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Better care thanks to better information

IT has become an integral part of the Dutch healthcare system. Healthcare continues to be ‘hand’ work, but the information for and about the patient can be significantly improved by the use of computers and IT applications.

Crucial information about the patient can be made accessible to healthcare practitioners with the aid of IT: Information and Communications Technology. Patient details can be checked day or night, and data is available quickly so that mistakes can be avoided, double input is no longer necessary and – in an emergency or a calamity – healthcare practitioners can respond more quickly. As a result, the quality of healthcare can improve substantially and significant cost savings are possible.

Many IT initiatives have been taken in the healthcare sector, but there is a great deal of fragmentation. NICTIZ, the Dutch National IT Institute for Healthcare, bridges the gap between these initiatives by bringing together all the parties involved. Along with patient organizations, healthcare providers, health insurers, IT suppliers and government agencies, NICTIZ is working to introduce a national Electronic Patient Record (EPR) together with other possible forms of electronic communication in...
the healthcare sector. The responsibility for introducing IT applications and services is borne, primarily, by healthcare institutions. NICTIZ stimulates favourable developments and helps remove obstacles which might prevent widespread application.

One important precondition for electronic communication on a national scale is the national infrastructure which has been designed by NICTIZ: a system of communal IT facilities which all parties in the sector can access. With the realisation of the national infrastructure, NICTIZ has laid the foundations for the secure and rapid exchange of information between various healthcare institutions and between the institutions and the health insurers. In addition, the logistical and administrative staff can also take advantage of improved communication facilities. The patient will also have access, to check his medical record for example, or to make an appointment with his doctor.

In order to avoid the need for a separate infrastructure for each separate application, and thus an array of different connections within a single institution, the working procedures and computer systems used in the healthcare sector need to be harmonized. In addition, measures must be taken to ensure the privacy of the patient and his data. This is a large-scale operation. NICTIZ initiates, stimulates, coordinates and supports: where it can be helpful and where it is necessary.

**Some patients’ views on the EPR**

- ‘Excellent. If this had existed years ago, I would never have been given the wrong penicillin.’

- ‘With an EPR, up-to-date details can be viewed at the touch of a button. That means fewer intake interviews, fewer tests, fewer staff and more money for essential investments in healthcare.’

- ‘The pharmacist had misread the GP’s handwritten prescription. The names of medicines are often similar. This sort of sloppiness can’t happen with the EPR.’

**EPR: step by step**

Calling it a national Electronic Patient Record makes it sound as if all the information about a patient will be stored at one central location. But the EPR is a virtual record. A healthcare practitioner can use a search engine – a sort of ‘healthcare Google’ – to call up important details from the records kept by other healthcare practitioners.
Some GPs’ views on the electronic locum record:

• ‘Perhaps the most important advantage of the electronic locum system is peace of mind. If you can be sure that information is available to the doctor standing in for you, that’s one worry less.’

• ‘As a locum, you know little about the medical history of most of the patients who come to see you. But such information can be highly relevant in at least twenty percent of the cases.’

• ‘When you have to make house calls, it is usually to older people with a complicated medical history and a complex medication pattern. It is then essential to have accurate details available.’
What facilities will be available?

NICTIZ infrastructure

The national infrastructure that NICTIZ has designed will make it possible for patient-related information to be accessed and supplemented from anywhere in the country. The information will be up-to-date, complete, and accessible day or night. Access to the information, transport of the information and storage of the information will be properly safeguarded. Exchange and use of the information will be closely supervised. Where possible, patient information will continue to be stored at the location where the healthcare practitioner has entered that information. This will ensure that data is reliable and up-to-date, and responsibility for the data will remain where it should be: at the source. This does not, of course, preclude certain groups of healthcare practitioners from using IT services through a network with a central data storage facility.

Advantages of the national infrastructure

- Access to up-to-date and complete patient information
- Safe access, exchange and storage of healthcare information
- Reduction of management, network and development costs
National Healthcare Information Hub

The infrastructure is centred around the National Healthcare Information Hub, the ‘Google for healthcare’. This Hub will connect the various computer systems of the different healthcare parties with each other and ensure that communications are safe and effective. The Hub will ensure that healthcare-related information can only be accessed by the appropriate practitioners. When they request information, healthcare practitioners will need to identify themselves with an electronic passport. The National Healthcare Information Hub will always know what type of patient information is stored in which computer system. The Hub will use the unique patient number sent by the information applicant to ensure that information is provided about the correct patient and to check that that patient has not objected to the exchange of his information by electronic means. At the same time, the Hub will record who has requested and viewed what information, so that it will be possible to check – if necessary, and in retrospect – whether or not that access was legitimate. A helpdesk will be set up for the suppliers of IT facilities who make it possible for their clients to connect to the Hub.

Privacy

The infrastructure will be set up in such a way that there is a balance between the availability of medical data on the one hand and the protection of personal data of the patient and the healthcare practitioner – as safeguarded in law – on the other hand. The patient must be well-informed about the way in which his data will be handled, and about the possibility of shielding that data from other healthcare institutions but also about the attendant risks. Access to patient information may only be granted if that access is necessary for the treatment of the patient. And it must be possible to determine – in advance or otherwise in retrospect – whether that access is or was in fact legitimate. The healthcare provider is responsible for applying the correct procedure within the organization. NICTIZ offers healthcare providers advice and basic information material.
Electronic passport

With a view to the privacy of the patient, it is essential to record who is seeking access to healthcare information and whether that person is authorized to do so. For this purpose, the government has introduced an electronic passport for all healthcare practitioners: the UZI card, the Unique Healthcare Practitioner ID. Firstly, the UZI card can be used to ascertain who has sent or called up information. In addition, a healthcare practitioner can use the card to encrypt information. In that way he can ensure that data can only be read by the person to whom he is sending it. And, finally, the healthcare practitioner can add an electronic signature to a prescription, a letter of referral or a contract with the aid of the UZI card. This electronic signature has the same function as a signature written on paper. The UZI register is responsible for processing applications, and for producing and issuing the UZI cards.

National patient number

When exchanging data, it is important to ensure that the personal details relate to the correct patient. In order to prevent confusion, the government is introducing a national unique patient number for all residents of the Netherlands: the Citizen Service Number (known in Dutch as BSN). Healthcare institutions and insurers will have to include the BSNs in their administrative records. The numbers will be issued by a special government agency, the ‘Sectorale Berichten Voorziening in de Zorg’. This organization will verify the correctness of the numbers of existing clients. The BSN will probably also be included in the electronic national ID card that the government is hoping to introduce in October 2006. This card will later allow patients to identify themselves when they wish to consult their own medical data via electronic methods.

International

In its design of the EPR, NICTIZ has opted to use the international HL7 version 3 technical communication standard. HL7 is a computer language that is already in use in the healthcare sector in many countries. HL7 version 2 is used in nearly all Dutch hospitals, but version 3 offers significantly more options in terms of exchangeability. The standard is still evolving. Along with the UK and Canada, the Netherlands is a pioneer in the field of medication data. Various models and messages have been developed in the Netherlands and submitted to HL7 for approval. This is not only important for the introduction of the Dutch EPR, but it also offers prospects for the exchange of medical data between the countries of the EU and even worldwide.
How will the scheme be implemented?

The first modules to be introduced will be the Electronic Medication Record (EMR) and the Electronic Locum Record (ELR) for GPs.

As from 2006, the healthcare sector will have a secure and effective nationwide infrastructure for electronic communications at its disposal. To ensure that the wishes and experience of the sector can be incorporated, it has been decided to adopt a gradual implementation of applications rather than a ‘big bang’ introduction. The first modules to be introduced will be the Electronic Medication Record (EMR) and the Electronic Locum Record (ELR) for GPs. During testing of these two modules, IT suppliers showed that they were willing and able to create suitable connections between the various computer systems in use by the healthcare institutions.

Through its Pioneer Programme, The Dutch Ministry of Health will be, in cooperation with NICTIZ and CIBG, advising regional alliances of healthcare institutions about the introduction. They will be given support in the form of know-how, expertise and a financial subsidy. The experience gained by these pioneers will be shared with the other regions, so that they in turn can be eased into the system.

Healthcare institutions should ask the supplier of the healthcare information system(s) with which they work to adapt them so that all stored healthcare information is available and accessible day and night for use by other authorized healthcare providers. For that purpose it is necessary for healthcare information to be stored
in a structured and secure manner and for local systems to be connected to the national infrastructure. The exact specifications for these so-called ‘Qualified Healthcare Information Systems’ will be made available by NICTIZ. Besides the technical aspects, it is important that data from the various healthcare institutions is recorded and used in an unambiguous manner. For the purposes of the Electronic Locum Record for GPs, for example, it has been decided what minimum details about a patient should be available to a locum at an after-hours medical post, and that details must definitely be fed back to the patient’s regular GP after a visit. NICTIZ and the federative organizations involved are developing guidelines for this purpose.

The national roll-out of the Electronic Medication Record and the Electronic Locum Record for GPs is planned for 2006 and 2007. If all parties involved continue to work together and respect national agreements, the national EPR can soon be extended to include other applications as well. A number of applications are already being prepared, including one for juvenile healthcare and one for accidents and emergencies.

The after-hours medical post after 2007

When Mrs Brandjes (60) gets out of bed one spring morning, she discovers a small itchy lump on her foot. By 7 o’clock that evening the small lump has grown into a sizable one, and there seems to be a thin red line going towards her groin. She feels uneasy about it and calls the local after-hours medical post. The assistant who answers the phone asks her to come to the medical centre, where the duty locum soon diagnoses Erysipelas (St Anthony’s fire), an acute bacterial infection of the skin. Via his computer, the locum requests a summary from the patient record held by Mrs Brandjes’ own GP. A moment later his screen shows a summary of her medical record, including the most significant health problems, notes from the most recent surgery visits, current medication data and information about allergies and intolerances. The summary tells him that Mrs Brandjes is allergic to penicillin. The doctor is pleased that this data was available: his first instinct had been to prescribe penicillin, but now he will give her different medication. When she visits her own GP a week later, Mrs Brandjes is surprised to find that he already knows about the incident. The findings of the after-hours medical post had been sent electronically to her GP that same evening. He can now check that the prescribed medication is having an effect and take further steps in the treatment of the Erysipelas. Two weeks later, Mrs Brandjes is her old self once again.
Progress to date

2003

- June
  - Start of introduction regional medication records

- July
  - Blueprint for national infrastructure completed

- November
  - IT suppliers demonstrated how medication record works

2004

- January
  - First electronic passport issued to a doctor

- April
  - Agreement on content of E-locum Record for GPs

- May
  - Decision to implement national patient number

2005

- January
  - Guidelines for access to patient data in E-locum record agreed

- August
  - Start of implementation of medication and E-locum records

- October
  - Start made with building National Healthcare Information Hub, the ‘Google for healthcare’

2006
Even after the Electronic Medication Record (EMR) and the Electronic Locum Record (ELR) for GPs have been introduced, there will still be a wide range of possibilities for the use of IT in the healthcare sector. NICTIZ will play an active role in facilitating direct access to the EPR for patients themselves, and in stimulating future applications with a view to the continuity of care and the improvement of preventive medicine.

Direct access for patients

Patients increasingly want to take responsibility for their own health. Direct access to the Electronic Patient Record can promote their autonomy and at the same time increase the quality of care. Moreover, it will lead to a more conscious use of healthcare services and will reduce the burden on healthcare practitioners.

The EPR will make it possible for the patient to view his own medical data. Initially this will be possible by requesting a print-out or by viewing the record during a visit to a healthcare practitioner. Once the necessary security measures are in place, patients will also be able to view their record via their own computer, via a computer in the waiting room at the surgery or hospital, or from other locations via the internet.

It should also be possible for the patient to check which healthcare practitioners have viewed his data and which have added information. If the patient then notes an irregularity, he can take action. In the long run, the patient will also be able to designate what...
details he wishes to shield from which individual healthcare practitioners, or categories of practitioners. The responsibility and involvement of the patient will be increased by reserving a part of the patient record for the patient to fill in himself. In this personal section, the patient can record any side-effects he experiences with certain medication, for example, or his experience of the treatment he is receiving. He can also include personal wishes, such as the registration as a donor or a desire not to be re-animated.

Before patients can reliably and securely be given access to their record, a means will have to be found by which the patient can identify himself. An electronic national ID card would provide a reliable method of allowing the patient access to all relevant information via the internet. It is expected that an electronic national ID card will be available by 1 October 2006.

**Continuity of care**

People with a chronic illness are often dependent on the services of a variety of specialized healthcare practitioners and institutions. To ensure continuity of care it is essential that healthcare practitioners harmonize their treatments and advice to the patient, and work according to transparent treatment guidelines.

Using patient records which are even partly kept on paper means that there is no way to check for consistency or completeness of data other than manually checking the written information. Such manual checks often bring to light double and even conflicting information, while the results of tests and important examinations are sometimes completely lacking.

Automated systems allow checks to be made on the completeness and consistency of data. In addition, an automatic signalling system can be used to chase up overdue results of tests. This reduces the work that healthcare practitioners and supporting staff need to do to obtain such details. When drawing up discharge notes, details such as diagnosis, recommended further treatment, results of previous tests and address details can be included, making them directly visible and precluding the need to have to look them up and copy them. This reduces administrative work for healthcare practitioners and avoids the errors which are an inherent risk in the copying of patient data. Finally, healthcare practitioners can use the facilities of the chain information system to show that the healthcare provided fulfils quality criteria and – where necessary – forms the basis on which treatment protocols can be modified.

One in three patients, for example, do not receive the most appropriate care for diabetes. This makes optimization of the chain highly relevant. Details of treatment and care must be more easily accessible for both the patients with diabetes and for healthcare practitioners. Signals warning that certain important details are missing from periodic checks can also be important to both parties. In addition, diabetes patients must be given the opportunity to record self-medication and make this information available to healthcare practitioners. One example of this is the blood sugar
This calls for optimum IT support for both patients and healthcare practitioners. The introduction of an electronic diabetes record will provide a basis for IT support of other care chains such as COPD, heart failure and hip disorders.

Better prevention

The Juvenile Healthcare Service provides preventive care at a local level for young people from birth to the age of 19 years. A national Electronic Child Record (ECR) will provide both healthcare professionals and policy-makers with better insight into the individual and collective healthcare needs of young people in the Netherlands.

Local councils are responsible for implementing a Basic Task Package for juvenile healthcare. Implementation is in the hands of approx. 100 juvenile healthcare institutions (municipal health authorities and baby and toddler clinics). All the country’s young people from 0 to 19 years of age fall under the Juvenile Healthcare Prevention Programme.

Research underlines importance of national EPR:

- According to estimates by the scientific institution of pharmacists in the Netherlands (WINAp), there are 90,000 hospitalizations each year as a result of avoidable medication errors. Access to the EPR could prevent a great deal of suffering and inconvenience, and save approx. 300 million euros a year.

- Research carried out by TNS-NIPO, a market research organization, shows that approx. 800,000 Dutch people over the age of 18 have been the victim of errors due to the inadequate transfer of medical information. Of those interviewed, 86 percent expected that this type of error would reduce once the EPR has been introduced.

- Research carried out by the De Beer Commission and the Health Insurance Board shows that efficient electronic expense claim systems can prevent errors in this domain and save approx. 140 million euros a year.
How is the NICTIZ organization structured?

Elco Brinkman, chairman of NICTIZ

Brinkman is a lawyer and was formerly Minister for Health, Welfare and Culture in the Lubbers government; at the time he was also chairman of the parliamentary Christian Democrat party in the Lower House. Since leaving politics in 1995 he has been a member of the governing bodies of various organizations.

Board of Management

The Board coordinates strategy and ensures the continuity of the foundation, and gives its approval to decisions made by the Programme Committee. The Board consists of eight members with an independent chairman. The members are delegates of the various federative and sectoral organizations.

Members:
Mr. L.C. Brinkman
Chairman
Mr. R.F. Bergmans
Independent member on behalf of the IT sector
Mr. M.J.W. Bontje
Dutch Association of Healthcare Insurers

The National IT Institute for Healthcare – NICTIZ – is a foundation which was set up by federative and sectoral organizations representing the healthcare and IT sector; it is funded by the Ministry of Health, Welfare and Sport. The federative and sectoral organizations themselves represent patients and consumers, healthcare institutions that are involved in curative healthcare such as hospitals and GP practices, institutions active in nursing, caring, and preventive medicine, plus health insurers and the IT industry.
Mr. B.E. van den Dungen  
Z-org, organization for healthcare entrepreneurs

Mr. R.G.P. Hagenouw, MD  
Royal Netherlands Medical Society (KNMG)

Mr. R. Meerhof  
Federation of Patients and Consumer Organizations in the Netherlands

Mr. E.C. Hermans  
Federation of Patients and Consumer Organizations in the Netherlands

Mr. P. Linsen  
Royal Netherlands Association for the Advancement of Pharmacy

Mr. R.J.M. Hopstaken  
Netherlands Federation of University Medical Centres

Advisory Board

The Advisory Board advises the Board of Management about strategic issues connected with NICTIZ’s long-term policy plan and action plan. The Advisory Board consists of delegates from the federative and sectoral organizations for healthcare and IT, the Ministry of Economic Affairs and the Ministry of Health, Welfare and Sport.

Organizations represented:
- Arcares, national association for nursing and care
- Association of Healthcare Insurers in the Netherlands
- Federation of Organizations for IT in Healthcare
- Federation of Patients and Consumer Organizations in the Netherlands
- Ministry of Economic Affairs
- Ministry of Public Health, Welfare & Sport
- Municipal health services in the Netherlands
- National Centre for Nursing and Care (LCVV)
- National Federation of Ambulance Services
- Netherlands Association for the Advancement of Dentistry
- Netherlands Association of Hospitals (NVZ)
- Netherlands College of General Practitioners (NHG)
- Netherlands Federation of University Medical Centres
- Netherlands Foundation for Mental Health Care (GGZ)
- Organization of Dutch Dental Prosthetic Specialists
- Royal Netherlands Association for Physiotherapy (KNGF)
- Royal Netherlands Association for the Advancement of Pharmacy
- Royal Netherlands Medical Society (KNMG)
- The Order of Medical Specialists
- Z-org, organization for healthcare entrepreneurs

Gert-Jan van Boven,  
director of NICTIZ

Van Boven is a doctor and IT specialist and has held various posts which called on his combined IT and healthcare expertise, including that of Director of Information and Technology at the Rotterdam’s University Hospital.
Administrative staff

The back office coordinates and supports the development, testing and roll-out of the national IT infrastructure for the healthcare sector and plays an initiating and stimulating role with a view to achieving optimum application of IT facilities in healthcare. The back office is engaged in a variety of projects.

General matters:

Broadband applications
Uniformity of terminology
Identification registers
Information security
Infrastructure
National Healthcare Information Hub
Standards
Access to patient data

Healthcare-specific matters:

Mass breast cancer screening
Chain of care, stroke services
Expense claims
Diagnosis Treatment Combinations

NICTIZ is constantly alert to new trends, responding to needs and initiatives with a view to achieving optimum application of IT in the service of healthcare.

In addition, the back office has a PR & Communications Department to foster collaboration between the parties concerned, and to ensure that IT in the healthcare setting remains high on the agenda of policy makers, the media and politicians.

Publications

An up-to-date list of publications related to NICTIZ’s activities can be found on the website www.nictiz.nl under “Publicaties”; most of these publications are only available in Dutch.
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