

Basis for discussion in health informatics –

Generic process model for health related services

This example from Sweden is given to raise interest in the future work in health informatics to identify and describe the generic process for health related services in a common and shared model. A common, shared and generally accepted process model could be most beneficial as a starting point for harmonisation efforts as well as for concept- and information modelling in health informatics.

This translation of the Swedish work into English is “home made”. The English terms are probably not the most appropriate and often given with alternatives. The concepts are described but not yet defined. Formal definitions will be worked out later.

Background/the Swedish national project

The Swedish National Board of Health and Welfare has been commissioned by the Ministry of Health and Social affairs to outline a national, normative information structure to be applied in all health care and welfare businesses.

The project includes, as a first step, to draw up a generic process model and to identify basic generic concepts which will serve as the base and reference to the concretised information structure. The basic concepts identified in the generic process model will also later be presented in a formal model of concepts. An information model will be worked out based on the generic concepts and together the process-, concept- and information models will constitute the national information structure. A first draft has been published in February 2008. Based on the process model work has been started with concept modelling and after that an information model will be worked out.

Project goals to

1. describe a model of the generic process for health related services
2. identify and describe the basic concepts identified in the model
3. describe the relation between these concepts

Starting points

The National strategy for e-health, health service regulations and the national strategy for good quality care are points of departure for the project.

The national strategy for good quality care includes requirements for a process oriented quality management system. ISO 9001:2000 and the guide for use in health services CEN/TS 15224 are therefore relevant. Other examples of standards that are considered are EN 13940:1 (Contsys 1), EN 12967 (HISA), EN 13606 (EHR-com), openEHR specifications, HL7 v3 RIM and the Snomed CT concept model.

The process model shall be based on the clinical perspective which means that the patient/individual and the clinical professionals perspectives are both included.

The concept of health is applied out from the WHO definition. This means that the process model is generic for health care as well as social services.

In this draft the term “individual” refers to the customer of a process (i.e. patient or subject of care). The provider of a service is called “professional actor”.

More concrete starting points are that the concepts and models should be generic and the basic concepts should be comprehensive in coverage of all kinds of health related services.

The consequences of these starting points are that the basic concepts should be general and comprehensive for all kinds of health care, social care and welfare. The basic concepts should also (by being parent concepts for specialisations) cover all needs of information concerning the content of the specialised processes in these businesses (roles and actors not included). This means that specialised concepts for different kinds of services and different perspectives on the core, clinical process should be derived from the basic, general and clinical concepts. The concepts in the generic process model are thus primarily chosen from the “clinical” perspective. The intention by using the term “clinical” in this context is to include the individual’s/subject of care’s as well as the professional actor/providers perspectives. An important aim of the generic process model is to support the management and improvements of the clinical processes. Especially the knowledge based process management will be increasingly important in the future health related services. The process model as a base for the future information structure and information systems should therefore be built to give prerequisites for different kinds of knowledge based clinical process management. That would include decision support by clinical guidelines, protocols etc, but also the possibilities for uniform and unambiguous data for follow up and comparisons.

The process concept and principles for the generic process model

Any business has a core process for delivering services to the main customer. Processes are categorised by their customer, input, refinement object and output respectively. The generic health related process have an individual as the customer, the health status of the individual as the input, the health status (documented as the health condition) as the refinement object and the health status of the individual after completion of all the activities as the output.

It should be emphasised that the generic process aims to cover all activities performed regardless organisational units or performers involved. Activities performed within a specific unit will then most often be regarded as a part of the process.

To support the core process there are almost always several supportive processes which influence and interact with the core process. These support processes share refinement object with the core process as their outputs are prerequisites for the core process to fulfil its aims. The view of the relation between core and support processes is of relevance for the approaches in the process management.

The concepts identified in the generic process have several characteristics. Specialisations of the basic concepts for different types of business and/or for different perspectives of the process (e.g. administrative and informative perspectives) can be identified and defined by focusing different characteristics of the basic concepts.

One individual can suffer from several health conditions/health issues/health problems influencing the current health status. In other contexts (i.e. CEN/TS 15224) a clinical process is defined as the activities performed to deal with one specific health issue. In the generic process model an individual can have several health issues and thereby several clinical processes, which then constitute parts of the comprehensive, generic process.

This is especially relevant for primary health care where often more than one health problem/health issue are dealt with during one period of time (included in one health concern/health issue thread/health conjunction).

On the basis of general principles for processes the project has applied a number of principles for the description of the generic process and the basic concepts. These principles are summarized below.

- The customer of the process is the individual or the patient
- The input is an individual’s health status and the process consists of activities aiming to indirectly or directly add value to the individual’s health status

- The starting points are the patient perspective and the professional activities made for the patient – the clinical perspective
- The process is regarded as a whole and covers all activities regardless organisational borders
- Is applicable to all health related businesses out from the WHO definition of health – specialisations for all types of businesses will be possible
- The basic concepts identified aim to be comprehensive for the core of all health related businesses. The concepts for other perspectives than the clinical will be possible to derive from attributes of the basic concepts
- The activities in the generic process have two main aims – identify the health problem and treat the problem respectively
- The process is need oriented (the indications for activities are assessed by professional actors)
- The process model is based on the definition of process in ISO 9000:2005 “set of interrelated or interacting activities which transform inputs into outputs”.

The generic, comprehensive process gives an aim and direction of the future information system. The possibilities and prerequisites for continuity or care and clinical process management supported by the information system are of special interest.

The generic process pattern and the generic process model.

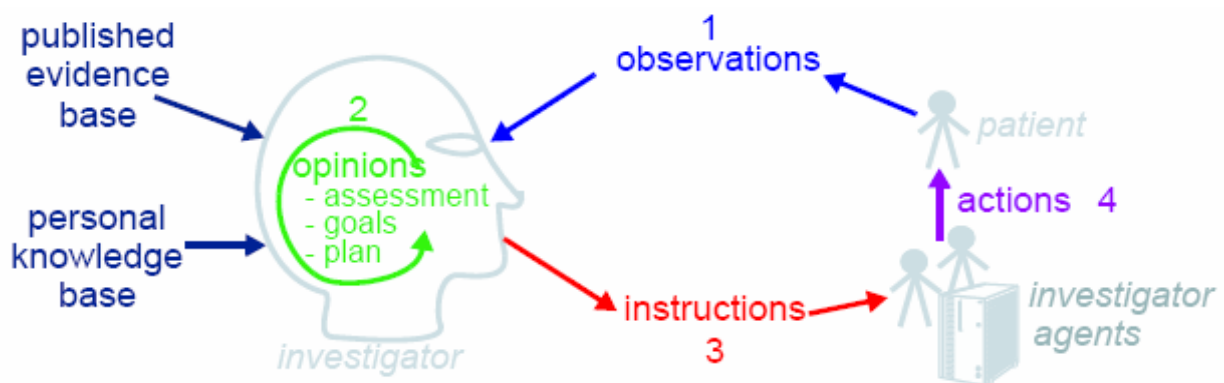
What is the most suitable level for how general a model should be to serve as the generic model? In the Swedish model this has been debated. The draft presented in this document include a generic process pattern that is applied twice in the generic process model. This is motivated by the aims. A very general model could always be considered generic but the aims of coverage and relevancy motivates a somewhat more specific model.

The process itself and every each activity/measure run through iterative moments that could be illustrated in circles. The steps could be identified as;

- Plan (including assessment/judgement of needs)
- Do (perform the planned activity)
- Check (analyse the result concerning the health status of the individual)
- Act (change/review the planning if the analyse motivates that)

The model in this way applies a variant of the Deming PDCA cycle.

Another way to describe the generic process pattern is to study models for problem solving. *Open EHR* have described a generic clinical problem solving process as shown in the figure below.

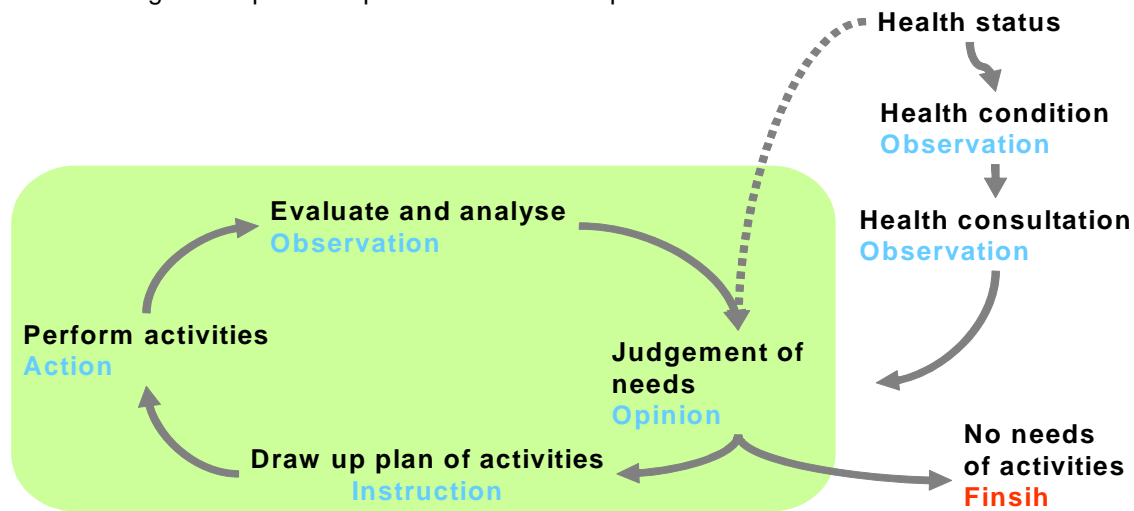


This pattern is also applicable on the process itself and every each activity/measure.

The generic process pattern in the Swedish project

In the Swedish project a process pattern similar to the *open* HER problem solving model has been identified. This generic pattern could be regarded as a somewhat specialised variant of the *open* EHR model. The pattern is shown below with related open HER concepts printed in blue;

Swedish generic process pattern related to open EHR

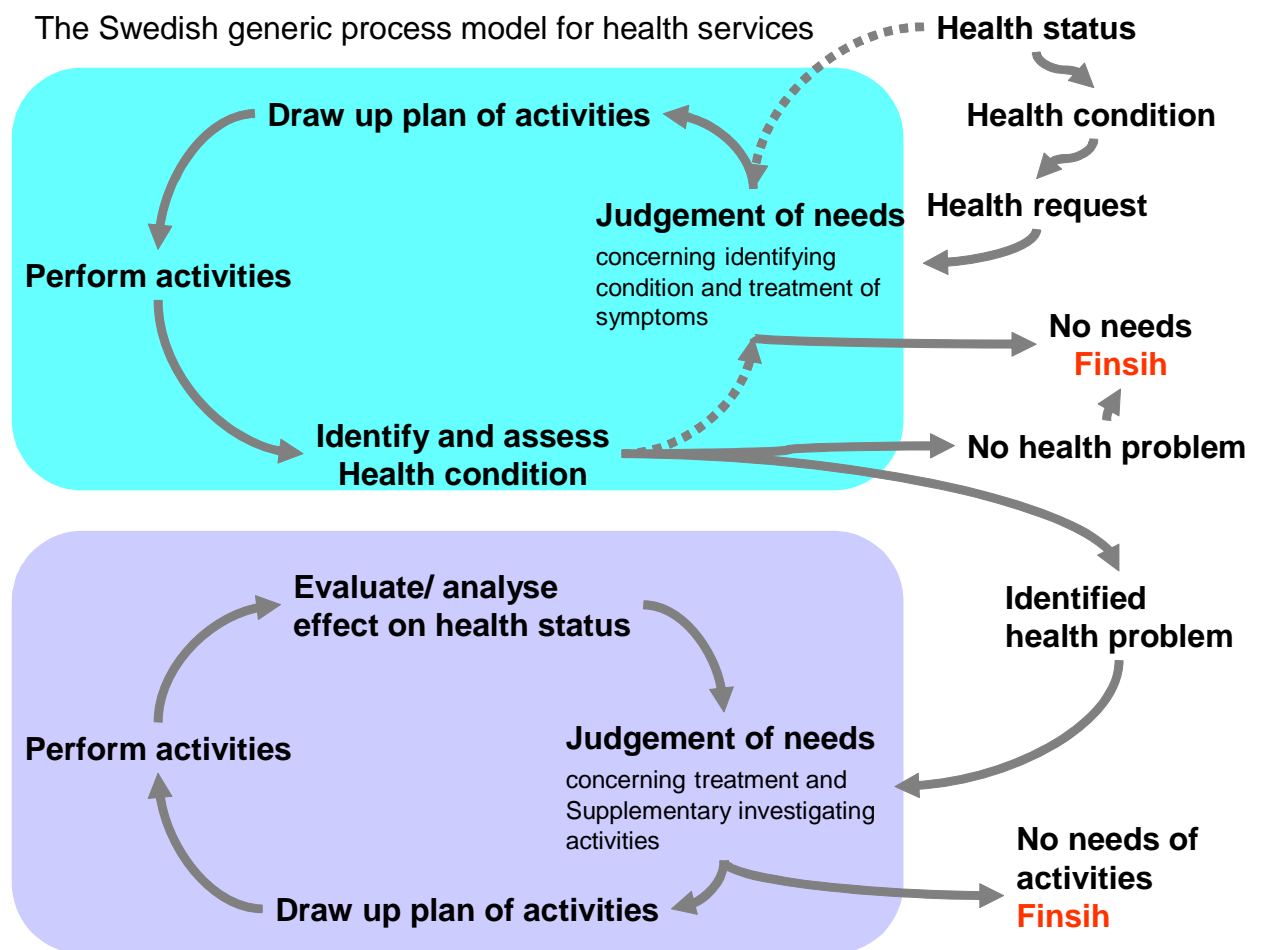


Blue= open EHR

However this pattern is not enough to fulfil the aims and starting points for being a comprehensive base for an information model for health services. The specialisation has to be put one step further to cover the aims for an information structure that allows development of information systems fulfilling requirements for comprehensiveness and clinical process management. The generic process model proposed in the Swedish project is therefore further specialised by applying the generic process pattern twice. The first sling in the generic process model presented below is used to identify the health problem with mainly investigating activities. The second sling is applied for describing mainly the treatment activities when the health problem is identified. In this way the complete clinical process could be covered and distinguished – from first contact in primary care to end of specialised care in hospitals.

The generic process model for health related services

The Swedish proposal to a generic process model to be generic for health care and social care and to be comprehensive regarding content and basic concepts is described below.



The reasons for applying the generic pattern twice are summarized as follows;

- Have respect for the (Swedish) legislative intentions
 - The individual's right to always get her/his health status assessed – sling 1
 - Measures in social care are considered as exercise of public authority – performed and distinguished in sling 2
- Have respect for natural ways of clinical working

- First find out what the problem is and thereafter take care of the problem; distinguished in slings 1 and 2
- Have respect for requirements for follow up and management
 - Follow up of symptoms for which the genesis have not been identified; sling 1, which also provides inclusion criteria for the health problem as an input to sling 2
 - Follow up efforts aimed to take care of identified and specified health problems; sling 2
 - Separate guidelines for investigating symptoms and for treating identified health conditions – create prerequisites for both types of knowledge based process management
- Have respect for expectations for making distributed provision of services possible
 - Different providers for identifying health problem and treatments respectively.

Comments to the generic process model for health related services

Input to the generic process is the health status of an individual who puts forward a request for consultation concerning his/her health.

The concept “health status” represents the real condition, not the condition perceived either by the individual or the professional actor.

The information/documentation that is relevant concerning the current health status and current requests for the individual needs to be identifiable/traceable. The concept for this is in this generic process model named health concern/health issue thread (the Swedish term would be closer to “health conjunction”).

The specific health consultation request and all consequences of that including activities, observations and assessments are in the model named “health issue”. A specific label for each specific request is needed for several reasons including prerequisites for knowledge based process management. by a professional actor

The process starts when any professional actor have received/documentated the request for consultation concerning an individual. The initial phase and activities in the process aim to result in a professional assessment of the individual’s health condition. The perceived condition should be distinguished from the “real” condition which is described as the “health status”. The individual and/or the professional actor (and other interested parties) can express their perception of the health status as a “perceived health status” or just a “health condition”. Investigations of different kinds are normally included in and dominating this first “sling”.

The professional assessment of the health condition after needed investigations constitutes an answer to the health related question in the request for consultation. The result of the assessment is the “by the professional actor perceived and assessed health condition”.

Next, the professional actor will identify if the current health condition also is a health problem. All health conditions which normally motivates any kind of professional treatment activity will be identified as a health problem. If the health condition is not identified as a health problem by the professional actor the process is finished as there are no further needs of activities.

The professionally identified health problem will constitute the input to the second sling in the process model. Based on the identified health condition, also identified as a health problem, the professional actor, in dialogue with the individual/patient, assess if the individual also in her/his specific situation could benefit from any kind of treatment that can be performed by the health service provider system. The judgement of indications for (treatment) activities is a responsibility for professional actors. The individual participates as an active part in the dialogue but the judgement is still up to the professional actor. The concept for this stage of the process is called “judgement of the needs concerning treatment and supplementary

investigation activities”. The identification of a health problem may also activate standardised plans (as clinical guidelines or protocols).

Professional advice and self care activities are not considered as treatment in this context. These advises are included in the consultation phase as a part of the answer to the question in the request for consultation concerning the individual’s health.

The next step in the process is to create an activity-plan for the (mainly treatment-) activities suggested to be performed. The plan should include all kinds of activities that are aimed to influence the health status of the individual. The plan should not be restricted to activities performed in the unit where the plan is created but include as many activities as could be foreseen in the current situation. Referrals and consultations should also be included as activities in the plan. The creation of this plan of activities should be regarded as an activity in itself with responsible professional actors for the planning. This actor or team based actors are then also responsible for the dialogue with and in getting the acceptance from the individual concerning the content of the plan.

The performance of the planned activities is next. The actor who proposed and planned the activity is responsible for her/his judgement of indications while the professional actor performing each activity is responsible for confirming the indication as well as for the performance. The performing actor belongs to an organisational unit whose managers are responsible for certain procedures, prerequisites and so on within the unit.

Events can occur during the process and most often during performance of activities. These events influence the process but are not aimed to do so. A specific kind of event is what we call adverse events. The event in itself is not an act but the observation of the event is regarded as an (unplanned) activity in the process.

After the completion of all activities the health status is perceived and analysed again in the follow up. If the assessment of the health status concludes that there are no further needs/indications for activities the process is finished. If needs are still current, the second process loop is repeated.

Karl-Henrik Lundell
karl-henrik.lundell@lj.se