



# The Netherlands: Another European Country Where GP's Have Been Using EMRs For Over Twenty Years

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## Introduction

**H**ealth care in the Netherlands costs 45 billion Euro (\$65 billion) a year and was 9.2% of the GDP in 2004 (\$3041/capita). Hospital care accounts for 29% while services for elderly people accounts for 18%; pharmaceuticals account for 11%.

Unlike many other European nations, the Netherlands has a private health care system for its 16.5 million inhabitants, with primary care physicians and practices, hospitals, nursing homes, mental health providers, and other health care organizations negotiating contracts and budgets with various health insurers. Until 2005, acute and general health care expenses were covered by another type of insurance, with 65 percent of the population qualifying for a publicly funded sickness fund because their incomes are below a certain threshold. In 2006, this changed with the introduction of an obligatory national insurance with basic care for all citizens. Under the new regulations, insurers cannot refuse coverage to any citizen, but can compete on price and quality and offer packages with additional services. Citizens pay an annual fee of about \$1,400 for the basic insurance, with a \$300 refund (for costs that are reimbursed if not claimed). The basic insurance covers all primary and secondary care; supplemental insurance is available to cover medical expenses for services not included (such as dental care and physical therapy).

The new insurance scheme means a reduction in the guaranteed income GPs receive for each patient; 6% of their budget will go first to insurance companies. With the new financing and contracting system, the billing process has become much more complex. Patients will have varying (additional) private policies, giving them the right to receive certain services, while other patients will not have (purchased) these rights. GPs will have to check the patient's insurance coverage before providing (additional) services.

## Primary Care

Primary care, which has proven to be essential to achieving desired health outcomes and limiting costs, plays a central role in the health care system in the

Netherlands. The country has roughly 9,000 family physicians, most of whom have received 2-3 years of specialist training in family medicine. Patients are able to choose their family physician but, beginning in 2006, must register with a specific primary care practice. Family physicians act as gatekeepers to the system and must give their approval before patients can access hospital and specialist care; 95% of problems presented in primary care are handled in the practices.

According to Grol, most family physicians and other primary care professionals currently work in private practices, with a majority working solo or in small group practices of two to three partners (88% of practices). However, capacity problems in family medicine and social trends (e.g. GPs working 'normal' and an increasing number of part-time female GP's) have been driving rapid change, and the number of large group practices is growing and new models for primary health care are being tested. In the future, health care centers with four to six doctors, one or two nurses, and other professionals (such as physiotherapists or pharmacists) caring for about 10,000 to 15,000 patients and working in close collaboration with local hospitals will be the norm.

In the past, sickness funds reimbursed primary care physicians through annual capitation payments, while private patients paid practices and were then reimbursed by insurers. A new payment system has been introduced in 2006 which will include capitation per patient and a fee per consultation, plus a negotiable reimbursement for practice costs depending on services offered, staff employed, and quality and efficiency indicators.

## After-Hours and Emergency Care

Historically, groups of collaborating family physicians provided after-hours and emergency care, but since 2000, these responsibilities have been assumed by large-scale, after-hours organizations, called primary care cooperatives. Approximately 100,000 to 400,000 patients are assigned to a cooperative; some 80 to 90% of Dutch patients are served by cooperatives. At the cooperatives, trained nurses are the first point of contact, performing triage and giving advice. Evaluations have shown that about half of all contacts are handled solely by nurses. After triage, family physicians provide consultations by telephone, at

walk-in centers, or, when necessary, at patients' homes. With the rapid rise of primary care cooperatives, there has been a growing need for information systems for these out-of-hours cooperatives and the ability to electronically exchange patient data with GPs and others.

## Hospital Care

The majority of the more than 100 acute care hospitals in the Netherlands are private and nonprofit. When they are referred to medical specialists by their family physicians, patients see specialists who work either in private practice within hospitals or on a salaried basis for the hospitals. Historically, hospitals have negotiated annual budgets for patient care and other costs. A new system of diagnosis treatment combinations (DBC's), which assign a price to each product or service, is now being used; 10 percent of these DBC's are now negotiable with the insurer, and this proportion will gradually be increased in the future. Medical specialists' salaries or fees are included in the DBC's, as well as all hospital costs involved. This new system enables insurers to purchase care based on price and, potentially, on quality—forcing hospitals to make prices transparent and increasing competition among them.

## GP information systems in the Netherlands

After the first Dutch general practitioner installed a computer in 1978, few followed suit. By 1983,

only 35 general practitioners were using a computer. Today, 97% of Dutch GPs use a computer-based GP information system. Almost all use their information system to record clinical notes during their consultation with a patient – a utilization rate which is similar to those being achieved in Denmark and Norway.

Dutch GPs can choose among 8 suppliers offering 11 information systems based on the requirements formulated by the professional organizations of general practitioners: a) the Dutch College of General Practitioners (NHG - Nederlands Huisarts Genootschap), which has a predominantly scientific focus, and b) the Dutch Association of General Practitioners, which promotes the interests of its members.

## Common systems functionality

The computer systems used by general practitioners have been designed specifically for use in primary care. They consist of different modules, each performing a specific set of functions. As the general practitioner automates his or her practice, additional modules are added; e.g. financial modules, medical modules, electronic communication modules, research modules or modules to support prescription selection.

GP systems enable Dutch GPs to code the “reason for the encounter” and the diagnosis using International Classification of Primary Care (ICPC), which was partly developed in The Netherlands. There are some

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however who have experienced the expressive powers of READ. SNOMED have been trying to convince others that they should accept other classifications besides ICPC. Increasingly, supplier systems are implementing ICD into their systems as well.

A database of all drugs available in the Netherlands, maintained by the Royal Dutch Association for the Advancement of Pharmacy, enables the physician to code prescriptions as well. Other capabilities allow the coding of laboratory results, numeric data obtained during physical examination plus referrals to other health care providers, or enrollment in studies.

Over 90% of prescriptions are generated electronically and a script is printed. Though all GP and pharmacy systems can, with varying degrees of ease, send/receive prescriptions electronically (EDI), currently this capability is not widely used. Most of the systems have decision support capabilities which check for drug-to-drug interactions, etc.

A few Regions use a regional GP system where all GP's work on a regionally hosted server. Another related development is the emergence of "national" healthcare networks, which are usually facilitated by GP-IS manufacturers who need a secure and stable network to offer their ASP-based GP information systems. The national networks of various providers and the regional networks are currently not interconnected.

### **Characteristics of the networks in the Netherlands**

There is no national network in the Netherlands at the moment covering all GPs. 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 to be known as the Electronic Health Record (EHR).

The role of NICTIZ (National IT Institute for Healthcare) is to set the standards for the purpose of exchanging patient data. Those standards include a national infrastructure, electronic messages and safety. NICTIZ intends to have a national network for a secure electronic information exchange amongst all Dutch healthcare providers (and insurers) by the end of 2006. Ultimately this should result in a (virtual) National Electronic Health Record.

Communication between general practitioners and other healthcare providers, e.g. pharmacist and hospital laboratories are mainly based on local projects. These projects have evolved into Regional Healthcare Networks, most of which currently use the EDIFACT standard for messages. However, NICTIZ has 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.

At present, 22 different networks cover most of the Netherlands. NICTIZ intends to use the regional networks as a safe 'tunnel' from local to national and to have the regions bundle the demand in the direction of the suppliers. NICTIZ policy is to leave data at the source system and to communicate between systems using messages.

### **National Switch Point**

On 31 January 2006, the National Switch Point (LSP) for the healthcare sector was established to serve as the 'traffic control tower' behind the secure electronic exchange of up-to-date patient data throughout the Netherlands. The LSP can be considered as the kernel of the national infrastructure for healthcare. In the summer of 2006, the LSP will be tested with ICT suppliers in the healthcare sector. Once in place, healthcare professionals all over the country will be able to retrieve up-to-date patient information from the systems of hospitals, pharmacies and GPs.

The LSP manages a 'national reference index' which can 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 LSP confirms that information is supplied only to healthcare providers with the requisite authorization. It also confirms with the aid of the Citizen Service Number that the correct patient data are being supplied. Finally, the LSP 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.

### **Electronic messaging capabilities**

Most GP IS systems support communication with systems outside the practice. General practitioners working in the same city or region of the country are able to use their systems to communicate with one another via EDIFACT messaging; connections to other health care institutions (e.g. data exchanges with hospitals such as in Nieuwegein) are also being established. A 2001 survey of general practitioners by van der Lei showed that electronic communication had decreased their workload and had increased their knowledge of care delivered by other health care providers.

Electronic messaging applications which are most commonly used include:

- Receiving laboratory results
- Receiving digital imaging and other results/reports from specialists and clinics
- Receiving status messages such as notification of admission or emergency room attendance from hospitals
- Sending prescriptions to community pharmacy as all systems do support the so called 'prescription message'

- Sending reimbursements (billings) to insurance companies

The total volume of messages in 2005 was ~20 million messages; up to 90% of Dutch GP's actively send and receive EDI messages. Electronic prescriptions and laboratory test results each represent some 25% of the message volumes. Status messages and radiology reports share third and fourth place with approximately 10-15% each. The remainder is formed by specialist reports and other message types.

Receiving discharge summaries from hospitals are at present very rare, but this type of message is expected to grow significantly in the future. Most referral letters to specialists are printed and handed to the patient to deliver.

## What were the driving forces to stimulate the physician uptake of computers?

### History

In the late 1970s and early 1980s, professional organizations of Dutch general practitioners recognized that conventional paper-based patient records were unable to provide such population-based services. In the mid '80s, a working group within the NHG developed a reference model for GP information systems (Werkgroep Coördinatie Informatisering en Automatisering – WCIA). This WCIA reference model describes the (minimum) requirements with regard to the functioning and quality of these systems. The intent was that GP's who wished to receive reimbursement for their information system (from healthcare insurers) had to work with a WCIA certified GP-information system.

The 1990 WCIA HIS reference model was successful in setting a defacto standard for all GP information systems. However, by 2005, none of the GP information system manufacturers had been able to produce a system which was compliant with the next 1995 WCIA HIS reference model - they simply had not offered their systems to the WCIA for certification. The WCIA HIS reference model thus lost much of its potential to stimulate and coordinate the development of GP information systems.

In August 2005, a new HIS reference model, in line with the recommendations of Professor Arie Hasman, then of the Department of Medical Informatics at the University of Maastricht, was released.

### Role of the College

An important contributor to the introduction of information technology is the potential user of the system. Aware of the need to educate potential users, in 1987, the Dutch College of General Practitioners (NHG) introduced postgraduate training on computers in general practice. This 2-day course conveyed a realistic set of expectations for the automation of their practices. Because computer-based patient records require the physician to interact personally with the system to record clinical data, the course included practical sessions on how to use these systems in routine

practice. The course also provided detailed practical scenarios describing how to introduce an information system to the physician's practice. It is still in operation today, almost 20 years since it was first introduced.

Parallel to the postgraduate training, a debate on information systems for primary care was carried out in the leading journals of Dutch general practitioners during the late 80's. In this debate, the participants weighed the advantages and the disadvantages of information systems in general practice. As a result, the general practitioner who decided to introduce a system in his or her practice was made aware of the consequences of that decision and was able to plan accordingly.

### Reimbursement

Prior to 1991, the GP was not reimbursed for expenses related to practice automation. In the fall of 1991, the National Association of General Practitioners and the government reached agreement on a plan to stimulate the use of computer-based patient records. There was an extra pro capita fee for each sickness fund patient and an addition to the fee for service for each private patient if the GP uses a computer. To qualify, the general practitioner had to: 1) use an information system that passed evaluation by the professional organizations, 2) introduce computer-based patient records within 2 years, and 3) provide data for health policy planning. The plan is still in effect today. However, the 2006 change of the healthcare system removed the sickness fund patient as well as the additional fees: the fee for ICT is now included in the fee per patient and is less visible.



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## Conclusion

According to Maat, the Dutch Government is working alongside parties in the healthcare sector to create a national system for the secure and reliable electronic exchange of patients' medical information. Based on the architectural design and the accompanying specifications for ICT in healthcare, suppliers are expected to incorporate the required functions into the systems used by healthcare providers.

The Netherlands has its sights set on a national transmutal Electronic Health Record (EHR): a secure environment in which client/patient data which is 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 infrastructure. The spearheads are the introduction of an Electronic Medication Record (EMD) and an Electronic Out-of-hours Record (WDH - Waarneem Dossier Huisartsen), but many more care applications are being developed. The Netherlands is moving towards a fully-fledged EHR.

The EMD will give healthcare providers insight into the medication history of specific patients via their own information system. This information will stay at the source (information system of a hospital, pharmacy, GP practice etc.) but will be 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.

The WDH 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.

During the next six months, proof-of-concept trials of the national ICT system will take place. Thereafter, the EMD and WDH will be implemented in 11 pilot environments. The national rollout of these two applications is intended to commence in the second quarter of 2007.

The choices made in the Netherlands are:

- All medical data is to remain in local repositories with exchange to be via the National Switch Point (in contrast with the NHS approach in UK that stores data in large regional and national databases).
- National registers for patient and provider identification and authentication (in contrast with countries that lack nationwide unique numbers for patients and healthcare workers).
- Message standardization based on HL7 v3.
- Security via NEN norm 7510 (based on the international ISO BS7799).
- Unlike a number of other countries, the Netherlands

has decided not to use a patient smartcard that contains the EHR. Instead, an electronic national identity card will be introduced in 2007 which allows patients to control their own privacy.

Interesting times ahead for Dutch GPs and their patients and yet another European country from which we can learn.

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