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ITa NETWORKING AWARDS 2009

REVIEW

WINNER

NETWORKING Awards 2009
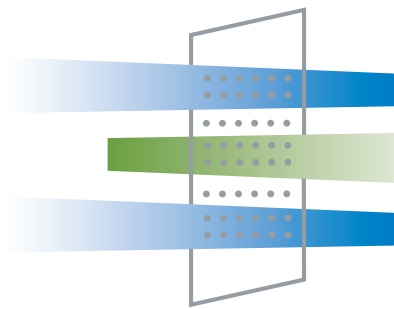
European Association of HEALTHCARE IT MANAGERS

The European Association of Healthcare IT Managers is a non-profit pan-European umbrella organisation for all relevant national healthcare IT associations and individual members in Europe.

OUR MISSION:

• We believe that the European Healthcare IT sector needs a common voice, especially in the face of rapid technological change and growing socioeconomic pressures.

• We encourage and support the emergence of common healthcare IT understanding and reinforce the appropriate recognition of healthcare IT management at hospital, EU and international levels.

• We invite you and your organisation to be involved in a community to exchange opinions and experiences with like-minded, forward thinking colleagues. We defend your interests and make your voice heard, effectively.
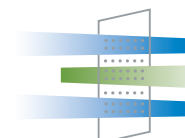
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ITa NETWORKING AWARDS 2009

REVIEW

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A Word From the Organisers

On behalf of the Executive Committee and General Secretariat of the European Association of Healthcare IT Managers (HITM), I would like to congratulate the winners of the *IT @ Networking Awards 2009* (*IT @ 2009*).

As an event which furthers our distinct mission of Unifying Healthcare IT across Europe by celebrating the pioneers of healthcare IT – *IT @ 2009* succeeded in rewarding the best of those who have designed and implemented new solutions in the field. We were elated with the overwhelming response from healthcare IT experts and professionals from across Europe, may of whom joined us at Square in Brussels October 29 - 30 for the *IT @ 2009* event.

Delegates were treated to MINDBYTE presentations on more than 20 of the top submissions selected by the *IT @ 2009* Review Committee and then wielded their influence by voting electronically for the five most innovative solutions.

Networking was more than just part of the title of our groundbreaking event – participants celebrated together at the opening reception and enjoyed interactive lunches during the two-day competition. A number of new projects and vital collaborations were undoubtedly initiated before, during and after *IT @ 2009*.

The WORKBENCH sessions on the second day highlighted a number of key IT innovations, which have been implemented across the continent. The Q&A sessions following the five finalist presentations were often lively and invigorated debates. Indeed, delegates became quite invested in their vital role of selecting the winner.

HITM and our partners, the European Association of Hospital Managers (EAHM), look forward to *IT @ 2010*, which promises to showcase even more innovative healthcare IT solutions. Make sure that you do not miss out on the chance to participate in Europe's premier healthcare IT event – SAVE THE DATE: 7-8 October 2010!

Christian Marolt, *Secretary-General,*
European Association of Healthcare IT Managers, c.m@hitm.eu

Dear colleagues,

On behalf of the European Association of Hospital Managers (EAHM) it gives me great pleasure to congratulate the I*T @ Networking Awards 2009* (*IT @ 2009*) winners. We were honoured to collaborate with the European Association of Healthcare IT Managers (HITM) for this innovative event, which brought the latest healthcare IT solutions to the pan-European stage.

This event served to emphasise the fact that Healthcare IT is of core importance to hospital management. Many of the projects presented highlighted how the right IT solution can increase cost-effectiveness, productivity and precision. Presenters were also honest about the difficulties they encountered when implementing their solutions- a refreshing change from other awards events.

As EAHM is dedicated to healthcare IT, we have set up a new working group to further explore the opportunities and possibilities healthcare IT brings. It is a complicated sector that can often seem daunting to hospital managers, especially considering a bad investment can have disastrous effects. We are working to keep our members informed so they can make the right decisions. *IT @ 2009* was an excellent learning opportunity.

With an eye on building on the success of this year's event, we are delighted to partner with HITM for *IT @ 2010*. It is clear that IT in the healthcare sector will only grow in importance as health systems and hospitals battle to cope with current challenges (i.e. financial crises; aging populations; increased movement of patients and healthcare professionals). Across Europe we are already making strides in e-health and telemedicine, *IT @ 2010* will serve as an opportunity to showcase new innovations.

Willy Heuschen,
Secretary General,
European Association of Hospital Managers

SQUARE, Bussels
29-30 October 2009

Presenters from Italy, Estonia, Finland, the UK and other countries across Europe joined together to share their experiences of implementing innovative healthcare IT solutions.

EU Commissioner Viviane Reding

Secretary General of EAHM, Willy Heuschen

Trophies and champagne

Mindbyte session 1

Mindbyte session 2

Mindbyte session 3

The Trophies

The unrivaled cash prize of 5,000 euros, the IT @ Networking Awards 2009 trophies and the nominee medals.

IT@ NETWORKING AWARDS 2009

The goal: Giving the pioneers of healthcare IT the recognition they deserve and bringing their solutions to the pan-European stage. The *IT @ Networking Awards 2009* was an opportunity to honour those who have designed outstanding healthcare IT solutions and also those with the foresight to implement them in their hospitals and healthcare facilities. The winning project received an unrivaled cash prize of 5000 euros, the coveted *IT @ 2009* trophy and a detailed presentation in this review distributed with Europe's leading healthcare management media.

Organised by the European Association of Healthcare IT Managers (HITM) and the European Association of Hospital Managers (EAHM), *IT@ 2009* was founded on the belief that healthcare professionals who use IT solutions on a daily basis are best placed to judge the value of new projects. Therefore, instead of the usual panel of expert judges, the winning project was selected by the audience. This was made possible thanks to a one-person=one-vote voting system. Attendees included hospital CEOs, CIOs, CMIOs, hospital and healthcare IT Managers and other healthcare workers with an interest in IT.

Out of a total of 78 submitted projects only 23 secured their place as a nominee for *IT @ 2009*. Nominees presented their projects during the first day MINDBYTE sessions in 10 minute presentations, explaining what differentiated their solution and why it deserved to win. Nominated solutions include national and regional projects such as healthcare information systems, PACS programmes and telemedicine initiatives; IT solutions for hospitals such as hospital information systems, electronic patient records and medical process reengineering; and specific departmental projects including decision support systems, simulators and computer-ized surveillance and alert systems. The audience decided on the spot if they liked the solution after each presentation.

Out of the top-level MINDBYTE presentations only five went through to the WORKBENCH finals. WORKBENCH sessions consisted of 45-minute in-depth project presentations followed by lively Q&A sessions with the audience. Voting took place after all presentations had been heard.

The Voting Criteria

All presentations were judged based on the following criteria:

1. The Importance of Technology
What technology was used and how it was integrated into the work place?

2. Benefits
→ Has the project helped those it was designed to help?
→ Has the project fundamentally changed how tasks are performed?
→ What new advantage(s) or opportunities does the project provide?

3. Originality
→ What makes the solution special?
→ Are there any original features?
→ Is it the first, the only, the best or the most effective application of its kind?
→ Is it an improvement on existing implementations?

4. Difficulty
→ What were the most important obstacles that had to be overcome?
→ Were there any technical or organisational problems?

5. Success
→ Has the project achieved or exceeded its goals?
→ How do you see the project's success affecting other applications, your facility or other organisations?
→ How quickly would the users accept this innovation?

6. Overall impression of the project
→ What is your overall impression of this project?

THE VOTING SYSTEM

The *IT @ 2009* audience used Easy-Vote, a paperless and wireless electronic voting system to express their views on every presentation. As *IT@ 2009* was based on peer – peer voting, the EasyVote system gave the specialist audience an opportunity to identify the *IT @ Networking Awards 2009* winner from the 5 finalists.

1

The Health Information System of the Rhône-Alpes region (SISRA) and the Shared and Distributed Patient Record (DPPR)

Dr Pierre BIRON / Regional Cancer Network Director, SISRA

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In order to improve the quality of patient care and facilitate rapid treatment, the Saarland University Hospital decided in 2002 to optimise the process of evaluating clinical findings and eliminate weak optimise the process of evaluating clinical findings and eliminate weaknessesnesses in analogue dictation using tapes. Thus, we want to briefly summarise the managers interested in the outsourcing of IT functions.

The aim of SISRA is to contribute to better health services for the population by proposing each caregiver and each health professional with a number of regional tools. SISRA first provides a regional patient identification number as no nation-wide national health ID is currently available in France. SISRA also allows medical data sharing through the shared and distributed patient record and offers several tools for care coordination. Three major principles have driven SISRA since its launch: Respect of Human Rights, development using a bottom up approach and avoiding intrusive EHR integration. Realisation has been fully supported by industrial partners. To date, SISRA connects 55 hospitals, both public and private, representing one third of all regional healthcare facilities, and 66 % of hospital beds. Founding partners are the three University hospitals of Lyon, Grenoble and Saint-Etienne, the Comprehensive Cancer Centre Léon Bérard, the regional cancer network ONCORA, and a private practice association (ADSIMIL). SISRA is politically influenced by the full college of regional health representatives, and the umbrella organisation of patients' associations (CISS-RA).

I- The System and its Deployment

SISRA uses a combination of backbone tools.

→ STIC (Serveur Télématique d'Identité Communautaire) is a regional patient ID server that provides local identification solutions and relies on five hard characteristics: family name at birth, first name, sex, date of birth, and postcode of place of birth.

→ DPPR (Dossier Patient Partagé Réparti) is a "shared and distri - buted patient record". "Distributed" means that the information is not stored centrally but is available from each local repository. Working like a web-based "health search engine", the system provides real-time access to original medical data documents, including hospital discharge letters, surgery reports, histological reports, lab results, treatment strategy, radiology reports and DICOM images.

→ PEPS (Plateforme d'Échange entre les Professionnels de Santé) is a health information exchange platform developed to serve 3 functions: PEPS NETWORKS to collect and centrally store all structural clinical information shared within a given network; PEPS HEBERGEMENT / HOSTING to connect healthcare facilities not yet equipped with a consistent EHR system; PEPS VILLE / COM-MUNITY to collect clinical data from GP's EHR systems not operating continuously, nights and weekends for instance.

From these core systems, allowing to share medical data across several sites, different tools have been developed to facilitate care coordination.

Dr. Pierre Biron during his Workbench presentation

About ten applications have already been developed from this structure, in fields such as emergency, oncology, perinatal care, etc... Two of them are intensively used.

→ TRAJECTOIRE is an equivalent of the region marketplace for hospital beds. The system provides a list of options in which appropriate follow-up treatment (e.g. nursing, rehabilitation...) corresponding to the patient's needs can be provided.

→ DCC (Communicating Cancer Record) is an oncology-specific disease record. It was created with the double aim to provide both healthcare providers with oncology-specific data selected from the patient's electronic medical record and to help health professionals organise their own activities. Functionalities include:

  → Directories of regional decision-making centres;
  → Planning of multidisciplinary oncology consultation;
  → Completion of oncology-specific files allowing to determine the best treatment strategy during these consultations, in accordance with good clinical practices;
  → Provision of personalised treatment plans for each given patient;

  → Notice of the decision to the general practitioner referring the patient, and
  → Evaluation of the activity of the centres.

Up to now 72 data repositories have been connected, bringing together 54 health facilities, 8 cancer coordination centres, 7 health networks for cancer, pain management and palliative care and neonatology, and 3 private emergency care units.

SISRA already stores 1,500,000 regional ID patient records corresponding to 25% of the Rhône-Alpes population, and 400,000 regional patient records (DPPR), with more than 4 million medical data. More than 30,000 connections are observed each month, with 400,000 accumulated accesses. "Trajectoire" now facilitates finding 80% of follow up beds in the region. More than 50% of other French regions have adopted the system, making "Trajectoire" the leading system in France in this field.

II-Success Factors

First and foremost, we have given special and pragmatic consideration to the users' needs. Analysis was based on real pragmatic and medical needs of the users, taking into account traditional ways of organising data, processes, and the computerization level of patient records (paper or computer).

We also wanted to elaborate an exhaustive record: 100% data for 100% diseases and 100% patients. Since the choice of medical data to be accessed is made by the searcher and not the sharer, special attention was given to data hierarchisation and classification. We have opted for internationally recognised tables and built upon previous work performed in the frame of the French national electronic record. Given that every practitioner and health facility must archive their own medical files, and considering the economics of storing data, especially with the heavy weight of current DICOM images, it was decided that data would remain stored in the repository of each data owner, avoiding double data entries whenever possible. A major roadblock was the heterogeneous computerization level of the different health facilities: Out of 300 facilities in the Rhône-Alpes region, only 48% used computerized patient records, while 52% still used paper records.

Human and political factors also played a key role in the project's success:

→ Since the beginning there has been a strong commitment from all major regional regulatory authorities: Regional health agency, regional council and liberal medical practice organisations, leading to funding agreements.
→ The energy of the founding members of SISRA was as strong as their desire and ability to work together and pool their capabilities.
→ There has been an effective integration of health user representatives into the process.

SISRA is a very small coordination unit with no full-time employee. However, personal commitment from each founding member, and clear,
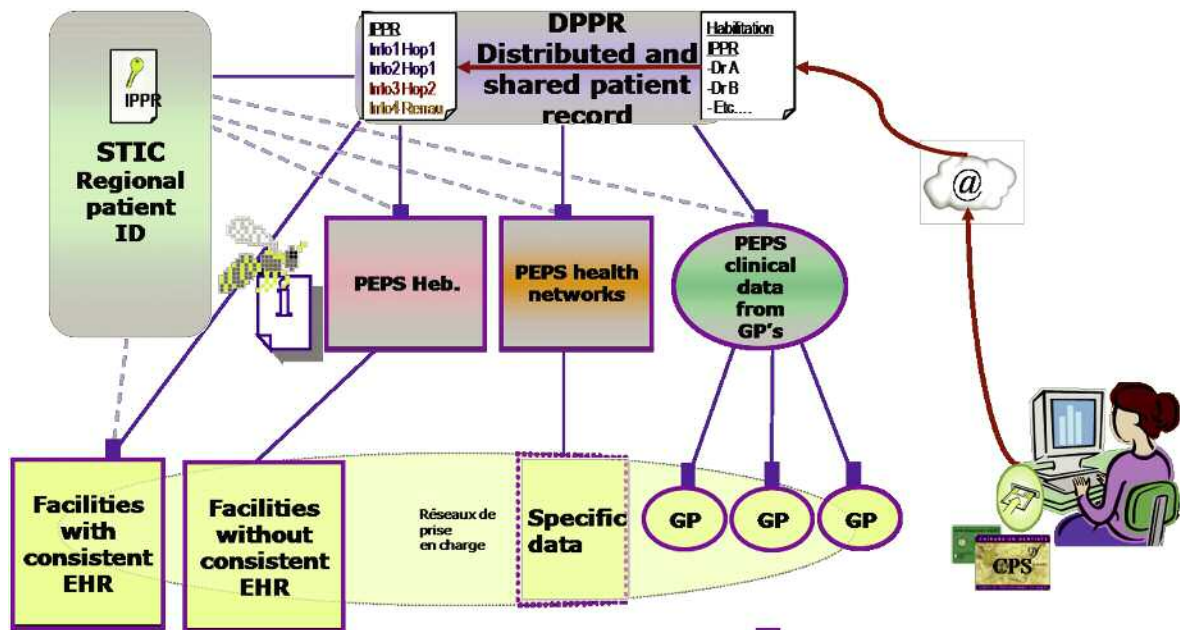
72 data repositories connected

distinct and well-articulated roles and responsibilities have made it possible. SISRA has designed workgroups and tools but relied on industrial partners for development and integration tasks.

Each project relied on strict sequencing, with precise separation and articulation of each step and event. Step 1: The steering committee decides on a collective view of what should be done according to its health policy. Step 2: The operational committee identifies professional and technical skills and then designs, elaborates and finally organises the implementation of the tools in a limited area. Step 3: Back to the steering committee- regulatory authorities include the operative project in their strategy and become its principal sponsors; they ensure its generalisation and stronger implementation.

Lets examine the example of the DCC (shared patient record in oncology). Step 1: The French cancer plan recommends that every patient's case be discussed in multidisciplinary onco-

logy consultation. Funds provided by national regulatory authorities (INCa) were raised. The management of the project was entrusted to ONCORA, the regional oncology network. Step 2: The major problem was the technical complexity of the project due to the existing situation where some institutions provided the information through their own system, and some were already involved in common web-based applications. However, we were able to elaborate a powerful communication tool serving as a viable solution for institutions where no system has been developed, a complement to pre-existing hospital information systems and a replacement of existing web-based systems. Several pilot units were designed to test the feasibility of the project. Step 3: Generalisation after feasibility evaluation and conclusion by the steering committee that the project was technically effective. The regulatory authorities became involved in the generalisation step in June 2009. They finally ordered, in a letter to the directors of all healthcare facilities, that 100% of the patient cases discussed in multidisci-

plinary oncology consultations should be recorded in the regional system by the end of 2009. Approximately 52% reports are recorded at this stage.

Previous experiences of sharing data within a hospital or network have shown that to develop access and use a large amount of data is required: Number of patient EHR, number of available medical data, especially key data like biology, functional explorations, or DICOM images for medical decision making etc. Searching data in the system and not being able to find it can be rapidly discouraging and limit its use. Practitioners will then still prefer traditional channels like letters, fax and phone. Enlarging the amount of data requires the connection of many repositories.

From an historical point of view the building of the system is a long lasting task. It began between 1995 and 2000 with planning, testing and learning from previous isolated experience, and identifying cornerstones like the need for a unique patient ID, and system accessibility,

reliability and security. The second phase, from 2000 to 2005, focussed on preparing connections between repositories and developing DPPR, STIC and PEPS. After a survey of the levels of computerization and use of local tools we began the development of connectors between the different local software editors. In 2005, the political objective was to have 50 repositories connected by the year 2009, despite difficulties due to heterogeneity and lack of innovative technology and systems skills in small health facilities. The third phase currently underway was started in 2005. It aimed, firstly, to fill the DPPR with content, deploy the DPPR on pilot sites and then wider after creating a SISRA Deployment team, and secondly, after accumulation of sufficient content, to facilitate its use by the implementation of specific levers like care coordination tools allowing patient placement at discharge (TRAJECTOIRE), emergency help (SPIRAL, OURAL) or oncology management ("shared patient record in oncology"). For 2009, the political objectives are 100% finding of follow-up beds using "Trajectoire", 100% Oncology, Obstetrics and emergency reports in the DPPR. The next step will be to increase secure exchange through the DPPR (DICOM and second advices), messaging with the objective to eliminate all paper in medical exchanges, thus ensuring speed as well as improved quality and reliability of data and care. The political objectives for 2010 are to increase the use of the tools to all caregivers and facilities, for example to nursing homes, old people's homes.

Throughout the development of the project, consumers and citizens have been strongly involved; health consumers' representative associations (CISS of Rhône-Alpes) have been invited to participate in workshops concerning access authorisation, access controls, and access for any stakeholders to logs in EHR. At this point we can consider that there is no actual gatekeeper, and the patient is the only gatekeeper of his own record.

Furthermore, taking into account the tools in use and that the use of electronics in medical practice is also a tremendous change of behaviour and culture we have decided to give special attention to the accompaniment of the change. A specific team was set up in 2006 to develop tools for stakeholders, patients, local project managers including media communication (booklets, flyers, posters, TV film in waiting rooms), training and formation of trainers by e-learning, DPPR Training, tool-specific training (Oncology, Trajectoire). The team also ensured that all relevant documentation and statistics and annual reports for health facilities and professionals were available to the users through the SISRA dashboard.

III- Technical Choices

The security and confidentiality of health data is of first concern. The "distributed" model means that access to all data is difficult. We have chosen to enable access through a strong identification via a microprocessor Health Professional ID Card and password, authorisations by the patients themselves, total traceability of information flow: Virtual Private Network, HTTPS following the French recommendations.

For EHR integration we have faced many difficulties as vendors were solicited for developing connectors for multiple projects, each time with "specific standards". It was difficult at first to find volunteers, even when offering payment. The biggest difficulty lay with the IT managers of health facilites who feared the intrusion into their own systems.

Consequently, we opted for a solution compatible with all facilities, whatever their computerization level; an easy and non-intrusive EHR integration providing access to information in the form in which it is stored: PDF, DOC, XML, DICOM, JPG, etc. The connectors were developed by firms in charge of the local EHR (workload ~30 days versus 100 days for the first ones), by improving the local gateway, by providing industrial partners (local EHR vendors) with the SISRA API (Application Provider Interface). We have tried to have achieve integration with the GP's EHR: GPs visualise DPPR data in their local EHR (web services): one click to upload and one click to visualise. A SISRA local (DMZ)

Dr. Pierre Biron accepting the IT @ 2009 Winning trophy and the cheque for 5000 euro

The 3 winning projects of the IT @ Networking Awards 2009

Gateway guarantees communication security. Today there are 23 connectors with health facilities EHR vendors corresponding to a potential of 92% hospitals (public/private) connectable and 5 connectors with GP's EHR vendors.

All SISRA tools are designed by SISRA teams but developed and integrated by industrial partners (SWORD, STERIA, ATOS). SISRA is the owner of the tools that are open source in terms of diffusion and provide an opening for better cooperation in tool improvement. For instance, in 2006, the first version of DPPR was taken up by industrial firms for the first trial of the national DMP in our region and further developments were integrated in the current version. To date, eight French regions have used the TRAJECTOIRE open source tool.

Based on an interface with local tools, SISRA encourages the computerization of healthcare facilities by leaving local managers free to choose the solution they wish.

All SISRA tools have obtained CNIL agreement. The CNIL (Commission Nationale Informatique et Libertés) is an independent French administrative authority protecting privacy

and personal data. All SISRA tools give a unique technical answer to multiple applications: Information sharing, information exchange: word documents, numeric data or DICOM images, etc. Once a facility is technically connected to SISRA, the facility can share its local EHR with the DPPR, can securely exchange documents with other practitioners, exchange DICOM images for second opinion or expert advice. All this by applying the same technical solution. SISRA guarantees regional healthcare facilities compatibility and convergence of regional tools with national projects: DMP, DCC, and OURAL.

SISRA has been audited by a consultant appointed by the European commission. It is one of 10 independent evaluations of good practice in interoperable electronic health record systems in Europe and beyond, commissioned by the European Commission with the aim to improve awareness of the benefits and provide new empirical evidence of the socio-economic impact of, and lessons learnt from, successfully implemented systems.

Annual net benefits have been achieved since 2008, five years after the first implementation of the sys-

tem, suggesting an increasing and sustainable cumulative net benefit from 2011 (though 16.6 million invested since 2001).

The three major lessons from SISRA for future decision-makers and development teams are:
1. Plan on long time scales, they are realistic;
2. Build from previous successes, and
3. Contribute to the pre-existing strategic and operational goals for healthcare.

Interoperability and transferability is essential to SISRA's success

In conclusion, things work out over time. In France we say "Paris was not built in one day…" Guiding principles are to respect the IT choices made by each healthcare facility, use industrial solutions, keep in touch with the environment and develop a specific team to help the implementation. SISRA is a unique data capture and storage network, available securely and confidentially when and where needed. Over the past ten years, we have gone from a situation where there was nothing to get people to work together beyond their legal obligations, from a situation where potential users were on the reserve and only minorities used services, to today, when users are always asking for more services. Our goal is not only to develop tools but also to make them accessible to users by a steady accompaniment of change. Over these ten years, ambitious investment has been made, based on a light but dynamic policy and a determined steering committee, a pragmatic and efficient choice of computerization level, respect for the solutions proposed by the actors, and a constant assistance in project management. Finally, the system allows long-term time and cost savings in medical practice and public health and, above all, it is a way of increasing the quality of patient management.

HEALTHCARE IT MANAGEMENT

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Digitisation of the Nationwide Breast Cancer Screening Programme in the Netherlands

Emile Knops[1] and **Bert Verdonck**[2]

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The Dutch government has ordered the digitisation of the national mammography screening programme for breast cancer. The RIVM assigned Philips and a consortium of specialised suppliers to handle all the IT aspects of this mega-project referred to as DigiBOB. The Philips iSite PACS forms the heart of this nationwide service, allowing radiologists to access new and historical patient data, including multiple mammograms, in seconds.

In the Netherlands, the National Institute for Public Health and the Environment (RIVM) provides a free nationwide breast cancer screening service for all women between 50 and 75 years of age. The programme started in 1989 and by 1999 national coverage was reached. All women in the target age group are invited every 2 years. This makes that close to one million women are examined per year, re-presenting more than 83% of the target group, the highest compliance percentage worldwide. A controlled and optimal balance is obtained between referral rate (1.5 – 2%) and detection rate (4.5 – 5.5 %).

The incidence of breast cancer is among the highest in the world: 126.7 cases per 100,000 women. A woman in the Netherlands has a 1 in 8 life-time risk of developing breast cancer. In 2006, 12.462 new cases were detected, and 3.350 women died of the disease. The high incidence is expected to be related to western life style in general, and to the reproductive life style more specifically.

Given the aging population, and the increasing healthcare expenditure, the Dutch government decided to innovate to reduce the healthcare cost increases, to increase the productivity of healthcare professionals and to improve the quality of healthcare. One of these innovation projects is the digitisation of the national mammography screening programme for breast cancer.

Bert Verdonck

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The RIVM assigned Philips and a consortium of specialised suppliers to handle all the IT aspects of this mega-project referred to as DigiBOB. This includes all the hardware, software, network infrastructure and data centres, but also all project management and training required to bring the service to life. Next to the information system iBOB, the Philips iSite PACS forms the heart of this nationwide service, allowing radiologists to access new and historical patient data, including multiple mammograms, in seconds.

Separate public tenders were issued to procure the digital mammography systems and the specially designed mobile units (busses) that tour the country with all the necessary equipment on board. The IT infrastructure is deployed in the mobile units, the static units, the reading centres and the regional and national archiving centres. And it connects all of these locations into a seamless and efficient operation.

The digitisation had to be deployed with minimal impact to the running programme: The show must go on. But also a principal decision was made to go with the flow without es-

cape, since analogue film techniques will become obsolete rather sooner than later. The project was set up within a public-private-private partnership: the public health authority hosts the national DigiBOB project team, using systems and services from private providers, and deploying them to the private regional screening organisations.

Screening mammography examinations are performed in 67 screening units, from which 57 are mobile units (busses) (refer to the graph). All nine regions and reading centres have been equipped with the new IT equipment and all clinical users have been trained and use the system effectively. Today two thirds of the 1000 expected users are active on the system and more than 2 million mammography examinations are available in the image archive. The implementation of this project has started early 2008 and by July 2010 all mobile screening units are expected to be integrated in the new system.

The scale of the undertaking is huge, with more than one million mammography examinations added each year, while guaranteeing performance for viewing new and prior images, and under stringent quality, security and privacy protection requirements.

The ambition of the digitisation project is high: To ban the use of paper and the use of film in a single coordinated transition. This involved a lot of business process redesign, where people are forced to change the way they work. The change was well deployed thanks to extremely intensive communication with all stakeholders, as well as by militant and dedicated project management on the national level.

For the patient the system will enable a faster response time after the mammography examination and a faster scheduling of follow-up examinations,

Emile Knops and Bert Verdonck
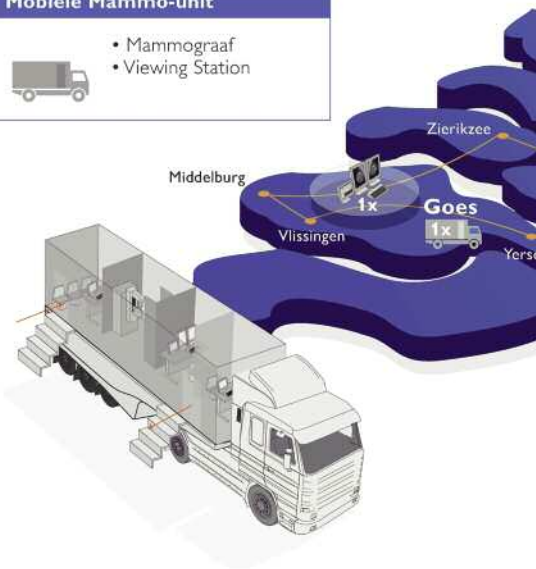
if required. The minimal requirement for the system was to guarantee at least the same high quality standards of the current screening programme. But the expectations are that digital imaging will further improve the clinical quality of the programme, with improved cancer detection rates, and more lives saved in the end.

derzoek Borstkanker Nederland

The system shall not have a negative impact on the productivity of personnel. Initially, the prior films are still looked up from the film archive and digitised. But over time the removal of all film handling will incur an important logistical saving. The digital image archive will allow future applications in the area of e-learning for radiologists in training, real time e-evaluation of image quality and reading performance, computer aided detection (CAD), and more. In a pilot project experiments are ongoing with electronic image transfer from the screening programme towards the hospitals to which patients are referred.

DigiBOB is the first nationwide digital mammography screening installation in the world. It is one of the few successful government driven healthcare IT projects of this scale. High expectations are set regarding a positive quality impact on the screening programme, and in ultimo on the reduction of cancer deaths.

3

From Free Text to Standardised Nursing Language
– The National Development Project of Nursing Documentation in Finland

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Director of Nursing Development, Turku University Hospital

Hospital District of South-West Finland

Turku, Finland

Summary

The Council of State made a decision in principle in 2002 that Finland should have a nationally interoperable Electronic Health Record (EHR) by the end of the year 2007. Furthermore the decree launched in 2007 requires public healthcare organisations to join the national patient record archive by the end of the year 2011. The Ministry of Social Affairs and Health is in charge of the implementation of this decision and the specification of the EHR solution. The national nursing documentation model and the Finnish Care Classification (FinCC) were developed in the national nursing documentation project 2005-2008 as a part of the national solution. FinCC has been implemented in CDA R2 format by Health Level 7 Finland. The information on nursing process and the nursing discharge summary can be transformed and stored in the national archive of EHRs. After the results of the national nursing documentation project, the nationwide implementation process started in Finland in October 2007 and will end in 2011.

Development Process

The national development process started in 2004 when the core data elements of the national EHR were introduced. The core data means health-related information required for data exchange between health information systems in a standardised format. In Finland, six IT suppliers representing the whole healthcare industry were initially involved in the national project.

The ratio of nurses to physicians is four to one in Finland. In clinical settings this means that nurses, being the largest group of healthcare professionals, constitute the most active users of patient data in hospitals. This dictates that tools and models adopted for daily practice must support nursing from philosophical, ethical and practical perspectives.

The Nursing Minimum Data Set (NMDS) is a part of the core data elements. The national NMDS and FinCC were integrated during 2005-2007 into eight health-recording systems in 34 healthcare organisations. Piloting was carried out as an action research in 106 units / wards in three university hospitals, 11 district hospitals, 19 healthcare centres, and in one private hospital.

Results

The developed systematic nursing documentation model is based on the nursing decision making process introduced by the World Health Orga - nisation in the late 1970's. This inter- national model comprises mainly four phases:

→ Assessment and naming the nursing needs (nursing diagnoses);
→ Planning and describing the outcomes of care;
→ Description of interventions performed, and
→ Assessment of nursing outcomes.

(Figure 1) An education model and an eEducation environment were also developed to support the implementation.

FinCC includes the Finnish Classification of Nursing Diagnosis (FiCND), Finnish Classification of Nursing Interventions (FiCNI) and Finnish Classification of Nursing Outcomes (FiCNO). The FinCC is a translation of the Clinical Care Classification (CCC) (www.sabacare.com) and it was implemented after a cultural validation. The CCC is approved by the American Nurses Association (ANA) and is cross-mapped to the International Classification for Nursing Practice by the International Council of Nursing (ICN) and to the Unified Medical Language Systems. The CCC is also a part of the international Snomed CT classification and it can be used together with ICD-10.
Based on the experiences and evaluation results the Finnish Care Classifi-

National Nursing project 2005–2008
Nursing Documentation model

View: Patient Care history

Interdiciplinary care process	Admission & Status		Planning		Action	Assessment		
	Data collection and analysis *	Definition of patient needs / diagnosis	Aims	Planned nursing interventions	Nursing Interventions	Nursing Outcomes	Nursing discharge summary	
Nursing process	Data collection and analysis *	Definition of patient needs / diagnosis	Aims	Planned nursing interventions	Nursing Interventions	Nursing Outcomes	Nursing discharge summary	
FiCND 2.01 FiCNO 1.0	-	FiCND and assessment scales	FiCND	-	-	FiCND, FiCNO and assessment scales	Includes: Summary of the nursing process data exploiting the structured documentation and the patient care intensity grade.	
FiCNI 2.01 FiCNO 1.0	-	-	-	FiCNI	FiCNI and assessment scales	FiCND, FiCNO and assessment scales ** Measurement of patient care intensity (OPCq)		
Nursing core data	Inter-disciplinary core data	Nursing needs			Nursing interventions	Nursing outcomes	Nursing discharge summary	Patient care intensity **

Figure 1: The nursing documentation model in Finland

cation can be implemented and used in all kinds of wards. Overall, the quality of the nursing documentation has improved. It is more uniform, patient-centered, based on guidelines accepted for care and in interdisciplinary use.

Kaarina Tantu

The length of oral reports has decreased, allowing more time for actual care-giving. Recording information concerning the well-being of the patient throughout treatment until discharge improves the care process and pathway and, additionally, this data can be used for managerial and administrative purposes.

Conclusions

There is no desire to return to the old model of recording patient data among nurses. The users have begun to see the benefits of the systematic nursing documentation and use of EHR. The experiences of the systematic model of recording patient data are promising. Statistics and reports of nursing processes by systematic documentation have far-reaching benefits, including: Nursing management, planning, education, research and quality assessment. After the results of the national project, the nationwide implementation process started in Finland in October 2007 and will end in 2011.

4

MPOC
Interoperability for Emergency Medical Care

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Overview

The mobile point of care (MPoC) pilot project at Emergency Medical Service of Prague (EMS) named "Replacing paper with electronic records" took place between February and April 2009. Rapid Response Unit physicians were equipped with laptops and wireless connectivity at emergency scenes to facilitate information flow and underpin fast and effective treatment.

Project Targets

The Prague Emergency Medical Service (EMS) implementation of the GEmMA emergency management system enabled EMS to manage its operations through the creation of Electronic Mission Records (EMiR). This included the compilation and reporting of statistical information on emergency events and the collection of billing information for insurance companies.

The project target was to replace workflow of handwritten medical documentation with primarily electronically created reports. A second goal was to utilise the mobile technology in the field and provide additional information from interoperable e-health and insurance registers for decision support at the emergency scene.

Rugged laptop PCs were provided for physicians in the Prague EMS, to collect information at the emergency scene. Physicians can access the Emergency Service Centre via a 3G HSDPA connection and a central application server located at the EMS Centre. Data that is inputted in the field feeds into the EMiR. The solution has interoperability with the national central electronic health record system IZIP, which provides emergent dataset about previous treatments and allows responders using insurance numbers to check online whether patients are registered with the General Health Insurance Company.

When the physician is handing over a patient to an ambulance or hospital, a subsection of the EMiR is printed off (named the Electronic Patient Record) and then handed over to ambulance staff. If the EMS physician has accompanied the patient to the hospital, he or she hands this over to the hospital doctor. The electronic patient record summari-ses information about the course of the mission and treatments provided, thus replacing hand-written (and often hardly readable) reports.

Difficulties

During implementation, we faced many difficulties, from technical problems (e.g. lack of broadband HSDPA connectivity in some Prague suburbs; finding safe and ergonomic placement of hardware in the vehicle; software integration of dispatch centre system; emergency data set availability in EPHR profiles in repository) to "philosophical" dilemmas (i.e. finding consensus on structure of collected data; conservativism of some physicians / users).

Benefits

Despite these difficulties, the MPoC pilot revealed intangible benefits in

areas of workflow optimisation, physician's decision-making, work efficiency, patient safety and well-being and staff satisfaction. The solution showed a Net Present Value of 21,403, a 12 month break-even point, and Return on Investment of 149%.

While these benefits were significant, the business value assessment of MPoC also emphasised that a holistic approach to technology implementation would benefit the entire health system.

Conclusion

As a result of the success of this pilot project, Prague EMS plans to implement this mobile solution in all rapid response and paramedic units over the next two years.

5

Dark Fibre PC network -
Public Internet Access Points in 5 Hospitals

Jan Pejchal / ICT Manager, Masaryk Hospital in Usti nad Labem

Regional Health Corp.
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Masaryk Hospital in Usti nad Labem Regional Health Corporation ("Krajska zdravotni, a.s.") consists of 5 hospitals with a long tradition and history - Masaryk Hospital in Usti nad Labem, Decin Hospital, Teplice Hospital, Most Hospital and Chomutov Hospital. The organisation was established in September 2007 to merge these 4 district hospitals and 1 regional (Masaryk) hospital under one roof creating the biggest healthcare provider in the Czech Republic. Masaryk hospital in Usti nad Labem was one of the biggest and most modern healthcare institutions in the country. The founder and the only owner of this joint-stock company is the region of Usti. The hospitals of the Regional Health Corporation (RHC) have 3350 beds and employ nearly 6500 employees (838 doctors and 2673 nurses). Their area covers about 820 000 citizens. RHC provides a wide spectrum of healthcare within its clinics and departments including a specialised unit. It also participates in pre-graduate and postgraduate education.

The RHC Centre of Information Systems operates its own regional optical network on the basis of dark fibre technology. It has a backbone transmittance of 10Gbps interconnecting its hospitals and also provides an in-direct connection to a national research network (CESNET2+) that connects a large number of institutions in the region, with the connectivity of 10GE over DWDM. Masaryk hospital operates as a data and communication RHC centre and is the first Czech filmless hospital, with its' PACS utilised by all RHC hospitals.

The most significant step of ICT in supporting the transformation of hospitals into one company was to create a regional optical network. This provided hospitals with parameters that enable access to geographically remote working sites, allowing them to merge into one organisation, with one information and telecommunication infrastructure.

In September 2006, Masaryk Hospital in Usti nad Labem started a big project called "Public Internet in the Usti Region hospital network", co-financed by EU structural funds. This project was completed in August 2007. Masaryk Hospital is The National Research Network CESNET2+ provider (10 Gbps access to CESNET2+ on DWDM). Clients of CESNET2 can access the research network through a RHC regional network. The U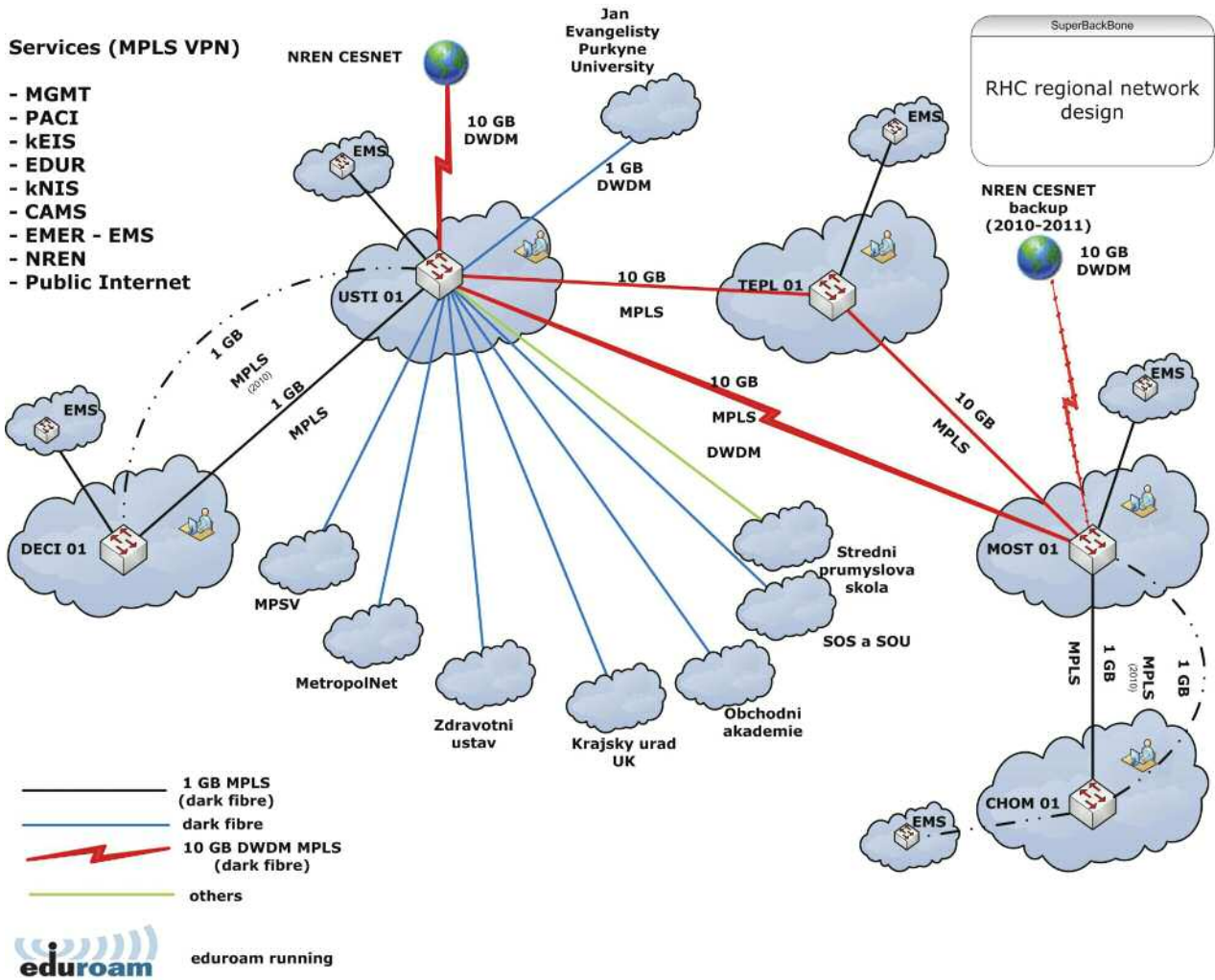sti Region EMS offices are also interconnected through this network. The RHC hospital dark fibre network provides services of a federative identity management Shibboleth and participates on an international roaming system for teachers, students and researches EduRoam.

The unique characteristics of this solution come out of conceptual approach of building regional information and telecommunication infrastructure for digitalisation of healthcare (e-health) based on best practices in the field and also open and prospective technologies and services (i.e. dark fibre, MPLS VPN networks, EduRoam, Shibboleth). The solution provided immediate benefit during the establishment of RHC (merge of 5 hospitals) and increased accessibility of The Usti Region EMS to the infrastructure (Integrated Emergency System) while it was being restructured. This solution is also a great example of multi-source financing in the field of healthcare.

Services (MPLS VPN)

- MGMT
- PACI
- kEIS
- EDUR
- kNIS
- CAMS
- EMER - EMS
- NREN
- Public Internet

NREN CESNET

Jan Evangelisty Purkyne University

SuperBackBone

RHC regional network design

EMS

10 GB DWDM

1 GB DWDM

EMS

NREN CESNET backup (2010-2011)

10 GB DWDM

USTI 01

10 GB MPLS

TEPL 01

EMS

1 GB MPLS (2010)

1 GB MPLS

1 GB MPLS

10 GB MPLS DWDM

10 GB MPLS

EMS

DECI 01

MOST 01

Stredni prumyslova skola

MPSV

SOS a SOU

MetropolNet

Zdravotni ustav

Krajsky urad UK

Obchodni akademie

MPLS

1 GB

1 GB MPLS (2010)

1 GB

CHOM 01

EMS

───── **1 GB MPLS** (dark fibre)

───── dark fibre

⟋⟍⟋ **10 GB DWDM MPLS** (dark fibre)

───── others

((•)) **eduroam**   eduroam running

M.J a J.P. 29.9.2009

An Interoperability Platform for Telemedicine Services in the Veneto Region

Claudio Saccavini / Arsenàl.IT, Italy

Telemedicine applications in Veneto Region Health Service were in some cases fragmented and scarcely interoperable among the 23 Local Health Authorities (LHAs) spread over the regional territory. Arsenàl.IT, Veneto's Research Centre for eHealth Innovation worked giving technical advice in the European Telemedicine Project called HEALTH OPTIMUM and released implementation guidelines (on the basis of IHE Integration Profiles) to set up Telecounselling Service for Neurosurgery, Telelaboratory and experiment with other new services (e.g. Stroke Management and Oral Anticoagulation Therapy).

These guidelines were designed adopting in a coordinate way the most advanced IHE Integration Profiles (e.g. XDS, XDS-I, XCA, etc…) and the most authoritative e-health standards (e.g. ebXML, XML CDA2, DICOM, PKCS#7, etc.). This facilitated interoperability between the 23 LHAs divided in seven different provinces, through a federal approach where each province is independent and where it is possible to share digitally signed Reports (XML-CDA2 documents) and DICOM CT Images.

The greater challenge taken up by Arsenàl.IT is to switch-on a Regional Telemedicine platform composed by seven heterogeneous Domains that have adopted both open standards and legacy solutions.

Taking advantage of this cooperation platform, a Governance System of Telemedicine Services is being developed with the purpose to check and monitor all systems and applications, provide the semantic interoperability (thanks to the adoption of a common coding system), the correct pricing of the service and the ability to carry out statistical analysis.

The key purpose of these applications is to avoid useless patient transfers, guarantee the continuity of care provision in all regional territory (about five million inhabitants spread over 18.000 km^2), tearing down the economic and organisational costs. In addition, the use of open standards provides the necessary flexibility to extend the telemedicine services also to other clinical fields of use (e.g. Cardiology, Gastroenterology, etc…).

The Successful Roll-Out of PACS in England – and Moving Forward with Image Sharing Between Hospital Trusts

Robert Hammond, Mary Barber/ NHS Connecting for Health, UK

By December 2007 all hospital trusts in England were using the digital imaging technology known as Picture Archiving & Communication Systems (PACS). This was as the result of a national roll-out encompassing 127 separate hospital trusts over a three year period.

Now, PACS is enabling clinicians to view diagnostic images at multiple locations within their hospital trusts, leading to speedier and more accurate diagnoses and treatment.

The national PACS programme – a collaborative effort between a central programme team at NHS Connecting for Health, strategic health authorities, hospital trusts, professional bodies, IT service providers and other stakeholders – is now working on ways to improve the sharing of images (and reports) across hospital trusts so that even more benefits can be realised.

The programme is taking a creative, pragmatic and cost conscious approach, meeting the large majority of clinicians' image sharing requirements by supporting the adoption of solutions such as web view and image routing technology that are available now.

Shared Electronic Medical Record in Catalonia (HC3) Organisation(s)

Manuel Sanromà / Hospital De Santa Tecla, Spain

The Shared Electronic Medical Record (HC3) is the backbone of our efforts in ICT in the e-health field. Its main objective is the improvement of citizens' healthcare service by using a tool to facilitate physicians' tasks, by allowing them the shared use of patients' available information from the Catalonian care centres. The HC3 facilitates and potentiates the continuity of care avoiding the repetition of diagnostic explorations or procedures.

This initiative piloted by Manuel Sanromà, CIO from the Santa Tecla Hospital, has increased the cost-benefit ratio by proving that with only a small financial investment, great benefits in quality of care for the patient, in the health professionals' way of working and overall efficiencies such as greater diagnosis speed.

The HC3 contents are structured in two big blocks. Firstly, the care centre's information, with the primary and specialised healthcare as well as the diagnosis procedures and, secondly the information provided by the Health Department, which contains the Hospital Minimum Data Set from the Discharge report, the dispensed medical treatment and the medical evaluations. All of this information is accessible through the high security Catalan Health network. The HC3 is unique and outstanding because it is designed to respect that each provider chooses and implements their own system interoperable through the HC3. This uniqueness is reflected with our model of proven interoperability and standards rather than a centralised system, and it is the feature due to which only a reduced financial investment was needed.

The HC3 has only been possible through the leadership of the Health Department in setting and promoting the use of standards, the enrollment and the implementation.

Integral Healthcare Information System Of Montenegro

Zoran Glomazic, Adis Balota, Denis Rekovic, Ružica Milutinovic, Kosta Simicevic, Mugoša, Denis Boban Rekovic, Ružica Milutinovic / Montenegro Health Insurance Fund, Republic of Montenegro, Institute of Public Health; MG-Soft, d.o.o; Ministry of Health, Montenegro

The Integral Information System for primary healthcare is implemented at a very high technological level. It is integrated with the Health Insurance Fund, the pharmaceutical sector, with all providers of health services at primary level and completely open for connection with higher levels of healthcare and other participants of the system. The entire population of the state is included.

One of the goals of health system reform is for the insured person be at the centre of the system and that the money follows insured person.

This implies standardisation and support of the process "end-to-end" (end2end) from notarisation of the medical insurance card by choice of a medical practitioner as gatekeeper of the system, to sending to the laboratory, prescribing medicines and their dispensing at the pharmacy.

Encryption methodology for drugs is introduced by ATC, for services ICPC2 for ICD10 diagnosis, etc.

The main advantage of this project solution is the multiple entering of the same information in different parts of the system. This means that once data is entered into the system, it becomes available to all segments of the system with respect to the rules of access and authority. Registration data, for example of the insured in the Fund insured persons database, becomes available to the whole system without the need for writing and possibility of making mistakes.

The implemented solution allows forming of: HER and Financial electronic card of the patient (costs - contributions).

Our experience has shown that ICT can bring many advantages, but only if they are closely related with the organisational characteristics of the company. One particular advantage is the savings by the use of IS in the pharmaceutical sector, they considerably exceed the cost of investment in the system.

Florence, Clinical Information Integrated System and its Tool Florence Mobile

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Luis Barcia Albacar, Miguel Ortiz Garcia, Bernardo Vila Roig, Alfonso Perez Cervello
Torrevieja Salud, Spain
Microsoft

The Torrevieja Hospital pursues a high efficiency management of its recourses, as well as the maximum level of services offered to its patients. And here "Florence" plays the key role. Florence is a clinical information and management integrated system, it assures communication between managers, doctors and patients. Florence allows access to necessary information in real time and from any place, in order to be able to make right clinical and management decisions. Consequently this improves efficiency, facilitates and speeds up administrative and clinical processes, improves assistance quality, makes the recourses profitable, foresees different situations, reduce incidents and increase user satisfaction.

For our doctors, the most useful and innovative tool is definitely "Florence Mobile". It allows accessing the EMR in real time by means of mobile phone. Thanks to Florence Mobile, they can see laboratory and radiology test results, receive and respond to the referrals of other doctors and work on the EMR of hospitalised patients from any place with no need of a PC. Florence Mobile allows receiving alerts by SMS about results of urgent tests when they are available in the EMR; also it offers an access to worklists of emergency departments, hospitalisation, etc.

The monitoring of use of Florence Mobile has confirmed that "benefits" are mainly focussed on speeding up the work of doctors by offering them important clinical information at any moment and place using mobile phones.

Telestroke Programme

Oscar Ezinmo, Carmen Jiménez / Servei de salut de les illes balears, Spain

A stroke is an acute vascular event that is associated with bleeding into the brain or decreased blood flow part of the brain. Both hemorrhagic and ischemic strokes may be treatable. Hemorrhagic strokes may be amenable to surgery (i.e. to remove blood clots or to clamp bleeding vessels). Ischemic strokes (approximately 85% of all cases) occur when there is decreased blood flow to a part of the brain and consequent cell death.

During a stroke every minute counts and access to neurological care makes the difference between life and death.

The successful treatment of stroke requires the prompt identification of the cause and its characterisation by a stroke expert (neurologist). Reviews of the clinical evidence show that favorable outcomes are achieved if thrombolysis with tissue plasminogen activator (tPA) is administered within 90 minutes of the onset of symptoms and that positive benefits can still be achieved up to 270 minutes after the onset of symptoms.

The geographic divide between islands, combined with the shortage of available skilled neurologists makes the specialised evaluation and the use of tPA difficult. Stroke is one of the leading causes of mortality in the Balearic Islands. With only one hospital (the University Hospital Son Dureta located in Palma, Mallorca) specialised in stroke treatment, patients' access to timely care is the region's major predicament.

This led Ib-Salut, the health authorities in the Balearic Islands, to explore innovative strategies to deliver timely treatment.

These strategies include the development of designated stroke centres, emergency services and hospitalary diagnosis and treatment protocols, and telehealth applications or "telestroke."

Torrevieja Hospital

Torrevieja Hospital, a medium size hospital located in the East coast of Spain, was opened in October 2006. Our mission is to provide full health care assistance to a department in our region.

¨We have implemented a special management formula that allows a private company to manage a public service in order to provide better service level at a lower cost¨ says Mr. Ortiz (CIO).

Mr Ortiz, Why Torrevieja is different?

¨The Torrevieja Hospital pursues a high efficiency management of its recourses, as well as the maximum level of services offered to its patients. And here ¨Florence¨ plays the key role. Florence is a clinical information and management integrated system, it assures the communication between managers, doctors and patients. Florence allows clinicians to have necessary information in real time from any place, in order to be able to make the right clinical and management decisions. Consequently, efficiency is improved as is facilitation and speed of administrative and clinical processes. This improves the assistance quality, making the recourses profitable, allowing different situations to be foreseen as well as the reduction of incidents and an overall increase in users satisfaction¨.

What are the most new tools from users?

¨For our doctors, the most useful and innovative tool is definitely ¨Florence Mobile¨. It allows accessing the EMR in real time by means of mobile phone. Thanks to Florence Mobile, they can see the laboratory and radiology test results, receive and respond to the referrals of other doctors and work on the EMR of hospitalised patients from any place with no need for a PC. Florence Mobile allows caregivers to receive alerts by SMS about results of urgent tests when they are available in the EMR; also it offers an access to worklists of departments of emergencies, hospitalisation, etc.

The monitoring of use of Florence Mobile has confirmed that ´benefits´ are mainly focussed on speeding up the work of doctors by offering them important clinical information at any moment and place just using a mobile phone¨.

Florence is an innovative ¨software¨ that controls all assistance activity, patients clinical information and the management in Torrevieja Hospital. A mobile phone is a healthcare tool within the Department Torrevieja for use by clinicians; but could patients also utilise it?

¨A patient can receive information about appointments, waiting time in Emergencies, vaccine reminders, appointments or tests and the primary care centres opening hours.This service is also digitalized and the images are uploaded into the system and in the patient medical record. The patient does not need to carry huge envelopes with test results from one place to another as it is possible to see these results from any computer. A doctor and a patient can also communicate remotely through a camera. This system allows the primary care doctor to connect with a doctor in hospital for the case conferences and promotes telecommuting of doctors from home¨.

The system detects every user that enters in the hospital providing the details of where each patient is in real time, who assisted this patient, what tests he has done or what is pending and how long he has being waiting. This allows the control of efficiency and performance of staff and rewards it according to the results.

¨When their computers are connected to Florence, doctors can directly make an appointment for their patients in the hospital. All medical information uploaded in the program is available on the web in order to make it accessible to all doctors, from any place, even at home¨.

Shared Web-Based Electronic Patient Record for Hospital, General Practitioner and Patient

Peeter Ross, Kelli Podoshvilev / East Tallinn Central Hospital, Estonia

Much attention has been paid to the development of the functionality and user friendliness of the electronic patient record (EPR) inside healthcare institutions. However, secure distribution of medical data outside the organisation still remains an issue. Besides of the development of universal EPR the aim of our hospital was to enable the retrieval of medical data through the single entry from outside the hospital. We used SSL link and Estonian nationwide data exchange platform called x-

road to secure the access to EPR from outside of the hospital. Identification of the person accessing EPR was based on the compulsory ID-card issued by the state.

The EPR enables work in different modules: Ambulatory care, stationary care, diagnostic and administrative module. For medical image viewing there is full integration with picture archiving and communication system (PACS). There are two modules for users from outside the hospital: e-

health record for general practitioners (GP), and iPatient for patient access. GPs and patients can use their module to book an appointment at the hospital, retrieve his/her patients´ or own medical data, and view images. The challenging aim of EPR development is to enable secure access to patient's health data and medical images from any location by both healthcare professionals and patients. This was successfully fulfilled. Our EPR is also connected to Estonian country-wide Health Information System.

Paper Free Patient Care

Raymond Rooijakkers / EMEA, Germany

Like many hospitals, Ammerland-Klinik, located in Westerstede, Germany, has been moving toward implementing electronic medical records (EMR) for several years. In 1997, the 356-bed hospital opted for a hospital infor-

mation system. In 2007, the decision was made to also upgrade the hospital's entire inventory of cardiopulmonary diagnostic equipment.

The aim was to make the hospital as paper free as possible, integra -

ting ECGs into the electronic health records. All processes are digital and traceable; test results are available immediately.

The project is in its early stages but progress has been made.

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Biofeedback and Virtual Reality: The INTREPID Project

Alessandra Gorini, Claudia Repetto, Federica Pallavicini, Giuseppe Riva /
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Generalised anxiety disorder (GAD) is a psychiatric disorder characterised by a constant and unspecific anxiety that interferes with daily-life activities. Its high prevalence in general population and the severe limitations it causes, point out the necessity to find new efficient strategies to treat it. Together with the cognitive-behavioural treatments, relaxation represents a useful approach for the treatment of GAD, but it has the limitation that it is hard to be learned.

The INTREPID project is aimed to implement a new instrument to treat anxiety-related disorders and to test its clinical efficacy in reducing anxiety-related symptoms. The innovation of this approach is the combination of virtual reality and biofeedback, so that the first is directly modified by the output of the second. In this way, the patient is made aware of his or her reactions through the modification of some features of the VR environment in real time.

Using mental exercises, the patient learns to control these physiological parameters and using the feedback provided by the virtual environment, is able to gauge his or her success.

The supplemental use of portable devices, such as PDA or smart-phones, allows the patient to perform at home, individually and autonomously, the same exercises experienced in therapist's office. The goal is to anchor the learned protocol in a real life context, so enhancing the patients' ability to deal with their symptoms.

The expected result is a better and faster learning of relaxation techniques, and thus an increased effectiveness of the treatment and reduced treatment costs if compared with traditional clinical approaches.

Computerised Surveillance and Alerting of Nosocomial Infections, Antimicrobial Resistance and Antibiotic Consumption in the Intensive Care Unit

Kristof Lamont, Kristof Taveirne, Kirsten Colpaert / IBBT, Belgium; UZ Gent

Hospital acquired or nosocomial infections are associated with unfavourable clinical and economic outcomes, and are especially alarming in the intensive care unit (ICU). Since ICU patients have the highest incidence rate and develop the most severe nosocomial infections, the ICU is clearly the epicentre of the problem.

The decrease in occurrence of nosocomial infections and antibiotic resistance can only be achieved by an efficient infection surveillance system. However, manual collection of data, gathered for this purpose, is retrospective, incomplete and very labour-intensive and therefore costly. The COSARA software was developed by a consortium consisting of the Department of Information Technology of the Ghent University and the ICU of Ghent University Hospital, a large 56 bed mixed tertiary ICU, with the aim to completely automate the surveillance of nosocomial infections. The product consists of two parts, namely a bedside client with patient level details and a management console with details on the ICU level.

The bedside client visualises all necessary data regarding the infections, thereby supporting the physician in his daily workflow. Unique is the linking information between nosocomial infections, antibiotic therapy and microbial data.

The COSARA management console informs ICU staff of alarming trends in the incidence of nosocomial infections, multi-resistant microorganisms and overuse of antimicrobial drugs.

This results in optimal antimicrobial therapy on multiple levels: Patient level, ICU-wide level and, if implemented nation-wide, the aggregated ICU data can provide clear information for policy support.

Orthopedic Web-Based Fracture Healing Telediagnostic Decision Support System

Wojciech Michal Glinkowski, Adam Karpowicz, Piotr Orlowski, Andrzej Górecki /
Medical University of Warsaw, Poland; Polish Telemedicine Society;
Polish-Japanese Institute of Information Technology

Fracture healing assessment is both a clinically relevant and frequently used outcome measure in orthopaedics. A lack of consensus with regard to the definition of fracture healing in the current orthopaedic literature is well known.

Manual manoeuvre and radiographic image subjective evaluation remain commonly used methods in bone union assessment clinically. Web-based Computer Aided Diagnostic (CAD) system, that has been designed for fracture union assessment, com-

bines EHR with Orthopaedic Analysis System for Fracture healing monitoring. The digital image analysis method based on open system Internet technology provide an alternative to supplement the traditional approach for a quantitative, accurate and cost-effective assessment of fracture healing.

The described system was developed and implemented as Web application that utilises single server and Web Browser for Internet communication. Networked functions including web

access, database access, and graphical analyser of digitised radiographic image are based on the client-server model. The system can be complemented with existing picture archiving and communication system (PACS), as well as recent advances in Internet technology. A relational image database system is used to organise fracture images, their extracted quantitative features and patient data. The Adobe Flash-based Web user interface allows users to interact with the series fracture radiograms database.

The BioSig Project – Getting a Grip on Biosignals

Alois Schlögl, Hubert Leitner /
Graz University of Technology, Austria; Steiermärkische Krankenanstaltenges.m.b.H.

Biomedical signals like electrocardiogram (ECG), electroencephalogram (EEG), electromyogram (EMG), etc. are (like medical images and clinical laboratory results) an important part of the patient health record. Biosignals are stored in a variety of different data formats. The specifications of about 20 different data formats are available in public.

However, every vendor is using its own data format. A rough estimate yield at least 80 different data formats for biomedical signals. Standardisation efforts were so far only partially successful in some specialised areas like in short-term ECG recordings.

BioSig - the free and open source software library for biomedical signal processing (http://biosig.sf.net) provides a software library with a common interface to a variety of data formats. Currently, more than 40 data formats can be read, and over 10 can be written. According to our knowledge, this is more than any other software package in this area. Biosig provides a converter between various data formats, a viewing and scoring tool (SigViewer), and software interfaces to C/C++, Octave/Matlab and Python. These tools are in production use in various research projects. Moreover, a proof-of-concept for a client-server-based archiving system

for biomedical signal data is available, too. BioSig is platform-neutral, i.e. it runs on Windows, Linux and MacOSX.

The Biosig tools have been very useful in extracting data from large routine EEG and polysomnographic databases of epileptic patients and neonates (ICU at paediatric department). This enabled the application of new data analysis methods, which were impossible with the original software provided by the vendor. In summary, the common software interface to different data formats ease the handling (exchange and archiving) of biosignal data from different equipment vendors.

Videoconferencing Application to Improve the Quality of Service Given to Cancer Patients

Marc Monballieu, Donald Claeys / AZ Maria Middelares, Belgium

When a doctor diagnoses cancer, a "Multidisciplinary Oncological Consultation" is recommended and in some cases obligatory, in accordance with the oncological care programmes in Belgium. This entails a consultation between all the doctors concerned in the diagnosis. The AZ Maria Middelares hospital declares and treats some 1000 new cases of cancer every year.

In this consultation, the active involvement of the general practitioner (GP) is of crucial importance. Not only is he aware of the physical, psy-chical and social situation of the patient, he also plays a vital role in the communication with the patients and their family. However, recent figures from the National Institute for Health and Invalidity Insurance (INAMI/RIZIV) show that the GP is present in only 3.5% of the cases. The most important reason for this is that the GP loses a lot of precious time travelling to and from the hospital.

As a close cooperation with the GP is explicitly mentioned in the mission statement of AZ Maria Middelares, they have launched a project to allow GPs to participate in the Multidisciplinary Oncological Consultation via videoconferencing. Belgacom, the solution provider, installed a Tandberg 3000 MXP videoconferencing solution in a meeting room at the hospital, using a 42" monitor and a high definition camera. At the GP's end, no additional investment or operational cost is required as he can run the Tandberg software on his PC with a broadband connection.

During the encrypted connection, the GP can, not only conference with the team in the hospital, but also consult the medical file of the patient, including Imaging.

Lifetime Dental Cross

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The Lifetime Dental Cross is an application that uses structured electronic health record to gather and store clinical information about the patient. It is based on a model that has been created during scientific project No. 1ET200300413 supported by the Academy of Sciences of the Czech Republic. This software is a complex tool that allows for fast, effective, voice controllable data collection in the field of paediatric and adult dental care. Collected data are further used in decision support systems for dental care that are under development with support of the project 1M06014 MSMT CR.

This voice module is fully automated and it is being routinely used at the Department of Paediatric Stomatology at the University Hospital Motol in Prague. The programme, in co-operation of the project contractor and the Institute of Computer Sciences AS CR, has been translated to English and it has become a commercial product for the area of the Czech Republic and English speaking countries.

Senolog, an Innovative Medical Database on Mammographic Practices

Aïssa Khelifa, Stéphane Thiroux, Jean-Philippe Masson
Organisation(s): Health Management Solutions, France; Observatoire de la Senologie, France;
Federation Nationale des Medecins Radiologues (fnmr)

French regulations for breast cancer screening have allowed for the coexistence of both an organised and an individual screening. The Health Insurance has comprehensive financial data on both practices, but with very poor medical information. On the contrary, the breast screening programme owns highly-medicalised information, but limited to the organised screening activity. To cope with the lack of information on a highly strategic activity, Senolog has thus been designed by FNMR (French Private-Practice Radiologist Union) as a comprehensive database on both senologic practices.

Designed in 2003, with the cooperation of RIS editors, who have implemented several versions of the module and agreed to quality assurance testing and certification, Senolog extracts from the RIS a large set of data, including limited patient information. The overall project has been performed with a grant by National Health Insurance. In 2008, 2400 radiologists have sent 3.8 million procedures to Senolog, accounting for 70 % of total senologic activity.

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Published five times a year with a circulation of more than 7,700 copies across Europe, HIT addresses the most pressing topics in the healthcare IT industry including digital diagnostics, e-health, medical informatics, telemedicine and data security. The journal promotes best practices and common management standards in the highly fragmented European market of healthcare IT. HIT reaches a distinct and highly qualified audience of key decision-makers in the healthcare IT management sphere on pan-European level.

Cardiology Management is the one and only journal exclusively dedica - ted to management topics in cardio -

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The official Management and Practice Journal of the International Symposium on Intensive Care and Emergency Medicine (ISICEM) working in close collaboration with several important associations and congresses such as the European Society of Intensive Care Medicine (ESICM), Euroanaesthesia, the Society for Critical Care Medicine (SCCM) and the Emergency Care Research Institute Europe (ECRI). Based on the most recent clinical developments, the journal focuses on best practice, efficiency, better value-for-money investments, cost savings, ethics and optimal patient and staff satisfaction. ICU Management is, thus, the point of reference in the increasingly sophisticated area of critical care and emergency medicine.

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Additionally, the French version of IMAGING Management is published twice a year in cooperation with Société Française de Radiologie. With circulation of over 10,000 copies it reaches medical imaging specialists from French speaking communities and is the world's most important francophone publication in this field.

Journal of CyberTherapy and Rehabilitation (JCR). A quarterly published academic journal exploring the uses of advanced technologies for therapy, training, education and rehabilitation. It mainly focuses on the rapidly expanding worldwide trend of moving toward technological applications in healthcare (virtual reality (VR), robotics, non-invasive physiological monitoring, e-health or adaptive displays).

Krankenhaus-IT Journal is the leading German healthcare IT publication published 6 times per year.

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Established in 2004, the **European Association of Healthcare IT Managers (HITM)** is the largest representation body of CIOs and healthcare IT managers. HITM is a non-profit organisation outlined as the pan-European umbrella association of all relevant national healthcare IT associations in Europe. Believing in the fundamental importance of unifying healthcare IT professionals at European and global levels, HITM is committed to increasing the professional authority and responsibility of healthcare IT managers and representing their interests to international institutions and associations. HITM is strategically based in Brussels, for easy access to the European institutions and associations.

HITM's goal is to unify the heavily fragmented healthcare IT management sector and recognises the need for common standards, best practice, unified policies and cross-border collaboration. HITM offers the only relevant pan-European communications platform for all stakeholders in healthcare IT, providing the sector the possibility to share knowledge.

HITM has invited all relevant national stakeholder communities to participate and support this necessary venture. Current membership excedes 7,500. To counter fragmentation and to allow communication with our members Healthcare IT Management, the Official Voice of HITM was set up and is now in its fourth year.

Further information can be found on **www.hitm.eu**

Founded in 1970, the **European Association of Hospital Managers (EAHM)** is the umbrella association for 27 leading associations in 25 European countries representing over 16,000 active members. EAHM is the world's largest, and most influential body for hospital managers and chief executives in both the public and private sector. EAHM is a non-profit organisation and aims to foster efficiency, effectiveness and promote best practice.

EAHM members represent over 94% of all hospital buying power across the entire European continent (including CEE countries) serving a population of 450 million, responsible for budgets that account for more than 4 % of Europe's GDP.

Targeting at the construction of a social Europe, EAHM puts forward proposals aimed at bringing together the global European hospital field in collaboration with European healthcare authorities and representatives from the healthcare industry. From increasing the professional authority and responsibility of hospital managers to competent representation in the European institutions and international committees, the EAHM takes care of every individual member.

(E)Hospital, first published in 1997, is the official voice of EAHM. The journal serves as a central platform from which to address the key issues facing hospital managers today.

Further information can be found on **www.eahm.eu.org**

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