ARAB bioclinic 3
BIOMEDICAL & CLINICAL ENGINEERING

The 3rd International Conference
ON Biomedical & Clinical Engineering

Health Informatics: Not Just EHR

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HISTORY

HISTORY

1940 - 1950

Germany's Dr. Gustav Wagner established the world's first professional organization for informatics

German Society for Medical Documentation, Computer Science, and Statistics.

1951 - 1960

Dr. Arthur E. Rappoport spoke about using the McBee manual punch card, the first computer used in clinical practice, at the American Society for Clinical Pathology.

1961 - 1970

Pappalardo, Marble, and Greenes develop MUMPS, a programming language which made it easier to create medical databases and integrate them into healthcare environments.

HISTORY

1971 - 1985

Release of computerized provider order entry system.

Launch of patient scheduling software, Cadence.

1988 - 1995

Launch of the American Medical Informatics Association to educate healthcare professionals in informatics standards and systems.

Launch of EpicCare the first Window-based electronic health records software.

2000 - 2013

Wearable health monitoring devices used in hospital trials.

Nearly 3/4 of physicians use tablets to maintain electronic health records.

DEFINITION

HEALTHCARE

The management of illness through the services of medical and allied health professionals

INFORMATICS

The Science of collecting, storing, manipulating, retrieving, analyzing and classifying recorded information (data)

HEALTH INFORMATICS

"The study of nature and principles of information and its applications within all aspects of health care delivery and promotion"

Protti DJ
AMIA Proceedings
Masson Publishing, 1982

HEALTH INFORMATICS
TWO DECADES LATER

Health informatics is concerned with the systematic processing of data, information and knowledge in medicine and healthcare.

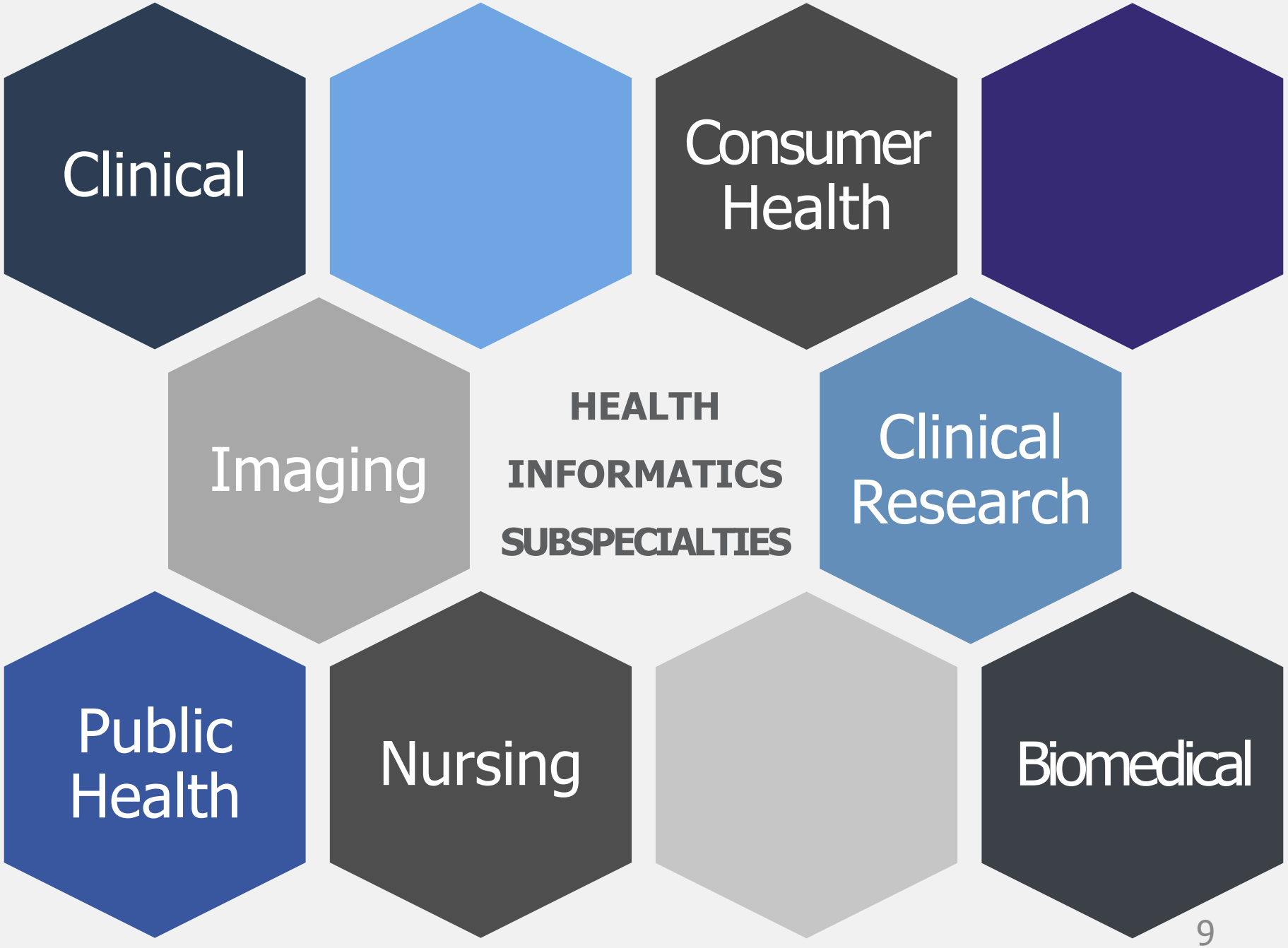
It covers computational and informational aspects of processes and structures, applicable to any clinical or managerial discipline within the health sector.

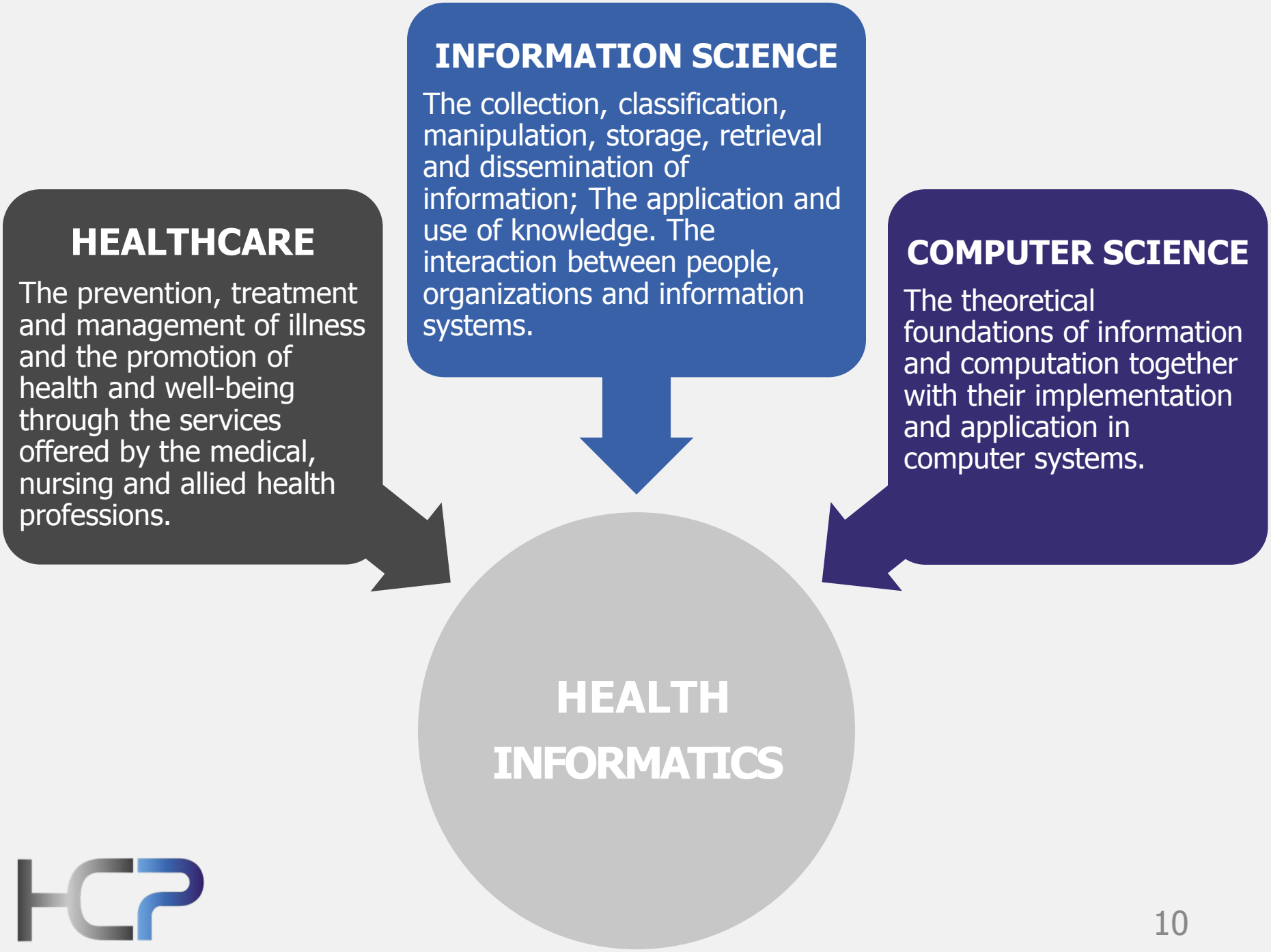
Health informatics is delivered by operational health practitioners, academic researchers and educators, scientists and technologists in operational, commercial and academic domains.

Jean Roberts – Medinfo2001

HEALTH INFORMATICS - WHO

'an umbrella term referring to the application of the methodologies and techniques of information science, computing, networking and communications to support health and health related disciplines such as medicine, nursing, pharmacy, dentistry, ...'


Clinical
Consumer Health
Imaging
HEALTH INFORMATICS SUBSPECIALTIES
Clinical Research
Public Health
Nursing
Biomedical


INFORMATION SCIENCE
The collection, classification, manipulation, storage, retrieval and dissemination of information; The application and use of knowledge. The interaction between people, organizations and information systems.
HEALTHCARE
The prevention, treatment and management of illness and the promotion of health and well-being through the services offered by the medical, nursing and allied health professions.
COMPUTER SCIENCE
The theoretical foundations of information and computation together with their implementation and application in computer systems.
HEALTH INFORMATICS

HEALTHCARE: PROMOTING WELLNESS

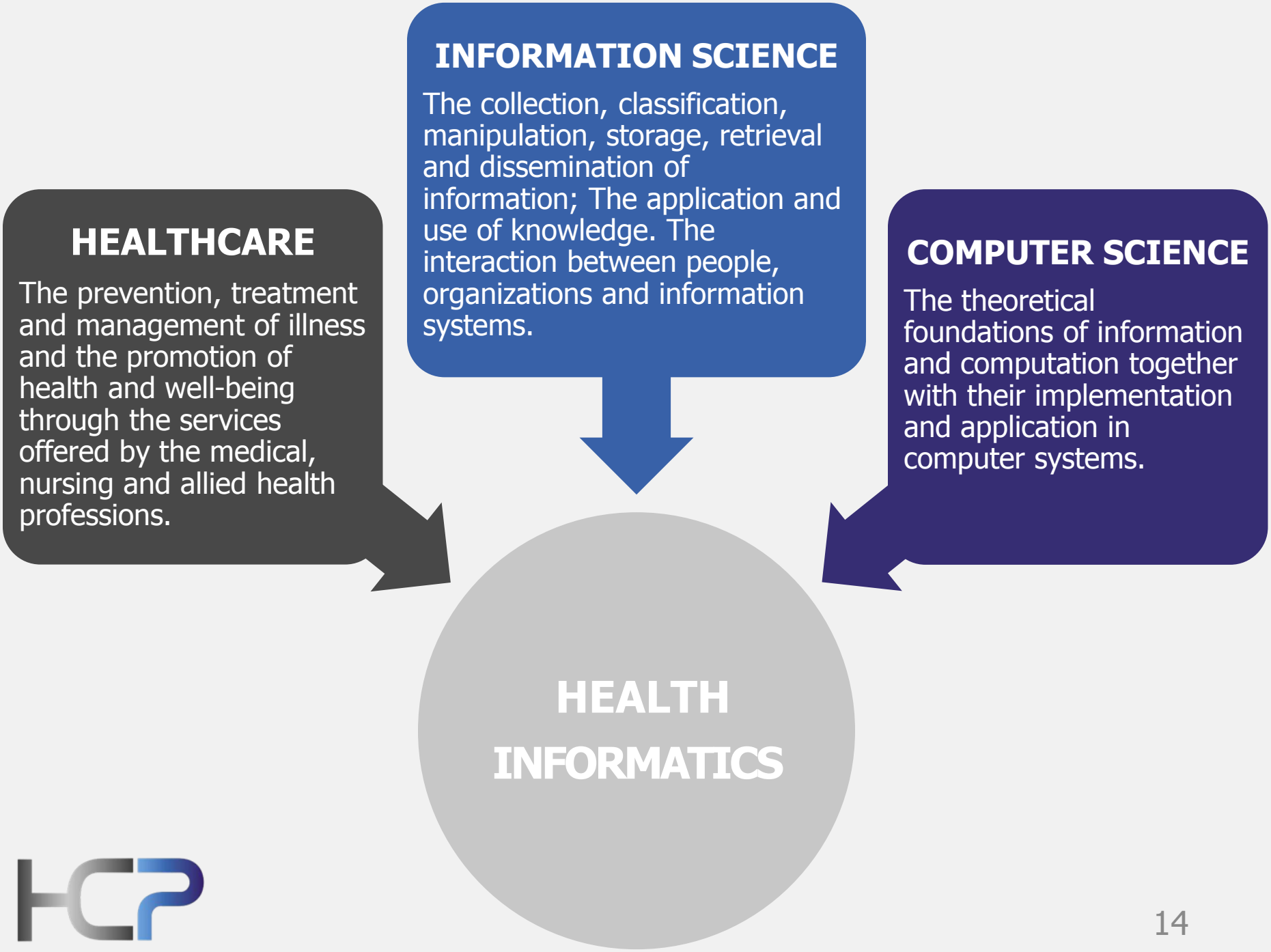
- Organizational development and change management
- Resource allocation models
- History and culture of clinicians
- Clinical practice content and process
- Clinical practice guidelines and protocols
- Evidence-based decision making
- Health outcomes and health status
- Epidemiology
- Population health
- Health economics and fiscal management
- Individual and group decision support systems
- Ethics and legislation

INFORMATION SCIENCE

- Data
- Power and value of information
- Coding, classification, nomenclature
- Data modeling data standards
- Managing information resources
- Statistical methods
- Systems analysis and design
- Information sources (local, national, international)
- Data analysis

COMPUTER SCIENCE

- Hardware processing and storage technologies
- Computer languages
- Software: operating systems, databases, application
- Communications technologies
  - Local Area Networks
  - Intranets and the Internet
  - Telemedicine
- Security and Confidentiality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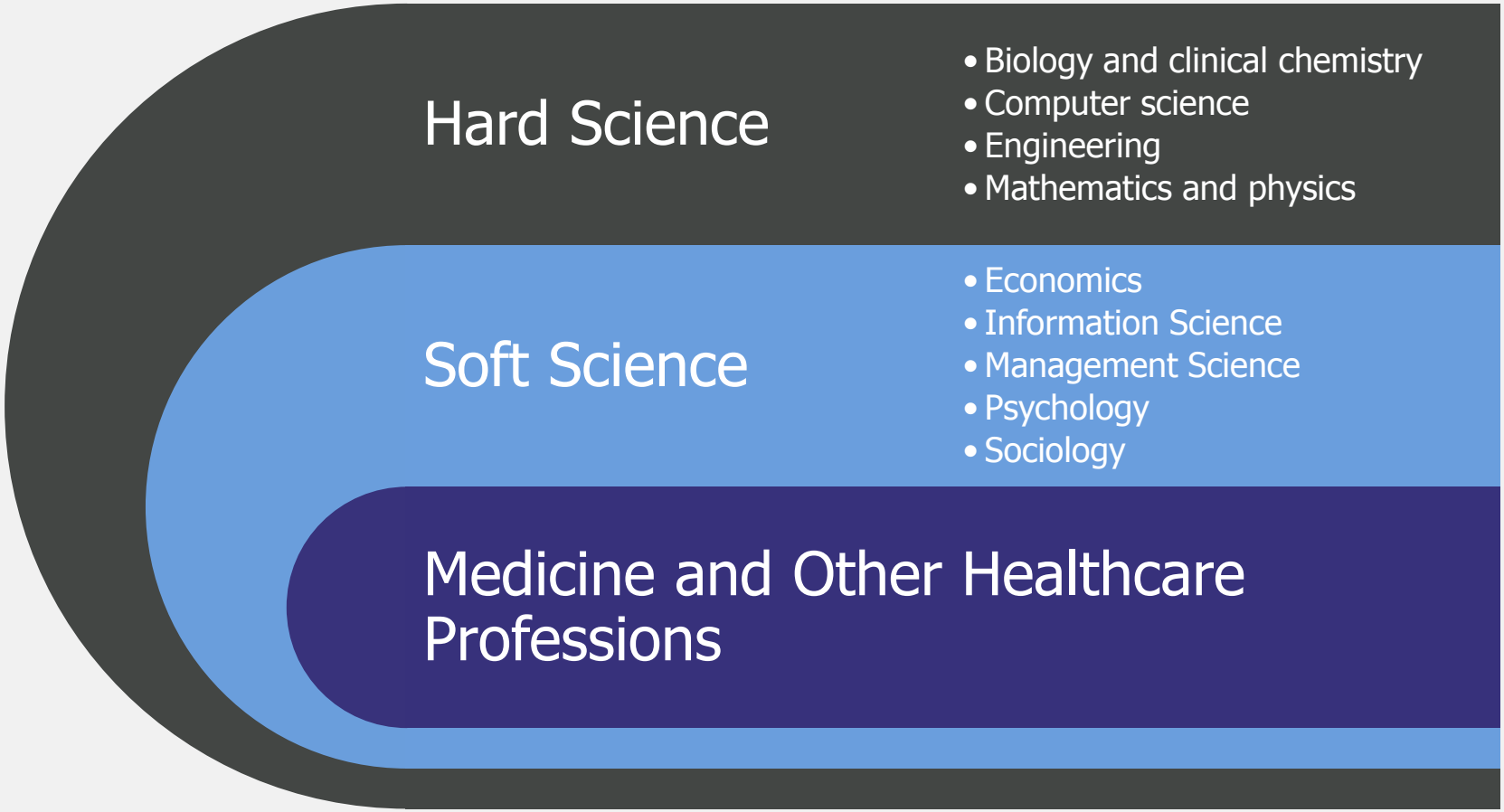
HEALTH INFORMATICS

THE MELTING POT:

KNOWLEDGE TANK
STAKEHOLDER DIVERSITY
APPLICATIONS

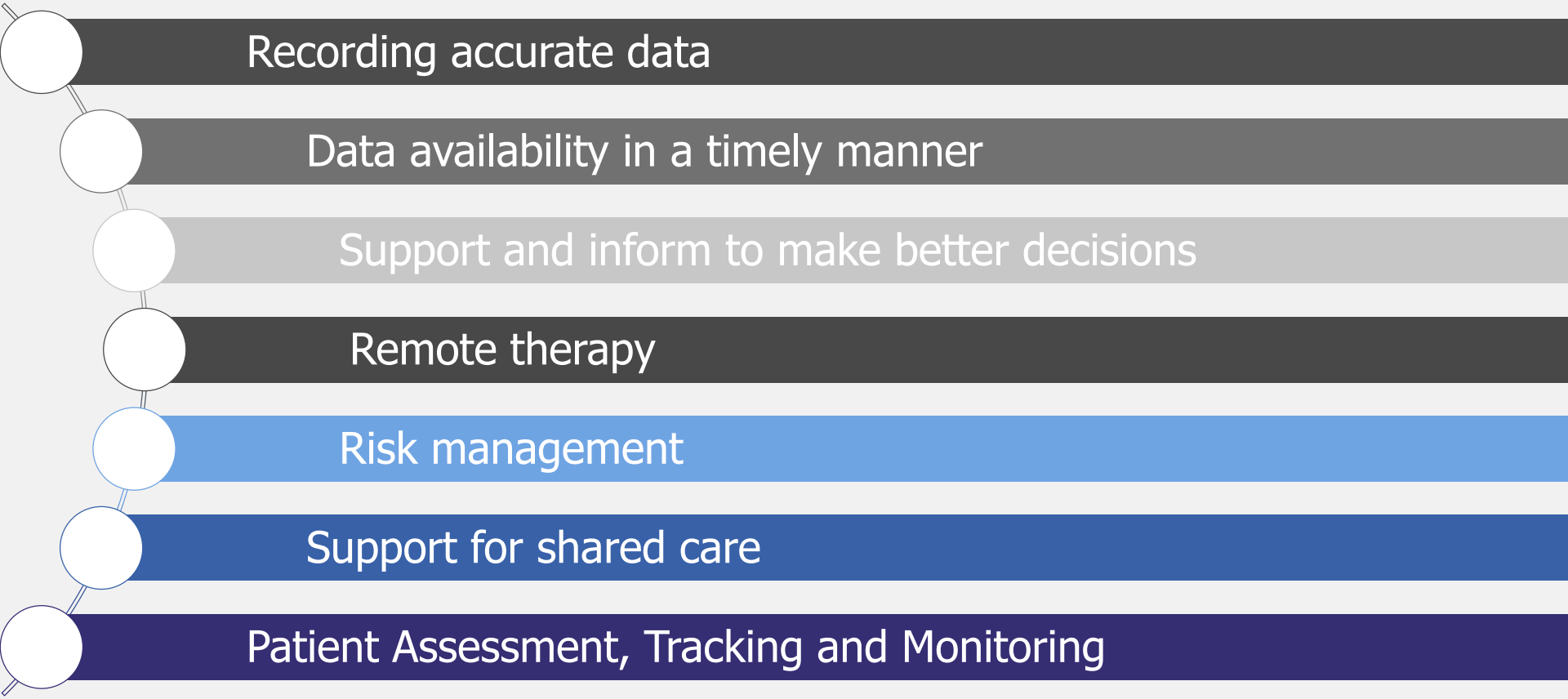
HEALTH INFORMATICS KNOWLEDGE



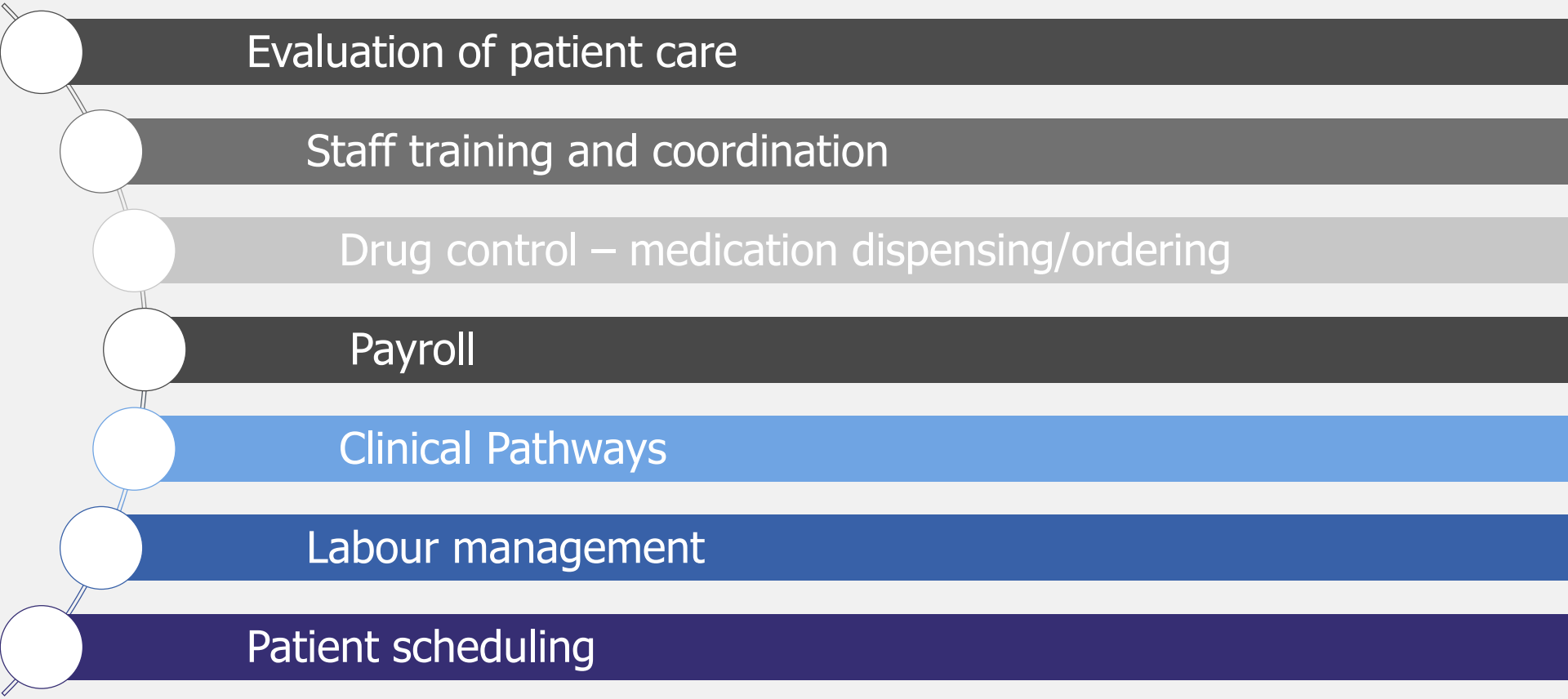
STAKEHOLDER DIVERSITY WILL ONE SOLUTION SUIT ALL?

- Patients, Tax Payers and The Public at Large
- Healthcare Professionals
- Government Bodies, Policy Makers, Strategists and Agencies
- Finance/Admin. Management in Hospitals
- Facility Management/Operational Management
- Healthcare Providers
- Healthcare Researchers
- Healthcare Educators and Their Students

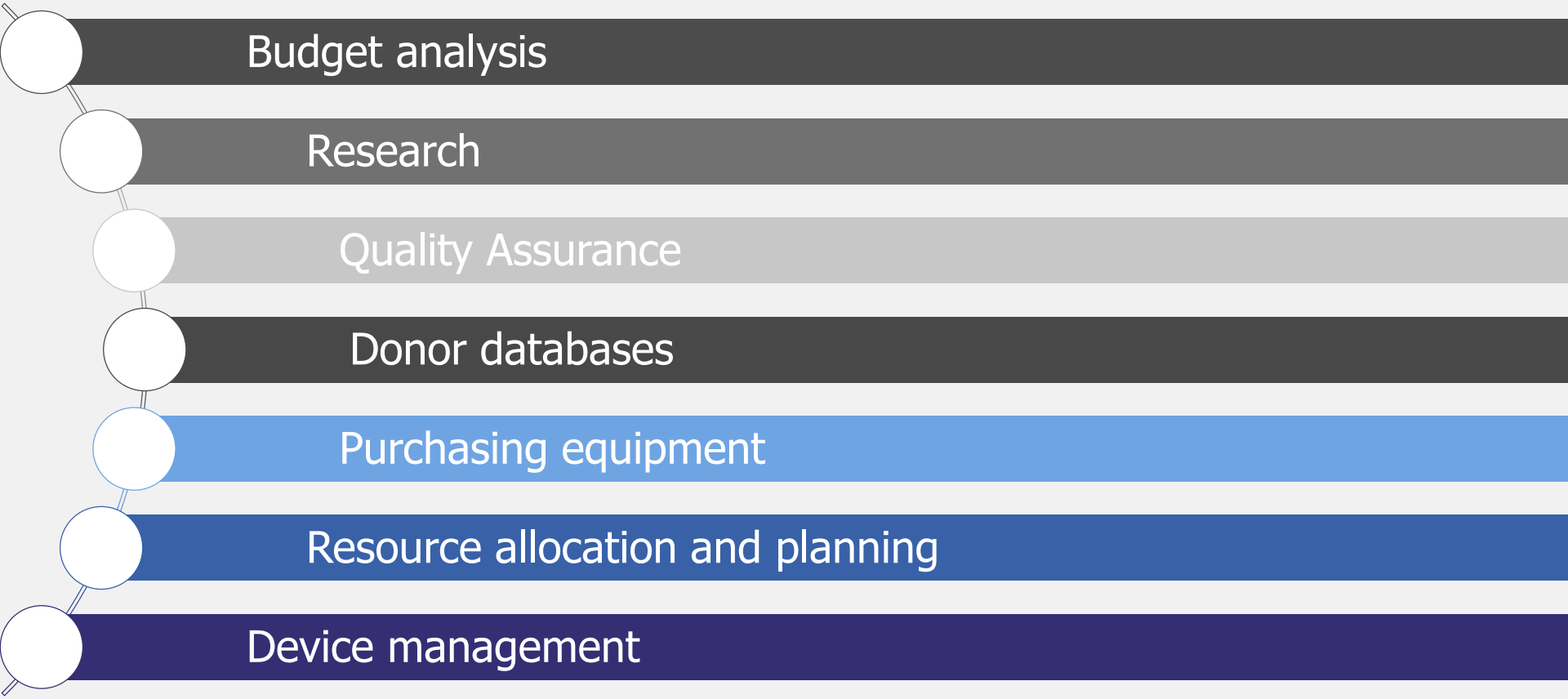
HEALTH INFORMATICS APPLICATIONS



HEALTH INFORMATICS APPLICATIONS



HEALTH INFORMATICS APPLICATIONS



TRANSFORMATION

HEALTHCARE TRANSFORMATION THROUGH HEALTH INFORMATICS

ELECTRONIC HEALTH RECORDS - EHR

Enacted in 2009, the **Health Information Technology for Economic and Clinical Health Act** (HITECH) required that all health care providers in the US adopt EHRs by 2015.

This legislation paved the way for health informatics to grow increasing the possibility for interoperability of patient records between providers.

MOBILE HEALTH - mHealth

mHealth applications are transforming how doctors and patients interact in the modern era.

For the patient:

- Convenient patient experience and care
- Streamlining management of health
- Easier communication with healthcare providers
- Appointment scheduling
- Access to health information

For the care provider:

- Improved patient compliance with tools that provide remote monitoring of certain health conditions and medical devices

TELEMEDICINE

Virtual communication between patients and caregivers.

Use of telecommunication tools, patients and their caregivers may interact without the need for transportation.

Telemedicine includes:

- Tele-Health
- Tele-Radiography
- Tele-Surgery

INTEROPERABILITY

Interoperable Healthcare Information Technology (HIT) Systems "the extent to which systems and devices can exchange data, and interpret that shared data" - HIMSS

According to the Healthcare Information and Management Systems Society (HIMSS), Interoperability is still a pipe dream for the health care industry. In reality, it is rather a Goal for those in the industry, working steadily towards achieving.

As systems and networks become more and more interoperable, the healthy and open flow of information among health care practitioners, patients and networks will ultimately lead to better health care and more informed patients who are in charge of their own health.

WEARABLES

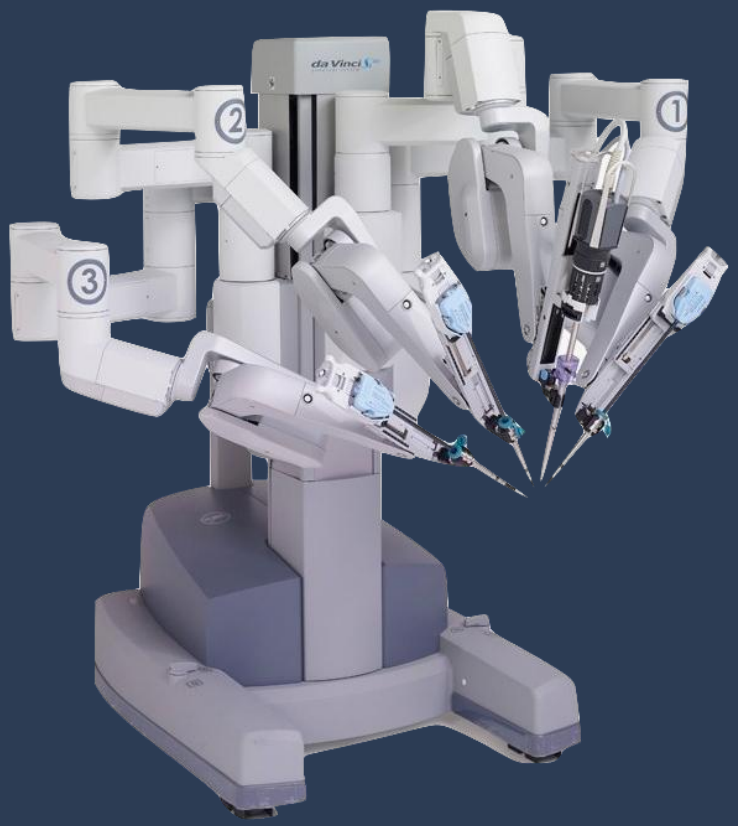
Wearables offer yet another avenue beyond electronic patient records to collect data, increase prevention and improve health outcomes for users.

Wearables can monitor and record everything from sleep and rest patterns to heart rate and calories.

As the wearables industry continues to expand, developers are looking at ways to take the technology even further

According to TechRepublic "Intel teamed up with the Michael J. Fox Foundation to use wearables to find certain characteristics of Parkinson's disease".

AI AND ROBOTICS



Advancements in Artificial Intelligence and robotics have lead to real uses for robots in hospital settings, whether as surgical assistants, nano-robots for intravenous drug delivery or for delivery and transportation of goods within the facility, the impact is immense.

HEALTHCARE TRANSFORMATION THROUGH HEALTH INFORMATICS

THE INTEGRATED OPERATING ROOM

HISTORY

John’s Hopkins Hospital OR (1904)

PAST

A modern OR in the mid 1980's

IMAGE / VIDEO STREAMING

- Image Transmission: Direct connectivity
- Single source to single destination
- Very primitive and limited distances
- Limited or no editing/annotation functionalities

IMAGE / VIDEO STREAMING

Two main players emerged:

1) Endoscopy Suppliers, capitalizing on their existing strength in the healthcare industry and widely available resources in the hospital environment

2) IT companies with extensive and broad knowledge in the field of technology but not necessarily in Healthcare

IMAGE / VIDEO STREAMING

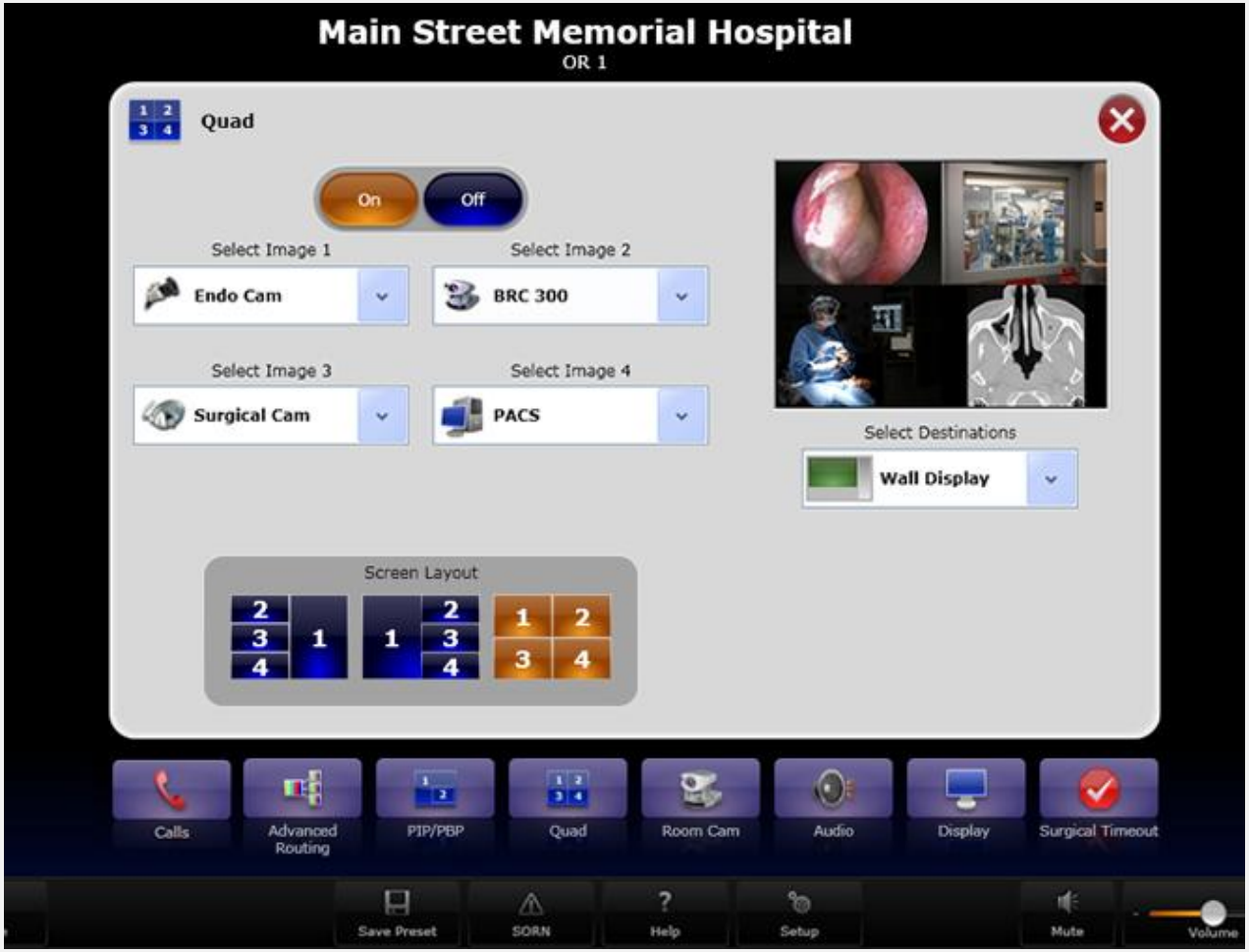
- Digitizing the endoscopic image to allow advanced transmission (over LAN) and additional features (storage, documentation, transmission, processing, conferencing, etc.)
- Digitizing the HMIS and CIS to allow networking and sharing of all clinical data using advanced methods.
- Digitizing the surgeon panel through BMS integration with various IT systems and subsystems.

THE DIGITAL OR – VIDEO STREAMING

SOURCES	DESTINATIONS
OR Light Camera	Anywhere
Laparoscopic Camera	Anywhere
Surgeon Helmet Camera	Anywhere
Wall mounted Camera(s)	Anywhere
Video conferencing	Anywhere
	In room monitors, In-facility offices, clinics, conference rooms, auditoriums, CCTV-Network, etc. Off-grounds, anywhere in the world on a connected device

IMAGE / VIDEO STREAMING

IMAGE / VIDEO STREAMING

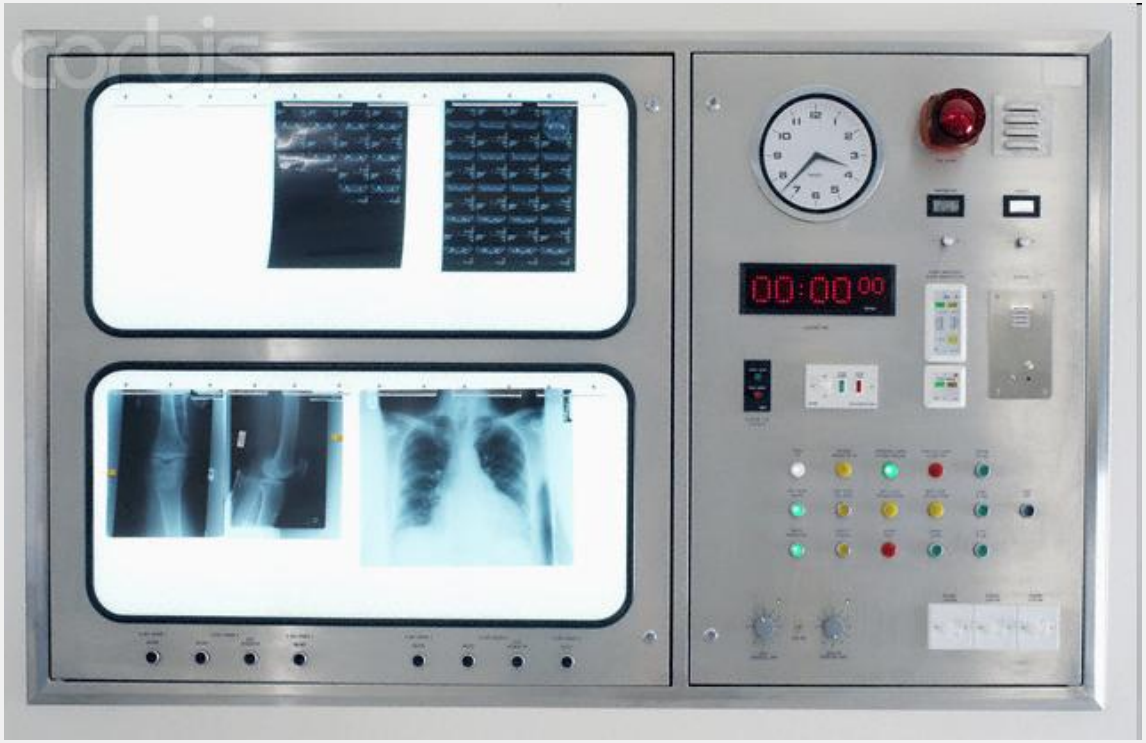


INTEGRATED CONTROL

- The nurse and surgeon can operate all components in the room from a single interface either inside or outside the sterile field.
- The interfacing capabilities include surgical planning and navigation, image data management, advanced visualization, and intra-operative imaging.

SURGEON PANELS

- Electrical Mechanical systems
- Patient data



INTEGRATED CONTROL


04:04:06
15:06:22
00:00:00
BrainLAB
VectorVision cranial

OLYMPUS ENDO ALPHA

KARL STORZ OR1

BERCHTOLD SUPERSUITE

RICHARD WOLF CORE

MAQUET AND HOWORTH AIRTECH OR3G

ADVANTAGES & DISADVANTAGES

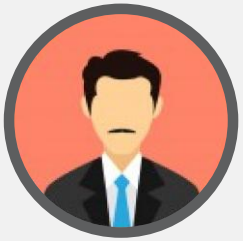
HEALTH INFORMATICS ADVANTAGES

Time and Cost Saving

Safer Healthcare

Geographical Independence

Patient Education



Patient Autonomy

Increase Quality Care

Environmentally Friendly

HEALTH INFORMATICS DISADVANTAGES

Expensive

Timely Implementation and Adaptation

Impersonalization of Care

Over Dependency on Technology

Cybersecurity

THANK YOU