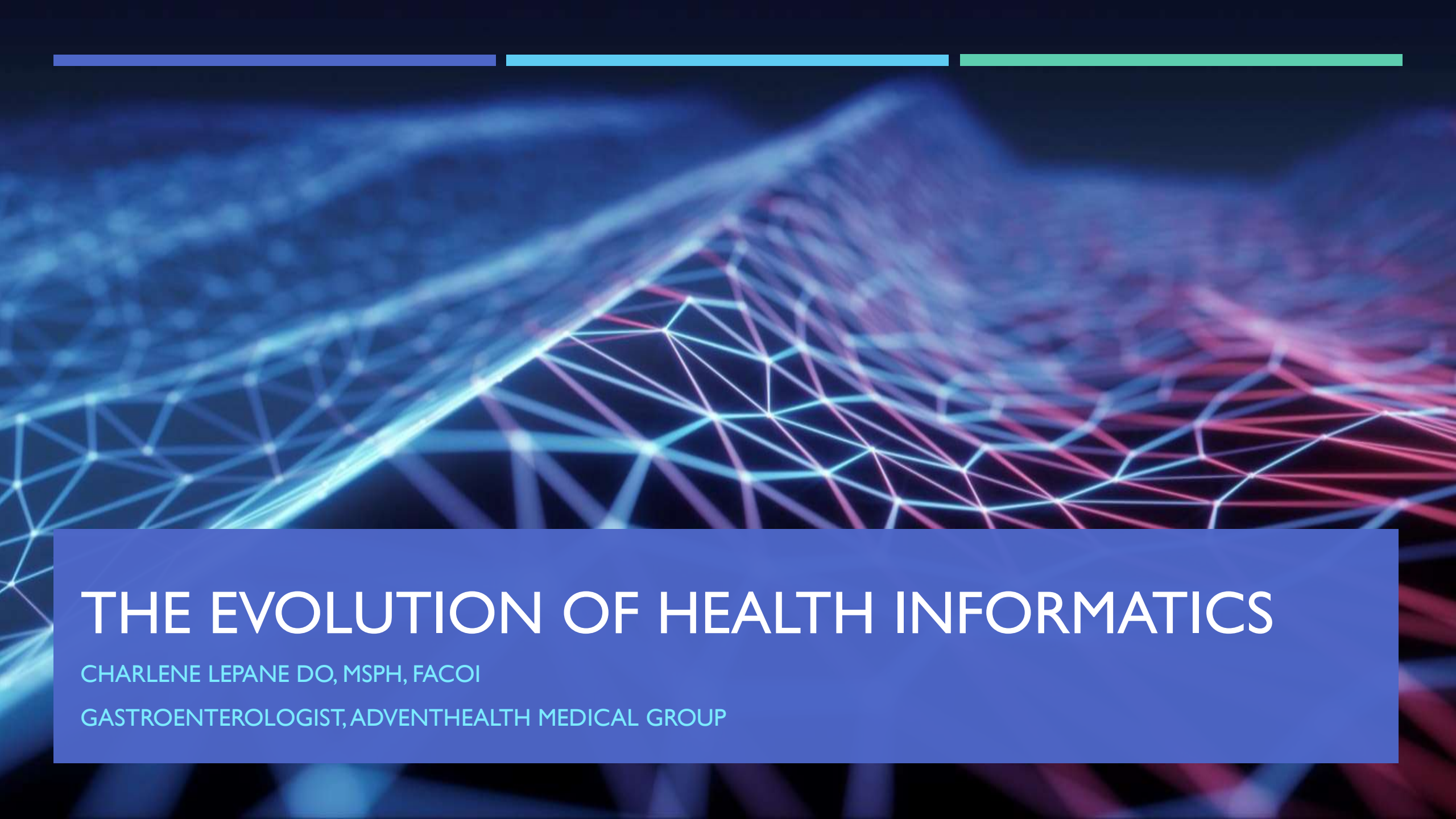


THE EVOLUTION OF HEALTH INFORMATICS

CHARLENE LEPANE DO, MSPH, FACOI

GASTROENTEROLOGIST, ADVENTHEALTH MEDICAL GROUP

DISCLOSURES

- Charlene LePane, D.O., MSPH, FACOI, FASGE
- I have no current or past relationships with commercial entities
- I have no actual or potential conflict of interest in relation to this program/presentation

A NEW DISCIPLINE IS BORN

THE BEGINNINGS OF INFORMATICS

THE 1950s

- The terms medical informatics, health informatics, electronic data processing, and automated data processing emerged
- Papers which referenced digital computing in medicine were first published
- Those papers addressed efforts to model biomedical processes using computers
  - Range of motion in orthopedics
  - Simulation of outcomes using computing technology
- American Hospital Association (AHA) and the Hospital Management Systems Society (HMSS) began to conduct annual conferences to acquaint hospital administrators with changes in Hospital Information Systems

THE 1960s AND 1970s

- Initial period of growth in the discipline
- Organizations like HIMSS, the Society for Advanced Medical Systems, and the American Medical Association began to promote the use of technology and information systems in medicine
- Terminology expanded from Medical Informatics to Health Care Informatics to reflect the expansion into all clinical areas
- In the 60s and 70s, health care informatics began to focus on acquisition, analysis, and dissemination of information as well as the use of novel technologies to improve the processing of information

THE 1980s AND 1990s

- Publications, organizations, conferences all began to contribute to the expansion of the discipline
- Worldwide, more and more organizations dedicated to the advancement of the discipline were created
- The focus of HCI began to sharpen to managing discretely collected information in medicine, processing it, and using it for outcome and treatment improvement
- Electronic medical records systems began to be developed and represented the most comprehensive application of informatics to date

2000s TO PRESENT

- The American Recovery and Reinvestment Act of 2009 (ARRA) set in motion the regulatory requirements called Meaningful Use
  - This program incentivized health systems and providers to use Electronic Medical Records for the capture, use, and exchange of clinical data for patient care
- Concepts like quality of care, health information exchange, and clinical decision support made their way into the health care informatics lexicon
- With more sophisticated data collection, exchange, and storage capabilities providers who used information systems in the provision of care improved outcomes and increased access to care

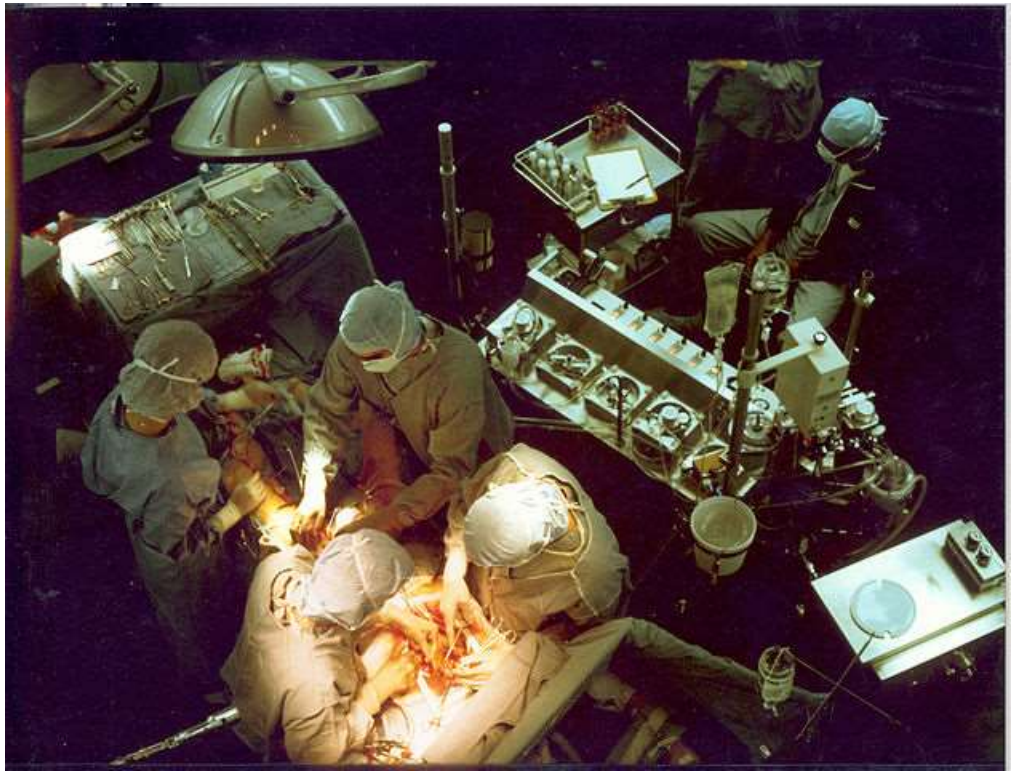
BRIEF OVERVIEW OF HEALTH CARE INFORMATICS

CURRENT STATE APPLICATIONS OF THE DISCIPLINE

WHAT IS HEALTH CARE INFORMATICS?

- Healthcare Information and Management Systems Society (HIMSS) defines health care informatics as:
  - **"The integration of healthcare sciences, computer science, information science, and cognitive science to assist in the management of healthcare information."**
- What does this really mean? HCI is the combination of:
  - The technology that we already use in our clinical practices
  - The technology that creates the machines and software to process data
    - Workstations, Servers, Databases, Applications, Interfaces
  - The technology that optimizes the movement of data between and among our practice spaces
    - Internet Infrastructure, Networks, Wireless, Wired
  - The science of what works best in these spheres to care for patients in the best way possible
    - Workflow, Human Factors Design, User Experience

BEEN HIGH-TECH FOR A LONG TIME, RIGHT?



- Prior to the digital age (30 years ago) medicine already had its high-tech
  - Heart-Lung/Bypass machines, circa 1953
  - MRI, circa 1978
  - Early gastrocameras and endoscopes, circa 1950s

TECHNOLOGY ALREADY USED IN MEDICINE

- Clinicians already use complex technologies across disciplines, for example:
  - The tools of imaging – MRI, CT, PET and the digitization of those tools
  - The tools of pathology, laboratory work which incorporate high-end technology and science
  - The tools of proceduralists – devices, instruments, equipment

However,

- Uptake of information technology by clinicians has been slow and some would say ***difficult***…

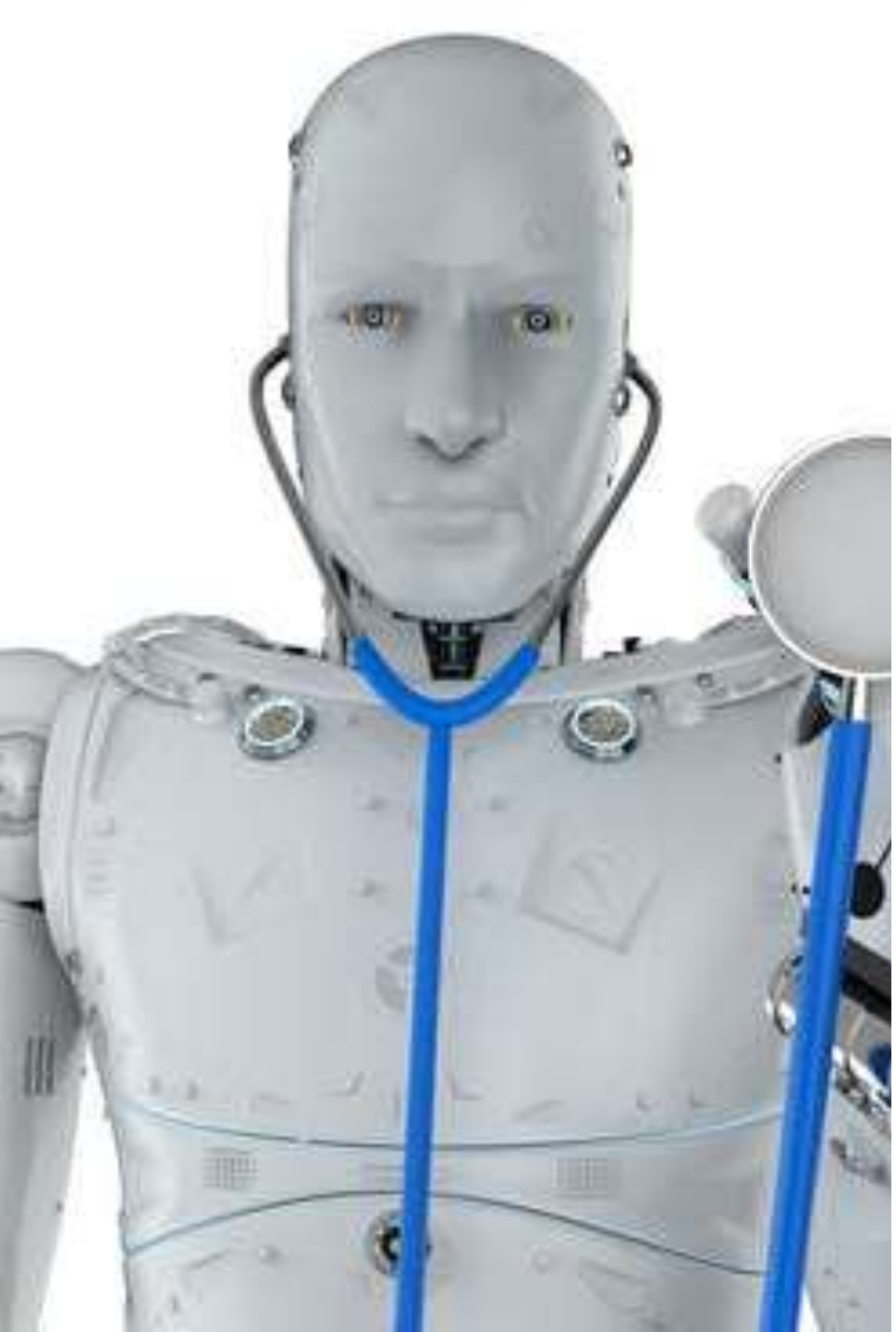
ENTER HEALTH CARE INFORMATICS

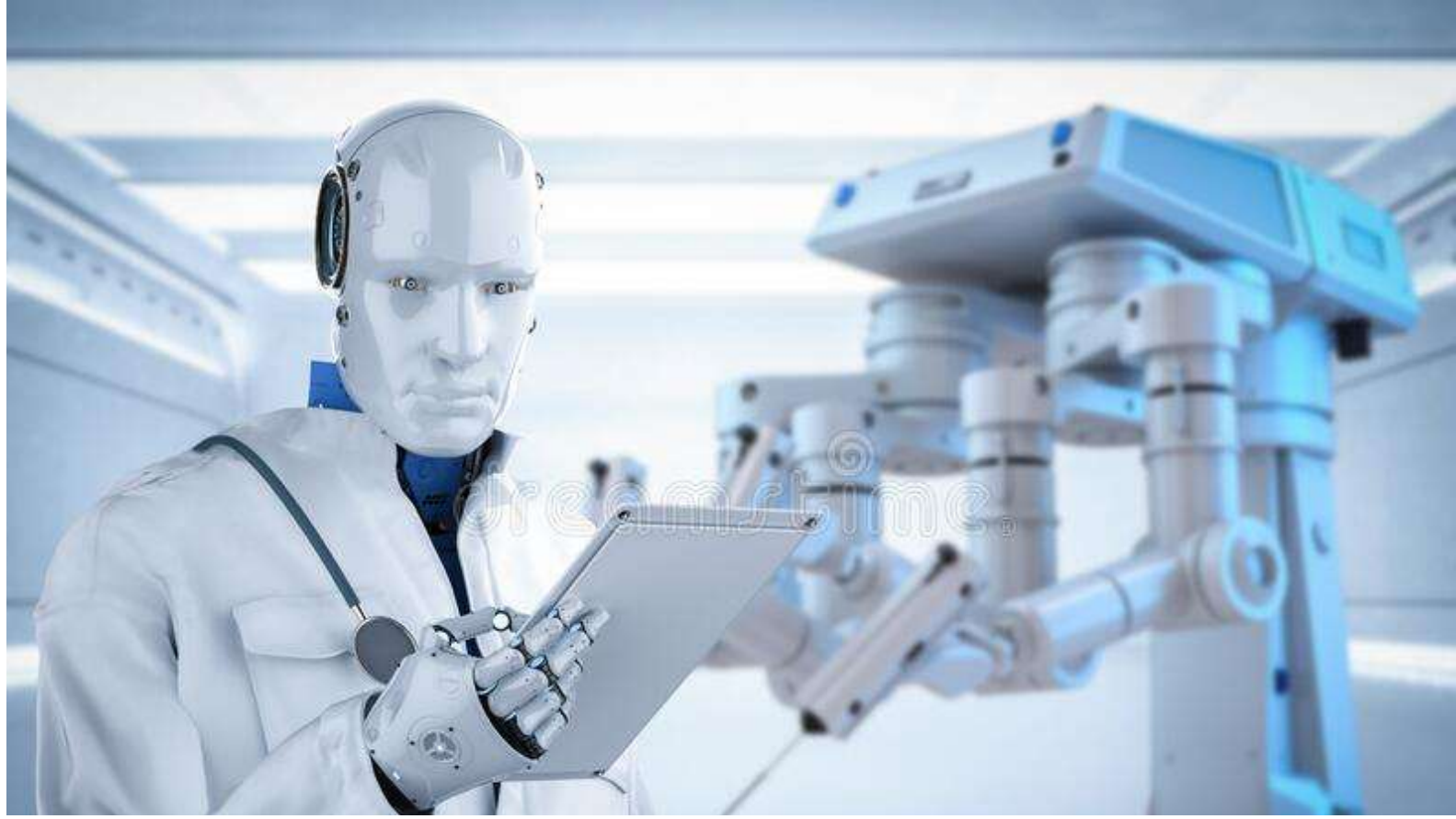
SCOPE OF INFORMATICS PRACTICE

- Hardware
- Software
- Computer Networks
- Wireless Networking
- The Internet
- Browsers
- Health Information Exchanges
- Hospital Information Systems
- Interfaces
- The Electronic Medical Record
- Computerized Provider Order Entry (CPOE)
- Decision Support Systems
- Email
- Faxing
- Telemedicine
- Handheld Devices
- AI/Robotics
- Analytics and Big Data

HCI - BRIDGING GAPS IN PROCESSES

- Documentation
- Transfers between settings of care
- Accuracy of ordering and prescribing
- Clinical effectiveness and innovation





HOW DO WE BRIDGE TECHNOLOGY AND HEALTHCARE?

CHIEF MEDICAL INFORMATICS OFFICER (CMIO)

- A Chief Medical Information Officer, or CMIO, essentially serves as the bridge between medical and IT departments at a health care organization
- May be referred to as the director of medical informatics or health informatics
- Most CMIOs are physicians with a background or interest in technology and most continue to see patients at least part time
- Other CMIOs are technology professionals who have been trained in health informatics, with an emphasis on the use of information in medicine and research
- CMIO is responsible for a healthcare organization's design, implementation and use of technology
- The field of health information technology is changing quickly, and therefore the role of the CMIO is also evolving

CHIEF MEDICAL INFORMATICS OFFICER

- The CMIO role has only begun to be defined over the past twenty years
- There is still much variance in duties across organizations
- As more healthcare organizations leverage information technology to improve patient outcomes by converting to standardized electronic methods, the role of the CMIO will continue to evolve
- A CMIO plays a critical role in any healthcare organization's overall mission and strategy

CHIEF MEDICAL INFORMATICS OFFICER RESPONSIBILITIES

- Applying and designing and integrating IT systems in medical departments
- Analyzing the use of technology such as electronic medical (or health) record and computerized physician order entry (CPOE) systems on patient outcomes
- Establishing standards for the use of medical terminology
- Training physicians on the use of software in healthcare
- Having a deep understanding of the software and applying that for influence future deployments
- Partnering with institution leadership to create a strategic plan for future healthcare IT
- Analyzing medical data particularly to improve healthcare delivery

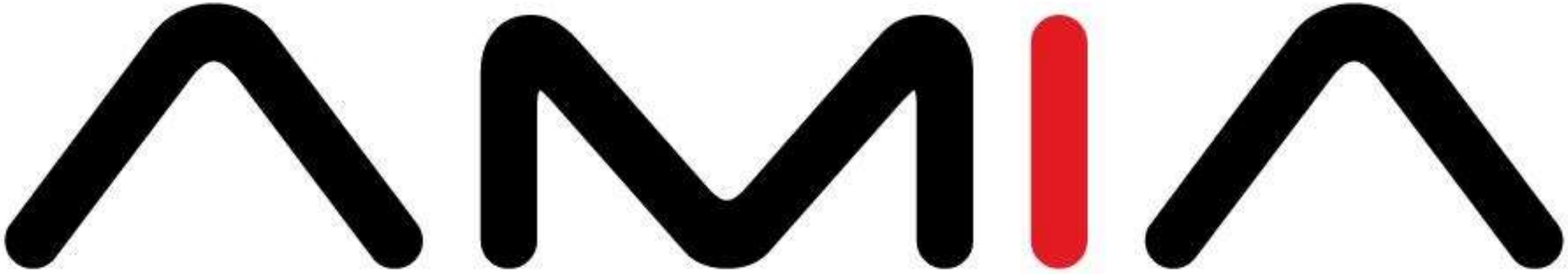
CHIEF MEDICAL INFORMATICS OFFICER

- Clinical Informaticians use their knowledge of patient care combined with their understanding of informatics concepts, methods, and tools to:
  - Assess information and knowledge needs of healthcare professionals and patients
  - Characterize, evaluate, and refine clinical processes
  - Develop, implement, and refine clinical decision support systems
  - Lead or participate in the procurement, customization, development, implementation, management, evaluation, and continuous improvement of clinical information systems

- The CMIO can **promote patient care** that is**: Safe, Efficient, Effective, Timely, Patient-centered and Equitable**

CHIEF MEDICAL INFORMATICS OFFICER TRAINING

- For any organization, successful health information system implementation depends in large measure on the knowledge and skills of the individuals who design, integrate, and implement these systems
- Clinical informatics demands physicians who understand the care process, informatics concepts, and information technology
- Creation of this formal subspecialty has helped standardize key elements of clinical informatics training programs and will increase the number of future training opportunities
- This initiative is consistent with the current national emphasis on strengthening the health information technology workforce



AMERICAN MEDICAL INFORMATICS ASSOCIATION (AMIA)

AMIA IS ONE OF THE MOST RESOURCEFUL SITES FOR BIOMEDICAL AND HEALTH INFORMATICS PROFESSIONALS

HISTORY OF THE AMERICAN MEDICAL INFORMATICS ASSOCIATION

- 2005 - concluded that demand was growing among physicians for formal training and certification in clinical informatics
- 2007 - received financial support from the Robert Wood Johnson Foundation and developed an 18-month process to define the core content of the subspecialty of clinical informatics and the training requirements for proposed clinical informatics fellowships
- 2008 - contacted several medical specialty boards to assess their interest in and willingness to sponsor an application to the American Board of Medical Specialty (ABMS) to create an approved certification process for the clinical informatics subspecialty
- 2009 - American Board of Preventive Medicine (ABPM) agreed to sponsor the application for a new subspecialty examination
- 2010 - ABPM submitted a formal application to ABMS to create the subspecialty certification
- 2011 - ABMS specialty boards and ABMS Committee on Certification (COCERT) approved the certification

AMIA Health Informatics Certification

CERTIFICATION IN CLINICAL INFORMATICS

CLINICAL INFORMATICS CERTIFICATION

- Becoming board-certified in clinical informatics sets the highest bar for those who are experts in the subspeciality
- Provides the opportunity to demonstrate your knowledge applying informatics to deliver improved healthcare services.
- The American Medical Informatics has created a pathway for a physician to become board certified in the subspecialty of Clinical Informatics through:
  - American Board of Preventative Medicine, or
  - American Board of Pathology

CLINICAL INFORMATICS CERTIFICATION

- Both ABPM and ABP require:
  - Medical License
  - Medical Degree
  - Board Certified through the American Board of Medicine Specialty https://www.certificationmatters.org/boards/

Allergy and Immunology

Anesthesiology

Colon and Rectal Surgery

Orthopaedic Surgery

Otolaryngology – Head and Neck Surgery

Pathology

Dermatology

Emergency Medicine

Family Medicine

Pediatrics

Physical Medicine and Rehabilitation

Plastic Surgery

Internal Medicine

Medical Genetics and Genomics

Neurological Surgery

Preventive Medicine

Psychiatry and Neurology

Radiology

Nuclear Medicine

Obstetrics and Gynecology

Ophthalmology

Surgery

Thoracic Surgery

Urology

CLINICAL INFORMATICS CERTIFICATION

- The Clinical Informatics subspecialty certifying exam will be offered annually in October
- Recommend a board review course offered through American Medical Informatics Association (AMIA), ABPM and ABP
- Clinical Informatics Board Review Course | AMIA - American Medical Informatics Association

CLINICAL INFORMATICS CERTIFICATION

- Two options exist currently in the Practice Pathway (*through 2025*)
  1. Time in Practice:
     - Three years of practice in Clinical Informatics is required
     - Practice time must be at least 25% of a Full-Time Equivalent (FTE) to be considered
  2. Masters or PhD in Biomedical Informatics

- *The Clinical Informatics Practice Pathway expires in 2025*
- *Beginning in 2026, the exam will be available only for those physicians who have completed an ACGME-accredited fellowship in Clinical Informatics*

CHIEF MEDICAL INFORMATICS OFFICER QUALIFICATIONS

- The qualifications required to become a chief medical information officer vary, depending on the organization
- Many health care facilities prefer licensed physicians who have practiced medicine for at least five years, have demonstrated leadership skills, and are proficient with medical records software, such as Epic
- Some candidates pursue a master's degree in healthcare administration or health informatics to make them more competitive in the job market
- Other qualifications include excellent communication and presentation skills, proficiency with data analysis and familiarity with relevant governmental regulations, such as HIPAA laws

CHIEF MEDICAL INFORMATICS OFFICER

- Bureau of Labor Statistics surmises that job growth should be pretty strong in the foreseeable future, based on the job growth rates for similar jobs like for health information technicians and health services managers
- Annual salaries also vary greatly depending on the size of the organization
- Although the role of the CMIO is still maturing, no one seems to doubt the importance of the role in today's healthcare industry
- As electronic records become more important, both in maintaining data and providing a base for strategizing, there will likely continue to be a need for a competent and compassionate chief medical information officer to step forward in the role of an expert who can bridge the gap between informatics and clinical medicine

THANK YOU

CHARLENE.LEPANE@ADVENTHEALTH.COM

REFERENCES

- Defining the Medical Subspecialty of Clinical Informatics. Don E Detmer, John R Lumpkin, Jeffrey J Williamson. JAMIA 2009;16:167-168 doi:10.1197/jamia.M3094

- AMIA Board White Paper: Core Content for the Subspecialty of Clinical Informatics. Reed M Gardner, J Marc Overhage, Elaine B Steen, Benson S Munger, John H Holmes, Jeffrey J Williamson, Don E Detmer, for the AMIA Board of Directors. JAMIA 2009;16:153-157 doi:10.1197/jamia.M3045

- AMIA Board White Paper: Program Requirements for Fellowship Education in the Subspecialty of Clinical Informatics. Charles Safran, M Michael Shabot, Benson S Munger, John H Holmes, Elaine B Steen, John R Lumpkin, Don E Detmer, for the AMIA Board of Directors. JAMIA 2009;16:158-166 doi:10.1197/jamia.M3046