



Health Informatics: Current Issues and Challenges



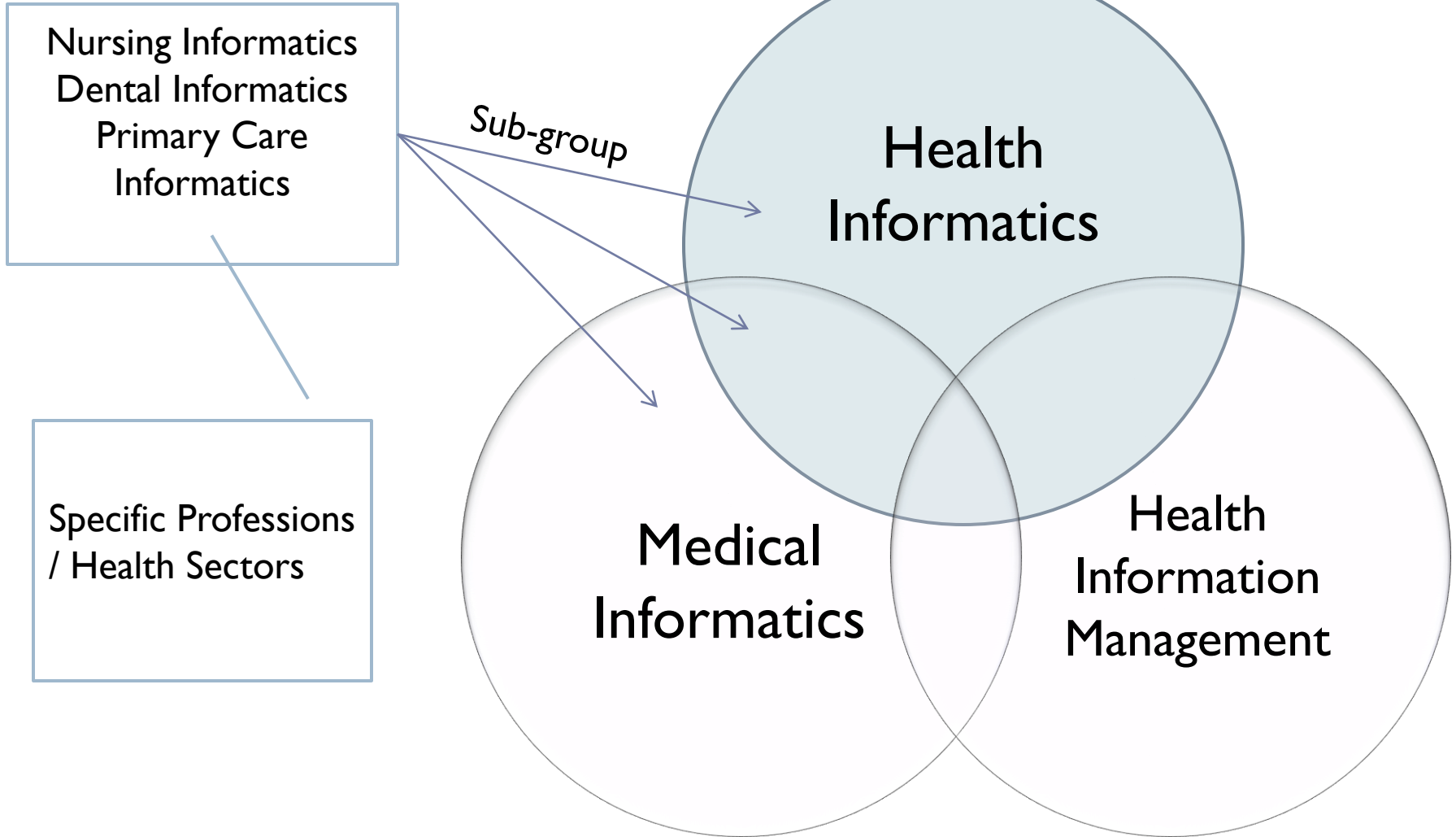
Vincent Yip

Agenda

- ▶ What is health Informatics
- ▶ Histories
- ▶ Information System and Electronic Records
- ▶ Information Needs and Use Within Health Care
- ▶ Data Mining
- ▶ Ethical Issue
- ▶ Challenges in Health Informatics
- ▶ Opportunities for health informatics
- ▶ Questions



What is health Informatics



3 separate, related and overlap fields

What is health Informatics

How information and communications technologies (ICTs) are used in health sectors

Health
Informatics

GOAL

Develop and improve the organization and management of information.

For more general applications
&
Involve more different health professions.

Improve the overall quality of patient care.

What is health Informatics

Have a specific clinical focus
&
Involve clinicians and doctors

Medical
Informatics

GOAL

Use of information
technology (IT).

Use of ICT. (to a lesser
extent)

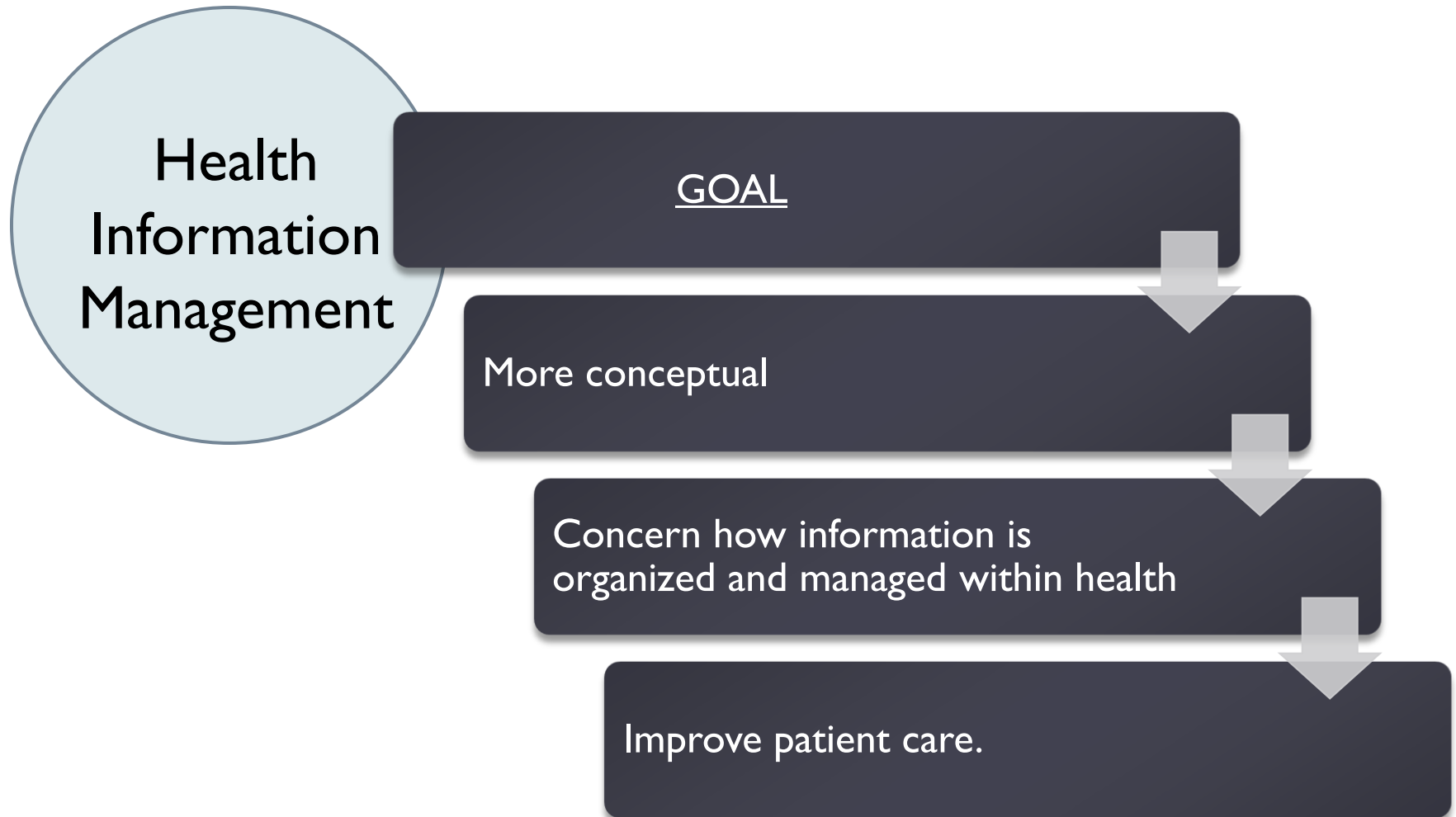
Improve patient care.

For specific clinical
applications:

e.g. storing medical images,
decision support tools, etc.



What is health Informatics

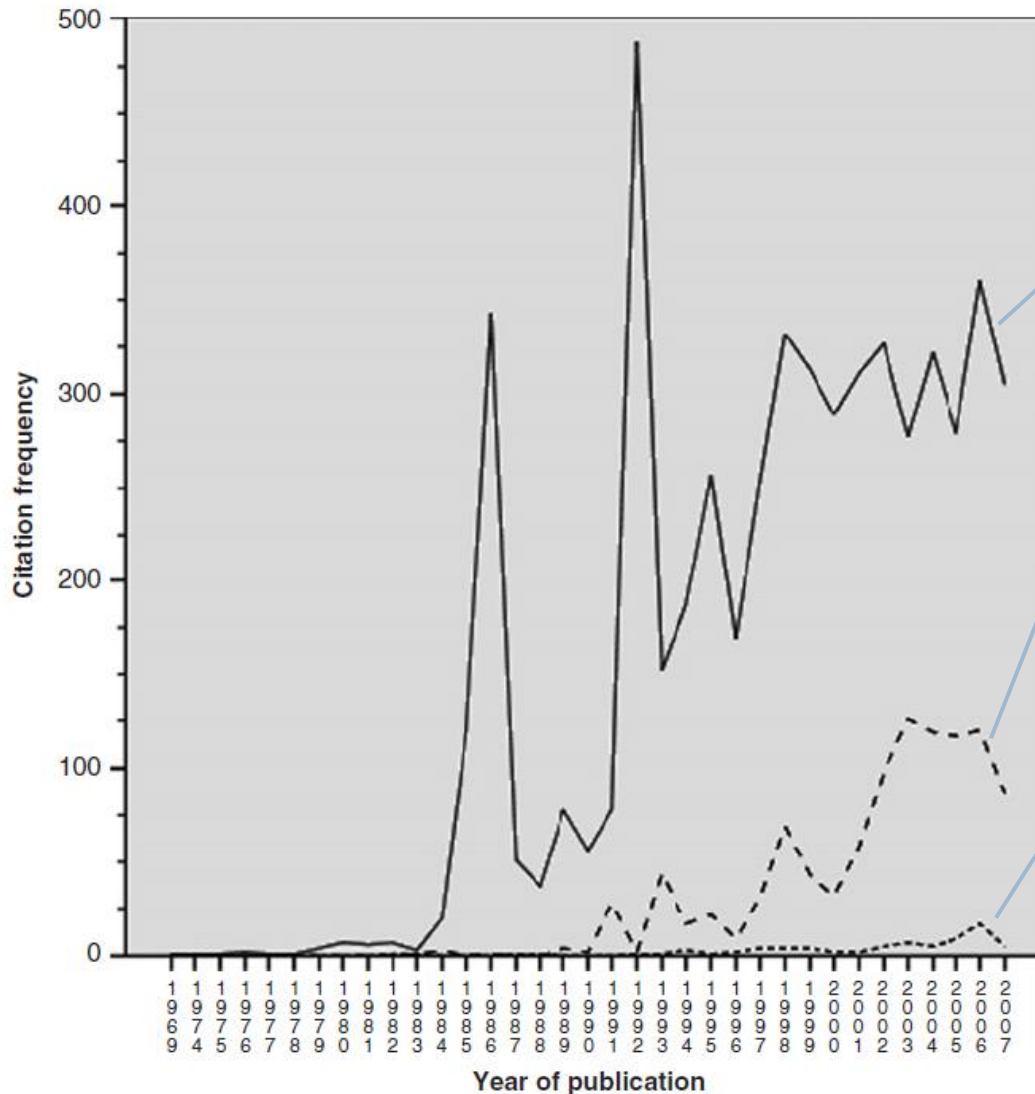


What is health Informatics

Health Informatics	Medical Informatics	Health Information Management
<p>More general</p> <p>+</p> <p>Involve different health Professions</p>	<p>More specific</p> <p>+</p> <p>Involve mainly clinician and doctors</p>	<p>More conceptual</p> <p>+</p> <p>Involve different health Professions</p>



Histories



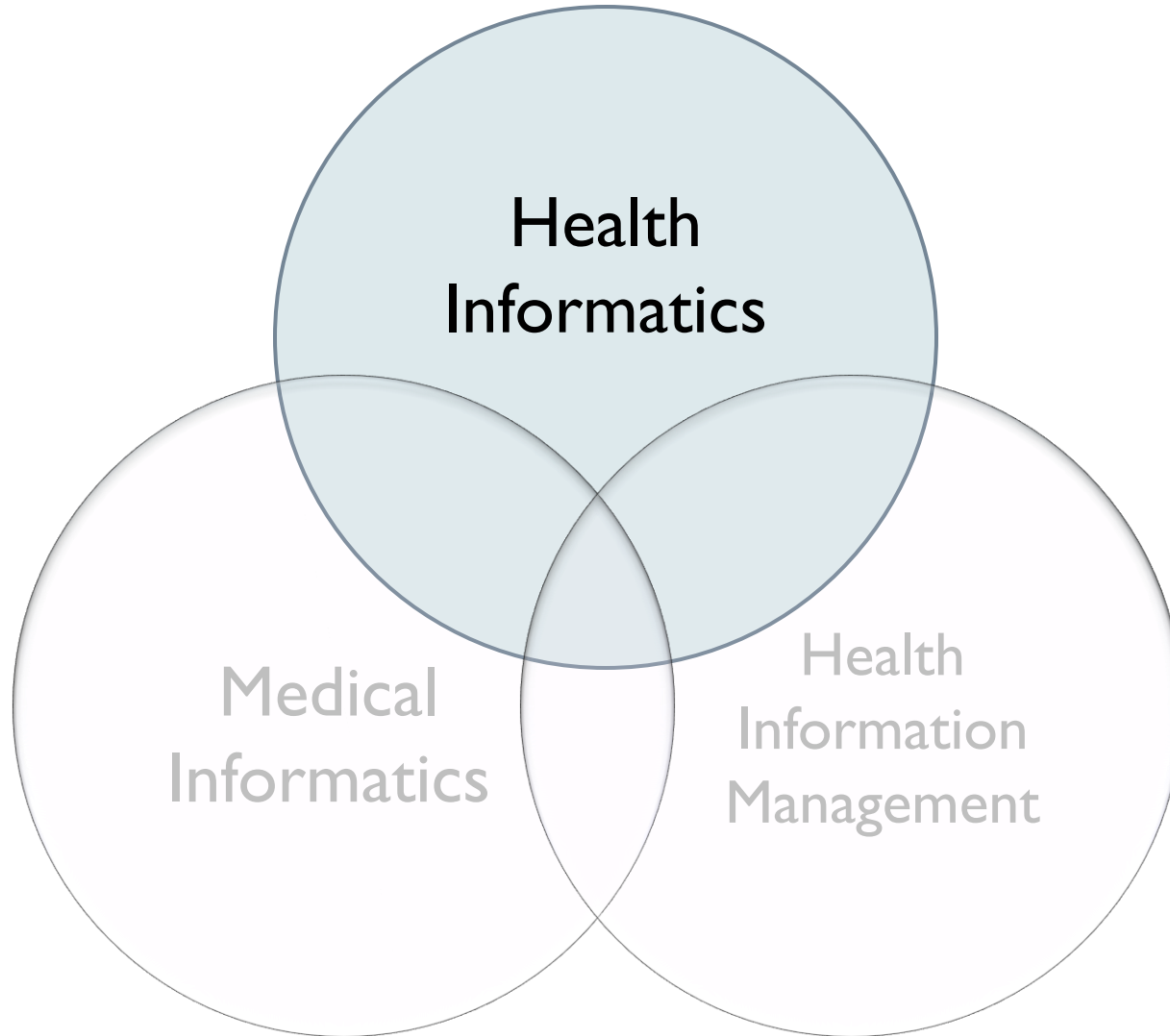
A keyword citation search in article titles and topics in the Web of Knowledge.

Medical Informatics
1974 – first appear
Mid -1980 - prominence

Health Informatics
1969 – first appear
1990 - prominence

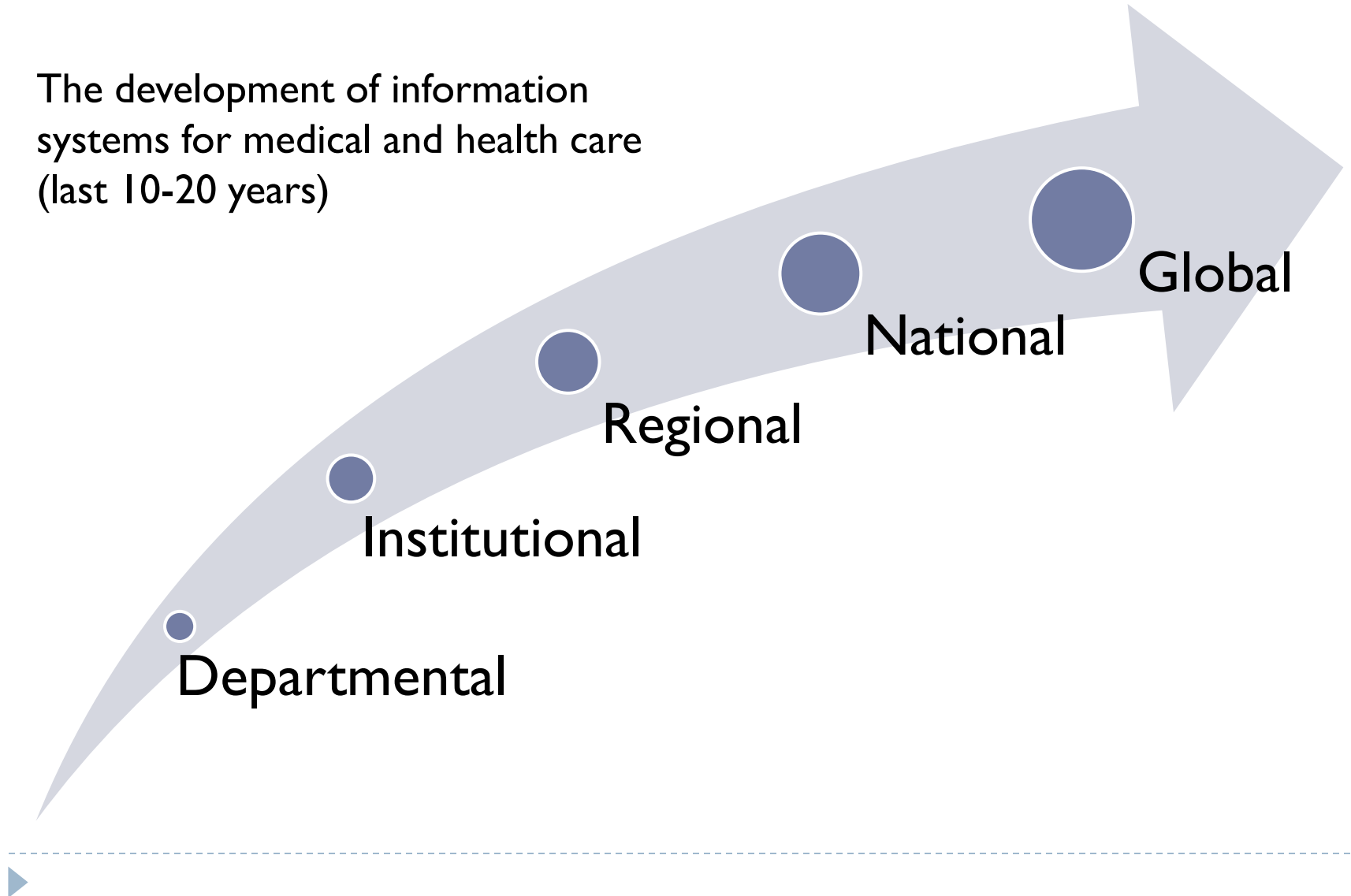
Health Information Management
1969 – first appear
Round 2000 - prominence

What is health Informatics



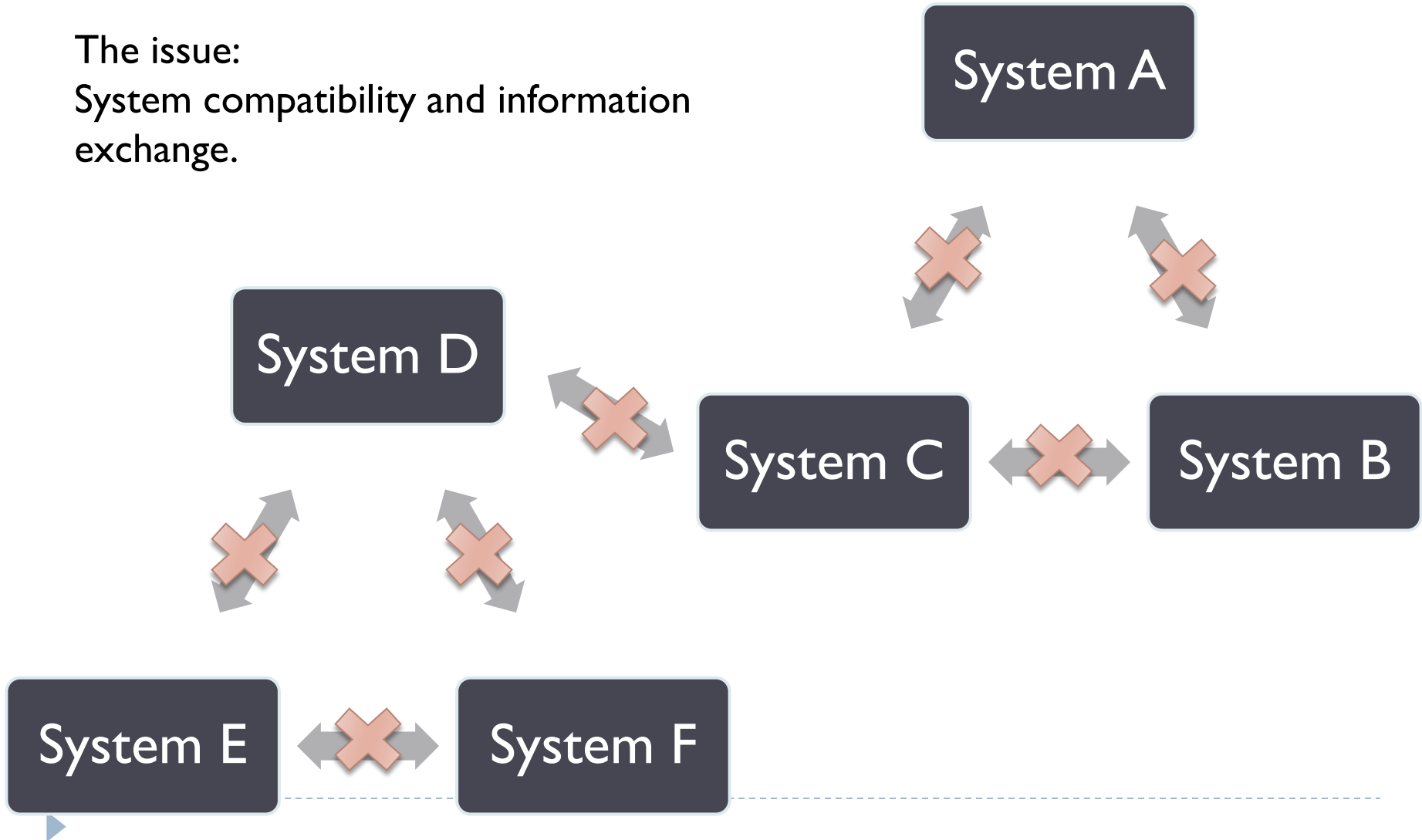
Information System and Electronic Records

The development of information systems for medical and health care (last 10-20 years)



Information System and Electronic Records

The issue:
System compatibility and information exchange.



Information System and Electronic Records

The Solutions:

Develop system to integrate existing legacy systems

Con:

proven to be problematic:

- a. Legacy systems are in different geo. Location.
- b. Uses different OS.

VS

Develop new Systems to replace the legacy systems

Con:

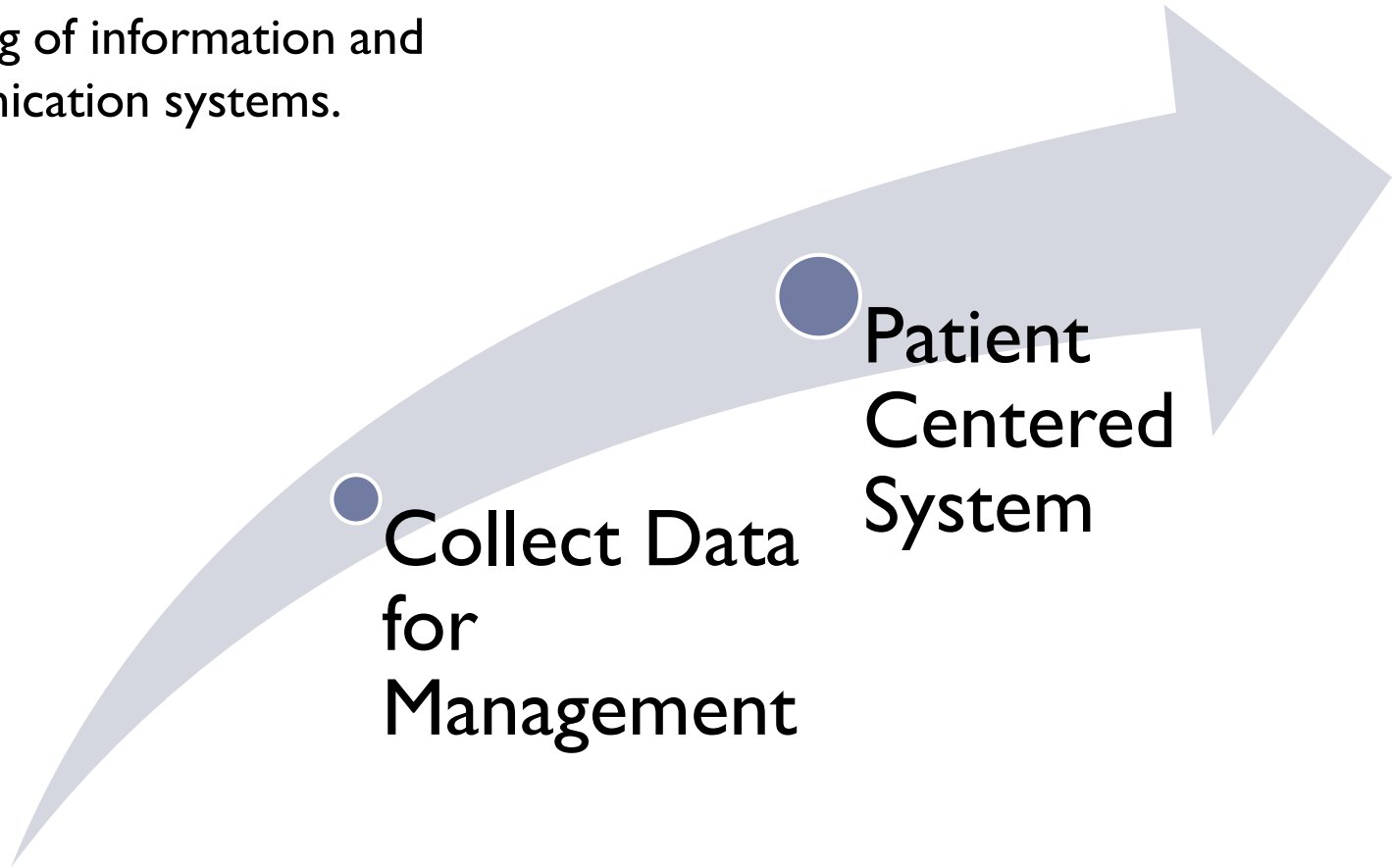
Overcome obstacles:

- a. incorporating previous data from a variety of systems.
- b. Data redundancy (paper + electronic versions)



Information System and Electronic Records

Changing of information and communication systems.



Information System and Electronic Records

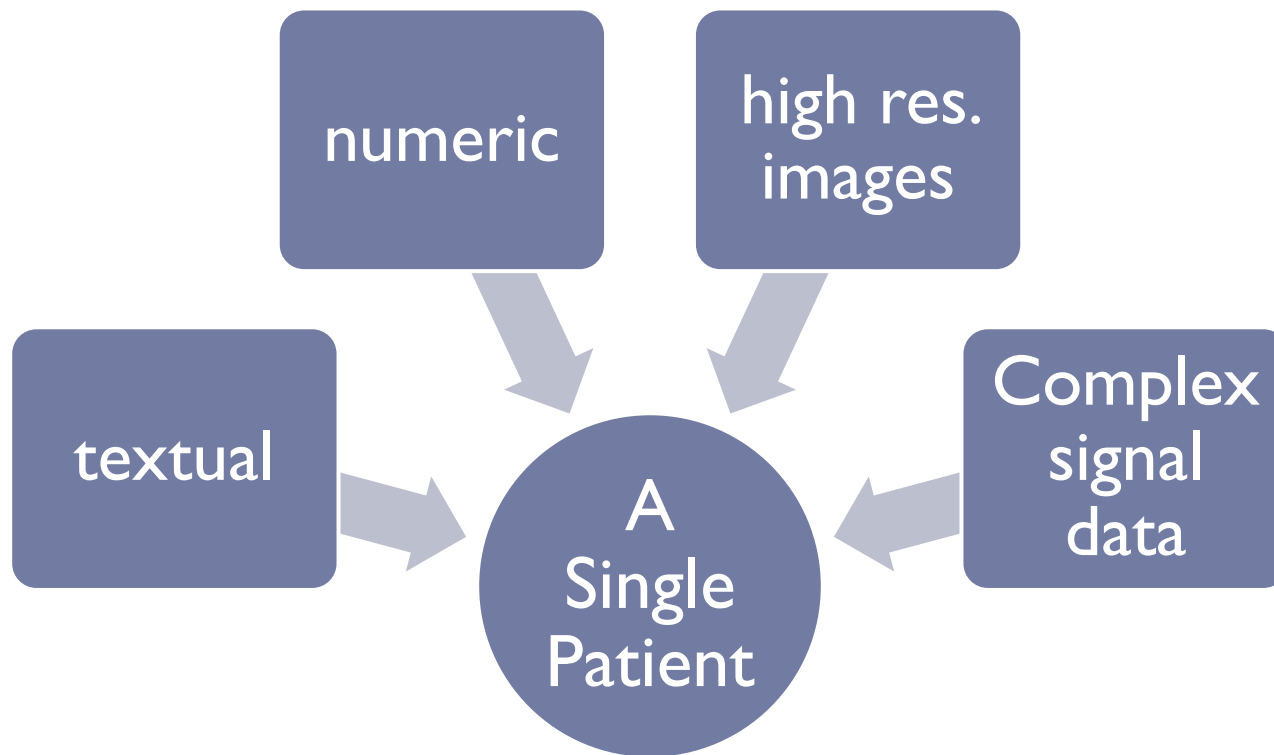
What to consider when electronic medical records are to be developed?

Data complexity!



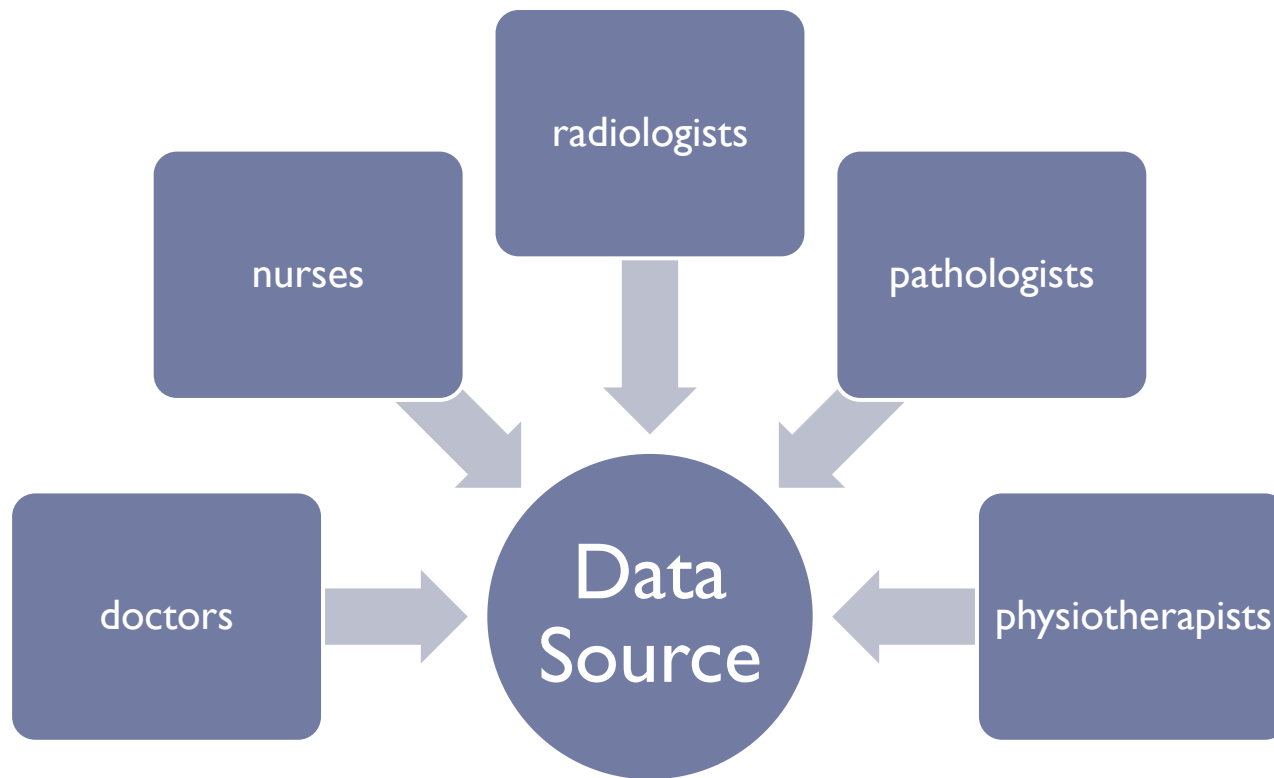
Information System and Electronic Records

Complexity of health information: data types.



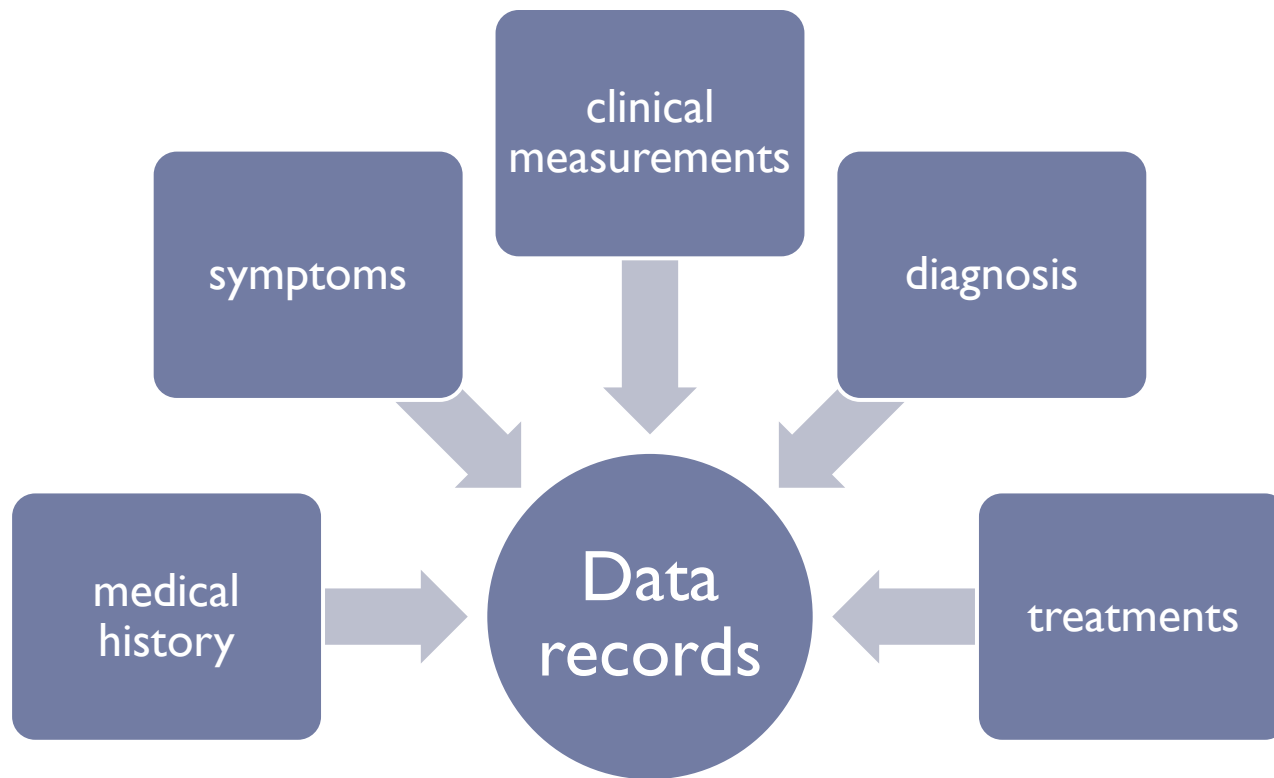
Information System and Electronic Records

Complexity of health information: data sources



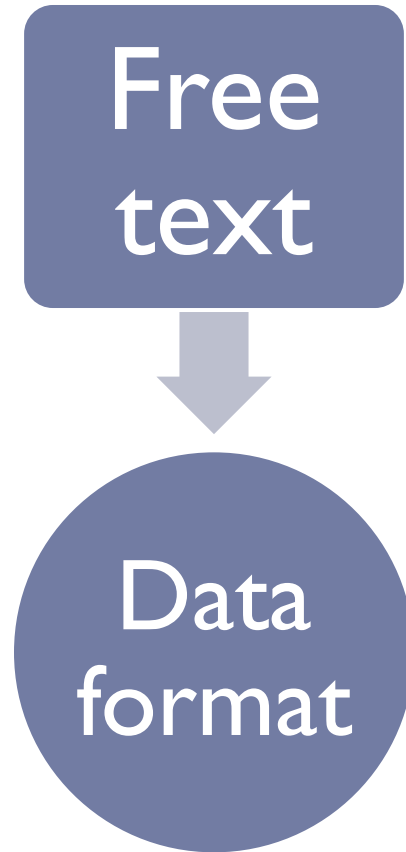
Information System and Electronic Records

Complexity of health information: data records



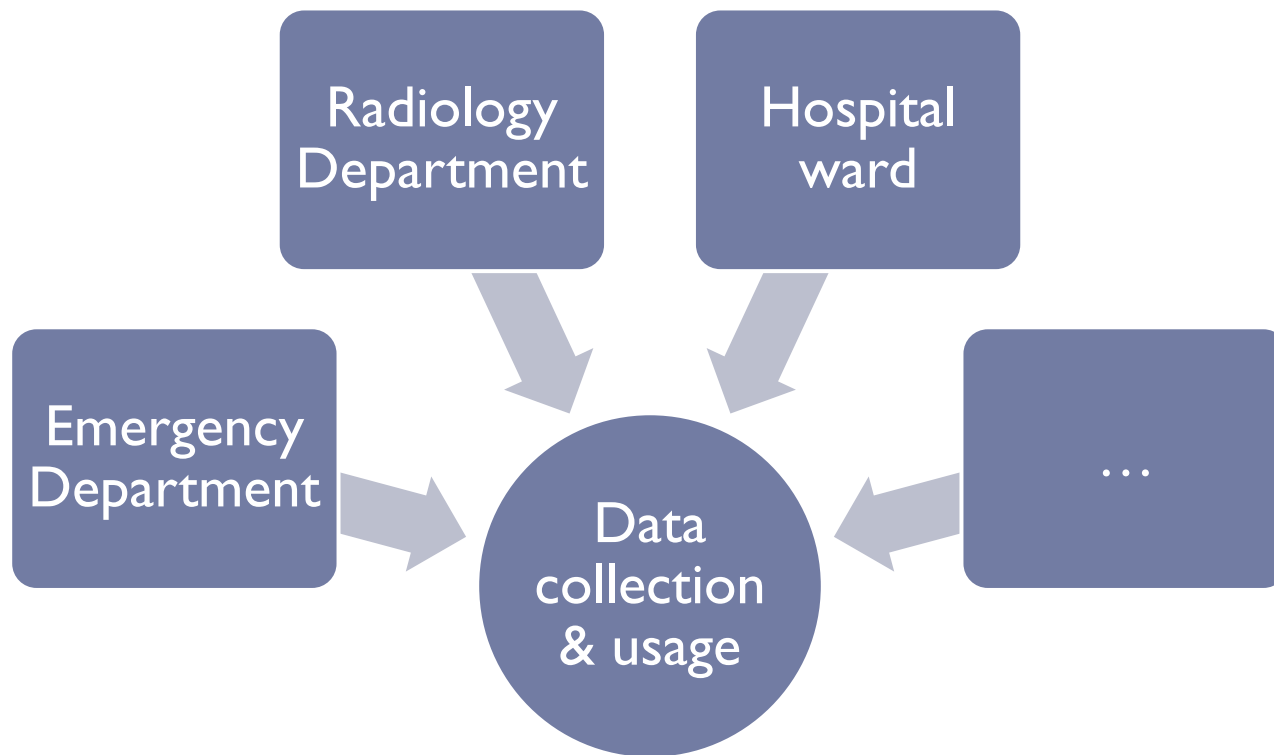
Information System and Electronic Records

Complexity of health information: data format



Information System and Electronic Records

Complexity of health information: data collection and usage



Information Needs and Use Within Health Care

Q: How can we use ICTs to benefit:

- Patients
- General Publics
- Health Professionals

A: Provide more health related information to educate them.

Q: What are the information these group of people need?

A: According to researches in information science:

- Different information behavior model have been studied
 - To understand how people seek information.
- Information needs are not necessarily the same within a particular group
- e.g. Information avoidance. (refuse info. -> diagnosis; accept info. -> treatment options.)

• Consider information needs of individuals -> designing intervention/ provide information. (e.g. stages/ when to provide information.)

Information Needs and Use Within Health Care

Q: What are the current issues on information delivery to health professionals and health researchers?

A: Information behavior models

- well known within information science.
- relatively unknown among health professionals and health researchers.

=> Help develop better information-related interventions.



Information Needs and Use Within Health Care

Health Professionals demand highly on 2 particular type of information:

Explicit information

Known information by health professionals.

(e.g. treatment options of known diseases.)

Information Easily Accessible.

Implicit Information

Information that health professional are yet not aware of.

(e.g. treatment of unknown symptoms of diseases.)

Information acquire through:
Post-mortem.

Possible Solution:
Change implicit info. To explicit.



Information Needs and Use Within Health Care

How do we deal with too much information?

Summarizing Information

Health Professionals and the general public can use the information more efficiently.

How do we deal with information accuracy and quality especially on the web?

Information Evaluation Tools

Generic tools for checking information accuracy.



Information Needs and Use Within Health Care

Benefits of CITs (Pros)

- information sharing and communication among patients (with similar conditions)
- improve quality of life
- give them a sense that they can manage their life → reduce stress (based on a research.)
- ...

Cons

- Replace face-to-face and verbal communication → affect the relationship between health care professionals and patients.



Data Mining

What is data mining?

- Knowledge discovery in database (KDD)
- Analyse large amount of data → identify hidden patterns and relationship among variables.

What do we want to pay attention when applying data mining to health informatics?

- Applying data mining on stock market vs health informatics?
- Safety issue → statistical relationship **SHOULD NOT** overrule clinical importance. **AND** domain experts.
- Other issue → data set size, missing data, etc.



Ethical Issue

General Issues:

Patients records stored, transferred, and access from one location to another.

- Online Security
- Online Privacy & Confidentiality
- Human rights ...

open questions:

- Data access control. (Can your parents access your record? Brother? Spouse?)
- Can a patient with mental problem access his own record?
- Should health professional obtain certification regarding ethical use of patients info.?
- How about information professionals? (U.S. currently only require to sign a Health Insurance Portability and Accountability Act (HIPAA) Agreement.)



Challenges in Health Informatics

Initial Cost

Health Professionals and Managers:
comfortable with current methods.

ICTs systems in place:
(further problems)

Incorrect data entry → training

Not trusting the system → have health
professionals involve designing the system.



Challenges in Health Informatics

Data incompatible for exchange between systems.

Standard for Data

Digital Imaging and Communication in Medicine (DICOM)

Health Level 7 (HL7)

International Classification of Diseases (ICD)



Opportunities for health informatics

Supporting an aging society (rise until 2050) → we all will be OLD then.



Sensor based technologies → collect and send data back & forth continuously.



Remote fall detections for seniors.



Detect early stage of diseases → disease controlling.



Questions?

