Medical National Database Necessity or Luxury?

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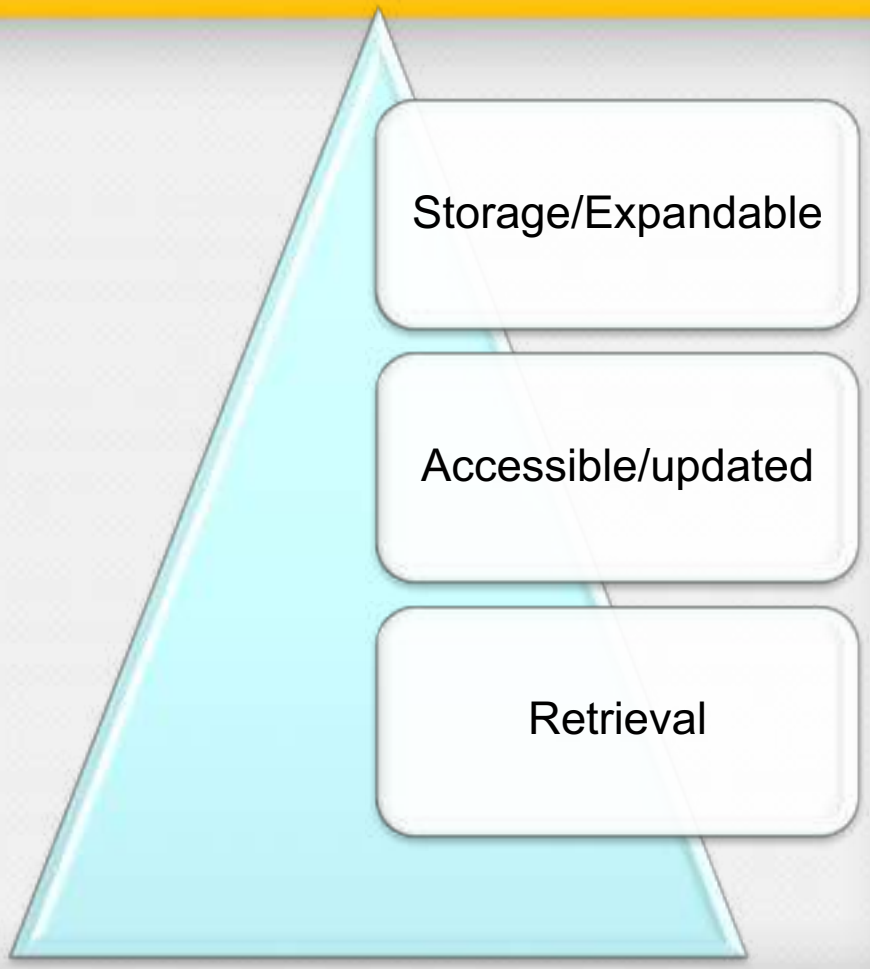
Esfand 1395, Feb. 2017

What Is a Healthcare Database?

An organized large collection of data in a computer.

- Not about specific patients for the treating physician.



Important maybe for conclusion?

- The desire to understand and improve the performance of the health system begets a need for better health data for several purposes: to assess the health of the public and patterns of illness and injury; identify unmet regional health needs; document patterns of health care expenditures on inappropriate, wasteful, or potentially harmful services; identify cost-effective care providers; and provide information to improve the quality of care in hospitals, practitioners' offices, clinics, and other health care settings.
- This, in turn, motivates proposals for the creation and maintenance of comprehensive, population-based health care databases that can provide such

Key characteristics of databases

Comprehensiveness

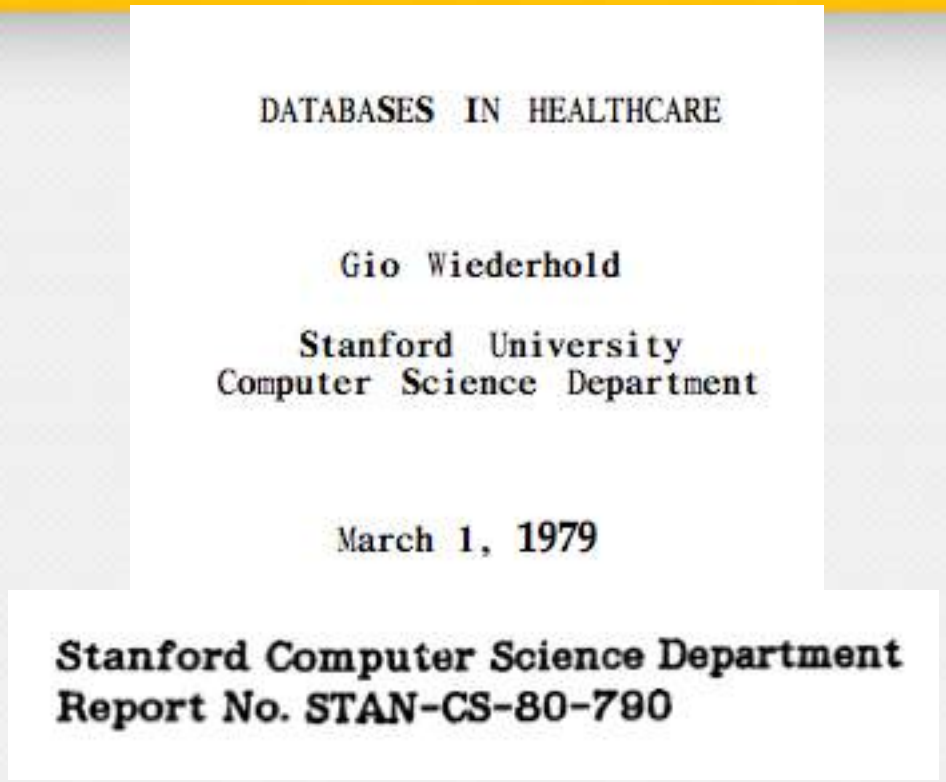
- Completeness of records about each patient's care events overtime

Inclusiveness

Which populations in a geographic area are included in a database.

100%coverage

Historical points



DATABASES IN HEALTHCARE

Gio Wiederhold

Stanford University
Computer Science Department

March 1, 1979

Stanford Computer Science Department
Report No. STAN-CS-80-790

The Evolution of Hospital Information Systems

1960s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
Medicare/Medicaid	• Expensive mainframes • Expensive storage	Shared hospital accounting systems

The Evolution of Hospital Information Systems

1970s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
• Hospital-wide communications (Broadened admin systems • Departmental systems processing	• Smaller computers • Improved terminals and connectivity	• Selected clinical department automation (Lab, MR,RX)

The Evolution of Hospital Information Systems

1980s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
• DRGs	• Networking • Personal computers • Cheaper storage • Independent software applications	• Managed care financial and administrative systems • Departmental imaging (limited systems)

The Evolution of Hospital Information Systems

1990s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
• Competition, consolidation • Integrated hospital, provider, and managed care offering	• Broadened distributed computers • Cheaper hardware and storage	• Expanded clinical departmental solutions • Emergence of integrated EMR data offerings

The Evolution of Hospital Information Systems

2000s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
• Beginnings of outcomes-based reimbursement	• More of everything • Mobility	• clinical decision support • Broad operational departmental systems with EMR integration • Emerging data warehousing and analytics solutions

Origin of medical database:

- The content is diverse enough to support the needs of medical students, faculty, and clinicians.
- medical records were paper-based
- Development of computers
- Databases
- Databases management system (system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data.)
-

Classification of medical database

- Medical databases collect, integrate, and store data from various sources;
- Medical databases are classified in accordance with their objectives
- **Primary database:**
- when the data were initially collected and used to serve the direct purposes of the user
- **secondary databases**
- when data derived from primary databases were stored in other databases and used for other objectives

Medical databases

- African Index Medicus
- Anatomography
- The Cancer Imaging Archive (TCIA)
- Central Cardiac Audit Database
- Centralised Information Service for Complementary Medicine
- Circumpolar Health Bibliographic Database
- Clinical trials registry
- ClinicalKey
- Collaborative Hypertext of Radiology
- DECIPHER
- **Diseases Database**
- E. Coli Metabolome Database
- EMedicine
- EudraPharm
- EUROCAT (medicine)
- FREIDA Online
- GeneReviews
- Healthcare Cost and Utilization Project
- HIV Drug Resistance Database
- Hospital Episode Statistics
- **Hospital Records Database**
- Human Metabolome Database
- Immune Epitope Database and Analysis Resource
- Influenza Research Database
- King Abdullah Abdul Aziz Health Encyclopedia
- Literatura Latino-Americana e do Caribe em Ciências da Saúde
- Medical data breach
- **MEDLINE**
- National Biomedical Imaging Archive
- National Pharmaceutical Product Index
- OneKey
- OpenPHACTS
- Pediatric Oncall
- Physician Data Query

Medical databases

- Physiotherapy Evidence Database
- Point of care medical information summary
- PubMed
- PubMed Central
- Pubmeth
- QResearch
- Radiology information system
- Redcap (Research Electronic Data Capture)
- Resistance Database Initiative
- RNA modification database
- Small Molecule Pathway Database
- Therapeutic Targets Database
- VIOLIN vaccine database
- Virtual Health Library
- Yeast Metabolome Database

The United States National Library of Medicine (NLM) programs

- **The NLM developed to help standardize medical terms & to support electronic access, search ,retrieval & links to its large number of databases.**
- Operated by the US federal government, is the world's largest medical library
- **Its collections include more than seven million books, journals, technical reports, manuscripts, microfilms, photographs, and images on medicine and related sciences, including some of the world's oldest and rarest works.**
- Medical subject headings**(MeSH)** vocabulary file was initiated in **1960** by NLM to facilitate the use of its search programs

MEDLINE :

- MEDLINE is an online searchable index medicus from 1966 forward.
- MEDLINE was inaugurated in 1970 by the NLM as an experimental online retrieval service.
- Itis a bibliographic database of life sciences and biomedical information.
- It includes bibliographic information for articles from academic journals covering medicine, nursing, pharmacy, dentistry, veterinary medicine, and health care.
- The database contains more than 21.6 million records
- http://www.medline.com

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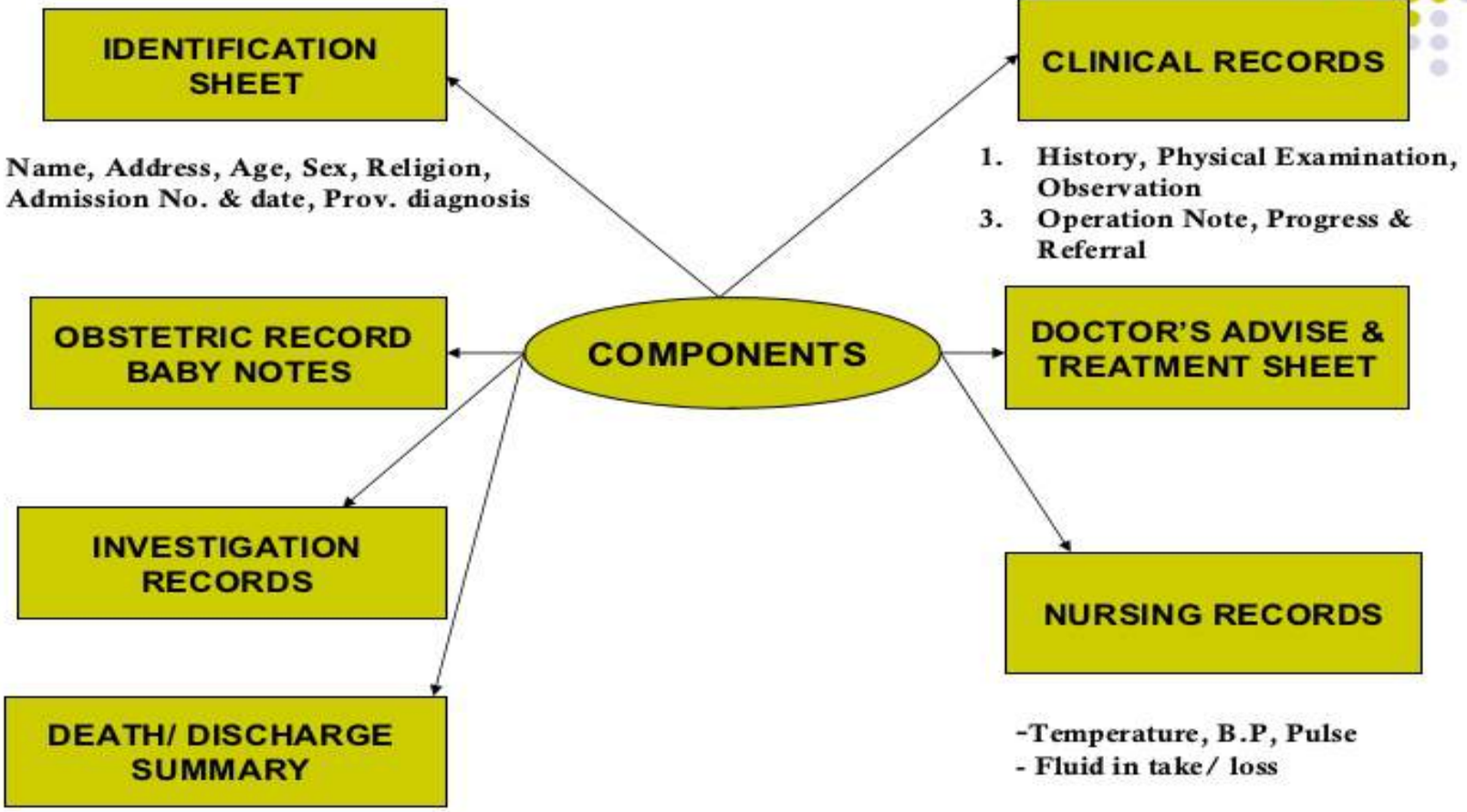
COMPONENTS OF MEDICAL RECORD



Relation between networking and database

- *Distributed database systems evolved in the 1970s with the introduction of low-cost*minicomputers and effi cient communication networks that brought computers closer to the users.
- In a distributed database system with a cluster of specialized subsystem databases, each subsystem collected and stored in its separate database
- the data it generated; and a communications network provided linkages for data
- entry to, and retrieval from, an integrating central database, and also to other subsystem databases as needed.

Networking and medical data base

- As each specialized clinical service developed its individual database to satisfy its own specifi c functional and technical requirements,
- This usually resulted in the need for an overall integrating database-management system that could better service the very complex organizational structure of a large hospital.
- This allowed physicians to use clinical workstations connected to client– server minicomputers connected in a local-area-network that linked the entire hospital.
- Patient data could be generated and used at the local sites, and collected from all of the distributed subsystem databases, and integrated in a central, computerbased patient record (Friedman et al., 1990 ; Collen 1995).

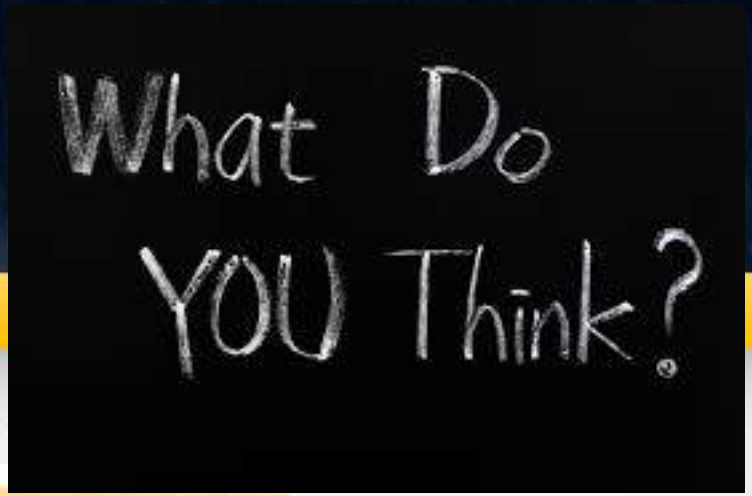
Problems give rise to development

- However, since the computers were often made by different manufacturers that used different software, this introduced a major problem when interchanging data between differently designed computer-database systems.
- This stimulated the evolution of specialized communications computers and networks for the distribution of data.
- Computers began to be linked together, usually connected to a central mainframe computer from which
- data could be downloaded to the smaller computers; and this changed the requirements and the designs of database-management systems.

what's the

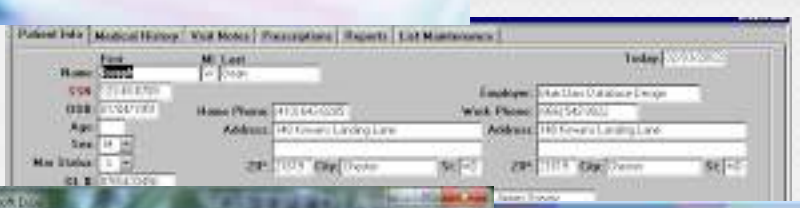
Problem?

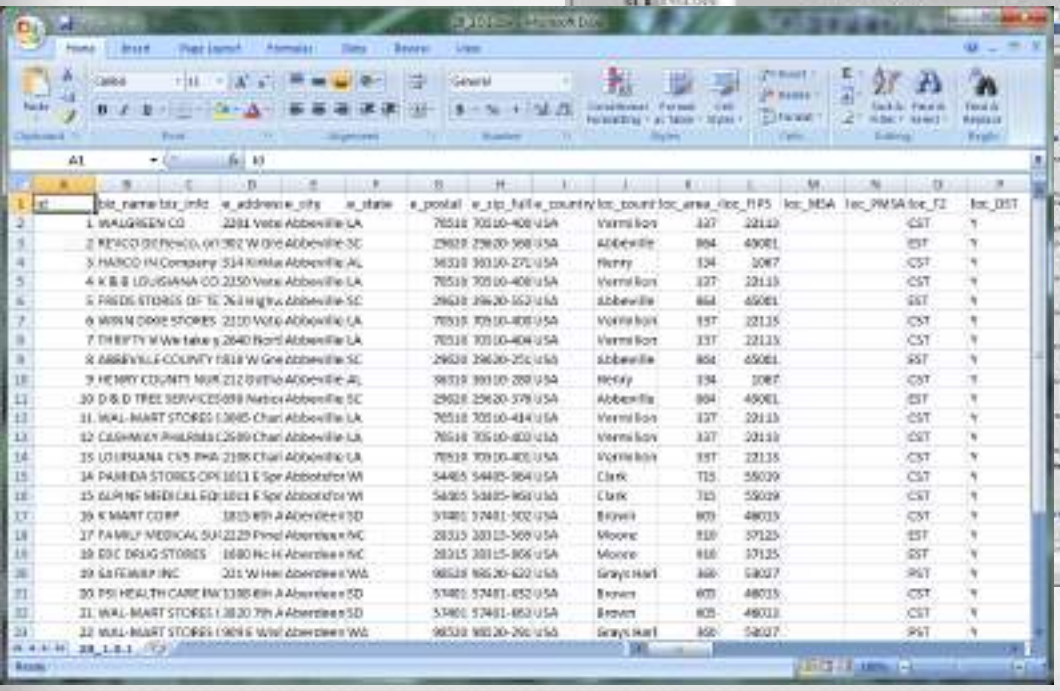
SOLUTION



Investment

opportunities





The problem ?

- • assess the health of the public and patterns of illness and injury;
  • identify unmet regional health needs;
  • document patterns of health care expenditures on inappropriate,
- wasteful, or potentially harmful services;
  • find cost-effective care providers; and
  • improve the quality of care in hospitals, practitioners' offices, clinics,
- and various other health care settings.

- Medical databases serve a critical function in healthcare, including the areas of patient care, administration, research and education.
- Administrative healthcare databases are uniquely suited to, particularly for studying the incidence or outcome of rare diseases that are impossible to study locally or within traditional cohort studies [2]. Such data are also uniquely suited to understanding secular trends in disease and examining healthcare resource consumption for planning the future of healthcare with respect to diseases and financial allocations.

Hospitals

- Patient care recording,
- For surveillance of patient status,
- For treatment advice,
- Researches,
- Education,
- For planning of service facilities,

Administrative

- For Cost-benefit assessments,
- For assessing the quality of healthcare,
- For epidemiological studies of disease
- For financial issues

Why Is Healthcare Data Management So Important?

- In the healthcare industry, big data functions much like a spinal cord. Pulled from across a variety of diverse sources, data helps health systems derive the level of insight and trends needed to personalize treatment, foster effective communication between patients and physicians, and improve the overall quality of patient care.
- **healthcare data management**

Integrate Data to Provide 360 Degree View of Patients

- In today's digital world, health systems are swimming in data
- But having access to data is not enough.

- In order to fully leverage data to improve patient outcomes, healthcare organizations must be able to integrate and align data from disparate sources (EHRs, health surveys, administrative data, physician notes, etc.) so that they can create a full and complete picture of the patient journey.
- make better administrative, clinical, and financial decisions that work to improve patient engagement, and ultimately patient care

- healthcare organizations can develop a 360 degree view of patients that encompasses not only the entire patient lifecycle (patient's condition, medical history, prior treatment, etc.) but also their consumer profiles, preferences, and behaviors

Translate Big Data Insights into Practice

- In today's rapidly-evolving healthcare landscape, enterprises that want to remain competitive need to turn patient data into a strategic asset. Indeed, the true value of healthcare data management comes from the ability to *turn insight into action*.

- A major benefit
  of databases in health care is due to the application of the information to the management of services and the allocation of resources needed for those services, but communication through the shared information among health care providers, and the validation of medical care hypotheses from observations on patients are also significant.

Database types

1- use of database in healthcare

- Solo practice
- Group practice
- Specialty practice
- The hospitals
- Clinical research
- Non-patients database

Current Health Care Applications of Databases

- Databases Used for Service Reimbursement

- Disease-Specific Shared Databases
- Databases in Health Maintenance Organizations
- Surveillance Databases
- General Clinical Databases
- Databases in Research
- Cost-effectiveness Issues
-

Clinical Data Repository Versus a Data Warehouse — Which Do You Need?

- Even though a clinical data repository is good at gathering data, it can't provide the depth of information necessary for cost and quality improvements because it wasn't designed for this type of use

- Instead, what health systems need is a flexible, late-binding enterprise data warehouse (EDW). With its unique ability to flexibly tie disparate data sources from across the organization into one source of truth, health systems will realize a significant return of investment (ROI) from their newfound ability to quickly and easily pull and analyze data for every service in the organization.

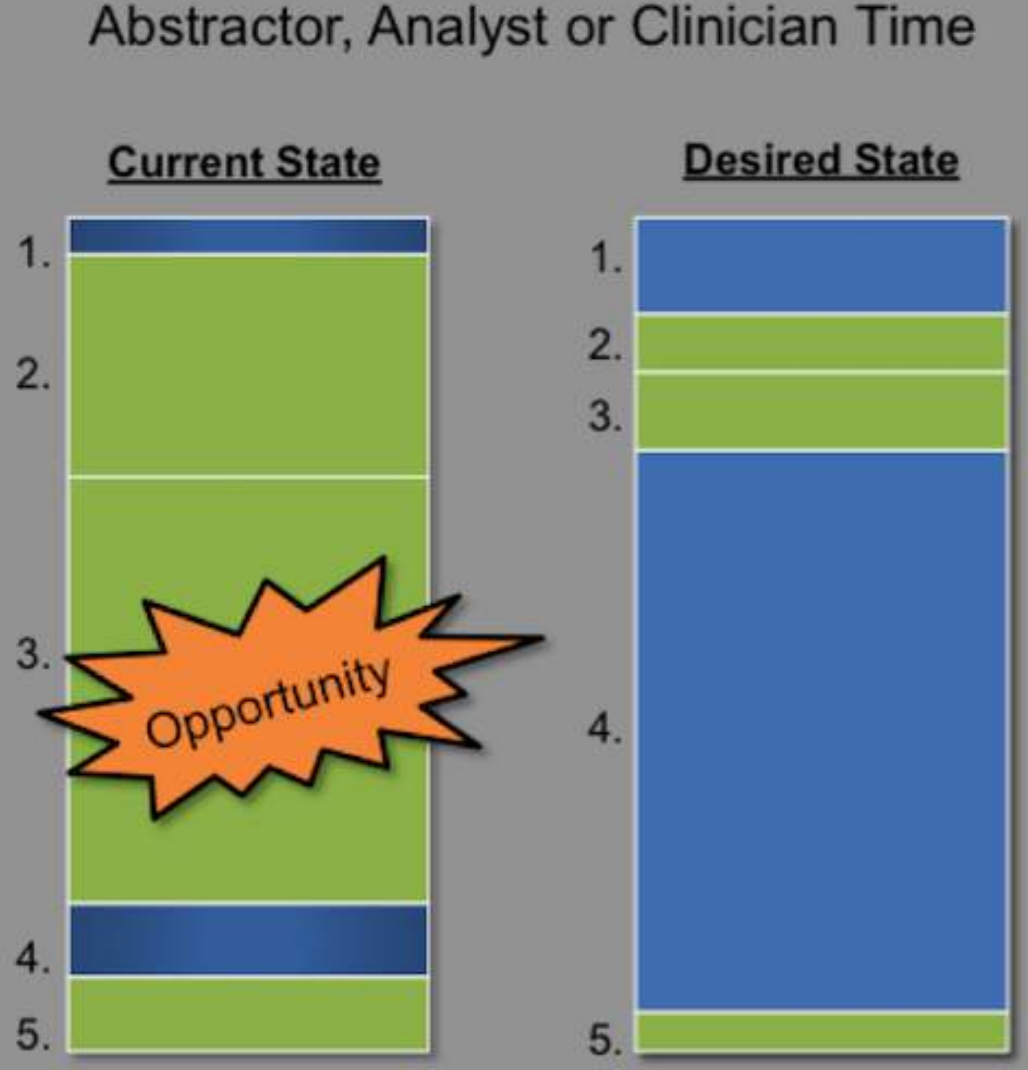
- While the data contained in a clinical repository is valuable because it shows a patient's clinical data, the design is not an adequate solution for health systems for numerous reasons. The primary reason is this: clinical data repositories don't offer flexible analytics for analysts to use as they work to improve patient care. These repositories function simply as a database that holds clinical data. In most cases, they also don't have the ability to integrate with other non-clinical source systems, eliminating the chance to follow patient care across the care continuum. Because of this major limitation, clinical data repositories can't provide a true picture of the cost per case for each patient. They also can't show patient satisfaction scores for each visit, which means they're inadequate for quality and cost improvement projects. There are other limitations as well.

Reduce Wasted Time

Initial assessment:
At least 80% of time spent hunting for and gathering data rather than understanding and interpreting data

1. Understanding the need
2. Hunting for the data
3. Gathering or compiling
4. Interpreting & Improving
5. Distribution of data

Value-add | Waste

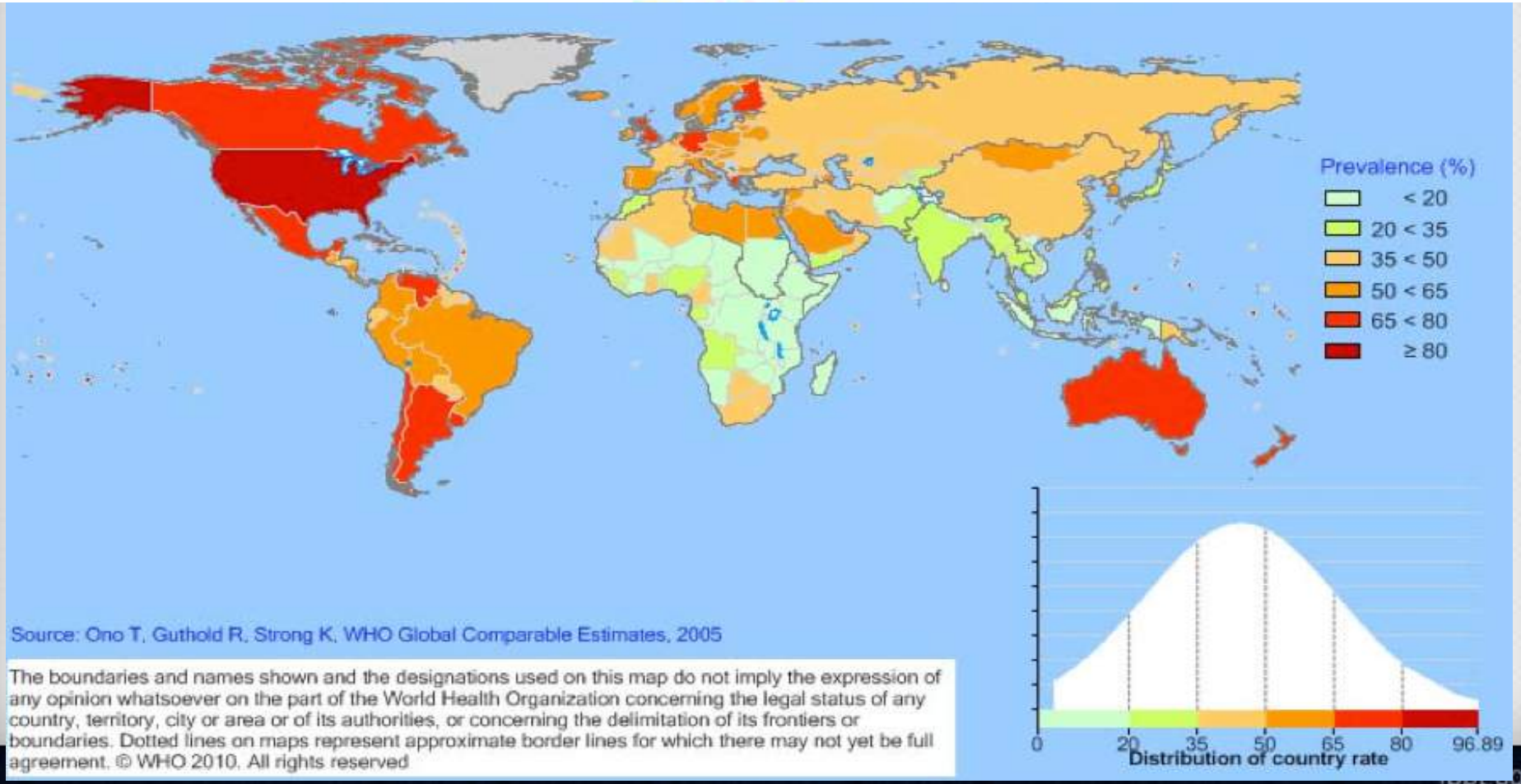


	Database	Data Warehouse
Definition	Any collection of data organized for storage, accessibility, and retrieval.	A type of database that integrates copies of transaction data from disparate source systems and provisions them for analytical use.
Types	There are different types of databases, but the term usually applies to an OLTP application database, which we'll focus on throughout this table.Other types of databases include OLAP (used for data warehouses), XML, CSV files, flat text, and even Excel spreadsheets. We've actually found that many healthcare organizations use Excel spreadsheets to perform analytics (a solution that is not scalable).	A data warehouse is an OLAP database. An OLAP database layers on top of OLTPs or other databases to perform analytics.An important side note about this type of database: Not all OLAPs are created equal. They differ according to how the data is modeled. Most data warehouses employ either an enterprise or dimensional data model, but at Health Catalyst, we advocate a unique, adaptive Late- Binding™ approach. You can learn more about why the Late-Binding™ approach is so important in healthcare analytics in Late-Binding vs. Models: A Comparison of Healthcare Data Warehouse Methodologies.
Similarities	Both OLTP and OLAP systems store and manage data in the form of tables, columns, indexes, keys, views, and data types. Both use SQL to query the data.	

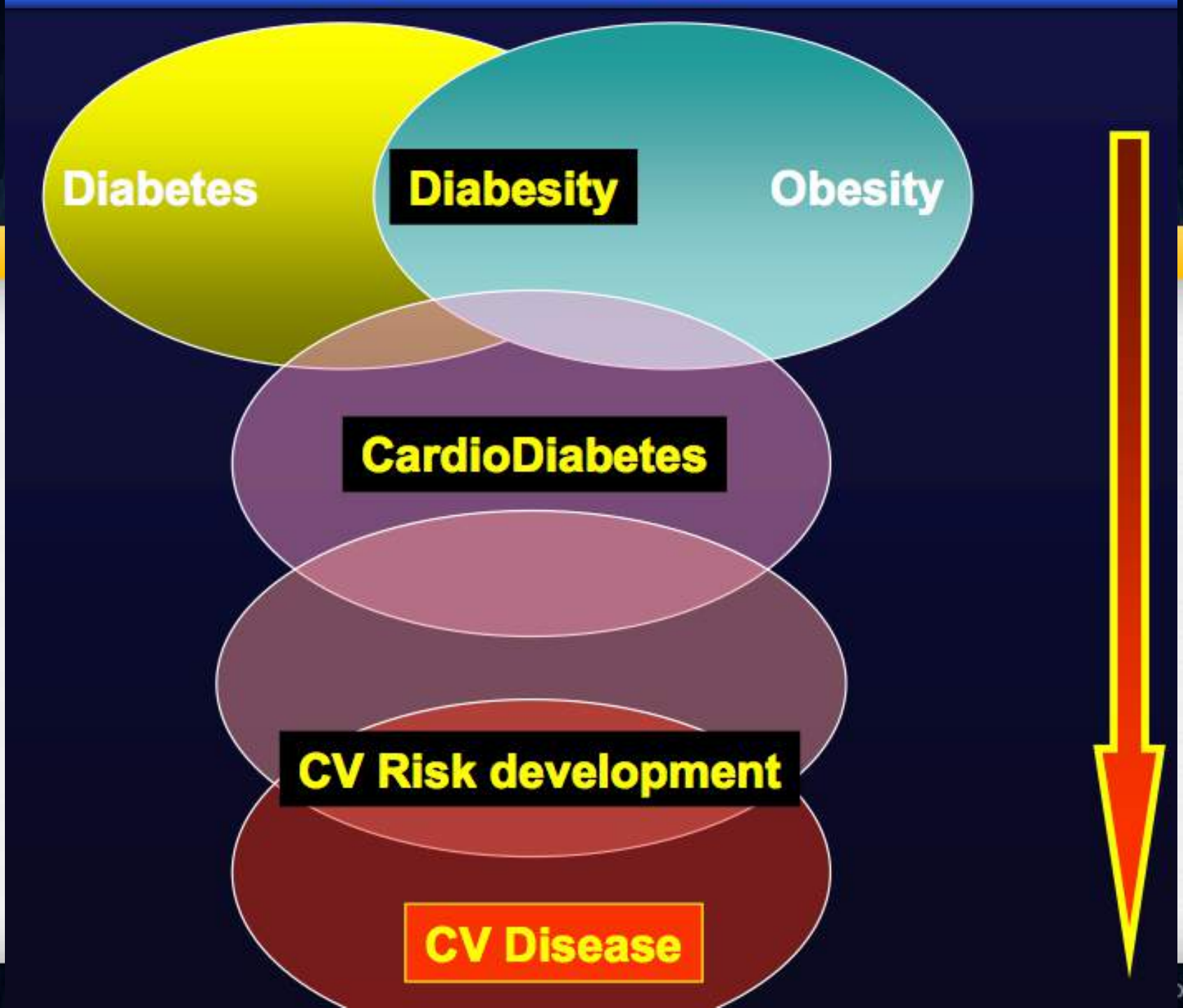
World Health Organization

Estimated overweight & obesity (BMI ⩾ 25kg/m²) prevalence, males, aged 15+

2010



Source: Ono T, Guthold R, Strong K, WHO Global Comparable Estimates, 2005


Diabetes
Diabesity
Obesity
CardioDiabetes
CV Risk development
CV Disease

Iran Offers New Healthcare Opportunities

1. Over 75 million, more than 50% are under the age of 35. A natural-resource rich nation.

2. Iran's healthcare out-of-pocket (OOP) expenditure is at 55%, which is very high compared to other neighboring countries.

3. Iran's medical devices industry is greatly depended on the imports, which accounts for over 88% of the market.

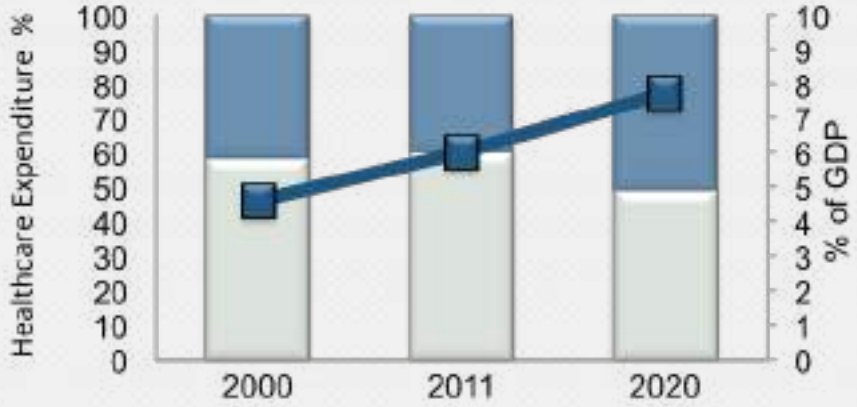
Source: Frost & Sullivan analysis.

Healthcare Spending and Demographic Outlook

Driven by healthcare reform and increasing disease prevalence Iran's healthcare expenditure is expected to grow.

With young but aging population of 75 million, Iran presents a significant potential in the healthcare market.

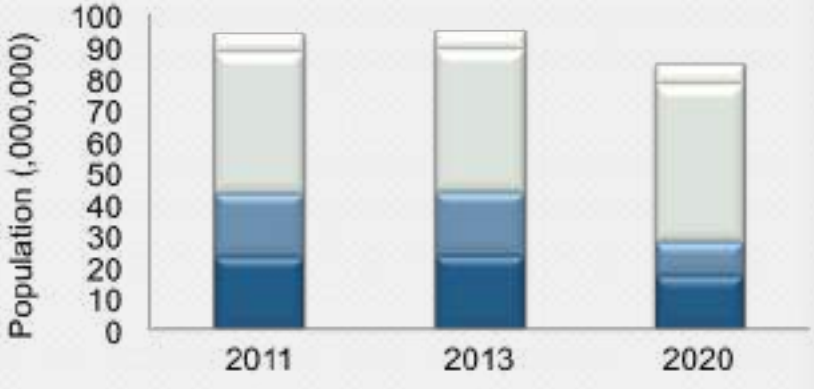
Total Healthcare Expenditure and as Percentage of GDP, Iran, 2000-2020



	2000	2011	2020
Public	41.6	39.7	51.1
Private	58.4	60.3	48.9
% of GDP	4.6	6.0	7.7

Sources: EIU; IMF; World Bank, Frost & Sullivan analysis.

Population by Age Group, Iran, 2011, 2013 and 2020



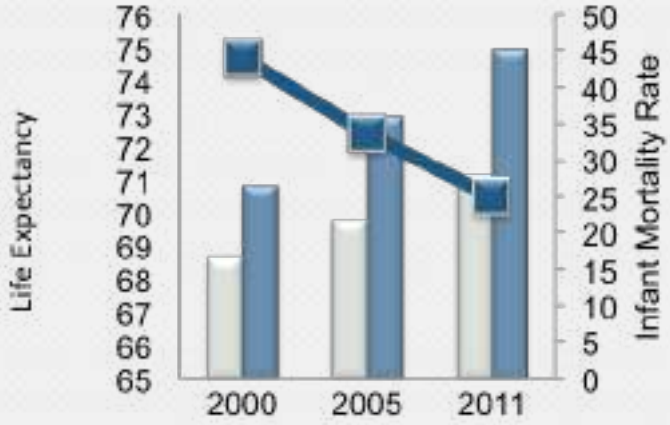
	2011	2013	2020
55-65	6.1	6.1	6.8
25–54	44.8	45.3	49.8
15–24	20.0	19.8	10.7
0–14	23.4	23.8	17.3

Source: World Bank, Frost & Sullivan analysis.

Health Indicators and Disease Burden

The key health indicators of Iran improved within the healthcare reform period implemented after the war however, due to socio-economic development and an urban lifestyle the causes of deaths by cardiovascular diseases and cancers are on the rise.

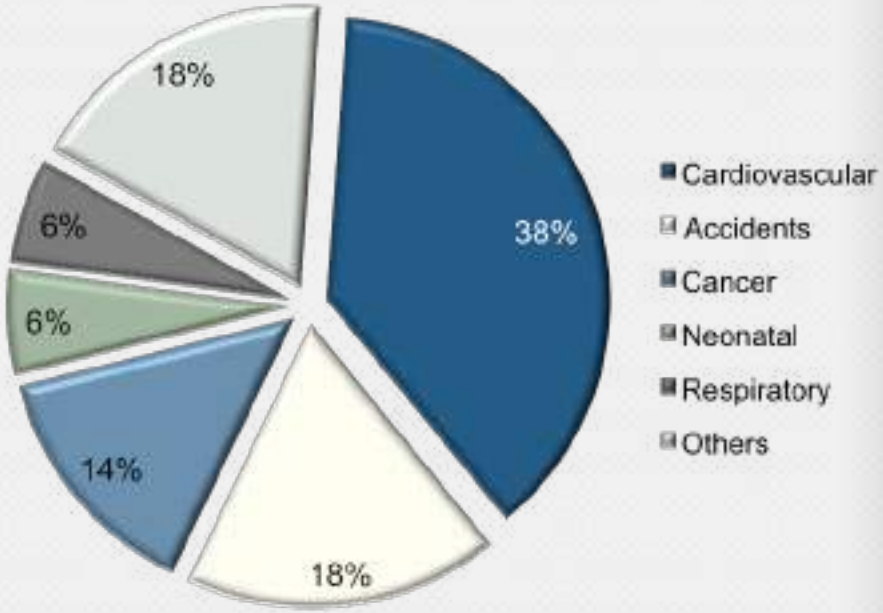
Iran Health Indicators , 2000, 2005 and 2011



	2000	2005	2011
Male Life Expectancy	68.69	69.8	71.16
Female Life Expectancy	70.85	72.95	74.94
Infant Mortality Rate	44	33.7	25

Sources: EIU; IMF; World Bank, Frost & Sullivan analysis.

Leading Causes of Deaths



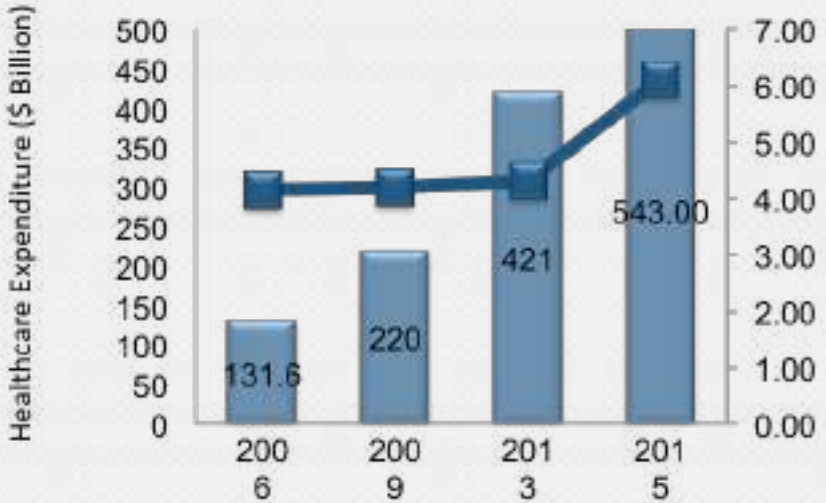
Sources: Iran Department of Health; Frost & Sullivan analysis.

Government Healthcare Budget

An upward trend in healthcare spending per person due to increasing universal health insurance coverage.

Government is dedicated to grow the healthcare expenditure by 4% each year.

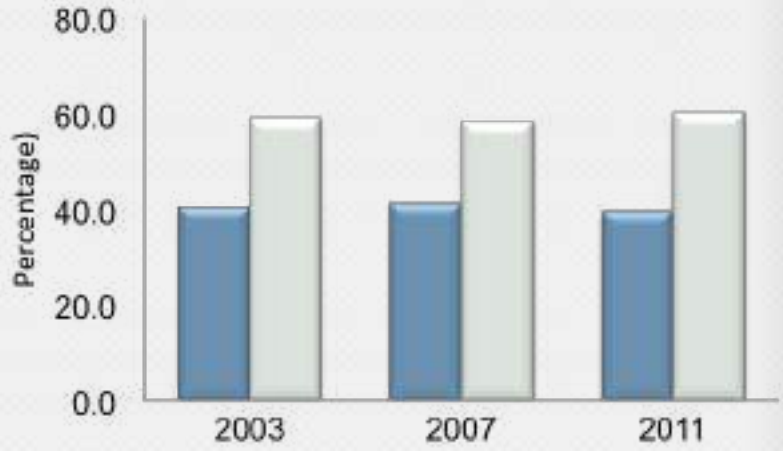
Total Healthcare Spending and as Percentage of GDP, Iran, 2006–2013



	2006	2009	2013	2015
US$ per head	131.6	220	421	543.00
% of GDP	4.15	4.20	4.30	6.10

Sources: EIU; IMF; World Bank, Frost & Sullivan analysis.

Expenditure on health as a percentage of total expenditure

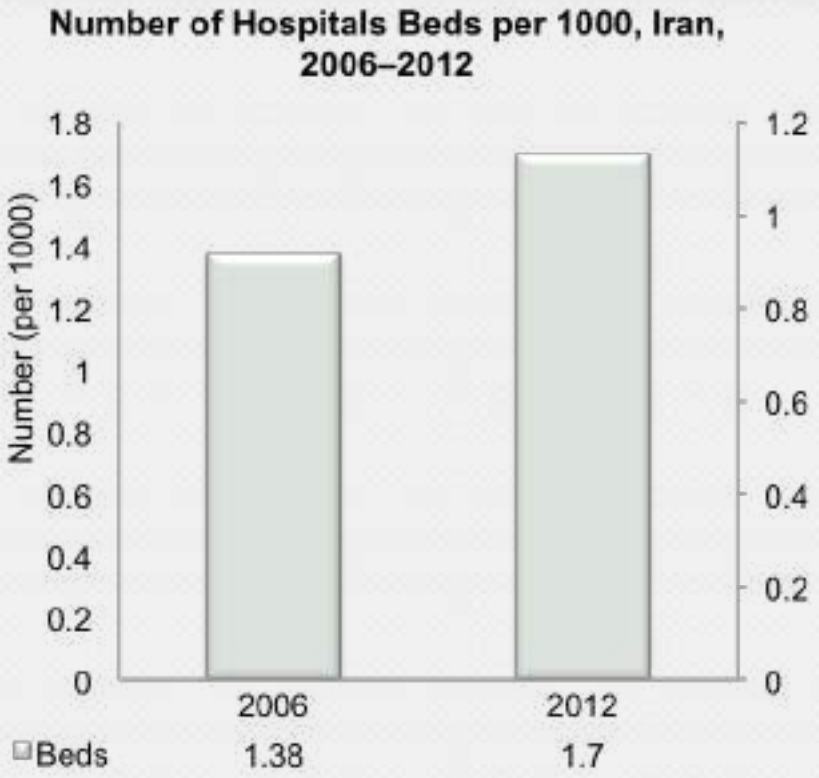


	2003	2007	2011
Government expenditure	40.6	41.4	39.7
Private expenditure	59.4	58.6	60.3

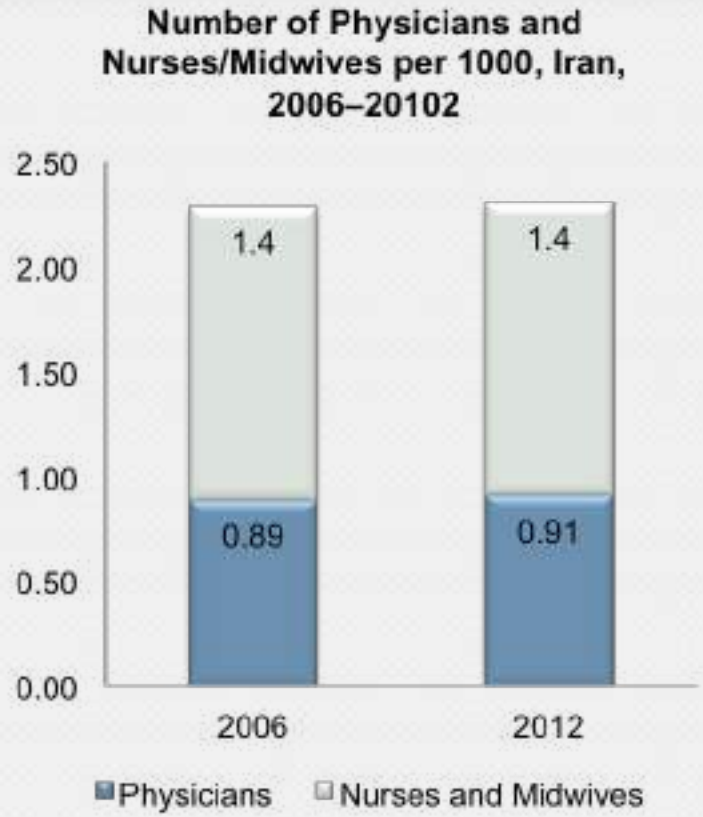
Sources: EIU; IMF; World Bank, Frost & Sullivan analysis.

Market Overview—Healthcare Infrastructure

Between 2006 and 2012, the number of hospital beds have increased and we see an upward stable growth trend in the number of physicians per 1000 patients.



Source: World Bank, Frost & Sullivan analysis.



Source: World Bank, Frost & Sullivan analysis.

Pharmaceuticals Segment Breakdown

Market Revenue	Revenue at End of Forecast Period
$3.51 B (2012)	$3.96 B CAGR: 8% (2015)

At a Glance..

- Iran mainly produces generic medicine and lacks the more high-tech production capabilities.
- Shortage of specialized medicine has opened up the doors for high volumes of specialized medicine, more preferably European and American brands.

Medical Devices Segment Breakdown

Market Revenue	Revenue at End of Forecast Period
$964 M (2012)	$1.03 B CAGR: 7% (2015)

At a Glance..

- Depended on the imports, which accounts for over 88% of the market.
- 70.4% of imports are from the European Union, Germany, the Netherlands and UK dominating the market.

Top Growth Opportunities

Transplants, and ophthalmology, devices

Consumables

Diagnostic imaging apparatus

Medical Tourism

At a Glance..

- A flourishing market, In 2012, Iran hosted over 200,000 health tourists, twice as much as the numbers in 2011.
- Majority of the visits are for transplants, ophthalmology, orthopedics and dentistry purposes.
- Iran offers high-quality expertise with low costs.
- Investments in infrastructure to better serve the visitors, for example for the Azerbaijani tourists, medical services are provided by the border.

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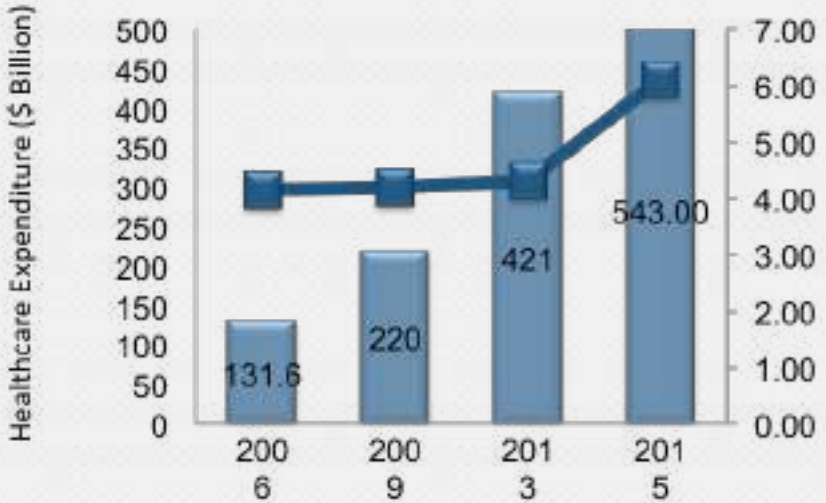

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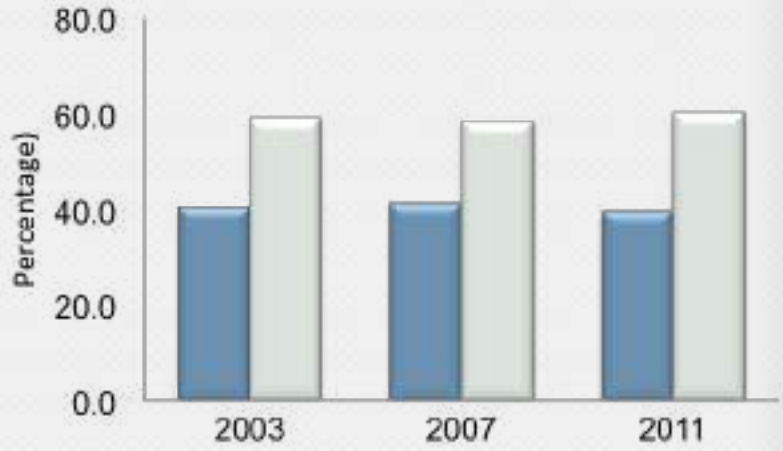

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Remember

- **Change starts with simple ideas!**
- **Simple ideas turn into national initiatives!**

% world papers on *Thomson Reuters Web of Knowledge*[SM]) for the five most research-prolific countries in the Arabian, alyzing the fields in which they are individually best represented.

Iran		Egypt		Saudi Arabia		Jordan	
Field	Percent	Field	Percent	Field	Percent	Field	Percent
gineering	1.71	Pharmacy	0.71	Mathematics	0.32	Environment	0.16
mistry	1.68	Materials Sciences	0.66	Engineering	0.31	Engineering	0.15
terials ences	1.19	Chemistry	0.64	Medicine	0.26	Agriculture	0.15
riculture	1.19	Engineering	0.57	Pharmacy	0.22	Mathematics	0.13
thematics	1.16	Agriculture	0.48	Materials Sciences	0.19	Pharmacy	0.12
rmacy	1.05	Physics	0.40	Geosciences	0.16	Chemistry	0.11
nt & mal ences	0.93	Microbiology	0.35	Chemistry	0.15	Computer Sciences	0.11
mputer ences	0.79	Geosciences	0.34	Computer Sciences	0.15	Geosciences	0.10

Research Steps

Outline

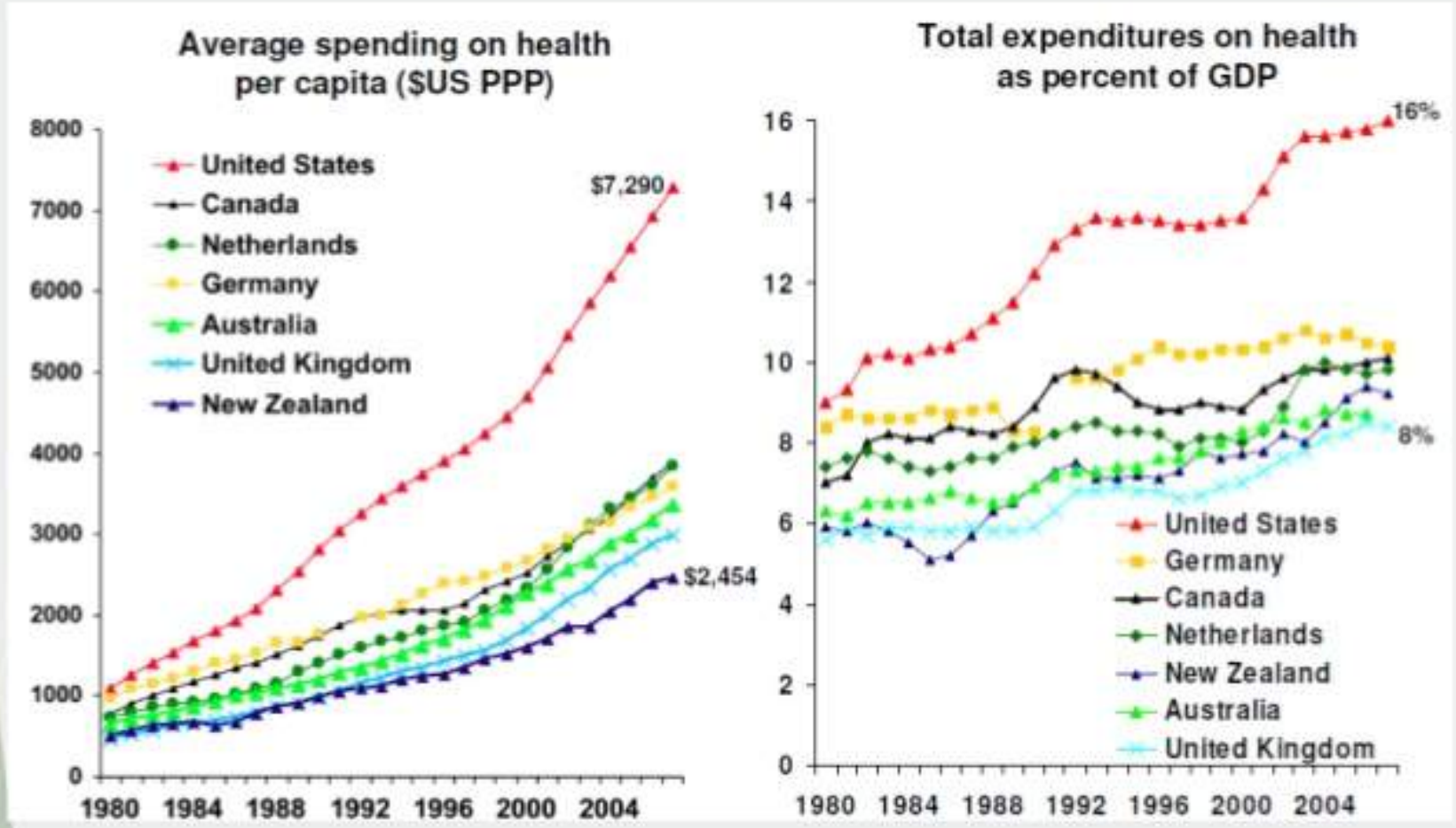
- Key developments in healthcare
- Types of systems
- Trends and developments
- Benefits of IS/IT

Current healthcare systems

- Inefficient
- Fragmented
- Quality issues
- Expensive

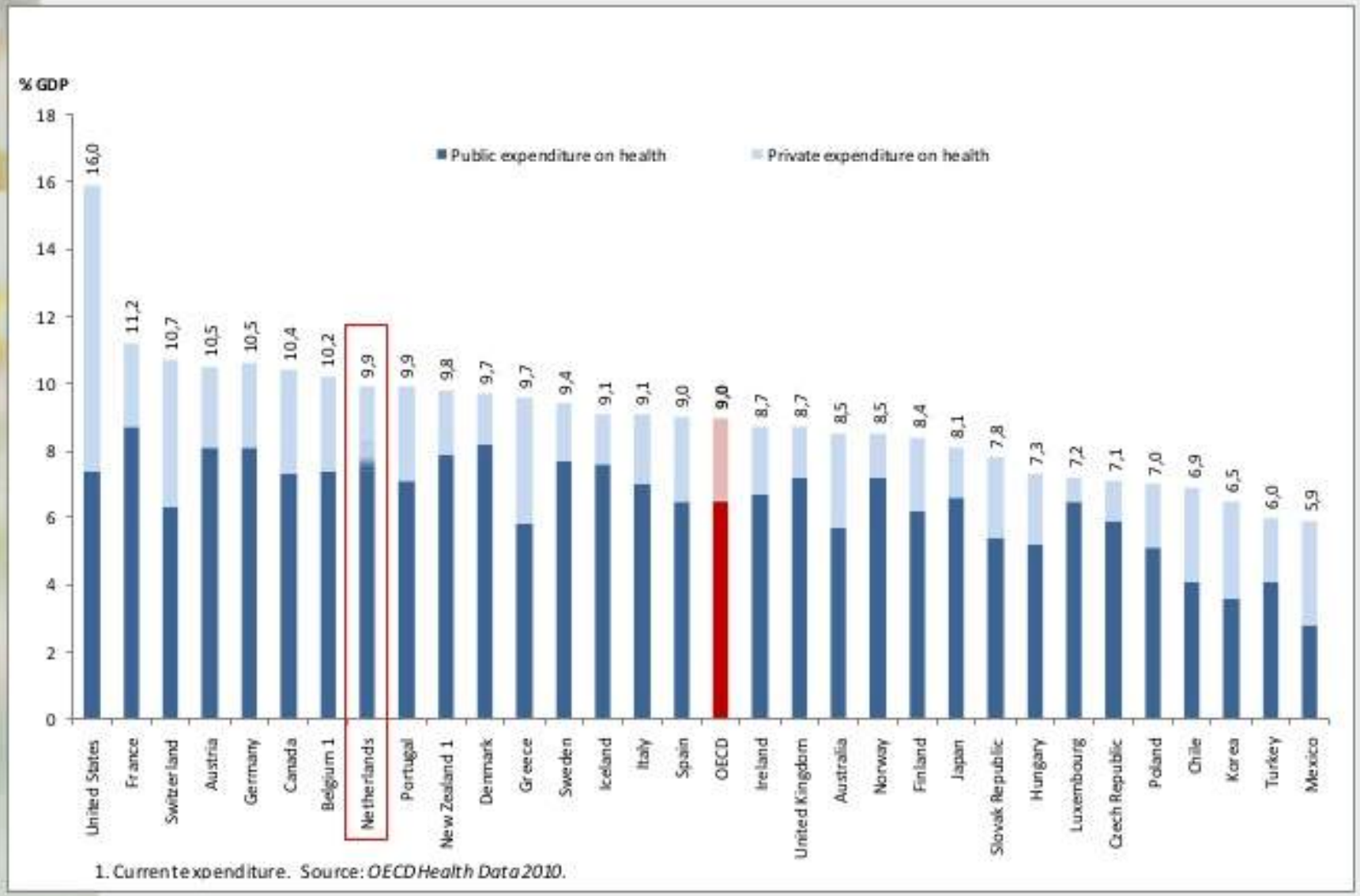
What about IT?

International Comparison of Spending on Health, 1980–2007



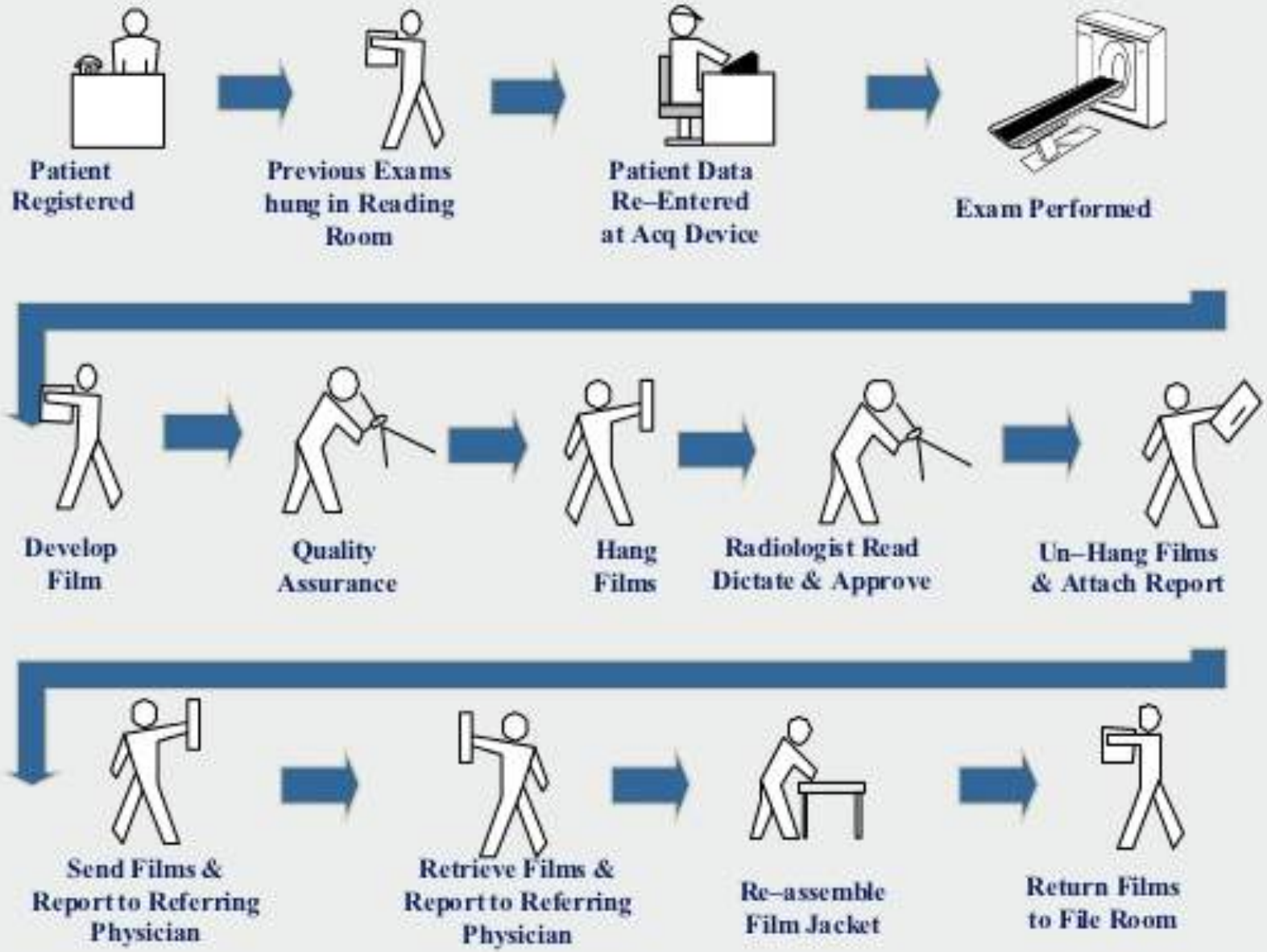
Source: Davis et al., How the performance of the U.S. health care system compares internationally. The common wealth fund (2010). See also OECD.org

The United States spends more than any other OECD country on healthcare

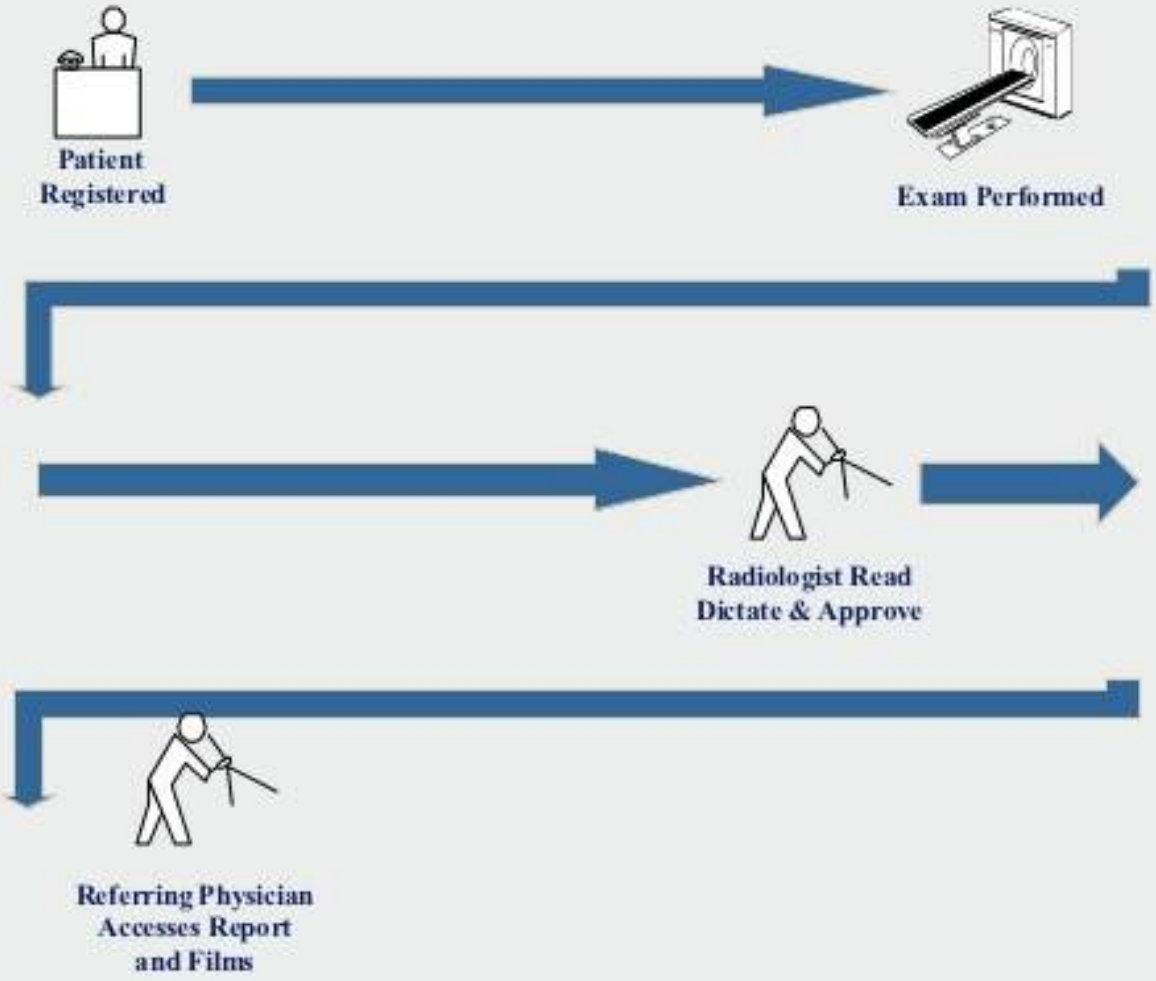


1. Current expenditure. Source: *OECD Health Data 2010.*

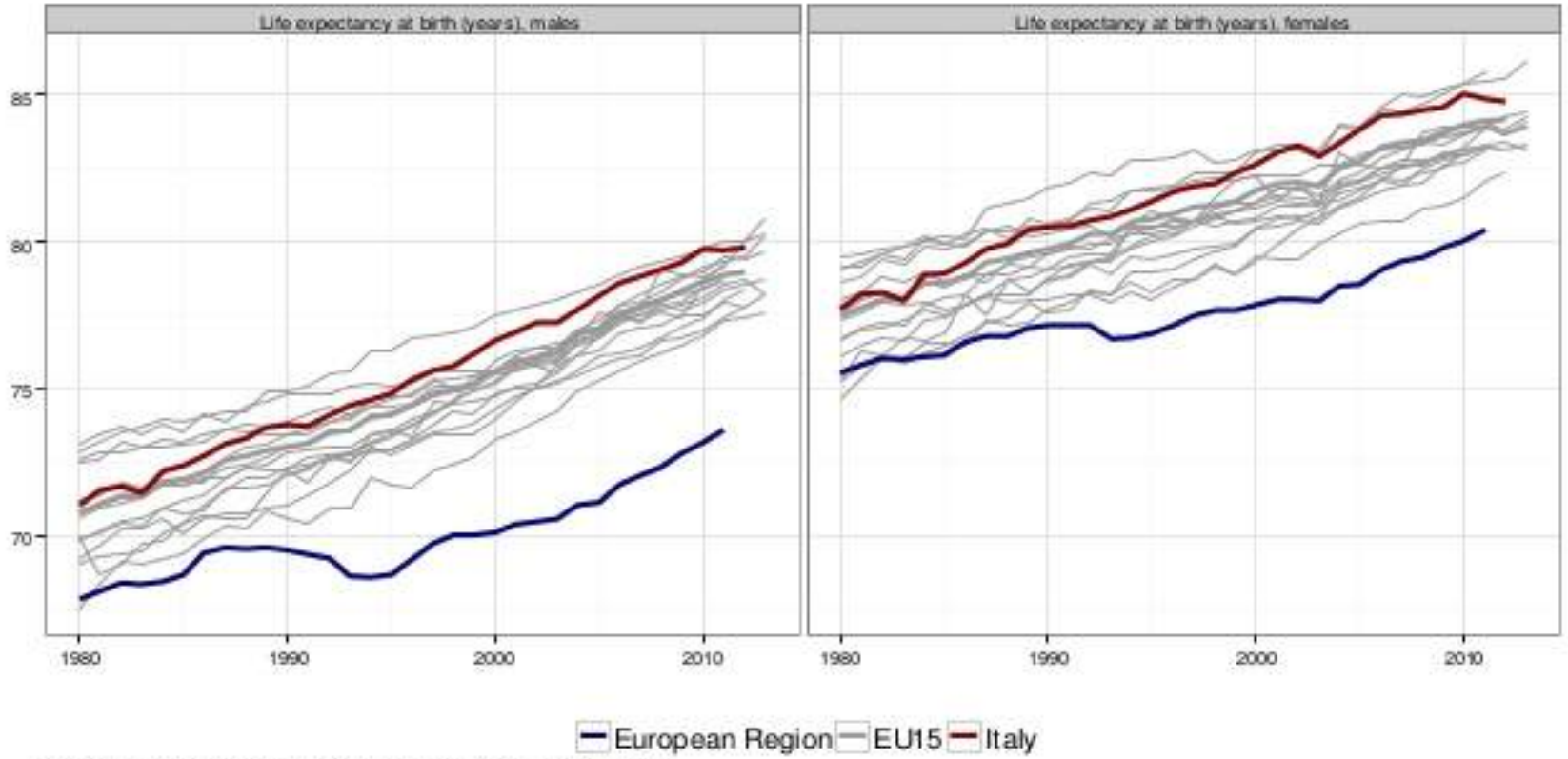
X-Ray Exam without PACS: an inefficient process



X–Ray Exam with PACS: an efficient process

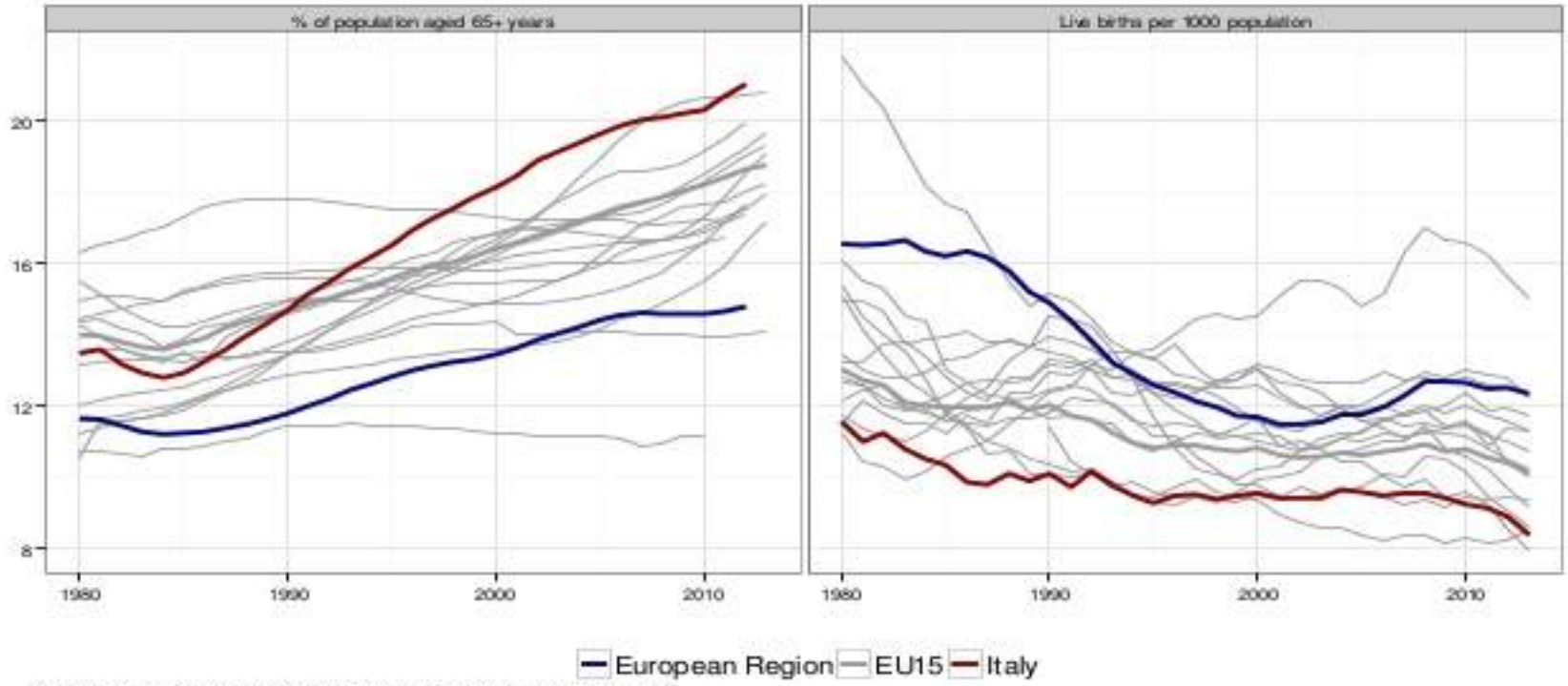


Life expectancy trends



Source: WHO Europe: European Health for All database

Proportion of the population aged ≥ 65 and birth rate



Source: WHO Europe: European Health for All database

Health

- **Health Investment:** GDP/ Health 6%
- **Infant Mortality Rate:** 26 deaths/1,000 live births
- **Average Life Expectancy at Birth:** Total: 70.3 – (Men: 68.6, Women: 72)
- **Total Fertility Rate:** 1.82 Children born/woman
- **Population Growth Rate:** 0.86% – Ranking 137th among 234 countries and independent islands worldwide.
- **Birth Rate:** 16.83 births/1,000 population – Ranking 131st among 225 countries and independent islands worldwide.
- **Death Rate:** 5.55 deaths/1,000 population –Ranking 181st among 225 countries and independent islands worldwide.

Health

- Under-5 mortality rank to the top: 79
- Under-5 mortality rate,1960: 281
- Under-5 mortality rate,2003: 39
- Infant mortality rate (under 1),1960: 164
- Infant mortality rate (under 1),2003 : 33

Healthcare Databases: Purpose, Strengths, Weaknesses

- type most commonly used in healthcare is the OLTP (online transaction processing) database.
- healthcare database serves to replace the paper documents, file folders, and filing cabinets of old. The data is now more convenient and immediate
- An electronic health record (EHR) is a prime example of such an application. The main strength of an OLTP database is that it allows for quick, real-time transactional processing.

Practice management system
EHR
Costing system
Patient satisfaction
Ambulatory surgery
Radiology
Pathology
Financial system
HR system

- 1 There is an overwhelming amount of raw data
- a way to turn all of that raw information into targeted, actionable knowledge
- 2 Data is siloed

- a solution to these two problems exists in the form of a second kind of healthcare database: an OLAP (online analytical processing) database
- **The Enterprise Data Warehouse**
- An EDW is structured to combine data from OLTP databases and create a layer optimized for and dedicated to analytics. The result is that organizations can perform sophisticated analysis on data from a variety of sources: the EHR, billing, costing, patient satisfaction, and more. EDWs have become essential to realizing the full benefit of healthcare organizations' many OLTP databases, including EHRs.

Clinical Data Repository Versus a Data Warehouse — Which Do You Need?

- Even though a clinical data repository is good at gathering data, it can't provide the depth of information necessary for cost and quality improvements because it wasn't designed for this type of use
- (EDW). With its unique ability to flexibly tie disparate data sources from across the organization into one source of truth, health systems will realize a significant return of investment (ROI) from their newfound ability to quickly and easily pull and analyze data for every service in the organization.

- While the data contained in a clinical repository is valuable because it shows a patient's clinical data, the design is not an adequate solution for health systems for numerous reasons.
- primary reason is this: clinical data repositories don't offer flexible analytics for analysts to use as they work to improve patient care.
- In most cases, they also don't have the ability to integrate with other non-clinical source systems, eliminating the chance to follow patient care across the care continuum

Clinical data repositories are inefficient.

- *When data analysts work with fragmented source systems in a siloed environment, they spend the majority of their time hunting and gathering data rather than interpreting it, leaving a tremendous opportunity to improve efficiency by using a centralized data environment.*

Clinical data repositories are inefficient

- There's a large margin for costly errors.
- Reports aren't standardized
- Tools aren't standardized
- Data isn't always secure

5 Reasons Healthcare Data is Unique and Difficult to Measure

- **1. Much of the data is in multiple places.**
- **2. The data is structured and unstructured.**
- **3. Inconsistent/variable definitions; Evidence-based practice and new research is coming out every day.**
- **4. The data is complex.**
- **5. Changing Regulatory Requirements.**

Sts report new release

- JAMA Cardiol. 2017 Feb 1. doi: 10.1001/jamacardio.2016.5302. [Epub ahead of print]
- **Quality-of-Life Outcomes After Transcatheter Aortic Valve Replacement in an Unselected Population: A Report From the STS/ACC Transcatheter Valve Therapy Registry.**
- Arnold SV1, Spertus JA1, Vemulapalli S2, Li Z2, Matsouaka RA2, Baron SJ1, Vora AN2, Mack MJ3, Reynolds MR4, Rumsfeld JS5, Cohen DJ1.

The importance of a database in the management of healthcare services

pubmed

- According to the World Cancer Report 2008, from the International Agency for Research on Cancer (IARC) / World Health Organization (WHO), the global impact of neoplasms more than doubled in 30 years. It was estimated that over the last years about 12 million new cases of cancer and 7 million deaths would occur [1].
- In Brazil, estimates for the years 2010 and 2011 near 489270 new cancer cases, the most frequent of which in the prostate and lung for males, and in the breast and uterine cervix for females[1].
- Thus, investment in and development of measures to improve cancer control by means of early detection, surveillance of risk factors and research have become fundamental. Based on reliable records and data, it is possible to carry out analyses that are the foundation for decision-making as to management and care(

JAMA Cardiol. 2017 Feb 1. doi: 10.1001/jamacardio.2016.5302. [Epub ahead of print]

Quality-of-Life Outcomes After Transcatheter Aortic Valve Replacement in an Unselected Population: A Report From the STS/ACC Transcatheter Valve Therapy Registry.

Arnold SV1, Spertus JA1, Vemulapalli S2, Li Z2, Matsouaka RA2, Baron SJ1, Vora AN2, Mack MJ3, Reynolds MR4, Rumsfeld JS5, Cohen DJ1.

Design

- TAVR in the Society of Thoracic Surgeons/American College of Cardiology Transcatheter Valve Therapy (TVT) Registry from November 1, 2011, to March 31, 2016, at more than 450 clinical sites.

conclusion

- Although the health status results were favorable for most patients, approximately 1 in 3 still had a poor outcome 1 year after TAVR. Continued efforts are needed to improve patient selection and procedural/postprocedural care to maximize health status outcomes of this evolving therapy.

- n a national, contemporary clinical practice cohort of unselected patients, improvement in health status after TAVR was similar to that seen in the pivotal clinical trials. Although the health status results were favorable for most patients, approximately 1 in 3 still had a poor outcome 1 year after TAVR. Continued efforts are needed to improve patient selection and procedural/postprocedural care to maximize health status outcomes of this evolving therapy.

Medical Necessity

- The AMA defines medical necessity as healthcare services or products that a prudent physician would provide to a patient for the purpose of preventing, diagnosing, or treating an illness, injury, disease, or its symptoms in a manner that is:
  - In accordance with generally accepted standards of medical practice.
  - Clinically appropriate in terms of type, frequency, extent, site, and duration.
  - Not primarily for the convenience of the patient, physician, or other healthcare provider.
- Usage of the term "medical necessity" must be consistent between the medical profession and the insurance industry.
- Carrier denials for non-covered services should state so explicitly and not confound this with a determination of lack of "medical necessity."

Source: American Medical Association, “H-320.953 Definitions of "Screening" and "Medical Necessity“, https://www.ama-assn.org/ssl3/ecomm/PolicyFinderForm.pl?site=www.ama-assn.org&uri=/resources/html/PolicyFinder/policyfiles/HnE/H-320.953.HTM

The Shared Responsibility of Medical Necessity

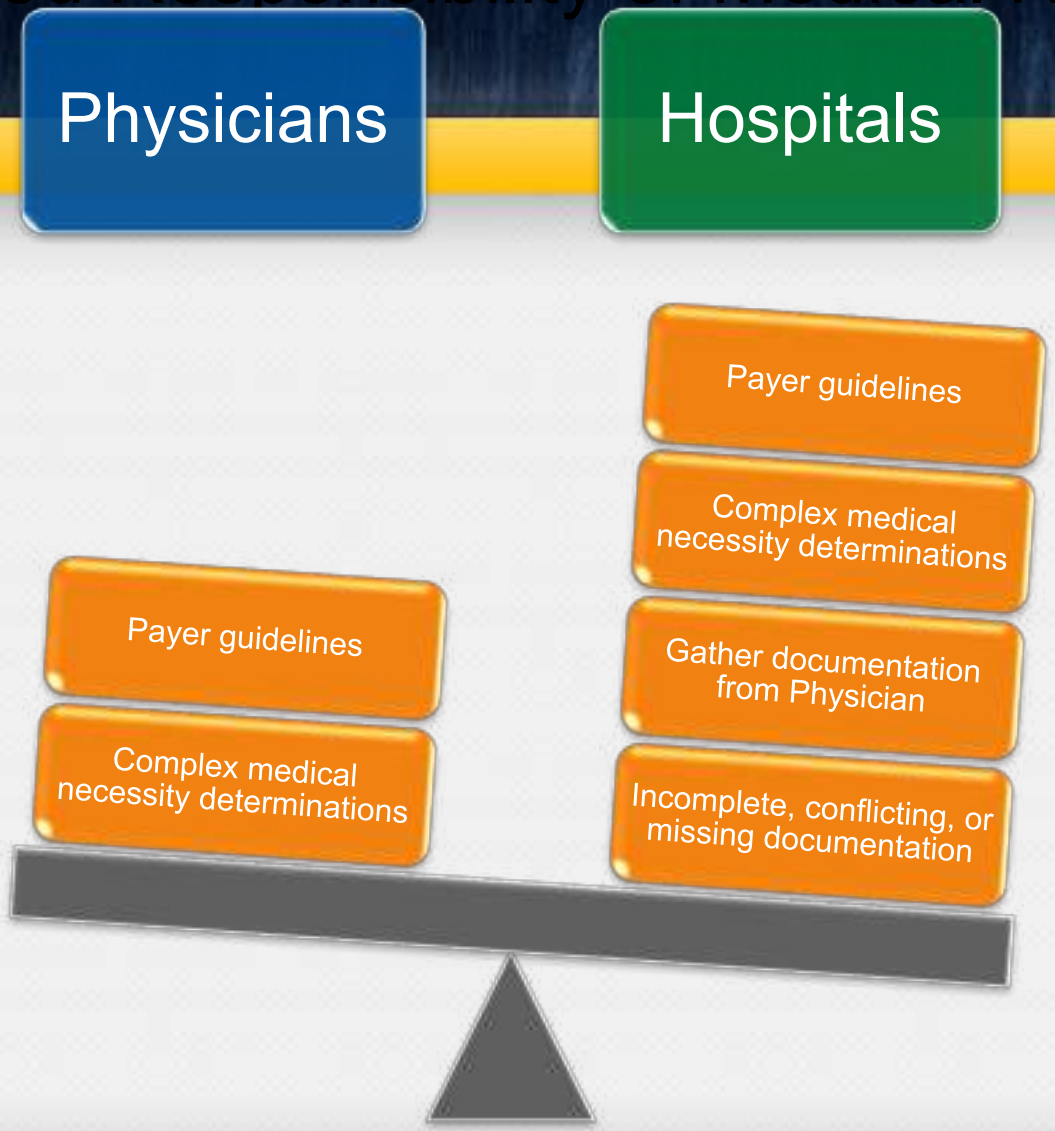
Physicians

- Order appropriate treatments for the patient
- Consider complex medical necessity standards as outlined by government and private payers

Hospitals

- Prohibited from billing for services ordered and performed by physicians that are not medically necessary

The Shared Responsibility of Medical Necessity



Documentation Is Important!

- Physicians may, knowingly or unknowingly, practice outside of the payer guidelines, but are also using the most up-to-date patient care guidelines.
  - Example: the most recent clinical guidelines and AUC for ICDs were issued in 2013, whereas the most recent update to NCD 20.4 was in 2005.
  - Physicians' documentation should be detailed as to what criteria or guidelines they are using to make treatment decisions.

Documentation Is Important!

- Documentation should very specifically answer the following questions:
  - What are the patient's specific signs and symptoms?
  - What are the diagnostic tests that support the diagnosis?
  - What are the patient comorbidities that contribute to the clinical picture?
  - How can the treatment improve the patient's expected long-term mortality?
  - How can the procedure potentially improve