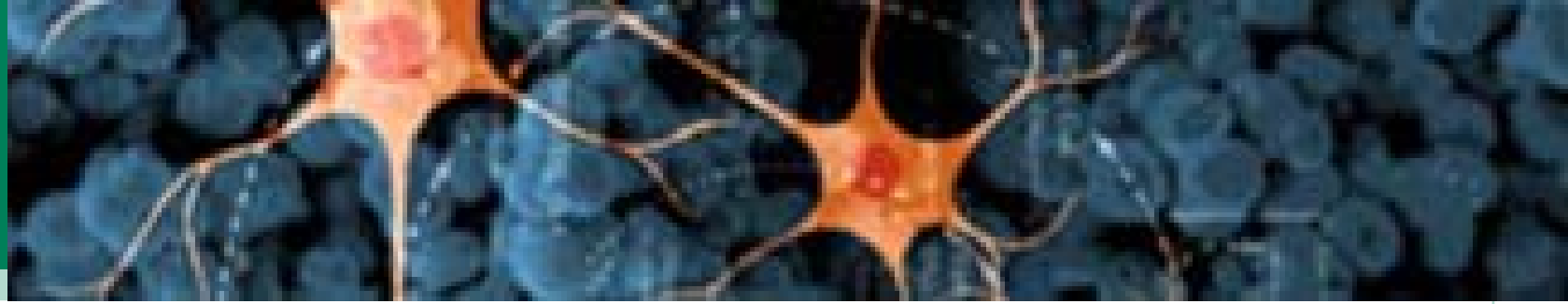

Online Transmission of Clinical Data for Disease Management and Registers

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Putting Knowledge to Work

Introduction

- **Growing demand for collection of structured clinical data in primary and ambulatory care**
  - ➔ Administrative and medical purposes such as
    Quality management,
    Registers and
    Health care system planning
  - ➔ Especially in the management of chronic diseases
- **Effective quality improvement strategies have been identified and published [1,2].**
- **Many of these strategies such as audit and feedback [3] rely on clinical data collected by physicians.**
- **We report experiences with data acquisition implemented in our online web application Healthgate BARS over 5 years.**

Project Aims

- **Provide a flexible system to collect clinical data from routine care for quality management and patient registry in diabetes care**
  - ➔ Area-wide availability across institutional borders
  - ➔ Provide plausibility checks and manual data revision to make structured data available at a required minimum quality level to subsequent data analysis
- **Keeping technical entry-barrier as low as possible**
  - ➔ The system was introduced in 2002 in Austria and Germany.
  - ➔ Common infrastructure such as electronic health record systems or health information networks were not available.
  - ➔ In both countries, electronic patient records (EPR) in GP (general practitioner) practices often were available in very basic form only or not present at all.

Data collection

- **Available data sources**
  a) data from paper forms made available electronically using an OCR (optical character recognition) scanner
  b) online data entry through a web browser
  c) data extracted from EPRs.

- **A text-based comma separated file format was defined for data import from scanner and EPRs and made public.**

Data Import

- **Carried out through a Java 2 Enterprise web application**
- **Two sequential steps: Upload and revision.**
  - ➔ Upload
    - *Files imported asynchronously using Message Driven Beans*
    - *All records passing plausibility checks immediately stored in the database*
    - *Remaining records marked for revision*
    - *Users were notified by email about import status*
  - ➔ Revision
    - *Revision of data-sets not yet imported via online interface*
    - *Valid data sets saved to the database*
    - *Data extracted from EPRs typically required only minor or no revisions*

Use of the system

- **In Austria and Germany used by the voluntary quality management initiative "Forum for Quality Systems in Diabetes care"**
- **In routine care in Diabetes education projects in four Austrian provinces**
  - ➔ Styria, Salzburg, Carinthia, Vienna
- **Difference:**
  - ➔ Germany: Mainly specialised diabetes clinics and hospitals
  - ➔ Austria: All health care system levels, also many GPs
- **Data collected on paper was scanned and imported in two regional offices and could be revised locally by the physicians.**

Objective of this Study

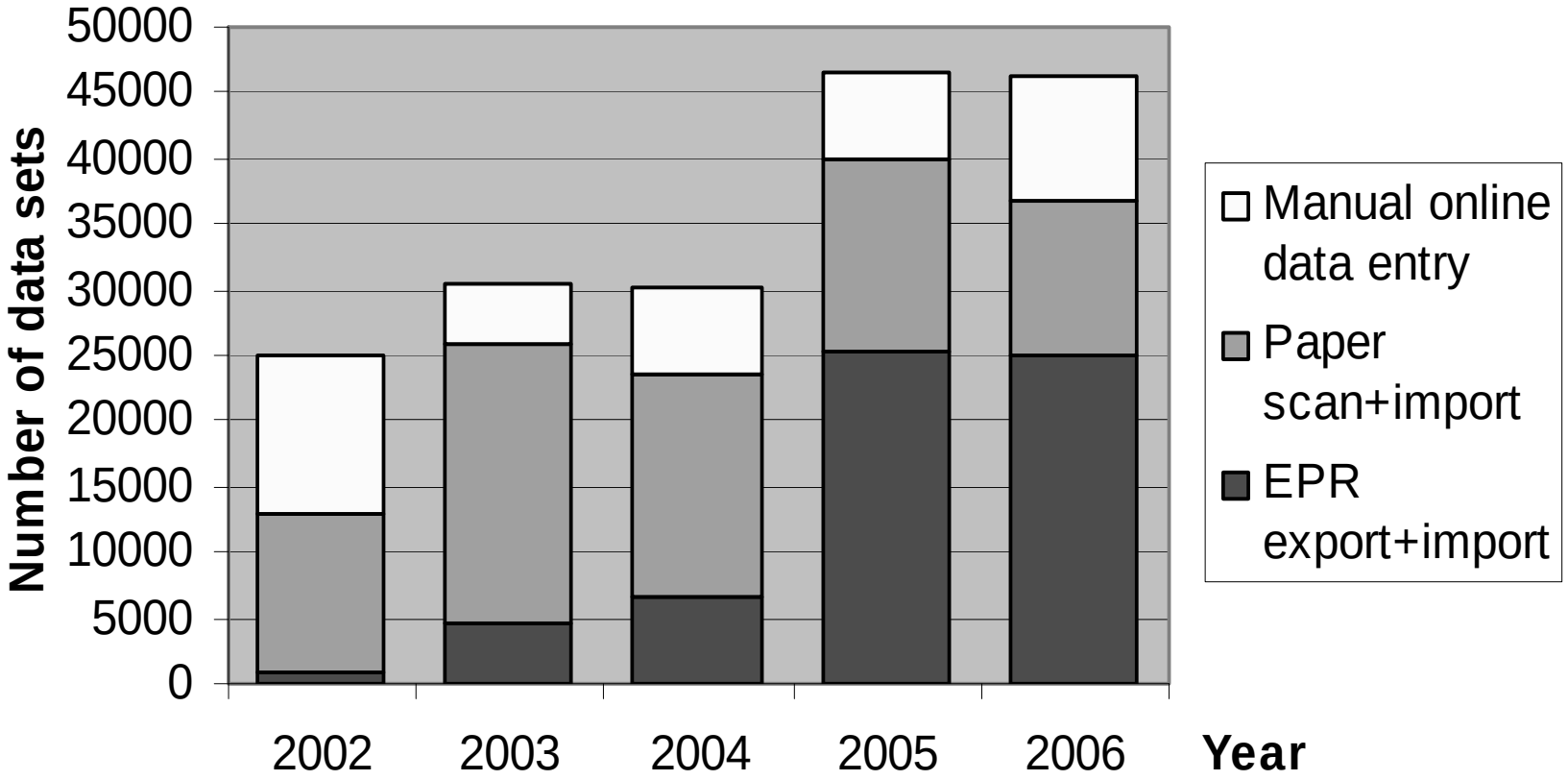
- Which data input methods are accepted and used in practice by physicians?
- Are there differences in smaller / bigger centres?
- Did data entry behaviour and data sources used change over time?

Results

- **More than 275.000 data-sets collected in Germany and Austria (February 2007).**
- **Since 2002, 78 % of data imported online**
- **Imports were performed by 34 different centres for 206 participating centres.**

- **32 specialized centres (9 hospitals, 22 diabetes clinics and 1 GP) managed to adopt EPR data extraction.**
- **These centres contributed more than 40 % of overall data.**
- **A certification programme introduced by the German Diabetes Association in 2005 is supported by Healthgate**
  - ➔ This increased the demand for EPR interface development
  - ➔ and lead to a dramatic increase of data imported from EPRs in Germany

Results
Data entry per year by input method



Discussion

- **Data acquisition tools for quality management are required and accepted by physicians**
- **Automatic extraction of data entered in EPRs**
  - ➔ is the most practical solution to establish regular and high volume data transmission
  - ➔ has the highest entry barrier, because it requires development and modification of existing software systems in physician's offices.
  - ➔ Incentives for physicians or regulations are required
- **The web-based approach made the system easy to reach, use and administer**
- **Germany**
  - ➔ HL7 based Sciphox(*) standard [4] currently used in a follow-up project for data collected in the nation-wide Disease Management Program
- **Austria**
  - ➔ Promising infrastructure provided by health information network and health smartcard

(*) Standardized Communication of Information Systems in Physician Offices and Hospitals using XML

Discussion
Need for standardisation

- Especially on the GP level, standards for data transmission only exist for administrative purposes and separation of healthcare sectors is prevalent
- Introduction of a national Electronic Health Record (EHR) is discussed [5], which could reduce many of the existing barriers
  - *Presumably, several years will pass until the fragmented market for EPR software on GP level will be penetrated by this initiative*
- Strong need for harmonization and standardisation
  - *As a step by step approach towards common EHR standards for connectivity and semantic interoperability*

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