

Introduction to Healthcare Informatics

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MHA621
Healthcare Informatics

Lecture 1



Intended Objectives

1. Provide an overview of the current state of healthcare delivery.
2. Discuss the role that technology plays in healthcare.
3. Define informatics.
4. Discuss the significance of informatics for healthcare.
5. Describe the process required to create an informatics culture.

What is Informatics?

- **Definition by the (American Medical Informatics Association (AMIA):** An interdisciplinary field drawing from computer science, decision science, and more.
- **Focus Areas:** Data mining, decision support, natural language processing, and genomics.

Overview of Healthcare Delivery Today

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➤ Challenges in Healthcare Delivery:

- Increased demand for quality, safety, and transparency.
- Shift in consumer-provider relationships.
- Need for adopting new care models and technologies.

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Healthcare Informatics

- **Definition:** The interdisciplinary field combining computer, information, and healthcare sciences.
- **Purpose:** To enhance healthcare delivery and outcomes using data, technology, and innovation.
- **Scope:** Encompasses clinical, public health, consumer health, and other informatics subfields.

Healthcare Informatics

➤ Examples and Applications:

- **Example:** Use of predictive analytics to identify high-risk patients for readmission.
- **Application:** Leveraging health informatics to design personalized treatment plans.

Healthcare Informatics

➤ Challenges in Healthcare Delivery:

- Increased demand for quality, safety, and transparency.
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Healthcare Informatics

- **Role of Technology:** A tool to support efficiency, communication, and care quality.
- **Challenge Example:** Fragmented care leading to poor communication between providers.
- **Technology Role:** Telehealth for remote consultations in underserved areas.

Healthcare Informatics

➤ Health Informatics Subfields:

- Clinical Informatics
- Public Health Informatics
- Consumer Health Informatics



Healthcare Informatics

1. Clinical Informatics: Focused on improving patient care through data and technology.

- **Example:** Implementation of Computerized Physician Order Entry (**CPOE**) systems.

Healthcare Informatics

2. Public Health Informatics: Supports population health management.

- **Example:** Syndromic surveillance systems to track disease trends.

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3. Consumer Health Informatics: Empowers

patients to manage their health.

- **Example:** Mobile apps for managing diabetes.



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Importance of Informatics in Healthcare

Importance of Informatics in Healthcare

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1. Facilitates a Learning Health System (LHS).

- **Example:** Integrating Electronic Health Record (EHR) data for continuous quality improvement.

Importance of Informatics in Healthcare

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2. Supports evidence-based practices and quality improvement.

- **Example:** Using analytics to measure adherence to clinical guidelines.

Importance of Informatics in Healthcare

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3. Enhances data-driven decision-making at all levels of care.

- **Example:** using a data-driven approach to support decisions such as reallocating resources during peak times, optimizing workflows, and reducing patient wait times.

- **Definition:** A broader term encompassing:
 - Plan.
 - Strategy.
 - Tool sets for data-driven decisions.
- **Applications:** Improves quality, efficiency, and strategic planning.

Healthcare Informatics & Business Intelligence

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- **Healthcare Informatics:** Managing and utilizing healthcare data to improve patient care and processes.
- **Business Intelligence (BI):** Analyzing data to derive actionable insights for operational and strategic decision-making.
- **Shared goal:** Leveraging data to improve outcomes and efficiency.

Healthcare Informatics & Business Intelligence

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- **Informatics collects data** (e.g., EHRs, billing, clinical systems).
- **BI processes data using:**
 - Data warehousing
 - ETL (Extract, Transform, Load)
 - Analytics tools
- **Outcome:** Integrated insights for informed decision-making.

Healthcare Informatics & Business Intelligence

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➤ Applications:

▪ Clinical Settings:

- Informatics tracks patient data, diagnoses, and treatment plans.
- BI optimizes care delivery and resource utilization.

▪ Administrative Functions:

- Informatics monitors operations (staffing, compliance).
- BI identifies cost savings and forecasts future needs.

Healthcare Informatics & Business Intelligence

➤ Technologies Used:

- **Informatics:** EHRs, clinical decision support systems.
- **BI:** Dashboards, predictive analytics, machine learning.

➤ Decision Support:

- **Informatics:** ensures accurate data.
- **BI:** translates data into insights for strategic and operational improvements.

- Healthcare Informatics and BI work together to maximize data utility.
- Informatics provides the foundation; BI generates actionable insights.
- Combined efforts enhance patient outcomes and organizational efficiency.



Emerging Science: Data Science

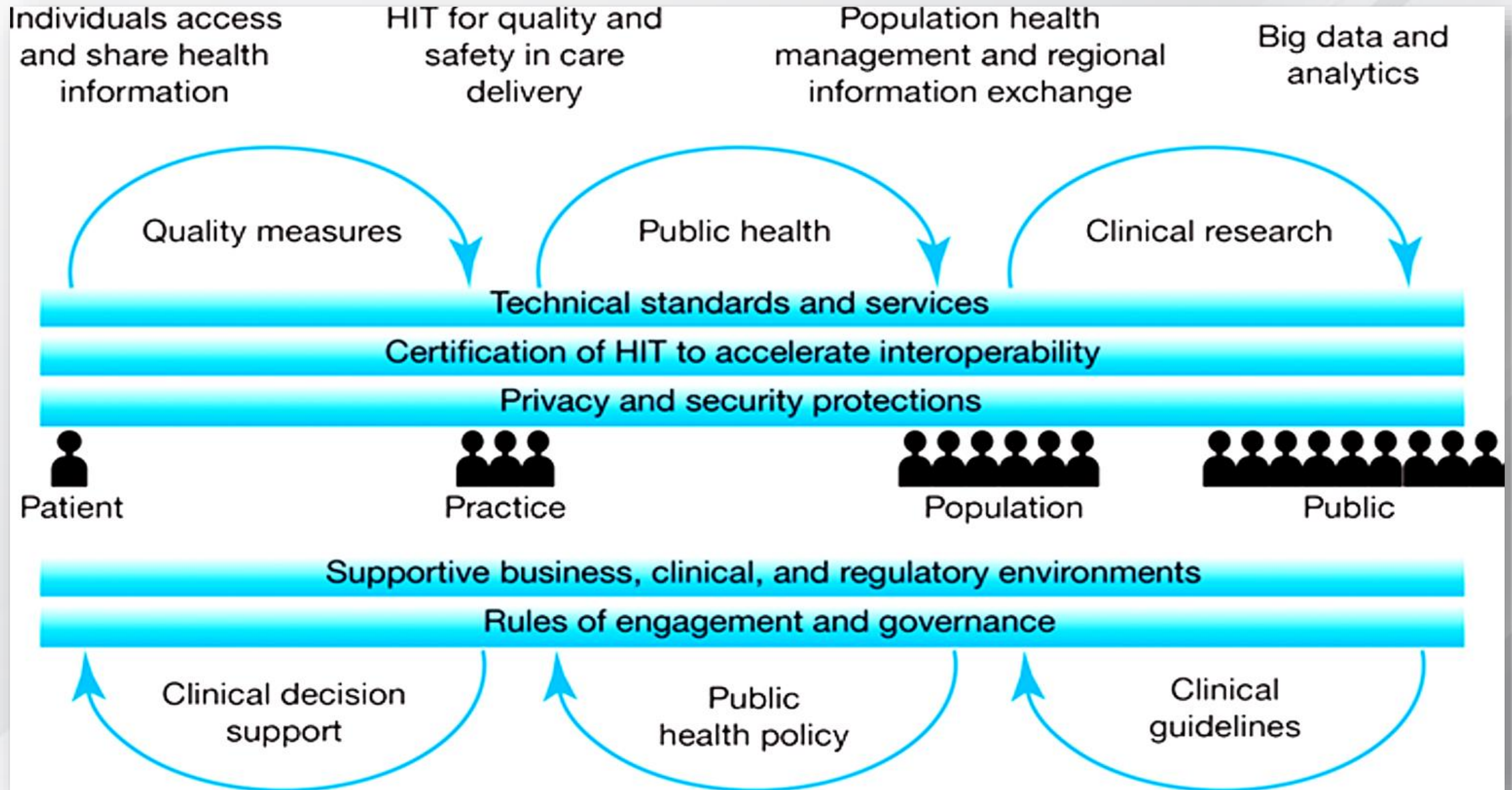
➤ Focus Areas:

- Data format and cleaning.
- Mining and management.
- Advanced analysis techniques.

➤ **Key Impact:** Facilitates the implementation of learning health systems.

Healthcare Information Technology (HIT)

- **Definition:** Tools enabling data collection, organization, and analysis in healthcare.
- **Examples:** Electronic Health Records (EHRs), telehealth, and wearable devices.
- **Benefits:** Improved safety, reduced costs, enhanced communication.



Challenges in Implementing HIT

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1. Slow Adoption: Due to the complexity of healthcare systems.

➤ **Example:** Resistance to EHR use among older clinicians.

2. Data Silos: Inconsistent formats and limited interoperability.

➤ **Example:** Different hospitals using incompatible EHR systems.

3. Workforce Preparation: Need for training in informatics competencies.

- **Example:** transitioning to an EHR system requires training healthcare staff to effectively navigate the platform and utilize its features, ensuring accurate data entry and adoption.

Building a Culture of Informatics

➤ Steps to Create an Informatics Culture:

- Assessing the current state.
- Developing policies and infrastructure.
- Educating healthcare professionals.

➤ **Foundational Skills Required:** Computer, information, and health literacy.

➤ Assessing the Current State:

Evaluate existing systems, data workflows, and staff readiness to identify gaps and opportunities for integrating informatics into practice.



Building a Culture of Informatics

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➤ **Developing Policies and Infrastructure:**

Establish clear guidelines and protocols and invest in robust IT systems to support data management, interoperability, and secure information sharing.



Building a Culture of Informatics

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➤ Educating Healthcare Professionals:

Provide targeted training and continuous education to ensure all staff members develop the necessary informatics skills and competencies.



Ethical and Legal Considerations

- **Guiding Principles in Health Informatics:**
- **Autonomy:** Respecting patient choice.
 - **Non-maleficence:** Avoiding harm.
 - **Beneficence:** Acting in patients' best interests.
 - **Justice:** Ensuring fairness in care delivery.

Ethical and Legal Considerations

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- **Ethical Issues:** Data privacy, security, and appropriate usage.
- **Privacy Example:** Health Insurance Portability and Accountability Act (**HIPAA**) regulations protecting patient data in the U.S.
- **Ethical Dilemma Example:** Use of AI in decision-making without transparency.



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Future Directions in Healthcare Informatics

Future Directions in Healthcare Informatics

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- Increased focus on interoperability of systems.
- Expansion of real-time data analytics and big data use.
- Development of **patient-centered** technologies.
- Integration of **AI and machine learning** in healthcare processes.

Future Directions in Healthcare Informatics

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➤ Examples and Applications:

- **Interoperability:** Fast Healthcare Interoperability Resources (FHIR) standards enable seamless data exchange.
- **AI Application:** Using machine learning to predict sepsis in ICU patients.

Wrap Up

1. **Healthcare Delivery Adaptation:** Healthcare systems must meet demands for better quality, safety, transparency, and workforce readiness, driving real-time innovation.
2. **Health Information Technology (HIT):** HIT improves care by enhancing safety, communication, decision-making, and cost-effectiveness.
3. **Healthcare Informatics:** Informatics equips healthcare professionals with the skills to use HIT for data management and improving patient care.
4. **Standardization and Big Data:** Standardized data formats and big data analytics support continuous healthcare improvement through consistent, real-time evidence.

Wrap Up

5. **Consumer-Provider Collaboration and Safety:** Consumer-driven care requires quality data for informed decisions, with HIT enhancing patient safety via tools like checklists.
6. **Informatics Culture:** Building an informatics culture involves creating strategies, infrastructure, and policies to turn data into actionable insights.
7. **Ethical Data Use:** Ethical use of data is essential, requiring all healthcare professionals to be trained in informatics for responsible data management.
8. **Technology in Healthcare Ecosystems:** Technology integrates devices, systems, and data to support patient care, research, and continuous quality improvement.



Thank You