Country Brief: Netherlands

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About *eHealth Strategies* and this report

To review progress made on eHealth by EU Member States, the European Commission has awarded the eHealth strategies study to empirica. This country brief analyses eHealth policies and implementations on the Member State level through the lens of the eHealth Action Plan priorities. A final study report on EU wide progress complements this analysis.

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Executive summary

An eHealth roadmap in ICT terms was produced in 2006 entitled "ICT in Dutch Healthcare; An International Perspective".[1] From a Dutch perspective, eHealth should not be regarded as separate from (regular) health; therefore no dedicated, encompassing eHealth policy document exists, but several multi-focused policies. The focus in the Netherlands has been on implementation of an electronic medication record and an electronic general practitioner's summary. One of the latest developments in the Netherlands is the Healthcare Innovation Platform (Zorginnovatieplatform, ZIP) Inspiration for Innovation[2] which includes development of technologies for chronically ill and older people.

The eHealth applications that have been assessed in this report in terms of progress towards reaching eHealth interoperability objectives include patient summaries, electronic health records, ePrescription, standards, and telemedicine. The Netherlands development in each of these areas is summarised below:

In terms of patient summaries in the Netherlands the "Patient Summary Record for the Locum GP" (WDH – Waarneem Dossier Huisartsen) was developed and approved as proof of concept in 2006. It is implicitly considered the patient summary for the entire healthcare system. By the end of 2009 the WDH had been put extensively to use between GPs and GP after hour services. For further information please see section 3.3.1 of this report.

The development of electronic health records (EHR) is underway in the Netherlands. A proposal of law is currently under discussion in the Dutch senate to introduce a system for a countrywide shared EHR. The structure of which is a gradual deployment of the national EHR, not all health systems at once. Further information is available in section 3.3.1 of this report.

The ePrescription procedure between GPs and pharmacists, within a region, has been routine in the Netherlands for many years now. Take up lies between 20 and 50%, depending on the region. For more details please see 3.3.2 of this report.

In terms of standards the Netherlands is member of the IHTSDO, the International Health Terminology Standards Development Organisation. Nictiz, the national expertise centre facilitating ICT in healthcare, is executing the activities in the Netherlands. More specific information can be found in section 3.3.3 of this report.

For telemedicine and telecare services chronic patients and elderly people are the focus points, with Dutch telemedicine services concerning prevention (e-mental health) and wellness in operation. A recent development in the field of telemedicine has been a special initiative eHealthNu (Nu = now), which started at the end of 2009 and is concerned with promoting eHealth, including telemedicine schemes. For more information please see section 3.3.4 of this report.

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[1] Ministry of Health 2006

[2] Zorginnovatieplatform 2009

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1   Introduction to the report

1.1   Motivation of the eHealth Strategies study

Following the *Communication* of the European Commission (EC) on "eHealth – making healthcare better for European citizens: An action plan for a European eHealth Area",[3] Member States of the European Union (EU) have committed themselves to develop and issue national roadmaps – national strategies and plans for the deployment of eHealth applications addressing policy actions identified in the European eHealth Action Plan.

The *2004 eHealth Action Plan* required the Commission to *regularly monitor* the state of the art in deployment of eHealth, the progress made in agreeing on and updating national eHealth Roadmaps, and to facilitate the exchange of good practices. Furthermore, in December 2006 the EU Competitiveness Council agreed to launch the *Lead Market Initiative*[4] as a new policy approach aiming at the creation of markets with high economic and social value, in which European companies could develop a globally leading role. Following this impetus, the Roadmap for implementation of the "eHealth Task Force Lead Market Initiative" also identified better coordination and exchange of good practices in eHealth as a way to reduce market fragmentation and lack of interoperability.[5]

On the more specific aspects of electronic health record (EHR) systems, the recent *EC Recommendation on cross-border interoperability of electronic health record systems*[6] notes under "Monitoring and Evaluation", that "in order to ensure monitoring and evaluation of cross-border interoperability of electronic health record systems, Member States should: consider the possibilities for setting up a monitoring observatory for interoperability of electronic health record systems in the Community to monitor, benchmark and assess progress on technical and semantic interoperability for successful implementation of electronic health record systems." The present study certainly is a contribution to monitoring the progress made in establishing national/regional EHR systems in Member States. It also provides analytical information and support to current efforts by the European Large Scale Pilot (LSP) on cross-border Patient Summary and ePrescription services, the epSOS - European patients Smart Open Services - project.[7] With the involvement of almost all Member States, its goal is to define and implement a European wide standard for such applications at the interface between national health systems.

Earlier, in line with the requirement to "regularly monitor the state of the art in deployment of eHealth", the EC already funded a first project to map national eHealth strategies – the eHealth ERA "Towards the establishment of a European eHealth Research Area" (FP6 Coordination Action)[8] - and a project on "Good eHealth: Study on the exchange of good practices in eHealth"[9] mapping good practices in Europe - both of which provided

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[3] European Commission 2004

[4] European Commission 2007

[5] European Communities 2007

[6] European Commission 2008

[7] Smart Open Services for European Patients

[8] empirica 2006

[9] European Commission; Information Society and Media Directorate-General 2009

valuable input to the present *eHealth Strategies* work and its reports. Member States' representatives and eHealth stakeholders, e.g. in the context of the *i2010 Subgroup on eHealth* and the annual European High Level eHealth Conferences have underlined the importance of this work and the need to maintain it updated to continue to benefit from it.

This country report on the Netherlands summarises main findings and an assessment of progress made towards realising key objectives of the eHealth Action Plan. It presents lessons learned from the national eHealth programme, planning and implementation efforts and provides an outlook on future developments.

1.2   Survey methodology

Through the Europe-wide network of national correspondents national level information has been collected. For the Netherlands, Chris Flim in the position of director of Flim P&C[10] supported this research. Flim P&C is a research and consulting firm specialising in information technology topics. Relevant information on policy contexts and health system situation, policies and initiatives as well as examples for specific applications was collected by the overall project lead - empirica in Bonn, Germany

The key tool to collect this information from the different national correspondents was an online survey template containing six main sections:

   A.   National eHealth Strategy

   B.   eHealth Implementations

   C.   Legal and Regulatory Facilitators

   D.   Administrative and Process Support

   E.   Financing and Reimbursement Issues

   F.   Evaluation

Under each section, specific questions were formulated and combined with free text fields and drop-down menus. The drop-down menus were designed to capture dates and stages of development (planning/implementation/routine operation). In addition, drop-down menus were designed to limit the number of possible answering options, for example with regard to specific telemedicine services or issues included in a strategy document. The overall purpose was to assure as much consistency as reasonably possible when comparing developments in different countries, in spite of the well-know disparity of European national and regional health system structures and services.

Under Section B on eHealth implementation, questions regarding the following applications were formulated: existence and deployment of patient and healthcare provider identifiers, eCards, patient summary, ePrescription, standards as well as telemonitoring and telecare.

The data and information gathering followed a multi-stage approach. In order to create a *baseline* for the progress assessment, the empirica team filled in those parts of the

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[10] flim Project Management & Consultancy   http://www.flimprojectmanagement.nl

respective questions dealing with the state of affairs about 3 to 4 years ago, thereby drawing on data from earlier eHealth ERA reports, case studies, etc. to the extent meaningfully possible. In the next step, national correspondents respectively partners from the study team filled in the template on recent developments in the healthcare sector of the corresponding country. These results were checked, further improved and validated by independent experts whenever possible.

Progress of eHealth in the Netherlands is described in chapter 3 of this report in the respective thematic subsections. The graphical illustrations presented there deliberately focus on key items on the progress timeline and cannot reflect all activities undertaken.

This report was subjected to both an internal and an external quality review process. Nevertheless, the document may not fully reflect the real situation and the analysis may not be exhaustive due to focusing on European policy priorities as well as due to limited study resources, and the consequent need for preferentially describing certain activities over others. Also, the views of those who helped to collect, interpret and validate contents may have had an impact.

1.3   Outline

At the outset and as an introduction, the report provides in chapter 2 general background information on the *Dutch* healthcare system. It is concerned with the overall system setting, such as decision making bodies, healthcare service providers and health indicator data.

Chapter 0 presents the current situation of selected key eHealth developments based on detailed analyses of available documents and other information by national correspondents and data gathered by them through a well-structured online questionnaire. It touches on issues and challenges around eHealth policy activities, administrative and organisational structure, the deployment of selected eHealth applications, technical aspects of their implementation, legal and regulatory facilitators, financing and reimbursement issues, and finally evaluation results, plans, and activities

The report finishes with a short outlook.

2   Healthcare system setting

2.1   Country introduction[11]

The Netherlands is a decentralised unit state. Policy making happens at national, regional (12 provinces) and local (around 500 municipalities) level. Policy implementation is decentralised to the lower levels, unless it can be done more efficiently at the national level. Many services are provided in municipalities ("on street level"). The regional level, meanwhile, mainly takes responsibility for environmental and planning issues and does not provide services to individual citizens.

The Netherlands has a prosperous and open economy, which depends heavily on foreign trade. GDP per head is above the EU15 average. The economy is noted for stable

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[11] eUser 2005

industrial relations, moderate unemployment and inflation, a flexible labour market, a sizeable current account surplus, and an important role as a European transportation hub. The country is also one of the leading European nations for attracting foreign direct investment.

Hospitals, GPs, paramedics, pharmacies, elderly care homes, and homecare are organised as private care providers. Most healthcare (prevention, cure and long term care) is financed by central government. Homecare and wellness is financed by municipalities, whose role is growing.

With regard to public health, the Dutch health system is organised as a regional network of municipal health services, which take care of child health examination, vaccinations, environmental health, health protection and health promotion activities. Local public health includes all aspects of infectious disease control, general hygiene, school health and public health education, and the dissemination of information on rearing children. The primary care system supports the public health tasks as does a series of national institutes and university departments in the various public health areas. This includes institutes that focus on healthcare areas with important public health implications, such as mental health and addiction and primary healthcare.[12]

Key facts about the Dutch healthcare system:[13]

Life expectancy at birth: 80.5 years

Healthcare Expenditure as % of GDP: 9.8% (OECD 2007)

WHO Ranking of Healthcare systems: rank 17

Public sector healthcare expenditure as % of total healthcare expenditure: 62.5% (OECD 2007)

2.2 Healthcare governance

Decision making bodies, responsibilities, sharing of power

The Ministry of Health, Welfare and Sport is responsible at the highest level for legislation, policies and budgets in healthcare. Measures by the ministry are currently changing the roles of patients significantly towards more patient empowerment which gives them more opportunities, but also more responsibilities. The Ministry and local authorities are jointly responsible for public healthcare, while the former, together with the Ministry of Interior and Kingdom Relations, is charged with integrated public safety policy.

Healthcare service providers

Public health is organised through municipal or district services, with supervision and monitoring at regional and national level by the Health Care Inspectorate. Strengthening preventive policies has been the leading theme of the public health services. Emphasis is

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[12] Exter, Hermans et al. 2004, p.63/65

[13] World Health Organization 2000; Health Consumer Powerhouse 2008; World Health Organization 2009

placed on reducing socioeconomic differences (the most widespread problem) and in trying to reduce morbidity in the elderly.

Primary healthcare is well developed and is provided mainly by family physicians, general practitioners (GPs), who are the gatekeepers and dominant figures in the system. The impact of gatekeeping is illustrated by the low referral rate, as the majority of medical problems are treated by GPs (primary care constitutes two thirds of all ambulatory care contacts). GPs spend a great deal of time talking with patients, and communication skills are an integral part of medical training. This helps to explain the very low prescription rate, with prescriptions given in about 66% of cases, compared to 75–95% in other European countries. Family physicians maintain independent and largely individual practices in each community.[14] In addition, in recent years, the role of general practice nurses has increased. Around 60% of GP practices now have a GP nurse whose activities allow for more personalised care, especially for chronically ill patients.[15]

GP's are reimbursed on the basis of a consultation reimbursement rate and a visit reimbursement rate for up to 20 minutes, and different rates (or tariffs) for longer than 20 minutes. This will be changed gradually for the treatment of chronic diseases, starting with diabetes in 2010, where integrated cost mechanisms are replacing separate pay-per-treatment for each patient. In addition, (maximum) rates apply for telephone consultations, repeat prescriptions and vaccinations. Theoretically, the GP could use tele-health services, because he is free to use the equipment he sees as most appropriate for the consultation. However, the reimbursement rate is lower than for physical consultations.

Secondary and tertiary care is mainly provided by medical specialists in hospitals with both outpatient and inpatient facilities. More than 90% of the hospitals are private, non-profit facilities; public university hospitals make up the balance.[16]

Since 1st January 2005, hospital treatment has been funded via so-called diagnosis treatment combinations (diagnosebehandelingcombinaties (DBCs)).

A DBC is the entire process from the diagnosis by the specialist up to and including (any) resulting hospital treatment. The combination of diagnosis and treatment results is a single rate that the hospital charges for a particular patient. This means that a DBC consists of all procedures performed by a hospital and a medical specialist as a result of a particular cure case. Each DBC has its own laid down rate, which consists of specialist fees and hospital costs. Unlike diagnosis related groups (DRGs) hospitals are not free to choose the treatment they consider as most effective and/or cost efficient. They are bound to the treatment determined by the diagnosis. Interestingly the current system of DBCs is moving towards a less regulated DRG-type, giving the healthcare provider more independence in the choice of treatment. Already now, it is possible for a healthcare provider to negotiate with an insurance company on a case-to-case basis the specific type of treatment procedures to be included in specific DBCs. This applies to curative care and mental care only.

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[14] European Observatory on Health Systems and Policies 2005, p.5

[15] Groenewegen 2007

[16] see above

Figure 1: Important features of primary healthcare organisation in the Netherlands

Political/administrative unit responsible for primary healthcare	No single responsibility, key role for GP, but also roles for pharmacies, paramedics, elderly (home)care, chronic care organisations.
Consumer Choice	Free choice of GP, (although sometimes this patient's right in practical situations may not be fully obtained).
Financing	Through taxes and income dependent contributions.
Public or private providers	Mainly private providers in a heavily regulated market.
Gatekeeping function of the GP	GP is gatekeeper for (more expensive) medical specialists, but not for all medical services e.g. free access to physiotherapist.
Integrating health: initiatives for coordination	For chronic care: Integrated costing principle (not per treatment, but for treatment of the disease as a whole, with subcontracting). Municipalities finance homecare and wellness more and more in integrated programmes.

2.3   Recent reforms and priorities of health system/public health

Currently ongoing reforms in the health and social care systems

For many years, Dutch health insurance for basic cure services consisted of a two-pillar system. One pillar consisted of the social health insurance system for people in the lower income brackets, and the other pillar was the voluntary private health insurance system for people with higher incomes. In 2006, the Dutch government implemented radical market reforms and the two pillars fused into one mandatory national health insurance system executed by private insurers. The key idea of the market reforms is to increase efficiency by promoting more competition on the health insurance market as well as on the healthcare provider market.[17]

Following this healthcare reform, the role of the Dutch Government is now a regulatory one ensuring good access to and the high quality of the system as provision is left to private health suppliers competing for patients.

The Government's main role is to define the basic entitlement to care and ensure that all insurers offer this package to all Dutch people at premiums calculated independently of risk. Those companies that take on riskier patients are compensated by the Government, which is intended to preserve competition in the market. Finally, the Government aids

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[17] Douven, Mot et al. 2007

those members of society less able to pay for health insurance, such as students and pensioners by providing rebates on health insurance premiums.

Thus, the provision and funding of healthcare is independent from the Government, with the State intervening only where the market would fail to guarantee universal access, equity and competition.[18]

The Act on Licensing of Care Provider Institutions was also part of the healthcare reform in 2006. An important provision is that the ban of for-profit hospital care is planned to be lifted in 2012. Lifting the ban is essential to attract private capital resources for hospital care. Yet, the government opts for a cautious approach. An important argument to postpone this market-making decision is that in its view the conditions for for-profit hospital care are not yet fulfilled. The new case-mix based payment system must be fully operative and hospitals must operate as risk-bearing entities that may go bankrupt. It is foreseen that around 50% will be freely negotiable by January 2011. The government is also concerned that an immediate lift of the ban may lead to situations in which the economic value of hospitals, that was created in the past with public resources in a risk-free environment, may leak to the commercial sector. The position of the new government on this market-making reform is uncertain yet. Here, crucial changes are underway, which concern financing and cost reduction within the healthcare system.[19] Further pressure on healthcare financing can be expected from the government's overall cost reduction target of 20%, following interventions during the recent financial crisis.

2.4 ICT use among general practitioners

This section provides a brief overview of relevant ICT related infrastructure and services data. It draws on earlier studies commissioned by the EC, notably the Indicators eHealth Study . Although the results of this study date from 2007 and may therefore not reflect latest changes, a more recent pan-European survey is not available[20].

In terms of infrastructure, 99% of Dutch GP practices use a computer. Almost the same share, that is 97% of the practices, utilises an Internet connection. In the Netherlands, broadband represents the most common form of access to the Internet with 82% of GP practices utilising broad-band connections.

With regard to the availability of a computer in the consultation room compared to the actual use of the PC in consultations with the patients, there is nearly no difference as both availability and use are nearly universal (99% of practices and 94% of practices respectively).

The storage of electronic patient data is common practice in the Netherlands. All types of medical patient data are stored in digital form in more than 90% of GP practices.

In the Netherlands the use of electronic networks for the transmission of medical patient data is well established and widespread. 84% of GP practices receive analytic results from labs and moreover 26% exchange data with other healthcare providers. The Netherlands shows exceptionally high usage rates when it comes to the transfer of any

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[18] Bosanquet, Haldenby et al. 2008

[19] Maarse 2007

[20] ICT and eHealth use among General Practitioners in Europe 2007

kind of medical patient data, as well as with regard to the transfer of administrative patient data. Especially remarkable in the Netherlands is the high occurrence of ePrescribing which is used by 71% of the practices.

Figure 2: eHealth Use by GPs in the Netherlands
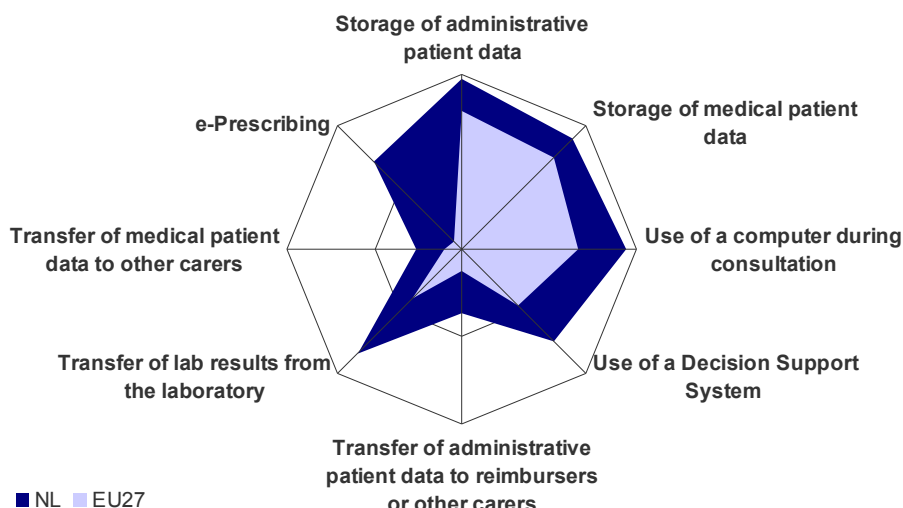
Indicators: Compound indicators of eHealth use (cf. annex for more information), % values. Source: empirica, Pilot on eHealth Indicators, 2007.

3 eHealth Strategies survey results

The following sections present the results of the eHealth Strategies country survey. In the first section, the eHealth policy actions undertaken in the Netherlands are presented. This is followed by a presentation of administrative and organisational measures taken. Section 3.3 presents results on key eHealth applications. Section 3.4 focuses on the technical side of eHealth, namely the role of the patient and healthcare provider identifiers and the role of eCards. Legal and regulatory facilitators as well as financing and reimbursement issues are presented in the following chapters, 3.5 and 3.6. The report concludes with evaluation activities (3.7) in the country and an outlook (4).

3.1 eHealth policy action

The eHealth strategies of EU and EEA countries are not always labelled as such. Some countries may indeed publish a policy document which refers to the ICT strategy in the healthcare sector. Other countries such as France and Germany have enshrined the central eHealth activities in legislation governing the healthcare sector. In Germany, the relevant law is the law on the modernisation of healthcare; in France the introduction of an electronic medical record is included in a law concerning social security.

3.1.1 Current strategy/roadmap

The Netherlands has no dedicated national eHealth Strategy document. From a Dutch perspective, eHealth should not be regarded as separate from (regular) health. A number of different documents can together be considered as the Dutch strategy documents for eHealth. The first of these documents is entitled "ICT in Dutch Healthcare; An International Perspective".[21] This document laid down for the first time the fact that other strategies and pieces of legislation exist, which form the building blocks for the eHealth strategy. For example, the legislation on the national electronic health record (status by the end of 2009: accepted by the National Parliament, under discussion in the Senate), the Nictiz agenda for ICT in healthcare (most recent version Q4 2008)[22]. These and other documents address issues such as infrastructure, specific applications, standards, as well as legal and financial aspects.

"ICT in Dutch Healthcare; an International Perspective"

Many aspects that apply to the Dutch eHealth system have already been illustrated in the 2007 eHealth ERA report.[23] Here, the focus was (and largely continues to be) on the implementation of an electronic medication record and an electronic general practitioner's summary. Overall, the Netherlands was, at this time, aiming for a step-by-step approach towards full deployment of eHealth. An overview of key policy documents related to eHealth can be found in figure 3 below.

Some further examples of broadly orientated documents that deal, amongst others, with eHealth are the following: 1) Governmental ICT agenda (until 2012), which includes the Actionprogram Social Sectors and ICT (among them Healthcare). This ICT agenda covers issues like open standards, open source, service guidelines, also for healthcare. 2) The Innovation Platform (IP) has published its vision paper. This paper, addressed to the Dutch government, lists a number of recommended research policy actions. Here, investments in healthcare related applications are considered a key element of innovation.[24] 3) Specific documents or legislation cover other areas, for example the Legislation on the Citizen Service Number (BSN, e-ID or programs for 'Personal Webpages' (for governmental services).

More specific for the Healthcare Sector are: 4) The vision of the Healthcare Innovation Platform (Zorginnovatieplatform, ZIP) Inspiration for Innovation[25].The focus of this Healthcare Innovation Platform is oriented to chronically ill and older people and one of the three themes is more development of the possibilities van IT and technology. The development of eHealth applications and laboursaving technologies are explicitly mentioned. 5) The guideline of the Royal Dutch Medical Association (KNMG (Koninklijke Nederlandse Maatschappij tot bevordering van de Geneeskunst). On the 1st of January 2010, this association published a guideline on how to handle medical data, including their view on the EHR and the use of the citizen service number in care.[26] Unlike in other federal or regionalised countries such as Italy and Spain, there are no formal provincial

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[21] Ministry of Health 2006

[22] National IT institute for Healthcare June 2008

[23] Haveman and Flim 2007

[24] Rinnooy Kan, Dijkgraaf et al. 2009

[25] Zorginnovatieplatform 2009

[26] Royal Dutch Medical Association 2010

documents on eHealth in the Netherlands. However, quite some provinces have programmes in which eHealth products and services are piloted or implemented. Health (including eHealth) policy in general is a national concern. Implementation and execution is organised mainly at a municipal level and/or by care providers. There are also regional innovation platforms, regional networks and service providers which have documents describing their strategy and objectives, but these organisations have no governmental status. In most cases these organisations are governed by a mix of healthcare providers, insurers and provincial/local government.

The EU eHealth Action Plan is not explicitly mentioned in the documents, but it has been addressed in the progress reports on electronic patient records for the Parliament. In these progress reports a section on international developments has been added. In an earlier version, attention was paid to international projects on an "ad hoc" basis. Furthermore, the Parliament was recently informed on the Prague Declaration and recently on the Barcelona Declaration on eHealth. In general, eHealth is becoming more important as part of healthcare at a political level – this includes international developments.

Figure 3: Dutch Policy Documents related to eHealth[27]
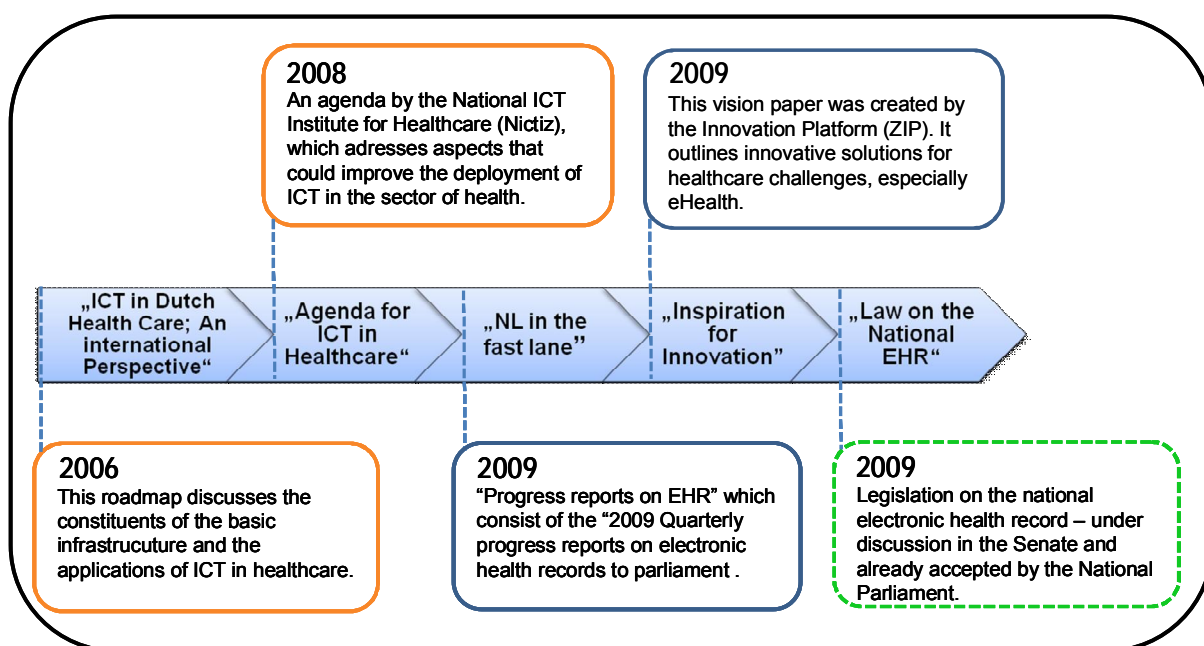
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3.2   Administrative and organisational structure

Competence centre "Nictiz"

There is a national competence centre in the Netherlands. The organisation, called "Nictiz" (**National IT Institute for Healthcare**), has three tasks: 1) Strategy development, coordination, knowledge and advice on all aspects of eHealth. 2) The development and maintenance of standards, protocols, profiles on IT in healthcare. 3) The specification, the procurement and implementation management, and the day-to-day running of the national infrastructure.

Regarding financial transactions in the healthcare system, i.e. the processing of payments between the different healthcare providers and the insurance companies, a dedicated company called "VECOZO" (Secure Communications in Healthcare) has been set up. A large part of outpatient care providers in the Netherlands are signed up to the system.[28]

Nictiz is an independent foundation mandated by the Ministry of Health, Welfare and Sport. Other institutes are either subsidiaries of Ministries (implementation bodies) or independent foundations. Regional organisations are either foundations or private limited liability companies.

However, many other organisations are involved in implementing eHealth. Some examples are:

Dutch programmes/organisations for eHealth implementation

Disease management programmes coordinated by ZonMW, the Dutch organisation for health research and development

Self management programmes coordinated by CBO, the Dutch institute for quality in healthcare

Transition programme in long-term care by the Ministry of Health

Projects at knowledge institutes like Trimbos, Vilans, TNO, support local and regional tests and pilots

Actionprogram Social Sectors and IT aimed at breakthroughs and upscaling of eHealth initiatives

Healthcare Innovation Platform: financial arrangements executed by Agentschap.nl

Agentschap,nl (the former Senternovem), a subsidiary of the Ministry of Economic Affairs also supports other financial instruments

Syntens – Innovation for SME's have the NDIV program with an eHealth track (NDIV = Netherlands Digitally Connected)

Many developments take place in regional constellations, consisting of local healthcare stakeholders. These developments and experiences are essential for a roll-out of the national eHealth structure and services.

Nictiz is funded through basic and project financing, mainly by the Ministry of Health, Welfare and Sport. Most other organisations are also largely financed by the Ministry of Health, Welfare and Sport for health related activities, some are also – to some extent – funded by other Ministries or institutes.

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[28] VECOZO 2009

Stakeholder integration through Nictiz and a platform for ICT

The incorporation and integration of different stakeholder views in the development of eHealth is essential and complex. The Netherlands has an extensive governance structure for the national eHealth infrastructure and projects executed by the Ministry of Health, Welfare and Sport and Nictiz: A steering committee for ICT and Innovation in healthcare, which is responsible for decision making on strategy, roadmap and programmes. Additionally, there is a platform for ICT and innovation in healthcare, which prepares decision making in the field. The steering committee and platform consist of board members of stakeholder associations, such as patients, doctors, nurses, pharmacists, healthcare providing organisations and insurance companies.

For each programme, programme advisory committees are established in which policy makers of relevant associations follow and advise decisions within the programme. Furthermore, Nictiz has an independent advisory board for organisation strategy and development, consisting of influential representatives from the health sector with eHealth affinity. Nictiz has also set up a platform for cooperation with and between regional eHealth organisations.

Challenging for the field of administration and organisation of eHealth is the integration of different opinions regarding the stakes of all parties involved. For the future, the Netherlands plans on focusing more on the creation of innovative movements. Innovation is a "bottom up" process, guided and facilitated "top down". Therefore, for the Dutch it is crucial to make use of existing local and regional structures. The Healthcare Innovation Platform (ZIP) is aimed to speed up innovation oriented to chronically ill and older people.

3.3 Deployment of eHealth applications

3.3.1 Patient summary and electronic health record (EHR)

In this study, the epSOS project's definition[29] of a patient summary was used as a general guideline. There a patient summary is defined as a minimum set of a patient's data which would provide a health professional with essential information needed in case of unexpected or unscheduled care (e.g. emergency, accident), but also in case of planned care (e.g. after a relocation, cross-organisational care path).

Lacking a standard definition, a patient's electronic health record (EHR) is here understood as an integrated or also interlinked (virtual) record of ALL his/her health-related data independent of when, where and by whom the data were recorded. In other words, it is an account of his/her diverse encounters with the health system as recorded in patient or medical records (EPR or EMR) maintained by various providers like GP, specialists, hospitals, laboratories, pharmacies etc. Such records may contain a patient summary as a subset. As of yet, fully-fledged EHR systems rarely exist, e.g. in regional health systems like Andalucia in Spain or Kronoberg in Sweden, or in HMOs (health maintenance organisations) like Kaiser Permanente in the USA.

It should be noted that in most policy documents reference is made simply to an "EHR" without any explanation of what is meant by it, thereby in reality even a single, basic electronic clinical record of a few recent health data may qualify. As a consequence, this

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[29] European Patients Smart and Open Services (epSOS)

section can only report on national activities connected to this wide variety of health-related records without being able to clearly pinpoint what (final) development stage is actually aimed for or has been reached so far.

For a good understanding of the latest status on patient summaries in the Netherlands, it is of crucial importance to distinguish local or regional systems from the foreseen national system. Local or regional health records are already in use in the Netherlands, but they are not regulated by any specific legal provisions. The proposal of law currently under discussion in the Dutch senate intends to introduce a system for a countrywide shared EHR. It will, however, only aim at data processing within the Netherlands.

The Dutch electronic health record - as foreseen in the latest available proposal of law - will consist of a set of applications linked to the national infrastructure 'AORTA'. The AORTA infrastructure will provide a national registration system for identification and authentication on the one hand and a reference indexing system, National Switch Point, on the other hand. However, instead of deploying full EHRs linking data from all healthcare information systems at once, the government opted for a gradual deployment of the national EHR. The Electronic Medication Record and a Patient Summary Record for the Locum GP were chosen as the two first chapters of the EHR.

The "Patient Summary Record for the Locum GP" (WDH – Waarneem Dossier Huisartsen) was developed and approved as proof of concept in 2006. It contains a set of basic information based on the professional summary for GPs and is implicitly considered as the patient summary for the entire healthcare system.

Many local or regional organisations of general practitioners used the WDH to exchange data between GP's and GP after hours services (evening, night, and weekend) by the end of 2009. Only a few of them use the "Patient Summary Record for the Locum GP" also for national exchange of information.

This summary is based on the professional summary for GPs and implicitly is considered as the patient summary for the entire healthcare system now. On this rather pragmatic approach, no formal agreement has been made with all other healthcare providers and most importantly, with the patient. Therefore, in the perceived end situation, it will be the patient who decides which care professional gets to see what information on his or her health record.

The professional summary, from which the patient summary is derived, consists of: the complete episode list, the journal list of the five most recent consultations (if there had been more consultations in the past four months, all journal lines sent from within this period), the drug use (current medication and medication history of the last four months), all medical intolerances and contra-indications, recent data transfer from other care providers.

Figure 4 on page 20 summarises the key developments regarding the patient summary in the Netherlands.

This data, including the electronic medication record, the electronic out-of-hours record for GPs and the electronic declaration system (for reimbursement) is connected to the national switch point. The data intersection is the core element of the EHR introduction,

as it has an index with pointers to all registered records. During this process, the EHRs remain with the provider and no data is stored centrally.[30]

The further deployment of the system will depend on different issues, the most important being:

1) Acceptance on the legislation for the electronic health record.

2) Financial compensation for connecting to the national hub.

3) The implementation of patient access.

4) The establishment of synergy between national and regional activities and approaches.

Up until today, the rules for patient records and their use are mainly based on the Medical Treatment Act (WGBO, Wet Geneeskundige Behandelovereenkomst) and the Personal Data Protection Act (WBP, Wet Bescherming Persoonsgegevens). As a consequence it is the patient who decides which care professional gets to see what information on his or her health record. In the current proposal of law on the EHR, however the use of the national system for EHRs would become obligatory for the healthcare practitioners. The practitioner will furthermore be obliged by law to register health data for every one of his patients, unless a patient explicitly opts-out. However, before a practitioner can access an EHR through the national system of one of his patients, that patient's informed consent will be required. The patient will furthermore be able to block or remove certain data or certain parts of his EHR through his practitioner. It is the Dutch Ministry's intention to give the patient access to his own medical records, but this is not yet in place[31].

In terms of condition-specific summaries, the Netherlands is currently developing – as one of the next chapters of the national electronic health record – a diabetes summary (e-diabetes), based on a defined health standard. Although no concrete plans have been made, up till now, to implement the e-diabetes summary in the EHR, the process to develop e-diabetes also defines the road for other chronic diseases.

Diabetes, COPD/Asthma, Chronic Heart Failure and Vascular diseases are most focused on, because they are part of a healthcare reorganisation programme of the Ministry of Health, Welfare and Sport with integrated financing of integrated care based on healthcare standards. In this programme, diabetes is the frontrunner as well, and other chronic diseases follow.

For the patient summary, different challenges can be outlined:

> **Challenges for the creation of a Dutch patient summary:**

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[30] Tange 2008

[31] Voorstel van Wet tot Wijziging van de Wet gebruik burgerservicenummer in de zorg in verband met de elektronische informatieuitwisseling in de zorg, tweede kamer, 2007-08, 31 466, nr.2; Memorie van toelichting bij het voorstel van wet, tweede kamer, 2007-08, nr.3 en Verslag van de expertenbijeenkomst over het elektronisch patiëntendossier van de vaste commissie voor volksgezondheid, welzijn en sport/jeugd en gezin, eerste kamer, 2009-10, 31 466, E, all available throuhg: http://www.minvws.nl/dossiers/elektronisch-patienten-dossier/kamerstukken/..

Implementing patient access (concerning technical barriers)

Acceptance by patients and care providers

Acceptance by all stakeholders

Strict record keeping by the GPs – it will cost time to upgrade all GP records to make the information fully usable for patients and other healthcare professionals

Making the (national) EHR an integral part of healthcare processes

Usage of the national EHR – as the legislation makes the connection mandatory, but not the actual use

Objectives by GPs concerning patient access – HCP[32] association guidelines for patient access were challenged by patient associations and up to this point no formal agreement has been reached by the MoH

In summary, the planned patient access may delay the implementation process, but it is considered important for uptake and usage of the national electronic health record by the Ministry of Health, because it will give transparency for the patient and make him or her an active partner (if wanted by the patient). The exchange of medical information will most likely shift from a discussion between government and care providers, to a discussion between patients and care providers, facilitated by the government.

Figure 4: Patient Summary in the Netherlands
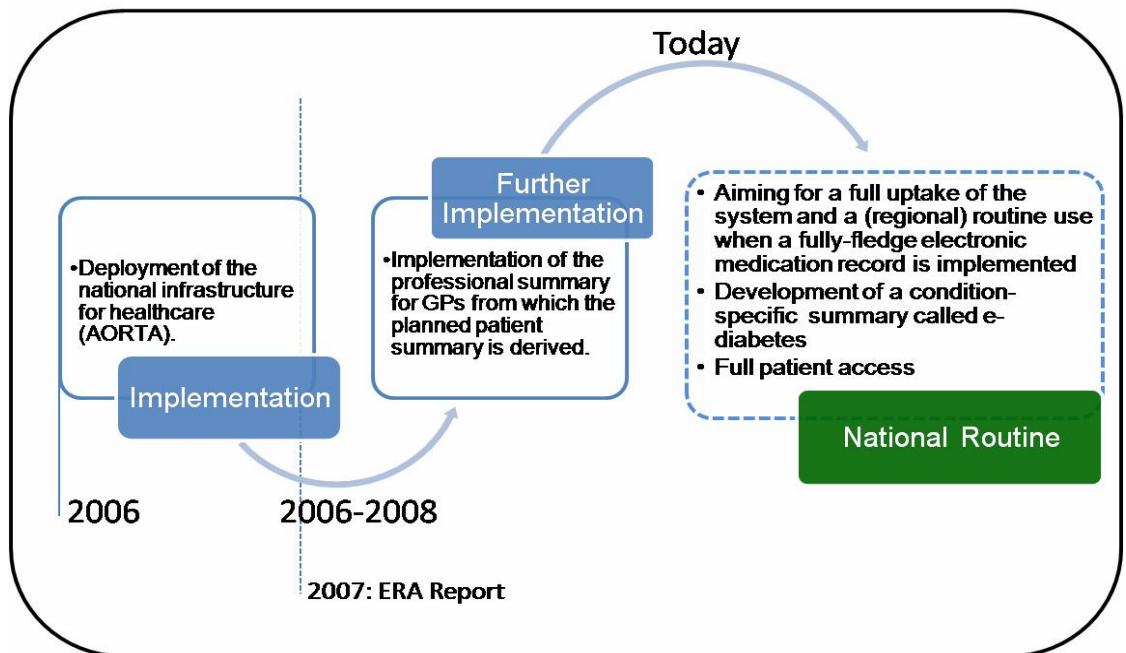
© empirica 2009

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[32] Healthcare Provider (HCP)

3.3.2 ePrescription

In the framework of this study and following work in epSOS[33], ePrescription is understood as the process of the electronic transfer of a prescription by a healthcare provider to a pharmacy for retrieval of the drug by the patient. In this strict sense, only a few European countries can claim to have implemented a fully operational ePrescription service.

Regional routine of ePrescription through the OZIS network

The electronic prescribing procedure through ePrescription between GPs and pharmacists has been regional routine in the Netherlands for many years now. A prescription is sent through the regional OZIS network, a communication protocol that makes it possible for pharmacists to exchange medication data by sharing a regionally accessible electronic medication record. Up till now, no national standard has been defined (and implemented) yet.

The take up for the regional transmission of ePrescription lies between 20 and 50%, whereas a distinction has to be made between general GPs and specialists: GPs have an estimated take up of 50% and specialists below 10%.

A challenging issue for ePrescription in general is that it starts with the medication record. The added value mainly lies within the electronic filing and exchange of this information. For ePrescription itself, challenges may concern the fear of pharmacists over using their unique position and/or how to get specialists to use computers, especially in an outpatient setting.

Furthermore, added value may rise when it is used for medication safety as well. Here, availability of relevant patient information (e.g. medication use, allergies, age) could reduce possible risks in prescription. This is the next step after the implementation of the medication record (i.e. delivered medication by pharmacists). Therefore, information should not only be available at the location of the distributor, but as well at the location of the prescriber. Additionally, decision support tools should be used.

3.3.3 Standards

Standards are not only crucial to enable interoperable exchange of meaningful information in the healthcare system; they also ensure secure access to patient records by healthcare providers and citizens. This study aims to identify, among other usage, standards related to the domain of health informatics, such as the SNOMED Clinical Terms or the LOINC (Logical Observation Identifiers, Names, Codes) terminology.

Several organisations are responsible for the development and application of standards in the Dutch eHealth environment: One of them is Nictiz, as the national expertise centre facilitating ICT in healthcare. Nictiz is an independent foundation, mandated and largely funded by the Ministry of Health. It does not develop standards itself. Another organisation involved in standards is NEN (Normalisation and Standards Development). It is a non-profit organisation. Beside these two, HL7-Netherlands or IHE-Netherlands can be called exemplary.

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[33] European Patients Smart and Open Services (epSOS)

Nictiz and NEN are responsible for Dutch eHealth standards

The Netherlands is member of the IHTSDO, the International Health Terminology Standards Development Organisation, where the Ministry of Health is a member and license holder. Nictiz is executing the activities.

International standards for health are also used in the following context:

International standards used in the Netherlands:

HL7V2 is mainly used in regional and local communications, not for the national infrastructure

HL7V3 is used as a standard for the communication using the national infrastructure

Snomed CT is licensed by the Netherlands, and its importance in Dutch healthcare is growing.

ICD9 is used in healthcare

ICD10 is to be adopted. The intention of the ICD-implementation is that hospitals can use ICD-10 by at least at 01-01-2011.

EN/ISO 13606 and the process of **IHE** are not adopted as national standards, but when they have added value, they will be used as part of the national information structure

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Other standards like CCR (Continuity of Care Record) and Continua Health Alliance standards for RPM (Remote Patient Monitoring) are monitored to see when/where they have added value to be used as part of the national information structure in the future.

3.3.4 Telemedicine

The use of telemedicine applications is recognised as beneficial to enable access to care from a distance and to reduce the number of GP visits or even inpatient admissions. Commission services define telemedicine as "the delivery of healthcare services through the use of Information and Communication Technologies (ICT) in a situation where the actors are not at the same location"[34]. In its recent communication on telemedicine for the benefit of patients, healthcare systems and society, the Commission re-emphasises the value of this technology for health system efficiency and the improvement of healthcare delivery[35].

Different telemedicine applications are in use

In the Netherlands all kinds of telemedicine and telecare services are used, both patient-to-doctor and doctor-to-doctor. There are also patient-to-patient-services available, which are mostly not denominated as telemedicine, but as part of "Health 2.0". Besides these applications, mobile monitoring (outside of the home), call centres for patient information and telemonitoring are also available. Dutch Telemedicine is also connected to services concerning prevention (e-mental health) and wellness, e.g. providing elderly or fragile people with services through video/TV screens.

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[34] Europe's Information Society 2009
[35] European Commission 2008

There is an important distinction in the Netherlands between services that are tested and piloted based on project funding and sustainable solutions, which are provided, based on structural funds and incorporated into regular healthcare financing. Examples for regular funding are e-Consult and teledermatology.

In general, telemedicine and telecare services for chronic patients and elderly people are the focus for the Healthcare Innovation Platform and several other programmes are promoting the uptake. For example: Social Sectors & ICT or Transitions in Healthcare (Actiz Telecare). Other programmes that support telemedicine rather indirectly are, for example, Disease Management, Elderly Care, Preventive Care or Care close to the home. Organisations like the Dutch Association for eHealth promote uptake of eHealth and telemedicine/telecare.[36]

Furthermore, a special initiative eHealthNu (Nu = now) started in the end of 2009. It was developed by a group of healthcare insurers, industry parties and the Healthcare Innovation Platform to stimulate eHealth (including telemedicine and telecare) for chronic diseases. The first issues addressed were diabetes and cardiac heart failure in order to reach a breakthrough for implementation of eHealth applications.[37].

The key developments in Telemedicine services are summarised in Figure 5 below.

Figure 5: Telemedicine Services in the Netherlands

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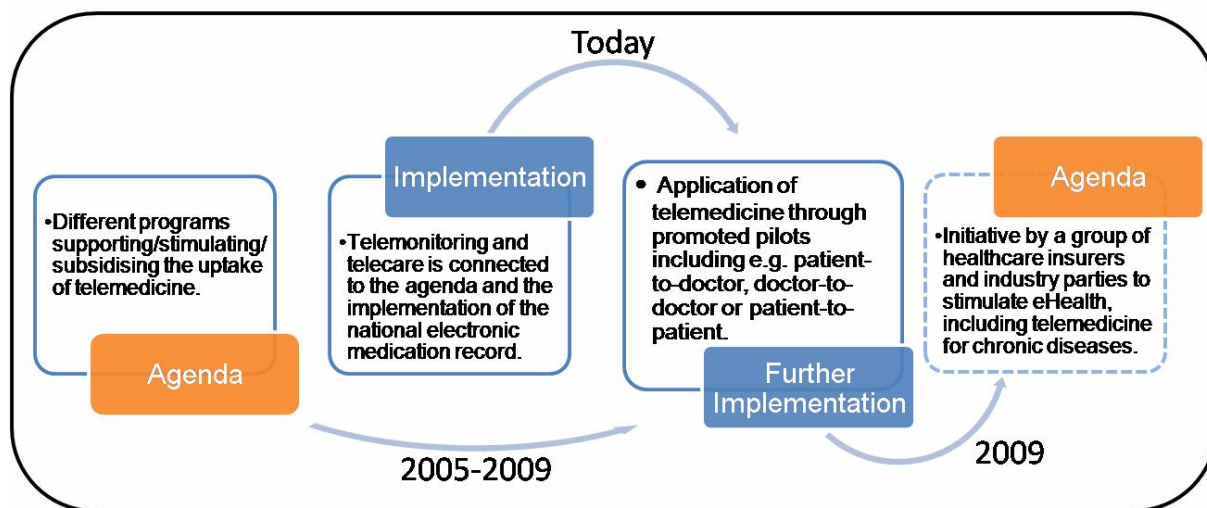
[36] Nederlandse Vereniging Voor eHealth

[37] eHealthNu [eHealthNow]

3.4 Technical aspects of implementation

A key prerequisite for the establishment of an eHealth infrastructure is the ability to uniquely identify citizens/patients and healthcare professionals. This part of the survey deals with identifiers and how they are stored. This section does not deal with the tokens through which identification can or will take place. One such possibility would be via an eCard. This topic is dealt with in the following section. The current section focuses solely on whether or not unique identifiers are in place in the Netherlands and for which purpose.

3.4.1 Unique identification of patients

Citizen Service Number (BSN) as patient ID

In the Netherlands, the choice was made not to introduce a separate ID for healthcare purposes. The Citizen Service Number (BSN) has been implemented for patient identification as well as for both healthcare insurers and healthcare providers. The usage of BSN has been obligatory in healthcare since the 1st of June 2009, based on an according legislation[38].

The citizen service number is managed by the ministry for Internal Affairs. The messaging in healthcare using this BSN is managed by the CIBG, an implementing body of the Ministry of Health, Welfare and Sport.

A website where the according patient insurance information can be traced is provided – among others – by VECOZO (Safe Communication in Healthcare). The identification of patients is done with the BSN, the national citizen number. The BSN-registry for use in the healthcare sector is also managed by CIBG.

Overall, regarding healthcare providers, the system is existing and fully operational. The challenge is to keep the information up to date and accessible for patients and citizens. For now, the citizen service number has, for the patient, no other meaning than identification. Another task for the future will be to regulate how to deal with citizens who do not have a Dutch nationality.

3.4.2 Unique identification of healthcare professionals

The Netherlands has had a national routine application for the registration of healthcare professionals since before 2000. The so-called BIG-registry (BIG stands for Professions in Healthcare) identifies doctors, nurses and paramedics (e.g. physiotherapists) – in total more than 390.000.

BIG-registry for healthcare professionals

This BIG ID for professionals is used as unique identification for the national register: the Dutch Unique Healthcare Provider Identification Register (UZI-register). The BIG-register and the UZI-register are maintained by the CIBG, an implementing body of the Ministry of Health, Welfare and Sport. 39 The CIBG provides healthcare providers with an electronic identity in form of an UZI-card. This card enables the identification and authentication of

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[38] Dutch Parliament 10 april 2008
[39] CIBG

professionals and at the same time the confidentiality of the communication is guaranteed through entering an electronic signature.

3.4.3 The role of eCards

Citizens in the Netherlands have no eCard. They have an insurance card on which the identification number BSN is also stored, but it is an old-fashioned, traditional, passive, plastic card distributed by insurance companies. It contains the EU-format for insurance cards on the back of the card.

This insurance card is not used for data exchange, payments or administration. The Dutch government is convinced that this can be provided through internet services. However, the goal was to have a national electronic ID card for citizens, the so-called eNik, also for use in the healthcare sector, especially for patients to access their own medical data.

The introduction of the eNik is troublesome. It was planned for 2006, but may not become available before 2012 or beyond. Now for patient record access other options are used/ have been developed.

The healthcare professional identification (UZI) card for the identification of care providers is being rolled out in parallel to the electronic health record and is used nationwide. This card will also be used for other identification purposes, for example in a regional setting.

The key steps in the development of eCards in the Netherlands are depicted in Figure 6 below.

Security mechanisms in form of a digital identity and SMS verification
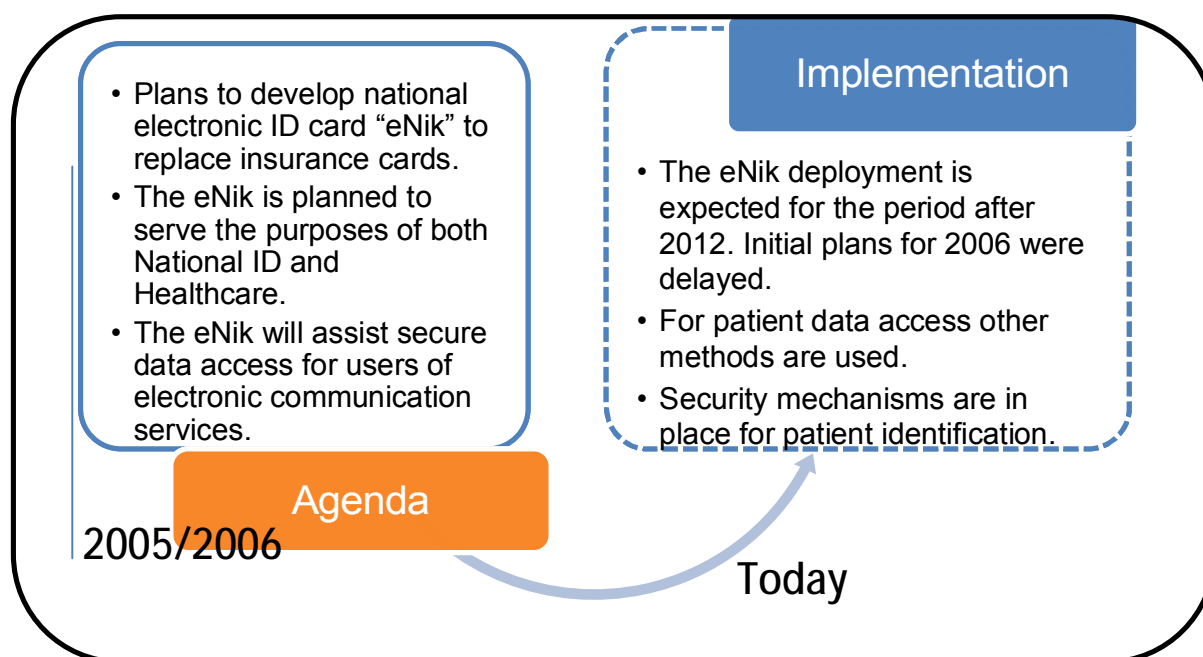
Security mechanisms concerning the identification of patients are in place in the Netherlands. First, there is the "DigID", the Digital Identity, which is a system that is shared between cooperating governmental agencies, allowing digital authentication of the identity of a person, who applies for a transaction service via internet. In addition there is SMS verification. The eNik plans security mechanisms through a PKI. The PKI is a public key infrastructure, which describes a system that provides users of electronic communication services with digital key pairs, consisting of a private and a public key. As it is planned that patients have access to their EHR, a face to face control is planned. Discussions are taking place about where this should be taken.

Given the fact that eNik is not available yet, the biggest challenge is the secure authentication of citizens: DigID, SMS and face to face control has been set up, which is a complex and labour intensive process. Challenges lie in all areas, from regulation to implementation.

The discussion is urgent because patient access remains a precondition for a national rollout of the electronic health record and is therefore crucial. Until this question is settled, full roll-out of the electronic health record will be slowed down. Discussions on this topic are expected to continue in 2010.

The Dutch developments with regard to eCards are summarised in Figure 6: eCards in the Netherlands below.

Figure 6: eCards in the Netherlands

- Plans to develop national electronic ID card "eNik" to replace insurance cards.
- The eNik is planned to serve the purposes of both National ID and Healthcare.
- The eNik will assist secure data access for users of electronic communication services.

Agenda

2005/2006

Implementation

- The eNik deployment is expected for the period after 2012. Initial plans for 2006 were delayed.
- For patient data access other methods are used.
- Security mechanisms are in place for patient identification.

Today

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3.5   Legal and regulatory facilitators

Legal and regulatory issues are among the most challenging aspects of eHealth: privacy and confidentiality, liability and data-protection all need to be addressed in order to make eHealth applications possible. Rarely does a country have a coherent set of laws specifically designed to address eHealth. Instead, the eHealth phenomenon has to be addressed within the existing laws on professional liability, data protection etc.

Legislation in the process of enacting

In the Netherlands, legislation for the national electronic health record is in the process of enacting: The law on the EHR is – at the time of this report – accepted by the House of Representatives (Second Chamber of the Parliament) and under discussion in the Senate (First Chamber). There is no specific legislation on regional infra- or information structures, as this can not be decided on a national level. However, it may be decided that elements of the national legislation become mandatory for regional infra-/info-structures as well. Of course there is national legislation for patient records and their use as the Medical Treatment Act (WGBO, Wet Geneeskundige Behandelovereenkomst) and the Personal Data Protection Act (WBP, Wet Bescherming Persoonsgegevens).

The National Switchpoint (Landelijk SchakelPunt, LSP) the EHR is managed by Nictiz on behalf of the Ministry of Health, Welfare and Sport. The LSP can be compared to a traffic-control tower which regulates the exchange of patient data between healthcare providers. It was built in January 2006 with a reference index for routing, identification, authentication, authorisation and logging.

Within the so-called AORTA-model (national infrastructure for healthcare), the National Switchpoint is one component for the "chain of trust" in which medical data can be safely

shared. Other components are the Citizen Service Number (BSN), the Unique Healthcare Provider Identification (UZI) and the information system used by the healthcare providers.

3.5.1 Patient rights

Opting out model for patient records

The patient rights for electronic data are based on the same rules applied to paper data. At the national level, an electronic patient record is automatically created if the citizen does not object to it (opting out model). But patient consent is needed for various usage of data: 1) patients need to consent by consultation to the inclusion of medical data in their national record on a case by case basis; 2) in current – although disputed – legal projects regarding EHRs, patients can demand the deletion of data from their healthcare record; 3) patients can demand the deletion of the entire healthcare record; 4) patients can bar certain healthcare providers from access to the healthcare record and 5) patients can hide certain types of information on their healthcare record and 6) patients can also get access to the logging of the use of their own data (whom looks at what).

The status of this regulation reflects the situation when legislation on EHR was adopted by the Parliament. Senate approval is – at the time of writing – still pending. Currently the discussion is ongoing whether the regional EHRs should get the same obligation.

The deletion of data is not yet implemented technically, but can be done manually. Here also, the discussion is ongoing as to whether or not a remark should be made in the EHR, such as "incomplete EHR". The possibility to bar or hide certain information has not been implemented technically yet.

It is planned that the patient will have read-only access to his or her patient record in 2011. The patient access is a precondition for a national rollout of the electronic health record and is therefore crucial.

Data of national infrastructure cannot be reused for insurance purposes in the Netherlands. Only mandated persons in healthcare have access to EHR, as insurance and government purposes have been explicitly excluded in the legislation for the national EHR. Use for scientific purposes is also not covered in the legislation. There are other possibilities for scientific research.

For the Dutch telemedical field and the accreditation for healthcare professionals no specific legislation has been issued. For now, the general national legislation on healthcare and the electronic health record applies. In the future, norms and guidelines may be developed for telemedicine services and some legislation may be needed for cross border telemedicine related to the curative sector, but also for services in prevention, long term and chronic care.

3.6 Financing and reimbursement issues

By far, most sources of finance are provided by the Ministry of Health either directly or indirectly, with additional minor contributions from the Ministry of Economic Affairs.. Another financing source is the private health insurance companies but also –

- the regular health insurance companies
- provincial & municipal initiatives.

- small scale private equity investments

The central government funds for example the following things:

> **Examples for funds from the central government are:**
>
> Basic finance for the national infrastructure
>
> Project finance for programmes and projects
>
> Budgets for innovation and stimulation programmes
>
> Finance through temporary policy rules (3 years)
>
> Funding of R&D programmes

In general, eHealth budgets are not explicitly allocated at the Ministry of Health, but are integral part of many innovation programmes and activities. An exception is the yearly basic eHealth infrastructure and related projects

International sources for eHealth are the European Commission and/or member states' R&D programmes. The later consists of KP7 (time to market 5-10 years), ambient assisted living (time to market 3-5 years) and the CIP (time to market 1-2 years). Altogether, EC sources represent only a small share of the total available funding.

In the area of financing and reimbursement, the main challenge is to make funding of eHealth an integral part of regular healthcare financing and reimbursement. The integrated funding may be a first step in that direction. Instead of reimbursement per treatment, a fixed budget is allocated for the complete treatment, based on healthcare standards and output quality criteria. Here, to whom and where treatments are provided is no longer described in detail, which opens up possibilities for integrating eHealth in treatment plans. The Ministry of Health, Welfare and Sport aims to introduce integrated funding for diabetes type 2, COPD, cardiac heart failure and vascular diseases. For diabetes and cardiovascular diseases, this operational funding started on January 1st, 2010. Similar plans for COPD will be launched by July 2010; provided that the healthcare standard for integrated care is ready. The entire set of disease plans will be evaluated after three years. In other words, it is a challenge to adapt all reimbursement and regulations to the new digital reality. Related to this is the lack of speed of including eHealth in regular reimbursement and regulations. The worlds of science and "evidence based" healthcare collide with the digital internet world. Traditional innovation processes in healthcare do not match with the speed of internet developments. A solution to this problem has to be found to bridge the gap between (many) successful R&D pilots, which end without making it to integration in sustainable healthcare services.

Figure 7: Financing of healthcare in the Netherlands, 2007[40]

Netherlands: Financing of health care, 2007

Source: http://www.ecosante.org/ocde.htm

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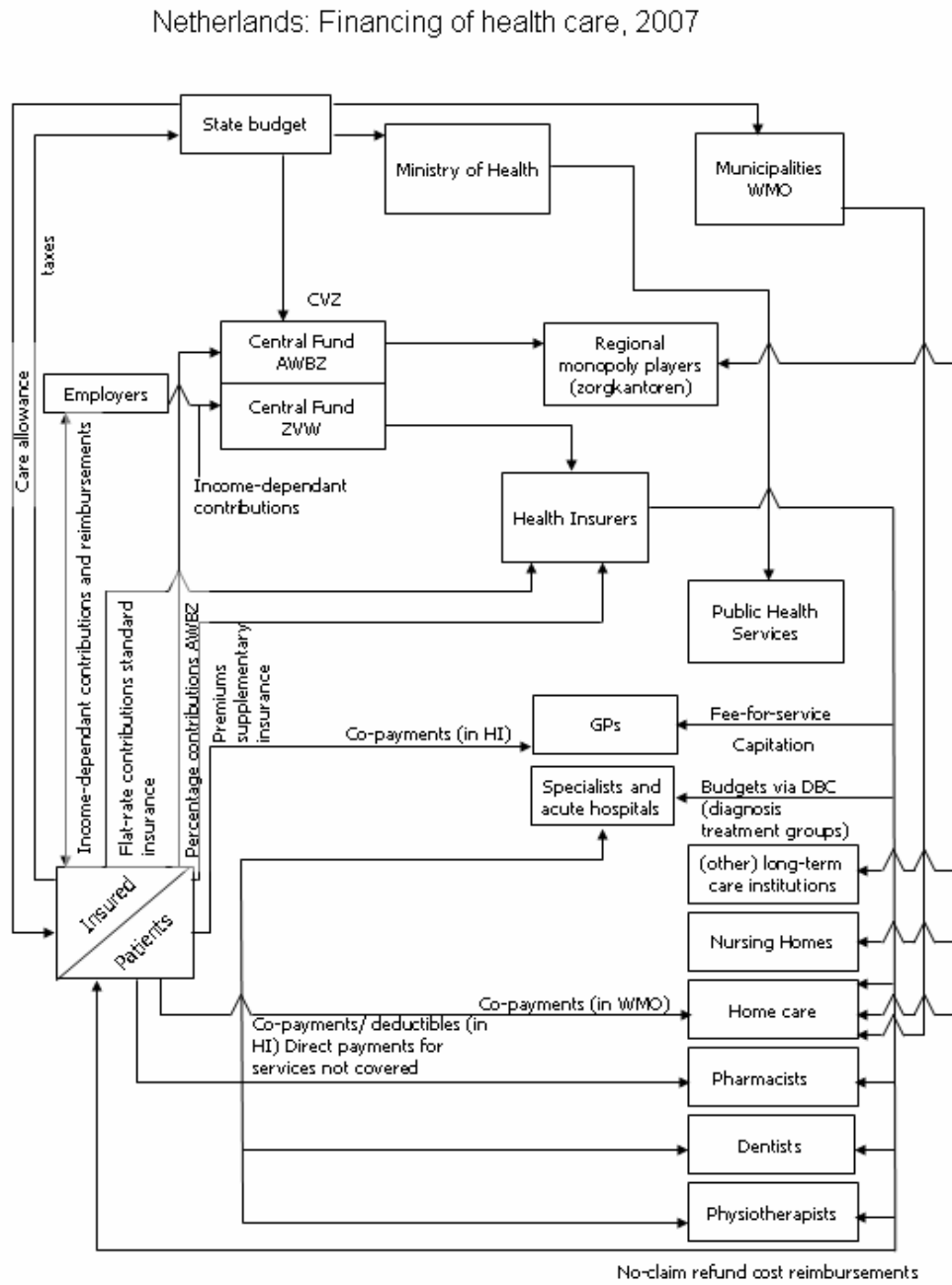
[40] For 'operational funding, a new role of 'care groups' appeared for chronic disease management. Furthermore, a number of private specialised clinics are rising fast.

3.7   Evaluation results/plans/activities

From a public policy perspective, evaluation is a key activity in the policy-cycle. It provides insights into the success or failure of a policy or project and leads to new policy goals and new methods of implementation. The need for evaluation of eHealth policies and projects has been stressed time and again by the EC, not least in order to further the spread of eHealth in the process of healthcare delivery.

In the Netherlands, several aspects of the national eHealth infrastructure are tested and evaluated on an ad hoc basis. For example, the following applications:

- GP locum record

- Electronic medication record

- Privacy aspects in the national infrastructure

- Security aspects in the national infrastructure

- Cost/benefit analysis for the GP locum and the electronic medical record.[41]

Evaluations/audits are or were executed through different channels. Some examples are universities, knowledge institutes, consultancy firms and often, on request, the Ministry of Health, Welfare and Sport. There are also other competent agencies, such as the National Healthcare Inspectorate or the Dutch Data Protection Authority.

Evaluation through different, public and private, channels

Further examples for evaluation applications are the regularly executed studies among members of associations for patients/consumers and healthcare providers on several aspects of the national electronic health record. In other national programmes, for example at ZonMW (Dutch organisation for health research and development), evaluation and auditing is a standard part of the programme. For the future, obligatory evaluation for all government funded programmes might be under discussion.

Other plans include a regular intruder test in order to assess the security aspects of the national eHealth infrastructure. Furthermore, evaluations will be planned for new programmes and applications of the national infra- and info-structure, mainly on an ad hoc basis. Competent authorities like the National Healthcare Inspectorate and the Dutch Data Protection Authority will continue to audit and/or evaluate certain aspects of the national eHealth infrastructure.

Up to now, there is no permanent evaluation organisation in the Netherlands, but the need for such an organisation might grow, when volumes of messages using the national eHealth infrastructure rise. However, the National Healthcare Inspectorate indicates that they see it as their role to assess eHealth activities in the future. The question of resources to execute this task is, however, uncertain at the moment. Furthermore, Nictiz assesses some parts of the national infrastructure as well, like qualifications for ICT suppliers and ICT networks.

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[41] This evaluation was carried out as a macro-level study. Its results are therefore disputed.

4   Outlook

eHealth in the Netherlands has moved from agenda to implementation stage. On the level of General Practitioners, the Netherlands is one of the frontrunners of ICT use with 99% of the Dutch GP practices using a computer. Almost the same share, that is 97% of the practices, have an Internet connection. Regarding patient summary and ePrescription services, progress has also been impressive, with ePrescription firmly used.

Against this backdrop, it is not surprising that the Netherlands has no single dedicated national eHealth Strategy document but several documents. eHealth has to a large extent been integrated in the regular process of healthcare delivery; organised by a dedicated eHealth competence centre Nictiz, the National Information and Communication Technology Institute for Healthcare.

Nevertheless the sense of urgency that a full implementation of eHealth application is necessary to keep the healthcare sector accessible and affordable is growing. The messages from the Barcelona Declaration and the Digital Agenda are adopted by the Ministry of Health, Welfare and Sport in the Netherlands.

Recently, eHealth has also come to the renewed attention of Dutch businesses. An eHealth guide was published online[42]to help businesses and entrepreneurs who want to enter the eHealth market or want to attract new users for eHealth services developed in one care institute. The eHealth guide is written by Syntens, a foundation initiated by the Dutch Ministry of Economic Affairs to boost innovation and the Dutch Association of eHealth.

In spite of these achievements, there remain open issues for further progress of eHealth in the Netherlands.

The delay of eNik, the electronic ID card for patients, will continue to be an issue in the Netherlands (from 2006 to 2012) eNik promises a higher standard of the security level for the identification of patients.

Patient access is a recent topic in the Netherlands, since legislation and regulation on this delays the process of implementation, but is also named as one of the most important issues

Related to the issue of interoperability is the question of standards. Their use could be further spread if Dutch legislation made them mandatory and agreed on a complementary set (examples are Snomed CT versus ICD-10 and HL7 versus EN/ISO 13606)

At present, there seems to be a lack of clear incentives and short-term added value for key stakeholders, especially HCPs

Regarding telemedicine applications, challenges have their origin in financing, legislative or interoperability issues. The structural finance model seems to be a problem, as reimbursement can be given either through regular healthcare finances and/or through private funding (e.g. citizens, employers). In addition, the setting up of the information architecture for telemedicine and telecare services is challenging because of individual

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[42] ehealth wijzer [ehealth pointer]

info- and infrastructures being developed without looking at choices made in other projects.

On the architecture side, a key challenge is to synchronise changes in the architecture of the system with changes in standards.

Another more general challenge in the future will be the alignment of national, regional and local activities, in awareness of the dissemination of experiences and cultural aspects. All efforts should avoid leaning towards "reinventing the wheel" and/or "not invented here". And second, to dissolve confusion on safety and responsibility when using telemedicine and telecare in healthcare processes.

A challenge shared by all healthcare systems in Europe is the systematic inclusion of patients in the healthcare delivery process through an expansion of services such as personal health systems, patient portals and other related web 2.0 services.

5   List of abbreviations

BIG	Professions in Healthcare
BSN	Citizen Service Number
CBO	The Dutch Institute for Quality in Healthcare
CCR	Continuity of Care Record
CIBG	An implementing body of the Dutch Ministry of Health, Welfare and Sport
COPD	Chronic Obstructive Pulmonary Disease
DBCs	Diagnosebehandelingcombinaties[Diagnosis Treatment Combinations]
DRG	Diagnosis Related Group
EC	European Commission
EEA	European Economic Area
EHR	Electronic Health Record
EMR	Electronic Medical Record
epSOS	European patients Smart Open Services
ERA	European Research Area
EU	European Union
GDP	Gross Domestic Product
GP	General Practitioner
HCP	Healthcare Provider
HMOs	Health Maintenance Organisations
HPC	Health Professional Card
ICT	Information and Communication Technology
ID	Identification (e.g. number, card or code)
IHTSDO	International Health Terminology Standards Development Organisation
IP	Innovation Platform
IT	Information Technology
LSP	Landelijk SchakelPunt [The National Switchpoint]
NDIV	Netherlands Digitally Connected
NEN	Normalisation and Standards Development

Nictiz	National IT Institute for Healthcare
OECD	Organisation for Economic Co-operation and Development
PHS	Personal Health System
PKI	Public Key Infrastructure
R&D	Research and Development
SMS	Short Message Service
UZI	Unique Healthcare Provider Identification
WDH	Waarneem Dossier Huisartsen [Patient Summary Record for the Locum GP]
WHO	World Health Organization
ZIP	Zorginnovatieplatform (Healthcare Innovation Platform)
ZonMW	The Dutch Organisation for Health Research and Development

6 Annex

Annex 1: Compound Indicators of eHealth use by GPs

Compound indicator name	Component indicators	Computation
Overall eHealth use	- Electronic storage of individual medical patient data - Electronic storage of individual administrative patient data - Use of a computer during consultation with the patient - Use of a Decision Support System (DSS) - Transfer of lab results from the laboratory - Transfer of administrative patient data to reimbursers or other care providers - Transfer of medical patient data to other care providers or professionals - ePrescribing (transfer of prescription to pharmacy)	Average of component indicators
Electronic storage of individual medical patient data	- A2a - Symptoms or the reasons for encounter - A2c - Medical history - A2c - Basic medical parameters such as allergies - A2d - Vital signs measurement - A2e - Diagnoses - A2f - Medications - A2g - Laboratory results - A2h - Ordered examinations and results - A2i - Radiological images - A2j - Treatment outcomes	Average of component indicators
Electronic storage of individual administrative patient data	- A1 - electronic storage of individual administrative patient	A1 value
Use of a computer during consultation with the patient	- B2 - Computer use during consultation	B2 value
Use of a Decision Support System (DSS)	- B3a - Availability of DSS for diagnosis - B3b - Availability of DSS for prescribing	Average of component indicators
Transfer of lab results from the laboratory	- D1e - Using electronic networks to transfer prescriptions electronically to dispensing pharmacists?	D1e value
Transfer of administrative patient data to reimbursers or other care providers	- D1a - Using electronic networks for exchange of administrative data with other healthcare providers - D1b - Using electronic networks for exchange of administrative data with reimbursing organisations	Average of component indicators
Transfer of medical patient data to other care providers or professionals	- D1c - Using electronic networks to exchange medical data with other health care providers and professionals	D1c value
ePrescribing (transfer of prescription to pharmacy)	- D1d - Using electronic networks to transfer prescriptions electronically to dispensing pharmacist	D1d value

Source: Dobrev, Haesner et al. 2008

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