2019

Clinical Informatics

THE ULTIMATE ANSWER TO MEDICINE, THE UNIVERSE AND EVERYTHING ELSE

Clinical Informatics

▶ Hello Earthlings.

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What is the connection to the title of today's talk?

▶ Raise your hand if you have seen this movie or read the book.

▶ *Hitchhiker's Guide to the Galaxy.*

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What is the connection to the title of today's talk?

Hitchhiker's Guide to the Galaxy

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What is the connection to the title of today's talk?

Dr. Vishnu Mohan, PD of OHSU CI Fellowship

▶ Super-computer called "Deep Thought" was programmed to calculate the answer to the Answer to the Ultimate Question of Life, the Universe, and Everything.

▶ My mentor, Dr. Vishnu Mohan, PD of OHSU CI Fellowship

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What is the connection to the title of today's talk?

Arthur Dent from

Hitchhiker's Guide to the Galaxy

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Dr. William Hersh

▶ Who are the informaticians?

▶ - Dr. William Hersh

▶ Based on Oregon Health and Science University, Dr. William Hersh who also provides great free education (which is the hook to take more classes... and then you end up getting your Master's and starting a Clinical Informatics Fellowship...

https://dmice.ohsu.edu/hersh/whatis/

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What source comprises the framework of this information?

▶ Framework from the paper "Core Content for the Subspecialty of Clinical Informatics" by Reed M. Gardner et. al. in the Journal of American Medical Informatics Association (JAMIA). 2009. 16(2)153-157.

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Dr. Don Rucker, National Coordinator for Health IT

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About me:

- ED Doc
- KHN since 2010 – Resident to Director of GME Research & Medical Informatics
- Master's in Clinical Informatics from Oregon Health & Science University (OHSU) - Dec. 2019
- American College of Emergency Physicians (ACEP) – Informatics Section Newsletter Editor and Secretary - Elect

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▶ **Clinical Informatics Subspecialty Framework**:

▶ Fundamentals

▶ Clinical decision making and care process improvement

▶ Health information systems

▶ Leadership and management of change

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **<u>Fundamentals</u>**

▶ Clinical decision making and care process improvement

▶ Health information systems

▶ Leadership and management of change

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **Fundamentals**

▶ What is clinical informatics?

▶ Some of you are informaticians

▶ Some have heard of it

▶ And others aren't sure exactly how to pronounce it.

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▶ Clinical Informatics Subspecialty Framework:

▶ **<u>Fundamentals</u>**

▶ When I first got involved in informatics as a resident, I was just trying to solve a problem using the computer.

▶ I led a QI project taking the paper paging system to a software-based system at Grandview (where I was a resident) and was an Epic Super-User during Go-Lives.

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Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **Fundamentals**

▶ What is informatics?

▶ People, Information & Technology

▶ https://dmice.ohsu.edu/hersh/whatis/ & Suny Buffalo

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Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **<u>Fundamentals</u>**

▶ What is informatics?

▶ "Optimal use of information, often aided by the use of technology, to improve health, healthcare, public health and biomedical research. Informaticians view their focus more on information than technology."

▶ https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/what-biomedical-informatics

Clinical Informatics

▶ **<u>Fundamentals:</u>**

▶ "Clinical informaticians transform health care by analyzing, designing, implementing, and evaluating information and communication systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship."

Clinical Informatics

▶ **Fundamentals:**

▶ "The subspecialty of all medical specialties that transforms healthcare by analyzing, designing, implementing, and evaluating information and communication systems to improve patient care, enhance access to care, advance individual and population health outcomes, and strengthen the clinician-patient relationship."

– ACGME & Gardner

Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **<u>Fundamentals:</u>**

▶ So that's all good. Sounds like it could save the world. But how does it affect my life? And why should I care?

▶ Well, if you or your family ever have any health problems, you want to know that evidence-based medicine is provided at the point of care by EVERY provider, no matter who is on call... whether it is a resident, new graduate, seasoned clinician.

▶ Availability of your chart to the clinician.

▶ Quality of patient care

▶ Medical discoveries are occurring at a rate faster than any one human being could keep up with. We need teamwork, especially clinical informatics, to synthesize information, evaluate patient status, and provide best practices at the point of care.

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Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ **Fundamentals:**

   ▶ Understand the basic knowledge needs of clinicians & patients, flow of data, information and knowledge

   ▶ Can include public health, population health, personal health and clinical research.

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ Clinical Informatics Subspecialty Framework:

▶ **Fundamentals:**

▶ Resources:

▶ American Medical Informatics Association (AMIA) – www.amia.org

▶ Mission – AMIA advances the informatics professions relating to health and disease. To this end it advances the use of health information and communications technology in clinical care and clinical research, personal health management, public health/population, and translational science with the ultimate objective of improving health.

▶ Dr. William Hersh https://dmice.ohsu.edu/hersh/whatis/

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▶ **<u>Fundamentals:</u>**

▶ More Resources:

▶ Healthcare Information and Management Systems Society (HIMSS) – www.himss.org

▶ American Health Information Management Association (AHIMA) – www.ahima.org

▶ Association of Medical Directors of Information Systems (AMDIS) – www.amdis.org

▶ Alliance for Nursing Informatics (ANI) – www.allianceni.org

▶ Public Health Informatics Institute (PHII) – www.phii.org

▶ International Society for Computational Biology (ISCB) – www.iscb.org

▶ Society for Imaging Informatics in Medicine (SIIM) – www.siim.org

▶ Association for Computing Machinery (ACM) – www.acm.org

▶ Medical Library Association (MLA) – www.mlanet.org

▶ Dr. William Hersh https://dmice.ohsu.edu/hersh/whatis/

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▶ **<u>Fundamentals</u>**

▶ Informatics Journals include:

▶ Journals of AMIA

▶ JAMIA – https://academic.oup.com/jamia

▶ JAMIA Open – https://academic.oup.com/jamiaopen

▶ Methods of Information in Medicine (MIM)

▶ International Journal of Medical Informatics (IJMI)

  ▶ https://dmice.ohsu.edu/hersh/whatis/WhatIs4.pdf

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- **Fundamentals:**
- More Informatics Journals include:
- Journal of Medical Internet Research (JMIR) – JMIR Medical Informatics
- Journal of Biomedical Informatics (JBI)
- Bioinformatics
- Journal of Digital Imaging (JDI)
- Biomed Central (BMC, www.biomedcentral.com) – BMC Medical Informatics and Decision Making – BMC Bioinformatics
- https://www.amia.org/news-publications/aci-open
- https://www.amia.org/about-amia/leadership/board-of-directors

- https://dmice.ohsu.edu/hersh/whatis/WhatIs4.pdf

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▶ **<u>Fundamentals:</u>**

▶ More Informatics Journals include:

▶ Applied Clinical Informatics (ACI)

▶ **<u>Applied Clinical Informatics – Open</u>**

▶ David A. Dorr, MD, MS and Lipika Samal, MD, MPH are the co-Editors-in-Chief.

    ▶ OHSU Faculty, AMIA Board of Directors and has presented to Congress

▶ Peer-reviewer (Carrie K. Baker, DO, MS-2019)

▶ https://www.amia.org/news-publications/aci-open

▶ https://www.amia.org/about-amia/leadership/board-of-directors

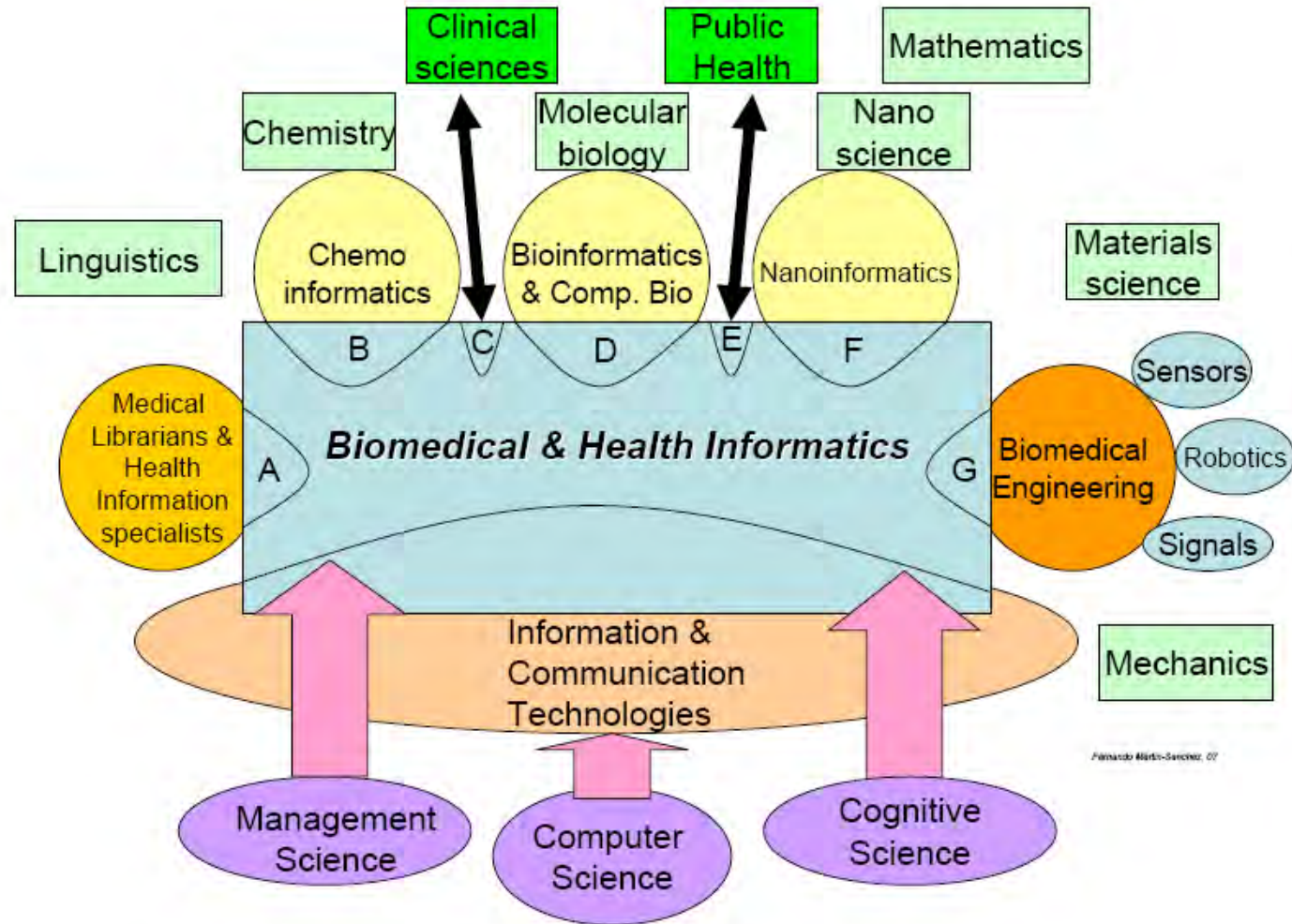▶ https://dmice.ohsu.edu/hersh/whatis/WhatIs4.pdf

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▶ **Fundamentals:**

▶ Clinical Informaticians can communicate with both medical professionals and information systems professionals to improve healthcare.

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Fundamentals:

▶Mantas J, Ammenwerth E, Demiris G, Hasman A, Haux R, Hersh W, et al.

▶Recommendations of the international medical informatics association (IMIA) on education in biomedical and health informatics. Methods Inf Med. 2010;49(2):105–20.

Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ Fundamentals

▶ **Clinical decision making and care process improvement**

▶ Health information systems

▶ Leadership and management of change

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **Clinical decision making and care process improvement**

▶ Quality Improvement

▶ Care Coordination

▶ Continuous Improvement

▶ Protect patient information

▶ Assess information and knowledge needs of patients and clinicians

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▶ **Clinical Decision Making and Care Process Improvement**:

▶ Examples:

  ▶ Prevent medication errors

  ▶ Suggest order sets

  ▶ Alert clinicians (sometimes too much)

  ▶ Teamwork between information systems and clinicians to support best practices.

  ▶ https://dmice.ohsu.edu/hersh/whatis/WhatIs4.pdf

Clinical Informatics

▶ **<u>Clinical Decision Making and Care Process Improvement</u>**:

▶ For those of you who work in quality, training in clinical informatics teaches the use of information technology by adhering to medical quality principles as noted by Agency for Healthcare Research and Quality (AHRQ) and the Institute of Medicine (IOM)

▶ Safe, efficient, effective, timely, patient-centered, and equitable.

▶ https://www.ahrq.gov/talkingquality/measures/six-domains.html

Clinical Informatics

▶ **Clinical Decision Making and Care Process Improvement**:

   ▶ Safe

   ▶ Efficient

   ▶ Effective

   ▶ Timely

   ▶ Patient-centered

   ▶ Equitable

▶ https://www.ahrq.gov/talkingquality/measures/six-domains.html

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▶ **Clinical Decision Making and Care Process Improvement**:

▶ Examples within Kettering Health Network include:

▶ Clinical Decision Support

▶ Physician Advisory Council

▶ Ambulatory Steering Committee

▶ Care Paths

Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ Fundamentals

▶ Clinical decision making and care process improvement

▶ **Health information systems**

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▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **Health information systems**

▶ Preparation and implementation of information systems including software, technology, people and processes.

▶ System evaluation is used to determine effectiveness.

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▶ **Health information systems**

▶ Clinical informaticists have a range of expertise in these areas based on experience and training.

▶ For example, the OHSU Master's program teaches the basics of programming, databases and analytics.

▶ That does not mean that I am a programmer, software developer or data scientist.

▶ This foundation enables me to communicate more effectively with the IS team

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▶ **Health information systems**

▶ Analytics: data scientists, data mining, data warehouses, mining, slicerDicer

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▶ **Health information systems**

▶ Usability: human-computer interaction

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▶ **Health information systems**

▶ Clinical data standards: nomenclatures, ontologies, interoperability

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▶ **Health information systems**

▶ Telecommunications: mHealth, telemedicine, Digital Experience, online scheduling, MyChart

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▶ **Health information systems**

▶ Testing: Make sure it works before going into clinical use.

▶ Evaluate to make sure it is performing as intended and for continuous improvement

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▶ **Health information systems**

▶ Data science: "The interdisciplinary field that studies and pursues the effective use of biomedical data, information and knowledge for scientific inquiry, problem solving and decision making, motivated by efforts to improve human health."

▶ Philip R O Payne, Elmer V Bernstam, Justin B Starren, Biomedical informatics meets data science: current state and future directions for interaction, *JAMIA Open*, Volume 1, Issue 2, October 2018, Pages 136–141, https://doi.org/10.1093/jamiaopen/ooy032

▶ https://www.ohsu.edu/school-of-medicine/medical-informatics-and-clinical-epidemiology/data-science

▶ http://informaticsprofessor.blogspot.com/2019/09/closing-loops-on-data-science-and.html

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▶ **Health information systems**

▶ Security:

▶ Medical identity theft

▶ Ransomware

▶ Victims can include patients, providers and the hospital system

▶ Information breaches are posted on the "wall of shame" by Health and Human Services

▶ https://ocrportal.hhs.gov/ocr/breach/breach_report.jsf as noted from 10x10 lecture by Dr. William Hersh regarding Privacy, Confidentiality and Security

Clinical Informatics

▶ **Health information systems**

▶ Multiple areas and subspecialties

Clinical Informatics

▶ Clinical Informatics Subspecialty Framework:

▶ Fundamentals

▶ Clinical decision making and care process improvement

▶ Health information systems

▶ **Leadership and management of change**

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Leadership and management of change</u>**

▶ Collaborate for continuous improvement

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **Leadership and management of change**

▶ "Successful implementation of information systems requires behavioral, cultural, and social change within an organization. Thus, clinical informaticians require knowledge and skills in understanding and analyzing organizational culture, planning organizational change, building and working in effective multidisciplinary teams, and leading information system development and implementation."

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **Leadership and management of change**

▶ "Clinical informaticians must be able to listen, understand needs, articulate plans, explain rationales, inform constituents, report results, and foster collaboration. They must relate clinical information system needs and plans to larger organizational strategic goals and be proficient in project management to oversee the implementation of new systems and processes."

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Leadership and management of change</u>**

▶ Motivate change

▶ Lead

▶ Negotiate

▶ Manage meetings and group deliberations

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Leadership and management of change</u>**

▶ Communication

   ▶ Written

   ▶ Oral

   ▶ Group

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Leadership and management of change</u>**

▶ Project management

▶ (I wish I would have had this in kindergarten.)

▶ Planning

▶ Identify Stakeholders

▶ Time management

▶ Work breakdown structure

▶ Scope creep

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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- **Leadership and management of change**
- Change management
- Identifying needs & setting goals
- Educating
- Transforming
- Continuous improvement
- Team effort

Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **Leadership and management of change**

▶ Working within the organization to continually improve

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi:

10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328**.**

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▶ Clinical Informatics Subspecialty Framework:

▶ Fundamentals

▶ Clinical decision making and care process improvement

▶ Health information systems

▶ Leadership and management of change

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Conclusion:</u>**

▶ Clinical Informatics at KHN

▶ Clinical Decision Support

▶ Data analytics

▶ Help Desk

▶ Information retrieval

▶ Standards and best practices

▶ Gardner RM, Overhage JM, Steen EB, Munger BS, Holmes JH, Williamson JJ, Detmer DE; AMIA Board of Directors. Core content for the subspecialty of clinical informatics. *J Am Med Inform Assoc*. 2009 Mar-Apr;16(2):153-7. doi: 10.1197/jamia.M3045. Epub 2008 Dec 11. PMID: 19074296; PMCID: PMC2649328.

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▶ **<u>Conclusion:</u>**

▶ Clinical Informatics: The future of medicine

▶ Clinical Informatics Fellowship Program

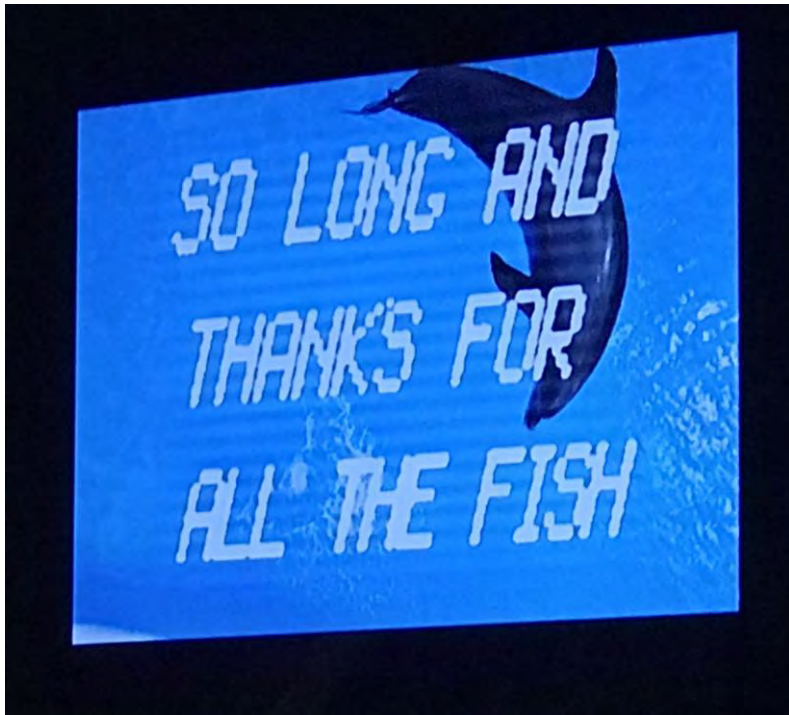▶ Actively participate in network initiatives to optimize patient care.

Clinical Informatics

▶ **Conclusion:**

▶ Team sport

▶ Requires multidisciplinary collaboration

▶ People, Information and Technology

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Clinical Informatics

▶ The ultimate answer to life, the universe and everything:

Clinical Informatics

"So long

and thanks for all the fish."

-Hitchhiker's Guide to the Galaxy