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## Evidence Based Guidelines for Nursing and Social Care on eHealth Services

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### Nurse ePrescribing

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## Acknowledgement

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[List of the ENS4Care partners](#)

## Executive Summary

'Diversity is strength' and ENS4Care presents partners within the 28 European Union member states with an opportunity to capitalise on different approaches used in other countries in relation to nurse ePrescribing. Where possible our goal is to share knowledge and exchange information thus avoiding 'wheel reinvention' by adopting and adapting best practices. The potential exists for nurse and social workers to build strong partnerships, develop capacity and begin to consider ways in which to create a platform that cannot only shape and inform future generations of nurse practitioners, but present opportunities to impact on organisational workforce, which as recent evidence suggests can have a direct bearing on patient-centred outcomes (Aiken et al, 2014).

The current document presents evidence-based guidelines to inform policy-makers, health professionals, social workers, citizens and industry in the design and deployment of eHealth services at local, regional, national and EU level based on identified best practice examples collected through the ENS4Care thematic network from countries across the EU. This guideline builds on the work of the ENS4Care network work stream 'nurse ePrescribing' and is concerned with eHealth services to support nurse ePrescribing in primary or secondary health and social care settings.

Nurse ePrescribing is a pathway with different gateways, which users must navigate through in order to achieve effective project deliverables. In this document, core concepts are defined as they relate to ePrescribing and three key critical factors are identified which should be borne in mind in the initial stages of planning for nurse ePrescribing: jurisdictional factors and prescriptive authorities; informatics infrastructure and platform; and, competency in clinical decision making.

The overarching purpose of this guideline is to describe how and where nurse leaders and policy makers (who are the principle intended audience of this guideline) should begin to gain a comprehensive overview of the key processes related to nurse ePrescribing. Information is presented from three differing perspectives – organisational or enterprise view, clinical view (using a patient case study), and informatics view – in order to demonstrate a roadmap that highlights the point that all phases of development need to be considered collectively and sequentially rather than in an ad hoc way.

Given the diverse organisational and professional challenges that nurse ePrescribing is currently presented with, this guideline provides insights not only from current online resources but also includes a purposefully created set of case studies, the aim of which is to demonstrate the flow of information and associated care processes within nurse ePrescribing. It is a useful resource for professionals, citizens and policy makers alike.

## 1. Introduction

This nurse ePrescribing guideline endeavours to identify what every nurse leader is required to understand about nurse ePrescribing. We begin by defining core concepts from the perspective of prescribing. We recognise that nurse ePrescribing programme development within the EU (in as far as is possible) should start from the premise that it shall be part of an enterprise national or regional deployment programme for Electronic Health Record (EHR). Recognition that integrated models of care are required to tackle fragmentation of healthcare services provision is a first principle.

Nurse and social care leaders are required to move from single disease approaches which struggle to address the health and social care needs of the estimated 50 million citizens in the EU with multiple chronic disease ([www.age-platform.eu](http://www.age-platform.eu)). For optimum impact on patient outcome ePrescribing will be implemented as part of an integrated multi-disciplinary health and social care process. The concepts ePrescribing, Patient Summary Record, Medications Management and healthcare devices<sup>1</sup> are frequently referred to together in the literature. We therefore define these concepts (see glossary) within this guideline for clarity and understanding. The guidelines presented here are based on input from the ENS4Care network partners and submitted cases of practice examples. The results of that data collection process and its analysis are included in [the ENS4Care Deliverable](#) on Nursing and Social Care practices in ICT enabled Prevention, Clinical Practice, Advanced Roles, Integrated care and nurse ePrescribing, which was prepared by the ENS4Care partners in May 2015.

ePrescribing in Europe is a dynamic activity which is shaped by a number of key facilitators and barriers. We suggest the reader visualises ePrescribing as a 'pathway' with different gateways which users must progress through in order to achieve effective project deliverables. One visual example included here which demonstrates this point is the ePrescriber planning toolkit from the UK NHS, which identifies a number of key stages required for effective deployment of an ePrescribing programme. See Franklin and Watson Tool Kit Planner [www.eprescribingtoolkit.com/planner/](http://www.eprescribingtoolkit.com/planner/) for an illustrative overview with examples.

In addition we also identify from the literature three key critical factors which should be borne in mind in the initial stages of planning for nurse ePrescribing:

1. Jurisdictional factors and prescriptive authorities which will guide care flow for nursing practitioners in ePrescribing (Source Krozen M, Dijk, L.V. Groenewegen, P & Franck, A.L. 2011).
2. Informatics Infrastructure and platform to address issues with semantic and syntactic interoperability, use case for ePrescribing care flow / practices and eDispensing (Source epSOS)
3. Competency in clinical decision-making, issues relating to nurse education and training on medication management (Source ENS4Care Survey Response Evaluation).

Each of these is discussed in turn next.

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<sup>1</sup> Spanish Legislation: Law 29/2006, 26 July 2006, Guarantees and the Rational Use of Medicines and Healthcare Products.

- **Jurisdictional Factors and Prescriptive Authorities**

Nurse prescribing has been introduced in a number of countries in recent years, although the legal practice of prescribing by nurses varies considerably by country as illustrated by the following quote by Krozen, Dijk, Groenewegen and Franck (2011):

In some countries, nurses share (full) jurisdiction with the medical profession whereas in other countries nurses prescribe in a subordinate position. In most countries the jurisdiction over prescribing remains predominantly with the medical profession. There seems to be a mechanism linking the jurisdictional settlements between professions with the forces that led to the introduction of nurse prescribing. Forces focussing on efficiency appear to lead to more extensive prescribing rights.

**Guidelines statement: Jurisdictional factors, including legislation and prescriptive authorities should be considered in the initial stages of planning for nurse ePrescribing.**

- **Informatics Infrastructure and Platform**

A significant EU project that continues to shape deployment of ePrescribing in Europe is the Smart Open Services for European Patients (epSOS). The deliverables within this EU programme (phase one 2008-2011; phase two 2011-2014) are significant and directly relate to the topic of ePrescribing in EU member states. We therefore have used the deliverables from epSOS within this guideline firstly to define specific concepts and terms, and secondly some reference documents from epSOS are used to define the functional service requirements for patient summary and electronic prescription and it is recommended for use by ENS4Care members. See epSOS Appendix 1.

The epSOS Final Functional Service Requirements resource is freely available online and is available from [here](#) (page 51, Chapter 7). Early recognition that future nurse ePrescribing will more than likely occur within a multi- disciplinary Electronic Health Record will assist the reader in making sense of the approach that has been espoused in this clinical guideline.

**Guidelines statement: Informatics infrastructure and platform should be considered in the initial stages of planning for nurse ePrescribing.**

- **Competency in Clinical Decision Making**

Emerging eHealth agendas uptake and use of smart, mobile and sensor technologies will also drive contemporary health and social care models. Educational and training programmes on medication management as well as informatics training for nursing and social care are paramount. Medication management requires nurse prescribers to not only adhere to electronic prescribing and administration of medication, it also requires medication optimisation to ensure clinical effectiveness is achieved as part of a patient focused, outcome based service. Nurse prescribers will need to use clinical judgement within their scope of practice underpinned by research and evidence.

**Guidelines statement: Competency in clinical decision-making should be considered in the initial stages of planning for nurse ePrescribing.**

Much of literature reviewed defines the scope, purpose and regulation of nurse ePrescribing as a competency, describing the intervention as an emerging dynamic skill set which requires specific formalised structures to be in place for successful integration into nursing practice. Sourcing recent definitions on nurse ePrescribing has proven challenging, we have therefore included the earlier definitions that we could source. We also distinguish between **ePrescribing** and **eDispensing**; whilst they are closely connected both are distinct processes which are included in the definitions below:

**eDispensing** is defined as the act of electronically retrieving a prescription and administering medicine to the patient as indicated in the corresponding ePrescription. Once the medicine is administered, the dispenser sends an electronic report on the dispensed medicine(s). **Source: epSOS D1.4.1**

**ePrescription** is a medicinal prescription, i.e. a set of data like drug ID, drug NAME, Strength, Form, Dosage, and/or indication(s), provided in electronic format. **Source: epSOS D1.4.1**

**A Nurse Prescriber (NP)** is defined as a registered nurse (RN) with additional education in health assessment, diagnosis and management of illnesses and injuries, including ordering tests and prescribing drugs. **Source: Canadian Nurse's Prescriber Guidelines 2006.**

**Nurse Prescribing Practice** is described as a prescribing practice which involves a number of complex skills including comprehensive consultation, diagnosis, information giving and accurate documentation. Consultation with a patient /service user during the prescribing process and the correct completion of a prescription enhances the patient/ service user safety and reduces the likelihood of a medication error (WHO, 1994; Latter S. Maben J. Myall and Young, A 2007).

**Source: Practice Standards Guidelines for Nurses and Midwives 2010 NMBI.**

**To Prescribe** is to authorise in writing the dispensing, supply and administration of a named medicinal product (typically a prescription-only medicine, but may include over the counter medications) for a specific patient/service user.

**Source: HSE Guiding Framework for Nurse and Midwifery Prescribing in Ireland 2008 and the Guidance to Nurses and Midwives on Medication Management ABA 2007.**

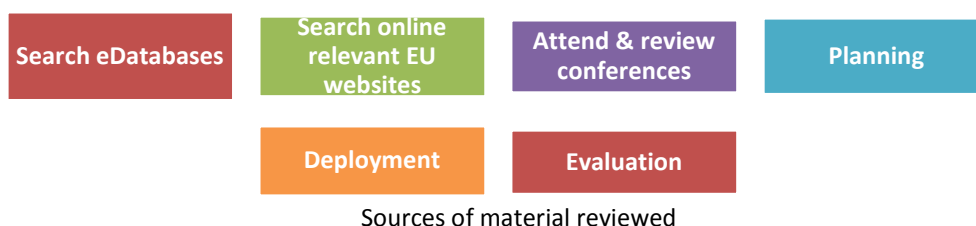
## 2. The Guideline

### 2.1 Scope

The overarching purpose of this guideline is to describe how and where nurse leaders should begin in order to gain a comprehensive overview of the key processes involved in learning about nurse ePrescribing (from concept to implementation). It is important to highlight from the outset that this clinical guideline presents current ‘state of the art’ recognising that nurse ePrescribing is an emerging practice currently only available in some EU member states. However, nurse ePrescribing is continually evolving and therefore this document will require regular review and updating in relation to the professional agenda and EU /International best practice on nurse ePrescribing.

We have consciously made a number of significant choices in the overall design of this resource by opting to present information from three differing perspectives: Organisational or enterprise view, Clinical view and Informatics view. The rationale for this approach is to present a logical and cohesive **roadmap**, which highlights the point that all three phases of development identified above need to be considered collectively and sequentially rather than in an ad hoc way. Given the diverse organisational and professional challenges that nurse ePrescribing is currently presented with, this guideline provides insights not only from current online resources but also includes a purposefully created set of case studies, the aim of which is to demonstrate the flow of information and associated care processes within nurse ePrescribing.

The main objective of this clinical guideline is to share existing knowledge and expertise in relation to 3 key areas – planning, deployment and evaluation of nurse ePrescribing – and to develop a guideline based on best practice and available evidence. This review used the following search strategy and article selection process. We conducted an electronic literature search of CINAHL, Web of Science and PubMed for articles published between January 2010 and July 2014. The search was completed across databases simultaneously and duplicate articles were eliminated from results. Four core search headings (MeSH) were used **Medication Management, Prescribing, ePrescribing and Nurse ePrescribing**. We also reviewed reference lists from articles sourced. As the topic under review nurse ePrescribing is an evolving area of practice we also completed a targeted grey literature search and reviewed websites of relevance for example EU databases and recent informatics conference proceedings. The quality of the articles sourced was assessed from the perspective of the intended audience and clarity of presentation and articles referenced within the review were considered to be relevant to criteria set by the ENS4Care project team. As the focus of this work package is to deliver a clinically pragmatic resource for a target audience, we also attended workshops on medication management and conferences on prescribing and medication care. In addition two site visits to services that deliver components of medication management using elements of ePrescribing within the Republic of Ireland were also scheduled in June 2014. The figure below illustrates the various sources of material included in the resource.



## 2.2 Process and Outcomes

To assist the reader to assimilate the material presented in this guideline current legislative practice and standards particularly from the Irish setting are used, since both the United Kingdom and Ireland are noted in the evidence base to have strong jurisdictional control for nurse prescribing. The three cases presented can be viewed as at different stages of deployment and are illustrated as stages 1-3 (figure 1). They can be explained as follows. **Level 1** presents cases from the Irish context where prescribing jurisdictional and legislative frameworks are in place. **Level 2** moves beyond level one in that it presents prescribing and electronic generation of ePrescription as part of a multi-disciplinary group; however electronic dispensing has not been achieved. **Level 3** presents the material from Spain where a fully integrated ePrescribing programme has been deployed; ePrescribing and eDispensing are therefore implemented in clinical encounters between nursing and citizens. Figure 1 demonstrates the three stages graphically and is also included within the case studies.

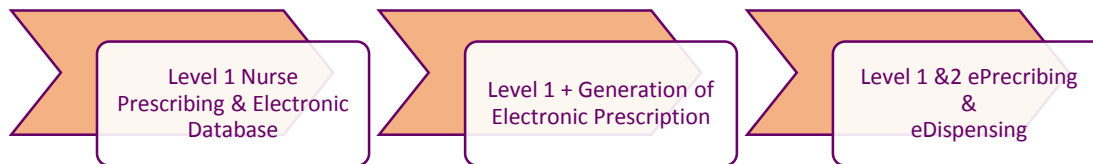


Figure 1 Representation of the 3 levels of the nurse ePrescribing platform from case studies presented

### Level One: Nurse ePrescribing

WP5 (Work Package 5) is part of the ENS4Care Project and its core purpose is to develop a clinical guideline on nurse ePrescribing based on the results of the ENS4Care Survey Tool. This survey tool collected cases of existing practice in relation to nurse ePrescribing within EU Member States from January 2014 to March 2014. In total there were 17 submissions from four countries UK, ROI, Spain and Italy (see [www.ens4care.eu](http://www.ens4care.eu)).

This guideline has been purposefully devised to support other work packages within the ENS4Care Project, however it can be distinguished from the other WPs as it has been **developed primarily as a resource for policy makers within healthcare whose role is to deliver nurse ePrescribing**. This clinical guideline presents the fundamental concepts of nurse ePrescribing for planning deployment and evaluation at a regional or national level. It is anticipated that this approach will be seen as useful to health managers who may have a requirement to produce guidelines for use by clinical teams within differing healthcare environments for example in the primary and secondary care domains. Key features of this guideline are to signpost and direct the reader to additional relevant online resources for sharing existing knowledge and expertise. This aligns the resource to core objectives specifically in relation to planning the deployment and evaluation of nurse ePrescribing.

Krozen et al. (2011) report eight countries have implemented nurse prescribing over a number of years with differing jurisdictional controls and use of prescriptive authorities. Prescriptive authority types include a) Independent jurisdictional control (b) Collaborative or supplementary control and c) Medical or patient group directives. In some instances more than one approach is adopted for



example the United Kingdom or Spain<sup>2</sup> has used all three approaches. epSOS reports 23 countries are currently engaging in piloting of patient summary ePrescribing and eDispensing programmes (see Appendix 1 epSOS Work Package D1.4.2 Country Status Outline and Template Specification). It is however unclear how the nursing profession is engaged with many of these pilot programmes in individual countries. Publications sourced report that practitioners in Norway, Spain, Finland and the United Kingdom are actively engaged in implementation of ePrescribing (Kivekas et al 2014; Wassink 2010; Lyngstad et al 2014; Quintanilla 2012). Critical factors impacting on the process of implementation articulated from practitioners in the ENS4Care WP 5 Survey of clinical practice includes **change management, benefit realisation, education and training** programmes. Jurisdictional and legislative frameworks and ensuring that appropriate hardware and network capacity have been established were also noted as important within the survey respondents. These critical factors will be explored in more detail in the proceeding sections. Figure 2 offers a visual representation of the three perspectives used in the following section to discuss the case studies selected within this clinical guideline.

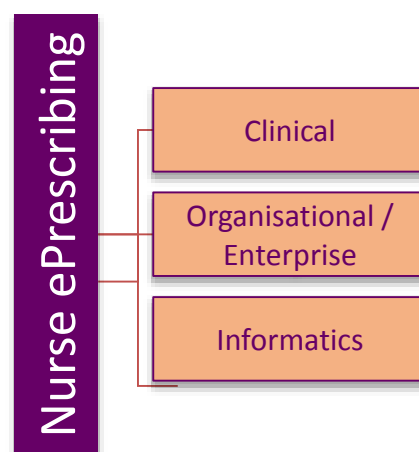


Figure 2 Three perspectives of nurse ePrescribing for cases selected

The rationale for the adoption of this structure has been informed by the existing practices described within the ENS4Care Survey Tool as recommended by evaluation document D1.8. We have opted to use case studies in each section. Case studies are useful for developing and testing problem-solving skills. They are used in this clinical guideline to demonstrate the theory presented within the nursing context that nurse leaders and policy makers may consider in order to achieve the desired outcome: a clinically pragmatic nurse ePrescribing system. Case studies are also contextually rich from a citizen's perspective as they locate the citizen at the centre of the guideline development process. In the proceeding sections we present the cases from clinical, organisational and data (informatics) viewpoints.

<sup>2</sup> In Spain, the legislation in this field establishes an autonomous and a complementary modality (through joint protocols with medical professionals). In addition, some regions, such as in the case of Andalusia, the specific legislation establishes prescribing by specific patient groups (please see DECREE 307/2009, 21 July 2009, within this nurses' tasks are defined in the field of the pharmaceutical provision of the Public Healthcare System of Andalusia).  
[http://www.juntadeandalucia.es/salud/export/sites/csalud/galerias/documentos/c\\_5\\_c\\_4\\_innovacion\\_en\\_organizacion\\_y\\_prestacion\\_de\\_servicios/decreto\\_307\\_09\\_prescripcion\\_enfermera.pdf](http://www.juntadeandalucia.es/salud/export/sites/csalud/galerias/documentos/c_5_c_4_innovacion_en_organizacion_y_prestacion_de_servicios/decreto_307_09_prescripcion_enfermera.pdf)

### Case Study One: Nursing ePrescribing Clinical Context

In this section a simple scenario on nurse ePrescribing is presented from the Republic of Ireland, the aim of which is to depict the care flow of a community nurse episode of care which includes a nurse ePrescribing intervention. This scenario has been purposefully devised by an experienced nurse practitioner who has a recognized qualification in nurse prescribing (RNP- Registered Nurse Prescriber in Ireland). As the legislation for Unique Health Identifier (UHI) is in progress and not fully legislated in Ireland full Nurse ePrescribing is not yet deployed.

Nurse ePrescribing is context dependent and so there are one to many care flows that could be described in this scenario. However, we have opted to describe a nurse ePrescriber practicing from a community environment which depicts the cases that have been included in the ENS4Care Survey Tool. This case study has been purposefully selected as it is representative of a significant number of survey responses from the ENS4Care survey tool. It also describes the current state of nurse prescribing practice per se within Ireland since 2006, when legislation was initially introduced (HSE, ONMSD, Prescribing Toolkit 2009). A total of 12 participants describe their experiences and current level of involvement in nurse prescribing in Ireland across different domains of practice including, paediatrics, mental health and acute general services. For a detailed analysis of the survey please see ([www.ens4care.eu](http://www.ens4care.eu)). In this guideline we offer a graphical representation of how the intervention is implemented (the ePrescribing activity) and identify the benefits and facilitators as identified by the practitioners themselves.

**Case Study One (CS1)** offers insights into phase one deployment of a Nurse ePrescribing system at a national level i.e. first steps to consider in national deployment of *Nurse ePrescribing - A Clinical Viewpoint*. The case study below depicts Michael's episode of care complemented by key criteria identified within Ireland for nurse prescribing.



Michael Walsh is a 74 year old married man living with his wife, Mary. He has been attending the Consultant Geriatrician in the local day hospital over the past two years. He is not receiving any community supports. He has a medical history of hypertension, ischaemic heart disease and a recent diagnosis of osteoarthritis. His current medications include an antihypertensive, a beta-blocker and a statin. He has failed to attend the Day Hospital for his last two allocated appointments. Following a call from the nursing team his wife stated it was due to him not being well enough to travel.

<b>Day 1</b>	Michael was discussed at the multidisciplinary team meeting in the Day Hospital due to him missing two recent appointments. It was decided a home visit to review his current status was required. A referral was made to the Advanced Nurse Practitioner (ANP) to carry out the visit.	<p>Guidance to Nurses and Midwives on Medication Management (2007) NMBI (formerly) An Bord Altranais</p> <p>Section 1.2 Key Principles</p> <p>Medication management activities performed by the nurse/midwife may vary, depending upon the individual patient/service user situation, the health care setting, its policies and protocols and the scope of practice of the nurse/midwife. The key factors to be considered when determining the scope of practice for nursing and midwifery care also apply to the scope of practice for medication management. These include:</p> <ul style="list-style-type: none"> <li>• Competence</li> <li>• Accountability and autonomy</li> <li>• Continuing professional development</li> <li>• Support for professional nursing and midwifery practice</li> <li>• Delegation</li> <li>• Emergency situations</li> </ul>
<b>Day 2</b>	The referral was received by the ANP who contacted Michael and a home visit was arranged.	<p>Standard 1.2 Key Principles</p> <p>Each nurse/midwife is expected to develop and maintain competence with regard to all aspects of medication management, ensuring that his/her skills, knowledge and clinical practice are up to date. The activities of medication management require that the nurse/midwife is accountable to the patient/service user, the public, the regulatory body, his or her employer and any relevant supervisory authority. This relates to both actions and omissions and uses clinical judgement and decision making competency skills.</p>

#### Day 4

Home visit: Michael was in bed and feeling unwell. Over the past couple of weeks there was a decline in his mobility due to pain in his knees. His main complaint was being very hot, cough and having no energy for about 10 days. His wife also noted a degree of confusion in previous twenty four hours.

Following a comprehensive assessment and detailed physical examination it was revealed Michael had a high temperature, upper respiratory tract infection (URTI) and pain in joints due to osteoarthritis. The following treatment was prescribed by the ANP who is also a Registered Nurse Prescriber:

-Antibiotic therapy - for URTI for ten days. It was established Michael has no known allergies to any medications.

-Paracetamol - for high temperature for ten days  
Analgesia - Paracetamol will also help with pain in knees as Michael was currently on no analgesics.

The prescription for the above medications ***was written by the ANP on a community prescription pad and given to his wife to fill at the local pharmacy.*** Education on the correct use of the medication and the importance of completing the full course of antibiotics was also explained to Michael and his wife. The ANP will liaise with Mary over the following days to monitor progress.

Home circumstances were very good and supported all Michael's needs. There was no need for outside supports at this time however a report was sent to the local PHN (Public Health Nurse) to inform her of the recent intervention. Details of the prescription were entered onto the national nurse prescribing database on return to the nursing office. A report of the intervention was sent to Michael's Geriatrician.

#### Standard 2.4 Electronic Prescribing

Electronic prescription writing is considered acceptable if the clinical standards for legal and best practices are realized.

The computer generated prescription must be dated and signed by the medical practitioner or registered nurse prescriber in his or her own hand writing.

#### Standard 1.3 Five Rights of Medication Administration

The prescription or medication order should be verified that it is correct, prior to administration of the medicinal product. Clarification of any questions regarding prescription/medication order should be conducted at this time with the appropriate healthcare professional. The expiration date of the medication should be checked prior to administration. Expired medications should not be administered.

The 5 Rights of Medication Administration should be applied for each patient/service user encounter:

1. Right medication
2. Right patient/service-user
3. Right dosage
4. Right form
5. Right time

#### 1.6 Patient / Service User Education

Education should be provided to the patient/service user/carers in relation to the use of medicinal products. It should be explained to the person in a way that is accessible and understandable.

Information should include:

- The expected mechanism of action of the medicinal product
- Potential side effects
- Signs and symptoms of potential adverse effects and actions to take if they occur
- Possible interactions of the medicinal product with other medications, particular food or other substances
- Precautions or instructions to follow, including time, route, and method of administration and storage of medicinal products
- Significance of adherence to prescribed therapy (duration and frequency)
- Recommendations for follow up and reporting of potential side effects or adverse reactions.

**Day 11** Michael was reviewed at home again by the ANP. Following assessment and physical examination it was determined his condition had greatly improved. Michael's temperature was in normal range and his chest was clear. The new onset of confusion had also resolved. His mobility had also improved with the regular analgesia. His energy levels were also better. Michael was reminded to complete the course of antibiotics. As the prescription for Paracetamol was initially for ten days and proved to be effective for management of pain in knees a further prescription was written for twenty eight days' supply. The effects of this will be monitored at his next outpatient appointment in three weeks' time. Michael can contact the ANP by phone in the meantime should it be required.

A prescription for Paracetamol was written by the ANP on a community prescription pad and given to his wife to fill in at the local pharmacy. Education on the correct use of the medication was given and the importance of taking the medication regularly also explained.

Details of the prescription were entered onto the national nurse prescribing database on return to the nursing office.

A report of the intervention was sent to Michael's Geriatrician in the Day Hospital. The ANP will review Michael at his next visit to the Day Hospital.

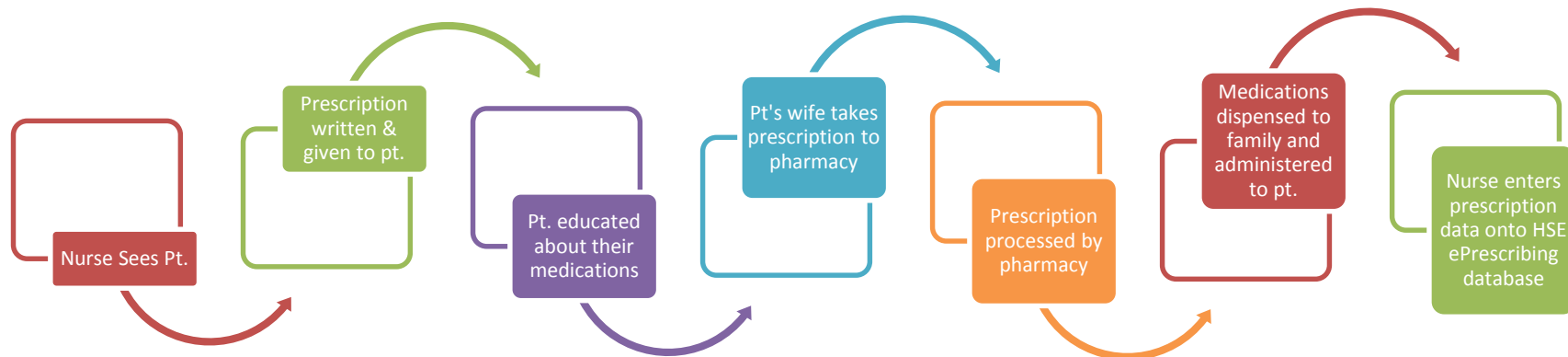


Figure 3 Activity flow nurse ePrescribing **Level 1** Case Study 1

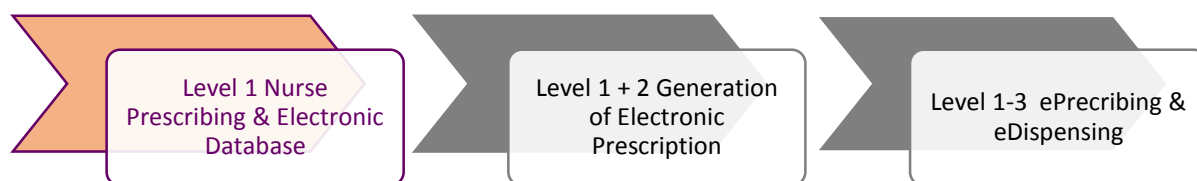


Figure 4 Case Study 1 - **Level 1** of nurse ePrescribing

The screenshot displays the 'New Prescription' form within the HSE Nurse prescribing programme. The form includes fields for Patient Name (Test MR), IPN (54321), Grade (Clinical Nurse Specialist), Clinical Area (Emergency Department), Site (Test Hospital), Date (17/Jun/2008), Shift (Afternoon (12:00-13:00)), and MMR (BN123). It also features a 'Prescription Item' section with dropdown menus for Medicinal Product (ABACOR), Dose (2.5), Unit (grams (g)), Per (litre (l)), Frequency (once daily), Route (orally (PO)), and Clinical Indication (Influenza). A 'Complete Prescription' button is visible at the bottom right.

Figure 5 HSE Nurse prescribing programme screenshot



**Benefits**  
Quality of Care  
Patient Safety  
Citizen Empowerment  
Time



**Facilitators**  
Education Training Changes in Policies  
IT Infrastructure

Figure 6 Case Study 1 benefits and facilitators

For additional information see Report on the Review of Nurse Midwife Prescribing Data Collection System (HSE, 2014) [see this link](#)

## Level Two: Nurse ePrescribing + Generation of ePrescription

In 2006 the Irish Medicines Board Act (Miscellaneous Provisions), 2006 (N0. 3 of 2006), and the Medicinal Products (Prescription and Control of Supply) (Amendment), regulations 2007 (SI201 of 2007) gave legal authority to nurse and midwives to prescribe medications based on the following conditions being satisfied:

1. Nurse/Midwife is employed by a health service provider in a hospital, nursing home, clinic or other health service setting (including any case where the health service is provided in a private home)
2. The medicinal product is one that would be given in the usual course of service employed in the healthcare service setting in which the nurse is employed.
3. The prescription is issued in the usual course of the provision of that health service
4. The NMBI Registration No also known as the Personal Identification number (PIN) must be stated on the prescription

### **Ref Guidance to nurses and midwives on medication management, 2007 p.7**

The Nursing and Midwifery Board of Ireland (NMBI) (formerly An Bord Altranais) is invested with the power to provide professional regulation for nurse and midwife prescribing. The professional regulatory framework was effected through the changes to the Nurses Rules in 2007, which created a new division of the Register for Registered Nurse Prescribers. NMBI has provided regulation for:

- Education
- Registration
- Clinical competence
- Clinical governance

For a nurse or midwife to have prescriptive authority in Ireland and to become a registered nurse prescriber (RNP), he/she must have successfully completed an approved education programme. In Ireland a number of academic institutions have been formally accredited by the Irish Nursing and Midwifery Board to offer this programme of study. Further information on nurse and midwifery prescribing programmes of study is available from [here](#). From the service perspective a number of set criteria must also be in place. A comprehensive set of resources are available to view on Nurse and Midwifery Prescribing, we recommend viewing the documents outlined below from the clinical viewpoint which is presented within this section. Irish Nurse Prescribing Tool kit is available from [here](#) and the references are contained within the reference list at the end of this document. Similarly the Nurse Prescribing CNS RNP Survey is available from [here](#) and/or in the reference list.

## Case Study Two: The Organisational or Enterprise Viewpoint

Case Study Two presents the organizational viewpoint of a health ecosystem that offers a view of Nurse ePrescribing in process. One of the case study respondents (ENS4Care Survey) reported on this particular nurse ePrescribing programme and a site visit to the service was arranged to discuss the current practice interventions. The organization [Caredoc](#) was originally established in 1999 and is an example of how healthcare professionals within one regional healthcare setting can integrate 24 hour patient centred care across local regions. This case study has been included as it presents phase 2 of a nurse ePrescribing deployment as part of an integrated healthcare record solution as opposed to a standalone Nurse ePrescribing database as is the case presented in Case Study One.



In this case study key challenges to deploy nurse ePrescribing at enterprise level such as the required unique health identifier is overcome by contingency planning across a number of private and public healthcare institutions. For example the adoption of a dot-matrix printer to dispense prescriptions in triplicate addresses one issue with data records. This approach will be replaced once the legislative framework introduces the health identifier and cloud based services are introduced to accommodate interoperability across different service providers such as general practitioner, pharmacist and community intervention team services.

**Case Study Two** is of particular interest to this clinical guideline as it offers an example of current best practice on nurse ePrescribing across and between healthcare service providers in Ireland. This case also demonstrates effective nursing leadership in action with indicators on tactical patient outcome that relate to sharing clinical information that is cost effective and efficient. Caredoc's use of effective role modelling underpins the organizational approach and demonstrates not only a cost effective practice but also a service which is valued by the citizens over time. As of May 2014 Caredoc provides a number of out of hours services to 1.6 million people and 410 General Practitioners in Ireland. These figures constitute approximately 25 per cent of the Irish population. Case study two presents nurses practicing in a dual role. The nursing team operating as part of the multi-disciplinary team plays a pivotal role in the service provision, decision making and the associated governance structure which is presented in Figure 7 as an overview of the organizational governance framework of Caredoc. The Caredoc Clinical Governance team comprises of:

- 2 General Practitioners (Medical Directors)
- 2 Directors of Nursing and Operations
- Clinical Nurse Managers Level 1 and Level 2

Core activity of the Caredoc team includes the development and maintenance of clinical best practice guidelines and protocols, supervision of clinical audit, in tandem with evaluation and reporting of key performance indicators. The Drugs and Therapeutic Committee shown in Figure 7 is a key requirement for all services to have in place which offer Nurse ePrescribing within Ireland. It is worthwhile in this organizational viewpoint to offer some examples of the criteria for business planning and service needs analysis all of which require careful implementation at organizational / enterprise level. The links included here to HSE (Health Service Executive, Ireland) provide practical guidance documents on business planning and identification of service needs. Both of these documents were used to inform and support nurse and midwife medicinal product prescribing as legislated in Ireland:

- Business Plan  
The Guiding Framework for the Implementation of Nurse and Midwife Prescribing in Ireland; Document is available from the HSE web site and from the reference list
- Service Needs Analysis  
The Service Needs Analysis for the Implementation of Nurse and Midwife Prescribing in Ireland is available from the HSE web site and from the reference list



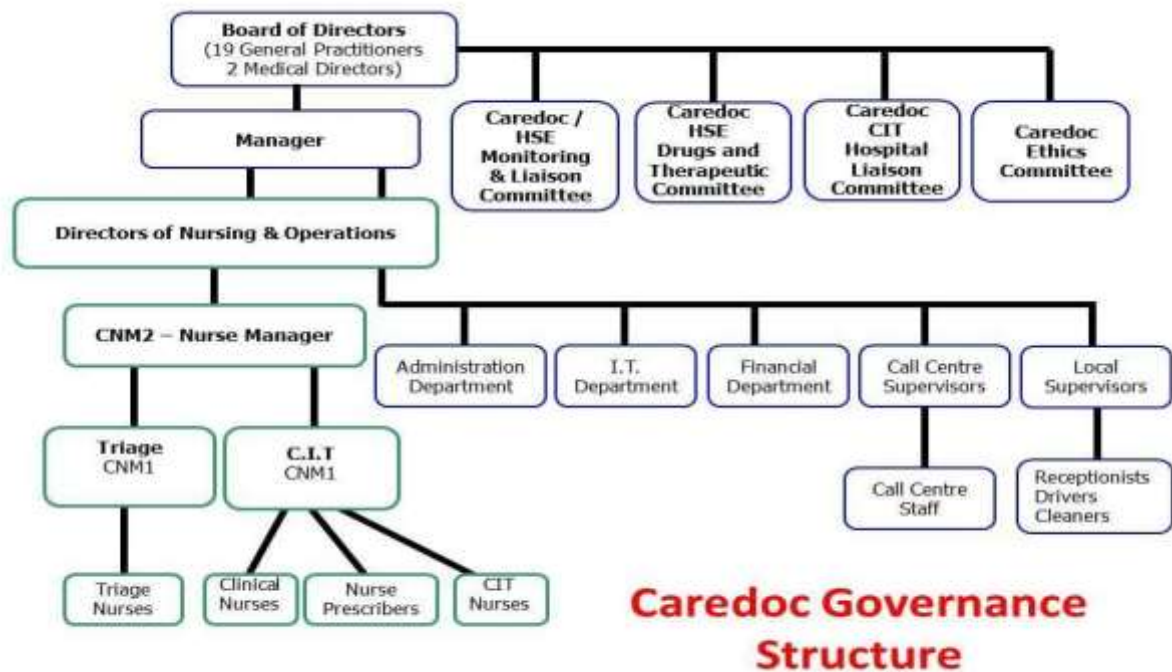


Figure 7 Caredoc governance structure (reproduced with permission of Caredoc)

In addition, Figure 8 offers a high level overview of Caredoc's Healthcare Platform in which nurse ePrescribing is integrated. Whilst the unique health identifier is awaited in Ireland they adapted their approach to proceed with automating Nurse ePrescribing in the following manner.

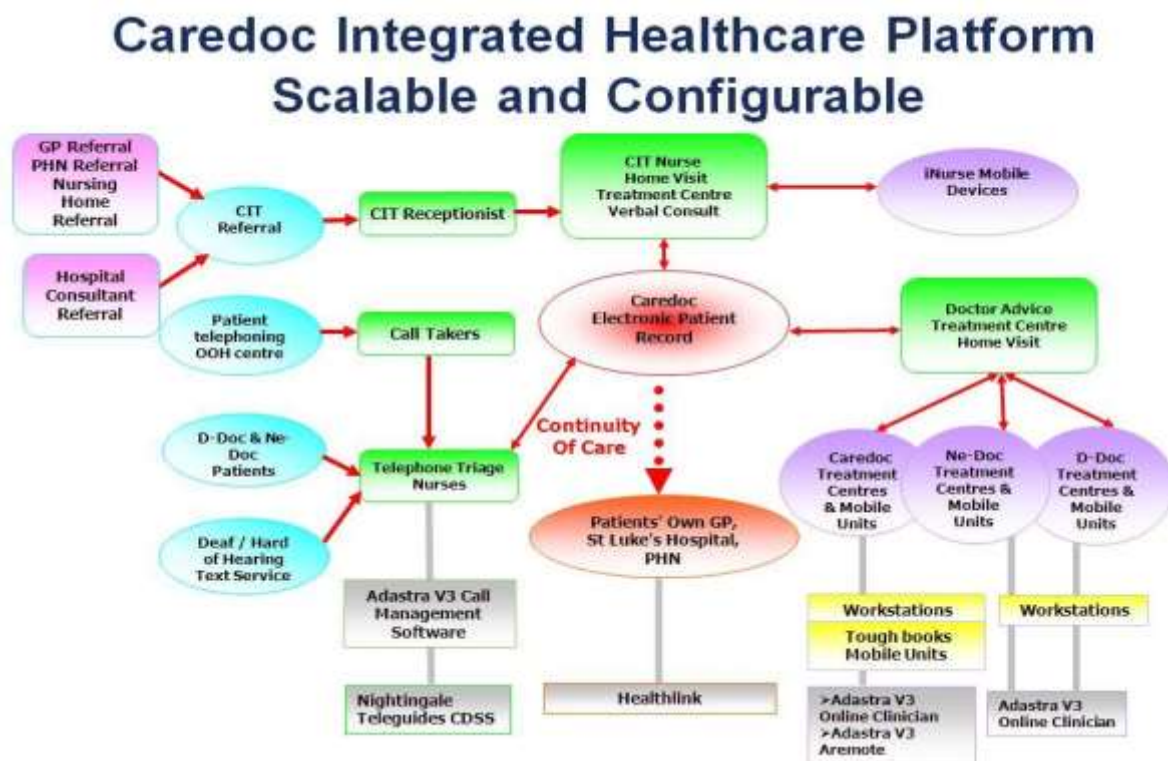


Figure 8 Caredoc integrated healthcare platform (reproduced with permission of Caredoc)



At 1700hrs Michael's wife calls Caredoc remote access clinic for advice out of hours, as her husband Michael is increasingly confused and agitated.

#### Episode of Care

Nurse triages Michael in remote assessment centre using clinical decision support software as urgent (requires to be seen within 2 hours) and an appointment is booked in the local after hour's service unit for 1900hrs. Michael is seen by the Registered Nurse Prescriber at 1910 hrs and following a comprehensive assessment is diagnosed with a urinary tract infection. The nurse prescribes Trimethoprim 100mgs PO for 7 days and then prints the prescription on the dot-matrix printer which is used to address patient care reimbursement scheme (PCRS) which is in operation in Ireland.

#### Section 4 Medication Protocols

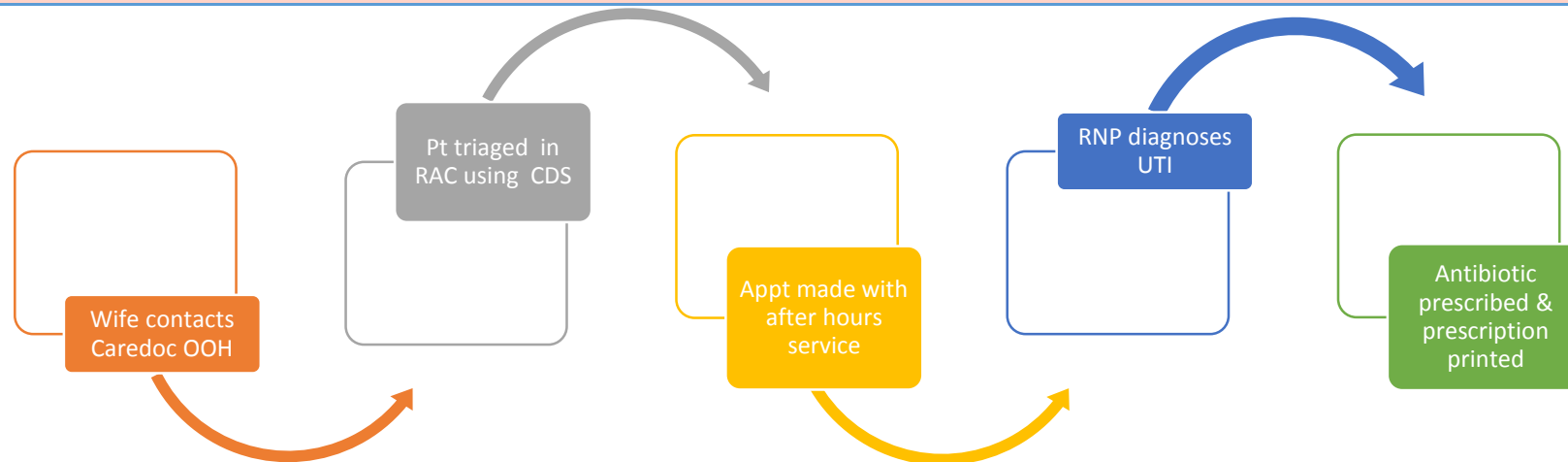
Medication protocols must be developed based on evidence of best practice and supported locally by a multidisciplinary team (i.e. senior doctors, pharmacists, nurses and midwives and healthcare managers). In respect of Caredoc a multidisciplinary drugs and therapeutic committee has developed best practice management and nurse prescribing in conjunction with national guidance from INMB. The medication protocol should adhere to particular standards, such as identifying who is responsible and competent to implement the protocol; specific exclusion, and inclusion criteria should be stated and should include a review date for evaluation.

The legislative basis for medication protocols for the supply and administration is available from relevant EU/national boards e.g. Irish medical board & EU (this excludes controlled drugs). Legislative frameworks for ePrescribing and eDispensing are currently being developed.

The responsibility for developing and quality assuring medication protocols rests with health service providers. It is important that local policies are devised to support the development and implementation of any medication protocols for patients/service user care. Provisions should be made:

- To enable nurses, midwives and members of the multidisciplinary healthcare team to devise and implement medication protocols where there is service need
- To enable the education and training of nurses and midwives.
- To disseminate information to all members of the healthcare team regarding organisational policies underpinning the use of medication protocols
- To establish review and audit processes to evaluate the use of medication protocols as part of quality care / risk management programmes.

These key provisions should be in place to facilitate nurses and midwives in safe practices for the supply and administration of medication utilising a medication protocol. Within Caredoc Nurse Prescribers work according to their collaborative practice agreements (CPA).



OOH = Out of Hours Service, RAC = Remote Access Clinic, CDS = Clinical Decision Support

Figure 9 Case Study 2 - **Level 2** of nurse ePrescribing

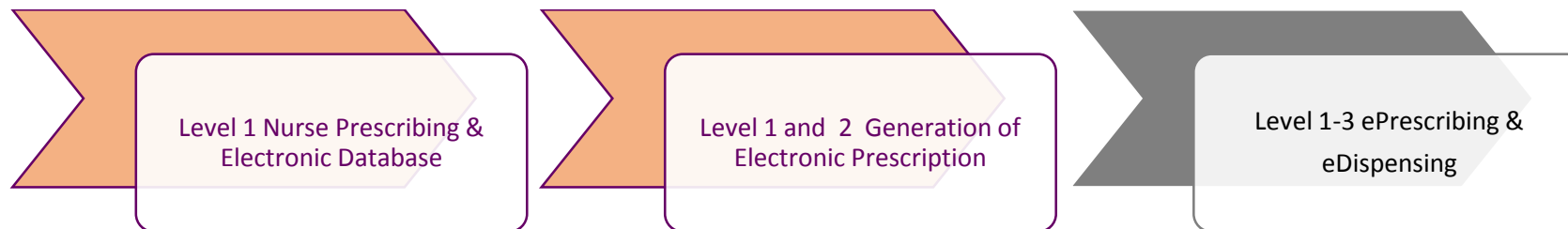


Figure 10 Case Study 2 depicts **Level 2** of nurse ePrescribing

Identification of work around strategies to address temporary omissions in legislative frameworks is important to facilitate ongoing development of processes to address issues that arise when challenges which can be associated with long implementation chains in programme development occur. The introduction of the dot matrix printer is one example which provides a workaround solution to facilitating primary care reimbursement in Ireland whilst legislation on health identifier is in process in Ireland.

GENERAL MEDICAL SERVICES				PRESCRIPTION FORM							PHARMACY SEQUENCE NO.		
NAME AND ADDRESS OF PATIENT Joe Bliggs Dublin Road Kilkenny				PATIENT'S NUMBER AND CODE LETTER A 1 2 3 4 5 6 7							DOCTOR NUMBER 62222		
DATE 10/11/12											GENERAL CONTROL REGISTRATION NO.		
Prescribe strength, quantity and dosage must be stated				Age if under 12 years				Years		Mths		NP	
co-amoxiclav (amoxicillin 125mg/5ml and clavulanic acid 31mg/5ml) suspension sugar-free				PHARMACIST MUST COMPLETE THIS PART Month Dispensed							Qty. supplied		
1 item(s) on form only											This column is for clinical use only		
Reg. Nurse Prescriber (R.N.P.) Signature:													
R.N.P. Pin Number:													
Printer R.N.P. Name (Block Capitals):													
Issued By:				PHARMACY STAMP AND COMPUTER NUMBER							SERIAL NO.		
CARE DOC ST DYMUNA'S HOSPITAL ATHY ROAD CARLOW											CP02855		
DOCTOR'S SIGNATURE				RECEIVED BY									

Figure 11 Image of the ePrescription generated by dot matrix printer (reproduced with permission of Caredoc)



Figure 12 Dot matrix printer (reproduced with permission of Caredoc)



**Benefits**  
Patient Safety - Allergy  
Security Audit



**Facilitators**  
Legislation Implemented  
PCRS

Figure 13 Case Study 2 **Level 2** benefits and facilitators

## Level Three: ePrescribing + eDispensing

### Case Study Three: The Informatics Viewpoint

Case Study Three (CS3) has been selected as it provides insight to the third and final viewpoint within this clinical guideline – the data/ informatics view. It has been selected to represent the Spanish National Programme for nurse ePrescribing which is currently in implementation mode. This case study also presents a summary view of key reference documents and resources that the reader may wish to review. Some sample figures that describe the business and information flow of an ePrescribing system required as part of a national Electronic Health Record solution are also illustrated from the informatics literature base.

The Spanish Nurse ePrescribing system is facilitated by the Spanish General Council of Nurses and has been devised by the Council through the management platform of good nursing practices. In the survey response the programme reports that the nurse ePrescribing project has completed a pilot training programme over the past three years and at the time of completing the survey 125,000 nurses have been through the programme. Core requirements include the use of mobile technology e.g. Tablet and Internet connection. A centralized database is in place to facilitate data sharing between users. Key factors underpinning the design approach include connecting the ePrescribing system to a formal nursing language repository such as [IHTSDO](#). A training needs analysis identified that both technical skills and educational programmes were required. Resulting in a six module post graduate training course further information on which is available from <http://www.campus.e-nursingbestpractices.com>

A paper by Quintanilla (2012) reports that four regions have introduced ePrescription: Andalusia, Extremadura, Balears and Catalonia. Commencing in 2003 in Andalucía the Spanish Ministry of Health has reduced the attendance to medical services across the four regions by 30% and has dispensed 139 million electronic prescriptions by 2012. This paper reports that more than 7 million citizens in Spain are treated by healthcare professionals that have an electronic prescription service. Initial funding provided amounts to a total of 195.2 Million Euros. The breakdown of funding allocation is as follows: 55 million Euros (provided by industry), 4.6 million provided by Health and 93.6 Million from the individual regions that wish to join the programme. Whilst different applications that support the electronic prescribing programme in the four regions are in place the functional model seen in Figure 14 is described in the article to depict the prescribing activity in process.

The Spanish General Council of Nursing, as competent authority and regulatory body of the nursing profession in Spain, has developed a digital platform to contribute to the achievement of the motto of its organization, i.e. 'Protecting people's health and ensuring patient safety through an ethical, autonomous and competent professional practice'. This tool provides nursing professionals with a mine of information that allows an appropriate management of nursing knowledge while facilitating clinical practice with safety guarantees, both for professionals and for users.



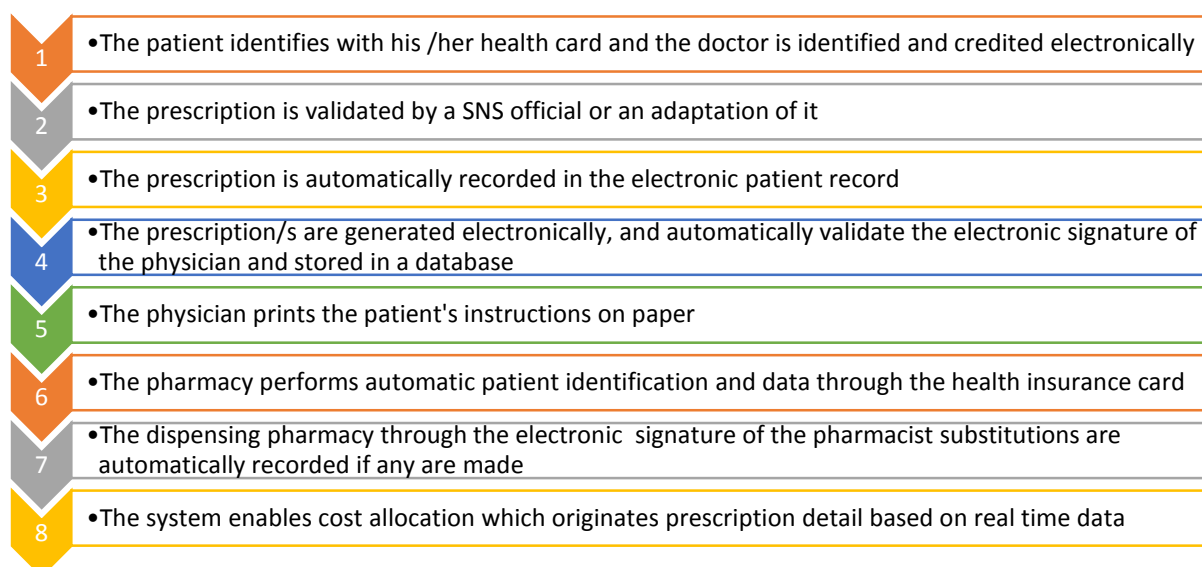


Figure 14 Functional model depicting prescribing activity

Knowledge management is based on the inclusion of powerful databases to allow a permanent update of knowledge while improving the working methodology and healthcare outcomes for citizens. The platform 'for the management of good nursing practices' contributes specifically to the fulfilment of Directive 2013/55/EU of the EU Parliament and of the Council of 20 November 2013, amending Directive 2005/36/EC on the recognition of professional qualifications and Regulation (EU) n. 1024/2012 on administrative cooperation through the Information System of the Internal Market. This Directive establishes in the new paragraph of Art. 31 that 'The educational qualifications for general care nurses shall accredit that the professional in question is at least capable of applying the following competency: Competence to independently diagnose the necessary nursing care using the relevant theoretical and clinical knowledge.' Therefore, the platform for the 'management of good nursing practices' gives a clear answer to this Directive since it includes the language relative to the Nursing Diagnosis, which allows nursing professionals to diagnose the nursing care needed by the citizens they provide care to. Thanks to this, the citizen receives care based on the scientific method and hence on evidence that can be assessed and is outcomes-oriented.

This tool also provides key elements that contribute to the achievement of one of the objectives included in the Directive proposal 2011/24/EU of the European Parliament and of the Council of 9 March 2011 on the application of patient rights in cross-border healthcare: 'To monitor that the relevant quality, safety and efficiency requirements are ensured in cross-border healthcare.' Hence, the platform 'for the management of good nursing practices' provides standardized nursing care guidelines, protocols and procedures that allow the provision of high quality evidence-based care and a real vision for its application in clinical practice.

Moreover, this tool ensures appropriate pharmacological and therapeutic care as it also includes powerful medicines databases, which constitute an essential element both to control and to follow up pharmacological treatments as well as – when the legislation so allows – to ensure nurse prescribing with high levels of safety. The achievements of the platform for the management of good nursing practices as regards nurse prescribing include:

- To maximize effectiveness
- To minimize risks
- To minimize costs
- To respect citizens' opinions

This way a response is given to the provisions of Execution Directive 2012/52/EU of the Commission of 20 December 2012, which establishes measures to facilitate the recognition of prescribing forms issued in another Member State, since information on drugs provided by the Official Medicines Agencies can be shared. It should be highlighted that this platform also provides safety elements for pharmacological and therapeutic vigilance giving an answer to the provisions of Directive 2010/84/EU of The European Parliament and of the Council of 15 December 2010, amending, as regards pharmacovigilance, Directive 2001/83/EC which establishes a European code on drugs for human use reminding us in its recitals that 'Pharmacovigilance rules are necessary to protect public health as well as to identify and assess adverse reactions to the drugs marketed in the European Union.'

### General features

- Safety and confidentiality
- Traceability
- Interoperability
- Standardization / Normalization
- Avoids 80% of iatrogenic effects
- Supports primary and specialized care processes

Figure 15 General features

To conclude, it is a tool aimed at managing good nursing practices including both nursing knowledge to ensure safe clinical practice as well as pharmacological follow up and prescribing by nursing professionals, as a commitment to better fulfil European regulations. Some examples of prescribing forms are shown below and access to a demonstration area is available from [here](#).

Organización Colegial de Enfermería		RECETA OFICIAL PRIVADA DE ENFERMERÍA		COLEGIO OFICIAL DE ENFERMERÍA DE CORUÑA (L.A)	
Sello de la institución (si procede)	Enfermero: Jose Luis Cobos Serrano		Nº Colegiado/a: 121212121		Fecha y Firma:
	Especialidad: Enfermería Obstétrico-Ginecológica		Población: Madrid		21/05/2010
	Dirección: C/ FUENTE DEL REY N° 2		E-Mail: jicobos@enfermundi.com		
	Provincia: Madrid		Teléfono: 913345520		
PACIENTE: Pepe Perez		AÑO DE NACTO.: 1930		DNI: 121123445	
VOLANTE DE INSTRUCCIONES DE PACIENTE	Cod. Prescrip.	Nº env.	PRESCRIPCIONES: (consigna el medicamento -DCI o marca-, forma farmacéutica, vía de administración, dosis por unidad y número de unidades por envase)		
	7290797	1	NOLOLIL 575 MG, 10 CAPSULAS DURAS		
	7712206	1	IRUXOL MONO, POMADA, 1 TUBO 15 G		
	3446143	1	ABSORB INCONT. ORINA DIA ANAT. INDASEC PANT. 10 U (T-G)		
Clase de Paciente (si procede): Dolor ocasional leve o moderado; Deterioro de la integridad tisular; Incontinencia urinaria de urgencia					
Instrucciones para el paciente:					
SUSTITUCIONES (sustituyo por):					
Farmacia (datos de identificación, fecha de dispensación y firma)					
Firma del Farmacéutico:					
El paciente será obligado a mostrar este volante en la G. Farmacia en los supuestos de sustitución del medicamento prescrito, y lo conservará durante el periodo de validez del tratamiento.					
					

Figure 16 Example of prescribing form 1

Sistema Nacional de Salud			
<b>Dps.</b> <small>(Consiguar el producto. En caso de medicamento: DCl; forma farmacéutica, vía de administración, dosis por unidad, nº de unidades por envase)</small> <b>DPS</b> 6636794 <b>Nº. enc.</b> 1 <b>PARACETAMOL APOTEX 1 G, 20 COMPRIM.</b>	<b>Duración del tratamiento:</b> <b>Posología:</b> <small>..... unidades/día</small> <small>..... horas</small> <b>21/05/2010</b>	<b>PACIENTE</b> (Nombre, Apellidos, Año de nacimiento, Nº de identificación) <b>Pepe Perez</b> <b>A.N.: 1930</b> <b>Nº SIP:12121212</b>	<b>ENFERMERO/A</b> (Datos de identificación y firma) <b>Jose Luis Cobos Serrano</b> <b>Col.: 121212121</b> <b>Sustituido por</b> (Fecha y firma del farmacéutico/a) <b>Información para el farmacéutico/a</b> <b>Interacción autorizada</b>
	<b>FARMACIA</b> (Datos de identificación, fecha, dispensación, firma) <div style="text-align: center; border: 1px solid black; padding: 10px;"> <b>JUSTIFICANTES DE DISPENSACIÓN</b> </div>		
<small>- Establecer de enfermería caduca a los DIEZ DÍAS. No será válida con envoltorios o raspaduras  - El beneficiario puede retirar en cualquier farmacia los productos sanitarios indicados</small>			

\*WA0000000175\*

Figure 17 Example of prescribing form 2

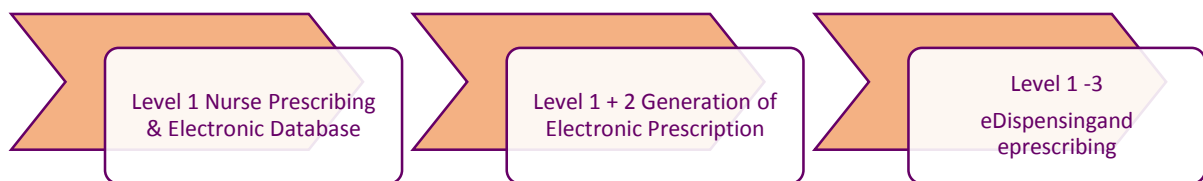


Figure 18 Case Study 3 depicts **Level 3** of nurse ePrescribing



Figure 19 Case Study 3 benefits and facilitators



One of the benefits identified in case study three includes cost effectiveness. A literature review on cost effectiveness of ePrescribing reported up on by Hahn and Lovett (2014) suggests that although studies revealing the cost effectiveness of ePrescribing are substantial, those effects are long term and relate to prospective cost savings for utilization. Cost effectiveness as a benefit for ePrescribing therefore needs to be seen over time after efficient training has been achieved.

The remainder of this case study describes the informatics viewpoint on ePrescribing and links to the EU literature relating to EHR that may be useful for readers to review over time. As informatics is a dynamic science readers are advised to recognize the resources included here may be subject to change in future years.

One of the most significant EU ePrescribing programmes delivered in the past ten years was epSOS which was introduced and discussed in the introduction of this document. The acronym epSOS refers to European Smart Open Services. As one of the first eHealth programmes epSOS pioneered much of the research on achieving cross border interoperability and at the time of writing this document many EU countries are in operational pilot mode with phase two of this programme scheduled for completion in Q2 2014, additional deliverables are anticipated. The videos included in eHealth and medication management section above demonstrates the care flow of data from the citizen and clinical perspective. The epSOS website offers a number of key references that are relevant to nurse ePrescribing including story boards which describe eDispensing and ePrescribing and discuss the associated legislation that must be addressed in different countries. One [example](#) includes a scenario on a **citizen travelling from Andalucía to Denmark** for one month's annual leave and the issues that arise in cross border prescribing. An important key resource produced by epSOS for review on ePrescribing to illustrate the core features that an ePrescribing system must include is available from [here](#). Whilst these examples do not refer to nurse ePrescribing the principles from an ICT perspective are the same regardless of role in the ePrescribing process. Engagement by nurse leaders with epSOS resources is important to ensure that the professional requirements are integrated in future informatics developments, we therefore offer a summary of some of the resources available in Appendix 1.

From an information architecture perspective two standards are more often used to achieve interoperability Health Level 7 (HL7) which incorporates Integrating the Healthcare Enterprise and EHRcom an EU standard which relates to Electronic Health Record communication. Figure 20 presents a view of the medication and dispensing prescription process. It depicts the four distinct business processes of medication management which are required to connect to each other in order for information to be transferred in the ePrescribing workflow process. Figure 20 is sourced from IHE Pharmacy Technical Committee (Integrating the Healthcare Enterprise) Community Medication Prescription and Dispense Technical Framework Supplement which is a useful resource to view and which is available from the following link [IHE Technical Frameworks -Pharmacy](#). Please note that documents published on this website are constantly under revision; in order to ensure you have the most recent publication check date and versioning.

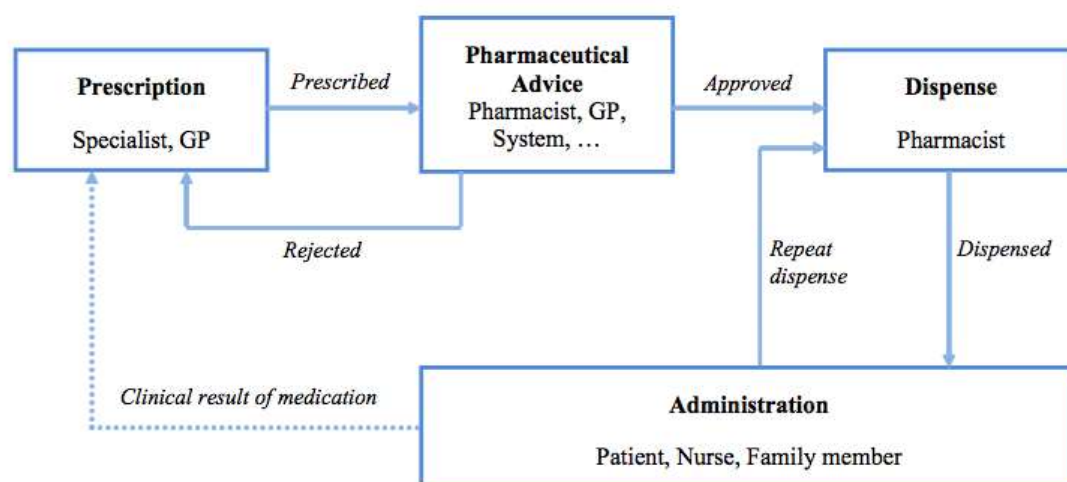


Figure 20 Medication prescription and dispensing process overview

Existing structures and healthcare service models are increasingly seen as not fit for purpose, particularly from an economic perspective with many EU member states health and social care budgets rising. As models of care change, so too does the delivery mechanisms related to them. The need for access to shared records of care is underpinned by a core requirement: interoperability. To achieve interoperability of health records health informatics standards are required. Table 1 lists some of the core health informatics standards devised relating to nursing and social care.

Standard Title	Relates to
Health Informatics Services Architecture EN12967	This standard offer a specification for a unified and open service architecture based on middleware of information services which is independent from specific applications /technology and capable of integrating common data and business logic. Further information is available from <a href="http://www.HISA-standard.org">www.HISA-standard.org</a>
System of Concepts for Continuity of Care Contsys EN3940	This standard defines the core concepts to support continuity of care. It supports the notion of semantic interoperability by defining core concepts and provides detail of work flow in context to support continuity of care across and between service providers.
International definition of personal health records ISO/ TR14292	A technical report created by International Standards Organisation which summarises current knowledge on the topic of personal health records
ISO 18104 Categorial structures for representation of nursing diagnoses and nursing actions in terminological systems to promote interoperability	A standard developed to support nursing diagnosis and nursing action and how they relate to each other. This standard identifies relationships between terminology models information models and ontologies within the domain of nursing

ISO 18308 Requirements for an Electronic Record Architecture	A framework standard which identifies the requirements to be met by the architecture of systems and services that process manage and communicate Electronic Health Record information.
ISO13606 Electronic Health Record Communication EHRcom	A framework standard which defines rigorous and stable information architecture for communicating part or all of an electronic health record for a single subject of care. This standard supports interoperability of systems and components that must communicate data via electronic messages preserving the original clinical meaning in a safe and confidential manner.
Health Level 7 HL7	A framework standard for the exchange, integration sharing and retrieval of electronic health information. Recognised as the most commonly used standard in the world for communication from one healthcare party to another

Table 1 Health Informatics Standards summary

### Planning for Nurse ePrescribing

Few EU Countries report that they have a full operational ePrescribing System implemented at a national level, however it would appear that most are in various stages of deployment, although jurisdictional conditions relating to prescribing varies across EU member states. Different workforce planning configurations as well as a shift in professional scope of practice predict the expanding role of the nurse to become registered nurse prescriber and to include ePrescribing as a priority. Whilst legal organisational and educational conditions are required to be in place across differing countries shared challenges relating to efficiency, tackling shortage of physicians, and unmet medication needs have led to the expansion of nurse prescribing (as opposed to ePrescribing) in a number of countries see Table 2 adapted from Kroezen et al 2011.

Year of Introduction of Nurse Prescribing	
1960's	United States of America
Early 1990's	Canada
1994	Sweden
1998	United Kingdom
2000	Australia
2001	New Zealand
2006	Spain
2006	Netherlands
2007	Ireland

Table 2 Source adapted from Kroezen et al 2011 p. 9

In earlier sections we presented a summary of key findings from the ENS4Care Survey Data and where appropriate signposted the reader to relevant key evidence relating to the nurse practitioners practice responses as outlined within the survey. In this section we now turn our attention to additional material sourced from a literature review completed in accordance with the set criteria from the ENS4Care Work Package 1 (WP1), which states that the guideline:

- Is based on the best available evidence
- Is appropriate to eHealth practices for nursing and social care
- Is devised using a process to develop gather and synthesise the available evidence and is logical, robust and free from bias

For clarity we also present the material in this section in accordance with the core principles and objectives defined for the work package namely the focus, impact, uptake and applicability of evidence and how it relates to planning, deployment and evaluation of nurse ePrescribing in EU Member States.

One of the most comprehensive online resources sourced on the topic of ePrescribing in this review is from the United Kingdom and available from <http://www.eprescribingtoolkit.com/tools/planning/>. This resource offers constructive advice on nine core areas relating to the topic of ePrescribing including planning, change management, measurements, supplier's procurement vendors and contracts in addition to staff training governance and policies. Included from this Toolkit are the ePrescribing building blocks presented by Bryony Franklin and Neil Watson.

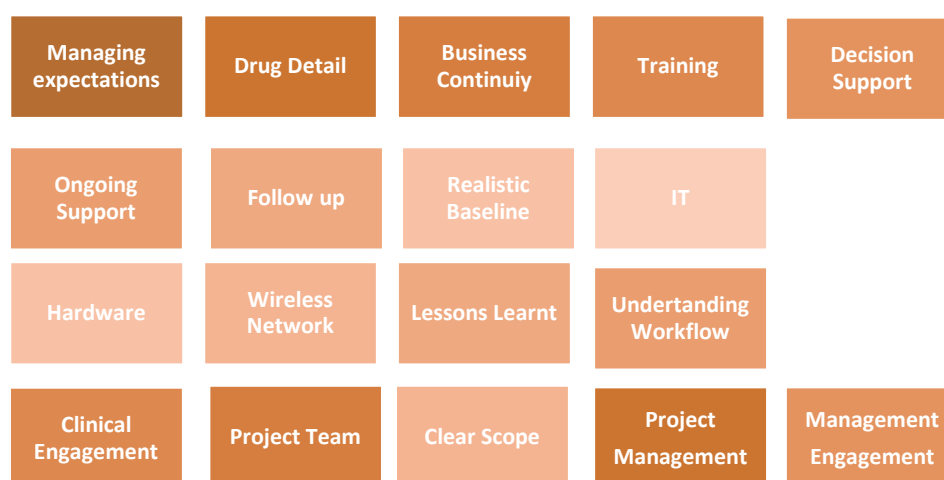


Figure 22 Source ePrescribing Tool Kit *Building blocks for ePrescribing* Franklin BD, Watson N

The key message arising from the aforementioned tool kit is to guarantee that a co-ordinated and cohesive approach is adopted, ensuring that time is allocated to safeguard that all relevant structures are in place to support the processes and actions required to realise tactical benefits for citizens. Planning and organisation of nurse ePrescribing therefore occurs within a wider framework of deployment more often relating to medication management and Electronic Health Record provision. A recent international review completed by the Health Information and Quality Authority in Ireland provides an overview of the current international state of implementation of ePrescribing ([HIQA 2012](#)). A premeditated approach adopted by the European Union has anticipated the requirements

within EU Member States. Whilst the following resources are not directly related to nurse ePrescribing they have a direct bearing on governance issues and data sets developed for nurse ePrescribing activity. They are briefly discussed in the following section with Ireland used as a case study demonstrating how the directives are being enacted into Irish Law.

### 3. Policy Context

The European Parliament and Council in 2010 published Regulation (EU) No 1235/2010 which includes legislative acts which relate to increasing transparency on pharmacovigilance issues. Specifically the changes include laying down Community procedures for the authorisation and supervision of medicinal products for humans and veterinary use and establishing a European Medicines Agency and Regulation (EC) No 1394/2007 on advanced therapy medicinal purposes. In July 2014 the governance process has been changed to implement this directive into Ireland and Irish National legislation enacted in 2012 was used to implement the EU Directive into Irish law. Included in Table 3 are linked examples of EU directives and related Irish Documents.

European Union Directive 2010/84/EU <a href="#">Directive 2010-84</a>
Pharmacovigilance rules for medicinal products and establishment of European Medicines Agency <a href="#">2010 Regulation</a>
Links to Irish legislation source <a href="http://www.hpra.ie/">http://www.hpra.ie/</a>
<a href="#">S.I. No. 272 of 2012 (Medicinal Products (Control of Placing on the Market) (Amendment) Regulations 2012)</a>
<a href="#">S.I. No. 273 of 2012 (Medicinal Products (Control of Manufacture) (Amendment) Regulations 2012)</a>
<a href="#">S.I. No. 274 of 2012 (Medicinal Products (Control of Wholesale Distribution) (Amendment) Regulations 2012)</a>

Table 3 Example of EU and legislative changes for ePrescribing

A clear objective for health services provision in the 21<sup>st</sup> century is for individuals with chronic illness and co-morbidity to have minimal hospital stays with maximum care at home. Practically this approach translates to more focused health and social care support using eHealth to facilitate access to critical data. From the individual citizen perspective, the concept of *Control* is acknowledged as an important factor, and one which will have a direct and significant impact on the future scope of the profession of nursing and social care practice. A key message that needs to be transmitted received and understood in eHealth systems development is that healthcare is now more than ever citizen centric, the [Irish eHealth strategy](#) published in 2013 is an example of this. Additional information about the wider European perspective is also available from [here](#).

### 4. Requirements to implement the guideline

As a component of EHR, medication management links directly with electronic prescribing as it encompasses governance issues which arise with the introduction of an ePrescribing activity. Particularly in regard to facilitating the safe and effective use of the medication prescribing processes including over the counter dispensing of medicinal products. Responsibilities of medication management incorporate the assessment, planning, implementation and evaluation of the nursing process in collaboration with other health and social care professionals in providing optimum care.

Currently EU member states are developing legislative frameworks to address the escalating costs of medication management. There is an increase in the use of generic medications which offer significant fiscal savings across EU member states. The European Medicines Agency offers a revised guideline in the acceptability of names for human medicines which will be processed through a centralised procedure. This guideline came into effect on the 1st January 2015 and is available to view from [this link](#). For additional insight into what medication management and ePrescribing activity involves we suggest you review the following video link on epSOS from a Danish use case study [video](#).

Gagnon et al argue the case that **implementation** plans require not only focused technical and organisational support but user group involvement that highlights views from pharmacists, nurses, managers and citizens. Such detail from key stakeholders requires careful examination (Gagnon et al, 2013). What follows is a brief review of evidence sourced from differing countries from a nursing perspective. Articles sourced and included offer evidence of ePrescribing activity in different EU member states includes Finland, Netherlands, Norway, Spain and Ireland.

In **Finland** all physicians in public healthcare have Electronic Patient Record applications including prescriptions which are administered to the ePrescription centre of the Finish Social Insurance Institution (KELA) see <http://www.kela.fi/web/en/sickness> for further information. Kivekas et al (2014) report on a regional Finnish development project which investigated how healthcare providers produce and receive information on a citizen's medication with a view to improving a number of key outcomes including the quality and effectiveness of healthcare services in regard to medication management. Data collection by interview and workshop (multiprofessional) indicated that only some professionals and care givers received medication management information. Critical issues such as medication reconciliation and information management were highlighted as posing a considerable risk for patient safety. Whilst the sample of participants was small (15 interviews and 42 attendees at workshops) this action research study demonstrates important insights in regard to deployment of ePrescribing applications;

1. Changes in medication information should be updated at every entry in order to make the new information available to all professionals with a legitimate concern in medication for the citizen, and
2. Challenges in upgrading existing organisational and regional systems are experienced specifically in regard to national standards and interoperability requirements (Kivekas et al p.177). The study also highlights the need for multi professional collaboration. The experience reported from this Finnish regional study would suggest that clinical governance structures as well as strong informatics architecture are critical factors for any deployment of nurse ePrescribing implementation programme.

The ePrescribing process between GPs and pharmacists is reported as being a regional routine in the **Netherlands** now for many years. Using the OZIS network a communication protocol facilitates sharing medication data in a regionally accessible electronic medication record. The Dutch are engaged with the work of epSOS (Wassink E, Netherlands eHStrategies Report, 2010 p.21) and videos mentioned in earlier sections of this guideline offer insight into the information flow of ePrescribing.



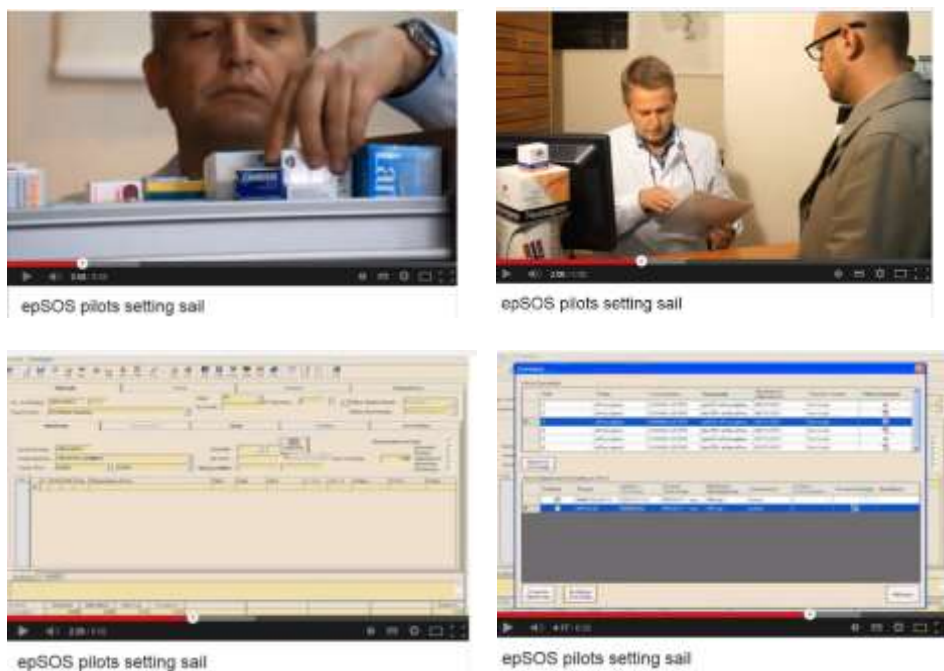


Figure 23 Screen shots of video (accessible from [this link](#) )

In **Norway** Lyngstad et al (2014) report on the experiences of home healthcare nurses and general practitioners in relation to the impact that electronic communication (including medications management) can have on patient safety to homebound citizens. This cross sectional study included 789 home healthcare nurses (425 in e-messaging group and 364 in the control group) with a response rate of 65% and 291 GP's (159 in e-messaging group and 131 in the control group ) with a response rate of 33%. Results demonstrate that there was a high agreement that e-messaging prevents errors and omissions. In regard to fewer medication errors the proportion of agreement was highest in both nursing groups with a slightly lower score for GP's (Lyngstad et al 2014, p. 392). Conclusions suggest that e-messaging leads to better communication and improved ability to prevent and reduce errors and omissions in care for home bound citizens.

A review of the involvement of **Spanish** nurses in secure electronic prescription is reported by Martinez (2012) who documented initial results of the pilot projects on specific sites which were selected to pilot ePrescribing as part of a national health system model in Spain. Reporting from four regions Andalusia, Extremadura, Balears and Catalonia findings indicate a decline in number of visits of citizens to health services by 30%. Using a healthcare card, the process is significantly streamlined for the citizen who more often only needs to attend the pharmacy rather than physician. Re-attendance to medical surgeries for repeat prescriptions has also been significantly reduced across all four regions. Nursing engagement in ePrescribing in Spain is reported in this document as both a process and structurally driven initiative. Key outcomes suggest that it strengthens the nursing professions scope of practice and includes controls over pharmaceutical budgets going forward. A significant point to note is that the scope of nurse ePrescribing includes medical devices and non-surgical matter such as incontinence pads and bandages.

Ireland as discussed earlier in this document whilst not possessing a fully operational eDispensing or ePrescribing programme has made progress on ePrescribing with the establishment of regulatory and educational infrastructure. Here we present recent publications in press which are of relevance to this

guideline as they support the theory of ePrescribing being a critical requirement in relation to patient safety.

Ahern et al (2014 in press) report on the frequency and preventability of Adverse Drug Reaction (ADR) related admissions to an Irish University Hospital. A sample of 1258 patients were admitted to the ED during the study period: 856 patients were included in the analyses of the study, 75 patients (8.8%) were deemed to have had an ADR-related admission (95% CI 7.0–10.9%). The results of this study indicate that Patients with ADR were taking a significantly higher number of drugs prior to admission compared with the non-ADR group. The patients in the ADR group were significantly older than those in the non-ADR group. Prescribers must therefore ensure that they use the lowest effective dose in the patient population of older persons and regularly review and monitor treatment.

## 5. Review of the guideline

In the final report on the review of NHS Connecting for Health programme in England, Sheikh et al (2011) noted that a key research recommendation for future eHealth programmes was to use independent evaluation strategies particularly focusing on the risks and benefits of eHealth. The authors argued the case when potentially useful interventions are implemented that they frequently fail to live up to their potential in the real world. A key issue cited in this comprehensive review is failure of programmes to integrate effectively with existing work patterns or for such initiatives to be adequately recognised as part of a wider change management reform programme. Sheikh et al suggest given the scale of such investment in differing countries, it is vital that every opportunity is taken to ensure that public money produces the desired outcomes in future eHealth initiatives (Sheikh et al 2011, p.12).

Supporting the recommendations of Sheikh et al (2011) is one approach entitled realistic evaluation. As an evaluation method it appraises interventions that involve change management such as ePrescribing. Realist evaluation science initially introduced in 1996 by Pawson and Tilley and later revisited by Pawson in 2013 in *The Science of Evaluation* (Pawson, 2013) advocates the adoption of a theory driven approach to evaluation. The comprehensive method proposed in realistic evaluation is often associated with the critical question '*what is it about a programme that works for whom, in what circumstances, in what respects over which duration*'. Scientific evaluation considers *context* carefully, for example what stakeholders are impacted upon, how can this programme integrate with the existing work patterns in a particular setting? The authors describe the specific intervention as a mechanism which is introduced into a specific context and once the aforementioned concepts context and mechanism are well defined and understood, the evaluation process then considers as a result of the implementation (mechanism) what the anticipated outcome in this particular contextual setting is. The authors entitle the process *a context mechanism and outcome configuration* (CMO). Once defined a CMO configuration can then be used as a framework to underpin the evaluation process. An independent evaluation team can demonstrate the identified constituent and interconnected parts listed in a CMO configuration which can act as a useful guide to the development process. In the social sciences this is described by Pawson as follows:

A CMO is a hypothesis that the programme works (O= Outcome) because of the action of some underlying mechanism (M= Mechanism) which only comes into operation in some particular context (C = Context). So if the right process operates in the right condition then the programme will prevail.



Pawson (2013) also recommends that programme teams when building a CMO configuration should situate the review on existing conceptual platforms, for example on what is already known on this topic (Pawson, 2013,p.161). We conclude this evaluation section by therefore linking with the extensive evaluation completed by the epSOS published in Q1 of 2014, and the reflections and recommendations that this summary of the evaluation reports completed by epSOS from 2008-2013.

The [epSOS deliverable 1.2.3](#) published in Q1 of 2014 provides recent results from participating nations on evaluation of the epSOS programmes including ePrescribing /eDispensing and patient summary modules. It includes findings from both the pilot evaluation and interoperability design evaluation. Key findings and recommendations are presented in Table 5.4 however we strongly recommend that the full document is reviewed over time.

<b>Reflections D1.2.3</b>	epSOS has shown that cross border information exchange is possible
<b>Reflections D1.2.3</b>	epSOS is a valuable asset in the view of health professionals participating in the service content and pilot evaluation
<b>Reflections D1.2.3</b>	The epSOS design for patient identification and consent process has been perceived to be secure
<b>Reflections D1.2.3</b>	The eHealth landscape within the participating nations is not (yet) significantly influenced by the design of epSOS. However, epSOS can be considered as an increasing source of inspiration and valuable toolkit for further cross border eHealth developments in the EU
<b>Convergence Study</b>	Semantic interoperability has been observed as the main challenge and complex aspect, specifically given the multi-cultural and pluralistic societies across Europe
<b>Recommendation 1</b>	The semantic aspects of interoperability need more attention with regard to future development of cross-border interoperability
<b>Recommendation 2</b>	The second recommendation is the improvement of the cross-border solutions' usability
<b>Recommendation 3</b>	It is recommendable to emphasize the relevance of the pilot evaluation and efforts and support are required to ensure that commitments are translated into practice
<b>Recommendation 4</b>	Because it is important to take the method of developing (iterative in epSOS) into account when evaluating the design/specifications, it is a precondition to manage and secure the development process in a structured and sustainable way and use this information in the evaluation
<b>Recommendation 5</b>	To capture the momentum and to sustain, diffuse and harvest the value of the epSOS design the most converged piloting participating nations should be treated and supported as the forefront of the cross border eHealth convergence within the EU.

The topic of nurse ePrescribing is a complex one. It requires not only organisational change management initiatives, but also behavioural changes in multidisciplinary roles which are both clinically pragmatic and sustainable. For example, in the case of **social work, social prescribing** is offering assistance in shared decision making for medication management or other clinical

interventions which impact on lifestyle are evident in the literature (OPM, 2013). Opting to use a strong evidence base by designing a CMO configuration which can be used to monitor progress and measure the anticipated outcomes is a pragmatic approach. Whatever evaluation method is selected, adopting a formative and summative appraisal for both the planning and implementation process will assist nursing leaders and other multidisciplinary team members, to make sense of the long implementation chains that are usually associated with such programme innovations. There is much literature available on the topic of evaluation; however for the purpose of this document we opted to briefly outline recent evidence from the epSOS evaluation (2008-2013) in order to inform the reader on the evaluation approach used and to describe what is already known on the topic of ePrescribing and eDispensing.

## 6. Conclusion

ENS4Care Work package 5 has reported on existing ePrescribing and nurse prescribing practices in accordance with the ENS4Care survey response tool. The EpSOS programme reports that 20 EU countries were engaged with the development of patient summary, ePrescribing and eDispensing pilot programmes between 2008-2013 (epSOS Country Status Report D1.4.2). Engagement of nursing with ePrescribing programmes is noted to be at different stages of implementation across the different EU member states with evidence sourced from Finland, Norway, United Kingdom, Spain, and the Netherlands. A proactive approach by nursing leaders to engage with initiatives such as epSOS is important in order to ensure nursing requirements are addressed and met. Nursing as the largest professional group within healthcare delivery provides a dual role within health and social care acting both as part of the multidisciplinary team in addition to working independently as patient advocate. Ensuring that adequate structures are set in place for future reporting on the nursing contribution to ePrescribing and medication management practices is therefore a critical requirement. Access to timely clinical data on ePrescribing procedures can have a direct bearing on patient safety and quality of healthcare provision. ePrescribing needs to be complemented by coordinated actions at a local level but also shared at a European level. The lack of economic recognition on the relevance of this technology contributes to be slowing down the development of integrated healthcare services. What is now required is a cultural change involving citizens, healthcare professionals and institutions. In this context civic recommendations are an expression of patient empowerment and a way to illustrate and analyse key information. Contemporary nursing practice will need to adapt to new models for eHealth in accordance with health and social policy agendas, and proactive engagement in activities such as ePrescribing which increasingly is seen as a core nursing activity will assist in driving this process forward. We conclude with a short list of key principles to underline this guideline based on the evidence presented from the survey data collection and the literature sourced and reviewed.

1. Nurse ePrescribing programme development should integrate with National Regional EHR deployment at enterprise level.
2. ePrescribing is part of medication management and should not be considered in isolated fashion . The nursing contribution of patient education in medication management is noted as significant.
3. Nurse ePrescribing is an integral part of clinical intelligence for nursing policy therefore involvement of national prescribing systems should include nursing from conception to delivery.
4. Jurisdiction on prescribing by nurses (paper or electronic) varies in different countries and is noted to be predominately with the medical profession. Professional competition over jurisdiction and level of training and experience by nurses to prescribe is a critical factor for consideration which can have a direct impact on patient safety and efficient access to medication (Source Krozen, Dijk, Groenewegen and Franck 2011).
5. Recognition that ePrescribing and medication management is an expensive commodity and that active generic drug brands as opposed to brand names on prescriptions is increasingly seen as the preferred option to minimise cost.
6. Nurse ePrescribing has broadened in scope to include prescription of medical devices and non-surgical aids such as bandages and incontinence pads (Martinez, 2012 )
7. Clarity in regard to legal protocols for nurse ePrescribing is critical to avoid legal risk, legal ethical and security protocols must be managed from a number of perspectives e.g. social organisational etc.
8. For technical requirements we recommend referring to epSOS Final Definition Functional Service Requirement for patient summary and ePrescription  
[http://www.epsos.eu/uploads/tx\\_epsosfileshare/D3.2.2\\_Final\\_Definition\\_Functional\\_Service\\_Req\\_Patient\\_Summary.pdf](http://www.epsos.eu/uploads/tx_epsosfileshare/D3.2.2_Final_Definition_Functional_Service_Req_Patient_Summary.pdf) . Whilst we recognise that this functional service requirement is to facilitate shared cross border ePrescription and eDispensing, the requirement sets in place a common infrastructure for nurse ePrescribing.
9. For semantic interoperability we recommend using the shared catalogue and value set which provides guidelines to achieve semantic interoperability in ePrescribing and eDispensing activities  
[http://ec.europa.eu/health/ehealth/docs/ev\\_20131119\\_co1\\_3\\_en.pdf](http://ec.europa.eu/health/ehealth/docs/ev_20131119_co1_3_en.pdf).
10. Promotion of efficient health and social care services which include integration of emerging technologies and which include the involvement of patients is recommended. Crucial is to guarantee equal access of patients to ePrescribing services avoiding inequalities in both accessibility and use of new drugs.
11. Common approaches to ePrescribing using funding such as direct resources provided by EU and establishing a process of involvement that would include regional partners, civic and patient organisations, health professionals, social workers and scientific and educational societies is recommended.
12. Transparency on the identity of healthcare professionals who provide ePrescribing services should be guaranteed.
13. A constant evaluation of the technologies with an approach that measures helpful, economic, social and ethnic consequences provoked directly or indirectly in short and long term is recommended.

## 7. Glossary

**ATC** – Anatomical Therapeutic Chemical Classification System

**Community-based care** – spectrum of services that enable individuals to live in the community and, in the case of children, to grow up in a family environment as opposed to an institution. It encompasses mainstream services, such as housing, health care, education, employment, culture and leisure, which should be accessible to everyone regardless of the nature of their impairment or the required level of support. It also refers to specialised services, such as personal assistance for persons with disabilities, respite care and others. In addition, the term includes family-based and family-like care for children, including substitute family care and preventive measures for early intervention and family support.

**EDQM** – European Directorate of Quality Medicines

**eDispensing** – eDispensing is defined as the act of electronically retrieving a prescription and giving out the medicine to the patient as indicated in the corresponding ePrescription . Once the medicine is dispensed , the dispenser shall report via software the information about the dispensed medicine(s) (epSOS)

**ePrescribing** – A prescription for medicines or treatments , provided in electronic format further information is available from here (epSOS)

**eHealth** – Refers to Information and Communication Technology tools and services for health, used by healthcare professionals, institutions and administrations as well as utilities which provide patients directly with services related to healthcare. (epSOS)

**EHR** – Electronic Healthcare Record : A comprehensive medical record or similar documentation for the past present physical and mental state of health of an individual in electronic form, and providing for ready available data for medical data and other closely related purposes. (epSOS)

**epSOS** – European Patient Smart Open Services

**HL7** – Health Level 7

**ICT** - ICT (information and communications technology) is an umbrella term that includes any communication device or application. For example radio; television; mobile phones; computer and network hardware and software; and services such as videoconferencing and distance learning.

**IHTSDO** – International health terminology standards development organisation


**MVC** – Master Value Catalogue (epSOS)

**Patient Summary** – A concise clinical document that provides an electronic patient health data set applicable both for unexpected, as well as expected, healthcare context. (epSOS)

**Medication Management** – A term related to medicines optimisation described as a patient-focused, outcome-based and clinically-led approach to optimising medicines use which will be supported by research and innovation, including the clinical effectiveness of medicines in real clinical practice” (Royal Pharmaceutical Society,2012)

**Semantic Interoperability** – Ensures meaning of the structure and syntax of the information exchanged electronically can be unambiguously understood between all interested parties. In order to achieve semantic interoperability the use of formalised terminologies is advised

**Syntactic Interoperability** – Facilitates exchange of information electronically that has the same structure or syntax.



**Team** – A group of individuals who work together to produce products or deliver services for which they are mutually accountable. Team members share goals and are mutually held accountable for meeting them, they are interdependent in their accomplishment, and they affect the results through their interactions with one another. Because the team is held collectively accountable, the work of integrating with one another is included among the responsibilities of each member (Mohrman et al, 1995).

**Additional Related Terms Available from epSOS Glossary** – <http://www.epsos.eu/faq-glossary/glossary.html>

## 8. References

- Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R. & Sermeus, W. Aiken, L and Scott P.A. 2014. Nurse staffing and education and hospital mortality in nine european countries: A retrospective observational study. *The Lancet*, 383(9931),pp.1824-1830.
- Bergeron, A., R., Webb, J., R., Serper, M., Federman, A., D., Shrank, W., H., Russell, A., L. and Wolf, M., S. 2013. Impact of electronic prescribing on medication use in ambulatory care. *American Journal of Managed Care*, 19(12), pp.1012-1017.
- Bowskill, D., Timmons, S. and James, V. 2013. How do nurse prescribers integrate prescribing in practice: Case studies in primary and secondary care. *Journal of Clinical Nursing*, 22(13), pp.2077-2086.
- Canadian Nurse Prescriber Guidelines 2006. Registered Nurses Act 2006 [Online]. Available from: <http://nslegislature.ca/legc/statutes/regisnur.htm> [Accessed October 20th 2014]
- CAREdoc Caredoc website [Online]. Available from: <http://www.caredoc.ie/> [Accessed September 20th 2014].
- Department of Health and Children Ireland 2013. Ehealth strategy Ireland. Dublin: Department of Health Ireland. Available from: <http://health.gov.ie/blog/publications/ehealth-strategy-for-ireland/> [Accessed September 20th 2014].
- Digital Agenda for Europe Accelerating innovation [Online]. Available from: <http://ec.europa.eu/digital-agenda/en/news/ehealth-%E2%80%93accelerating-innovation> [Accessed 15th January 2015]
- eHealth strategies report European Commission. [Online] Available from: <http://www.ehealth-strategies.eu/report/report.html> [Accessed September 20th 2014].
- ENS4Care (2014) Deliverable D2/3/4/5.1: Overview of Practices. Brussels, ENS4Care
- ENS4Care (2014) Deliverable D1.8: Evaluation Framework. Brussels, ENS4Care
- epSOS ePrescription Storyboards [Online]. Available from <http://www.epsos.eu/old-content-parts/use-cases/storyboards.html> [Accessed December 6th 2014]
- European Age Platform Online Resource Available from <http://www.age-platform.eu> [Accessed January 12th 2015]
- European Commission General Health and Consumers Directorate Public health portal [Online]. Available from: <http://ec.europa.eu/health/aging/policy/index.en.html> [Accessed September 20th 2014].
- European Medicines Agency Science medicines health: Access to documents page [Online]. Available from: [http://www.ema.europa.eu/ema/index.jsp?curl=pages/document\\_library/document\\_listing/document\\_listing\\_000312.jsp&](http://www.ema.europa.eu/ema/index.jsp?curl=pages/document_library/document_listing/document_listing_000312.jsp&) [Accessed September 20th 2014].
- European Parliament and Council DIRECTIVE 2010/84/EU ammendment on pharmacovigilance [Online]. Available from: [https://www.hightail.com/download/e?phi\\_action=app/directDownload&fl=SWWhZekZoZEszMWxsQXN3V3FGVHVnVE9yZWt5UmdteDRsUjJuWENHRzVZbz0](https://www.hightail.com/download/e?phi_action=app/directDownload&fl=SWWhZekZoZEszMWxsQXN3V3FGVHVnVE9yZWt5UmdteDRsUjJuWENHRzVZbz0) [Accessed September 20th 2014].



European Parliament and Council. 2012. REGULATION (EU) no 1235/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. Official Journal of the European Union, pp.L 348/1.

European Smart Open Services Epsos [Online]. Available from: <http://www.epsos.eu/epsos-services/eprescription.html> [Accessed September 20th 2014].

Franklin B.D and Watson N ePrescribing toolkit building blocks for ePrescribing [Online]. Available from: <http://www.eprescribingtoolkit.com/planner/> [Accessed June 12th 2014].

Gielen, S., C., Dekker, J., Francke, A., L., Mistiaen, P. and Kroezen, M. 2014. The effects of nurse prescribing: A systematic review. International Journal of Nursing Studies, 51(7), pp.1048-1061.

Government of Ireland. 2012. Medicinal Products Control of Manufacture Amendment published by Iris Oifigiúil. [Online]. Available from: No. 273 of 2012 (Medicinal Products (Control of Manufacture) (Amendment) Regulations 2012) [Accessed September 20th 2014]

Government of Ireland. 2012. Medicinal Products Control of Wholesale Distribution Amendment published by Iris Oifigiúil. S I No 274 ed. [Online]. Available from: No. 274 of 2012 (Medicinal Products (Control of Wholesale Distribution) (Amendment) Regulations 2012) Accessed September 20th 2014]

Government of Ireland. 2012. Medicinal Products Regulation published by Iris Oifigiúil. [Online]. Available from: 2010 Regulation Accessed September 20th 2014]

Hahn, A. and Lovett, A. Electronic Prescribing: An Examination of Cost Effectiveness, Clinician Adoption and Limitations Universal Journal of Clinical Medicine 2(1): 1-24, 2014  
DOI: 10.13189/ujcm.2014.020101 Online Resource Available from <http://www.hrpub.org> [Accessed 30/04/15]

Health Information and Quality Authority November 2012. ePrescribing and electronic transfer of prescriptions: An international review. Dublin Ireland: HIQA. [Online]. Available from: <http://hiqa.ie/standards/information-governance/health-information-technical-standards> [Accessed September 20th 2014].

Health Level 7 HL7 version 3 pharmacy [Online]. Available from: [http://www.hl7.org/implement/standards/product\\_brief.cfm?product\\_id=66](http://www.hl7.org/implement/standards/product_brief.cfm?product_id=66) [Accessed September 20th 2014].

Health Products Regulatory Authority HPRA online resource [Online]. Available from: <http://www.hpra.ie/> [Accessed September 20th 2014].

Health Service Executive Guiding Framework for Nurse and Midwifery Prescribing in Ireland 2008 and the Guidance to Nurses and Midwives on Medication Management, ABA 2007 [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Guiding\\_Framework\\_for\\_the\\_Implementation\\_for\\_Nurse\\_and\\_Midwife\\_Prescribing\\_in\\_Ireland.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Guiding_Framework_for_the_Implementation_for_Nurse_and_Midwife_Prescribing_in_Ireland.pdf) [Accessed 15th January 2015]

Health Services Executive How to become a nurse midwife prescriber [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/How\\_to\\_Become\\_a\\_Nurse\\_Prescriber.html](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/How_to_Become_a_Nurse_Prescriber.html) [Accessed September 20th 2014].

- Health Services Executive Nurse and Midwife Medicinal Product Prescribing Toolkit [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse\\_Midwife\\_Prescribing\\_toolkit\\_Info\\_and\\_Background.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse_Midwife_Prescribing_toolkit_Info_and_Background.pdf) [Accessed January 14th 2015].
- Health Services Executive Review of Nurse Midwife Prescribing Data Collection System [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse\\_Midwife\\_Prescribing\\_Data\\_Collection\\_System\\_Report.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse_Midwife_Prescribing_Data_Collection_System_Report.pdf) [Accessed January 14th 2015].
- Integrating the Healthcare Enterprise Pharmacy Technical Committee Community Medication Prescription and Dispense (CMPD) Trial Implementation 29th September 2014 [Online] Available from [http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE\\_Pharmacy\\_Suppl\\_CMPD.pdf](http://www.ihe.net/uploadedFiles/Documents/Pharmacy/IHE_Pharmacy_Suppl_CMPD.pdf) [Accessed October 1st 2014].
- International Health Terminology Standards Development Organisation IHTSDO span [Online]. Available from: <http://www.ihtsdo.org/members/spain/> [Accessed September 20th 2014].
- Jones, M. and al, e. 2010. Nurse prescribing roles in acute care: An evaluative case study. *Journal of Advanced Nursing*, 67(1), pp.117-126.
- KELA Finland KELA operations finnish social insurance institution [Online]. Available from: <http://www.kela.fi/web/en/operations> [Accessed September 20th 2014].
- KELA Finland KELA operations finnish social insurance institution [Online]. Available from: <http://www.kela.fi/web/en/sickness> [Accessed February 6th 2015].
- Kivekäs, E., Luukkonen, I., Mykkänen, J. and Saranto, K. 2014. Improving the coordination of patients' medication management: A regional finnish development project. *Studies in Health Technology & Informatics*, 201pp.175-180.
- Kroezen, M., Van Dijk, L., Groenewegen, P.P. and Francke, A.L. 2011. Nurse prescribing of medicines in western european and anglo-saxon countries: A systematic review of the literature. *BMC Health Service Research*, 11pp.127.
- Légaré, F., Stacey, D., Gagnon, S., Dunn S., Frosh, D., Kryworuchko J Gagnon, M. and Graham, I. 2011 August. Validating a conceptual model for an inter-professional approach to shared decision making: A mixed methods study. *Journal of Evaluation in Clinical Practice*, 17(4), pp.554-64.
- Lim, A., Gigi, North, N. and Shaw, J. 2014. Nurse prescribing: The New Zealand context. *Nursing Praxis in New Zealand*, 30(2), pp.18-27.
- Lyngstad, M. and Hellesø, R. 2014. Electronic communication experiences of home health care nurses and general practitioners: A cross-sectional study. *Nursing Informatics Open Access*, pp.388-394.
- Lyth, N. 2014. Urgent action is needed on the lack of time to undertake important tasks... aiken L, rafferty A M, sermeus W. caring nurses hit by quality storm, 2014 apr 30; 28 (35): 22-5. *Nursing Standard*, 28(37), pp.34-34.
- Martinez. 2012. Involvement of nurses in secure electronic prescriptions *Gerokomos* 23(3), pp. September 20th. [Online]. Available from:

[http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1134-928X2012000300002](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1134-928X2012000300002) [Accessed September 2013]

Mumcu, G., Köksal, L., Sisman, N. and Çatar, R., Özgür. 2013. The effectiveness and outcomes of computerized provider order entry in emergency care department of private hospitals. *Journal of Marmara University Institute of Health Sciences*, 3(2), pp.83-90.

Nursing and Midwifery Board, Ireland, Practice Standards Guidelines for Nurses and Midwives 2010 [Online]. Available at: [http://www.nursingboard.ie/en/publications\\_current.aspx](http://www.nursingboard.ie/en/publications_current.aspx). [Accessed 8th December 2014]

O'Connor, M., N., Gallagher, P. and O'Mahony, D. 2012. Inappropriate prescribing: Criteria, detection and prevention. *Drugs & Aging*, 29(6), pp.437-452.

Office for Public Management Social Prescribing offers a model to prevent ill health [Online]. Available from: <http://www.opm.co.uk/blog/social-prescribing-offers-a-model-to-prevent-ill-health-but-shared-decision-making-could-be-the-mechanism-that-makes-it-happen/> [Accessed February 4th 2015]

Office of Nursing Services and Midwifery Director Health Service Executive Ireland 2009. Nursing and midwife prescribing toolkit business plan. Dublin Ireland: HSE. [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse\\_and\\_Midwife\\_Prescribing\\_Toolkit\\_Business\\_Plan.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse_and_Midwife_Prescribing_Toolkit_Business_Plan.pdf) [Accessed September 20th 2014]

Office of Nursing Services and Midwifery Director Health Service Executive Ireland Nurse and midwife medicinal prescribing toolkit introduction and background [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse\\_Midwife\\_Prescribing\\_toolkit\\_Info\\_and\\_Background.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse_Midwife_Prescribing_toolkit_Info_and_Background.pdf) [Accessed 8th December 2014].

Office of Nursing Services and Midwifery Director Health Service Executive Ireland Nurse and midwifery clinical nurse specialist registered prescribing survey [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/CNMS\\_RNP\\_Survey\\_Report.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/CNMS_RNP_Survey_Report.pdf) [Accessed September 2014].

Office of Nursing Services and Midwifery Director Health Service Executive Ireland Service needs analysis toolkit [Online]. Available from: [http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse\\_and\\_Midwife\\_Prescribing\\_Toolkit\\_Service\\_Needs\\_Analysis.pdf](http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse_and_Midwife_Prescribing_Toolkit_Service_Needs_Analysis.pdf) [Accessed September 20th 2014].

OPM (2013). Social prescribing offers a model to prevent ill health, but shared decision making could be the mechanism that makes it happen. Available from: <http://www.opm.co.uk/blog/social-prescribing-offers-a-model-to-prevent-ill-health-but-shared-decision-making-could-be-the-mechanism-that-makes-it-happen/>

Pawson R 2013 *The Science of Evaluation A Realist Manifesto* Sage London

Pawson, R. and Tilley, N. 1997. *Realistic Evaluation*. London: Sage Publications.

The Prevention Library, available on <http://scie-mailing.org.uk/405-34IT5-F0P0YC670/cr.aspx>

Quintanilla, M. 2012 Online Resource Available from <http://scielo.isciii.es/pdf/geroko/v23n3/comunicacion1.pdf> [Accessed 12th January 2015]

Rigby, M European Science Foundation 2013. Developing a new understanding of enabling health and wellbeing in Europe: Harmonising health and social care delivery and informatics support to ensure holistic care: Science position paper. EU: European Science Foundation. [Online]. Available from [http://www.esf.org/fileadmin/Public\\_documents/Publications/Health\\_Wellbeing\\_Europe.pdf](http://www.esf.org/fileadmin/Public_documents/Publications/Health_Wellbeing_Europe.pdf) [Accessed September 20th 2014]

Royal Pharmaceutical Society 2012 Medicines optimisation helping patients get the most from their medicines: a discussion paper [Online]. Available from [www.rpharms.com](http://www.rpharms.com) [Accessed September 2013]

Shawahna, R., Rahman, N., Ahmad, M., Debray, M., Yliperttula, M. and Declèves, X. 2011. Electronic prescribing reduces prescribing error in public hospitals. *Journal of Clinical Nursing*, 20(21), pp.3233-3245.

Sheikh, A. The national institute of health research ePrescribing toolkit [Online]. Available from: <http://www.eprescribingtoolkit.com/> [Accessed September 20th 2014].

Sheikh, A. McLean, S. Cresswell, K. (2011) The Impact of eHealth on Quality and Safety of Healthcare. An updated systematic overview and synthesis of the literature. Final Report for the NHS Connecting for Health Evaluation Programmes (NHS CFHEP 001) London: Imperial College London [Online] <http://www.birmingham.ac.uk/Documents/college-mds/haps/projects/cfhcp/projects/001Extension/CFHEP001FinalReport-March2011.pdf> [Accessed September 20th 2014]

Stroetmann, K.A., Artmann, J., Stroetmann V, Protti, D. Dumortier, J. Giest S, Walossek U and Whitehouse D. 2011. European countries on their journeys towards national eHealth infrastructures

Virtual Campus Spanish e-nursing best practice e-nursing best practice [Online]. Available from: <http://www.campus.e-nursingbestpractices.com/> [Accessed September 20th 2014].

## Appendices

### Appendix 1: Key epSOS Resources Selected for Review

<b>Title</b>	epSOS Work Package Dissemination 1.3 D1.3.5 Specific epSOS Factsheets
<b>Resource Overview</b>	Offers a high level overview of the epSOS project and the associated fact sheets that were created for dissemination of information to both healthcare professionals and citizens in EU Member States.
<b>Link to Document</b>	<a href="http://www.epsos.eu/uploads/tx_epsosfileshare/D1.3.5_Specific_epSOS_Factsheets_01.pdf">http://www.epsos.eu/uploads/tx_epsosfileshare/D1.3.5_Specific_epSOS_Factsheets_01.pdf</a>
<b>Publication Date</b>	February 21 <sup>st</sup> 2012

<b>Title</b>	epSOS Work Package D1.4.2 Country Status Outline and Template Specification
<b>Resource Overview</b>	Presents a high level overview of the 23 participating nations (20 EU and 3 Affiliate Countries) eHealth services including ePrescribing and eDispensing. Key references section 3.3 page 22 and Annex B Country Maps offer data on patient summary, eprescription and dispensing of medication.
<b>Link to epSOS Document</b>	<a href="http://www.epsos.eu/uploads/tx_epsosfileshare/D1.4.2_Country_status_outline_and_template_specification_v1.00.pdf">http://www.epsos.eu/uploads/tx_epsosfileshare/D1.4.2_Country_status_outline_and_template_specification_v1.00.pdf</a>
<b>Publication Date</b>	February 2 <sup>nd</sup> 2012

<b>Title</b>	The Experience of Selecting the Code Systems for the Development of the epSOS Master Value Catalogue
<b>Resource Overview</b>	Patient information was noted in pilot of epSOS to be mostly available as free text in the natural language of the participating nations, this document sets in place code systems recommended for future development of ePrescribing and eDispensing in EU Member States. ATC was noted as best suited to act as minimum dataset, and EDQM value package was selected for dose form and route of administration information, whilst HL7 substance Admin Substitution for replacement of a prescribed medication if not available in the country where the dispensing was performed. HL7:substanceAdminSubstitutionwas selected
<b>Link to epSOS Document</b>	<a href="http://ec.europa.eu/health/ehealth/docs/ev_20131119_co1_3_en.pdf">http://ec.europa.eu/health/ehealth/docs/ev_20131119_co1_3_en.pdf</a>
<b>Publication Date</b>	September 23 <sup>rd</sup> 2013

## Appendix 2: Resources on Evaluation

<b>Title</b>	epSOS Work Package D1.2.3 epSOS Evaluation Results
<b>Resource Overview</b>	Final deliverable from the epSOS project provides final results and recommendations from the epSOS pilot evaluation and the epSOS interoperability design evaluation. This report also contains in the annex a simulation consultation report, the extensibility and scalability report and the convergence report.
<b>Link to epSOS Document</b>	<a href="http://www.epsos.eu/uploads/tx_epsosfileshare/D1.2.3_Evaluation_Results_v1.0_01.pdf">http://www.epsos.eu/uploads/tx_epsosfileshare/D1.2.3_Evaluation_Results_v1.0_01.pdf</a>
<b>Publication Date</b>	February 1st 2014

## Appendix 3: Web Resources Self-Test Evaluation Planning

Self-assessment or self-evaluation page readiness for engagement

For example (draft only)

Do you have a legislative framework in place (UHI) And (Role ID) Is there support at government level to amend legislation? Other influential groups e.g. The Medication Safety Forum – chaired by the Chief Pharmacist DoH	Yes No
Have you a regulatory nursing board to accredit a nurse (e) midwife prescribing educational programme.	Yes No
Have you targeted funding for change management and nursing role development initiatives at local regional and national level?	Yes No
Have you addressed related governance issues Supporting documentation Auditing and monitoring processes National Key Stakeholders and multidisciplinary engagement and support Consider a pilot or trial on ePrescribing with the nurse and midwife prescribers.	Yes No



## Appendix 4: Evaluation Material

<b>Title</b>	Evaluation Pilot Plan epSOS phase 2 Work Package D1.2.1
<b>Resource Overview</b>	
<b>Link to epSOS Document</b>	Key resource Evaluation Pilot Plan D1.2.1 of epSOS phase 2 <a href="http://www.epsos.eu/uploads/tx_epsosfileshare/D_121_EED_Evaluationpilotplan_epsosphase2.pdf">http://www.epsos.eu/uploads/tx_epsosfileshare/D_121_EED_Evaluationpilotplan_epsosphase2.pdf</a>
<b>Publication Date</b>	November 2012

## Appendix 5: Guidelines on ePrescriptions Dataset for Electronic Exchange - Cross-Border Directive 2011/24/EU

<b>Title</b>	Additional Guidelines on ePrescriptions Dataset for Electronic Exchange Under Cross-Border Directive 2011/24/EU Release 1
<b>Resource Overview</b>	These guidelines define the need for “guidelines supporting the member states in developing the interoperability of ePrescriptions” they are intended to be complementary to Commission Implementing Directive 2012/52/EU. These guidelines were adopted on 18 <sup>th</sup> November 2014
<b>Link</b>	<a href="http://ec.europa.eu/health/ehealth/docs/eprescription_guidelines_en.pdf">http://ec.europa.eu/health/ehealth/docs/eprescription_guidelines_en.pdf</a>

## Advisory Committee Members

ENS4Care Work Package 5 group would like to express their sincere gratitude to the advisory committee for their input on this clinical guideline. The committee members are as follows:

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## ENS4Care Partners

