



# **No continuous evaluation**

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**In the Netherlands that is the most recent formal evaluation of an HIS**



# **Evolution in the organisational structure**

- **Initially government sponsored experiment in one hospital (1972-1976)**
- **Next cooperative of hospitals, cost sharing (1977-1984)**
- **Cooperative with fee for service system (1985-1994)**
- **Company with hospitals as shareholders (1994-1998)**



# **Need/wish to go international**

- **Development and maintenance of a state-of-the-art HIS requires substantial resources**
- **Competitors (from abroad) with such resources**
- **So we recognized the need to go international**
- **We decided unanimously to sell the company (1998) to the Baan Brothers**
- **They got some problems, sold it to Torex,**
- **Torex merged with iSOFT**



# **Not only successes, nursing applications**

- **Nurses are the largest professional group in a hospital**
- **Round-the-clock nursing care, so need for transfer of information**
- **Data needed at the bedside, not only at the nursing station**
- **So we decided to invest in nursing applications (meal supply and result retrieval were already implemented, at the wards). With high expectations**



# **Nursing applications**

- **Based on the concept of integrated nursing (according to literature the way to go)**
- **In principle possible when using ICT**
- **Individualized nursing care plans**
- **Vital signs**
- **Scheduling**
- **Patient agenda**



# Formal evaluation

- **3 hospitals**

- **University hospital (Amsterdam) bedside terminals**
- **General hospital (Nieuwegein) terminals in the patient rooms**
- **Psychiatric hospital 's Hertogenbosch terminals at the nursing station**

- **Before and after measurements (twice)**

- **Questionnaires**
- **Multimoment observations**
- **Inspection of patient records**

- **Control wards without the nursing applications**



# **Results of the evaluation**

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**Positive (statistically significant):**

- **User satisfaction**
- **Completeness of patient record**
- **Quality of care**



# **Nevertheless limited roll out, possible reasons**

- **Integrated nursing is theory, the practice is different**
- **Lack of standard care plans**
- **Nursing has no power (no influence on investment policy)**
- **Nursing has no tradition to invest in technology**





# **Sharing knowledge and experiences**

- **Important role of IMIA**
  - **International Medical Informatics Association**
- **IMIA: national members (associations in this domain)**
- **Working groups**
- **International conferences: Medinfo**
  - **(this year in Brisbane Australia)**



# **More about IMIA**

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- **About 40 national members; what about Russia ?**
- **Since 1986 a working group on hospital information systems**
  - **Working conferences: Nijmegen, Goettingen, Durham, Heidelberg**
  - **Proceedings published**



## **Also other information systems in health care**

- **Pharmacies (started in the early seventies)**
- **General practitioners (taking advantage of the PC introduction)**



# **Scope of most information systems in health care**

- **Initially limited to one institution (hospital, pharmacy, general practice)**
- **Growing need for external communication (with insurance companies, with other care providers)**



# **The Electronic Patient Record**

- **Recognized as an important support for efficient and effective health care (>20 yrs ago)**
- **Nowadays within the hospitals and within the general practices realised to a significant extent**
- **Across borders of institutions still in its infancy**



# **Artificial Intelligence in Health Care**

- **ECG analysis routine now**
- **Other examples still seldom**
  - **Dosage of certain drugs (anti-coagulants)**
  - **Some image analysis applications**
- **In general diagnosis (still ?) human judgement**
- **Russian chess players versus computer programmes**



# **Digitizing the Dutch Breast Cancer Screening Programme**

- **An ambitious project**
- **Using advanced technology**
- **Under way now**



# **The Dutch Breast Cancer Screening Programme set-up**

- **For women in the age between 50 and 75**
- **Every 2 years**
- **Mammograms taken in mobile units**
- **Units positioned near the patient**
- **Mammograms read by 2 radiologists independently**
- **If suspected referral to a hospital**





# **The Dutch Breast Cancer Screening Programme figures**

- **Target population about 2 million**
- **Compliance >80 %**
- **900,000 screenings/year; av 2.7 images/study**
- **9 regions (take care of logistics)**
- **25 reading locations**
- **65 mobile units; about 1500 locations**
- **About 1 % referred, half of them positive**



# **The Dutch Breast Cancer Screening Programme digitization**

- **In each mobile unit a digital mammograph**
- **Technicians view images in the unit, previous images available**
- **If indicated additional images**
- **Transfer of digital images to reading locations by removable disk or wireless data communication**



# **The Dutch Breast Cancer Screening Programme**

- **In reading locations diagnostic workstations**
- **Older images available on request (through fast network)**
- **CAD (Computer Aided Detection)**
- **Independent Double Reading (+ arbitration)**



# **Diagnostic workstation**

- **2 high resolution flat screens (2048\*2048)**
- **1 screen for alpha-numeric client data**
- **Keypad for navigation**
- **Capacity >100 studies/hr**
- **4 images to screen <1 sec**



# **The Dutch Breast Cancer Screening Programme**

- **Central digital archive (>200TB)**
- **Duplication of archive facilities**
- **Connected to reading locations through fast network (SURFNET6) 1Gb/sec**
- **Second phase:**
  - **image communication to hospital**
  - **In-service monitoring**

# **HIS and Ships**

**compare  
design, construction and use  
striking differences  
but also similarities**





# About ships (nanocourse)

- **we use them for many centuries**
- **initially trial and error, use of experience**
- **better ships a major advantage (Golden Age, world trade)**
- **now theoretical background:**
  - **prediction of behaviour**
  - **calculations, model experiments**
- **certification agencies**



# HIS

- **Design/development based on:**
  - **experience**
  - **intuition**
  - **emotion**
- **Trial and error**
- **Hardly any theoretical foundation**
- **No metric (yet ?)**
- **No certification (yet ?)**