



Office of the National Coordinator for Health Information Technology  
(ONC)

# Medication Management Prototype Use Case

## Table of Contents

<b>1.0 INTRODUCTION .....</b>	<b>2</b>
1.1 USE CASE DESCRIPTION.....	2
1.2 SCOPE OF THE USE CASE.....	2
<b>2.0 USE CASE STAKEHOLDERS .....</b>	<b>5</b>
<b>3.0 ISSUES AND OBSTACLES.....</b>	<b>7</b>
<b>4.0 USE CASE PERSPECTIVES.....</b>	<b>10</b>
<b>5.0 USE CASE SCENARIOS .....</b>	<b>11</b>
5.1 SCENARIO 1: INPATIENT MEDICATION RECONCILIATION .....	11
5.2 SCENARIO 2: ACCESS TO CURRENT MEDICATION AND ALLERGY INFORMATION IN AN AMBULATORY CARE SETTING.....	11
5.3 SCENARIO 3: PRESCRIBING PROCESS IN AN AMBULATORY CARE SETTING .....	12
5.4 COMMON PROCESSES .....	12
<b>6.0 SCENARIO 1: INPATIENT MEDICATION RECONCILIATION .....</b>	<b>14</b>
6.1 CLINICIAN PERSPECTIVE .....	14
6.2 INPATIENT PHARMACIST PERSPECTIVE .....	18
6.3 CONSUMER PERSPECTIVE.....	18
<b>7.0 SCENARIO 2: ACCESS TO CURRENT MEDICATION AND ALLERGY INFORMATION IN AN AMBULATORY CARE SETTING .....</b>	<b>21</b>
7.1 CLINICIAN PERSPECTIVE .....	21
7.2 CONSUMER PERSPECTIVE.....	22
<b>8.0 SCENARIO 3: PRESCRIBING PROCESS IN AN AMBULATORY CARE SETTING .....</b>	<b>25</b>
8.1 CLINICIAN PERSPECTIVE .....	25
8.2 PHARMACIST PERSPECTIVE.....	26
8.3 CONSUMER PERSPECTIVE.....	27
<b>APPENDIX A: GLOSSARY .....</b>	<b>A-1</b>
<b>APPENDIX B: OVERVIEW OF MEDICATION MANAGEMENT IN AN AMBULATORY CARE SETTING .....</b>	<b>B-1</b>

## 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 that addresses medication management. This use case would allow providers and consumers access to necessary medication and allergy information when healthcare is sought and delivered to improve medication management overall 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 health care; and
- In addition to health benefits, medication management will be better supported when clinicians have more information available about prescription benefits, when effective electronic exchange supports the prescribing process, and consumers can request prescription renewals and refills online.

The Medication Management Use Case describes the stakeholders, 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 Prototype 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 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. The 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 are underway 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.

The Secretary of the U.S. Department of Health and Human Services (HHS) has a congressional mandate to publish the named standards for ePrescribing by April 2008.

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

Stakeholder	Working Definition
<b>Clinicians</b>	Health care providers with patient care responsibilities, including physicians, advanced practice nurses, physician assistants, nurses, and other credentialed personnel involved in treating patients.
<b>Consumers</b>	Members of the public who may receive healthcare services and may have a PHR which may be used to access and maintain their personal health record. 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 and/or using a PHR.
<b>Drug Knowledge Suppliers</b>	An organization that maintains and provides 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.
<b>Health Care Entities</b>	A collection of organizations that are engaged in or supporting the delivery of healthcare. These entities are included to describe those entities where multiple roles are filled by the same organization, such as an organization serving as both the Payor and PBM.
<b>Health Care Payors</b>	Insurers providing health care benefits to enrolled members and reimbursing provider organizations and pharmacies for services provided. 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.
<b>Health Information Exchange (HIE)</b>	Organizations that may provide trust and governance relationships for a network of users and applications. Organizations playing this role may be, but are not limited to, statewide or regional groupings, or geographically diverse integrated networks. Some HIEs may receive networking services from other health information providers.
<b>Patients</b>	Members of the public who receive health care services.
<b>Pharmacists</b>	Health professionals who are licensed to prepare and dispense medication in response to the orders of physicians and other licensed clinicians.

Stakeholder	Working Definition
<b>Pharmacy Benefit Managers (PBMs)</b>	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.
<b>Pharmacy Network Intermediaries (PNIs)</b>	These entities support the health care 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.
<b>Pharmacy Systems</b>	Electronic systems that support pharmacists with their role in dispensing medication. For medication management, this includes systems that may be able to provide useful information on consumers' past medication history.

### 3.0 Issues and Obstacles

Realizing the full benefits of health information technology capabilities mentioned above 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 records needs to be accomplished in a confidential and secure manner that respects consumer decisions regarding access to their information. Policies, implementation mechanisms, and supporting technologies are needed to accomplish this objective. 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 protected whenever it is stored, transmitted, or disposed of by any person who has been given authorization to view that information. Mechanisms are needed to allow authorized access to patient information 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.

*Audit and logging exchange.* The mechanisms needed to review access to a specific consumer's information across multiple organizations, geographic regions, or health information exchanges may not be readily available. 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.

#### **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 medication and allergies. Near-term improvements are achievable with sharing of unstructured information for viewing. Integrating 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.

*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. Today, system interoperability is frequently accomplished through data translation and data mapping. 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 and other allergens.* Agreement is needed on the specific vocabulary to be used to document allergies and on the elements for accompanying information (e.g., nature of reaction, severity of reaction, and source of information).

### **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 for the criteria to be used for identifying relevant medication would ensure that clinical needs are met.

During the public feedback period, ONC would like to receive input on the definition of the scope of a patient’s medication history to be addressed during medication reconciliation.

### **EHR Data and Penetration**

*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 enable an additional layer of patient safety by using clinical decision support tools that can support medication ordering by screening orders for contraindications such as drug-drug interactions and potential errors in dosing. Effective contraindication screening will be facilitated by tools that are supported by standardized vocabularies for describing

medication and allergies. These barriers need to be overcome to realize the full potential of the use case for improving patient safety.

## 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. These three perspectives are used to indicate roles and functions, rather than physical locations. Each is further described below:

- ***Clinician***

The clinician perspective includes health care providers with patient care responsibilities including physicians (and other credentialed practitioners such as physician assistants) who order medication and nurses (and others) who play a role in medication reconciliation. Clinicians can also be referred to as “prescribers” when an activity is focused on the writing of orders or prescriptions.

- ***Pharmacist***

The pharmacist perspective includes licensed health professionals who prepare and dispense medication in response to the orders of physicians and other licensed clinicians. This perspective includes hospital pharmacists who dispense medication for patients admitted to the hospital and pharmacists in institutional and community pharmacies who dispense medications to outpatients. Pharmacists can also be referred to as “dispensers.”

- ***Consumer***

The consumer is a member 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 three scenarios for inpatient and ambulatory care in which availability and exchange of complete information on patient medication and allergies would increase both patient safety and efficiency. Appendix B of this use case shows an overview of the two ambulatory scenarios simultaneously.

### 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 (also called hand-offs) across settings, services, providers, or levels of care. Medication reconciliation documents the efforts made to assemble and consider information on current medication 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 and allergies;
- Deciding and documenting which medications are to be continued or discontinued;
- Transmitting information at discharge to the next provider of care; and
- Communicating discharge information to the patient and next provider of care.

These latter aspects promote the continuity of care as a consumer moves from an inpatient environment to home care (or under the care of a Primary Care Provider) or the care of another provider.

### 5.2 Scenario 2: Access to Current Medication and Allergy Information in an Ambulatory Care Setting

This is the first of two scenarios for ambulatory medication management and focuses on providing clinicians with complete information about each patient's medications and allergies not just from local documentation, but also from:

- Other ambulatory clinicians;
- Hospitals, where 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.

### 5.3 Scenario 3: Prescribing Process in an Ambulatory Care Setting

The second scenario for medication management in the ambulatory setting focuses on prescription management, including prescription writing, prescription transmittal to a pharmacy, and consumer-generated requests for prescription refills and renewals.

### 5.4 Common Processes

The event descriptions in the sections that follow represent a high-level view of healthcare processes that pertain to this use case. In some instances, an event, or a sequence of events, may occur in more than one process, or more than one use case. For the prototype use cases, these common processes have not been specifically recognized. In the forthcoming detailed use cases, some common processes will be detailed with the intent that reusable models can be referenced in these and future use cases. Examples of these common processes could include:

- ***Adjudication of identities***

Systems involved in exchanging patient-specific information need mechanisms to reconcile person identity between nodes (e.g., between health information service providers).

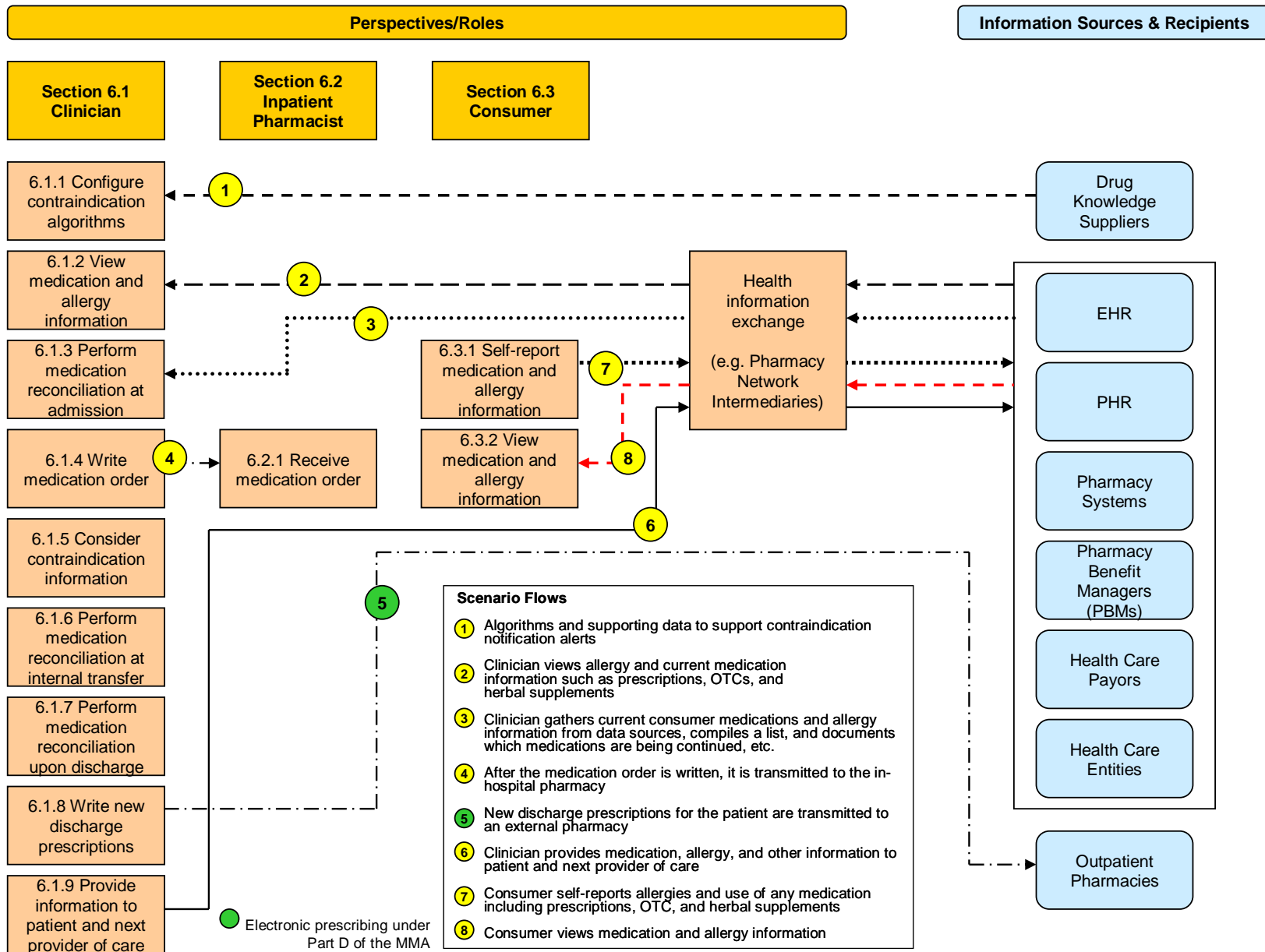
- ***Create and maintain access control lists***

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 so they can also implement the access controls.

- ***Provisioning for secondary use***

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 describe the data needs, terminologies, algorithms, etc. in a way that could be readily used in the target systems to report the needed information.

# Scenario 1: Inpatient Medication Reconciliation



## 6.0 Scenario 1: Inpatient Medication Reconciliation

### 6.1 Clinician Perspective

#### 6.1.1 Configure Contraindication Algorithms

Access to more complete allergy and medication information will better inform clinicians at admission and could enable the hospital EHR to provide more comprehensive feedback to the clinician regarding any potential medication-allergy contraindications. The algorithms and supporting reference information for clinical decision support are frequently supplied by commercial vendors and incorporated into the medication ordering function of the EHR.

*Data Exchange: Commercial vendors provide algorithms and supporting reference information to support contraindication notification from medication screening. These are provided as a reference resource to the hospital EHR and the final configuration is approved by clinicians who consider relevant clinical contexts and appropriate, specific notifications.*

#### 6.1.2 View medication and allergy information

To make decisions regarding care, the clinician benefits from a complete view of the patient's current medication and allergies. At admission, this may require information from sources outside the hospital.

Upon admission, clinicians gather information about the patient's current medication and allergies from several sources:

- In today's environment, this information is frequently gathered by interviewing the patient, patient's family, significant others and/or caregivers – and in some instances, contacting the patient's Primary Care Physician (PCP). The intent is to compile complete information including over-the-counter (OTC) medication and herbal and other supplements the patient is taking. This initial set of patient-reported medication is frequently called "home medications" or "home meds." On occasion, a patient provides this information by presenting a bag of pills or pill bottles upon admission that must be examined to establish medication specifics. This process is frequently supported by nurses, other clinicians, and in some cases an inpatient pharmacist.
- This information can be gathered electronically via health information exchange, which can retrieve available information from the patient's PHR, various EHR systems that hold information about the patient, other sources such as local pharmacy systems, Pharmacy Benefits Managers (PBMs), or Payors.

In the near term, the need for this information from external sources could be met with “viewable” information, where a clinician could view summary medication information from multiple sources.

However, to provide an integrated electronic view of medication and allergy information from multiple sources without duplications in a form that can be communicated at discharge, this information will need to be available in discrete form using coded, standardized vocabularies.

***Data Exchange:** Clinician gathers consumer self-reported prescription, medication, and allergy information from multiple information sources (including potentially a PHR). Clinician also gathers patient information from hospital EHRs, ambulatory EHRs, and other sources (such as pharmacy systems, PNIs, PBMs, Payors, etc.). Note that the use case discusses the information needs at admission because of the need for interoperability with external systems, although clinicians also need to be able to view medication and allergy information throughout the hospital stay.*

### **6.1.3 Perform medication reconciliation at admission**

Once information on current medications and allergies has been compiled as described above, clinicians involved in medication reconciliation create the patient’s current medication list. This list is used by a clinician during medication reconciliation to designate which medications will be continued or discontinued. In addition, this list is considered when writing admission orders for medications and other services.

The compiled medication and allergy information could be viewable in the hospital EHR and documentation of the medication reconciliation process be captured electronically as well.

***Data Exchange:** Incorporation of information on current medications and allergies from external sources for viewing and documentation of medication reconciliation.*

### **6.1.4 Write medication order**

Clinician writes medication orders at admission and during the patient’s inpatient stay. This ordering could be accomplished using Computerized Provider Order Entry (CPOE). Only selected details of this ordering process are included in this use case to address interoperability concerns. This event includes communicating the medication order to the pharmacy system. The pharmacy system could be one of the following implementations:

- An inpatient hospital pharmacy system, fully integrated within the hospital EHR;



- A separate pharmacy system used in the pharmacy, which has established processes and/or interfaces with the organization's EHR; or
- An external pharmacy not integrated with the organization's EHR.

At times, additional considerations must be made during medication ordering related to patient-specific variables for proper dosing. For example, medication doses for the pediatric population are often determined based on patient weight. Medication ordering would benefit from support for these needs in the design of ordering systems.

Following pharmacist verification, the verification status and any pharmacist-entered changes update the information available in the EHR about patient medications. This requires additional information exchange if this is not an integrated pharmacy application.

***Data Exchange:** After the medication order is written, it is electronically transmitted to the inpatient pharmacy. Additional standards may be needed to accomplish these information flows where the pharmacy system is not fully integrated with the hospital EHR.*

#### **6.1.5 Consider contraindication information**

When a clinician is writing medication orders, it is desirable that systems screen medication orders for drug-drug interactions, drug-diagnosis considerations, or drug-renal function contraindications, patient allergies, potential errors in dosing, and other issues that may lead to adverse drug events. The hospital EHR can contribute to medication safety by providing clinical decision support tools that providers can use to reduce adverse drug events. For certain populations and medications, it is important that medication screening for appropriate dosing, for example, take account of patient specifics such as weight (i.e., pediatrics and certain adult medications) or renal status (any nephrotoxic drug).

#### **6.1.6 Perform medication reconciliation at internal transfer**

During the course of a hospital stay, medication reconciliation also occurs during transfers within the hospital to a different level of care (e.g., between intensive care and acute care). This process is supported by information available in the patient's current hospital medical record and follows the steps outlined above.

### **6.1.7 Perform medication reconciliation upon discharge**

At discharge, the clinician reviews the patient's current medication regimen to determine what medication orders are needed post-discharge. This process is supported by:

- Reviewing the current hospital medication list;
- Reviewing allergies documented for the patient;
- Reviewing the "home medications" list as compiled at admission;
- Determining which of the medications the patient was taking prior to admission should be continued or discontinued upon discharge.

The clinician then documents decisions on medications to be continued or discontinued, as well as any new discharge medications.

Most of 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 review of medication orders during the stay.

### **6.1.8 Write new discharge prescriptions**

The clinician may determine that the patient needs one or more new prescriptions following a hospital stay.

- Clinicians could use an electronic prescribing function (e.g., an ePrescribing tool, an ambulatory EHR, or a hospital EHR with ambulatory prescribing functionality) to write these prescriptions electronically.

These electronic prescriptions could be communicated to the patient's preferred pharmacy.

***Data Exchange:** Discharge prescriptions for the patient are transmitted to a pharmacy.*

### **6.1.9 Provide information to the patient and next provider of care**

At the conclusion of the hospital stay, a patient could return to the care of their primary care physician and/or medical specialist(s), or be transferred into the care of another health care facility (e.g., a long-term care facility).

Medication and allergy information could be communicated to the patient's PHR along with relevant discharge instructions. Similarly, the ability to communicate information about discharge medications and current allergy information to the next provider of care could be accomplished via both clinicians' EHR systems.

***Data Exchange:** Discharge information, including the medication list, allergy information, instructions and new prescriptions, is communicated to the patient, family members, patient advocate, and/or next provider of care. This information*

*could be communicated to outpatient clinicians and long-term care facilities using an EHR. Communication to the patient could be communicated using a PHR.*

## 6.2 Inpatient Pharmacist Perspective

### 6.2.1 Receive medication order

In the case of an in-house pharmacy system that is separate from the clinician's order entry system, the medication order may be communicated via electronic interface, if possible.

***Data Exchange:** An inpatient pharmacist receives medication orders. The format and standards for this information flow could vary depending on the degree of integration between medication order entry and pharmacy systems.*

## 6.3 Consumer Perspective

### 6.3.1 Self-report medication and allergy information

Currently, patients admitted to a hospital (supplemented by family members and others) provide much of the information on current medications and allergies.

Using a PHR, consumers could supplement information on prescribed medications from external sources with information about their use of over-the-counter medication, herbal and other supplements and other medication information. The consumer could likewise self-report allergies to medications and other environmental and food allergens. Ideally, this information includes allergen, type of reaction, and severity of reaction.

This information could be available to support future clinician encounters by retrieval from the consumer's PHR.

***Data Exchange:** Consumer can self-report information on allergies and any medication use including prescriptions, over-the-counter medication, and herbal and other supplements.*

### 6.3.2 View medication and allergy information

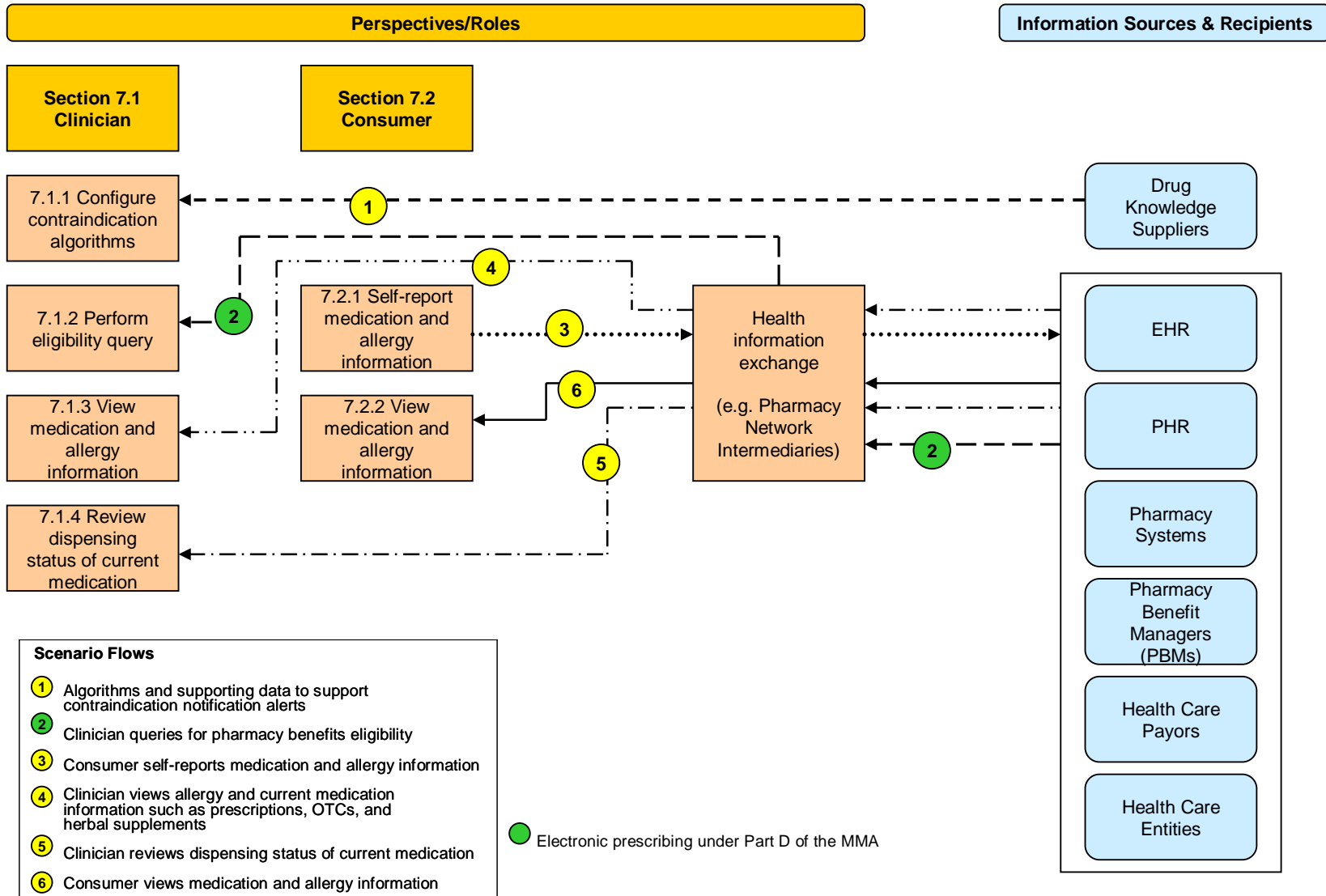
The consumers could retrieve available medication and allergy information via their PHR. This information might have been self-reported earlier or may be derived from their clinicians' EHR systems, a PBM system, and/or a pharmacy system.

Also, consumers may be able to permit designated clinicians and other individuals (e.g., family members) to view information in their PHR (a.k.a., proxy access).

***Data Exchange:** Consumer can view information on allergies and medication. This includes previously self-reported items, as well as prescribed medication and*

*allergy information that may come from information sources such as EHRs, PNIs, PBMs, and other systems.*

# Scenario 2: Access to Current Medication and Allergy Information in an Ambulatory Care Setting



\*Please see Appendix B for an overview of medication management in an ambulatory setting

## 7.0 Scenario 2: Access to Current Medication and Allergy Information in an Ambulatory Care Setting

### 7.1 Clinician Perspective

#### 7.1.1 Configure contraindication algorithms

Access to more complete allergy and medication information in a discrete, coded form amenable to processing could enable the ambulatory EHR to provide more comprehensive feedback to the clinician for any potential medication-allergy contraindications. The algorithms and supporting reference information to support this process are frequently supplied by commercial vendors and incorporated into the prescription writing function of an ambulatory EHR.

***Data Exchange:** Commercial vendors provide algorithms and supporting reference information to support contraindication notification from medication screening. These are provided as a reference resource to the ambulatory EHR and the final configuration is pre-approved by clinical content teams who consider relevant clinical contexts and appropriate, specific notifications.*

#### 7.1.2 Perform eligibility query

During an ambulatory patient visit, the clinician's office staff would confirm the patient's eligibility for services, including pharmacy benefits.

***Data Exchange:** Clinician can query for eligibility and pharmacy benefits information from a PNI, PBM, or Payor directly, and/or through health information exchange.*

#### 7.1.3 View medication and allergy information

A patient may have a PCP, as well as one or more specialists, all of whom may be writing medication prescriptions for the patient. In the ambulatory care setting, a clinician may only have access to information about the prescriptions written locally, and may be forced to depend on the patient to provide information about prescriptions written by other providers, as well as self-reported information on over-the-counter medications, herbal and other supplements, and allergies.

To make decisions about care, the clinician would benefit from a complete view of the patient's current medication and allergies (including the status of dispensing for past prescriptions as described below).

This need could be met by retrieving and integrating medication information in accordance with the patient's access decisions from multiple sources, including external EHR systems (e.g., other ambulatory EHR systems, the hospital EHR from which a patient has recently been discharged), the patient's PHR, external pharmacy dispensing systems (e.g., retail pharmacy systems), etc.

In the near term, this need could be met with “viewable” information, where an ambulatory clinician could view summary medication information from multiple sources, in accordance with the patient’s access decisions.

However, to provide an integrated electronic view of the current and recent past medication history without duplications and in a form that it can be subjected to medication screening for contraindications, this information would need to be available using coded, standardized vocabularies. Ideally, this information, including updates from all external sources, would be available anytime the clinician views medication and allergy information for a particular patient.

***Data Exchange:** Clinician gathers current patient medication and allergy information from multiple information sources. These sources may include hospital EHRs, ambulatory EHRs, consumer self-reported home medication and allergy information (potentially via PHR), and other sources for medication and allergy information (such as pharmacy systems, PNIs, PBMs, Payors, etc.)*

#### **7.1.4 Review dispensing status of current medication**

In assessing patient status and determining care plans, clinicians would benefit from being able to confirm that patients had access to their prescribed medication. In today’s ambulatory environment, there may not be an electronic information flow in place to provide this feedback information.

Dispensing status information could be communicated from a pharmacy system or PBM through health information exchange to the clinician’s EHR system.

***Data Exchange:** The clinician is able to review the dispensing status of current medication when reviewing the current medication list. This information is saved at the time of dispensing by a system that supports dispensing (pharmacy system or PNI that transmits prescriptions to pharmacies) or reimbursement (PBM, payor, or PNI that transmits reimbursement-related information about prescriptions).*

## **7.2 Consumer Perspective**

### **7.2.1 Self-report medication and allergy information**

Currently, consumers provide this information during encounters with a clinician.

Using a PHR, the consumer could supplement information on prescribed medication (provided by external sources) with information about their use of over-the-counter medication, herbal and other supplements, and other medication information. The consumer could likewise self-report allergies to medications and other environmental and food allergens. Ideally, this information includes allergen, type of reaction, and severity of reaction.

This information could be available to support future clinician appointments by retrieval from the consumer's PHR.

***Data Exchange:** Consumer can self-report information on allergies and any medication use including prescriptions, over-the-counter medication, and herbal and other supplements.*

### **7.2.2 View medication and allergy information**

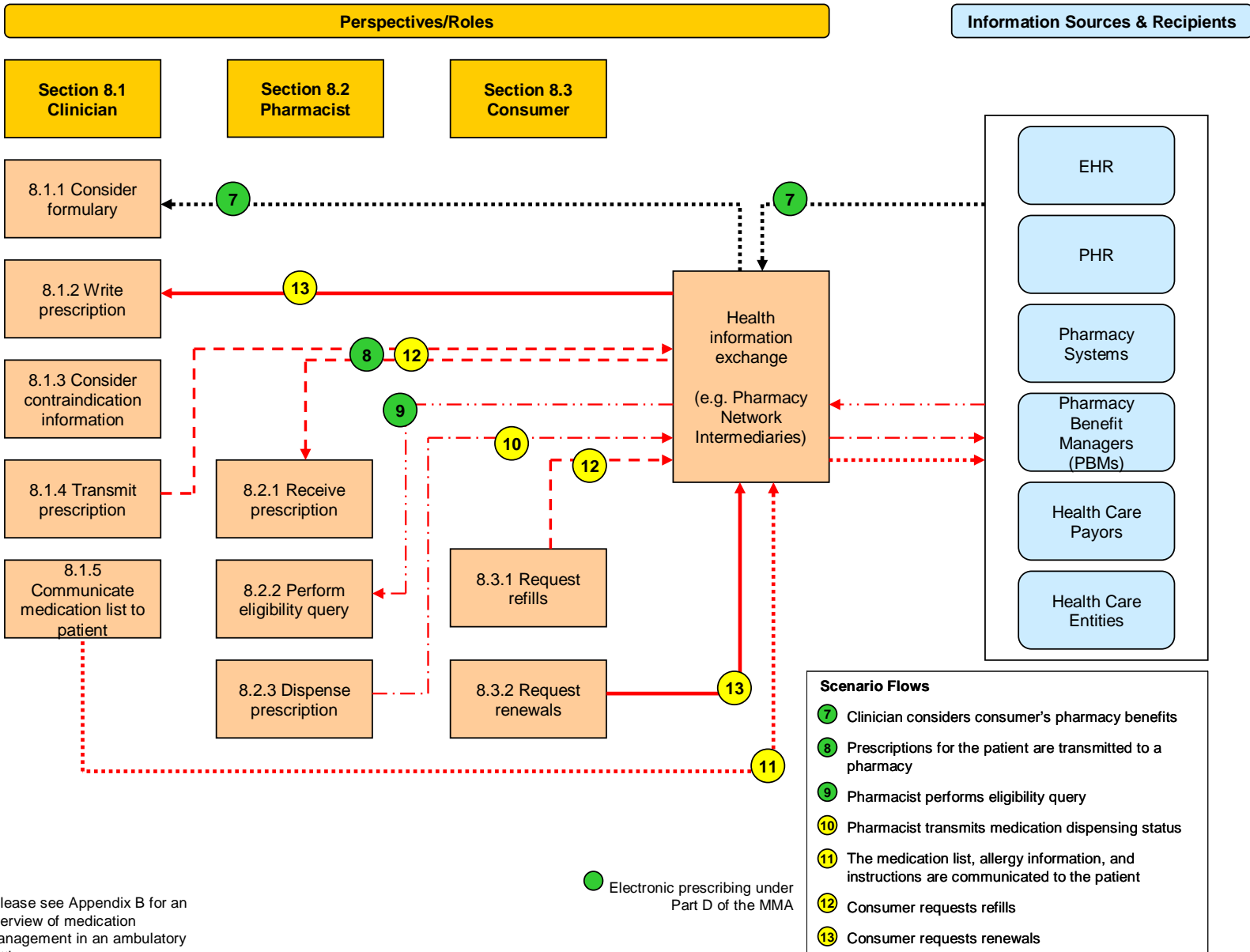
The consumer could retrieve available medication and allergy information via their PHR. This information might have been self-reported earlier or derived from their clinicians' EHR systems, a PBM system, and/or a pharmacy system.

Also, consumers may be able to permit designated clinicians and other individuals (e.g., family members) to view information in their PHR (a.k.a., proxy access).

***Data Exchange:** Consumer can view information on allergies and medication. This includes previously self-reported items, as well as prescribed medication and allergy information that may come from information sources such as EHRs, PNIs, PBMs, and other systems.*



# Scenario 3: Prescribing Process in an Ambulatory Care Setting



\*Please see Appendix B for an overview of medication management in an ambulatory setting

## 8.0 Scenario 3: Prescribing Process in an Ambulatory Care Setting

### 8.1 Clinician Perspective

#### 8.1.1 Consider formulary

In the ambulatory care setting, clinicians would benefit from being able to access and consider patient-specific pharmacy benefit information for tiered pharmacy benefits, Medicare part D, and formulary information as they make prescribing decisions.

***Data Exchange:** Based on a consumer's eligibility and pharmacy benefit information, a clinician may make formulary considerations prior to writing a prescription. This information may be provided by pharmacy systems, PBM's, or Payors and may be provided directly or through the use of a PNI.*

#### 8.1.2 Write prescription

As ambulatory EHRs and ePrescribing tools become more prevalent, the clinician could write prescriptions electronically.

At times, additional considerations may be made during prescription writing related to patient-specific variables for proper dosing. For example, medication doses for the pediatric population and for some adult medications are often determined based on patient weight. Prescription writing would benefit from support for these needs in the design of ordering systems.

The clinician could also receive electronic requests for prescription renewals from consumers via their PHRs.

***Data Exchange:** A renewal request may indicate to a clinician a consumer's request for a new prescription.*

#### 8.1.3 Consider contraindication information

When a clinician is writing prescriptions, contraindication notifications from medication screening are presented by the EHR based on previously loaded contraindication algorithms, clinical reference data, and specific patient information. Ambulatory EHRs can support medication safety by providing clinical decision support tools that clinicians can use to screen prescriptions for potential drug-allergy, drug-drug, drug-age, or drug-diagnosis contraindications (or dosing errors). For certain populations and medications, it is important that medication screening for appropriate dosing, for example, take account of patient specifics such as weight (i.e., pediatrics and certain adult medications) or renal status (any nephrotoxic drug).

#### **8.1.4 Transmit prescription**

An ePrescribing tool or an ambulatory EHR could communicate electronic prescriptions to a patient's preferred pharmacy.

***Data Exchange:** Prescriptions for the patient are communicated to a pharmacy. The format and standards for this information flow could vary depending on the interoperability between the ambulatory prescribing system and the receiving pharmacy system, and this could be supported through health information exchange.*

#### **8.1.5 Communicate medication list to patient**

Consumers would benefit from having a complete list of current medication prescribed by their PCP and other providers. This information could be communicated to their PHRs from ambulatory EHR.

***Data Exchange:** The medication list, allergy information, and instructions are communicated to the patient. This could be supported through the use of a PHR.*

### **8.2 Pharmacist Perspective**

#### **8.2.1 Receive prescription**

When clinicians write prescriptions using an electronic prescribing function (e.g., an ePrescribing tool or ambulatory EHR), pharmacists may be able to receive them in electronic form.

An electronic request for medication could also be initiated by a consumer requesting a refill through a PHR.

***Data Exchange:** A pharmacist receives a prescription request to initiate pharmacy activities. The format and standards for this information flow could vary depending on the degree of integration between prescription writing and pharmacy systems.*

#### **8.2.2 Perform eligibility query**

During a pharmacist's prescription filling activity, the pharmacist's office staff could confirm the consumer's eligibility for services, including pharmacy benefits. The pharmacist could also view formulary considerations.

***Data Exchange:** Pharmacist can query for patient eligibility and pharmacy benefits information from a PNI, PBM, or Payor directly, or through health information exchange.*

#### **8.2.3 Dispense prescription**

As a pharmacist fills a prescription and dispenses medication, a pharmacist would:

- Review for potential issues related to patient safety;
- Communicate with prescribing provider as needed to resolve any identified issues; and
- Dispense prescribed medication.

Pharmacists could communicate with a prescribing physician's EHR to record information about the dispensing status for a filled prescription, so clinicians can confirm that patients have access to their prescribed medication.

***Data Exchange:** Pharmacist saves the dispensing status of current medication for future consideration. This could be communicated using a system such as a pharmacy system, a PNI, an EHR, Payor, or other pharmacy support system. This information can be used in the future by the prescribing provider to evaluate if the consumer has had access to the prescribed medication.*

## 8.3 Consumer Perspective

### 8.3.1 Request refills

A consumer could request prescription refills using their PHR. The PHR would transmit refill requests directly to a pharmacy of choice.

***Data Exchange:** Consumer can request prescription refills using a PHR or other system that allows interoperability with a preferred pharmacy.*

### 8.3.2 Request renewals

A consumer could request prescription renewals using their PHR. The PHR would transmit renewal requests directly to a patient's ambulatory clinician.

***Data Exchange:** Consumer can request prescription renewals using a PHR or other system that allows interoperability with a preferred provider.*

## Appendix A: 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.

**Clinician:** Health care provider 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 component of the Department of Health and Human Services.

**Consumer:** Members of the public all of whom are possible users of the health care system. Consumer is intended to include members of the public who are engaged in health prevention activities. Consumers also include caregivers, patient advocates or surrogates, family members, and other parties who may be acting for, or in support of, a patient. For medication management, this includes both consumers receiving medication and consumer representatives who support patients by assisting with medication management activities.

**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 medication list:** A list of medication 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.

**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, CMS, and others.

**Discharge prescription:** A prescription given to a patient at the end of a hospital stay as they are released to their own care or the care of another including a provider such as a Primary Care Provider or a Long Term Care facility provider.

**Dispensers:** Another term for pharmacists that speaks more directly to their role in dispensing medication according to a physician's prescription.

**Drug Knowledge Suppliers:** An organization that maintains and provides 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.

**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, medication, 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.

**Healthcare Entities:** A collection of organizations that are engaged in or supporting the delivery of healthcare.

**Health Care Payors:** Insurers providing health care benefits to enrolled members and reimbursing provider organizations and pharmacies for services provided. 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.

**Healthcare Information Exchanges (HIE):** Organizations that may provide trust and governance relationships and information exchange for a network of users and applications. Organizations playing this role may be, but are not limited to, statewide or regional groupings, or geographically diverse networks. Having the role of HIE does not imply that the HIE directly provides networking services.

**Health Information Services (HIS):** Services provided by health information networks for information exchange and business functions.

**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, diagnostic and contrast agents used on or administered to persons to diagnose, treat or prevent disease or other abnormal conditions; and any product designated by the FDA as a drug, with the exception of enteral nutrient solutions, oxygen, and other medical gases.

**Medication history:** A complete list of past and present prescription and non-prescription patient medication.

**Medication list:** A tool used by a consumer to track medication. A medication list may also be used to track medication start and stop dates, when the medication should be taken, purpose of taking it, and if any monitoring is required. A medication list also helps providers reconcile medications during medical visits.

**Medication management:** The system for how healthcare organizations handle medication. 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 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 home medication – including name, dosage, frequency and route – and comparing admission, transfer, and/or discharge medication orders to that list. The Joint Commission requires that decisions regarding medications to be continued and discontinued be documented and that, upon discharge, current medication information be provided to the patient and the next provider of care.

**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.

**Patient:** Members of the public who receive health care services.

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

**Pharmacist:** Health professionals who are licensed to prepare and dispense medication in response to the orders of physicians and other licensed clinicians. Pharmacists may

perform additional services related to patient care and safety, including medication review and reporting on possible drug contraindications.

**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 Network Intermediaries (PNIs):** These entities support the health care 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.

**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.



# Appendix B: Overview of Medication Management in an Ambulatory Care Setting

