ICT in Dutch Healthcare: 
An International Perspective
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1 Summary

The Dutch government is working with players in the healthcare sector to develop a nationwide system for secure and reliable electronic exchange of medical data. Many initiatives have also been launched in the international domain to improve the deployment of ICT in healthcare. This roadmap is a working document which presents the Dutch position on ICT in healthcare in an international perspective.

ICT suppliers can use Dutch designs for ICT architecture in the healthcare sector and the accompanying specifications as a basis for integrating the required functions in the systems of healthcare providers and health insurers, thus enabling healthcare professionals to exchange digital information on a national scale. The roadmap discusses the constituents of the basic infrastructure and the applications.

For identification and authentication we distinguish between the Citizen Service Number (BSN) for identifying patients, the Unique Healthcare Professional Identification (UZI) for identifying healthcare providers, and the Unique Health Insurer Identification (UZOVI) for identifying health insurers.

In January 2006 a National Switch Point (LSP) was built with a reference index for routing, identification, authentication, authorization and logging. The National Switch Point acts as a sort of ‘traffic control tower’ through which healthcare providers can request recent patient data from the systems of hospitals, pharmacies and GPs. Healthcare institutions can log on to the National Switch Point via the networks of commercial providers – Care Service Providers – of communication, application and content services. The data in local systems need to be systematically stored and secured and meet the criteria for a Well-Managed Healthcare System (GBZ)

The Dutch government has opted for the incremental development of an Electronic Health Record (EPD). This consists of a collection of applications which are connected to the national infrastructure. The spearheads are the introduction of an Electronic Medication Record (EMD) and an Electronic General Practitioner’s Record (WDH), but many other healthcare applications are also being developed.

The components of the basic infrastructure and the first two applications come together in the EMD/WDH implementation programme. To ensure a smooth transition several regions have been selected as ‘pilots’ and the implementation process has been split into three phases, starting with a Proof of Concept in which all the constituents of the chain are tested in combination under laboratory conditions. This will be followed by implementation in the reference environments and then in the other pilot regions.
The implementation of a nationwide Electronic Health Record in the Netherlands is based on the assumption that primary responsibility for the quality of the care and the use of the ICT systems rests with the providers. The government’s role is to pave the way by passing legislation, creating the right investment climate, and coordinating the overall process.

Section 3 addresses the activities being carried out in the Netherlands in relation to the EU eHealth Action Plan of 2004.

2 Introduction

Healthcare is provided by humans – and, as everybody knows, humans are not infallible and sometimes make mistakes. Technology has a lot to offer in support of human effort. One area where ICT can play a crucial role is the exchange of medical data. If healthcare providers were to have access to accurate and recent data, they would be in a far better position to provide the requisite care.

The Ministry of Health, Welfare and Sport is working with the National IT Institute for Healthcare (NICTIZ) and the Central Information Point for Healthcare Professions (CIBG) on the development of a nationwide system for the electronic exchange of medical data. This system is known as the Electronic Health Record (EPD).

However, the promotion of ICT in healthcare (eHealthcare) does not stop at the geographical borders of the Netherlands. Many initiatives have also been launched in the international domain, aimed at improving the affordability, accessibility and quality of healthcare through the deployment of ICT. Another – related – trend is increasing mobility among patients and professionals. Further objectives are being pursued at political level to give shape and form to trans-border mobility and (preventive) medicine.

2.1 The healthcare system in the Netherlands

The healthcare system in the Netherlands consists of three compartments. The first covers long-term care and the so-called ‘uninsurable’ medical risks. The care in this compartment is largely provided and funded by the state via the Exceptional Medical Expenses Act (AWBZ).

The second covers short-term medical care (cure) which should be universally accessible. The care in this compartment is provided and funded by the state and the insurers.

The third covers the care that is not included in the first or second compartment and for which everyone can voluntarily insure themselves; typical examples are dental treatment and alternative medicine.

The ageing population will intensify the pressure on the Dutch healthcare system. More and more people will develop chronic conditions such as diabetes, cardio-vascular disease and bronchial complaints. The accessibility, affordability and quality of the care must continue to be guaranteed. It is for this reason that a number of changes were introduced in 2006.

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1 The NICTIZ is a neutral and independent organization which was founded in 2002 by various players in the healthcare sector. It is responsible for the design and construction of the nationwide basic infrastructure and for the development of standards for an Electronic Health Record. For more information see www.nictiz.nl.

2 The CIBG (www.cibg.nl) consists of nine different units and is an executive arm of the Ministry of Health, Welfare & Sport. The registration of data and the provision of information are among its most important tasks. Each unit specializes in a specific segment of the care market.
These changes, which are designed to prepare the system for the future and to make the healthcare more effective, efficient and customer-focused, necessitate a better distribution of responsibility among the key players. The patient/client occupies a central role in the current healthcare system in the Netherlands, with more opportunities but also more responsibility. It is up to the patient/client to bring about improvements to the quality. A well-informed patient can single out the provider that offers the best care for his condition. This will spurt healthcare providers (doctors, hospital boards, etc.) to raise their performance. Medical insurers will bear more responsibility for matching the demands of the consumer with the offerings of the providers. It is the government’s job to oversee quality, accessibility and affordability.

The Dutch healthcare system takes the form of an insurance system which is run by private providers with a public remit. This set-up also applies to the ICT policy and role allocation in the healthcare sector. The government, in this case the Ministry of Health, Welfare & Sport, wants to promote the use of ICT in healthcare with the ultimate aim of improving affordability, accessibility and quality. It will do so by creating a climate which is conducive to optimal and secure use of ICT. The healthcare providers bear primary responsibility for the quality of the care and the use of ICT systems.

2.2 Aim of the roadmap

International cooperation means that, if we can share our data here in the Netherlands, then European interoperability must also be achievable. The Netherlands favours a pragmatic approach: member states should prepare themselves for trans-Europe exchange of medical data in the future and reach some form of agreement.

The aim of this roadmap is to present the Dutch standpoint on ICT in healthcare in an international perspective. It begins by describing the current situation in the Netherlands and then outlines the expected situation after 2006. It explains the decisions to deploy ICT in the Dutch healthcare system and positions them in relation to policy and decisions in Europe. Finally, it sets the Dutch government’s timetable for ICT in healthcare in an international perspective.

This roadmap is intended primarily for policymakers and policy executives in the Netherlands and abroad. It provides a snapshot image of national developments in relation to the eHealth programme of the EU and will be presented at the High Level eHealth conference in Malaga (10 - 12 May 2006). The timetable is based on the national focus and developments. Parts of the roadmap, however, need to be further fleshed out nationally and internationally. Discussions are needed at various levels for this purpose.

3 Healthcare and ICT in the Netherlands

This section explains the healthcare and ICT situation in the Netherlands. The first part will address the applications of the Electronic Health Record (EPD). The second will discuss the various components of the national basic infrastructure. The third deals with the implementation programme for the Electronic Medication Record (EMD) and the Electronic General Practitioner’s Record (WDH), paragraph 3.3) in which these two functions will be tested together for the first time. Attention will also be paid to other ICT developments in the healthcare sector, such as consultations by e-mail. The final paragraph will discuss the instruments which the Dutch government can employ to realize all of this.

3.1 Electronic Health Record

The Netherlands has its sights set on a national transmural Electronic Health Record (EPD): a secure environment in which client/patient data which are stored in different systems can be retrieved, exchanged and cogently shown to authorized healthcare providers to support the healthcare processes. This ‘virtual’ EPD consists of a collection of applications which are connected to the national AORTA infrastructure. The spearheads are the introduction of an Electronic Medication Record (EMD) and an Electronic General Practitioner’s Record (WDH), but many more care applications are being developed. The Netherlands is moving towards a fully-fledged EPD.

A Electronic Medication Record (EMD)

The Electronic Medication Record gives healthcare providers insight into the medication history of specific patients via their own information system. This information stays at the source (information system of a hospital, pharmacy, GP practice etc.) but is available to providers and prescribers of medication: public pharmacies, hospital pharmacies, GP practices, locum posts, hospitals, mental health institutions and residential care and nursing homes.

Research by the Dutch pharmaceutical association, the Wetenschappelijk Instituut Nederlandse Apothekers, has revealed that an estimated 90,000 patients are admitted to hospital every year as a result of medication errors that could have been avoided. This costs around 300 million euros a year and accounts for approximately 2.5% of hospitalization nationwide. If healthcare providers have electronic access to all the medication data of their patient, a lot of suffering and inconvenience can be avoided and a large part of this sum can be saved.

B Electronic General Practitioner’s Record (WDH)

The GP shortage, an ageing population, an ageing professional group, plus the fact that most newly qualified GPs prefer to work part-time have precipitated the emergence of
Locum Posts in recent years. At the moment the GPs who stand in for their colleagues at Locum Posts in the evenings and weekends have hardly any access to the medical history of the patients. In some cases this prevents the locum from making an adequate diagnosis. It is not always possible to get the required information from the regular GP. What is more, many patients are unable to provide crucial information and sometimes cannot even recall the name of the medication they are taking. An Electronic General Practitioner’s Record will provide the locum with a summary of the patient’s history. The records will remain with the regular GP and will only be accessible to a locum. Information gained during the consultation is automatically relayed to the regular GP in the form of a locum report. The information appears on the screen of the GP, who checks it and adds it to the records with a click on the button.

C Extension of applications

The first steps have already been taken. Most of the ICT agenda for the coming period is still to be determined. The introduction of new applications will be prioritized on the basis of the technological possibilities and the wishes of the patients, the healthcare providers and the insurers. In the next few years, various ‘chapters’ will be added to the EPD, which will be extended to other professional groups and domains (welfare, juvenile care etc.). This step-by-step approach should eventually lead to an umbrella collection of exchangeable data for all the players. At all events the following initiatives will be launched in the near future:

- Further development of the EPD components:
  - Extend the EMD by adding electronic prescription functions for healthcare providers;
  - Extend the EMD to other professional groups;
  - Extend the WDH to Accident & Emergency;
  - Develop the components for an electronic diabetes file (around the complex chain of healthcare providers), starting with a self-management tool which gives patients access to their own diabetes data;
  - Develop an Electronic Child’s Record (EKD). From 1 January 2007 every child born in the Netherlands will have his/her own EKD, containing information on the child, the family situation and the environment. The records will be administered by doctors and nurses in the juvenile care sector. Various organizations will be able to add observations to the record without consulting it. This way, the privacy of the child is protected while juvenile care workers can identify problems sooner and take quicker action.
  - Upsize proven eHealth applications by means of various programmes (e.g. the Nationwide Programme for Social Sectors and ICT).\(^3\)

- Create conditions whereby patients get electronic access to their own record. At the moment policymakers are thinking in terms of an electronic National Identity Card as a means of patient access.

The choices in the Netherlands:
- Incremental development of an Electronic Health Record. New applications will be regularly added to the EPD in the years ahead.
- General Practitioner’s Record as an initial application of an EPD.
- Electronic Medication Record as an initial application of an EPD.

3.2 AORTA basic infrastructure

In recent years the Dutch government, the National ICT Institute for Care (NICTIZ) and healthcare professionals have together laid the foundation for nationwide electronic communication in the healthcare sector. ICT suppliers can use Dutch designs for ICT architecture in the healthcare sector and the accompanying specifications as a basis for integrating the required functions in the systems of healthcare providers and insurers, thereby enabling electronic exchange of information on a national scale. The systems of the healthcare providers and insurers need to be modified so that they can be linked to the basic infrastructure and in order to realize the desired level of security and accessibility. The national basic infrastructure for healthcare consists of a number of components and is due for realization in 2006.

A National registration systems for identification and authentication of patients, healthcare providers, insurers and other care agencies

National electronic information-exchange involves the linking of data. To ensure that data is registered consistently and that patients, healthcare providers and insurers communicating at a distance are properly identified, unique national identification numbers will be applied, namely:

1. The Citizen Service Number (BSN) for patient identification. The introduction of this number at all government organizations will be regulated by law. Separate legislation will be drawn up for the use of this number in the care sector.
2. Unique Healthcare Professional Identification (UZI) for the identification of care providers. A register of care providers has been set up, which also sees to the issuing of UZI passes and UZI certificates for identifying and authenticating care providers. The first passes were issued at the start of 2006.
3. Unique Health Insurer Identification (UZOVI) for the identification of health insurers. A register of health insurers will also be set up and certificates will be issued to confirm identities when data is electronically exchanged. The certificates will be issued from January 2007.

\(^3\) To realize breakthroughs in upsizing the ICT applications and services the Dutch government will have to take the lead in resolving sticking points. Responsibility has been delegated to the Nationwide Programme for Social Sectors and ICT (2005-2009) which covers four domains (mobility, education, safety and healthcare).
B A National Switch Point (LSP) with a reference index for routing, identification, authentication, authorization and logging

On 31 January 2006 the National Switch Point (LSP) for the healthcare sector was established. This is an important step, as the National Switch Point is the ‘traffic control tower’ behind the secure electronic exchange of up-to-date patient data throughout the Netherlands. In the summer of 2006 the National Switch Point will be tested with ICT suppliers in the healthcare sector. Afterwards the healthcare providers can be connected to it. This is explained further in section 3.3. The construction of the National Switch Point was commissioned by NICTIZ. After a European tendering procedure the contract was awarded on 8 November 2005. Actual realization took less than three months.

With the National Switch Point as the traffic control tower, healthcare professionals all over the country can retrieve up-to-date patient information from the systems of hospitals, pharmacies and GPs. The primary advantage of the National Switch Point is that care institutions and suppliers of ICT applications for the healthcare sector have one point of contact for specific services:

- The National Switch Point manages a ‘national reference index’ which can swiftly track patient data when a healthcare provider requests specific information. The patient data are not stored at a central point. The reference index keeps track of which patient data are stored in which information system in the country.
- At the same time the National Switch Point confirms that information is supplied only to healthcare providers with the requisite authorization. The switch point checks the provider against the national UZI register. The provider must prove his identity with a UZI pass.
- The National Switch Point also confirms with the aid of the Citizen Service Number that the correct patient data are being supplied. The government is responsible for issuing and controlling this national patient identification number.
- Finally, the National Switch Point ascertains which information the healthcare provider may access (authorization) and keeps a record of the provider and the consulted data (logging), so that the authorization regulations can be monitored.

C Care Service Providers for communication and services between local environments and the central LSP environment.

So, to promote safe and fast communication between care organizations across the country a National Switch Point (LSP) has been established. Care organizations can connect with the LSP via the network connections of commercial providers of communication, application and content services. In the long run these ‘Care Service Providers’ will require certification. In the interim, a system has been devised whereby market players can be audited on the basis of a qualification scheme. A successful audit combined with a successful LSP acceptance test leads to recognition as a Care Service Provider.

D Information systems of care organizations

Care organizations need to ask their supplier to modify their information systems so that the data is available 24/7 and can be accessed by authorized users. This means that the data must be stored and secured in a structured system and that the local systems can connect with the National Switch Point. Healthcare information systems need to satisfy the GBZ standards for well-managed healthcare systems, whereby they also meet the international security guidelines. In addition, care organizations, healthcare providers, and local healthcare information systems must be identifiable with a unique nationally applicable number.

E Security and Authorization

Players in the healthcare sector and patients must be confident that the data transport and storage and access to patient information is adequately secured. A whole array of instruments has been developed for this purpose. Access can be secured as follows: before access to certain information is granted, the identity of the applicant is ascertained (identification) and confirmed (authentication). The rights of the applicant to consult the information are then checked out (authorization). Messages are encrypted to ensure that the information cannot be intercepted during transport.

To optimize security all organizational and technical aspects need to be properly regulated. The infrastructure is Public Key Infrastructure (PKI), a system of organizational and technical rules, including authentication (Is the applicant really who he claims to be?), data encryption and an electronic signature. PKI is the most commonly used security standard. One single agency confirms the access entitlement of the healthcare provider, institution or computer system and issues an electronic certificate. This certificate is then used to determine the access rights and register the identity of the sender.

F Message standards

Information exchange between healthcare professionals requires message standards at various levels. Messages at application level are defined from one information model based on the international HL7 version 3 standard. The Dutch have decided to standardize on ‘HL7 version 3’ messages because this is an international standard with the potential to develop with one standard from a national e-medication record to a national Electronic Health Record. The specifications have been worked out in dialogue with HL7 Nederland and are being incorporated in the international HL7 standard.

As healthcare information services cover a broad spectrum it has been decided to gear further development to the generic infrastructural facilities which will at the very least be needed to realize the e-medication record. It is within this context that the basic infrastructure specifications have been drawn up. These will then be extended and optimized.
3.3 EMD/WDH implementation programme

In the EMD/WDH implementation programme the components of the basic infrastructure and the first two applications come together. The different components will have to operate in concert in a test environment. Five EMD and six WDH pilot regions have been selected for this trial and will receive active assistance with the introduction of one or both applications. Together, these pilot regions cover 1,000 healthcare providers and some 2 million files. For more information send an e-mail to info@invoering-epd.nl.

Besides the pilot trial, there are other ways in which healthcare providers are closely involved in the introduction of the EMD and the WDH. Four workgroups have been formed to define the functional needs and wishes of the healthcare providers in the programme. These workgroups are focusing on everyday aspects of the EMD and the WDH, such as the technical requirements of the healthcare and administrative processes at pharmacies, GP practices and hospitals, and on meeting the GBZ standards.

To ensure optimal care and attention the implementation process has been split into three phases:

1. **Proof of Concept (PoC)**
   The implementation of the Electronic Medication Record and the Electronic General Practitioner’s Record begins with a ‘Proof of Concept’ (PoC) phase. In the PoC all the constituents of the chain (LSP, (LSP, SBV-z (sectoral message services in care), the Citizen Service Number, the UZI register, the UZI pass and the ICT systems of the healthcare providers) are tested in concert under laboratory conditions. This will show whether the national facilities are working effectively and whether the tested healthcare systems are operating correctly and safely in tandem with the national facilities. Once this phase has been successfully completed the systems of the suppliers can be implemented in the environments of the healthcare providers.

2. **Pilot in pilot reference environment**
   In the second phase the results from the Proof of Concept are introduced in the healthcare sector of two of the pilot regions (the reference environments): one EMD and one WDH region. This pilot can only proceed if the Proof of Concept phase has been completed and approved and the GBZ criteria have been met. Previous experience of this test has shown that the systems may need modification. The systems then definitively become operational in the respective region.

3. **Pilot in other pilot regions**
   After the pilots have been successfully completed in the reference environments and any flaws in the system have been redressed, the implementation in the other pilot regions can start. If these prove successful the national roll-out begins early in 2007.

3.4 Other aspects

Now that the basic infrastructure and the applications for EPD are being implemented, the many healthcare and business applications via Internet which are developed in the Netherlands will get a safe and reliable basis for data exchange.

Healthcare applications will especially benefit from the new basic infrastructure. Take, for example, e-mail consultations, Internet applications in the mental health sector,
tele-dermatological consultations and ‘screen-to-screen care’ in nursing. In 2004 the Dutch government launched the Declaratiescasus programme, a project to improve billing in the care sector (every year the insurers receive millions of medical bills from thousands of care providers).

Though the need to deploy ICT to help safeguard affordable and accessible healthcare is beyond dispute, many of the tele-medicine applications are having difficulty becoming a part (both organizational and financial) of the mainstream healthcare process. Their effectiveness will have to be proven before they can be integrated in the current funding system and – if necessary – connected to the national infrastructure. An additional obstacle is that the costs and benefits of investment and operation are usually spread across different players. However, the potential profits from tele-medicine and the potential for broad application are becoming more discernible all the time.

The Dutch government has launched various programmes to upsize specific ICT projects or projects in which ICT plays a role, such as Sneller Beter (Faster Better), Zorg voor Beter (Getting Better) and the Nationwide Action Plan for Social Sectors and ICT (2005 - 2009).

3.5 Conditions

Primary responsibility for the quality of healthcare and the use of ICT systems rests with the healthcare providers. It is the government’s task to pave the way and facilitate and stimulate the use of ICT in healthcare by passing legislation, creating a conducive financial climate and coordinating the process, all with a view to improving accessibility, affordability and quality.

3.5.1 Legislative framework

The provision of responsible care and the use of modern tools in present-day healthcare falls under the Quality of Healthcare Institutions Act (Kwaliteitswet Zorginstellingen). The Medical Treatment Act (Wet Geneeskundige Behandelovereenkomst) requires healthcare providers to keep records and the Personal Data Protection Act (Wet Bescherming Persoonsgegevens) sets privacy criteria for the processing of personal data. The current legislation, which applies to ‘paper’ records, offers an adequate legislative framework for an EPD. The legislative framework will, however, have to be amended to cover information searches with the Citizen Service Number (BSN) and to encourage all healthcare providers to make use of Electronic Health Records:

A. Legislation on the use of the Citizen Service Number (BSN) in healthcare

This legislation regulates the use of a national identification number in the healthcare sector in a way that enables medical data to be uniquely linked to one patient across multiple information systems. The Bill is awaiting debate by the Dutch Parliament.

Healthcare workers and organizations will be obliged to enter the BSN in their records, confirm that it belongs to the person in question, and to use it in the electronic exchange of data.

B. Legislation on the Electronic Health Record (EPD)

The aim of this legislation is to address issues, such as security, data quality, authorization and access (by the patient amongst others), standardization and the actual use of the EPD.

Legislation for the nationwide Electronic Health Record should regulate at the very least:
• (mandatory) connection of healthcare providers with the National Switch Point;
• electronic availability of patient data via the National Switch Point;
• secure and reliable information exchange via the National Switch Point.

Initially, the legal obligation will apply only to healthcare providers who are required to test the operation of the EMD and the WDH. If necessary, the legislation can be extended to other providers and other parts of the Electronic Health Record.

3.5.2 Funding

The national facilities for the infrastructure will be funded by the state – at least in the early years. This consists of the development and management of the National Switch Point and the registers of care providers and health insurers. The government will also fund the first issue of the UZI pass and the card-reader. Further, the government will contribute financially to the implementation of the EMD/WDH in the pilot regions, whereby the ICT suppliers who wish to participate in the frontrunner project will get the chance to adapt their systems. The local users will pay for implementation at local level – connecting the system with the National Switch Point – and the data exchange. The annual budget for ICT – currently intended for all components of the basic infrastructure and the EMD/WDH implementation programme – amounts to over € 35 million.

3.5.3 Coordination

Most of the central facilities for the programme are ready, so the emphasis has shifted from design and construction to actual implementation of the first two applications in concert with the central facilities. As this requires a central point of contact, the Ministry of Health, Welfare & Sport is responsible for coordinating the process from 1 January 2006. Hence, a separate implementation organization has been set up within the ministry for this purpose. Its task is twofold: first to support and facilitate the introduction of the Electronic Medication Record and the Electronic General Practitioner’s Record in the pilot region; and second, to coordinate the entire operation.
4 EU eHealth Action Plan

4.1 Introduction

The eHealth Action Plan is part of the European Union’s e-Europe strategy, which aims to bring the benefits of the information society within reach of all European citizens. The primary objective of the eHealth Action Plan is to enable the EU to utilize the full potential of on-line healthcare systems and services within a European space for eHealth.

Three spearheads have been defined:

• Develop a strategy for common challenges and create a framework conducive to eHealth;
• Organize pilot projects to kick-start eHealth;
• Disseminate best practices and evaluate the progress.

The eHealth workgroup has prioritized the following elements in the Action Plan:

• Patient summary
• Identity of citizens/patients and healthcare professionals
• Emergency data set

On the advice of the workgroup a Stakeholders Group has been formed to flesh out these issues.

4.2 A strategy for common challenges

A Healthcare institutions have an important job to do

The Action Plan proposes that each member state develops a national or regional roadmap by mid-2006 at the latest. This roadmap must contain a continuous agenda and be finalized in the autumn of 2006.

Situation in the Netherlands:

• The Dutch government will present its eHealth roadmap at the ‘High Level eHealth conference’ in Malaga at the start of May 2006.

B Interoperability of the healthcare information systems

Interoperable healthcare information systems must ensure unambiguous identification of patients and transparent exchange of healthcare data throughout Europe. The Action Plan therefore proposes that the member states formulate a collective strategy for patient identification by the end of 2006 and reach agreement on interoperability standards for messages containing medical data and electronic medical
files. The strategy must also take account of best practices, relevant standardization activities and recent developments in, for example, the European insurance card and identity management for European citizens.

**Situation in the Netherlands:**
- Identification: in February 2006 the Dutch organized a European Expert Meeting on Health ID Management. The results are due to be announced in May 2006. At the same time, the Dutch will make the national solution for patients and healthcare providers accessible for international harmonization.
- Interoperability for message traffic: the Dutch have opted to standardize messages via HL7 version 3, as this is an international standard which offers potential for developing further with one standard from a national EMD/WDI to a national Electronic Health Record.
- Standardization: this is essential in order to realize the eHealth objectives in Europe. The Dutch regard the recommendations of the CEN/ISS ‘eHealth Standardization Focus Group’ (14 March 2005) as the basis for a collective strategy on standardization.
- European insurance card: the European insurance card was introduced in the Netherlands on 1 January 2006. The card is not yet connected to an electronic functionality. The Dutch government is not in favour of connecting this electronic card to patient identity, nor does it see the card as a key for accessing or supplying medical data.

**C Mobility of patients and healthcare professionals**
Patients and healthcare workers are becoming ever more mobile within the EU. The EU has already adopted a statement on patient mobility and started projects to improve information services in this domain. Information on the mobility of patients and healthcare professionals will be improved by the activities of the workgroup on healthcare systems.

**Situation in the Netherlands:**
- The Dutch government is working on a nationwide Electronic Health Record which will make healthcare information available to authorized users regardless of time or place.
- The Dutch are playing an active role in the European debate on the mobility of patients and doctors within the EU. Besides its interest in standardization for future ideals, the Dutch support pragmatic solutions for bottlenecks.

**D Modernization of infrastructure and technology**
The Action Plan requires the member states to support the construction of eHealth information networks in 2004-2008 on the basis of fixed and wireless mobile and broadband infrastructure and grid technology.

**Situation in the Netherlands:**
- The Nationwide Action Plan for Social Sectors and ICT (2005-2009) is also geared to applications which need broadband (utilization of broadband).
- There is a high level of broadband coverage in the Netherlands. In a recent OESO study the Netherlands scored high in broadband penetration, with over 25 subscriptions per 100 inhabitants.

**E Conformity tests and accreditation for an eHealthcare market**
Numerous European countries have already embraced the accreditation of electronic healthcare systems, which are now serving as models for other regions. By mid-2006 at the latest the Commission must compile a list of best European practices as a guideline for the member states. By the end of 2007 the member states must then organize conformity tests and accreditation on the basis of successful best practices.

**Situation in the Netherlands:**
- In 2006 the basic infrastructure is due for testing in pilot environments.
- In 2007 certification schemes will be ready for the local information systems (GBZ/ well-managed healthcare systems) for connection to the National Switch Point.

**F Investment incentives**
Each development or modernization of the systems requires investment. Accordingly, the member states – in line with the Action Plan – must develop a joint strategy by the end of 2006 to support and stimulate investment in eHealth.

**Situation in the Netherlands:**
- Upsizing: The Dutch government is encouraging the upsizing of developments in ICT systems and services via a Nationwide Action Plan for the Social Sectors and ICT.
- At the end of 2006 the Dutch will exchange information with other countries on defraying the costs of eHealth.

**G Judicial and regulatory aspects**
Under the Action Plan the European Commission must take joint action with the member states by the end of 2009 to:
- establish a reference for a standardized European qualification for eHealth services in a clinical and administrative setting;
• create a framework for more legal security in relation to product and service liability in eHealth within the context of the existing legislation on product liability;
• improve the information for patients, health insurance systems and healthcare providers on how to reclaim the costs of eHealth services;
• promote eHealth to reduce industrial accidents and occupational illnesses and to find ways of preventing new risks in the workplace.

4.3 Pilot projects

Many pilot projects on eHealth are already underway in the European Union or will start very soon.

H Information for citizens and governments on health education and prevention of illness

As part of its public health programme the European Commission has been working on a public health portal site for the entire EU, scheduled to be operational at the end of 2005. This site offers citizens one point of access to information on public health and also on health and safety in the workplace.

The EC is also improving the ICT instruments so that early warning, detection, and surveillance of threats to public health can be stepped up.

Situation in the Netherlands:
• In 2005 a portal was set up in the Netherlands offering comparative and health information to members of the public. This portal contains information on hospitals, health insurance, medication, patient interest and medical issues (www.kiesbeter.nl). In 2006 and 2007 the portal is to be further extended with information on, amongst others, GPs, physiotherapists, residential care and nursing homes, homecare, mental health care and care for the handicapped.
• It will be harmonized with the EU portal site in 2006.

I The development of integrated healthcare information networks

At present, a lot of work and energy is being invested in the interconnection of healthcare information networks. By the end of 2008 most European healthcare organizations and regions (municipalities, provinces etc.) must be able to offer on-line services such as tele-consultations (second medical opinion), electronic prescriptions, electronic referral to specialized services, tele-monitoring and tele-care (monitoring the patient at home).

Situation in the Netherlands:
• The Netherlands will actively look into the initiatives of other member states to integrate domotica, telemedicine and standardization concerning Electronic Health Records.

J Encouraging the use of cards in the healthcare sector

There are two types of card that can be used in the healthcare sector: the healthcare pass, which contains useful information for emergencies, such as blood group, medical conditions and treatment; and the European health insurance card, which was launched on 1 January 2004 and replaces all the papers that people used to need to get emergency medical care during a stay abroad. The member states are organizing campaigns to encourage people to use these cards. It has also been agreed that the principle of the electronic health insurance card will be approved by 2008.

Situation in the Netherlands:
• On the issue of patient access to their own medical records the Dutch are focusing on the electronic national identity card which will be introduced in 2007.
• Patients will not be able to use the European insurance card, introduced on 1 January 2006, to access their own records. The Netherlands is playing an active role in the debate on the electronic insurance card which the EU plans to introduce in 2008.

4.4 Monitoring

K Dissemination of best practices

eHealthcare must be supported by the large-scale dissemination of best practices. The key issues are the effects on access to healthcare, the quality of healthcare, an evaluation of cost savings and productivity gains, and models for a strategy to address liability for tele-medical services, reimbursement procedures and accreditation of eHealth products and services.

The dissemination of best practices needs to be safeguarded by regular high-level conferences which enjoy the support of the European Commission. Meantime, the Commission must introduce an effective system for disseminating best practices by the end of 2005.

Situation in the Netherlands:
• The Netherlands will actively share its best practices with other member states.
An English overview will be available at the start of 2007.

L Evaluation

The European Commission has undertaken to publish a biennial evaluation in the course of 2004-2010 on the progress in the introduction of eHealthcare.

Situation in the Netherlands:
• The Netherlands will actively contribute to biennial evaluation by the EC.
## Appendix 1

### Health indicators - The Netherlands

**Source:** www.who.org

#### Population Estimates

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (000), 2003</td>
<td>16,149.0</td>
</tr>
<tr>
<td>Annual population growth rate (%), 1993 to 2003</td>
<td>0.6</td>
</tr>
<tr>
<td>Annual population growth rate (%), 1993 to 2003</td>
<td>48.0</td>
</tr>
<tr>
<td>Annual population growth rate (%), 1993 to 2003</td>
<td>18.7</td>
</tr>
<tr>
<td>Total fertility rate, 2003</td>
<td>1.7</td>
</tr>
</tbody>
</table>

#### Health Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy at birth (years) 2003</td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>79</td>
</tr>
<tr>
<td>Males</td>
<td>76</td>
</tr>
<tr>
<td>Females</td>
<td>81</td>
</tr>
<tr>
<td>Child mortality (probability of dying under age 5 years) (per 1000) 2003</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>6</td>
</tr>
<tr>
<td>Females</td>
<td>5</td>
</tr>
<tr>
<td>Adult mortality (probability of dying between 15 and 59) (per 1000) 2003</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>93</td>
</tr>
<tr>
<td>Females</td>
<td>66</td>
</tr>
<tr>
<td>Healthy life expectancy at birth (years) 2002</td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>71.2</td>
</tr>
<tr>
<td>Males</td>
<td>69.7</td>
</tr>
<tr>
<td>Females</td>
<td>72.6</td>
</tr>
<tr>
<td>Healthy life expectancy at age 60 (years) 2002</td>
<td></td>
</tr>
<tr>
<td>Males at age 60</td>
<td>15.5</td>
</tr>
<tr>
<td>Females at age 60</td>
<td>18.4</td>
</tr>
<tr>
<td>Expectation of lost healthy years at birth due to poor health (years) 2002</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>6.3</td>
</tr>
<tr>
<td>Females</td>
<td>8.5</td>
</tr>
<tr>
<td>Percentage of total life expectancy lost due to poor health (%) 2002</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8.3</td>
</tr>
<tr>
<td>Females</td>
<td>10.4</td>
</tr>
</tbody>
</table>
Appendix 2

National expenditure on health - The Netherlands

Source: www.who.org

A. Proposed ratios and levels

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
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</thead>
<tbody>
<tr>
<td><strong>I. Expenditure ratios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total expenditure on health (%THE)</td>
<td>8.2</td>
<td>8.4</td>
<td>8.3</td>
<td>8.7</td>
<td>9.3</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td>General government expenditure on health (%GGHE)</td>
<td>64.1</td>
<td>62.7</td>
<td>63.1</td>
<td>62.8</td>
<td>62.5</td>
<td>62.4</td>
<td>62.4</td>
</tr>
<tr>
<td>Private expenditure on health (%PvtHE)</td>
<td>35.9</td>
<td>37.3</td>
<td>36.9</td>
<td>37.2</td>
<td>37.5</td>
<td>37.6</td>
<td>38.8</td>
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<tr>
<td>GGHE % General government expenditure</td>
<td>11.2</td>
<td>11.2</td>
<td>11.5</td>
<td>11.5</td>
<td>12</td>
<td>12.4</td>
<td>12.3</td>
</tr>
<tr>
<td>Social security expenditure on health (%GGHE)</td>
<td>93.9</td>
<td>93.8</td>
<td>93.8</td>
<td>93.8</td>
<td>93</td>
<td>93</td>
<td>93.3</td>
</tr>
<tr>
<td>Net out-of-pocket spending on health (%OOPs)</td>
<td>23.6</td>
<td>24.1</td>
<td>24.3</td>
<td>23.4</td>
<td>21.4</td>
<td>20.8</td>
<td>20.8</td>
</tr>
<tr>
<td>Private prepaid plans expenditure on health (%PvtHE)</td>
<td>45.6</td>
<td>44.5</td>
<td>43</td>
<td>43.6</td>
<td>45.6</td>
<td>45.7</td>
<td>46.4</td>
</tr>
<tr>
<td>Externally funded expenditure on health (%THE)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

| **II. Per capita levels** |      |      |      |      |      |      |      |
| Total expenditure on health (THE) per capita at exchange rate (US$) | 2,067 | 2,102 | 1,916 | 2,067 | 2,411 | 3,088 | 3,471 |
| General government expenditure on health (GGHE) per capita at exchange rate (US$) | 1,326 | 1,318 | 1,209 | 1,328 | 1,506 | 1,926 | 2,123 |
| Private expenditure on health (PvtHE) per capita at international dollar rate | 2,044 | 2,124 | 2,270 | 2,517 | 2,777 | 2,987 | 3,056 |
| GGHE per capita at international dollar rate | 1,311 | 1,332 | 1,432 | 1,581 | 1,735 | 1,863 | 1,869 |

B. Values underlying ratios and levels

Health System Expenditure & Financing (million NCU)

I. Measured Financing Agents

| Total expenditure on health (THE) | 29,221 | 31,236 | 33,261 | 37,150 | 41,264 | 44,589 | 46,754 |
| General government expenditure on health (GGHE) | 18,744 | 19,589 | 20,981 | 23,333 | 25,773 | 27,815 | 27,981 |
| ...of which Social security expenditure on health | 17,604 | 18,367 | 19,696 | 21,881 | 24,165 | 25,856 | 26,095 |
| Private expenditure on health (PvtHE) | 10,477 | 11,649 | 12,280 | 13,817 | 15,491 | 16,774 | 17,773 |
| ... of which Net out-of-pocket spending on health | 2,469 | 2,807 | 2,987 | 3,232 | 3,310 | 3,496 | 3,548 |
| ... of which Private prepaid plans expenditure on health | 4,778 | 5,186 | 5,280 | 6,029 | 7,070 | 7,673 | 8,255 |

II. Measured Financing Sources

Externally funded expenditure on health | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

III. Macro Variables

| Gross domestic product (GDP) (million NCU) | 354,194 | 374,070 | 402,291 | 429,345 | 445,160 | 454,276 | 466,310 |
| General government expenditure (million NCU) | 167,216 | 175,554 | 182,228 | 203,063 | 214,960 | 224,231 | 227,535 |
| Exchange rate (NCU per US$) | 0.9 | 0.94 | 1.09 | 1.12 | 1.06 | 0.89 | 0.81 |
| International dollar rate (NCU per international dollar) | 0.91 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Total population (in thousands) | 15,707 | 15,812 | 15,926 | 16,046 | 16,149 | 16,225 | 16,275 |
## Appendix 3

### Healthcare professionals - The Netherlands

<table>
<thead>
<tr>
<th>Health care professionals</th>
<th>Number in 2003</th>
<th>Density per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>50854</td>
<td>3.15</td>
</tr>
<tr>
<td>Nurses</td>
<td>221783</td>
<td>13.73</td>
</tr>
<tr>
<td>Midwives</td>
<td>1940</td>
<td>0.12</td>
</tr>
<tr>
<td>Dentists</td>
<td>7759</td>
<td>0.48</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>3134</td>
<td>0.19</td>
</tr>
</tbody>
</table>
ICT in Dutch Healthcare
An International Perspective