

# Internet of Medical Things (IoMT): Empowering Healthcare with IoT and 5G Connectivity

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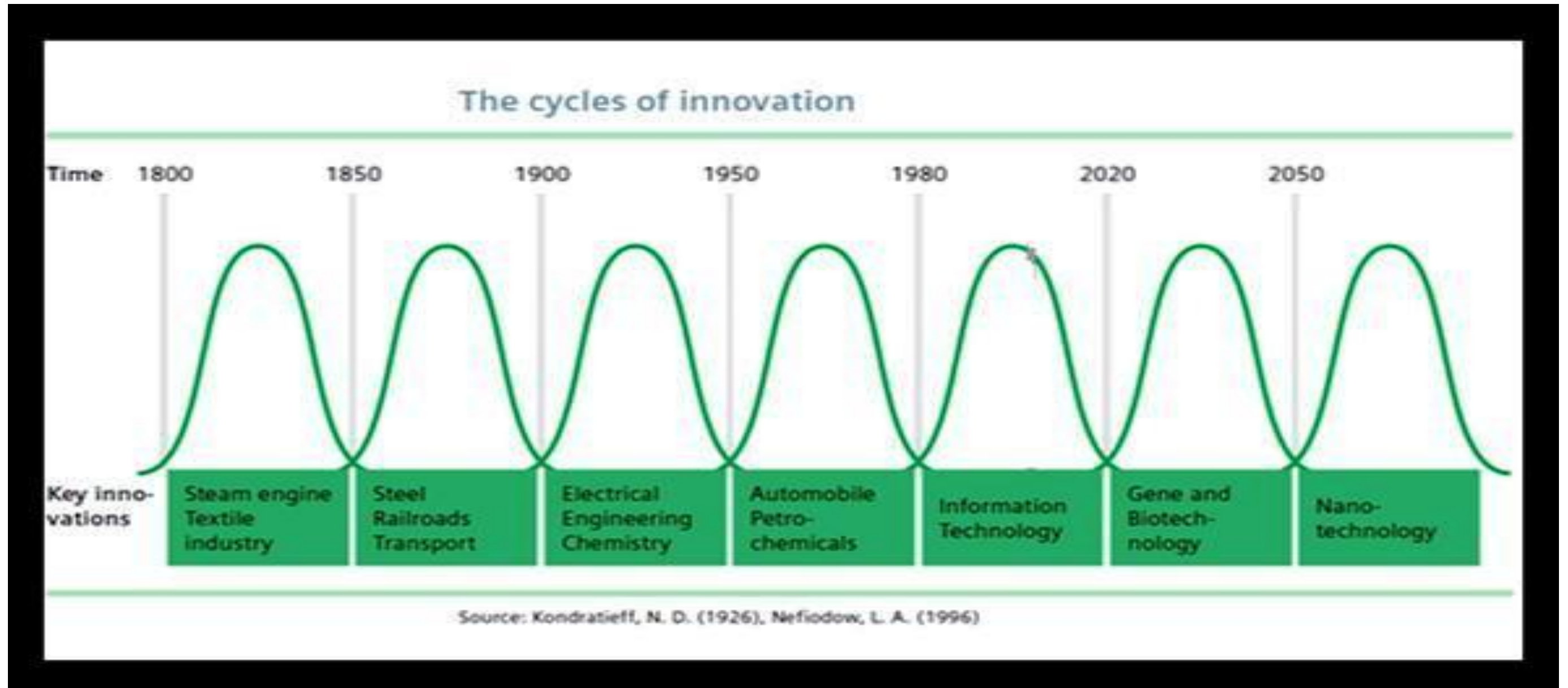
Past President(2014-15). Secretary(2012-13), Joint Secy (2010-2011)

Indian Association of Medical Informatics (IAMI)

Board Member of Society of International Society for Gerontechnology.

Nodal Office : SNOMED CT implementation project of MoHFW

# The Cycles of Innovation



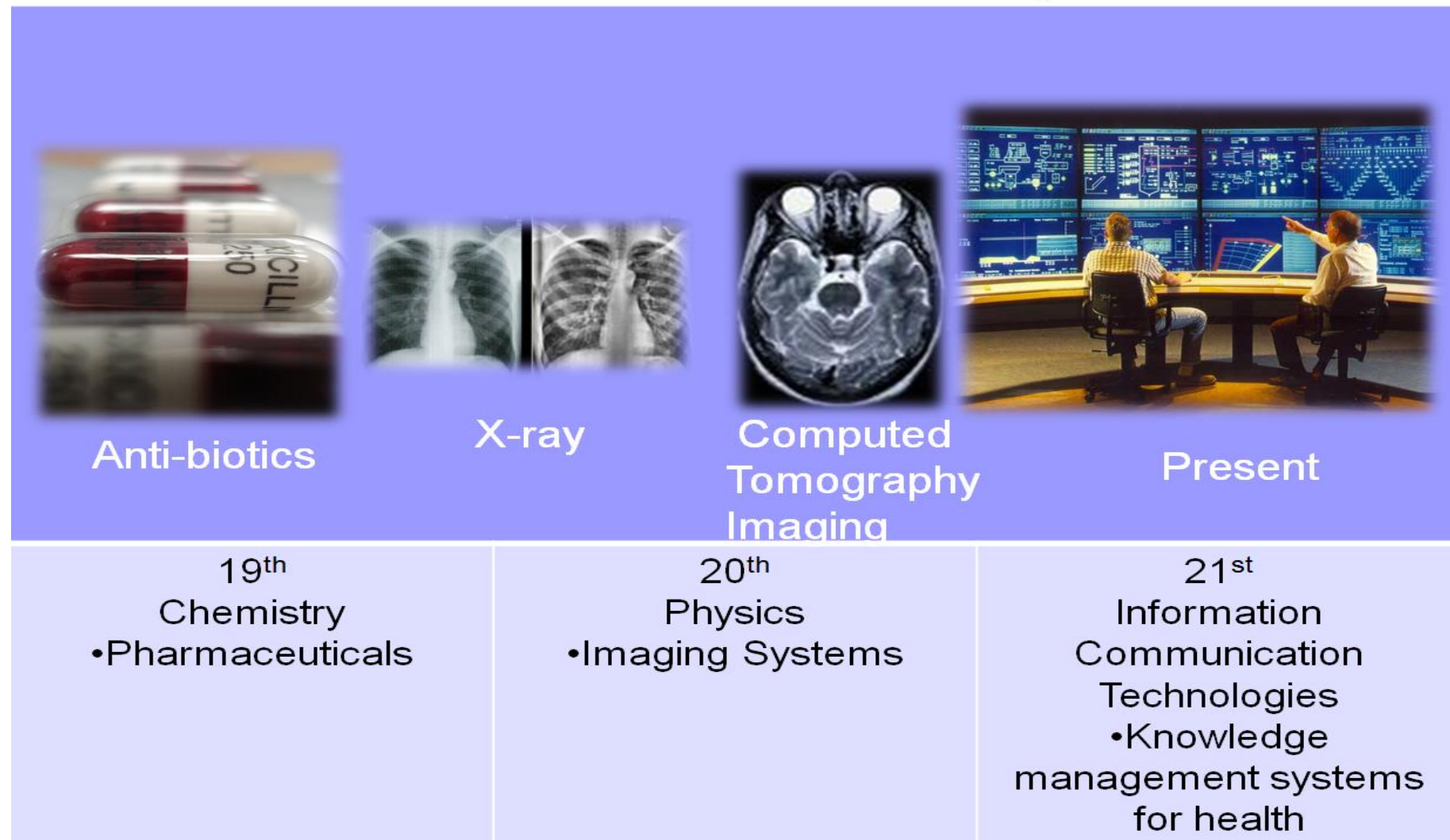
# Hype Cycle Of The Top 50 Emerging Digital Health Trends In 2022



Data visualization by The Medical Futurist

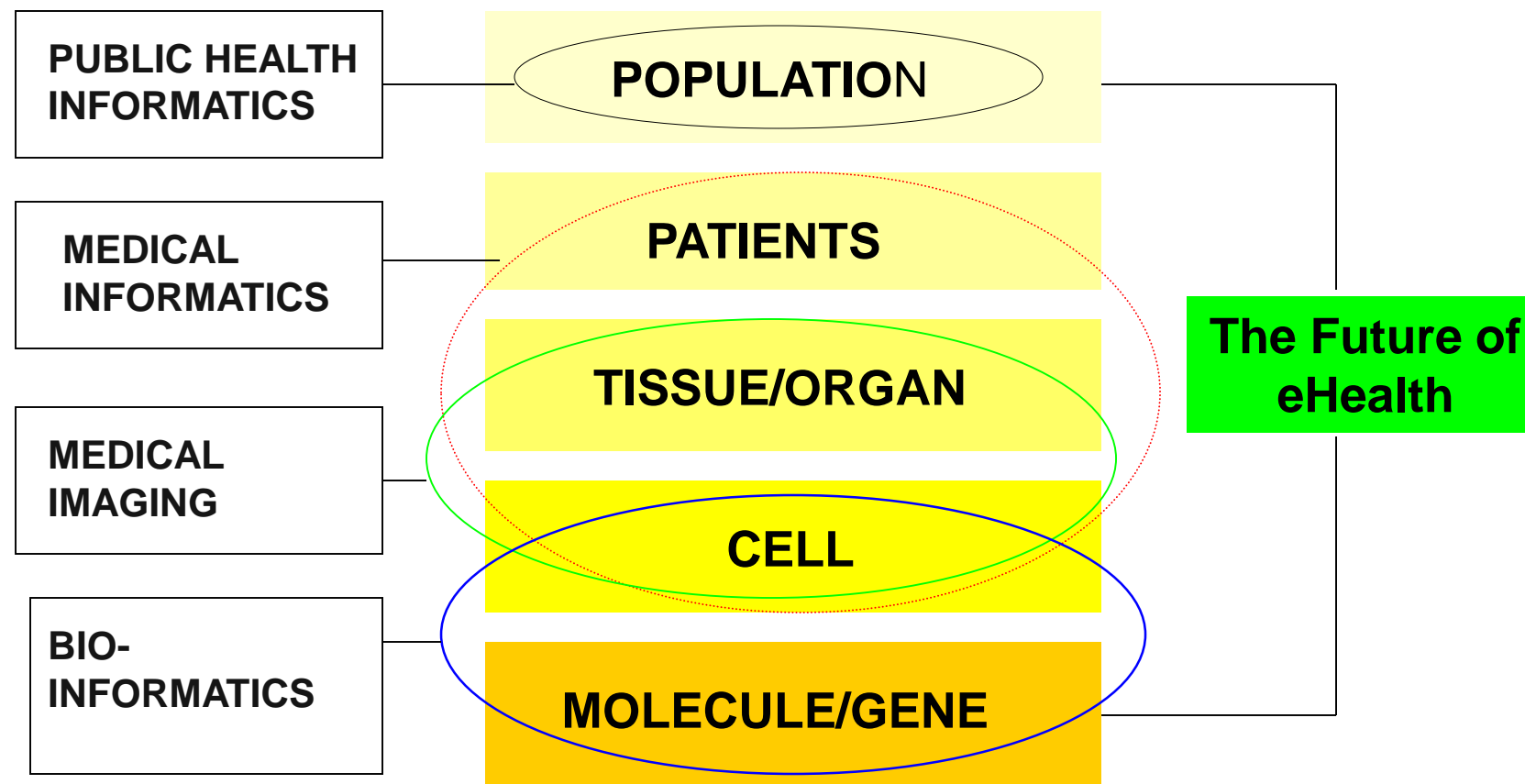
Data visualization by The Medical Futurist

# Innovation in Health Industry



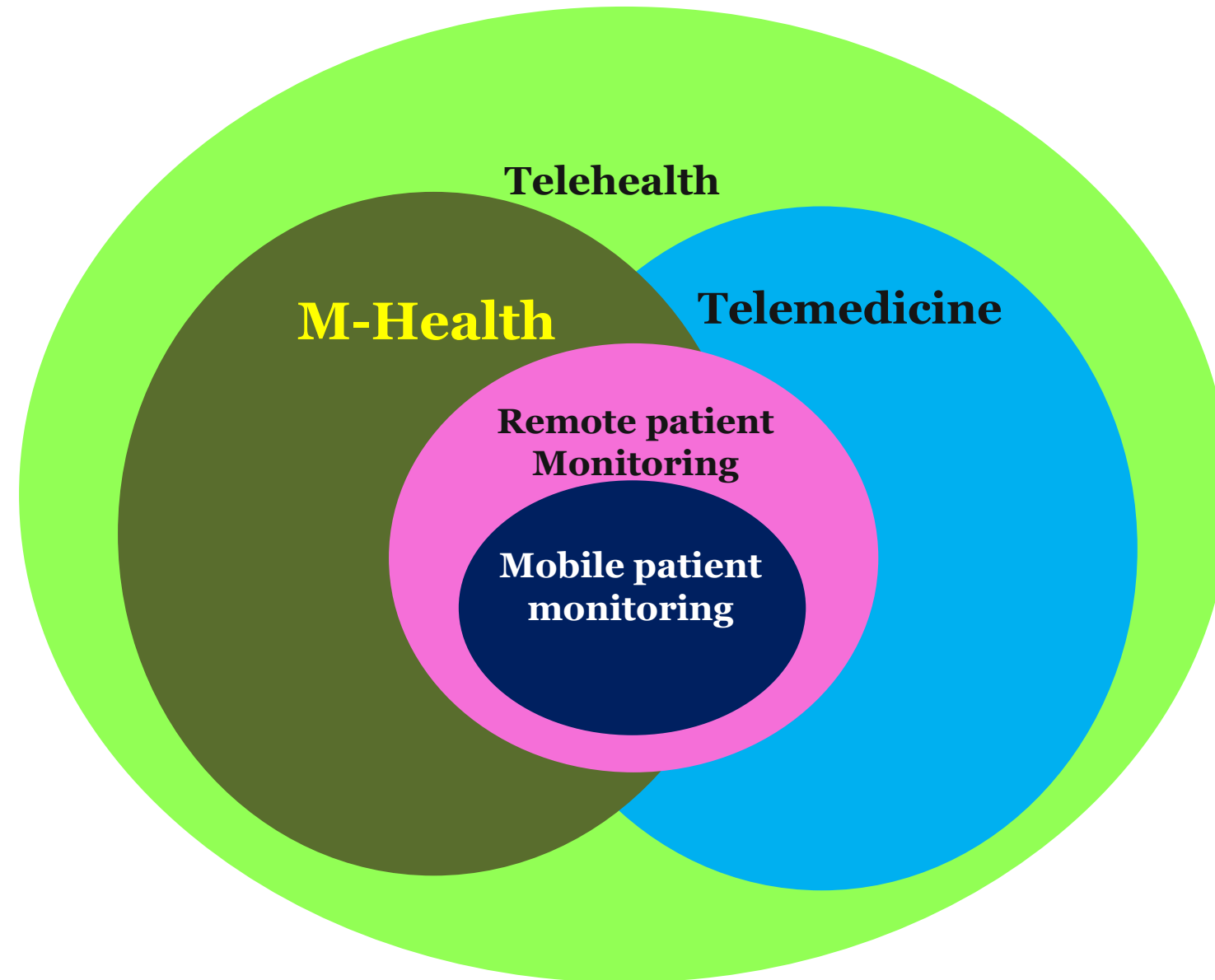
**eHealth is today's tool for substantial productivity gains, while providing tomorrow's instrument for restructured, citizen-centred health care systems and, at the same time, respecting the diversity of multi-cultural, multi-lingual health care traditions. There are many examples of successful e-Health developments including health information networks, electronic health records, telemedicine services, wearable and portable monitoring systems, and health portals**

# The Future of eHealth

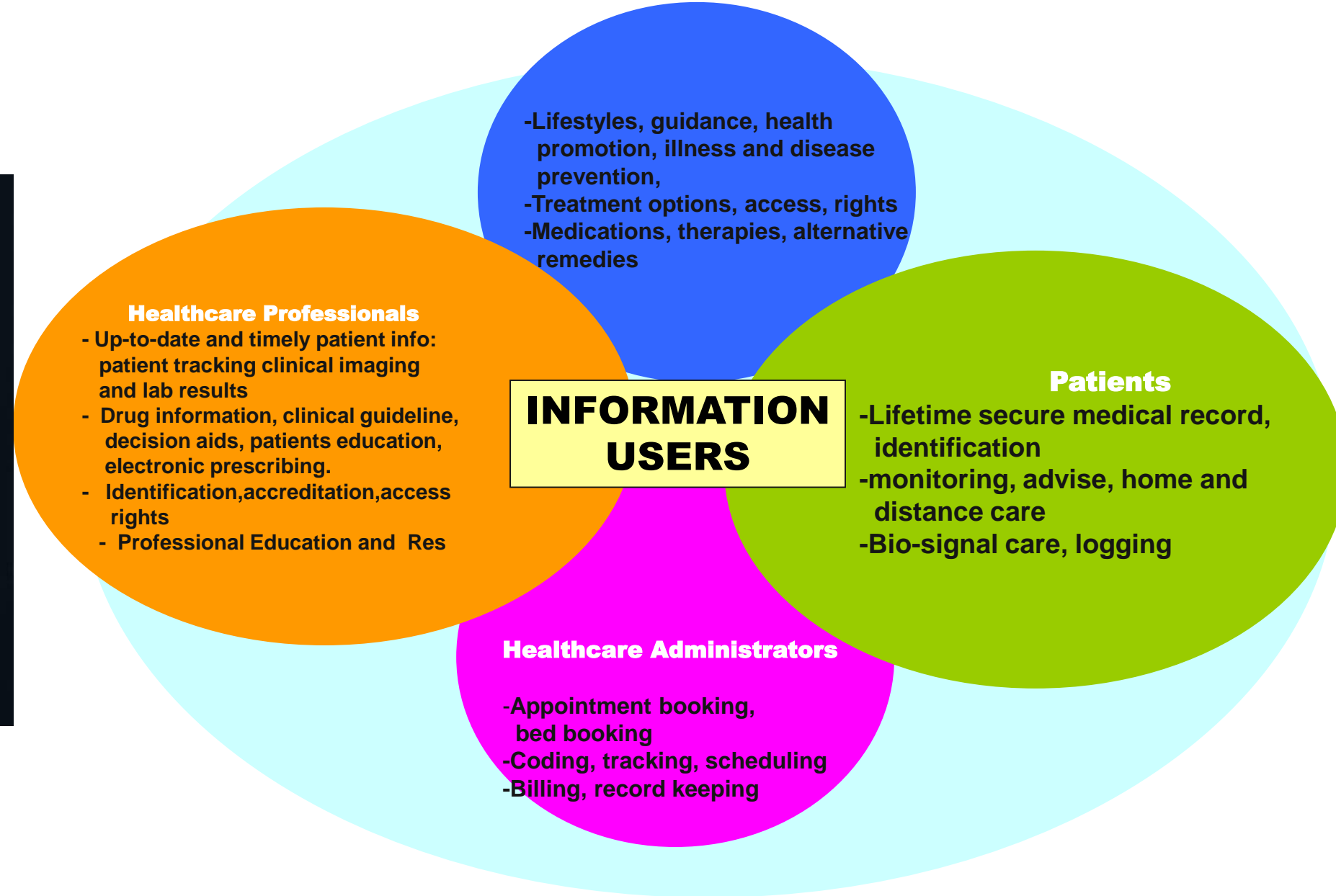


**Synthesis of knowledge at all levels**

# E-Health



# eHealth system available to different user





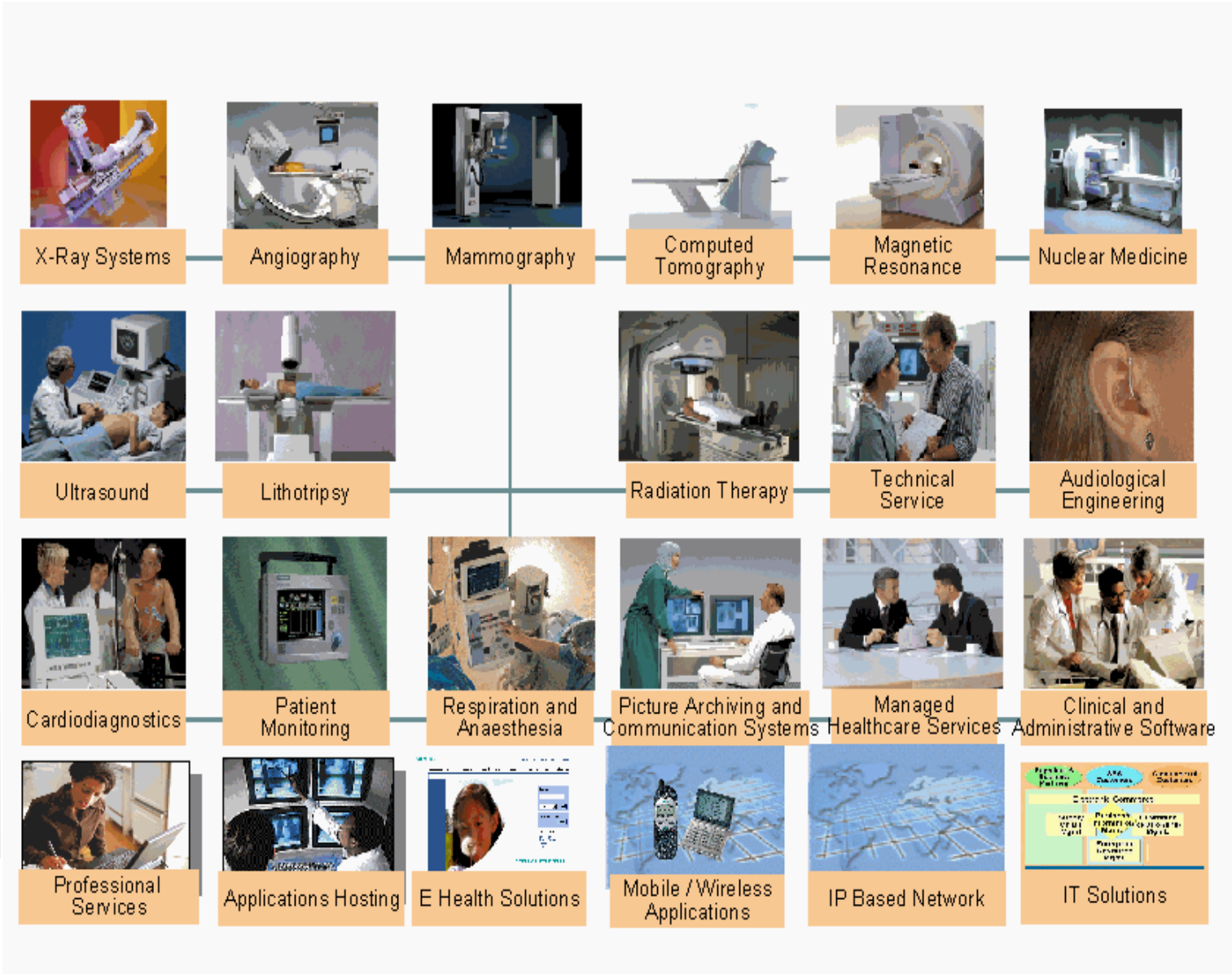
# Who's Generating Data in Health Care



6<sup>th</sup> April 2024  
The Surya Hotel

Bharat Digital Healthcare Summit 2024

# A full spectrum of Solutions & Services in HIS/CIS/RIS/NMIS/PIMS/PACS



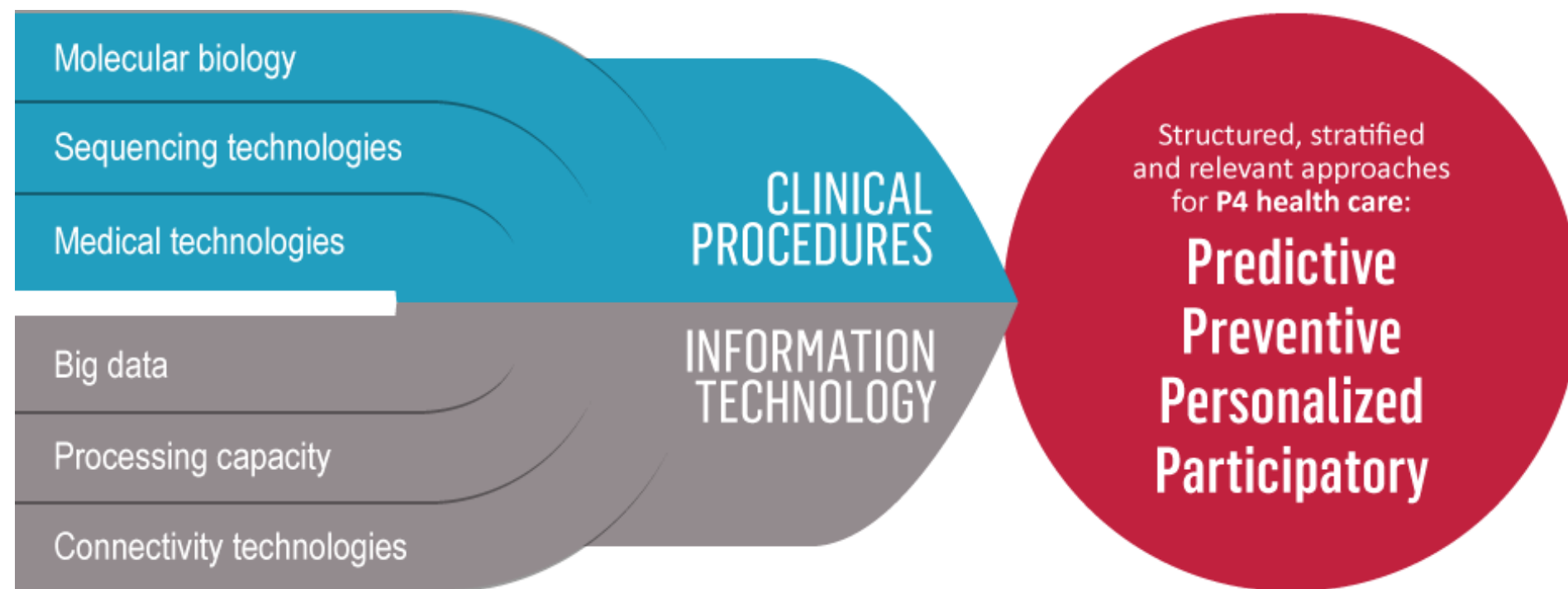
6<sup>th</sup> April 2024  
The Surya Hotel

Bharat Digital Healthcare Submmit 2024

# Translational Bioinformatics (TBI)



**Development of storage, analytic, and visualization methods.**



# Personalizing Health & Care (PHC)



1. Better understanding health, ageing & disease
2. Effective health promotion, prediction, screening and disease prevention
3. Early diagnosis (detection)
4. Innovative treatments & technologies
5. Advancing active & healthy ageing
6. Integrated, sustainable, citizen-centered care
7. Improving health information, data exploitation & knowledge translation

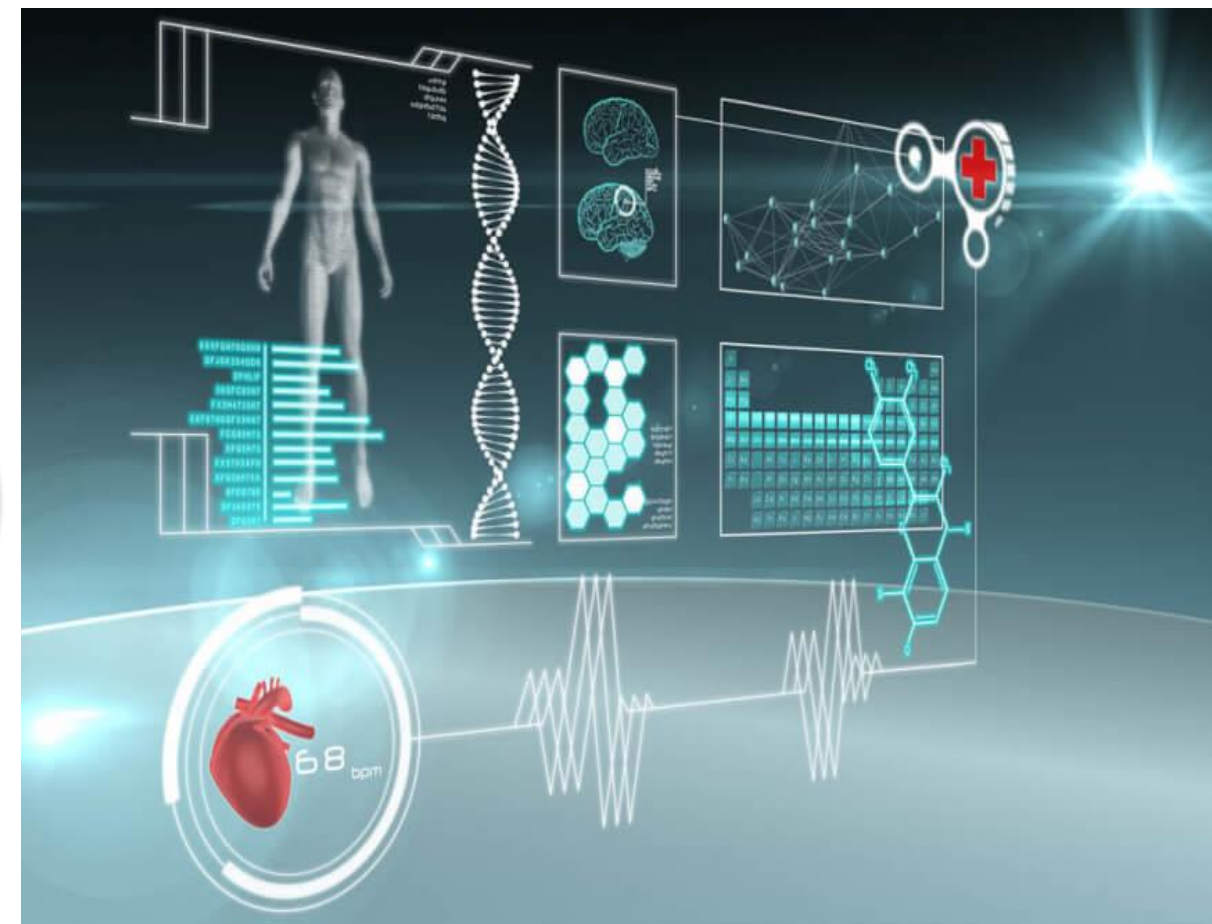
# Approach for 4P

Translational  
Research

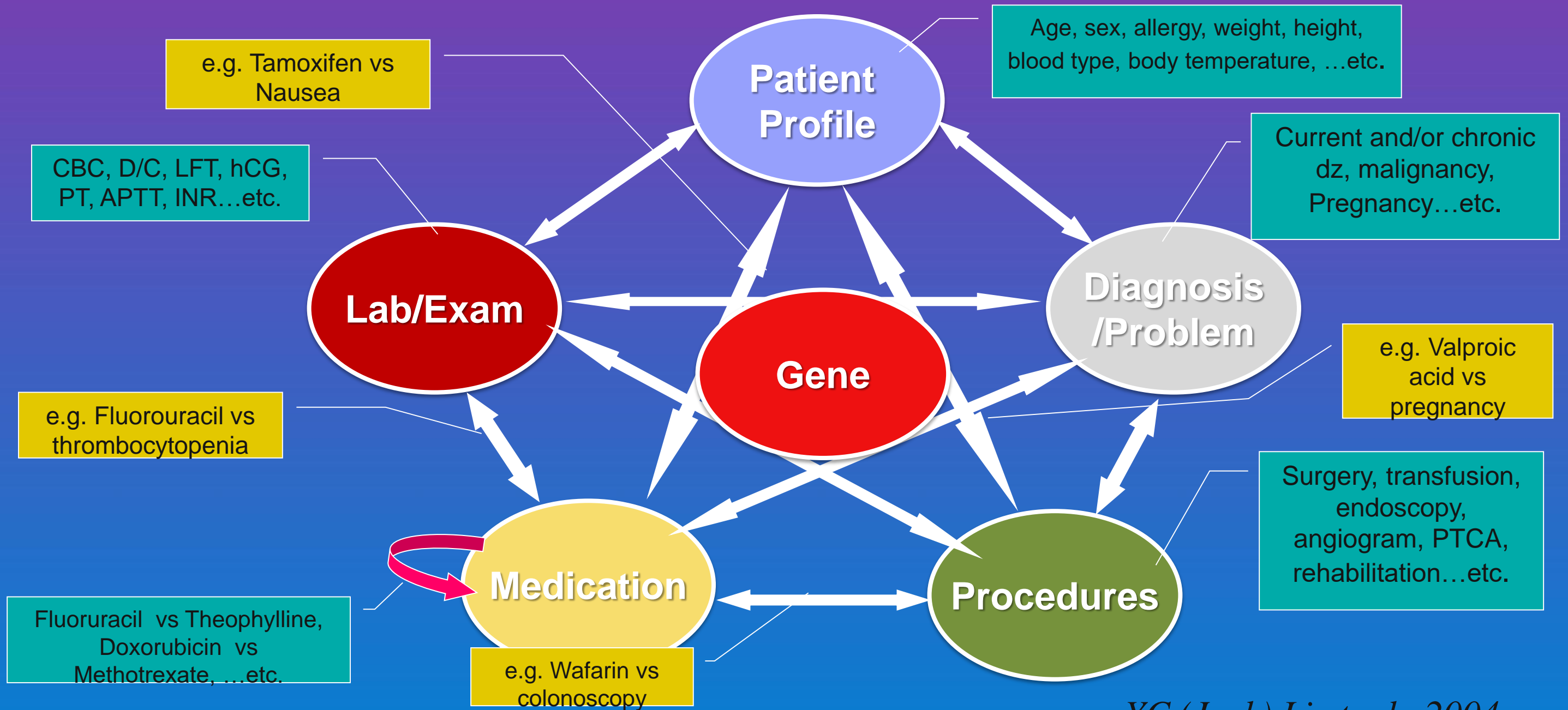
Public Health



Text mining, BioPatch, CAMA, DzMap, CKD, PWAS, Drug reposition  
Reverse translational research

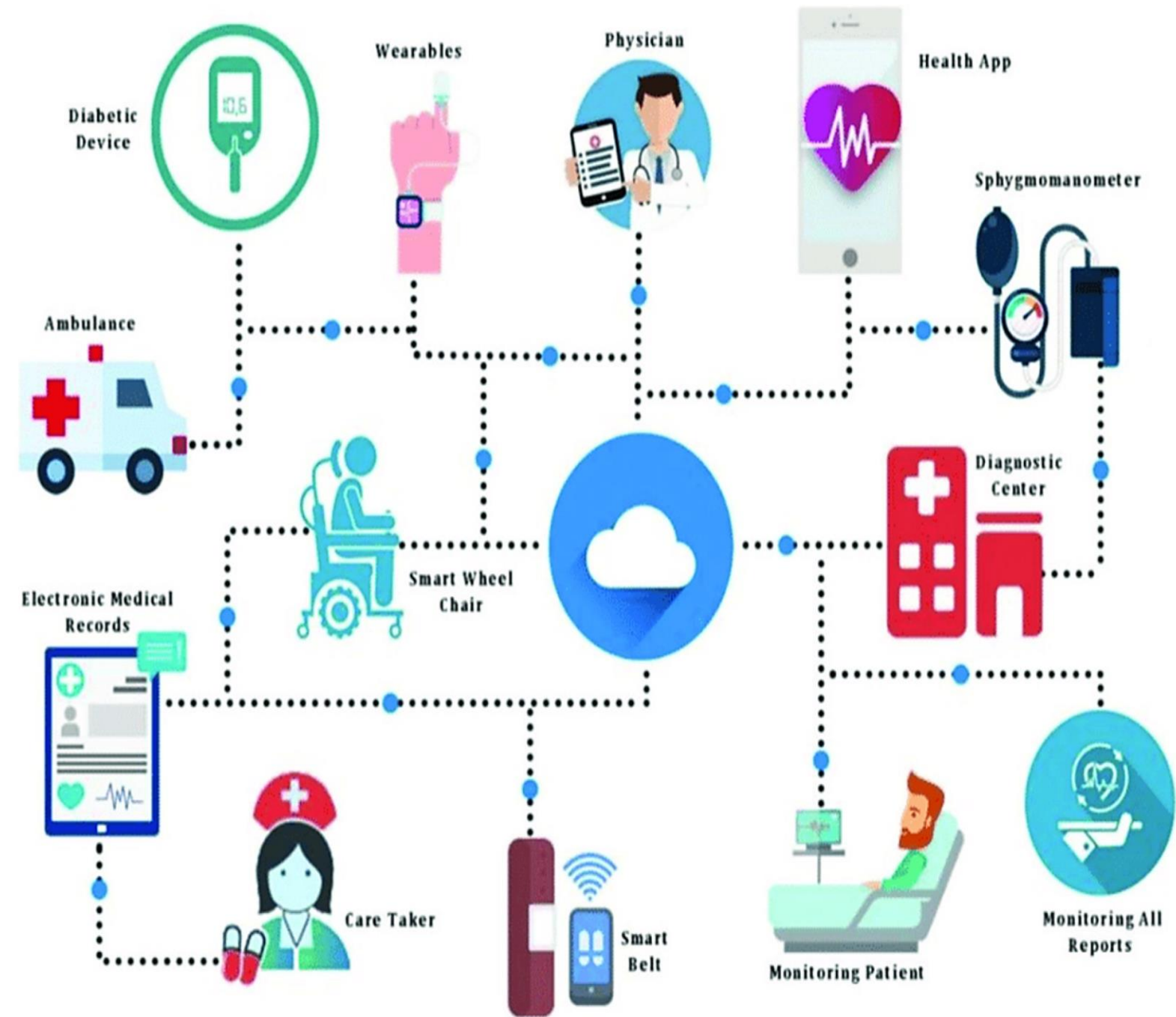


# Data Interaction Model for Translational Bioinformatics Research



# Introduction to IoMT

The Internet of Medical Things (IoMT) refers to the integration of medical devices and applications with healthcare IT systems. IoMT facilitates the monitoring of patients, enabling remote healthcare and improving medical outcomes.







## **IoMT activities and applications**

The **Internet of Medical Things (IoMT)** encompasses interconnected devices and applications used in medical and healthcare information technology. These devices connect patients, doctors, and medical equipment by transmitting information over a secure network. Much like general IoT devices, IoMT leverages automation, sensors, and machine-based intelligence to reduce reliance on human intervention during routine healthcare procedures and monitoring operations.

# Here are some common types of **IoMT devices**:

**1. Fitness Wearables:** These consumer-grade wearables include devices like Fitbit, other fitness monitors, activity trackers, and Apple Watches.

**2. Clinical Grade Wearables:** These wearables are more advanced and are used in clinical settings. They monitor vital signs, track patient health, and provide real-time data to healthcare professionals

**3. Remote Patient Monitoring Devices:** These devices allow healthcare providers to monitor patients remotely. They can track vital signs, medication adherence, and disease-specific parameters

**4. Smart Pills:** These ingestible sensors are embedded in medications

## INTERNET OF MEDICAL THINGS (IoMT)

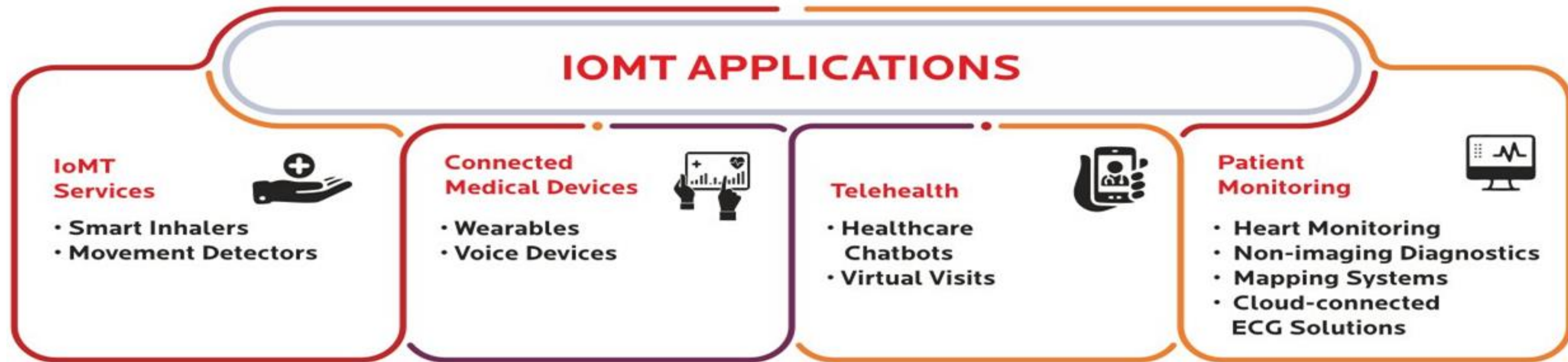
Types of IoMT Devices



**5. Point of Care Devices and Kiosks:** These are used at the point of care, such as in clinics or pharmacies

**6. Clinical Monitors:** These devices are used in hospitals and clinics for continuous monitoring of patients

**7. Hospital Devices:** Beyond wearables, IoMT includes various hospital equipment and diagnostic gear. These devices are essential for patient care, diagnostics, and treatment

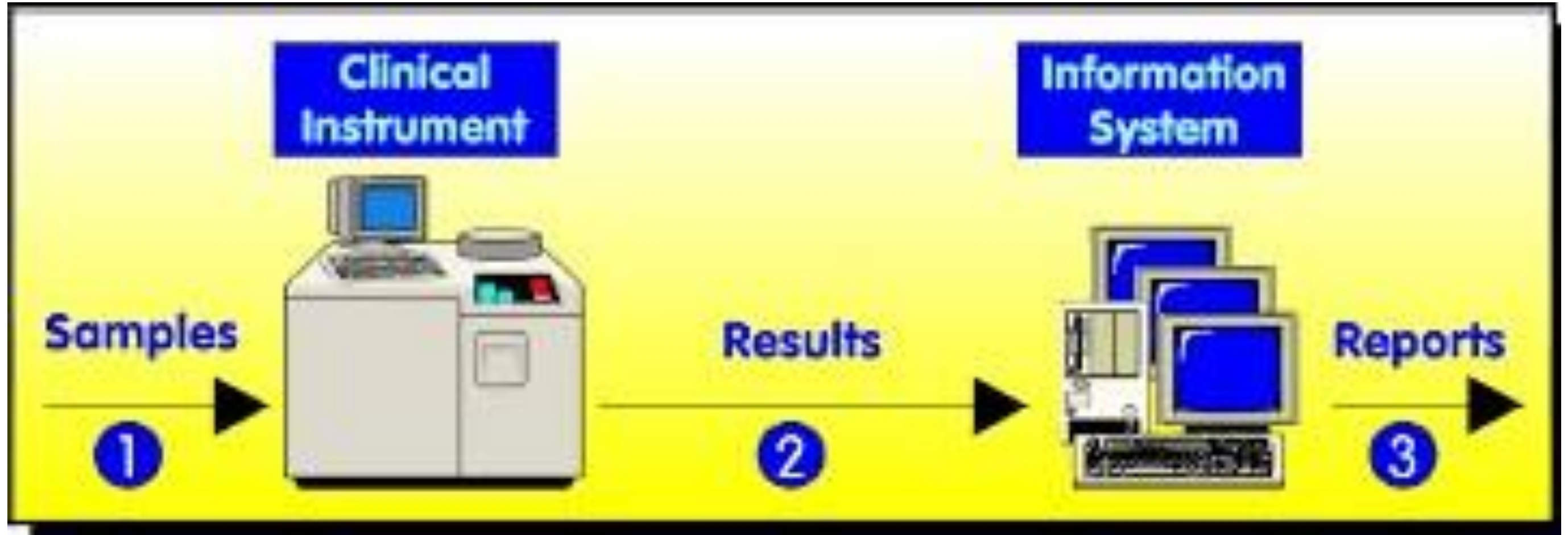


# Laboratory Equipment Interfacing

- Desktop-based laboratory interfacing
- Translate physician orders into test result reports.
- A tremendous volume of data processed by the laboratory
- Reduce the clerical labour
- Makes the system fast and accurate
- Uni and Bi-Directional
- HL-7 standard

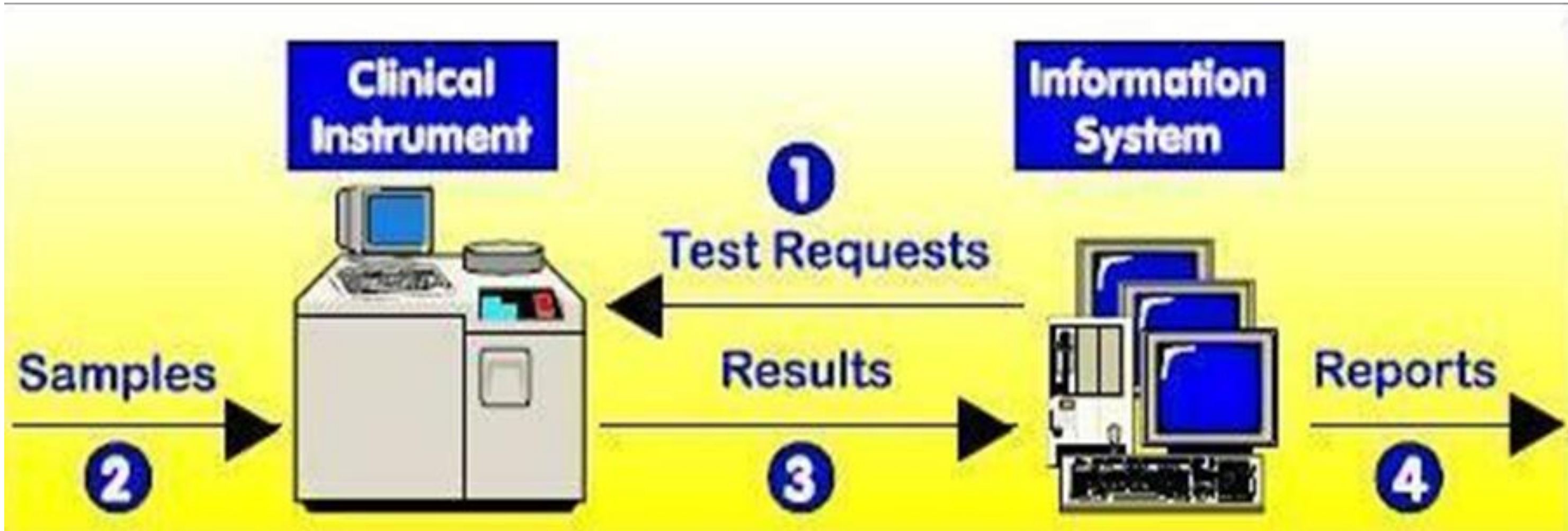


# Uni-Directional Interface



Clinical Laboratory Automation

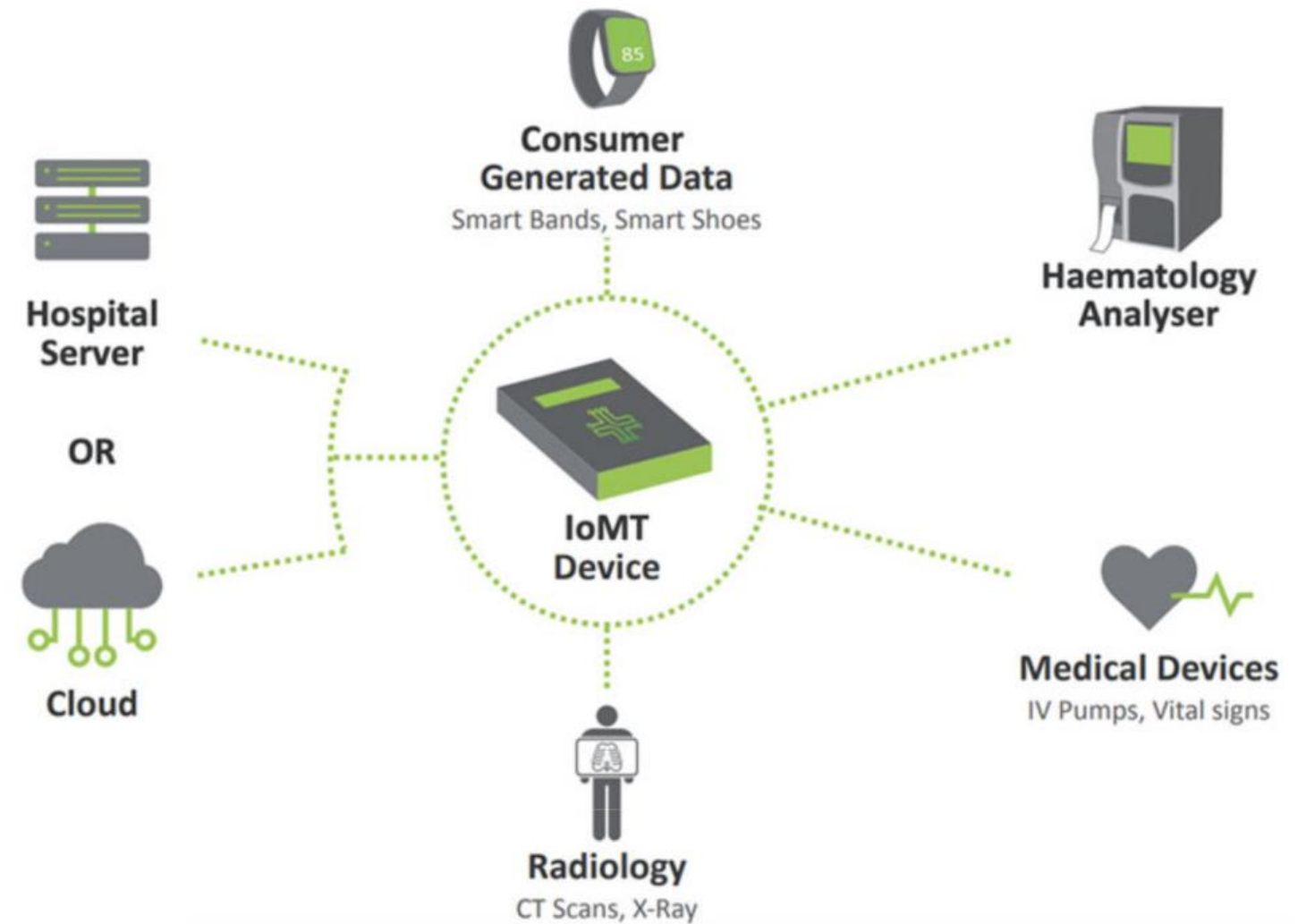
# Bi-directional Communication ( LIS - Analyzer - LIS )



Clinical Laboratory Automation

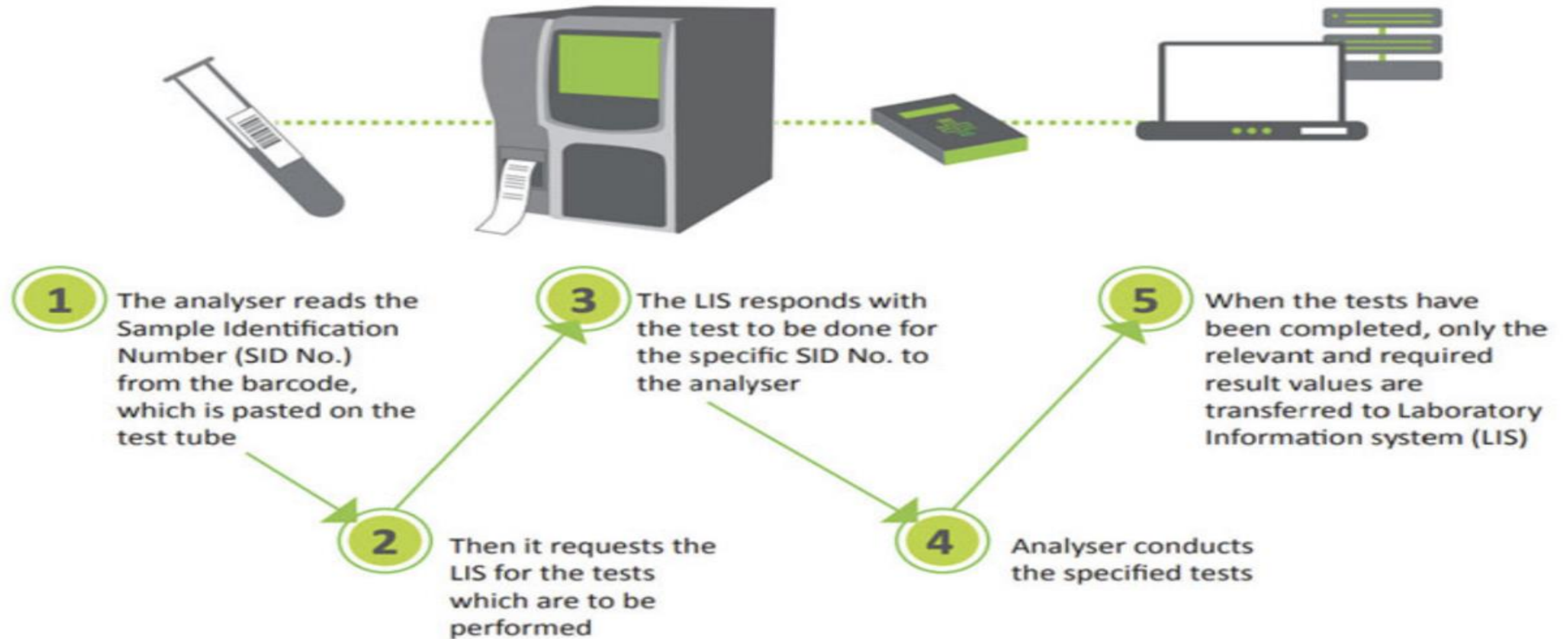
# IOMT Interfacing

**IOMT (Internet of Medical Things) interfacing Provides direct connectivity and automation by interfacing laboratory analyzers and Laboratory Information Systems (LIS) across locations.**



## Clinical Laboratory Automation

# IOMT Work Flow





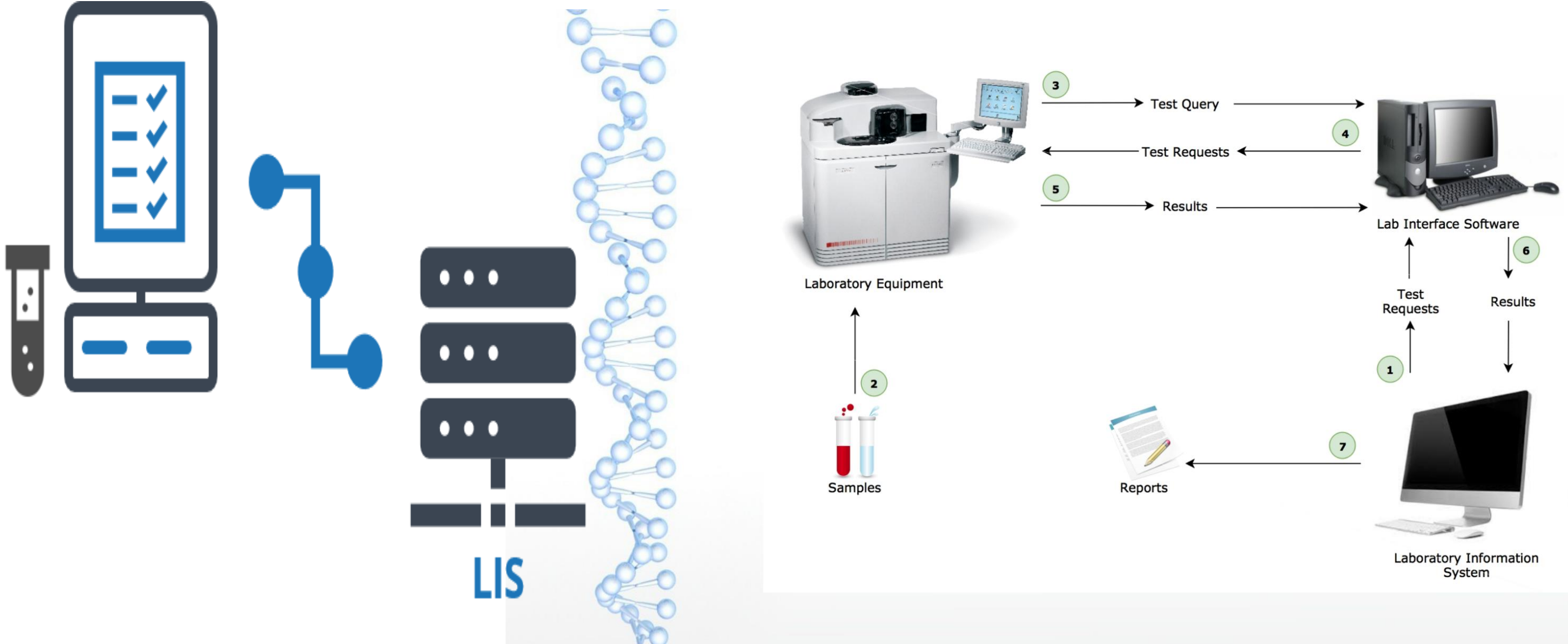
# HL7 Message from LIS to Analyzer interface software

After collection of lab specimen of patient, system generates one HL7 message from LIS to interfacing SW of analyzer

```
MSH|^~\&|EHOSPITAL|600^BU10|IP||20151213015234||OML^O21|EHM-131215201|P|2.4||AL|AL||485212
PID|||101119281||Miss ALINA ALINA||2002-07-01|Female||^A^A^A^AE||0566619400||E|M
ORC|NW|201500000000381283||11||37|||148||Main Hospital Ward|R
OBR|EHM-131215201||64_4_PLATELET COUNT_150.00-
400.00_10\S\3/μL_1650853_2015||20151213120453|||A|||Blood|5000000167^Dr. S C SHARMA^^
OBR|EHM-131215201||64_2_HCT_0.00-0.00_%_1650853_2015||20151213120453|||A|||Blood|5000000167^Dr. S C
SHARMA^^
OBR|EHM-131215201||64_24_HB_12.00-
15.00_g/dL_1650853_2015||20151213120453|||A|||Blood|5000000167^Dr. S C SHARMA^^
OBR|EHM-131215201||64_6_T.L.C_4.00-
11.00_10\S\3/μL_1650853_2015||20151213120453|||A|||Blood|5000000167^Dr. S C SHARMA^^
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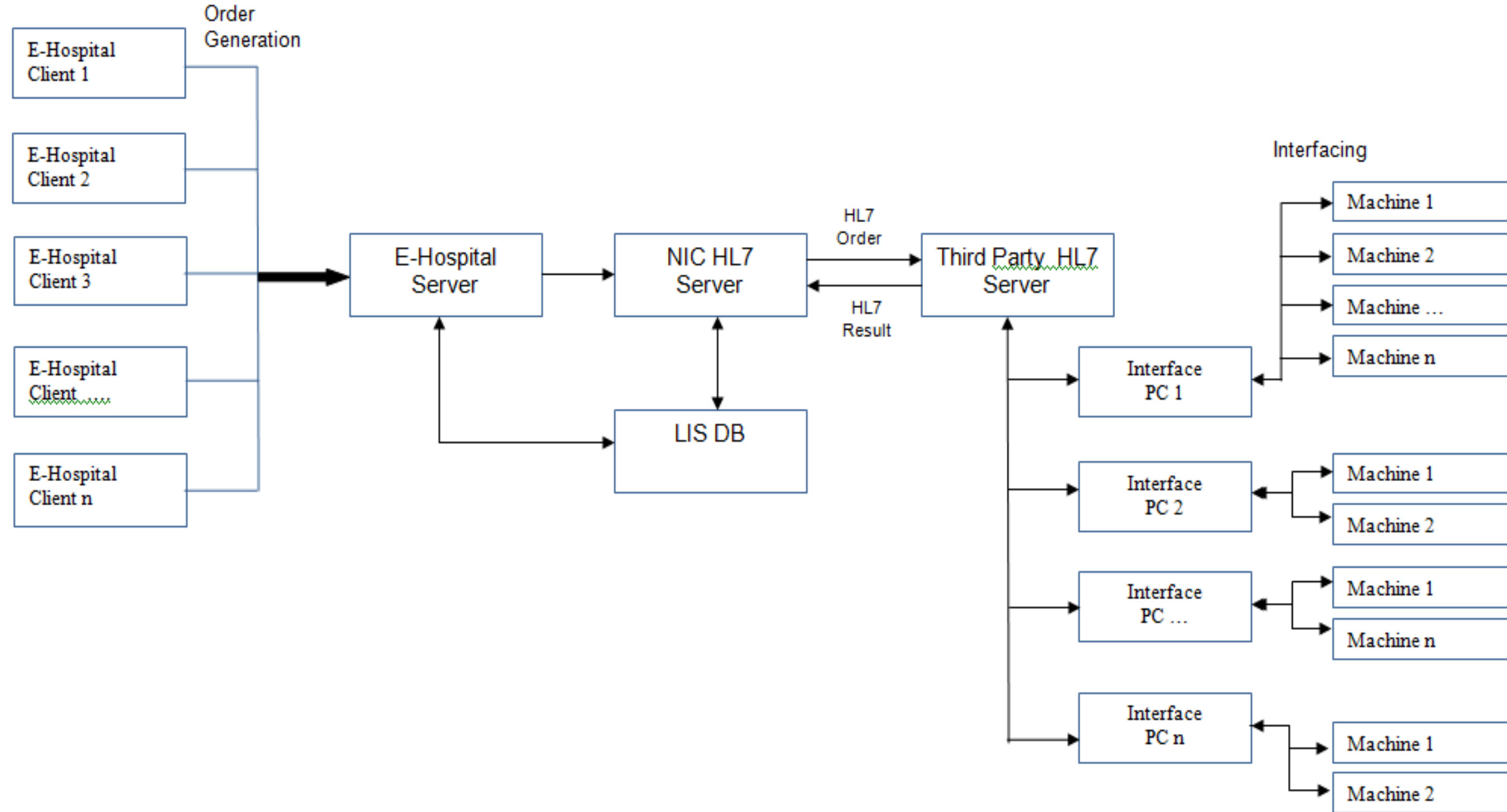
Clinical Laboratory Automation

# Bi-Directional Interface with Analyzer



## Clinical Laboratory Automation

# Flow of Integration with LIS and Analyzer



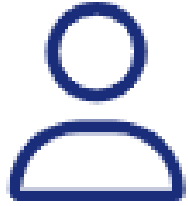
## Benefits Of IOMT Interfacing

- Inexpensive
- Adaptable and easy-to-use
- Power-efficient - Compliant
- Beyond just lab Analyzers
- Platform / Tech-Agnostic



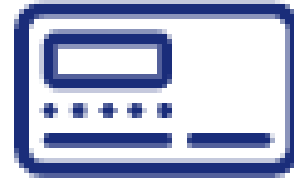
## Clinical Laboratory Automation

# IoMT Integration with 5G Technology



## Healthcare Connectivity

IoMT integrated with 5G enables seamless connectivity for healthcare devices and systems



## High-Speed Data Transfer

5G technology facilitates rapid data transfer, enhancing IoMT functionalities and efficiency.



## Real-time Communication

Real-time communication between medical professionals and IoT devices is made possible with 5G integration.

**Pl. watch the video**

**THANK YOU FOR PAYING YOUR ATTENTION**



**Any Questions?**

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