AMIA
INFORMATICS PROFESSIONALS. LEADING THE WAY.

1C – The Health System

William Hersh, MD, FACMI, FAMIA
Oregon Health & Science University

Clinical Informatics
Board Review Course

Clinical Informatics Subspecialty Delineation of Practice (CIS DoP)

Domain 1: Fundamental Knowledge and Skills (no Tasks are associated with this Domain which is focused on fundamental knowledge and skills)

Clinical Informatics

K001. The discipline of informatics (e.g., definitions, history, careers, professional organizations)
K002. Fundamental informatics concepts, models, and theories
K003. Core clinical informatics literature (e.g., foundational literature, principle journals, critical analysis of literature, use of evidence to inform practice)
K004. Descriptive and inferential statistics
K005. Health Information Technology (HIT) principles and science
K006. Computer programming fundamentals and computational thinking
K007. Basic systems and network architectures
K008. Basic database structure, data retrieval and analytics techniques and tools
K009. Development and use of interoperability/exchange standards (e.g., Fast Health Interoperability Resources [FHIR], Digital Imaging and Communications in Medicine [DICOM])
K010. Development and use of transaction standards (e.g., American National Standards Institute X12)
K011. Development and use of messaging standards (e.g., Health Level Seven [HL7] v2)
K012. Development and use of ancillary data standards (e.g., imaging and Laboratory Information System[LIS])
K013. Development and use of data model standards
K014. Vocabularies, terminologies, and nomenclatures (e.g., Logical Observation Identifiers Names and Codes [LOINC], Systematized Nomenclature of Medicine --Clinical Terms [SNOMED-CT], RxNorm, International Classification Of Diseases[ICD], Current Procedural Terminology [CPT])
K015. Data taxonomies and ontologies
K016. Security, privacy, and confidentiality requirements and practices
K017. Legal and regulatory issues related to clinical data and information sharing
K018. Technical and non-technical approaches and barriers to interoperability
K019. Ethics and professionalism

The Health System

K020. Primary domains of health, organizational structures, cultures, and processes (e.g., health care delivery, public health, personal health, population health, education of health professionals, clinical research)
K021. Determinants of individual and population health
K022. Forces shaping health care delivery and considerations regarding health care access
K023. Health economics and financing
K024. Policy and regulatory frameworks related to the healthcare system
K025. The flow of data, information, and knowledge within the health system

Domain 2: Improving Care Delivery and Outcomes

K026. Decision science (e.g., Bayes theorem, decision analysis, probability theory, utility and preference assessment, test characteristics)
K027. Clinical decision support standards and processes for development, implementation, evaluation, and maintenance
K028. Five Rights of clinical decision support (i.e., information, person, intervention formats, channel, and point/time in workflow)
K029. Legal, regulatory, and ethical issues regarding clinical decision support
K030. Methods of workflow analysis
K031. Principles of workflow re-engineering
K032. Quality improvement principles and practices (e.g., Six Sigma, Lean, Plan-Do-Study-Act [PDSA] cycle, root cause analysis)
K033. User-centered design principles (e.g., iterative design process)
K034. Usability testing
K035. Definitions of measures (e.g., quality performance, regulatory, pay for performance, public health surveillance)
K036. Measure development and evaluation processes and criteria
K037. Key performance indicators (KPIs)
K038. Claims analytics and benchmarks
K039. Predictive analytic techniques, indications, and limitations
K040. Clinical and financial benchmarking sources (e.g., Gartner, Healthcare Information and Management Systems Society [HIMSS] Analytics, Centers for Medicare and Medicaid Services [CMS], Leapfrog)
K041. Quality standards and measures promulgated by quality organizations (e.g., National Quality Forum [NQF], Centers for Medicare and Medicaid Services [CMS], National Committee for Quality Assurance [NCQA])
K042. Facility accreditation quality and safety standards (e.g., The Joint Commission, Clinical Laboratory Improvement Amendments [CLIA])
K043. Clinical quality standards (e.g., Physician Quality Reporting System [PQRS], Agency for Healthcare Research and Quality [AHRQ], National Surgical Quality Improvement Program [NSQIP], Quality Reporting Document Architecture [QRDA], Health Quality Measure Format [HQMF], Council on Quality and Leadership [CQL], Fast Health Interoperability Resources [FHIR] Clinical Reasoning)
K044. Reporting requirements
K045. Methods to measure and report organizational performance
K046. Adoption metrics (e.g., Electronic Medical Records Adoption Model [EMRAM], Adoption Model for Analytics Maturity [AMAM])
K047. Social determinants of health
K048. Use of patient-generated data
K049. Prediction models
K050. Risk stratification and adjustment
K051. Concepts and tools for care coordination
K052. Care delivery and payment models

Domain 3: Enterprise Information Systems

K053. Health information technology landscape (e.g., innovation strategies, emerging technologies)
K054. Institutional governance of clinical information systems
K055. Information system maintenance requirements
K056. Information needs analysis and information system selection
K057. Information system implementation procedures
K058. Information system evaluation techniques and methods
K059. Information system and integration testing techniques and methodologies
K060. Enterprise architecture (databases, storage, application, interface engine)
K061. Methods of communication between various software components
K062. Network communications infrastructure and protocols between information systems (e.g., Transmission Control Protocol/Internet Protocol [TCP/IP], switches, routers)
K063. Types of settings (e.g., labs, ambulatory, radiology, home) where various systems are used
K064. Clinical system functional requirements
K065. Models and theories of human-computer (machine) interaction (HCI)
K066. HCI evaluation, usability engineering and testing, study design and methods
K067. HCI design standards and design principles
K068. Functionalities of clinical information systems (e.g., Electronic Health Records [EHR], Laboratory Information System [LIS], Picture Archiving and Communication System [PACS], Radiology Information System [RIS] vendor-neutral archive, pharmacy, revenue cycle)
K069. Consumer-facing health informatics applications (e.g., patient portals, mobile health apps and devices, disease management, patient education, behavior modification)
K070. User types and roles, institutional policy and access control
K071. Clinical communication channels and best practices for use (e.g., secure messaging, closed loop communication)
K072. Security threat assessment methods and mitigation strategies
K073. Security standards and safeguards
K074. Clinical impact of scheduled and unscheduled system downtimes
K075. Information system failure modes and downtime mitigation strategies (e.g., replicated data centers, log shipping)
K076. Approaches to knowledge repositories and their implementation and maintenance
K077. Data storage options and their implications
K078. Clinical registries
K079. Health information exchanges
K080. Patient matching strategies
K081. Master patient index
K082. Data reconciliation
K083. Regulated medical devices (e.g., pumps, telemetry monitors) that may be integrated into information systems
K084. Non-regulated medical devices (e.g., consumer devices)
K085. Telehealth workflows and resources (e.g., software, hardware, staff)

Domain 4: Data Governance and Data Analytics

K086. Stewardship of data
K087. Regulations, organizations, and best practice related to data access and sharing agreements, data use, privacy, security, and portability
K088. Metadata and data dictionaries
K089. Data life cycle
K090. Transactional and reporting/research databases
K091. Techniques for the storage of disparate data types
K092. Techniques to extract, transform, and load data
K093. Data associated with workflow processes and clinical context
K094. Data management and validation techniques
K095. Standards related to storage and retrieval from specialized and emerging data sources
K096. Types and uses of specialized and emerging data sources (e.g., imaging, bioinformatics, internet of things (IoT), patient-generated, social determinants)
K097. Issues related to integrating emerging data sources into business and clinical decision making
K098. Information architecture
K099. Query tools and techniques
K100. Flat files, relational and non-relational/NoSQL database structures, distributed file systems
K101. Definitions and appropriate use of descriptive, diagnostic, predictive, and prescriptive analytics
K102. Analytic tools and techniques (e.g., Boolean, Bayesian, statistical/mathematical modeling)
K103. Advanced modeling and algorithms
K104. Artificial intelligence
K105. Machine learning (e.g., neural networks, support vector machines, Bayesian network)
K106. Data visualization (e.g., graphical, geospatial, 3D modeling, dashboards, heat maps)
K107. Natural language processing
K108. Precision medicine (customized treatment plans based on patient-specific data)
K109. Knowledge management and archiving science
K110. Methods for knowledge persistence and sharing
K111. Methods and standards for data sharing across systems (e.g., health information exchanges, public health reporting)

Domain 5: Leadership and Professionalism

K112. Environmental scanning and assessment methods and techniques
K113. Consensus building, collaboration, and conflict management
K114. Business plan development for informatics projects and activities (e.g., return on investment, business case analysis, pro forma projections)
K115. Basic revenue cycle
K116. Basic managerial/cost accounting principles and concepts
K117. Capital and operating budgeting
K118. Strategy formulation and evaluation
K119. Approaches to establishing Health Information Technology (HIT) mission and objectives
K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication
K121. Effective communication programs to support and sustain systems implementation
K122. Writing effectively for various audiences and goals
K123. Negotiation strategies, methods, and techniques
K124. Conflict management strategies, methods, and techniques
K125. Change management principles, models, and methods
K126. Assessment of organizational culture and behavior change theories
K127. Theory and methods for promoting the adoption and effective use of clinical information systems
K128. Motivational strategies, methods, and techniques
K129. Basic principles and practices of project management
K130. Project management tools and techniques
K131. Leadership principles, models, and methods
K132. Intergenerational communication techniques
K133. Coaching, mentoring, championing and cheerleading methods
K134. Adult learning theories, methods, and techniques
K135. Teaching modalities for individuals and groups
K136. Methods to assess the effectiveness of training and competency development
K137. Principles, models, and methods for building and managing effective interdisciplinary teams
K138. Team productivity and effectiveness (e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)
K139. Group management processes (e.g., nominal group, consensus mapping, Delphi method)

Knowledge Statements from the DoP

K020. Primary domains of health, organizational structures, cultures, and processes (e.g., health care delivery, public health, personal health, population health, education of health professionals, clinical research)

K021. Determinants of individual and population health

K022. Forces shaping health care delivery and considerations regarding health care access

K024. Policy and regulatory frameworks related to the healthcare system

K025. The flow of data, information, and knowledge within the health system

1C – The Health System

Determinants of individual and population health

Primary domains, organizational structures, cultures, and processes

The flow of data, information, and knowledge within the health system

Policy and regulatory framework

Health economics and financing

Forces shaping health care delivery

Health care quality and improvement

The Health Information Technology for Economic and Clinical Health (HITECH) Act and “meaningful use” of the electronic health record

Determinants of individual and population health

https://www.healthypeople.gov/2020/about/foundation-health-measures/Determinants-of-Health

Policymaking – local, state, and national

Social factors – economics, environment, education, etc.

Health services – health care, public health

Individual behavior – diet, activity, lifestyle

Biology and genetics

Primary domains, organizational structures, cultures, and processes

- Health care delivery
- Public health
- Clinical research
- Education of health professionals

Health care – levels of care

Primary care – initial and ongoing care, typically provided in an office or clinic

Secondary care – specialty care provided in the community

Tertiary care – highly specialized care usually provided by referral in a large, typically academic, medical center

Quaternary care – sometimes used as an extension of tertiary care in reference to advanced levels of medicine that are highly specialized and not widely accessed

Stakeholders – the “p’s”

Patient – the one who gets healthcare, often called a consumer or citizen when they are well

Provider – those who “provide” healthcare, e.g., physicians, nurses, allied health

Purchaser – those who buy healthcare, usually employers or the government

Payor – those who “pay” the healthcare system, i.e., the insurance companies and government

Public health – protectors of the public’s health

And there are major problems

US pays more for all aspects of care (OECD, 2019)

- Has comparable number of physicians and hospital beds per capita but spends more for them (Papanicolas, 2018)

Of social determinants of health (SDOH), healthcare only responsible for 20% of health outcomes (Magnan, 2017; Artiga, 2018)

US has a “health disadvantage”: life expectancy and infant mortality among lowest of advanced countries (Woolf, 2013)

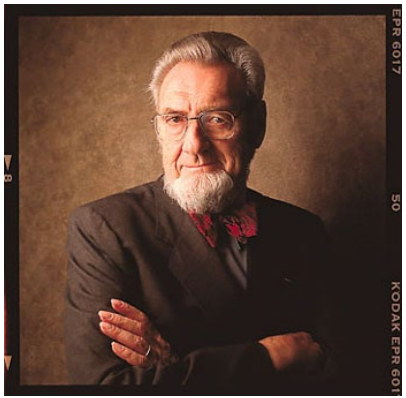
System has as much as 20% waste (Berwick, 2012)

- Overtreatment
- Failures of care coordination
- Failures of care delivery – best practices
- Administrative complexity
- Pricing failures – above market
- Fraud and abuse

Public health

The “science of protecting and improving the health of communities through education, promotion of healthy lifestyles, and research for disease and injury prevention”

- https://www.cdcfoundation.org/what-public-health
- “Health care is vital to all of us some of the time, but public health is vital to all of us all of the time”
- C. Everett Koop, Former US Surgeon General



Public health functions and activities

Public health performs its missions through its core functions

- Assessment
- Policy Development
- Assurance

Public health activities include

- Prevent epidemics and the spread of disease
- Protect against environmental hazards
- Prevent injuries
- Promote and encourage healthy behaviors
- Respond to disasters and assists communities in recovery
- Assure the quality and accessibility of health services

Public health perspective

Public health tends to take perspective of health of populations

- One of its basic sciences is *epidemiology* – study of disease in populations
- However, public health is increasingly involved in other forms of health promotion and prevention, e.g., obesity, nutrition, etc.

May result in different perspective than individual care

- Population-based view focuses on preventing disease as well as societal impacts on health
- Usually a government (regional or federal) activity

Clinical research (US National Institutes of Health; https://www.nih.gov/)

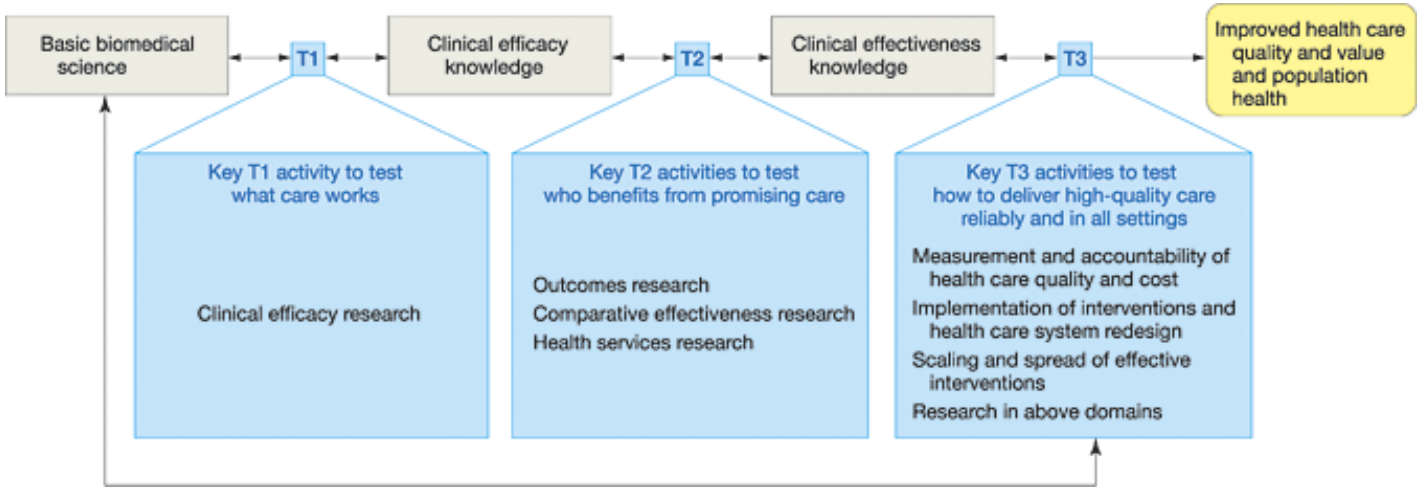
Clinical research comprises studies and trials in human subjects that fall into the three sub-categories

- Patient-oriented research – research conducted with human subjects (or on material of human origin such as tissues, specimens and cognitive phenomena) for which an investigator (or colleague) directly interacts with human subjects, including
  - Mechanisms of human disease
  - Therapeutic interventions
  - Clinical trials
  - Development of new technologies
- Epidemiologic and behavioral studies
- Outcomes research and health services research

Translational research (Zerhouni, 2007)

Accelerating research results from laboratory to clinical environment to community along T1/T2/T3 axis (Dougherty, 2008)

Benefits require collaboration and partnerships, facilitated by informatics (Richesson, 2019)



Education of health professionals

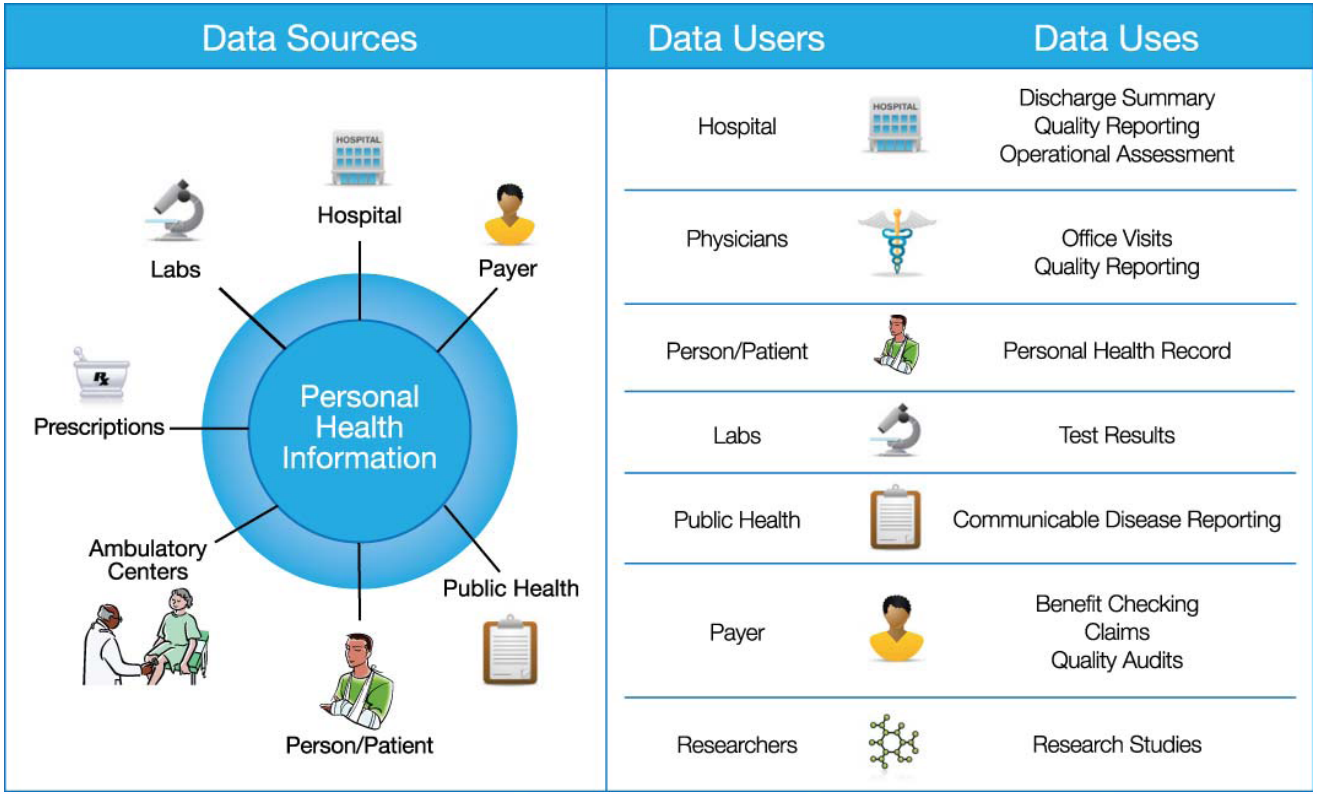
Mostly in professional schools – medicine, nursing, dentistry, pharmacy, allied health

Usually culminating in

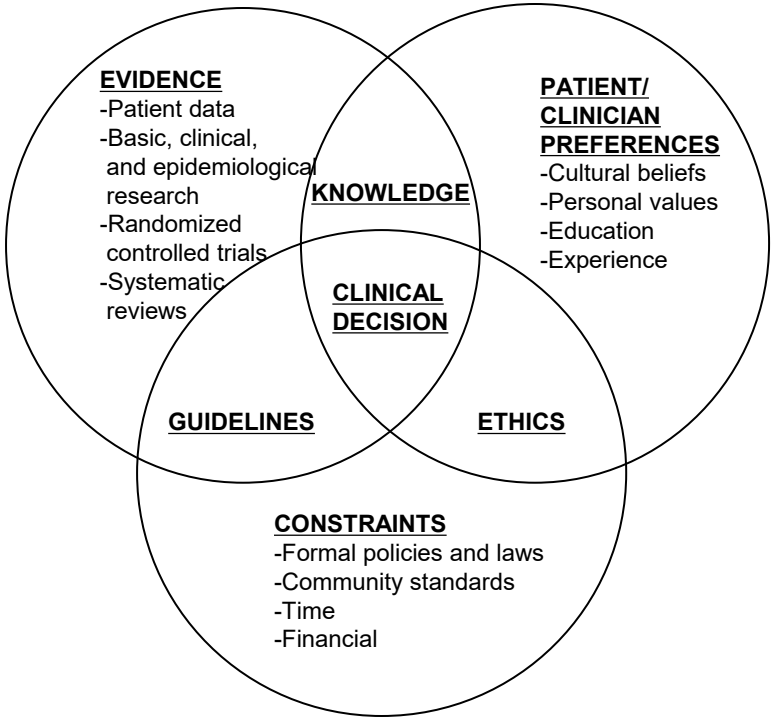
- Certification – national, through 24 private, non-profit boards
- Licensure – through state government

Continuing education – historically focused on courses and credits, now shifting to “maintenance of certification” (Rhodes, 2007), or “continuing certification”

Flow of data, information, and knowledge (NCVHS, 2009)



From data and information to clinical decisions (Mulrow, 1998)



Policy and regulatory framework

Federal: Department of Health and Human Services (HHS)

- Centers for Medicare and Medicaid Services (CMS)
- Centers for Disease Control and Prevention (CDC)
- Food and Drug Administration (FDA)
- National Institutes of Health (NIH)
- Office of the National Coordinator for Health IT (ONC)

State and local – various

Health economics and financing

No matter who pays the cost (patient, employer, or government), most healthcare is financed on the notion of insurance

- Everyone pays some, those who need it use it

Payment methods

- Private fee-for-service
- Private managed care, a.k.a., HMOs, PPOs
- Government-financed, a.k.a., single-payer
- Government-provided

How is healthcare financed in the US?

Annual publication of California Health Care Foundation gives good overview: *Health Care Costs 101* (Wilson, 2021)

Major findings

- Total spending is 17.7% of GDP, estimated by some to increase to 20% in future
- Per-person spending on healthcare more than doubled from 1996 to $11,582 by 2019
- About half of spending growth is due to medical price inflation – the rising cost of providing existing services to patients – with most of rest due to aging population

Major healthcare payors in US

Private health insurance – for most employed citizens and their dependents, except those in lower-paying jobs

Medicare – government insurance for elderly and disabled

Medicaid – government insurance for indigent

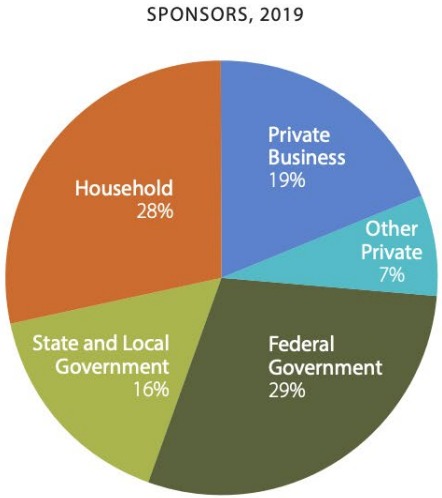
State Children's Health Insurance Program (SCHIP) – government insurance for uninsured low-income children

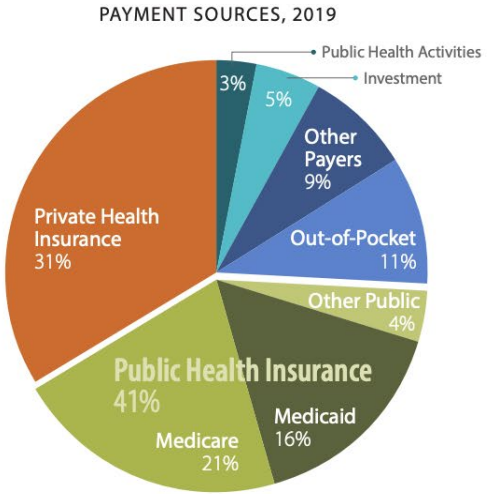
Other expenses due to out-of-pocket, public health, and other expenditures

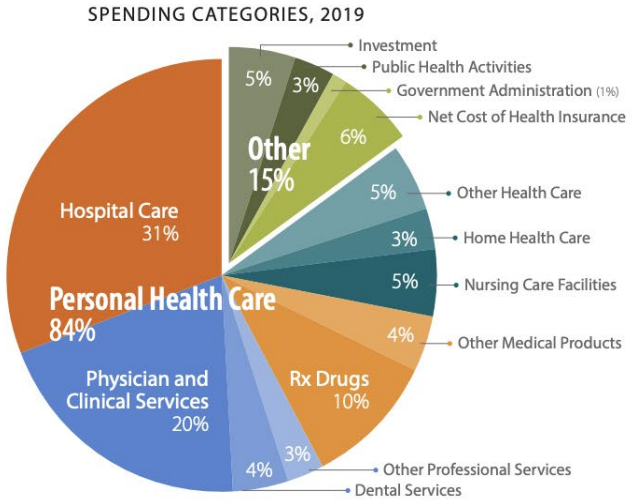
Payer mix is percentage of revenue from private insurance vs. government insurance vs. self-paying individuals

- Mix important because Medicare and Medicaid pay hospitals less than what it costs to treat patients

How is the money spent and paid? (Wilson, 2021)







Forces shaping health care delivery

The Affordable Care Act (ACA, or “Obamacare”) is the law of the land (Obama, 2016; Selker, 2021; etc.)

- https://www.healthcare.gov/

Massive legislation has three broad goals

- Regulation of coverage – e.g., eliminating coverage restrictions, creating temporary high-risk pools
- Major expansion of coverage – e.g., individual mandates, health insurance exchanges, employer penalties, Medicaid expansion
- Bending the cost curve – e.g., provide incentives for higher-quality, lower-cost care

Forces shaping health care delivery

Presidents of both major parties have proposed comprehensive plans

- Democrat Harry Truman (1949)
- Republican Richard Nixon (1974)

Emergency Medical Treatment & Labor Act (EMTALA - Katz, 2019) – passed in 1986, requires emergency departments to evaluate patients and treat emergent conditions

Obamacare

Small business tax credits

Close Medicare “donut hole”

Requirement for larger (>50) employers to offer health insurance coverage

Expand Medicaid for low-income Americans (<133% of poverty level) – Supreme Court ruled states could decide whether to expand

Creation of health insurance exchanges – with subsidies to allow affordability for those with incomes up to 400% of poverty level

Community rating for insurance policies – no denial of insurance for pre-existing illnesses

Require coverage of essential health conditions

Increase payroll tax of upper-income Americans and some other taxes

Individual mandate for health insurance – repealed with tax law changes in 2017

Has the ACA been successful?

So far, mostly in reducing rate of uninsurance (Martinez, 2018)

- Over 20 million Americans who previously were uninsured now have health insurance due to insurance subsidies, Medicaid expansion, and children on plans to age 26 (Uberoi, 2016)
- Rate of uninsurance lowered from >20% to 11.5-13.1% (Uberoi, 2016)

Remaining challenge is individual market (Aaron, 2017)

Other benefits of ACA

Systematic review of studies showing numerous positive benefits – increases in (Mazurenko, 2018; Allen, 2019)

- Self-reported health
- Condition-specific outcomes
- Population-level survival

Reverting to pre-ACA eligibility levels could lead to increases in rural hospital closures (Lindrooth, 2018)

Continued benefit found in COVID-19 pandemic (Agarwal, 2020)

Despite focus on insurance, ACA also addresses cost and quality

“Accountable care”

- Accountable Care Organizations (ACOs) provide flexible financial support in exchange for accepting accountability for overall quality and cost, aka “shared savings” (Longworth, 2011; Pham, 2015)
  - Including Oregon Medicaid “Coordinated Care Organizations” (CCOs) (McConnell, 2014)

Focus on care “that works”

- Patient-Centered Outcomes Research Institute (PCORI, https://www.pcori.org/) – supporting comparative effectiveness research (Frank, 2014)

Toward the future

From the right

- More competition in private insurance market
- Higher deductible plans that expose patients more to actual costs
- Replace government spending (e.g., Medicaid expansion and insurance subsidies) with tax credits
- Health savings accounts

From the left

- Public option – insurance option to buy into Medicare
- Medicare For All – expanding Medicare to single-payer solution for all US population

Health care quality and the IOM reports

In recent times, driven by “triple aim” (Berwick, 2008)

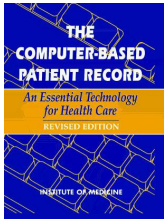
- Better health
- Better healthcare
- Lower cost

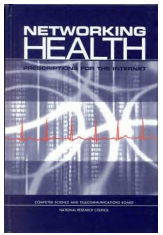
Quality measured in three categories at individual and organizational levels (Donabedian, 2002)

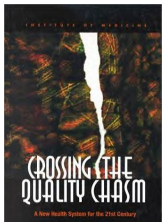
- Structural – factors that make it easier or harder to deliver high-quality care, e.g., hospital location, volume, physician licensure, nurse staffing levels
- Process – factors describing healthcare content and activities, e.g., adherence to guidelines for screening, treatment, etc.
- Outcomes – changes attributable to care, e.g., mortality, morbidity, functional status

(More in Lecture 2C on Quality Improvement)

Early IOM reports that identified the problems and set the agenda







The Computer-Based Patient Record (1997) – paper records are illegible, inefficient, and error-prone; computer-based record vital to modern healthcare

For the Record: Protecting Electronic Health Information (1997) – benefits of electronic health information compromised by inadequate protection; informed HIPAA legislation

Networking Health (2000) – value of networks important but do not need separate health Internet; availability more important than bandwidth

To Err is Human (2000) – medical errors are common and a systems problem

Crossing the Quality Chasm (2001) – Developed set of aims and rules for high-quality 21st century healthcare

Spurring adoption of health information technology

"To improve the quality of our health care while lowering its cost, we will make the immediate investments necessary to ensure that within five years, all of America's medical records are computerized … It just won't save billions of dollars and thousands of jobs – it will save lives by reducing the deadly but preventable medical errors that pervade our health care system."

January 5, 2009

Health Information Technology for Economic and Clinical Health (HITECH) Act of the American Recovery and Reinvestment Act (ARRA) (Blumenthal, 2010)

- Incentives for electronic health record (EHR) adoption by physicians and hospitals (up to $27B)
- Direct grants administered by federal agencies ($2B, including $118M for workforce development)

Centerpiece of HITECH Act was incentives for "meaningful use"

Conceptually originated in legislation by Stark (2010)

- Must use certified EHR connected for health information exchange and able to submit data on clinical quality measures

All MU criteria must "map" to one or more of five goals for the healthcare system

- Improving quality, safety, and efficiency
- Engaging patients in their care
- Increasing coordination of care
- Improving the health status of the population
- Ensuring privacy and security

Examples

- Implement drug-drug interaction checks → Improving quality, safety, and efficiency
- Provide summary of care to patients → Engaging patients in their care

Key Readings

Askin, E (Ed.). *The Health Care Handbook - A Clear and Concise Guide to the United States Health Care System, Second Edition*. St. Louis, MO, Washington University School of Medicine, 2014

Selker E (Ed.). *The Affordable Care Act as a National Experiment: Health Policy Innovations and Lessons*, New York, Springer, 2021

Many other overviews of healthcare and public health systems

Appendix

Personal health

Decision-making (Mass. BCBS, 2007)

- Half of adults make healthcare decisions for others in their family (children, elders, etc.)
- Three-quarters are interested in information to help inform decisions (quality ratings, physician experience, etc.)
  - Much of the kinds of information they seek are not available
  - As such, they often make decisions rapidly with little information

Most want access to their data and information, including 60% by electronic means (Deloitte, 2008)

Quality aims for 21st century healthcare (IOM, 2001)

Healthcare should be

- **Safe** – avoid injuries from care intended to help
- **Effective** – provide service based on scientific knowledge and avoid care unlikely to benefit
- **Patient-centered** – care respectful of patients' preferences, needs, and values
- **Timely** – reduce waits and delays in care
- **Efficient** – avoid waste of equipment, supplies, and energy
- **Equitable** – provide care that does not vary based on personal characteristics

Rules for 21st century healthcare

Patient needs and values should drive variation in care

Care based on continuous healing relationships, i.e., 24/7 and by all modalities

Patient as source of control

Shared knowledge, free flow of information, and transparency of information

Anticipation of needs rather than reacting to them

Evidence-based decision making

More recent IOM reports

Knowing What Works in Health Care (Eden, 2008) – introduced the learning health system and comparative effectiveness research

Digital Infrastructure for the Learning Healthcare System (Grossman, 2009) – data and information systems needed

Health IT and Patient Safety (2012) – health IT can cause harm as well as benefit

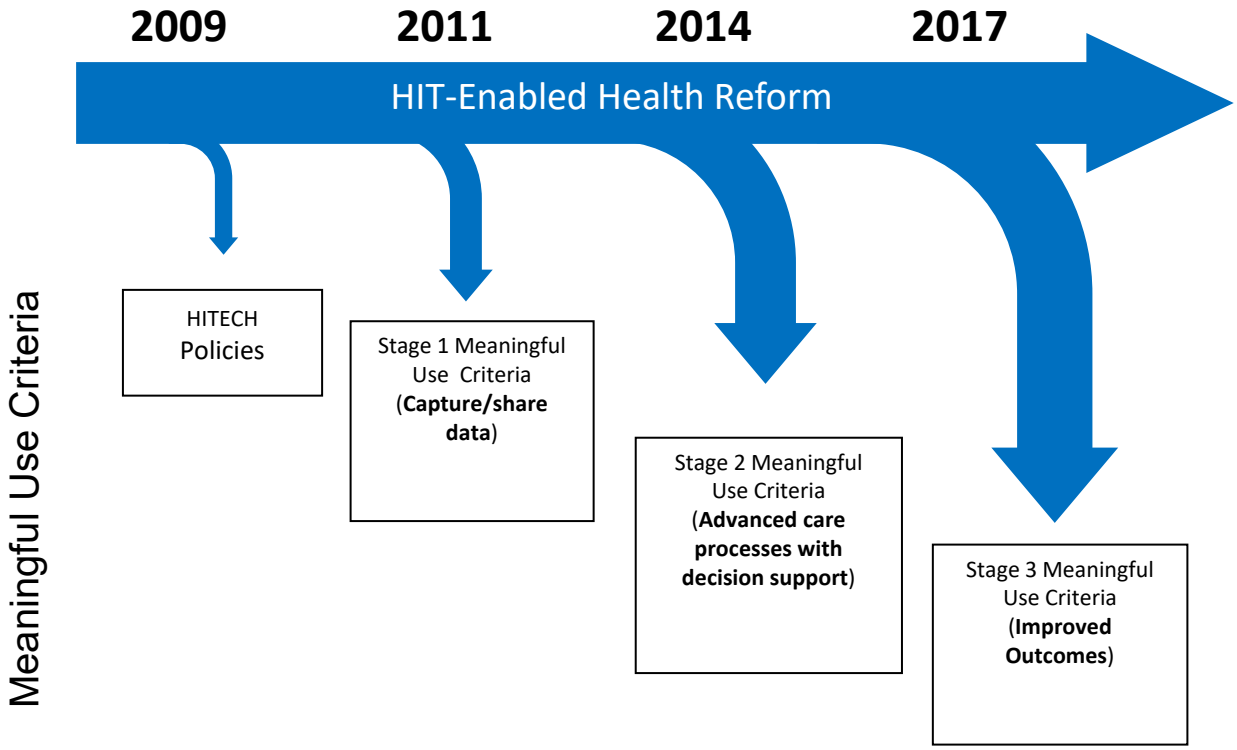
Best Care, Lower Cost (Smith, 2012) – implementing comprehensive vision of the learning health system

Implementation

Implemented through increased Medicare or Medicaid reimbursement to

- Eligible professionals (EPs)
  - Medicare: MD, DO, DDS/DMD, DPM, OD, DC
  - Medicaid: MD, DO, DDS/DMD, Certified Nurse Midwives, Nurse Practitioners, Physicians Assistants operating at an FQHC/RHC
  - Hospital-based EPs not eligible (>90% service in hospital, e.g., pathologist, emergency physician)
- Eligible hospitals (EHs)
  - Medicare: Acute Care Hospitals, Critical Access Hospitals (CAHs)
  - Medicaid: Acute Care Hospitals , CAHs, Children's Hospitals

Implemented in three stages – https://www.healthit.gov/



Incentive amounts

Incentives paid through Medicare and Medicaid reimbursement

$44 - 63K for EPs

$2 - 9M to EHs

Varied by

- Medicare vs. Medicaid qualification
- Amount of Medicare or Medicaid patients seen
- For hospitals, number of discharges per year

MU operationalized – original

Stage 1 (Blumenthal, 2010)

- Objectives announced in 2010
- Program began payments on
  - January 1, 2011 for EPs
  - October 1, 2010 for EHs

Stage 2

- Objectives announced in 2012
- Start pushed back one year to 2014
- Raised the bar, with additional emphasis on patient engagement and health information exchange
- “Modified” in 2015 to consolidate Stages 1-2

Stage 3

- Rules set but program transitioned …

MU operationalized – transition to Promoting Interoperability (PI)

EH

- Transformed into PI with more emphasis on ability to achieve interoperability and health information exchange

EP

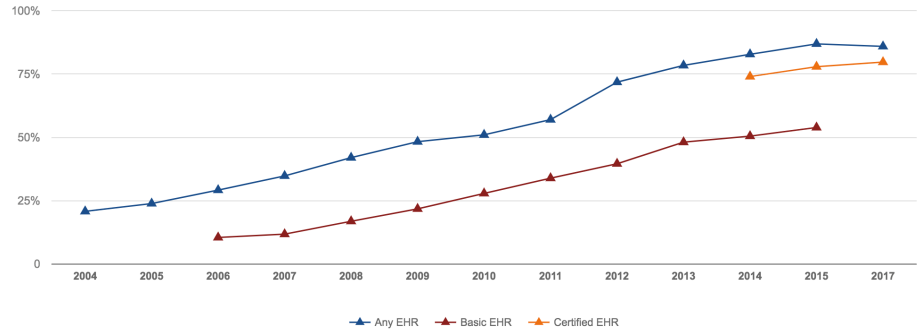
- Folded into physician quality program – Advancing Care Information (ACI) as part of Merit-based Incentive Payment System (MIPS) program of Medicare Access and CHIP Reauthorization Act (MACRA)

Summaries of program – glass half-full vs. half-empty (Washington, 2017; Halamka, 2017)

Interoperability being driven by requirements specified in 21st Century Cures Act

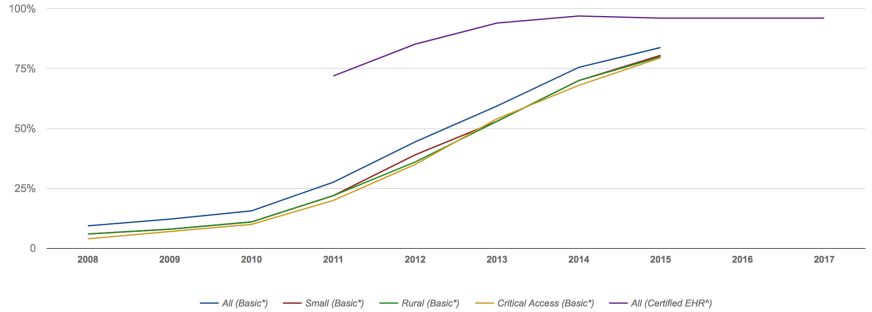
- New CMS/ONC rules required interoperability for EHR certification – https://www.healthit.gov/curesrule/

EHR adoption resulting from MU



https://dashboard.healthit.gov/quickstats/pages/physician-ehr-adoption-trends.php

https://dashboard.healthit.gov/quickstats/pages/FIG-Hospital-EHR-Adoption.php



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