

Annex D
to
eHealth-INTEROP Report
Use case examples
in response to
**eHealth Interoperability Standards
Mandate**

(SA/CEN/ENTR/000/2007-20 eHealth Mandate M/403 – Phase 1)

<http://www.ehealth-interop.eu>

Document History:

**Annex B , Use case examples, to
SA/CEN/ENTR/000/2007-20 eHealth Mandate M/403 – Phase 1 Report**Document Location: *http://www.ehealth-interop.eu*5 Validity: *From date of publication until approval by ESOs, EC and EFTA.*File name: *ESO_eHealth-INTEROP_AnnexD_v1000.doc***Change History:**

Date	Version (n.rrr)	Changes file name format: ESO_eHealth-INTEROP_D0Nnn_CCYYMMDD.doc
2008-11-26	0.600	Post comment editing started.
2008-12-22	0.900	Post-comment editing completed
2009-02-10	1.000	Final version approved by GEN, GENELEC and ETSI

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Main Report, Summary of Report and Annexes A, B & C available from <http://www.ehealth-interop.eu>

D.1 Introduction

Annex D contains an illustrative list of high-level descriptions of eHealth use cases that has been collated from various sources. It is intended to be a list of examples that will make clearer the idea of a use-case and not to be an exhaustive list. Since identification and documentation of eHealth use cases is an ongoing activity, a fixed comprehensive list cannot be given, nor is the fact that these examples are cited to be regarded as any comment on their quality or strategic value; it simply reflects their availability.

Each use case is listed in one of the following sections:

- D.1 based on the citizen's participation, this first section assumes a citizen who is driving all or most of the application tasks;
- D.2 refers to applications with workflows each related to a single citizen / patient;
- D.3 refers to multi- citizen / -patient applications.
- D.4 discusses emergency data set use cases

The title of each use case states how the respective publisher titles his use case. There may exist use cases using different titles but with similar or overlapping functionality. The title should communicate the underlying intention of the use case and act like a product brand, thus helping to distinguish a specific use case from other similar use cases.

Each use case is described from a user's perspective. Many of the use cases are based on technically similar applications providing a persistent, citizen-centric, ubiquitous, electronic health record (EHR), for which the technical foundations would be similar but with information requirements still depending on the application-level use case.

The selection and the definition of the boundary of any use case is generally a business strategic decision. This is why these use cases are called in other sections of this report "Business use cases". As we saw in Chapter 4 of the Main Report, , these Business use cases are often broken down into Technical use cases, for example patient identification is a technical use case that is in many cases a subset of one or more Business use cases. These different levels of use cases are discussed further here, where specific examples will be analysed.

D.2 Citizen perspective

These Business use cases are mainly focussed at serving the citizen's need, generally contributing to more active participation in their own care or well-being.

D.2.1 Consumer empowerment / consumer access to clinical information

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Enables a consumer's access to clinical information via a personal health record (PHR) system.

- provides functionality to the consumer to receive and access clinical information;
- provides functionality to the consumer to create provider lists and establish provider access permissions
- provides functionality to the consumer to transfer PHR information among different PHR Systems.
- assumes the presence of electronic systems such as EHRs, PHRs, etc.

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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.2.2 ePrescription (as “VerOrdnungs-Daten-Dienst VODD”)

- Records secure/confidential prescriptions
- Dispenses to authorised client
- Improves reimbursement
- Supports documentation and archiving purposes

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Publisher: gematik, D, see Glossary of Main Report for full details

D.2.3 HealthSpace basic medical record

- active medical data reporting
- enables patient to reliably record basic vital sign readings
- clinicians may obtain collected vital signs in a clinical setting

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Publisher: NHS (England), UK, see Glossary of Main Report for full details

D.2.4 HealthSpace choose and book

- in the context of a current referral
- the patient may select among list of available care providers and
- easily commit an appointment that suits both patient and care provider

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Publisher: NHS (England), UK, see Glossary of Main Report for full details

D.2.5 Assisted living

- recognizing the fact that most patients may continue living in their homes if some assistance is given
- characteristics: little data – fast reaction time – integration into home
- focus on patient-clinician interaction based on vital signs and medical compliance

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- online and interactively collect, analyse and react on data from an ambient network including e.g.
 - o Pedometer
 - o Glucose Meter in kitchen
 - o Scale in bathroom
 - o Pill minder in kitchen
 - o Blood Pressure cuff in living room

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Publisher: Continua, USA, see Glossary of Main Report for full details

D.2.6 Remote monitoring

- send interoperable ambulatory remote monitoring information to the EHR / PHR
- patient gathers and communicates remote monitoring information electronically from measurement devices in a home or other non-clinical setting to a clinician's ambulatory EHR system and/or to the patient's PHR.
- may include, but is not limited to, communication of: physiologic measurements (e.g., weight, blood pressure, heart rate and rhythm, pulse oximetry, glucose), diagnostic measurements (e.g., transthoracic impedance) medication tracking device information (e.g., medication pumps, infusion devices, electronic pillboxes), and activities of daily living measurements (e.g., ADL biosensors, pedometers, sleep actigraphy).
- clinicians, care managers, and disease management programs receive patient remote monitoring information within an EHR.

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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.2.7 Patient – Provider secure messaging

- support secure patient-to-clinician communications and effective management of chronic care conditions
- promotes preventive healthcare by giving clinicians the ability to securely communicate reminders to patients and their family members
- may include items such as annual check-ups, cancer screenings (e.g., mammograms and colonoscopies), and immunizations.
- gives patients access to their clinicians in a more timely, efficient manner than an office visit or a phone call.
- communications could also include caregivers, family members, and patient advocates to further promote and coordinate patient care.
- also supports message-based prompts and reminders initiated by clinicians and their staff to remind patients of events and activities
- clinicians will benefit from having the ability to respond to or initiate secure communications to facilitate the care process and promote better patient health.

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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.3 Care provision perspective

D.3.1 Demographics electronic clipboard

- locally mirror all consumer's registration/demographics information
- easily updatable local database
- 5 - assists in filling out medical forms
- reduces errors
- improves workflow speed and patient safety

Publisher: AHIC, USA, see Glossary of Main Report for full details

D.3.2 eHealth insurance card (eEHIC)

- 10 - enables citizens to receive healthcare in other EU member states
- Checks eligibility of patient for different healthcare services and obtain coverage schemes in a cross-border environment.
- Helps EU member states to employ electronic reimbursement services.
- Offers an infrastructure for EHR and emergency data exchange.

15 Publisher: DG EMPL, EU, see Glossary of Main Report for full details

D.3.3 Healthcare coverage check

- Checks eligibility of patient for different healthcare services and obtain coverage schemes.
- Helps payment guarantors to improve reimbursement.

Publisher: gematik, D, see Glossary of Main Report for full details

D.3.4 Health record locator

Recognizing the possibility that multiple EHR / PHR systems for the same patient may coexist and that querying / retrieving (bulky) documents from remote servers may be time-consuming, a lightweight-index may help the clinician to focus subsequent queries to a focussed subset of patient-related entries

- integrates record location info from multiple EHR / PHR servers
- 25 - quickly responds with lightweight indicators towards big-footprint documents
- stores values for a selection of demographics/encounter-related attributes only
- resolves different/unknown patient identifiers

Publisher: Connecting for Health (Markle Foundation), USA, see Glossary of Main Report for full details

D.3.5 Detailed care records service (CRS)

- 30 - provides healthcare staff with quicker access to reliable information to help with treatment, including in an emergency.
- also shares notes of appointments, medicines prescribed, test results, details of any referrals to other health professionals and, clinical treatments. X-rays and scans are also increasingly held on computers and shared through the CRS.

- makes caring across organisational boundaries safer and more efficient.
- provides access to records that cover care across different organisations, such as the GP practice and the hospital.
- allows information to be accessed more quickly, and gradually to phase out paper and film records which can be more difficult to access.
- provides single-entry point for patient-related medical history

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Publisher: NHS (England), UK, see Glossary of Main Report for full details

D.3.6 Personalised healthcare

- manages EHR entries with "lifelong significance"
- clinically useful genetic information,
- personal and family health history, and
- need to integrate existing data from other sources
- need to collect data retrospectively
- need to integrate analytical tools into EHRs to support clinical decision-making.

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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.3.7 Medication management

Note that aspects of this use case could legitimately appear in the citizen-centric area

- promotes medication safety and patient support
- focuses on patient medication and allergies information exchange, and the sharing of that information between consumers, clinicians (in multiple sites and settings of care), pharmacists, and organizations that provide health insurance and provide pharmacy benefits.
 1. "inpatient setting" includes medication reconciliation and ordering along with other supporting interactions in the hospital.
 2. ambulatory setting addresses access to current medication and allergy information and support for electronic prescribing in this environment.
- assumes IT-systems such as Electronic Health Records (EHRs), ePrescribing tools, Personal Health Records (PHRs), and other local or Web-based solutions supporting consumers and clinicians

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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.3.8 eEmergency data set

- stores authenticated emergency-relevant conditions
- is restricted to selected terminology
- validates condition record (author's signature)
- restricts access to registered medical professionals
- provides information offline on patient's health card

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Publisher: gematik, D, see Glossary of Main Report for full details

D.3.9 HealthSpace summary care record

- 5 - stores selected clinical report types which may be used as care summary information for care coordination and emergency IT systems, e.g. key elements from encounters and health status such as current and past medication, allergies, key diagnostics procedure results, etc. for use by care providers and emergency care clinicians.
- clinician may query based on various attributes
- could give medical staff quicker access to information they need to plan the best course of treatment.
- clinician obtains authenticated medical documents
- 10 - initially contains basic information from patient's record held by the GP such as date of birth and address, details of allergies, current prescriptions and bad reactions to medicines.
- with each encounter more information may be added to the patients ECR

Publisher: NHS (England), UK, see Glossary of Main Report for full details

D.3.10 Consultations & transfers of care

- 15 - exchange relevant patient-related clinical information between providers of care
- exchange information between providers and between providers and patients in relation to consultations and transfers of care.
- A provider may be an individual clinician (as in the case of a consultation) or a care delivery setting (as in the case of a transfer of care). Note: Electronic consultation between patients and providers is not included within this use case and is addressed in the Patient-Provider Secure Messaging Detailed Use Case.
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Publisher: AHIC, USA, see Glossary of Main Report for full details

D.3.11 Lab Reports in electronic health records

- 25 - widely available, secure solution for accessing laboratory results and interpretations in a patient-centric manner for clinical care by authorized parties.
- ability to receive, store, and share lab test results with other doctors and with their patients
- functionality for laboratory results reporting and notification, applicable to many types of laboratory tests, including but not limited to: clinical chemistry, hematology, serology, and microbiology.
- 30 - transmission of complete, preliminary, final and updated lab results to the EHR system (local or remote) of the ordering clinician;
- transmission of complete, preliminary, final and updated (or notification) to the EHR system (local or remote) or other clinical data system of designated providers of care (with respect to a specific patient);
- retrieval of historical lab results by providers of care;
- 35 - clinician access to test results respects privacy concerns, sensitivity designations or other attributes.
- clinician access to results respects access rules determined by policy (e.g., certain results categorized as sensitive and not normally made available); and
- sending and accepting appropriate acknowledgement of receipt for interactions.

Publisher: AHIC, USA, see Glossary of Main Report for full details.

D.3.12 Shared imaging data

- shares big-footprint documents in a region for some months

- allows clinicians to query registries for existing diagnostic images
 - quickly obtains lightweight references from registry to entries stored on one or multiple repositories
 - downloads transparently entries for documents (stored in distributed repositories) as well as large image objects (stored in local PACS).
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- safely shares data according to patient consent with authorised clinicians
 - leaves all archiving duties with the PACS

Publisher: Federal Health Ministry, Austria see Glossary of Main Report for full details.

D.3.13 Clinical encounter record

- Collects clinical documents related to a clinical encounter
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- Shares documents with authorised organisations/roles even outside the care provider organisation (referring physician, lab, radiology etc)
 - Securely accesses specific (constrained) views onto the encounter record

Publisher: Fraunhofer ISST, see Glossary of Main Report for full details.

D.4 Population health perspective

D.4.1 Immunisation & response management

- access information about individuals who need to receive specific vaccines, drugs, or other interventions;
- 5 - report, track, and manage administration of vaccines, drugs, isolation and quarantine;
- identify and electronically exchange information describing the treatment or prophylaxis status of populations;
- exchange specific resource and supply chain data from public and private sectors.

Publisher: AHIC, USA, see Glossary of Main Report for full details.

D.4.2 Biosurveillance

10 Transmit essential ambulatory care and emergency department visit, utilization, and lab result data from electronically enabled health care delivery and public health systems in standardized and anonymised format to authorized public health agencies with less than one day lag time. Data and IT-systems included in the use case are:

- 15 - Data routinely entered into hospital, ambulatory care, and other ancillary care data systems. These may include patient demographics; diagnostic data; chief complaints; triage data; laboratory orders and results; physician orders; healthcare facilities' capacity information; and admission, discharge and transfer data.
- 20 - Hospital systems and affiliated clinical personnel who have clinical data of public health significance or oversee response management responsibilities.
- The legally authorized local, regional, state, and federal public health personnel who monitor and manage public health surveillance data.

Publisher: AHIC, USA, see Glossary of Main Report for full details.

D.4.3 Quality

25 Support for information exchange related to quality measurement, feedback and reporting with respect to a patients' encounter with the healthcare delivery system. Obtaining and processing quality-related data includes:

- Hospital-based quality measures (core set):
 - 30 o Automate data capture and reporting of HQA measures through EHRs in support of provider workflows; and
 - o Communicate HQA measure data to external entities.
- Clinician-level measures (core set):
 - 35 o Automate data capture and reporting of AQA measures through EHRs in support of provider workflows; and
 - o Communicate AQA quality measure data to external entities for aggregation and reporting.
- Feedback to Clinicians (self-assessment):
 - 40 o Enable real-time or near-real time feedback to clinicians regarding specific quality indicators which are relevant for a particular patient. This may occur through event detectors - based on evidence-based practice guidelines, and driven by clinical information about the patient - in EHRs that identify significant variances in practice.

- if coupled with automated collection of adherence, non-adherence and exclusion criteria, both delivery of high quality care and quality reporting could be enabled as part of the decision-making process; and
- Public Reporting:
 - 5 ○ Aggregate data across multiple sources (claims data, medication data, laboratory data, etc.) to support quality measurement, promote accountability among providers, and aid consumers in making informed choices; and
 - 10 ○ Communicate quality measurement data quickly and clearly in a manner that makes it useful to a wide variety of decision makers, patients, healthcare providers, payers, health plans, public health organizations, health researchers, and regulators who are involved with this process.

Publisher: AHIC, USA, see Glossary of Main Report for full details.

D.4.4 Emergency responder based on an EHR

- 15 - access current and historical health data by those involved in the response to an emergency situation.
- covers scenarios from the dispatch of on-site care providers to the scene of an emergency incident and follows the patient through initial treatment, the evacuation process to emergency medical treatment facilities, until the emergency care information is passed to the electronic health record.
- 20 - assumes the existence of an operational Electronic Health Record within medical treatment facilities, but it primarily models the exchange of information related to the emergency incident between on-site care providers, medical treatment facilities, facilities in the definitive care system, medical examiner/fatality managers' offices and public health practitioners
- timely electronic access to critical health information relating to the assessment, stabilization and treatment of the victims of emergency incidents.
- 25 - definitive care clinicians involved in the care and treatment of emergency incident victims, medical examiner/fatality managers investigating cause of death, and public health practitioners using information contained in the ER-EHR, are included because of their interactions with the other portions of this use case.

Publisher: AHIC, USA, see Glossary of Main Report for full details.

D.5 Emergency Data Set

D.5.1 Common requirements

5 Independent of the use case, the common notion of an EDS is “patient-related” “long-term” “medical data”, with these three terms immediately creating the first requirements for one interpretation of an EDSS (descriptions are derived from gematik, D, see Glossary of Main Report for full details):

The EDSS shall output to the user respective patient-related identity information in a way that supports the (medical professional) user in verifying the patient’s identity. Note: Checking the identity is first and not always easy, and may require other local means to identify a possibly unconscious patient.

10 The EDSS shall provide the (medical professional) the ability to enter all (if applicable: or parts of) the EDS for that patient.

The EDSS shall store the EDS persistently until a user erases parts (if applicable: or parts of) that data.

15 The EDSS shall provide the (medical professional) the ability to read all (if applicable: or parts of) the EDS for that patient.

The EDSS shall provide the (medical professional) the ability to delete all (if applicable: or parts of) the EDS for that patient.

The EDSS shall be able to represent the EDS using a formal terminology that makes the EDS independent of natural languages.

20 Note: This requires specification of a data structure based on an information model and a corresponding suitable terminology to use as a basis for an encoded storage representation. Since different organisations of medical professionals do not agree on what “emergency-related” or “long-term diagnoses” are, this decision depends on medical application specialists.

Some more common security requirements:

25 The EDSS shall provide the user with a way to validate the authenticity of the author of all (if applicable: or parts of the) EDS. Note on governance: That requires at least consensus on the way how to authenticate potential users and a consensus who shall be in this group.

The EDSS shall restrict access regarding patient identity and EDS to authorised users only. Note on governance: That requires a policy which determines access rights.

30 D.5.2 Detailed requirements structured by use case:

D.5.2.1 Data Entry

OFFICE: The medical professional writes "EDS" for a patient for whom (s)he has medical history data and for whom (s)he can access the EDSS (description derived from gematik, D, see Glossary of Main Report for full details):

35 The EDSS shall provide the user with the ability to convert plain text into terms of the internal terminology and into the storage representation in order to store new (if applicable: or partially new) EDS data. (description derived from gematik, D)

D.5.2.2 On-Site Emergency Care

40 ON-SITE: The medical professional accesses "EDS" when providing emergency care. (descriptions are derived from gematik, D)

The EDSS shall provide the user with the ability to obtain the stored EDS in natural language.

The EDSS shall provide the user with the ability to obtain a list of headings giving an condensed EDS extract (like e.g. keywords, provider, date). Note: This is to enable the user to focus on what might be needed in on-site/during transport, to avoid lengthy lookup among huge text entries, and to avoid images or other huge objects.

D.5.2.3 Hospital care after Emergency

INPATIENT: The medical professionals in a healthcare site that receives / is about to receive an emergency patient look up EDS during the transport of that patient into that site - so they can prepare themselves for that patient (description derived from gematik, D, see Glossary of Main Report for full details):

The EDSS shall provide the user (on-site) with the ability to transfer the patient identification and/or the EDS data) of the patient from site/transport to a receiving healthcare organisation. Note: That requires a communication infrastructure and a technical identification of healthcare organisations. This "INPATIENT" use case typically is more realistic, since emergency professionals on-site anyway restrict their interventions to what is quite independent from the patient's medical history and the feature required would enable a hospital to prepare in a specific way.

A question that needs to be asked, once these requirements have been analysed, is how much more will be needed for sharing a more general-purpose patient summary that can be used not only in emergency situations, but in more common place transfer of care, and in Personal health Records.

In addition, the recording of this information is not performed in an Emergency situation, and as in every interoperability related project, the main practical challenges and deployment barriers are always on motivating the data sources to invest time and IT resources in sharing the information they have. This is why any use case needs to be carefully considered in the business context in which it is expected to deliver some benefits. The return on the investments need to widely and evenly shared to turn a use case idea into a deployed success. For this reason the documentation and the strategic prioritisation of business use cases is an activity that needs the proper focus (Main Report, Chapter 4), before the technical interoperability aspects (technical use cases) can be defined, and then the profiling (Main Report, Chapter 4) of the standards addressed.

Profiling in area of patient summaries has received more attention in the past few years and some major progress has been achieved in 2007-2008 with patient summaries (with semantically rich content) defined in several European national or regional projects (Germany, England, Finland, Italy, etc.) with several more underway (Spain, France, Austria, Sweden, etc.). The same movement has also accelerated in Asia (Taiwan, Japan, USA, etc.) as well as in more generic profiling efforts in IHE Patient Care Coordination (CDA based) and OpenEHR (13606 Based). The US national effort, based on HL7 CDA with the Continuity of Care Document (CCD) with a broad set of terminologies, profiled by HITSP is now required for EHR Certification and has received attention well beyond the US. Despite this encouraging progress, it is important to note that these summaries are not so far consistent in their target use or multilingual in their profiling. To achieve these capabilities will require additional effort.