibility checking prior to medication dispensing.
7.2.4	**Event:** Dispense prescription	
7.2.4.1	**Action:** Dispense medication to the patient.	Once all necessary patient safety considerations and formulary considerations have been reviewed, medication could be dispensed to the patient. Direct care activities the pharmacist may perform include patient education, patient assessment, consultation, and medication use. The patient may also be provided with relevant medication guides or patient information sheets.

Code	Description	Comments
7.2.4.2	**Action:** Provide medication dispensing status.	The pharmacy system records the dispensing status (or "fill status notification") of each medication for future consideration. Clinicians would benefit from knowing the dispensing status as a partial indicator of patient compliance with the recommended treatment. The information communicated should include the dispensing date, the date the prescription was picked up from the pharmacy, medication lot number, expiration date, and quantity dispensed.

Figure 7-5. Ambulatory Medication Management, Consumer Perspective Events and Actions Table

Code	Description	Comments
7.3.1	**Event:** Self-report medication and allergy information	
7.3.1.1	**Action:** Consumers self-report information on medications and allergies in their PHR.	The consumer could use their PHR to record information about other prescribed medications, their use of over-the-counter medication, vitamins, herbal and other supplements, and other medication information. The consumer could likewise self-report allergies, including allergies to medications as well as any environmental and food allergens, 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). This information could be available to a clinician via retrieval from the consumer's PHR or provided automatically to the clinician based on the consumer's preferences. A generalized process for access control is described in Appendix A: Create and Maintain Access Control Lists.
7.3.2	**Event:** Request refills	
7.3.2.1	**Action:** Communicate a refill request to the patient's preferred pharmacy.	A consumer could send prescription refill requests via their PHR to a pharmacy of choice. If no refills remain on the original prescription, the consumer could contact the original prescribing clinician for a prescription renewal. Alternatively, the pharmacist may notify the prescribing clinician if a refill is requested by a consumer and no more are available. Some EHRs and MNIs may offer this capability in addition to PHRs. Additionally, payors may need to be included in this action for approval of some refills.
7.3.3	**Event:** Request renewals	
7.3.3.1	**Action**: Communicate a renewal request to the patient's prescribing clinician.	A consumer could request prescription renewals using their PHR. The PHR would transmit renewal requests directly to the consumer's clinician or pharmacist. As noted above, the renewal request may also be initiated by a pharmacist when no more refills are allowed by the prescription.
7.3.4	**Event:** Request and view medication and allergy information	
7.3.4.1	**Action**: Request available medication and allergy information.	The consumer requests available medication and allergy information via their PHR. This information might have been self-reported earlier, or may be derived from external sources such as their clinicians' EHR systems, a PBM system, and/or a pharmacy system. Information obtained from some sources may be obtained at the time of the consumer request or may have been previously "pushed" to the patient's PHR. A generalized process for matching

Code	Description	Comments
		patients is described in Appendix A: Arbitrating Identities. The consumer may benefit from the ability to permit designated clinicians, pharmacists, and other individuals (e.g., family members) to view information in their PHR (a.k.a., proxy access).
7.3.4.2	**Action:** View available medication and allergy information.	After information is gathered from multiple sources, the consumer could view the information in a consolidated format via their PHR. Consumers may also benefit from additional information being accessible via their PHRs such as when refills are filled and awaiting pick-up or overdue for pick-up, when prescriptions are due to expire, and medication pricing information.

8.0 Information Exchange

This section describes at a high level the role of information exchange in the scenarios described in this use case. The information exchange activities may be carried out by a health information exchange (HIE), by a medication network intermediary, by point-to-point exchange, or other means. All of the activities listed below would be relevant for a health information exchange, however some activities may not be applicable to the other methods of information exchange.

Figure 8-1. Medication Management Information Exchange Table

Code	Activity	Comments
8.1	Identify Subject	Based on a query or the contents of a record, determine if an HIE subject registry has a record that matches the subject referenced in the query or record. Search for candidate subject matches within an HIE registry.
8.2	Locate Records	Locate the records within an HIE or among several HIEs for a patient that has been identified. Retrieve any available locations that have records for the identified patient, within an HIE and possible among several across HIEs.
8.3	Retrieve Data	Enable providers and consumers to view or access patient records within and across HIEs. Provide the requested data from the identified record locations in response to the user request.
8.4	Route Data Based on Content	Some messages have content that indicates the providers and Care Delivery Organizations (CDOs) that should receive a message. Some consumers may seek to establish data delivery to their PHR or other providers of their care. The HIE reviews these contents and distributes the messages accordingly. The distribution may be within the HIE or across HIEs. Forward the message to the appropriate location based on the identified patient and/or provider referenced in the message.

Health Information Exchange (HIE): A multi-stakeholder entity that enables the movement of health-related data within state, regional, or non-jurisdictional participant groups.

Medication Network Intermediaries (MNIs): These entities support the healthcare process by accomplishing communication among providers, pharmacies, and pharmacy benefits managers or payors as needed for medication dispensing and reimbursement. In this role, they are both a conduit for communication and a source

of information on aspects of medication management such as medication prescription history, dispensing status, and pharmacy benefits. This stakeholder group includes Pharmacy Network Intermediaries (PNIs), ePrescribing Network Intermediaries (ePNIs), clearinghouses, and similar organizations.

Point-to-Point Exchange: A direct link or communication connection with defined endpoints.

9.0 Medication Management Dataset Considerations

At this time, there is discussion regarding what might compose a summary data set and/or standards for the transfer of medication and allergy information between PHRs, EHRs, etc. There have been discussions regarding using the Continuity of Care Record (CCR) and suggestions to use the jointly created Continuity of Care Document (CCD) in the effort of sending information between systems. There also have been considerations for datasets related to activities of the Joint Commission, Health Level 7, the Consolidated Health Informatics (CHI) initiative, and the National Council for Prescription Drug Programs. Finally, dataset discussion has also included considerations of the vocabulary of SNOMED and federal standards/vocabulary work such as the National Drug File, Structured Product Labeling, Unique Ingredient Identifier (UNII), and RxNorm.

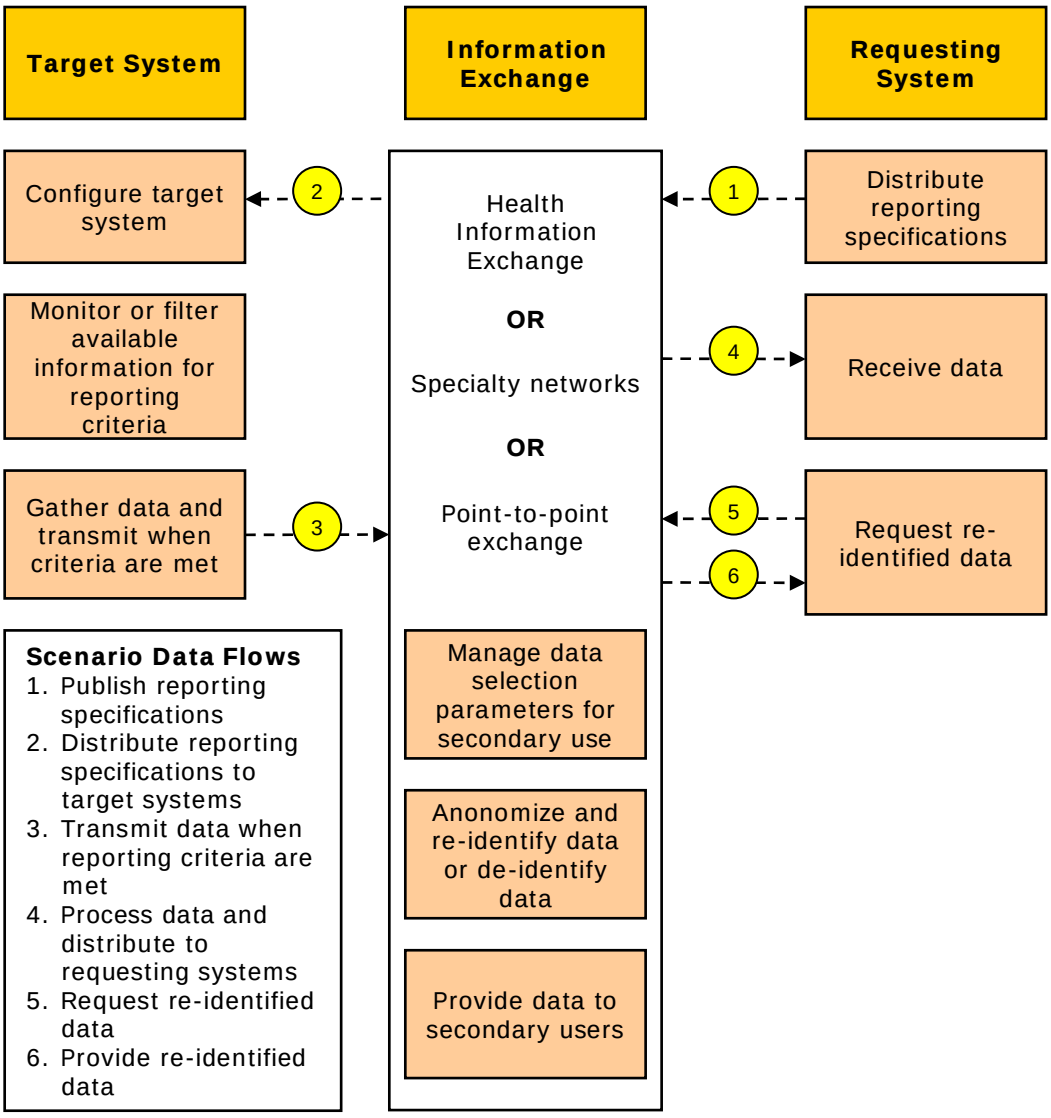
To date, there is no established “data set” of elements associated with a consumer accessing and/or sending their clinical information. For the purposes of addressing the scenarios in this use case, the following information categories may be considered:

- Medication Decision Support
- Outpatient Medication List
- Allergies and Medication Intolerances
- Medication/Allergy History
- Medication Orders/Prescriptions
- Current Medications
- Healthcare Provider List Information
- Healthcare Provider Permissions Information

Appendix A: Common Processes

A1.0 Provisioning for Secondary Use

Figure A1-1. Provisioning for Secondary Use



Concept - Secondary use systems could communicate reporting needs to provider systems in a form that could be used to configure those systems to gather and report needed information. The focus would be to electronically describe the data needs, terminologies, algorithms, etc. in a way which could be readily used in the target systems to report the needed information.

Generalized information flow - A target system may contain data which is of interest to users of a requesting system. The requesting system communicates the request for data in

the form of reporting specifications to the target system. The target system implements the reporting specifications and monitors for the presence of data which meet the reporting criteria. This monitoring process persists in the target system until the request is withdrawn or expires. When the reporting criteria are met, the target system gathers the requested data, formats it according to the specifications, and transmits the data to the requesting system.

While this flow describes interaction between a single target system and single requesting system, it is likely that there will be multiple target systems which need to receive the request for data, and multiple requesting systems which need to receive the data.

This information flow describes a push model for delivering data from the target system to the requesting system. However, it may also be possible for the requesting system to initiate an ad-hoc query to the target systems to retrieve data of interest.

Examples

- Public health case reporting;
- Quality measure reporting;
- Response management queries; and
- Adverse event surveillance.

Related flows which could be called by this flow

- Augment clinical information

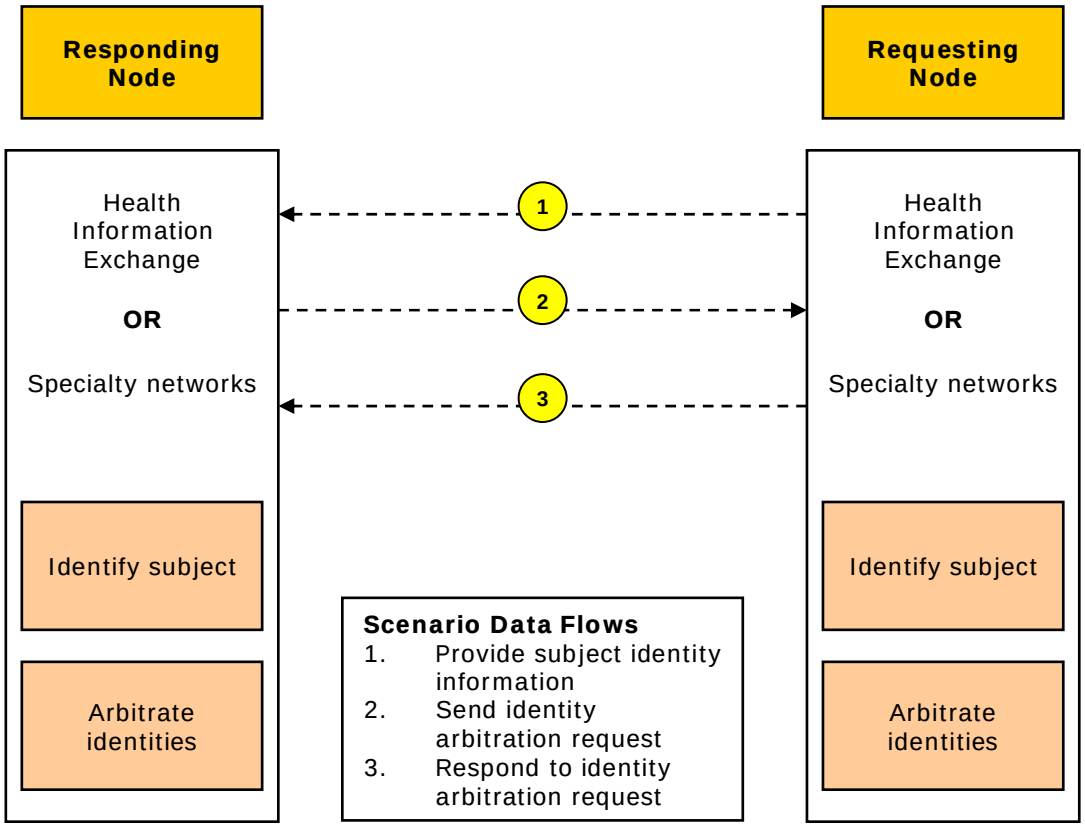
Figure A1-2. Provisioning for Secondary Use Scenario Data Flows Table

Flow	Description	Comments
1	Publish reporting specifications	Entities wishing to receive data from a target system distribute the reporting requirements and specifications in interoperable electronic form. Specifications could include: ▪ Filtering or triggering criteria describing specific data or temporal conditions which, when met, would initiate the data gathering and reporting process in the target system. Criteria could be based on the presence of specific data value(s), could be time-based, or be based on other algorithms; ▪ Data reporting specifications including data sets and specific taxonomies or vocabularies to be used by the target system when reporting. This may also include conditional data requirements, which only need to be reported when additional criteria are met by data in the target system (e.g., if a particular combination of data values are present in the target system, gather the following additional data); ▪ Specifications for data formatting, messaging, privacy and security requirements, etc.; and ▪ Routing and distribution specifications including identifying information for

Flow	Description	Comments
		all systems which should receive the data.
2	Distribute reporting specifications to target systems	Information exchange mechanisms distribute the reporting specifications to the target systems. This could be accomplished by point-to-point exchanges, specialty networks, or health information exchanges. ▪ Point-to-point exchange – could include direct (push) transmission of the reporting specifications from the requesting system to the target system or delivery upon a request initiated by the target system (pull). ▪ Specialty networks – may exist which manage the routing of data requests and reports among specific groups of entities. These networks may also provide additional capabilities. ▪ Health information exchange – may have the capability to manage the distribution of data selection parameters on behalf of target and requesting systems. This could include determining which connected systems should receive the reporting specifications based on the target system capabilities identified in HIE registries and routing the specifications to those systems.
3	Transmit data when reporting criteria are met	Based on the reporting specifications, target systems are configured to monitor or filter available data, and initiate a report when the reporting criteria are met. When the reporting criteria are met, the target system gathers the required data and assembles it in the format required, utilizing the taxonomies and vocabularies defined in the reporting specifications. The target system transmits the data using point-to-point, specialty networks, or health information exchange capabilities.
4	Process data and distribute to requesting systems	If the data are distributed via health information exchange, capabilities may be available to: ▪ Anonymize and re-identify data or de-identify data based on the reporting specifications; and ▪ Distribute the data to multiple receiving systems based on the distribution specifications in the reporting requirements and the receiving system capabilities identified in the HIE registries.
5	Request re-identified data	The requesting system may have an authorized need to re-identify data received in flow #4. The requesting system sends a request for re-identification to the information exchange to re-identify the data.
6	Provide re-identified data	After confirming that the requesting system has been authorized to receive re-identified data, the information exchange provides the re-identified data to the requesting system

A2.0 Arbitrating Identities

Figure A2-1. Arbitrating Identities



Concept - Systems involved in exchanging patient-specific information need mechanisms to reconcile person identity between nodes (e.g., between health information exchanges) without a universal identifier.

Generalized information flow – The requesting node has a need to determine if the responding node has information about a specific individual (a "subject", such as a provider or patient). The requesting node sends subject identifiers to the responding node. The responding node determines whether it can:

- Match the provided identifiers to a subject known to the responding node;
- Identify a match that has some conflicting information such as an old address; and
- Not match to any subject known by the responding node.

Identity arbitration represents the reconciliation of identify information between two nodes to ensure that data are correctly associated with the right subject. The responding node

identifies a match, or in some circumstances, replies with information about a match which might not exactly correspond to all the information provided by the requesting node. The requesting node evaluates the information provided for the candidate subjects and determines whether there should be a link to the subject of interest. If the requesting node determines that there should be a link, it transmits information about the link to the responding node. Processes to maintain the linkage may also be operational between nodes (e.g., if one of the nodes becomes aware of changes to the information which was used to create the match).

Identity arbitration occurs between two nodes in a network when data must be transacted between those nodes. This process does not imply that all identities are reconciled between nodes, only that they are reconciled on an as needed basis.

Examples

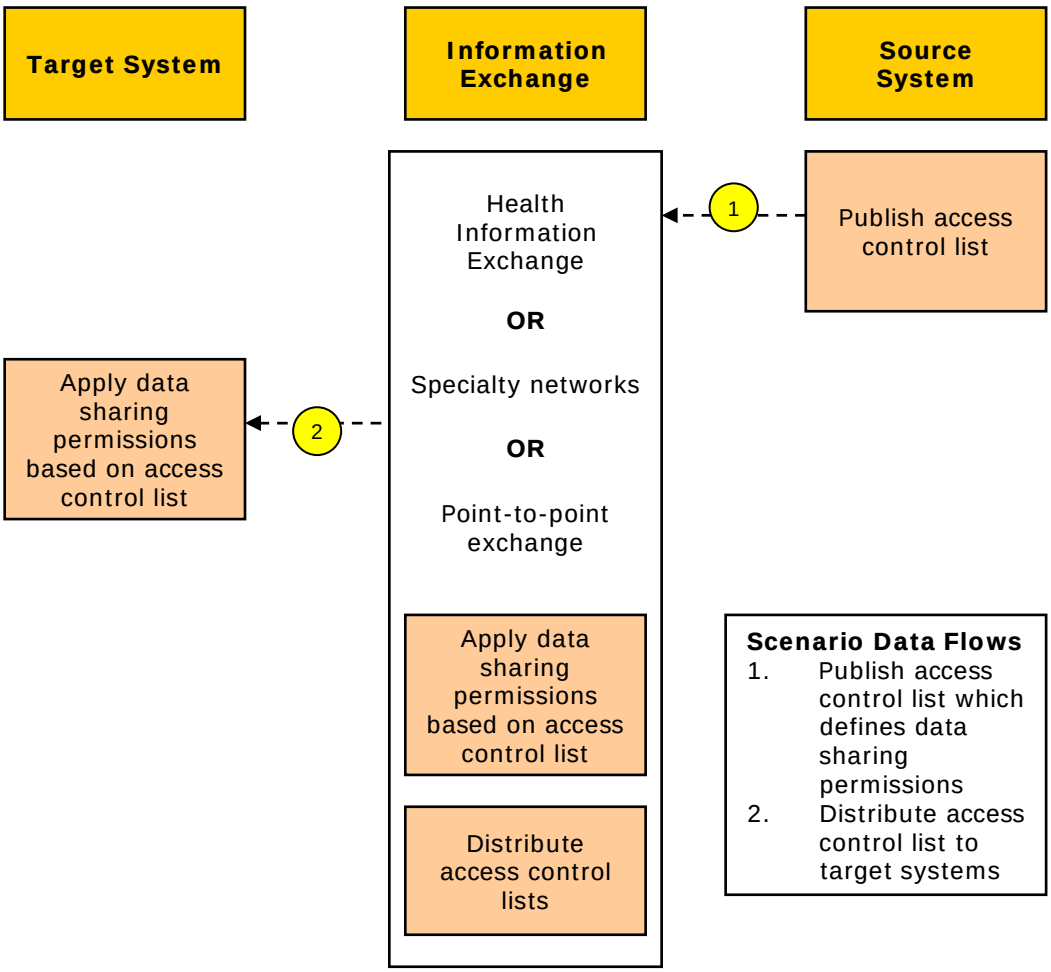
- HIE to HIE interactions;
- CDO – HIE interactions; and
- PHR – HIE interactions.

Figure A2-2. Arbitrating Identities Scenario Data Flows Table

Flow	Description	Comments
1	Provide subject identity information	The requesting system sends information describing the subject of interest to the responding node.
2	Send identity arbitration request	Using the information provided by the requesting node, the responding node carries out a process to match the subject of interest to those known to the responding node. If the responding node determines that there is a match, it replies as such. In appropriate cases, if the responding node determines that it has a match that does not completely correspond to the provided information (such as an old address), the responding node sends information on the match and any conflicts to the requesting node. If the responding node determines that it cannot match the subject of interest, it responds accordingly.
3	Respond to identity arbitration request	The requesting node assesses the match information provided by the responding node and determines whether there should be a link with the subject of interest. If the requesting node determines that there should be a link, it communicates to the responding node, which also maintains the linkage between nodes.

A3.0 Create and Maintain Access Control Lists

Figure A3-1. Create and Maintain Access Control Lists



Concept - Systems involved in information exchange may need a mechanism to provision target systems with information needed to assign access privileges and communicate access control lists to other systems to implement the access controls. Access control can be extremely burdensome to manage normally and, with providers covering for each other, may need to be implemented very conservatively.

Generalized information flow – A source system needs to communicate access control lists to one or more target systems for implementation in the target system processes related to access to data and data exchange. The source system develops the access control list and distributes it to the target system(s). The target system receives and implements the controls defined in the access control list. Permissions may be persistent, may be temporally constrained, or defined using other logical constructs.

While this flow describes interaction between a single target system and single requesting system, it is likely that there will be multiple target systems which need to receive the access control list.
This information flow describes a push model for delivering data from the source system to the target system. However, it may also be possible for the target system to query the source system for the access control list.

Examples

- Consumer-defined access decisions

Figure A3-2. Create and Maintain Access Control Lists Scenario Data Flows Table

Flow	Description	Comments
1	Publish access control list which defines data sharing permissions	The source system enables a user to designate data sharing permissions to individuals, groups, entities, etc. The types and granularity of data which could be controlled by permissions might include: ▪ Meta-data; ▪ Full data; ▪ Partial data; ▪ Individual data; and ▪ Portions of documents. Individuals, groups and entities to which the data sharing permissions could be applied include: ▪ Individuals; ▪ Groups of individuals; ▪ Organizations; and ▪ Roles. The permissions could also be defined temporally: ▪ Persistent until revised; ▪ Persistent with an expiration date; ▪ Time-based with various mechanisms to define the duration of the permission; and ▪ Other logic may also be present, including such things as access during a specific encounter or episode of care.
2	Distribute access control list to target systems	Information exchange mechanisms distribute the access control lists to the target systems. This could be accomplished by point-to-point exchanges, specialty networks or health information exchanges. ▪ Point-to-point exchange – Could include direct (push) transmission of the access control list from the source system to the target system or delivery upon a request initiated by the target system (pull). ▪ Specialty networks – May exist which manage the routing of access control lists among specific groups of entities. These networks may also provide additional capabilities related to access control. ▪ Health information exchange – May have the capability to manage the distribution of access control lists on behalf of source systems. This could include determining which connected systems should receive the access control list based on the target system capabilities identified in HIE

Flow	Description	Comments
		registries and routing the access control list to those systems. The target systems and health information exchange implement the data sharing permissions as defined by the access control as they carry out data access and data exchange activities.

Appendix B: Glossary

AHIC: American Health Information Community.

Allergy: Hypersensitivity caused by exposure to a particular antigen (allergen) resulting in a marked increase in reactivity to that antigen on subsequent exposure, sometimes resulting in harmful immunologic consequences.

Ambulatory Care: Any medical care delivered on an outpatient basis. Sites where ambulatory care can be delivered include physician offices, hospital emergency departments, and urgent care centers.

Care: Relieving the suffering of individuals, families, communities, and populations by providing, protecting, promoting, and advocating the optimization of health and abilities.

CCHIT: Certification Commission for Healthcare Information Technology.

Clinicians: Healthcare providers with patient care responsibilities, including physicians, advanced practice nurses, physician assistants, nurses, and other credentialed personnel involved in treating patients.

CMS: Centers for Medicare & Medicaid Services, a federal agency within the Department of Health and Human Services.

Consumers: Members of the public who may receive healthcare services. These individuals may include: caregivers, patient advocates, surrogates, family members, and other parties who may be acting for, or in support of, a patient in the activities of receiving healthcare.

Contraindication Alerts: Notifications that can be provided to a provider or pharmacist providing warnings concerning drug interactions with other drugs, indicated allergies, and other situations.

Current Hospital Medication List: The patient medication list initiated at admission and modified as additional medications are ordered during a hospital stay.

Current Medication List: A list of medications for which a consumer has an active prescription; this information is frequently consulted by a clinician while providing care and is especially important during transitions in care from one site, setting, or level of care to another. Clinicians are assisted in care management decisions if the current medication list includes patient-reported use of non-prescription medications such as over-the-counter drugs and remedies such as herbal and homeopathic supplements.

Department of Health and Human Services (HHS): This is the federal agency responsible for human health, and has oversight over many other federal agencies such as FDA, the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), CMS, the Agency for Health Research and Quality (AHRQ), the Substance Abuse and Mental Health Services Administration (SAMHSA), and others.

Dietary Supplement: A product taken by mouth that contains a “dietary ingredient” intended to supplement the diet. These ingredients may include vitamins, minerals, herbs or other botanicals, or other substances.

Discharge Prescription: A prescription written at the end of a hospital stay as a patient is released to self care or the care of another, including a provider such as a Primary Care Provider or a Long Term Care facility provider.

Drug Knowledge Suppliers: Organizations that maintain and provide reference information on drugs that is used to provide clinical content in pharmacy systems and EHRs. Drug reference information provides the clinical content for medication screening for

possible contraindications such as drug-drug, drug-allergy, or drug-diagnosis interactions and inappropriate dosing. It also can provide assistance in selecting appropriate medications and quick access to monographs and other reference information. Drug Knowledge Suppliers can also provide new warnings, prescribing limitations, similar communications, and patient education information.

Electronic Health Record (EHR): The electronic health record is a longitudinal electronic record of patient health information generated in one or more encounters in any care delivery setting. This information may include patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory information and radiology reports.

ePrescribing: The process of using electronic means to transfer information between provider and pharmacist regarding a prescription.

FDA: Food and Drug Administration.

Formulary: A list of medication that can be prescribed and is allowable under a set of restrictions such as available in the pharmacy or covered by a health plan.

Health Information Exchange (HIE): A multi-stakeholder entity that enables the movement of health-related data within state, regional, or non-jurisdictional participant groups.

Healthcare Entities: Organizations that are engaged in or support the delivery of healthcare. These organizations could include hospitals, ambulatory clinics, long-term care facilities, community-based healthcare organizations, employers/occupational health, school health, dental clinics, psychology clinics, care delivery organizations, and other healthcare facilities.

Healthcare Payors: Insurers, including health plans, self-insured employer plans, and third party administrators, providing healthcare benefits to enrolled members and reimbursing provider organizations. As part of this role, they provide information on eligibility and coverage for individual consumers, as well as claims-based information on consumer medication history. Case management or disease management may also be supported.

HITSP: Healthcare Information Technology Standards Panel.

Inpatient: A patient who is hospitalized to receive healthcare treatment.

Medication: Medication includes any prescription medications, sample medications, herbal remedies, over-the-counter drugs, vaccines, and diagnostic and contrast agents used on or administered to persons to diagnose, treat, or prevent disease or other abnormal conditions. This also includes any product designated by the FDA as a drug with the exception of enteral nutrient solutions, oxygen, and other medical gases.

Medication History: A list of past and present prescription and non-prescription patient medications that is relevant for future clinical episodes.

Medication List: A compilation of current medications. This may also include the history of medications for a period of time. A medication list includes medication start and stop dates, and may include the clinical indication.

Medication Management: The system for how healthcare organizations handle medications. The medication management process includes ordering and prescribing, preparing and dispensing, administration, monitoring, medication selection and procurement (i.e., formulary considerations), and medication storage.

Medication Network Intermediaries (MNIs): These entities support the healthcare process by accomplishing communication among providers, pharmacies, and pharmacy benefits managers or payors as needed for medication dispensing and reimbursement. In this role, they are both a conduit for communication and a source of information on aspects of medication management such as medication prescription history, dispensing status, and pharmacy benefits. This stakeholder group includes Pharmacy Network Intermediaries, ePrescribing Network Intermediaries, clearinghouses, and similar organizations.

Medication Order: Traditionally hand-written or verbally communicated order for patient care, provided to the medical staff (nurses, therapists or other physicians) or to the departments (pharmacy, laboratory or radiology) responsible for fulfilling the order. A medication order can also be electronic.

Medication Reconciliation: Formal process of obtaining a complete and accurate list of each consumer's current medications – including name, dosage, frequency and route – and allergies and documenting decisions that are made about which medications are continued as the patient transitions from one level or setting of care to another (admission to hospital, intra-hospital transfer, discharge to home). For patient transitions that transfer the patient from one setting to another (hospital to PCP or long-term care), medication reconciliation requires communication of information to the next provider of care and to the patient.

ONC: Office of National Coordinator for Health Information Technology.

OTC: Over-the-counter, as in OTC medication, which implies that it does not require prescribing by a physician.

Outpatient Medication List: Also known as the "home medication list", a list of current medications assembled at admission to an Emergency Department or hospital. It is assembled from the patient (or other patient representative) and from available external electronic sources and is intended to include all current prescribed medications, as well as OTC, herbal and homeopathic drugs, and dietary supplements the patient is taking.

Outpatient Pharmacies: Pharmacies that are primarily engaged in filling ambulatory patient prescriptions.

Patients: Members of the public who receive healthcare services.

Personal Health Record (PHR): A health record that can be created, reviewed, annotated, and maintained by the patient or the caregiver for a patient. The personal health record may include any aspect(s) of the health condition, medications, medical problems, allergies, vaccination history, visit history, or communications with healthcare providers.

Pharmacists: Health professionals and clinicians who are licensed to prepare, dispense and support the use of medication pursuant to the request of authorized prescribers. The practice of pharmacy includes, but is not limited to, the assessment, monitoring, and modification of medication and the compounding or dispensing of medication. Direct care activities that pharmacists can perform include patient education, patient assessment, and consultation.

Pharmacy Benefit Managers (PBMs): These entities manage pharmacy benefits on behalf of payors, interacting with pharmacies and providers via a pharmacy network intermediary. As part of this role, they can provide information on pharmacy benefits available to an individual consumer and an individual consumer's medication history.

Pharmacy Systems: Electronic systems that support pharmacists with their role in dispensing medication. This includes systems that may be able to provide useful information on consumers' past medication histories.

Point-to-Point Exchange: A direct link or communication connection with defined endpoints.

Prescription: An order made by a qualified health professional to a pharmacist or other therapist for the preparation and administration of a drug or device for a patient.

Public Health Agencies (local/state/federal): Local, state, and federal government organizations and personnel that exist to help protect and improve the health of their respective constituents.