Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Health Information and Standards

National Standard on information requirements for national community-based ePrescribing

December 2018

Safer Better Care

About the Health Information and Quality Authority

The Health Information and Quality Authority (HIQA) is an independent authority established to drive high-quality and safe care for people using our health and social care services in Ireland. HIQA's role is to develop standards, inspect and review health and social care services and support informed decisions on how services are delivered.

HIQA aims to safeguard people and improve the safety and quality of health and social care services across its full range of functions.

HIQA's mandate to date extends across a specified range of public, private and voluntary sector services. Reporting to the Minister for Health and engaging with the Minister for Children and Youth Affairs, HIQA has statutory responsibility for:

- **Setting Standards for Health and Social Services —** Developing person-centred standards, based on evidence and best international practice, for health and social care services in Ireland.
- **Regulation —** Registering and inspecting designated centres.
- **Monitoring Children's Services —** Monitoring and inspecting children's social services.
- **Monitoring Healthcare Safety and Quality —** Monitoring the safety and quality of health services and investigating as necessary serious concerns about the health and welfare of people who use these services.
- **Health Technology Assessment —** Providing advice that enables the best outcome for people who use our health service and the best use of resources by evaluating the clinical effectiveness and cost-effectiveness of drugs, equipment, diagnostic techniques and health promotion and protection activities.
- **Health Information —** Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information about the delivery and performance of Ireland's health and social care services.

Overview of the health information function of HIQA

Healthcare is information-intensive, generating huge volumes of data every day. Health and social care workers spend a significant amount of their time handling information, collecting it, looking for it and storing it. It is therefore imperative that information is managed in the most effective way possible in order to ensure a high-quality, safe service.

Safe, reliable healthcare depends on access to, and the use of, information that is accurate, valid, reliable, timely, relevant, legible and complete. For example, when giving a patient a drug, a nurse needs to be sure that they are administering the appropriate dose of the correct drug to the right patient and that the patient is not allergic to it. Similarly, lack of up-to-date information can lead to the unnecessary duplication of tests — if critical diagnostic results are missing or overlooked, tests have to be repeated unnecessarily and, at best, appropriate treatment is delayed or at worst not given.

In addition, health information has a key role to play in healthcare planning decisions — where to locate a new service, whether or not to introduce a new national screening programme and decisions on best value for money in health and social care provision.

Under section 8(1)(j), HIQA is charged with evaluating the quality of the information available on health and social care and making recommendations in relation to improving the quality and filling in gaps where information is needed but is not currently available.

Information and communications technology (ICT) has a critical role to play in ensuring that information to drive quality and safety in health and social care settings is available when and where it is required. For example, it can generate alerts in the event that a patient is prescribed medication to which they are allergic. Further to this, it can support a much faster, more reliable and safer referral system between the patient's general practitioner and hospitals.

Although there are a number of examples of good practice, the current ICT infrastructure in Ireland's health and social care sector is highly fragmented with major gaps and silos of information which prevents the safe, effective, transfer of information. This results in people using the service being asked to provide the same information on multiple occasions.

In Ireland, information can be lost, documentation is poor, and there is over-reliance on memory. Equally, those responsible for planning our services experience great difficulty in bringing together information in order to make informed decisions. Variability in practice leads to variability in outcomes and cost of care. Furthermore, we are all being encouraged to take more responsibility for our own health and wellbeing, yet it can be very difficult to find consistent, understandable and trustworthy information on which to base our decisions.

As a result of these deficiencies, there is a clear and pressing need to develop a coherent and integrated approach to health information, based on standards and international best practice. A robust health information environment will allow all stakeholders, the general public, patients and service users, health professionals and policy makers to make choices or decisions based on the best available information. This is a fundamental requirement for a high reliability healthcare system.

Through its health information function, HIQA is addressing these issues and working to ensure that high quality health and social care information is available to support the delivery, planning and monitoring of services.

HIQA has developed information requirements for community-based ePrescribing and dispensing. ePrescribing can deliver significant benefits for patients, prescribers, pharmacists and others involved in the process. In particular, ePrescribing can improve patient safety, for example, by reducing errors of mistaken identity, incorrect dosage, incorrect medication and adverse drug interactions. It can also reduce the number of pharmacist interventions significantly. Moreover, ePrescribing costs less and takes less time than processing the same prescriptions manually.

Information requirements are a minimum set of data items that are recommended for implementation in information systems that create and transfer information to support the delivery of safe and quality care to patients. The inclusion of data items in the minimum set of data is determined by the clinical relevancy of the data item and the potential for the data item to improve patient safety in integrated care. The information requirements presented in this document have been developed in conjunction with our eHealth Standards Advisory Group.

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Chapter 1 Introduction

Electronic prescribing can deliver significant benefits for patients, prescribers, pharmacists and others involved in the process.[1] In particular, ePrescribing can improve patient safety, for example, by reducing errors of mistaken identity, incorrect dosage, incorrect medication and adverse drug interactions. It can also reduce the number of pharmacist interventions significantly. Moreover, ePrescribing costs less and takes less time than processing the same prescriptions manually.

ePrescribing can be described as a three-step approach. First, at the time of prescribing medications for a patient, the prescriber's clinical information system generates the prescription in electronic format. Second, the electronic format of the prescription is transmitted to a message exchange or mailbox and, when the patient presents in a pharmacy requesting their medication, the pharmacist retrieves the electronic prescription from the message exchange. Third, the pharmacists dispenses the medication and reports on the medicines given to the patient.

Those exchanging the information are primary care healthcare providers such as general practitioners or nurse prescribers, for prescribing, and community pharmacists, for dispensing of medication. Today in Ireland, doctors, dentists and nurse prescribers create paper-based prescriptions which are signed and given to the patient or their representative. However, many countries create an electronic version of the paper prescription and make it available to pharmacists when the patient presents at the pharmacy, this is known as electronic prescribing or ePrescribing.

The vision for the Irish national, community-based ePrescribing programme is set out in the eHealth Strategy for Ireland.[2] The goal of ePrescribing identified in the eHealth Strategy is to reduce medication errors, thereby reducing the associated costs, and speeding up patient access to medication. eHealth Ireland* is responsible

* "A key element of the eHealth Strategy is the establishment of an independent entity called "eHealth Ireland". This will be established initially on an administrative basis within the HSE, through the formation of the eHealth Ireland Committee, approved by the HSE Directorate. The purpose of the Committee will be to support and guide implementation of the eHealth Strategy through the implementation of the Knowledge and Information plan..."

for realising this vision and, in June 2015, it announced the National ePharmacy Programme, which includes ePrescribing in primary care among its initiatives.

Furthemore, the Slaintecare Implementation Strategy published in August 2018 identifies that "ICT has the potential to be the biggest and most effective driver of change and improvement for better patient outcomes across the health system."[3] The strategy identified as a priority the design and roll out of a range of primary- and community-based ICT services that will improve the lives of patients. These include ePrescribing, summary care records and telehealth solutions to support care in the community.

The Slaintecare Implementation Strategy also lists the implementation of ePrescribing services, as part of the implementation of community-care solutions, as one of the ten key strategic actions that underpin the Slaintecare vision. The approach outlined in the strategy '…centres around strong health service governance, leadership, accountability, a focus on clear outcomes, providing support to the frontline to drive change, and sustained stakeholder engagement…'

In order to advance this agenda, HIQA has recently published recommendations for an ePrescribing programme in a community setting. These set out high-level recommendations around legislative and regulatory requirements, governance, data privacy, stakeholder engagement and a standards-based, phased implementation approach. The HIQA Board approved these recommendations on 19 September 2018. Following approval, these were submitted to the Minister for Health 9 October 2018.

HIQA has given significant attention to ePrescribing due to the benefits that it potentially offers. In 2012, HIQA completed an international review on ePrescribing[4] to inform the adoption of appropriate standards in Ireland. The international review was revised in 2018, and the revised review outlined changes to ePrescribing initiatives internationally since 2012.[5] HIQA has also previously developed a number of standards related to ePrescribing.[6],[7],[8]

The National Standard on information requirements for community-based ePresribing has been developed to further advance this work and defines the information requirements required to implement community-based ePrescribing and dispensing in Ireland. Information requirements are minimum set of data items that should be implemented in information systems that create and transfer information to support the delivery of safe and quality care to patients. The inclusion of data in the minimum set of data is determined by the clinical relevancy of the data and the potential for the data to improve patient safety to support integrated care.

1.1 How the National Standard was developed

This standard was developed under section 8(1)(k) of the Health Act 2007[9] has been developed in line with HIQA's standards development process.

Review of evidence

The project team completed a review of both international and national literature to inform the development of the draft standard. International standards and technical specifications on ePrescribing were reviewed and assessed. A review of all relevant national policies and national reports was undertaken.

In 2012, HIQA completed an international review on ePrescribing to inform the adoption of appropriate standards in Ireland. This review was revised in 2018. The reviews focuses on the prescribing and dispensing of medication in the community. HIQA has also published National Standards for ePrescribing, dispensing and a data model for an electronic medicinal product reference catalogue.

eHealth Standards Advisory Group

As part of the development process, and in line with its legal remit, HIQA has a longstanding eHealth Standards Advisory Group. The eHealth Standards Advisory Group consists of a diverse range of stakeholder organisations, including representatives from relevant sections of the HSE, the Department of Health and a service-user advocacy group. The function of the group is to advise HIQA on eHealth interoperability standards. Two meetings were held with the advisory group to get

advice on the draft standard. The list of members of the Advisory Group is outlined in Appendix 1. Additionally, a working group was convened consisting of pharmacists and IT specialists and a meeting was held to get their input on the standard.

Public consultation

The draft standard was made available for a six-week public consultation, running from 19 July 2018 to 31 August 2018. In this way, the public, service users and service providers had the opportunity to provide feedback and participate in the development process. HIQA received a total of 25 submissions, with 19 submissions made on behalf of organisations and six submissions made by individuals. Following the consultation, all submissions were analysed and the draft standards were revised, as appropriate. A revised version of the draft standard was circulated to the eHealth Standards Advisory Group for final review in October 2018.

A summary of findings from the public consultation submissions in a Statement of Outcomes report is published on the HIQA website together with the National Standard.

The draft standard was approved by the HIQA Executive Management Team and the HIQA Board.

Chapter 2 Background

Before defining the high-level information requirements for ePrescribing in Ireland, it is important to understand what the term ePrescribing means, the benefits that a national ePrescribing programme can realize and the initiatives that are underway in Ireland and internationally.

2.1 Definition

The US Centers for Medicare and Medicaid Services state that 'ePrescribing is a prescriber's ability to electronically send an accurate, error-free and understandable prescription directly to a pharmacy from the point-of-care, an important element in improving the quality of patient care'.[10] This definition captures the generation of the prescription, the transmission of the prescription from prescriber to pharmacy and the pharmacy's dispensing of the prescription.

In a similar manner, the original Fifth Community Agreement between the Australian Department of Health and the Pharmacy Guild of Australia includes the following concepts: the prescriber's ability to generate an accurate prescription electronically, the electronic transfer of the prescription to the pharmacist and the pharmacist's ability to receive and dispense the prescription. It also states explicitly that the prescription must be signed digitally, transmitted securely and integrate with the pharmacy billing system.[11]

The European Patient Smart Open Services (epSOS) initiative, which sought to develop an eHealth infrastructure that would enable seamless and secure access to patient health information across borders for European citizens, defined the ePrescribing process as having two parts:

- **ePrescribing** is defined as a prescriber's ability to electronically send an accurate, error-free and understandable prescription directly to a pharmacy from the point of care.[10]

- **eDispensing** is defined as the act of electronically retrieving a prescription and reporting on giving the medicine to the patient as indicated in the corresponding ePrescription.[12]

These international programmes reflect the general understanding that the term ePrescribing is used to describe all aspects of the generation and transfer of prescriptions electronically using a dedicated system, whether in paper or electronic from, rather than faxing or emailing the prescription.[1] The same sources consistently identify ePrescribing as taking place in primary care, which involves the generation of the prescription by general practitioners, the transmission of prescriptions electronically from general practitioners to pharmacy over national networks and the pharmacy dispensing the prescription.

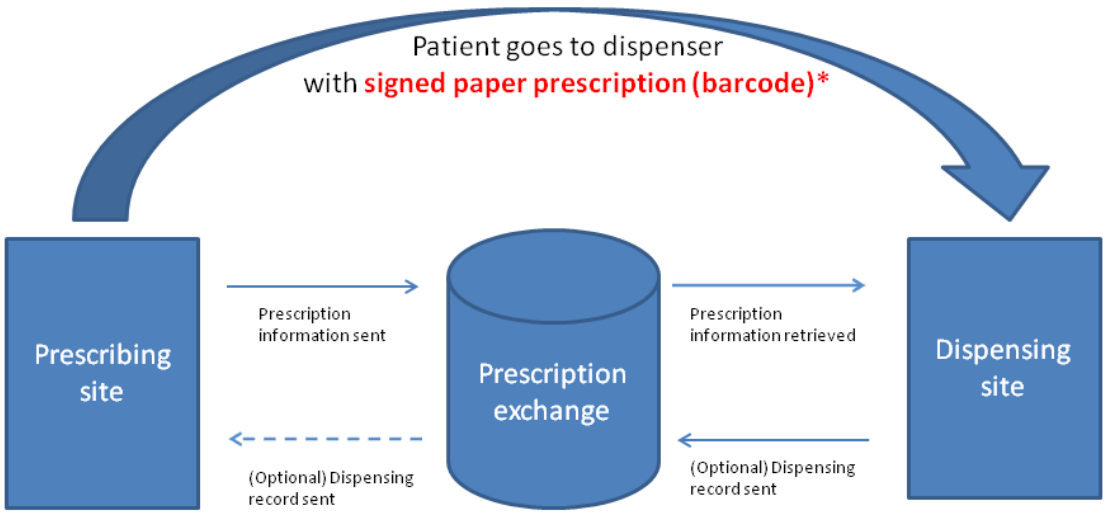
Figure 1 illustrates ePrescribing using a paper prescription. In this scenario, ePrescribing mimics the paper-script-based business practice and the paper prescription remains the legal document, indicated in red with an asterisk (*):

1. **ePrescribing:** The prescriber generates a paper prescription with a barcode, which the prescriber signs. The barcode can contain either a unique identifier or all the prescription information.

2. **Electronic transfer of the prescription:** An electronic version of the prescription is sent to the prescription exchange, where it is stored until it is downloaded and dispensed.

3. **eDispensing:** The pharmacist scans the barcode on the paper prescription, which contains either all of the prescription information or a unique identifier to retrieve the prescription information.

Figure 1. ePrescribing with paper prescription



The pharmacist can optionally send an acknowledgement that the prescription items have been dispensed.

International programmes usually take a phased approach to implementation. A two-phased approach was adopted in England. During the first phase, a signed, barcoded paper prescription continues to be the legal document, with prescription information transferred electronically in parallel. This approach allows time for stakeholders to build skills and experience the benefits of ePrescribing as well as for the requisite legislative changes to be introduced. This provides a solid foundation for the second phase, when the digitally signed, electronic prescription is the legal document.

A two-phased approach was also adopted in Australia, with two similar levels of implementation levels supported — first, with the paper prescription as the legal document, and second, with the electronic prescription as the legal and definitive document. Both levels assumed that prescription information was transferred electronically through a message exchange. However, the Australian implementation approach supported direct transfer from general practitioners to pharmacy as an interim measure. These implementations, along with ten others, are described in

HIQA's 2018 *ePrescribing: An International Review*.[5] The review also found that successful national ePrescribing programmes began with a community-based ePrescribing service and gathered clear and detailed information requirements.

2.2 Benefits

The evidence shows that ePrescribing benefits can include time savings and efficiency gains, transparency and fraud detection, health and social benefits and cost benefits.

A national ePrescribing service can benefit prescribers by enabling the safe electronic sharing of prescription information. This reduces the administration effort required by general practitioners with existing paper-based prescriptions. This can potentially increase the amount of time general practitioners can spend on consultations with patients and reduce reliance on less reliable, traditional means of information sharing such as transcribing of prescription information. Prescribers can receive notifications when a patient collects a prescription from pharmacy, enabling the prescriber to ensure follow-up with the patient. There may also be reduced interruptions from pharmacies who have queries about prescriptions or need corrections to a prescription.

A national ePrescribing service can benefit pharmacists through the electronic downloading of prescription details, rather than manual entry. This can make the dispensing process more efficient and can reduce error (thus increasing patient safety). It can also reduce the time the pharmacist spends contacting prescribers to query, clarify or get a correction for a prescription, which improves the quality of prescriptions.

Most importantly, ePrescribing can improve patient outcomes significantly. Approximately half of the 17% of patient hospitalisations that are due to medication error are considered avoidable.[13] ePrescribing can reduce medication errors. For example, it has reduced medication errors by an estimated 15% in Sweden.[13] It can also make both prescribers and pharmacists more accountable through increased transparency.[13] ePrescribing can make time-critical medications more

readily available to patients, and it costs far less and takes less time than processing the same prescriptions manually, saving time and money.[1] In Estonia, the cost savings from ePrescribing in 2010 almost matched the country's investment in the printing and secure storage of the forms in 2009.[14]

2.3 ePrescribing in Ireland

The vision for the Irish national, community-based ePrescribing programmes is set out in the Department of Health's eHealth strategy.[2] The goal for ePrescribing in Ireland is to reduce medication errors, thereby reducing the associated costs and speeding up patient access to medication. eHealth Ireland is responsible for realizing this vision and, in June 2015, announced the National ePrescribing Programme, which included ePrescribing in primary care and the National Medicinal Product Catalogue among its projects.

The national, community-based ePrescribing programme also published its plan for a phased, standards-based implementation. The programme's phased approach included the development of the initial building blocks (phase 1), leading to an 'ePrescription' phase (phase 2), followed by the roll out of ePrescribing in primary care (phase 3). The adoption of a phased, pilot-based approach is in line with recommendations and best practices.

As part of phase 1, eHealth Ireland worked with a number of organisations to develop a relevant interoperability framework based on national and international standards. HIQA, whose statutory remit includes developing national technical standards for health information, has defined and agreed the related standards for messaging and datasets, including:

- *ePrescription dataset and clinical document architecture standard* (March 2015)[6]
- *Data model for an electronic medicinal product reference catalogue – a National Standard* (March 2015)[7]
- *National Standard for a Dispensing Note including a Clinical Document Architecture specification* (January 2017).[8]

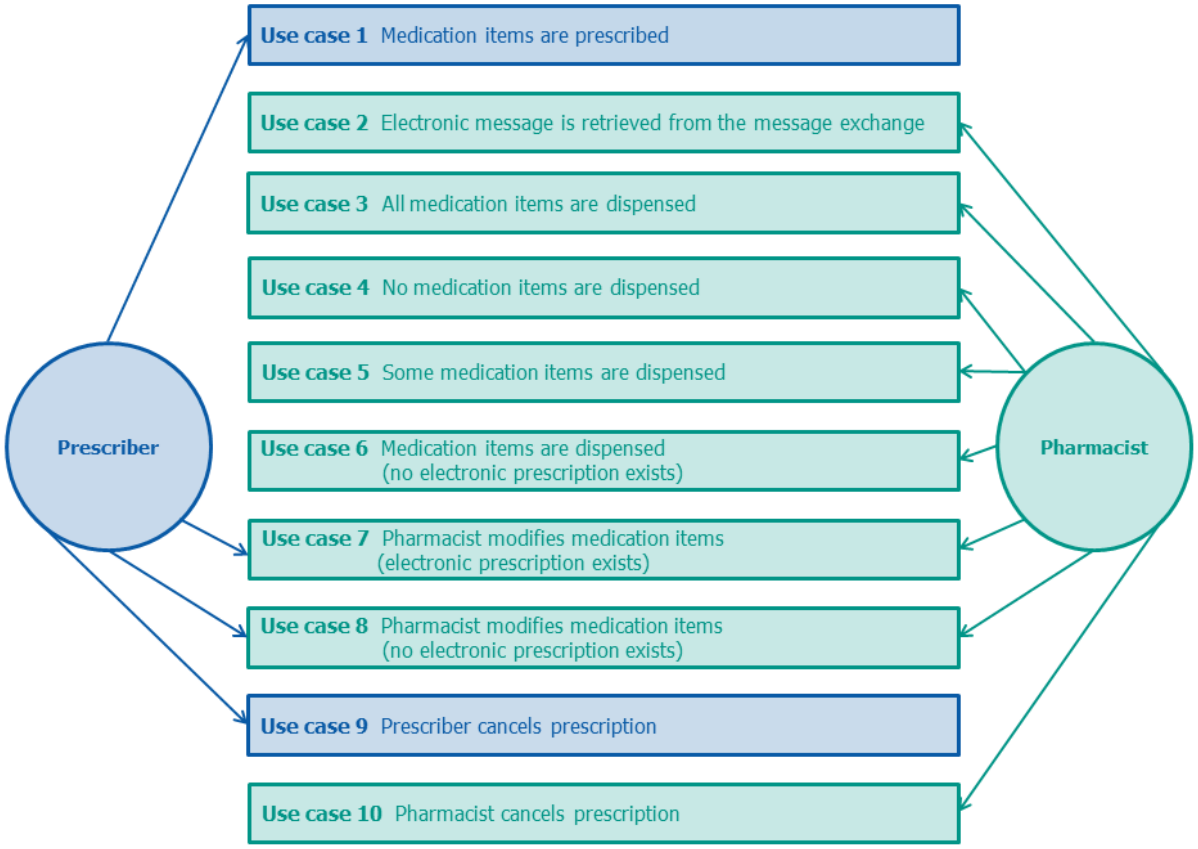
A proof of concept has been undertaken, whereby prescribers sent the prescription information to the cloud and generated the legal paper script that included a barcode. When patients presented to pharmacies requesting their medication, the pharmacist scanned the barcode on the prescription and the prescription information was downloaded in electronic format for the pharmacist to review.

The need for an Irish national, community-based ePrescribing Standard is underpinned by the Slaintecare Implementation Strategy, published in August 2018, which identifies ePrescribing as one the key strategic actions that has the potential to deliver improvements in patient outcomes across the health system.

Chapter 3 Use cases

Use cases are a tool used to describe how actors interact with an information system. In the context of ePrescribing, they describe how patients, prescribers and pharmacists interact with a national community-based electronic prescribing system. Figure 2 illustrates the ten use cases required to support ePrescribing in the community. These use cases have been developed in conjunction with our eHealth Standards Advisory Group. A brief description of each use case is provided, along with clinical examples.

Figure 2. Use cases for ePrescribing



3.1 An electronic prescription exists, all, some or no medication is dispensed (Use Case 1, 2, 3, 4 and 5)

Use Case: At the time of prescribing medication to a patient, a prescriber's clinical information system creates a barcoded paper prescription that the prescriber signs An electronic version of the prescription is then sent to and stored at a message exchange. The patient subsequently attends a pharmacist and provides the pharmacist with the barcoded paper prescription, which allows the pharmacist to identify and retrieve the electronic prescription from the message exchange. The pharmacist then dispenses some or all of the prescribed medication in accordance with the prescription information. An electronic record of the medications dispensed by the pharmacists is sent to the message exchange. Finally, if no medications are dispensed for the prescription, the pharmacist indicates this by returning the unfulfilled items in a message back to the message exchange.

3.1.1 Clinical examples to describe Use Cases 1, 2, 3, 4 and 5

- The patient attends a prescriber and is prescribed medication. (Use Case 1)
- A patient may contact a prescriber requesting that a repeat prescription is issued. (Use Case 1)
- A next of kin or carer may request a prescription be issued for a patient. (Use Case 1)
- The patient or a person on their behalf attends the pharmacy of their choice in order to have medication items dispensed. The pharmacist retrieves the electronic prescription from the message exchange. (Use Case 2)
- A prescription is presented to a pharmacist. The person the prescription relates to may present in person or another person may collect the prescription on their behalf. The pharmacist retrieves the electronic prescription from the message exchange. The pharmacist is able to dispense all medication items on the prescription (Use Case 2 and Use Case 3).

- The patient receives a prescription from a prescriber and decides to have the price checked at the pharmacy without any of the prescribed medication items being dispensed. (Use Case 2 and Use Case 4)
- The patient attends the pharmacy of their choice but the pharmacy does not have the required medication in stock and no medication items are dispensed (Use Case 2 and Use Case 4)
- The patient attends a prescriber and receives a prescription for one or more medication items. The pharmacist does not have all medications in stock but dispenses some of the medication items prescribed (Use Case 2 and Use Case 5)
- The patient attends the prescriber and receives a prescription for more than one medication. The patient decides to collect only part of the prescription; therefore, some of the medication items are dispensed (Use Case 2 and Use Case 5)
- A General Medical Services (GMS) patient attends the prescriber and receives a prescription for more than one medication item. Some medications are not covered under the GMS scheme and are, therefore, not dispensed (Use Case 2 and Use Case 5)

3.2 No electronic prescription exists, all medication is dispensed (Use Case 6)

Use Case: A patient attends a pharmacist with a paper prescription and no electronic prescription exists for the prescription from the prescriber. The pharmacist dispenses the medication items to the patient and records this on their computer system. An electronic record of the medications dispensed by the pharmacists is sent to the message exchange.

3.2.1 Clinical examples to describe Use Case 6

The prescriber has given the patient a handwritten, typed, or printed prescription because:

- a patient attends a prescriber who has yet to computerise processes and is given a handwritten, typed or printed prescription
- information systems are not functioning and the prescriber must revert to manual processes and prescribe using a paper handwritten prescription
- a patient is reviewed by a prescriber during a home visit and the prescriber writes a paper prescription
- a patient is reviewed by a prescriber out of hours and the prescriber creates a paper prescription.

3.3 An electronic prescription exists, modified medication is dispensed (Use Case 7)

Use Case: At the time of prescribing medication to a patient a prescriber's clinical information system creates a barcoded paper prescription which the prescriber signs and an electronic version of prescription is sent to and stored at a message exchange or mailbox. The patient visits a pharmacist to have the medication items dispensed. Prior to dispensing a medication item, the pharmacist decides a substitution is to be made for one of the medication items. This requires authorisation by the prescriber. The authorisation to change the medication items is obtained, and a prescriber subsequently issues an updated prescription. An electronic record of the medications dispensed by the pharmacists is sent to the message exchange.

3.3.1 Clinical examples to describe Use Case 7

- The pharmacist feels it is necessary to change the dose of a medication due to an error on the prescription or other clinical factors.
- The duration that the medication is to be taken may require a change.
- The route of administration of the medication may need to be changed.
- The pharmacist may have knowledge of an allergy that requires substitution for a different type of medication.

3.4 No electronic prescription exists, modified medications are dispensed (Use Case 8)

Use Case: A patient attends a prescriber and is prescribed medication items on a paper prescription. The patient visits a pharmacy to have the medication items dispensed. Prior to dispensing medication, a substitution is made for one of the medication items which requires authorisation by the doctor. The authorisation is obtained and a doctor sends another paper prescription to the pharmacy. An electronic record of the medications dispensed by the pharmacists is sent to the message exchange.

3.4.1 Clinical examples to describe the Use Case 8

- The pharmacist feels it is necessary to change the dose of a medication due to an error on the prescription or other clinical factors.
- The duration that the medication is to be taken may require a change.
- The route of administration of the medication may need to be changed.
- The pharmacist may have knowledge of an allergy that requires substitution for a different type of medication.

3.5 An electronic prescription exists which is subsequently cancelled (Use Case 9 and 10)

Use Case: At the time of prescribing medication to a patient, a prescriber's clinical information system creates a barcoded paper prescription, which the prescriber signs, and an electronic version of prescription is sent to and stored at a message exchange or mailbox. After the patient has left, the prescriber decides the prescription should be cancelled.

The patient subsequently attends a pharmacist and provides the pharmacist with a barcoded paper prescription which allows the pharmacist to identify and retrieve the prescription from the message exchange. The pharmacist retrieves a cancelled prescription indicating that the prescriber has decided that the prescription is not required. The pharmacist informs the patient of the cancellation.

Alternatively, a patient attends a prescriber, who generates an electronic prescription which is sent and stored in the message exchange. The patient subsequently attends a pharmacist and provides the pharmacist with a barcoded paper prescription which allows the pharmacist to identify and retrieve the prescription from the message exchange. The pharmacist decides that the prescription should be cancelled. Authorisation is received from the prescriber, and the pharmacist cancels the prescription and informs the patient.

3.5.1 Clinical examples to describe the Use Case 9 and Use Case 10

- The prescriber or pharmacist suspects medication misuse or abuse. (Use Case 9 and Use Case 10)
- The pharmacist discovers the prescriber is not authorised to prescribe a certain type of medication. (Use Case 10)
- The pharmacist may decide it is unsafe to dispense the medication prescribed. (Use Case 10)
- The pharmacist may discover that the prescription is for an unlicensed medication and may cancel the prescription. (Use Case 10)

Chapter 4 Information requirements

This section describes the information requirements needed to support national community-based ePrescribing. As stated earlier, information requirements define the minimum set of data items that are recommended for implementation in information systems that create and transfer information to support the delivery of quality care. The inclusion of data in the minimum set of data is determined by the clinical relevancy of the data and the potential for the data to improve patient safety in a collaborative care environment.

This section defines the information that should be contained within an ePrescription message when an electronic prescription is generated by a clinical information system used by a prescriber. It also defines the information that should be contained within an electronic dispensing message generated at the time of dispensing the medication to the patient in a community pharmacy. Though additional information regarding the patient's visit may be recorded by the prescriber or pharmacist, HIQA has only identified the information that is required to be shared in an electronic solution in order to ensure safe prescribing and dispensing practices.

Sources which have been used in the development of the information requirements to date include:

- epSOS Semantic Implementation Guidelines Work Package 3.9 – Appendix B1/B[(15)]
- Integrating the Healthcare Enterprise, Pharmacy, Community Medication Prescription and Dispense's Technical Framework, Trial Implementation (2015)[(16)]
- Digital Health Australian's National Requirements for electronic prescriptions version 1.0[(17)]
- Health Level Seven International Messaging Standards — version 2.4, version 2.6 and version 2.7[(18)]

- Health Level Seven International HL7 Fast Healthcare Interoperability Resources standard (FHIR)[19]
- openEHR Clinical Knowledge Manager Medication Order Archetype[20]
- Electronic Pharmaceutical Messaging Standards, New Zealand[21]
- US National Council for Prescription Drug Programs[22]
- HL7 Implementation Guide: CDA R2 Continuity of Care Document (CCD).[23]

The information requirement tables presented below describe each data items in term of a requirement statement and a usage statement. The definitions of SHALL and SHOULD are as follows:

SHALL	When appearing in a requirement, the verb **SHALL** indicates a mandatory requirement. Its negative form **SHALL NOT** indicates a prohibition.
SHOULD	When appearing in a requirement, the verb **SHOULD** indicates a recommendation. Its negative form **SHOULD NOT** indicates an option that is not recommended.

4.1 Subject of care information requirement

Table 1 describes the information requirements for the patient's demographic details. Though additional information may be recorded at the time of the visit, HIQA has only identified the information that is required to be shared in an electronic solution in order to ensure safe prescribing and dispensing practices.

Table 1. The patient's demographic details

No.	Data item	Requirement statement	Usage
1.1	**Title**	The subject of care **SHOULD** contains the title relevant to the subject of care.	A coded value to be selected from a predefined list.
1.2	**Forename**	The subject of care **SHALL** contain a patient's first name or given name(s) as per their birth certificate.	A patient's first name or given name(s) as per their birth certificate.
1.3	**Surname**	The subject of care **SHALL** contain the second part of a patient's name which denotes their family or marital name.	The second part of a patient's name which denotes their family or marital name.
1.4	**Address**	The subject of care **SHALL** contain the location to be used to contact or correspond with the patient. This would normally be the patient's usual home address.	The particulars of the place where the patient lives.
1.5	**Date of birth**	The subject of care **SHOULD** contain the date of birth indicating the day, month and year when the patient was born. The date of birth **SHALL** be	The date of birth of the patient.

		provided for all patients under 12 years of age.	
1.6	**Sex**	The subject of care **SHOULD** contain gender identity is a person's sense of identification with either the male or female sex, as manifested in appearance, behaviour and other aspects of a person's life.	Gender identity is a person's sense of identification with either the male or female sex, as manifested in appearance, behaviour and other aspects of a person's life.
1.7	**Health identifier**	The subject of care **SHOULD** contain a number or code assigned to an individual to uniquely identify the individual within an organisation.	Both the code and the code type the code relates to should be provided, for example, 0987654321 Individual Healthcare Identifier (IHI). Other identifiers which may be carried in this field include the General Medical Services Scheme, Drug Payment Scheme, Long Term Illness Scheme and Hardship Scheme identifiers.

4.2 Prescribing information requirements

Table 2 describes the information requirements for medicinal products prescribed for a patient. Though additional information may be recorded at the time of the visit, only the information that is required to be shared in an electronic solution in order to ensure safe prescribing and dispensing practices is identified.

Table 2. Prescribing information requirements

No.	Data item	Requirement statement	Usage.
2.1	**Date written**	The prescription **SHALL** state the date on which the prescription was written.	The date field which indicates when the prescription was written.
2.2	**Medicinal product**	The prescription **SHALL** state the name of the medicinal product or package. It may be a trade name or a generic name.	The medicinal products that are prescribed. This field also covers where package level dispensing occurs or where a formulation takes place in the pharmacy in order to produce the substance dispensed to the patient.
2.3	**Dose form (strength)**	The prescription **SHALL** state the content of the active ingredient expressed quantitatively per dosage unit, per unit of volume or per unit of weight, according to the pharmaceutical dose form.	This field consists of a size value and unit, with a combination of both defining the strength, for example, 250mg, 1g.
2.4	**Dose form (type)**	The prescription **SHALL** include a description of the dose type.	This field describes the dose type, for example, tablet or vial.
2.5	**Dose form (total)**	The prescription **SHALL** include the total number of instances of the medicinal product required to fulfil the prescription.	This field is used to describe the number of the unit(s) to dispense.
2.6	**Dose form (intake)**	The prescription **SHALL** state the number of the instances of the medicinal	This field is used to describe the number of unit(s) to be taken at a given time.

		product to be taken by the patient at a given time.	
2.7	**Frequency of intake**	The prescription **SHALL** state how often the medicinal product is to be administered, often expressed as the number of times per day but may also include information such as one hour before or after meals.	This field is used to describe the frequency of the does that should be taken by the patient.
2.8	**Duration of treatment**	The prescription **SHALL** state the duration the medicinal product is to be taken.	This field is used to describe the duration of the dose to be taken by the patient.
2.9	**Route of administration**	The prescription **SHALL** indicate how the medicinal product is to be received by the patient.	A representation of the place in or on the body when the medicinal product or active ingredient is introduced in order to achieve the desired effect.
2.10	**Advice to pharmacist**	The prescription **SHOULD** include any advice the prescriber might suggest to the pharmacist.	Additional advice the prescriber may provide to the pharmacist.
2.11	**Substitution**	The prescription **SHOULD** be used to indicate if the medication prescribed may not be substituted.	Indicates whether the prescriber does not want generic substitution to occur.
2.12	**Indications**	The prescription **SHOULD** provide clinical information about the reason for providing the medicinal product.	The clinical reasons why the medicinal product is being prescribed.
2.13	**Repeats**	The prescription **SHOULD** provide an indication that dispensing of the medicinal product can be repeated or not.	This indicate whether the prescriber wishes for the prescription to be repeated.
2.14	**Number of repeats**	The prescription **SHOULD** provide an indication of the number of occasions the medicinal product may be	The number of times that the prescription may be dispensed.

	repeated	
2.15 Advice to patient	The prescription **SHOULD** any advice the prescriber might suggest to the patient.	Additional advice the prescriber may provide to the patient.

4.3 Dispensing information requirements

Table 3 describes the information requirements for medications dispensed to a patient. Though additional information may be recorded at the time of the visit, only the information that is required to be shared in an electronic solution in order to ensure safe prescribing and dispensing practices is identified.

Table 3. Dispensing information requirements

No.	Data item	Requirement statement (Usage)	Usage
3.1	**Date time of dispense event**	The dispensing record **SHALL** include the point in time at which the medication action is completed.	The date field which indicates when the prescription was dispensed.
3.2	**Medicinal product**	The dispensing record **SHALL** state the medicinal product that was dispensed.	The medicinal products that were dispensed. This field also covers where package level dispensing occurs or where a formulation takes place in the pharmacy in order to produce the substance dispensed to the patient.
3.3	**Dose form (strength)**	The dispensing record **SHALL** state the strength of the medicinal product that was dispensed.	This field consists of a size value and unit, with a combination of both defining the strength, for example, 250mg, 1g.
3.4	**Dose form (type)**	The dispensing record **SHALL** state the formulation or presentation of the medicinal product.	This field describes the dose type, for example, tablet, vial.
3.5	**Dose form (total)**	The dispensing record **SHALL** the total quantity of the medicinal product that was dispensed.	This field is used to describe the number of the unit(s) dispensed.
3.6	**Dose form**	The dispensing record	This field is used to describe

	(intake)	**SHALL** state the number of the instances of the medicinal product to be taken by the patient at a given time.	the number of unit(s) to be taken at a given time.
3.7	**Frequency**	The dispensing record **SHALL** state how often the medicinal product is to be administered, often expressed as the number of times per day but may also include information such as one hour before or after meals.	This field is used to describe the frequency of the dose that should be taken by the patient.
3.8	**Route of administration**	The dispensing record **SHALL** indicate how the medicinal product is to be received by the patient.	A representation of the place in or on the body when the medicinal product or active ingredient is introduced in order to achieve the desired effect.
3.9	**Label instructions**	The dispensing record **SHOULD** include any instructions given to the subject of care or carer at the time of the dispense event.	The label instructions provided to the patient at the time of dispensing the medication.
3.10	**Brand substitution occurred**	The dispensing record **SHOULD** state that a different brand of the same medicinal product was substituted for the one nominated in the order.	This field indication whether brand substitution occurred.
3.11	**Manufacturer**	The dispensing record **SHOULD** include the administrative code of the manufacturer of the medicinal product supplied.	This field holds information related to the manufacturer of the medicinal product dispensed.

Chapter 5 Conclusion

ePrescribing can deliver significant benefits for patients, prescribers, pharmacists and others involved in the process. In particular, ePrescribing can improve patient safety, for example, by reducing errors of mistaken identity, incorrect dosage, incorrect medication and adverse drug interactions. It can also reduce the number of pharmacist interventions significantly. Moreover, ePrescribing costs less and is quicker than processing the same prescriptions manually.

The goal of ePrescribing identified in the eHealth Strategy 2013 is to reduce medication errors, thereby reducing the associated costs and speeding up patient access to medication. The Slaintecare Implementation Strategy, published in August 2018 lists the implementation of ePrescribing service, as part of the implementation of community care solutions, as one of the ten key strategic actions that underpin the Slaintecare vision. The *National Standard on information requirements for community-based ePrescribing* has been developed to further advance this work and defines the information requirements required to implement community-based ePrescribing and dispensing in Ireland.

Appendix A eHealth Standards Advisory Group and HIQA's project team

The eHealth Standards Advisory Group consists of the followed individuals:

Niall Sinnott	Department of Health
Loretta Grogan	Health Service Executive (HSE) — Clinical Care Programmes
Iyrna Pokhilo	Patient representative — CAIRDE
Jack Shanahan	Irish Pharmaceutical Union
Gerry Kelliher	Royal College of Surgeons in Ireland — Surgical Affairs
Brian O'Mahony	Irish College of General Practitioners (General Practice IT Group)
Gerardine Sayers	HSE — Health Intelligence
Emer Kelly	Royal College of Physicians of Ireland
Eileen Bell	Enterprise Ireland
Roisin Doherty	Access to Information
Peter Connolly	HSE — Office of Chief Information Officer — Enterprise Architecture
Yvonne Goff	HSE — Office of Chief Information Officer
Fran Thompson	HSE — Office of Chief Information Officer
Damon Berry	National Standards Authority of Ireland
Paul Gallagher	Irish Association of Directors of Nursing and Midwifery

The project team consisted of:

Kevin O'Carroll	Standards and Technology Manager
Louise Mc Quaid	Standards and Technology Lead
Deirdre Laffan	Standards and Technology Lead

Appendix B Consultation questions

The *Draft Standard for Consultation: Information requirements for community-based ePrescribing* was available for public consultation for a six-week period. In this way, the public, service users and service providers were provided the opportunity to provide feedback and participate in the development process. The questions asked during the consultation are listed below.

Question 1:

Have you any alterations you would make to the subject of care information requirements?

Question 2:

Have you any additional items to add to the subject of care information requirements?

Question 3:

Have you any alterations you would make to the prescription information requirements?

Question 4:

Have you any additional items to add to the prescription information requirements?

Question 5:

Have you any alterations you would make to the dispensing information requirements?

Question 6:

Have you any additional items to add to the dispensing information requirements?

Question 7:

Have you any general comments you would like to make about this document?

Appendix C Mapping to messaging standards

Table 4 maps each of the field in the prescribing information requirements to two Health Level 7 International messaging standards — the Version 2.4 standard and the Fast Healthcare Interoperability Resources standard.

Table 4. Prescribing information requirements mapping

Data Item	HL7 v2.4	FHIR
Date written	ORC-9 Date/time of transaction	MedicationRequest.authoredOn
Medicinal product	RXO-1	MedicationRequest.medication
Dose form (strength)	RXO-2 Requested give amount - minimum RXO-4 Requested give units	MedicationRequest.Medication.ingredient.amount
Dose form (type)	RXO-5 Requested dosage form	MedicationRequest.Medication.ingredient.form
Dose form (total)	RXO-11 Requested dispense amount	MedicationRequest.dispenseRequest.quantity
Dose form (intake)	ORC-7 Quantity/Timing	MedicationRequest.dosageInstruction.dose
Frequency	ORC-7 Quantity/Timing	MedicationRequest.dosageInstruction.timing
Duration	ORC-7 Quantity/Timing	MedicationRequest.dosageInstruction.timing
Route of administration	RXR-1 Route	MedicationRequest.dosageInstruction.route
Advice to pharmacist	RXO-6 Provider's pharmacy/treatment instructions	MedicationRequest.supporting information
Substitution	RXO-9 Allow substitutions	MedicationRequest.substitution
Indications	RXO-20 Indication	MedicationRequest.reason
Repeats	RXO-13 Number of refills	MedicationRequest.DispenseRequest.numberOfRepeatsAllowed
Number of Repeats	RXO-13 Number of refills	MedicationRequest.DispenseRequest.numberOfRepeatsAllowed
Advice to patient	RXO-7 Provider's administration instructions	MedicationRequest.dosageInstruction.patientInstruction

Table 5 maps each of the field in the dispensing information requirements to two messaging two Health Level 7 International messaging standards — the Version 2.4 standards and the Fast Healthcare Interoperability Resources standard.

Table 5. Dispensing information requirements mapping

Data Item	HL7 v2.4 ORC/ RXD/RXR	HL7 v2.4 RXE	FHIR
Date time of dispense event	ORC-9 & RXD-3		MedicationDispense.whenPrepared
Medicinal product	RXD-2	RXE-2	MedicationDispense.medication
Dose form (strength)	RDX-4 & RXD-5	RXE-3 & RXE-5	MedicationRequest.medication .Medication.ingredient.amount
Dose form (type)	RXD-6	RXE-6	MedicationDispense.medication .Medication.ingredient.form
Dose form (total)	RXD-4	RXE-10	MedicationDispense.Quantity
Dose form (intake)	ORC-7		MedicationDispense.dosageInstruction.dose
Frequency	ORC-7	RXE-1	MedicationDispense.dosageInstruction.timing
Route of administration	RXR-1		MedicationDispense.dosageInstruction.route
Label instructions	RXD-15	RXE-7	MedicationDispense.dosageInstruction.patientInstructions
Brand Substitution Occurred	RXD-11	RXE-9	MedicationDispense.substitution.wasSubstituted
Manufacturer code	RXD-20		MedicationDispense.Medication.manufacturer

Appendix D HL7 v2.4 abstract message types

Table 6 is an extract from the HL7 v2.4 standards. It illustrates the full Health Level 7 International version 2.4 abstract message type used to carry prescription information. For further information, please see www.hl7.org.

Table 6. HL7 v2.4 OMP^O09 abstract message type

OMP^O09^OMP_O09	Pharmacy/treatment Order Message	Status	Chapter
MSH	Message Header		2
[{ SFT }]	Software		2
[UAC]	User Authentication Credential		2
[{ NTE }]	Notes and Comments (for Header)		2
[	--- PATIENT begin		
PID	Patient Identification		3
[PD1]	Additional Demographics		3
[{ NTE }]	Notes and Comments (for Patient ID)		2
[	--- PATIENT_VISIT begin		
PV1	Patient Visit		3
[PV2]	Patient Visit - Additional Info		3
]	--- PATIENT_VISIT end		
[{	--- INSURANCE begin		
IN1	Insurance		6
[IN2]	Insurance Additional Information		6
[IN3]	Insurance Additional Information, Certification		6
}]	--- INSURANCE end		
[GT1]	Guarantor		6
[{ AL1 }]	Allergy Information		3
]	--- PATIENT end		
{	--- ORDER begin		
ORC	Common Order		4
[{	--- TIMING begin		
TQ1	Timing/Quantity		4
[{ TQ2 }]	Timing/Quantity Order Sequence		4
}]	--- TIMING end		
RXO	Pharmacy/Treatment Order		4
[{ NTE }]	Notes and Comments (for RXO)		2
{ RXR }	Pharmacy/Treatment Route		4
[{	--- COMPONENT begin		
RXC	Pharmacy/Treatment Component		4
[{ NTE }]	Notes and Comments (for each RXC)		2
}]	--- COMPONENT end		
[{	--- OBSERVATION begin		
OBX	Observation/Result		7
[{ NTE }]	Notes and Comments (for OBX)		2
}]	--- OBSERVATION end		
[{ FT1 }]	Financial Transaction		6
[BLG]	Billing Segment		6
}	--- ORDER end		

Table 7 is an extract from the HL7 v2.4 standards. It illustrates the full Health Level 7 International version 2.4 abstract message type used to carry dispensing information. For further information, please see www.hl7.org.

Table 7. HL7 v2.4 RDS^O13 abstract message type

RDS^O13^RDS O13	Pharmacy/Treatment Dispense Message	Status	Chapter
MSH	Message Header		2
[{ SFT }]	Software		2
[UAC]	User Authentication Credential		2
[{ NTE }]	Notes and Comments (for Header)		2
[	--- PATIENT begin		
PID	Patient Identification		3
[PD1]	Additional Demographics		3
[{ NTE }]	Notes and Comments (for PID)		2
[{ AL1 }]	Allergy Information		2
[	--- PATIENT_VISIT begin		
PV1	Patient Visit		3
[PV2]	Patient Visit - Additional Info		3
]	--- PATIENT_VISIT end		
]	--- PATIENT end		
{	--- ORDER begin		
ORC	Common Order		4
[{	--- TIMING begin		
TQ1	Timing/Quantity		4
[{ TQ2 }]	Timing/Quantity Order Sequence		4
}]	--- TIMING end		
[	--- ORDER_DETAIL begin		
RXO	Pharmacy /Treatment Order		4
[	--- ORDER_DETAIL_SUPPLEMENT begin		
{ NTE }	Notes and Comments (for RXO)		2
{ RXR }	Pharmacy/Treatment Route		4
[{	--- COMPONENT begin		
RXC	Pharmacy/Treatment Component		4
[{ NTE }]	Notes and Comments (for each RXC)		2
}]	--- COMPONENT end		
]	--- ORDER_DETAIL_SUPPLEMENT end		
]	--- ORDER_DETAIL end		
[	--- ENCODING begin		
RXE	Pharmacy/Treatment Encoded Order		4
[{ NTE }]	Notes and Comments (for RXE)		2
{	--- TIMING_ENCODED begin		
TQ1	Timing/Quantity		4
[{ TQ2 }]	Timing/Quantity Order Sequence		4
}	--- TIMING_ENCODED end		
{ RXR }	Pharmacy/Treatment Route		4
[{ RXC }]	Pharmacy/Treatment Component		4
]	--- ENCODING end		
RXD	Pharmacy/Treatment Dispense		4
[{ NTE }]	Notes and Comments (for RXD)		2
{ RXR }	Pharmacy/Treatment Route		4
[{ RXC }]	Pharmacy/Treatment Component		4
[{	--- OBSERVATION begin		
OBX	Results		7
[{ NTE }]	Notes and Comments (for OBX)		2
}]	--- OBSERVATION end		
[{ FT1 }]	Financial Transaction segment		6
}	--- Order ends		

Appendix E FHIR resources

Table 8 is an extract from the HL7 FHIR standard. It illustrates the full Health Level 7 International Fast Healthcare Interoperability Resources standard used to carry prescribing information.

Table 8. FHIR MedicationRequest Resource

Name	Flags	Card.	Type	Description & Constraints
MedicationRequest			DomainResource	Ordering of medication for patient or group Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier		0..*	Identifier	External ids for this request
definition	Σ	0..*	Reference(ActivityDefinition | PlanDefinition)	Protocol or definition
basedOn	Σ	0..*	Reference(CarePlan | MedicationRequest | ProcedureRequest | ReferralRequest)	What request fulfills
groupIdentifier	Σ	0..1	Identifier	Composite request this is part of
status	?!Σ	0..1	code	active | on-hold | cancelled | completed | entered-in-error | stopped | draft | unknown MedicationRequestStatus (Required)
intent	?!Σ	1..1	code	proposal | plan | order | instance-order MedicationRequestIntent (Required)
category		0..1	CodeableConcept	Type of medication usage MedicationRequestCategory

				(Preferred)
priority	Σ	0..1	code	routine | urgent | stat | asap MedicationRequestPriority (Required)
medication[x]	Σ	1..1		Medication to be taken SNOMED CT Medication Codes (Example)
medicationCodeableConcept			CodeableConcept	
medicationReference			Reference(Medication)	
subject	Σ	1..1	Reference(Patient | Group)	Who or group medication request is for
context		0..1	Reference(Encounter | EpisodeOfCare)	Created during encounter/admission/stay
supportingInformation		0..*	Reference(Any)	Information to support ordering of the medication
authoredOn	Σ	0..1	dateTime	When request was initially authored
requester	ΣI	0..1	BackboneElement	Who/What requested the Request *+ onBehalfOf can only be specified if agent is practitioner or device*
agent	Σ	1..1	Reference(Practitioner | Organization | Patient | RelatedPerson | Device)	Who ordered the initial medication(s)
onBehalfOf	ΣI	0..1	Reference(Organization)	Organization agent is acting for
recorder		0..1	Reference(Practitioner)	Person who entered the request
reasonCode		0..*	CodeableConcept	Reason or indication for writing the prescription

				Condition/Problem/Diagnosis Codes (Example)
reasonReference		0..*	Reference(Condition | Observation)	Condition or Observation that supports why the prescription is being written
note		0..*	Annotation	Information about the prescription
dosageInstruction		0..*	Dosage	How the medication should be taken
dispenseRequest		0..1	BackboneElement	Medication supply authorization
validityPeriod		0..1	Period	Time period supply is authorized for
numberOfRepeatsAllowed		0..1	positiveInt	Number of refills authorized
quantity		0..1	SimpleQuantity	Amount of medication to supply per dispense
expectedSupplyDuration		0..1	Duration	Number of days supply per dispense
performer		0..1	Reference(Organization)	Intended dispenser
substitution		0..1	BackboneElement	Any restrictions on medication substitution
allowed	?!	1..1	boolean	Whether substitution is allowed or not
reason		0..1	CodeableConcept	Why should (not) substitution be made SubstanceAdminSubstitutionReason (Example)
priorPrescription		0..1	Reference(MedicationRequest)	An order/prescription that is being replaced
detectedIssue		0..*	Reference(DetectedIssue)	Clinical Issue with action
eventHistory		0..*	Reference(Provenance)	A list of events of interest in the lifecycle

Table 9 is an extract from the HL7 FHIR standard. It illustrates the full Health Level 7 International Fast Healthcare Interoperability Resources standard used to carry dispensing information. For further information, please see www.hl7.org.

Table 9. FHIR MedicationDispense Resource

Name	Flags	Card.	Type	Description & Constraints
MedicationDispense	I		DomainResource	Dispensing a medication to a named patient + *whenHandedOver cannot be before whenPrepared* Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier		0..*	Identifier	External identifier
partOf		0..*	Reference(Procedure)	Event that dispense is part of
status	?!Σ	0..1	code	preparation | in-progress | on-hold | completed | entered-in-error | stopped MedicationDispenseStatus (Required)
category		0..1	CodeableConcept	Type of medication dispense MedicationDispenseCategory (Preferred)
medication[x]	Σ	1..1		What medication was supplied SNOMED CT Medication Codes (Example)
medicationCodeableConcept			CodeableConcept	
medicationReference			Reference(Medication)	
subject	Σ	0..1	Reference(Patient | Group)	Who the dispense is for
context		0..1	Reference(Encounter |	Encounter / Episode

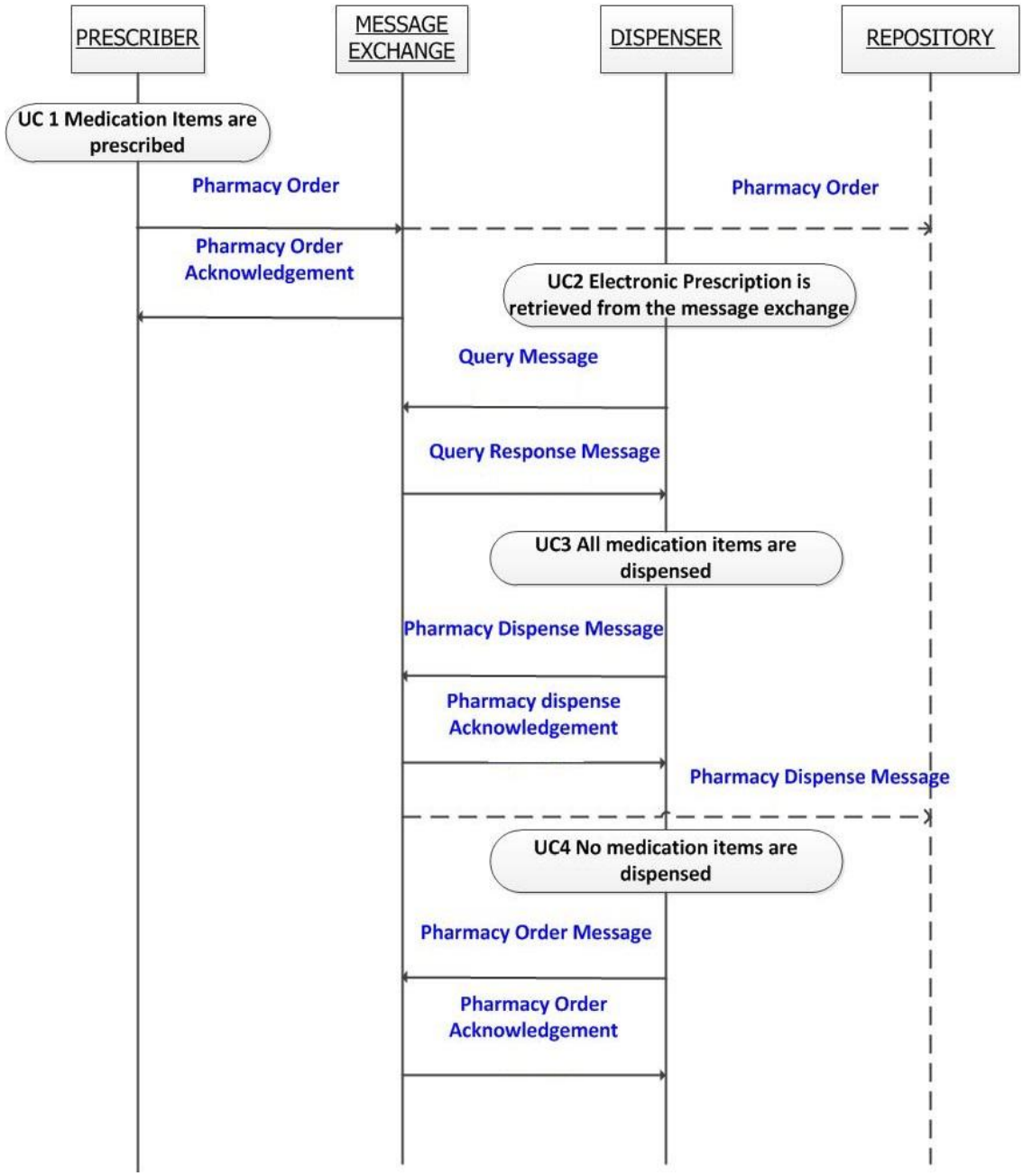
			EpisodeOfCare)	associated with event
supportingInformation		0..*	Reference(Any)	Information that supports the dispensing of the medication
performer		0..*	BackboneElement	Who performed event
actor		1..1	Reference(Practitioner | Organization | Patient | Device | RelatedPerson)	Individual who was performing
onBehalfOf		0..1	Reference(Organization)	Organization organization was acting for
authorizingPrescription		0..*	Reference(MedicationRequest)	Medication order that authorizes the dispense
type		0..1	CodeableConcept	Trial fill, partial fill, emergency fill, etc. ActPharmacySupplyType (Example)
quantity		0..1	SimpleQuantity	Amount dispensed
daysSupply		0..1	SimpleQuantity	Amount of medication expressed as a timing amount
whenPrepared	Σ	0..1	dateTime	When product was packaged and reviewed
whenHandedOver		0..1	dateTime	When product was given out
destination		0..1	Reference(Location)	Where the medication was sent
receiver		0..*	Reference(Patient | Practitioner)	Who collected the medication
note		0..*	Annotation	Information about the dispense
dosageInstruction		0..*	Dosage	How the medication is to be used by the patient or administered by the caregiver
substitution		0..1	BackboneElement	Whether a substitution was performed on the dispense

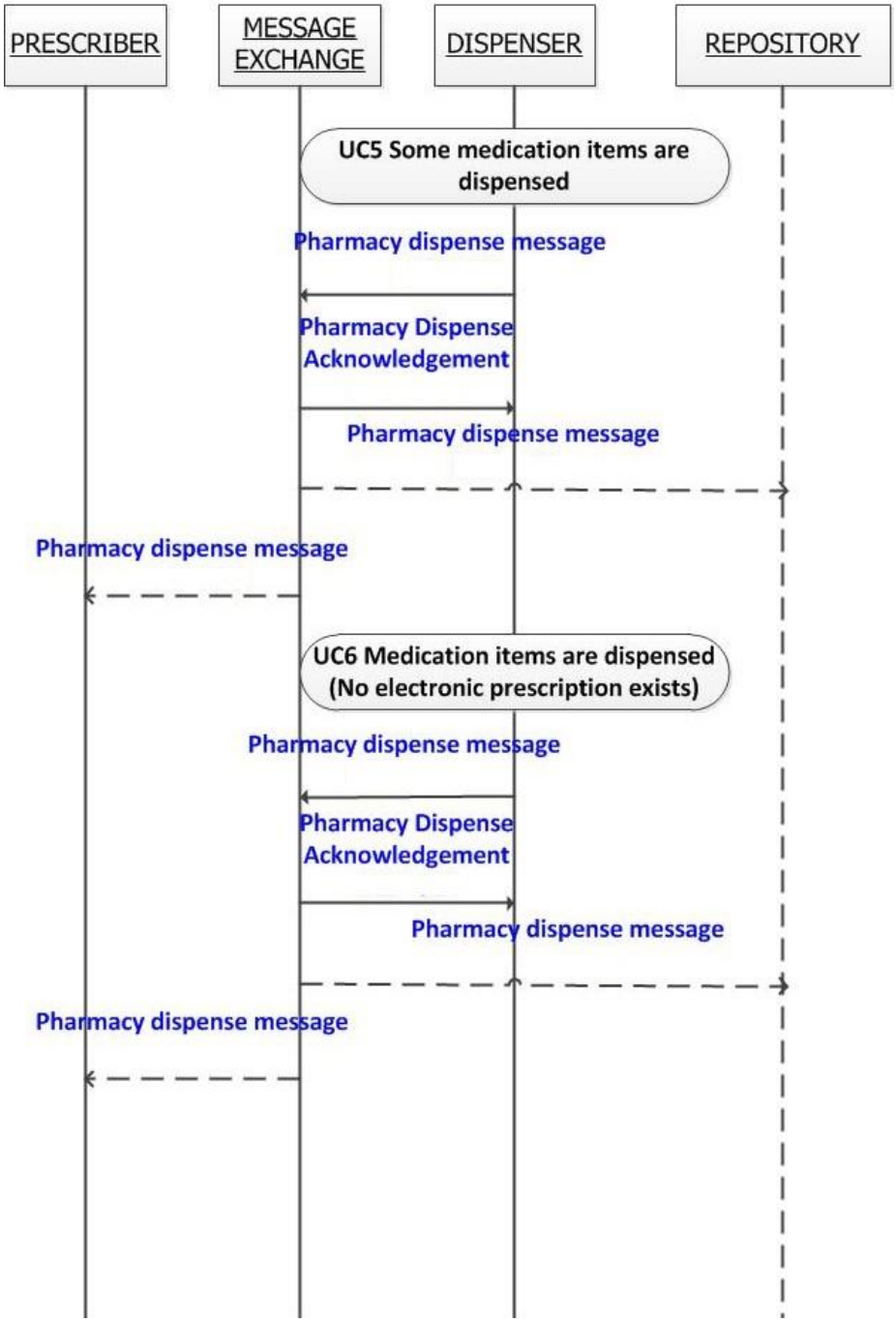
wasSubstituted		1..1	boolean	Whether a substitution was or was not performed on the dispense
type		0..1	CodeableConcept	Code signifying whether a different drug was dispensed from what was prescribed ActSubstanceAdminSubstitutionCode (Example)
reason		0..*	CodeableConcept	Why was substitution made SubstanceAdminSubstitutionReason (Example)
responsibleParty		0..*	Reference(Practitioner)	Who is responsible for the substitution
detectedIssue		0..*	Reference(DetectedIssue)	Clinical issue with action
notDone		0..1	boolean	Whether the dispense was or was not performed
notDoneReason[x]		0..1		Why a dispense was not performed
notDoneReasonCodeableConcept			CodeableConcept	
notDoneReasonReference			Reference(DetectedIssue)	
eventHistory		0..*	Reference(Provenance)	A list of releveant lifecycle events

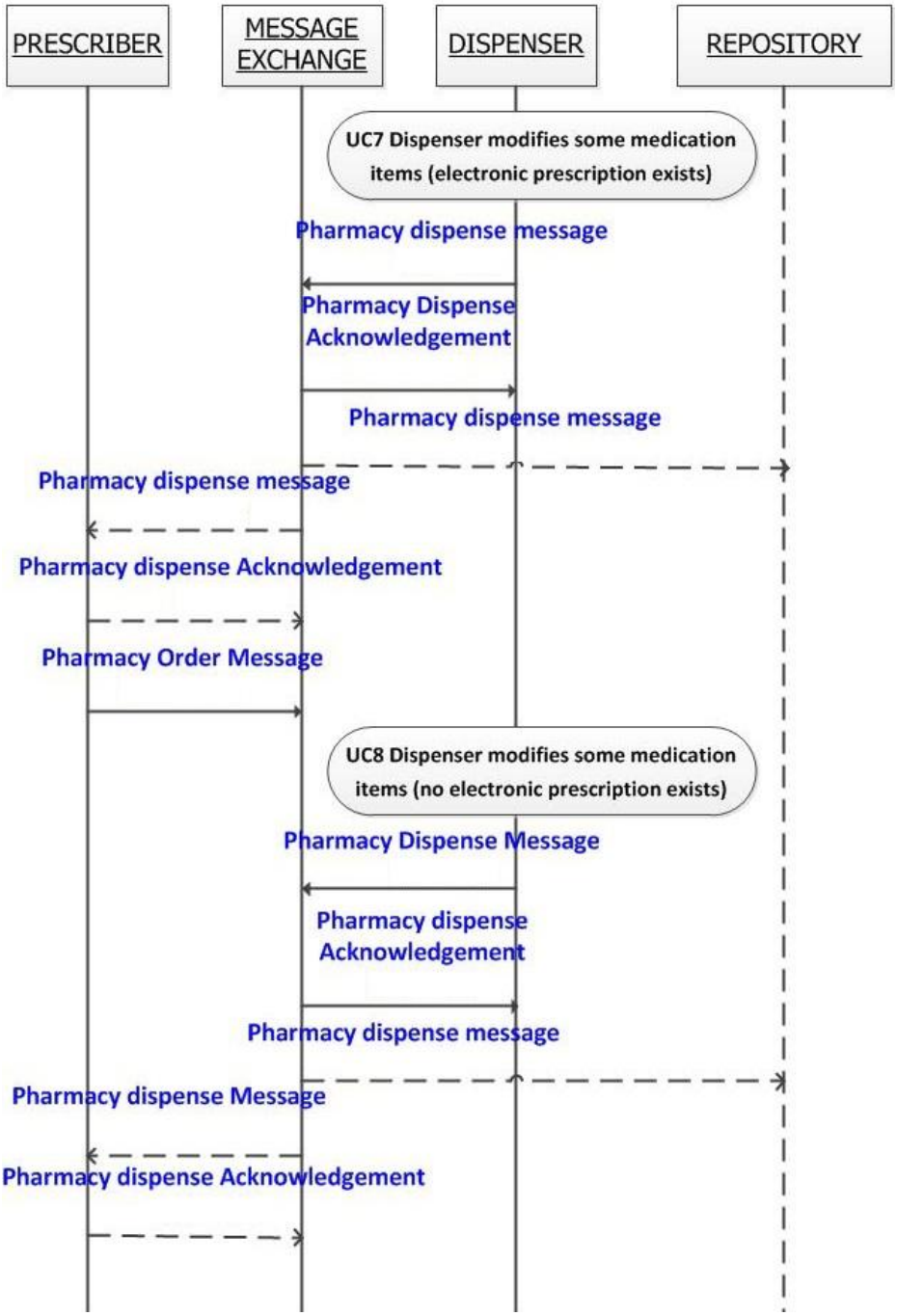
Appendix F Message flows

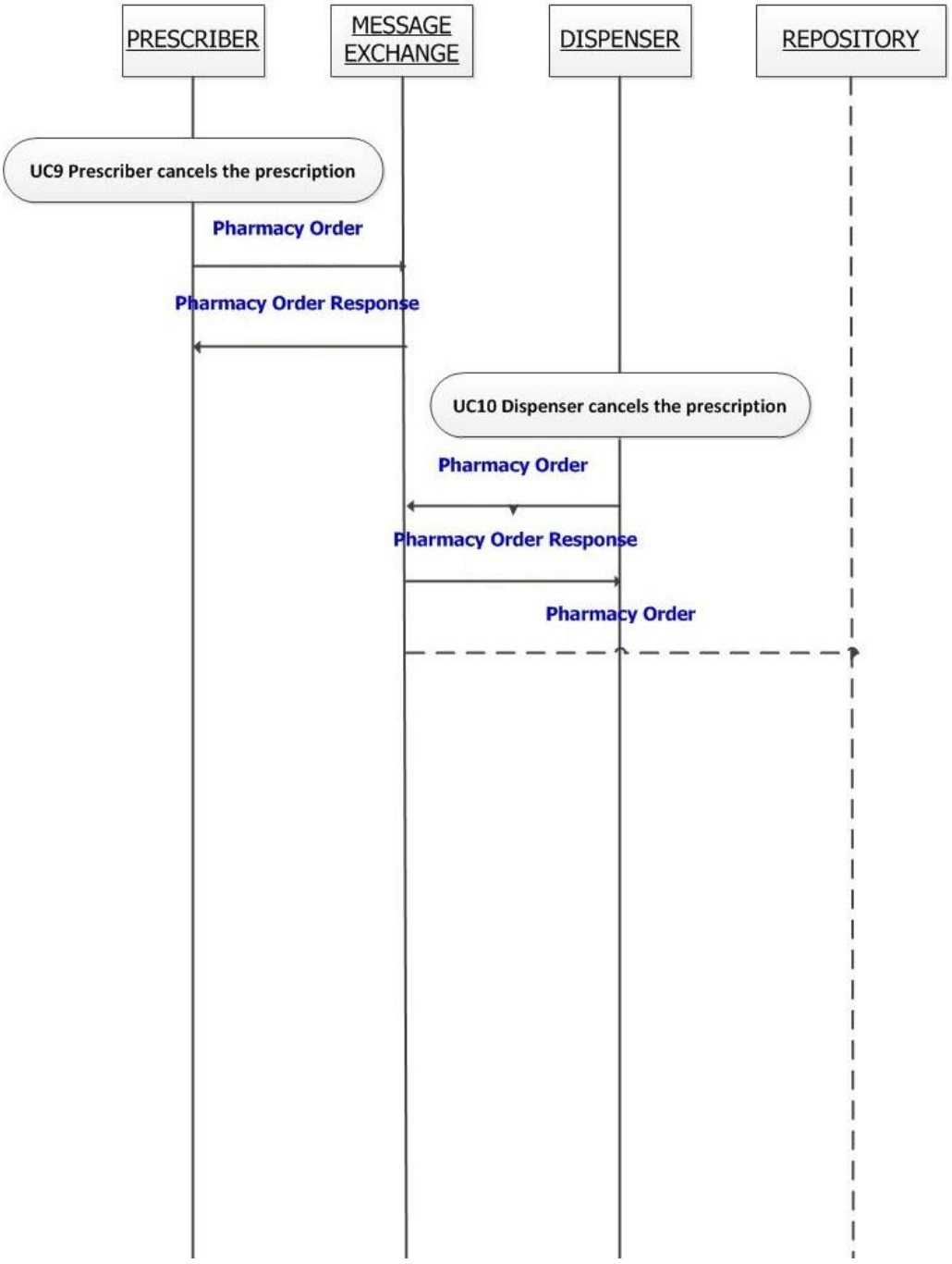
Figure 3 illustrates message flows that are required to support the transfer of information between prescribers and pharmacists for each of the use cases identified in Chapter 2.

Figure 3. Message flows for transfer for information between prescribers and pharmacists




PRESCRIBER
MESSAGE EXCHANGE
DISPENSER
REPOSITORY
UC5 Some medication items are dispensed
Pharmacy dispense message
Pharmacy Dispense Acknowledgement
Pharmacy dispense message
Pharmacy dispense message
UC6 Medication items are dispensed (No electronic prescription exists)
Pharmacy dispense message
Pharmacy Dispense Acknowledgement
Pharmacy dispense message
Pharmacy dispense message


PRESCRIBER
MESSAGE EXCHANGE
DISPENSER
REPOSITORY
UC7 Dispenser modifies some medication items (electronic prescription exists)
Pharmacy dispense message
Pharmacy Dispense Acknowledgement
Pharmacy dispense message
Pharmacy dispense message
Pharmacy dispense Acknowledgement
Pharmacy Order Message
UC8 Dispenser modifies some medication items (no electronic prescription exists)
Pharmacy Dispense Message
Pharmacy dispense Acknowledgement
Pharmacy dispense message
Pharmacy dispense Message
Pharmacy dispense Acknowledgement


PRESCRIBER
MESSAGE EXCHANGE
DISPENSER
REPOSITORY
UC9 Prescriber cancels the prescription
Pharmacy Order
Pharmacy Order Response
UC10 Dispenser cancels the prescription
Pharmacy Order
Pharmacy Order Response
Pharmacy Order

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