Technology Development

Presenters
Hal Katz, Esq.
Husch Blackwell

Todd A. Zigrang
MBA, MHA, FACHE, ASA
HEALTH CAPITAL CONSULTANTS

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Presenter Bio

Hal Katz, Esq., is a partner in the law firm of Husch Blackwell and is based in the firm's Austin, Texas office. Mr. Katz practices in many facets of general corporate and transactional areas, such as the purchase and sale of businesses, mergers and acquisitions, corporate restructurings, reorganizations, franchises, joint ventures, management arrangements, employment and healthcare matters. Numerous businesses, governmental entities and nonprofit corporations rely on Hal to represent their interests in strategic planning and corporate governance matters and in handling all aspects of the startup and operation of their businesses. As a recognized authority, Hal is regularly asked by industry leaders to lecture on corporate, transactional and regulatory issues, such as: (1) Business startups; (2) Structuring sales of businesses; (3) Healthcare reform; (4) Joint ventures; (5) Management arrangements; (6) Business divorce; and, (7) For-profit and nonprofit collaborations.

Before joining the firm, Hal was a partner at Brown McCarroll. He is board certified in healthcare law by the Texas Board of Legal Specialization and a member of the firm's Healthcare, Life Sciences & Education team.

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Presenter Bio

Todd A. Zigrang, MBA, MHA, FACHE, ASA is the President of **HEALTH CAPITAL CONSULTANTS** (HCC), where he focuses on the areas of valuation and financial analysis for hospitals, physician practices, and other healthcare enterprises. Mr. Zigrang has over 20 years of experience providing valuation, financial, transaction and strategic advisory services nationwide in over 1,000 transactions and joint ventures involving acute care hospitals and health systems; physician practices; ambulatory surgery centers; diagnostic imaging centers; accountable care organizations, managed care organizations, and other third-party payors; dialysis centers; home health agencies; long-term care facilities; and, numerous other ancillary healthcare service businesses. Mr. Zigrang is also considered an expert in the field of healthcare compensation for physicians, executives and other professionals.

Mr. Zigrang is the co-author of the soon-to-be released "*Adviser's Guide to Healthcare – 2nd Edition*" (AICPA, 2015), numerous chapters in legal treatises and anthologies, and peer-reviewed and industry articles such as: *The Accountant's Business Manual* (AICPA); *Valuing Professional Practices and Licenses* (Aspen Publishers); *Valuation Strategies*; *Business Appraisal Practice*; and, *NACVA QuickRead*. Additionally, Mr. Zigrang has served as faculty before professional and trade associations such as the American Bar Association (ABA); the National Association of Certified Valuators and Analysts (NACVA); Physician Hospitals of America (PHA); the Institute of Business Appraisers (IBA); the Healthcare Financial Management Association (HFMA); and, the CPA Leadership Institute.

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About the American Society of Appraisers

The American Society of Appraisers, is an international organization of appraisal professionals, founded in 1952 to provide a comprehensive, profession wide organization for appraisers and valuation engineers.

As a comprehensive body, the ASA pursues accurate valuation for all classes of property and hence examines multiple levels of economic activity. As such, the ASA seeks to foster cooperation between professionals of several valuation disciplines, and this spirit of cooperation may help engender multidisciplinary approaches to the art and science of valuation.

Mission of the Healthcare Special Interest Group (HSIG)

The *Healthcare Special Interest Group* (HSIG) is a Subcommittee of the ASA's International Education Committee and dedicated to the advancement of multidisciplinary education in healthcare valuation.

HSIG views the field of healthcare valuation as a complex area affecting multiple disciplines and requiring unique approaches for study and solutions. At the same time, the field also holds much promise for those willing to pursue new, multidisciplinary answers an this ever-changing healthcare market environment.

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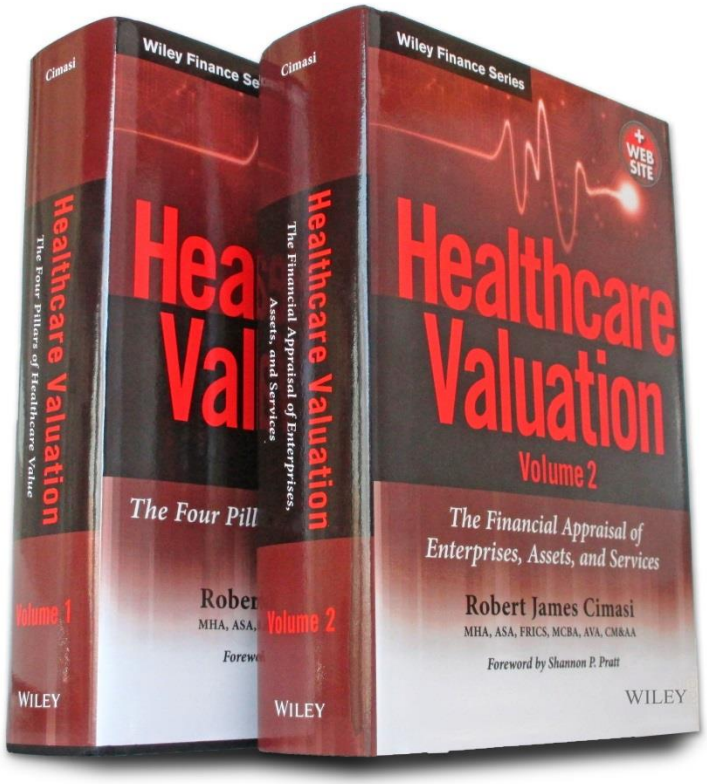
In-Person Course Session Textbook



The course session textbook page reference appears, for your reference, at the top left-hand corner of each slide.

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Overview of the Presentation

- State of the Healthcare Industry
- The Historical Role of Healthcare Technology
- Technology Perspectives
- The Current Role of Technology
  - Clinical Technology
  - Operations Management
  - Wellness Technology
- Unique Technology Valuation Considerations
- Legal Issues
- Sample Transactions
- Concluding Remarks

State of the Healthcare Industry

Industry Drivers

- Healthcare reform
  - 2013 - $3.8T – 21% GNP Kaiser
  - Medicare / Medicaid / CMS is going broke
  - Baby Boomers entering Medicare - 9/29/11 USA Today
    - 3.942M in 2013 – 1 every 8 seconds
    - 4.2M per year by 2030 estimating 80M total (47M today)
  - Medicaid Growth
  - 75% of healthcare costs – Chronic Conditions CDC
  - 50% of population < 3% Spending US Dept Health Human Services
  - 5% of population spend almost half US Dept Health Human Services
    - CHF, CAD, COPD, Diabetes, Asthma

Industry Drivers

- Commercial third party payors
  - Narrowing networks based upon quality
  - Pay or performance
- Delivery system reform
  - Consolidation
  - Integration
  - Outpatient
- Development of technology
  - Medical Technology: $350 billion – 2013
  - Digital Health: $233 billion by 2020

Roles of Payers, Providers, Patients Traditionally Stable

Assumptions Underlying Provider Growth Strategy

Entrenched Payer

- Maintain broad provider networks
- Pass excess cost growth on to employers through brokers

Established Provider

- Expect steady public-payer, commercial price growth
- In-network for most plans

Price-Insulated Patient

- Open access to broad provider network
- Seek care with little concern for out-of-pocket payment

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Source: Health Care Advisory Board interviews and analysis.

Three Trends Threatening the Traditional Provider Business Model

- Medicare Payment Innovation
  - New risk-based payment models
  - Growth of Medicare Advantage
- Market-Based Medicaid Reform
  - Growth of Medicaid Managed Care
  - Commercialization through "*Private Option*"
- Increased Commercial Market Competition
  - Many new options in individual market
  - New competition in group market

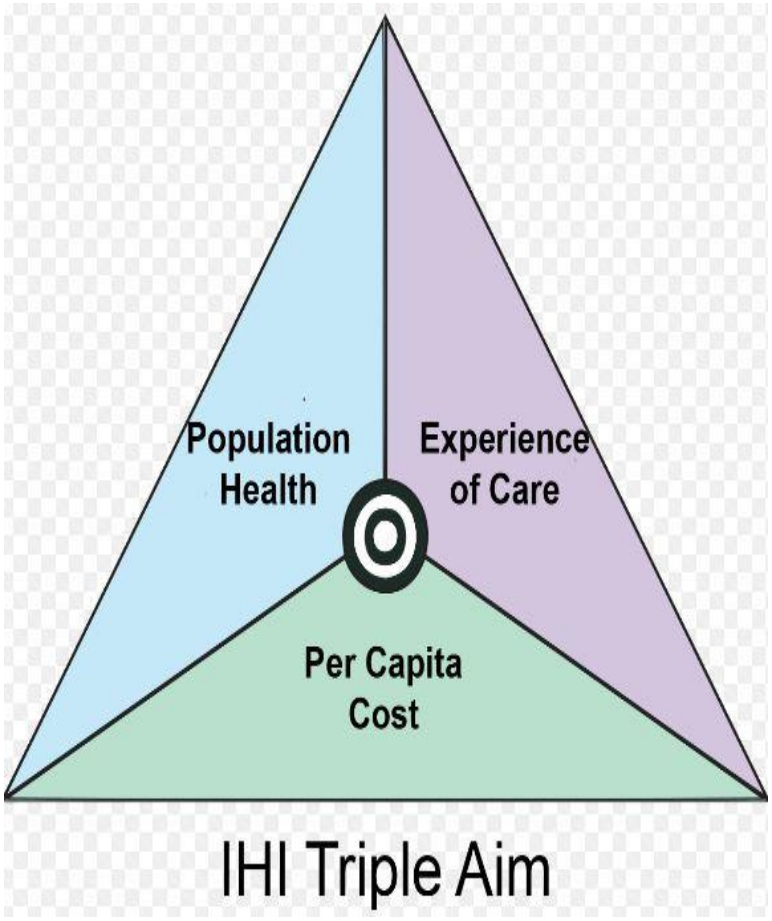
Industry Themes

- New Reimbursement Models
- Prevention and Wellness
- Disease and Care Management
- End of Life
- Declining Reimbursements
- Reduction in Inpatient and Diagnostic Services

Industry Themes

- Less Room for Error/Better Care
- Lower Costs
- Portable and Remote Access to Records
- Integration of Clinical Decision Making
- More Easily Obtainable Information
- Enhanced Revenue

Institute for Healthcare Improvement Triple Aim



"The IHI Triple Aim," Institute for Healthcare Improvement, http://www.ihi.org/engage/initiatives/tripleaim/Pages/default.aspx (Accessed 10/12/15).

Triple Aim Translation

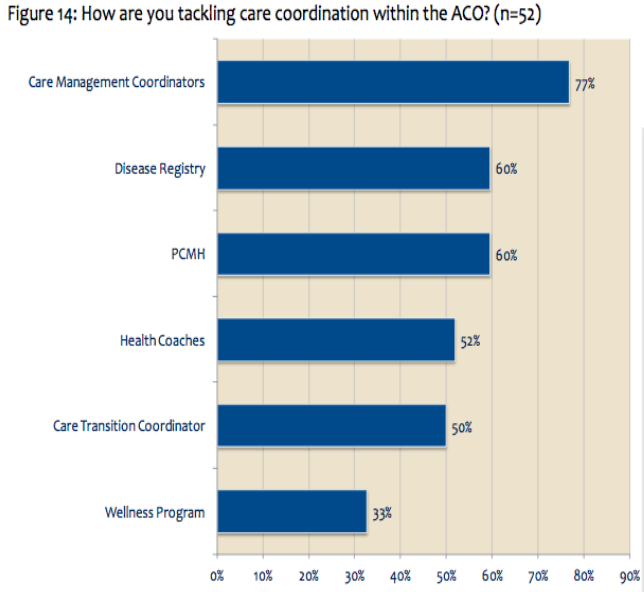
- Lower Cost per Capita
  - Reduce unnecessary Admissions, ER visits and Readmissions
  - Reduce Duplicate Tests
  - Care Coordination – patient referral patterns
  - Identify utilization and cost overruns – change provider behavior
- Population Health
  - Risk Stratify Population
  - Focus on high risk patients (Care Manage)
  - Prevention
- Experience of Care
  - Engage Patients in their care
  - Monitor and influence behavior

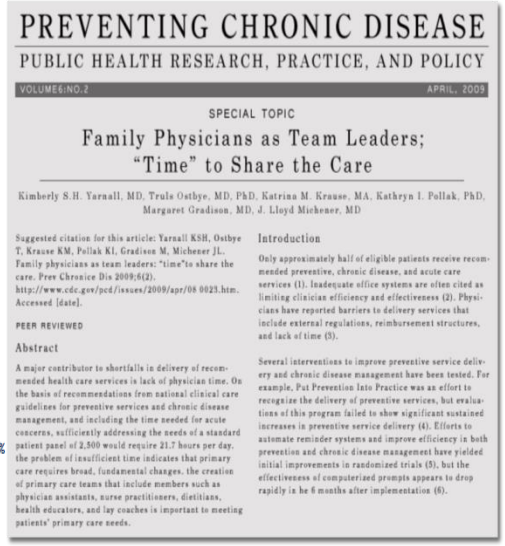
Other Key Drivers

- Quality Measures
  - CMS – ACO 33 Measures
  - NCQA – HEDIS 179 Measures
  - NQF
  - PQRS
  - STARS
  - Commercial Specific

Current Strategies

- Proactively manage populations of patients
- Focus on medium and high risk members
- Coordinated, proactive approach to care
- Focus on prevention and chronic care
- Engage physicians
- Engage patients




PREVENTING CHRONIC DISEASE

PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

VOLUME 6: NO. 2 APRIL, 2009

SPECIAL TOPIC

Family Physicians as Team Leaders; "Time" to Share the Care

Kimberly S.H. Yarnall, MD, Trula Ostbye, MD, PhD, Katrina M. Krause, MA, Kathryn I. Pollak, PhD, Margaret Gradison, MD, J. Lloyd Michener, MD

Suggested citation for this article: Yarnall KSH, Ostbye T, Krause KM, Pollak KI, Gradison M, Michener JL. Family physicians as team leaders: "time"to share the care. Prev Chronice Dis 2009;6(2). http://www.cdc.gov/pcd/issues/2009/apr/08 0023.htm. Accessed [date].

PEER REVIEWED

Abstract

A major contributor to shortfalls in delivery of recommended health care services is lack of physician time. On the basis of recommendations from national clinical care guidelines for preventive services and chronic disease management, and including the time needed for acute concerns, sufficiently addressing the needs of a standard patient panel of 2,500 would require 21.7 hours per day. the problem of insufficient time indicates that primary care requires broad, fundamental changes. the creation of primary care teams that include members such as physician assistants, nurse practitioners, dietitians, health educators, and lay coaches is important to meeting patients' primary care needs.

Introduction

Only approximately half of eligible patients receive recommended preventive, chronic disease, and acute care services (1). Inadequate office systems are often cited as limiting clinician efficiency and effectiveness (2). Physicians have reported barriers to delivery services that include external regulations, reimbursement structures, and lack of time (3).

Several interventions to improve preventive service delivery and chronic disease management have been tested. For example, Put Prevention Into Practice was an effort to recognize the delivery of preventive services, but evaluations of this program failed to show significant sustained increases in preventive service delivery (4). Efforts to automate reminder systems and improve efficiency in both prevention and chronic disease management have yielded initial improvements in randomized trials (5), but the effectiveness of computerized prompts appears to drop rapidly in he 6 months after implementation (6).

Technology Perspectives

- Payors
  - Using
  - Creating
  - Sharing
- Hospital Systems
  - Using
  - Creating
  - Sharing
- Pharmaceutical/Manufacturer
  - Using
  - Creating
- Physicians
  - Using
  - Creating
- Ancillary Providers
  - Using
  - Creating
- Patients
  - Using
- Technology Companies
  - Using
  - Creating

Overview

- Range of technology in healthcare utilized during provision of healthcare clinical services:
  - Management platforms
  - Treatment tools, e.g., medical devices, diagnostics & therapeutics
  - Pharmaceuticals
  - Computer hardware and software that providers utilize during provision of clinical services and treatment plans
  - Patient record management
  - Protocols, procedures, and treatment plans constituting the standardized course of care
- Healthcare technology has been evolving since the beginning of medical science

Overview

- Multiple factors have contributed to the struggle of the healthcare system to fund emerging technologies. These factors include:
  - The economic downturn, beginning in 2008
  - The failure of the market to rebound to pre-recession levels
  - The uncertainty surrounding the state of healthcare reform
  - Limited access to capital
  - Ongoing issues related to reimbursement

"2011 Capital Spend: EMR Dominates Budgets" By Karen Minich-Pourshadi, HealthLeaders Media Intelligence Report, March 2011, p.3.

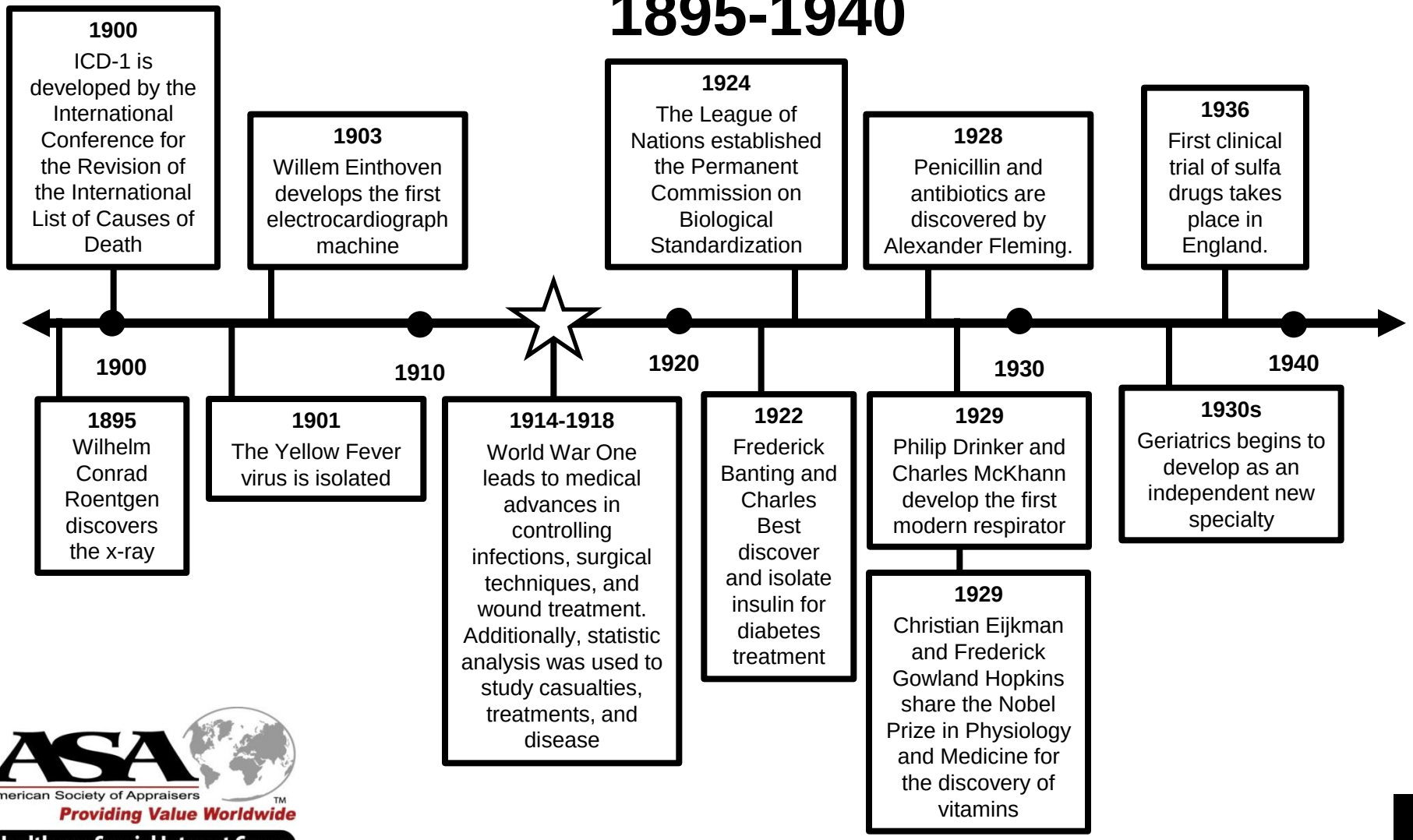
Overview

- Despite the recession, recent data suggests that the healthcare industry is still committed to spending
  - In 2015, The National Institutes of Health's Information Technology Acquisition and Assessment Center announced it is awarding $20 billion in IT work

"NIH to spend $20B on Health IT" Healthcare IT News, http://www.healthcareitnews.com/news/nih-spend-21b-health-it (Accessed 4/21/2015).

The Historical Role of Healthcare Technology

Milestones of Technological Innovations: 1895-1940



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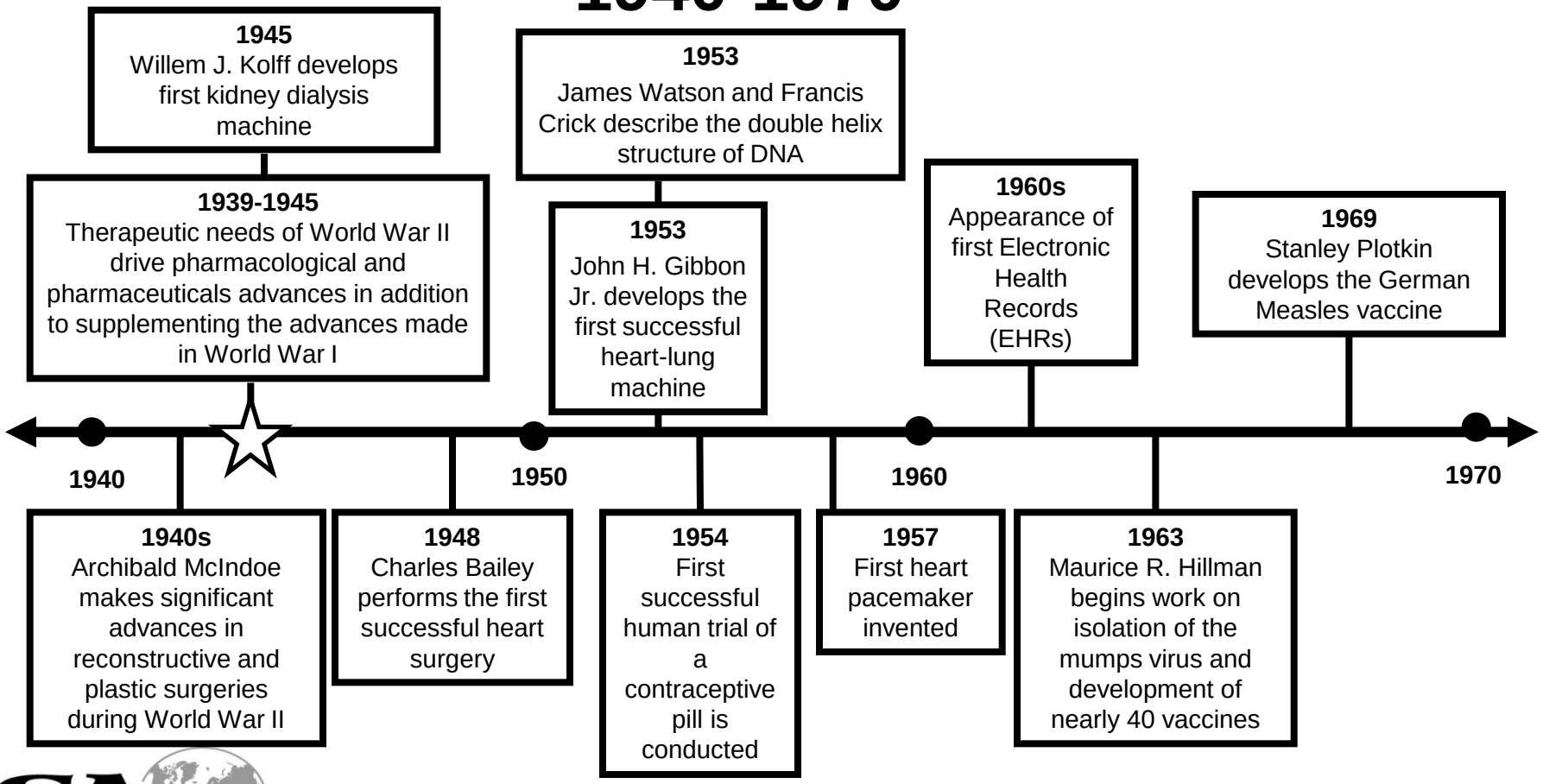
Milestones of Technological Innovations: 1940-1970



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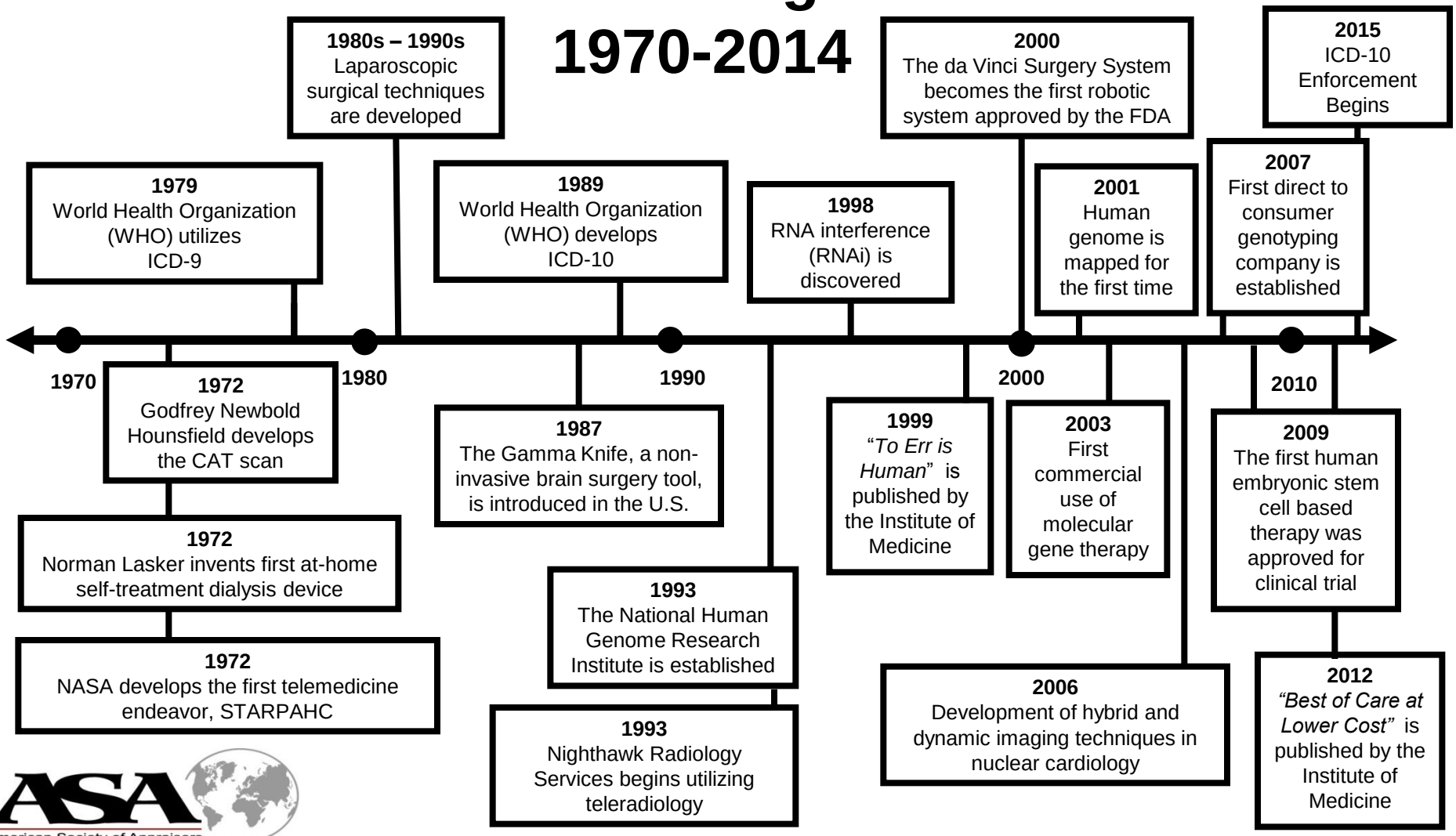
Milestones of Technological Innovations: 1970-2014



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The Current Role of Technology in Healthcare

Notable Precursors of EHR Technology

Year	Program	Developer	Impact
1960s-1970s	Technicon Data System (TDS)	Lockheed and El Camino Hospital	Processing speed and flexibility let multiple users into the system at one time
1960s	Health Evaluation through Logical Processing (HELP)	University of Utah and Latter-Day Saints Hospital (brought to market by the 3M Corporation)	One of the first clinical decision support programs
1968-1975	Computer Stored Ambulatory Record (COSTAR)	Harvard University and Massachusetts General Hospital	Compartmentalized design increased efficiency and flexible vocabulary accounted for terminology variations and first to be made available in public domain
1970s	Decentralized Hospital Computer Program (DHCP)	U.S. Department of Veterans' Affairs	First time federal government began using EHR
1983	THERESA	Emory University and Grady Memorial Hospital	First system to encourage direct physician data entry
1986	The Medical Record (TMR)	Duke University Medical Center	Made data easy to manipulate and sort for ease of reference, giving way to Duke's Health Information System
1988	Composite Health Care System (CHCS)	U.S. Department of Defense	Renowned for lowering medical errors integrating various health record components

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"Electronic Health Records Overview" MITRE Center for Enterprise Modernization, To National Institutes of Health, National Center for Research Resources, McLean, VA: MITRE, April 2006, p. 2; "History of Medicine: Development of the Electronic Health Record" By Jim Atherton, American Medical Association Journal of Ethics, Vol. 13, no. 3, March 2011, p. 187; "Computer-Based Patient Record Technologies" National Research Council, The Computer-Based Patient Record: An Essential Technology for Health Care, Revised Edition, Washington, D.C., The National Academies Press, 1997, p. 114-115, 117-118; "History of Health Informatics at Duke" Duke Center for Health Informatics, Durham, N.C.: 2010, p. 2, Accessed at http://www.google.com/url?sa=t&rct=j&q=%22the%20medical%20record%22%20duke&source=web&cd=2&ved=0CFEQFjAB&url=https%3A%2F%2Fwww.dchi.duke.edu%2Fabout-us%2Fdchi-book%2FThe%2520evolution%2520of%2520Duke%2520systems.pdf&ei=5DT7T8akDYHs8wS0i4zXBg&usgAFQjCNFpqc5cfDVHWXsDMsvNtN3i-tTGgA (Accessed 7/9/12).

Management Technology

- The demand for healthcare services is expected to increase dramatically in the coming years, as:
  - Access improves
  - General population grows
  - Number of individuals over the age of 65 increases
  - Physician shortage worsens

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""Population" in "Statistical Abstract of the United States: 2012" U.S. Census Bureau, 131st Edition, Washington, D.C., 2011, p. 9.
"Why Population Aging Matters: A Global Perspective" National Institute on Aging, National Institute of Health, the United States Department of Health and Human Services, http://www.nia.nih.gov/sites/default/files/WPAM.pdf (Accessed 05/14/12).
"Physician Shortages to Worsen Without Increases in Residency Training" Association of American Medical College, 2010, https://www.aamc.org/download/286592/data/physicianshortage.pdf (Accessed 8/2/2012).

Management Technology

- As of March 4, 2015, more than 16 million people enrolled in health insurance through the marketplace and Medicaid since the October 1, 2013 open enrollment began
  - This number is expected to continue to increase
    - Providers will have to implement methods of managing added patient throughput
    - This growth in demand is a significant driver of more sophisticated patient management technologies
    - Infrastructure for gathering and interpreting quality and outcomes data to support evidence-based performance metrics as the foundation for value-based reimbursement

•"Health Insurance and the Affordable Care Act" Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services, May 5, 2015, http://aspe.hhs.gov/sites/default/files/pdf/83966/ib_uninsured_change.pdf (Accessed 8/24/15).
•"Obamacare Enrollment Could Hit 7 Million As Signup Enters Final Day," By Bruce Jaspen, Forbes, March 3, 2014, http://www.forbes.com/sites/brucejapsen/2014/03/30/obamacare-signup-could-hit-7-million-target-as-signup-enters-final-day/ (Accessed 4/21/14).

Management Technology

- Management technologies include:
  - Processes and procedures through which providers organize patient encounters, charge entry, and manage the billing process
  - Software and devices that support these endeavors
- Most publicized healthcare management methods involve the interoperable exchange and consolidation of patient data and treatment standards

Management Technology

- Most current *management systems* are implemented as a single package, and many contain:
  - Electronic health records (EHRs)
  - Computerized physician order entry (CPOE)
  - Billing components

Technology as "Process"

- The term ***healthcare technology*** goes beyond the simple hardware and software utilized by providers
  - Includes such intangible concepts as:
    - ***Healthcare processes***
- ***Process technologies*** can affect the manner and structure by which healthcare is delivered and measured on both a clinical and management level, including:
  - Treatment protocols
  - Care mapping
  - Case management

Management Protocols

- Aim to reduce healthcare spending without lowering quality care delivered by establishing protocols that allow providers to appropriately identify those procedures in which the expected treatment benefits to the patient are outweighed by the costs of delivering such care, including:
  - Beta blockers for high-risk patients after heart attack
  - Treatment for moderate hypertension
  - Dialysis for end stage renal failure

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"Can cost-effective health care = better health care?" Harvard School of Public Health, HSPH News (Winter 2010), http://www.hsph.harvard.edu/news/magazine/winter10assessment/ (Accessed 4/21/14); "Is Health Spending Excessive? If So, What Can We Do About It?" By Henry J. Aaron and Paul B. Ginsberg, Health Affairs, Vol. 28, No. 5, September/October 2009; "Let's (Not) Get Physicals" By Elisabeth Rosenthal, The New York Times, June 2, 2012.

Management Protocols

- 2012 IOM Report - "*Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*"
  - Recommended steps to facilitate relationships between technology & providers:
    - Ensure that EHR systems and other digital technologies capture & deliver the core data elements needed to support knowledge generation
    - Partner with patients, the delivery system, insurers, researchers, innovators, regulators, & other stakeholders

Management Protocols

- 2012 IOM Report - "*Best Care at Lower Cost: The Path to Continuously Learning Health Care in America,*" continued
  - Recommended steps to facilitate relationships between technology & providers:
    - Collaborate in development of core data sets for different diseases & conditions to support clinical care, improvement & research
    - Consider interoperability & integration in clinical workflows in designing digital health systems
    - Develop tools that assist individuals in managing their health & healthcare & that provide opportunities for building communities to support patient efforts

"Best Care at Lower Cost: The Path to Continuously Learning Health Care in America," Institute of Medicine, Washington, D.C.: The National Academies Press, 2012.

Caregiver Experience

- Empower clinicians with intuitive and meaningful solutions that enable positive healthcare delivery
  - Enabling positive experiences
  - Access to information – anytime/anywhere
  - Supporting the ability to make smart decisions
  - Simplifying the clinician workflow
  - Improve EHR access

Capacity/Resource Management

- Reduce costs by managing labor cost in real time and by using predictive algorithms that result in actionable cost savings
- Eliminate needless searching for patients, providers, and equipment and quickly identify their real time location
- Ensure each patient receives the required resources to achieve their expected health outcomes
- Improve patient throughput by improving efficiencies for environment services and transport

Patient Experience

- Creating the optimal patient experience where patients are engaged, informed, connected and entertained throughout the care process
  - Faster recovery times
  - Better decision making
  - Increased patient satisfaction
  - Reduced readmission rates

Workflow Optimization

- Creating efficiencies and optimizing clinical and non-clinical processes across the enterprise
  - Streamlined processes
  - Access to information for everyone involved in the patient's care
  - Time-saving solutions
  - Evidence-based design

Patient Safety

- Top issues in patient safety in 2014:
  - Hand-off communications
  - Medication errors
  - Lack of interoperability
- ECRI Institute's Health Technology Hazards for 2014:
  - Alarm hazards
  - Infusion pump medication errors
  - Robotic surgery complications
  - Data integrity failures in EHRs and other Health IT systems

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"2014 Top 10 Health Technology Hazards," ECRI Institute, https://www.ecri.org/Forms/Pages/2014_Top_10_Hazards.aspx (Accessed 4/21/14); "Challenges & Solutions," Patient Safety Movement, http://patientsafetymovement.org/challenges-and-solutions/ (Accessed 4/21/14).

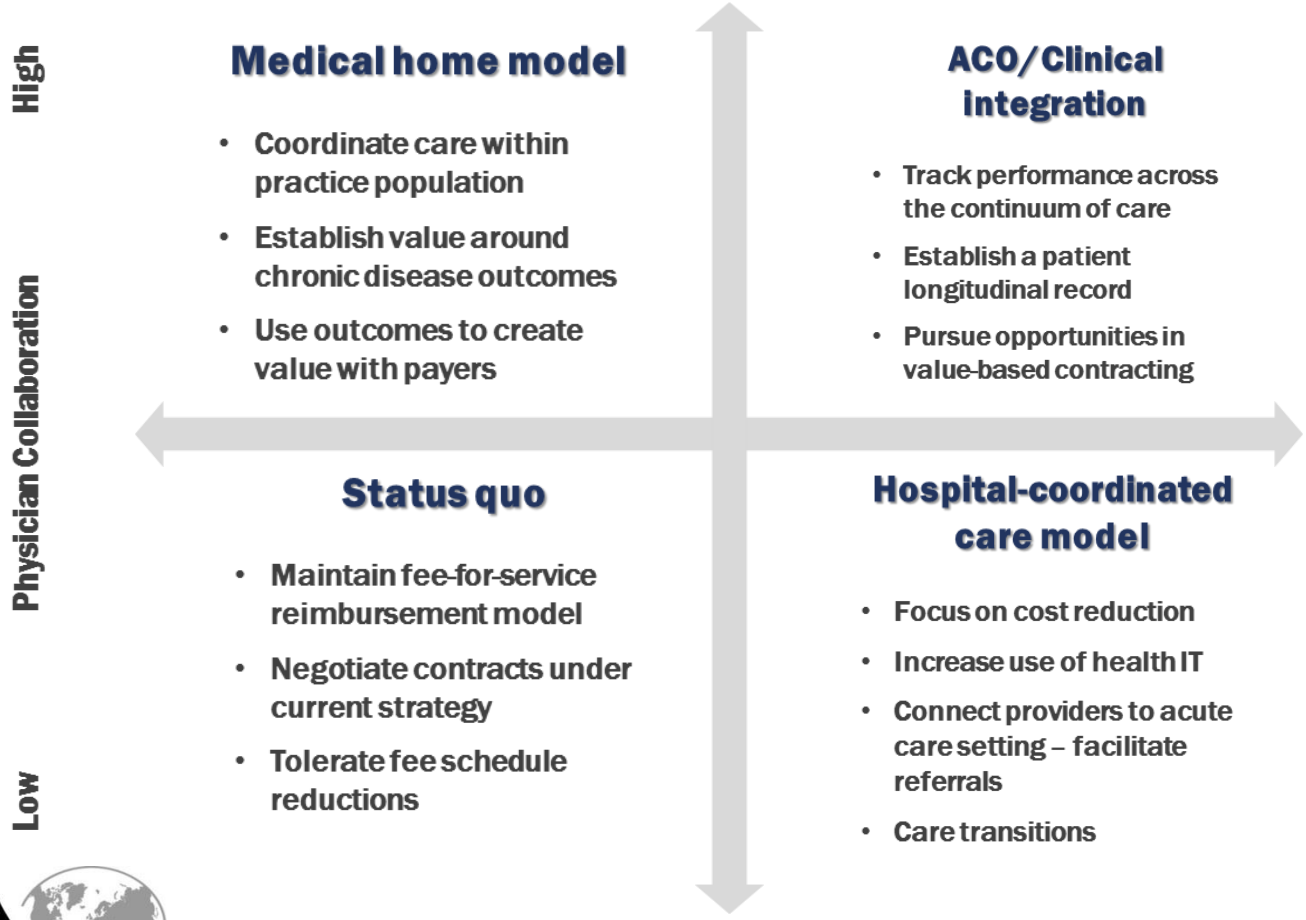
Replatforming Healthcare: 8 Rules for Disruption

- *Networks & network* effects, not silos
- *Platforms*, not just products
- *Business ecosystems*, not just business models of individual companies
- *Pull*, not just push

Replatforming Healthcare: 8 Rules for Disruption

- *Patient access and control*, not just provider control of health records
- *Strategic openness,* not *"hoarding"* of data and workflow
- *Personalized context*, not just centralized locations
- *Digital value creation*, not just physical value creation

Population Health Strategy Segmentation Model



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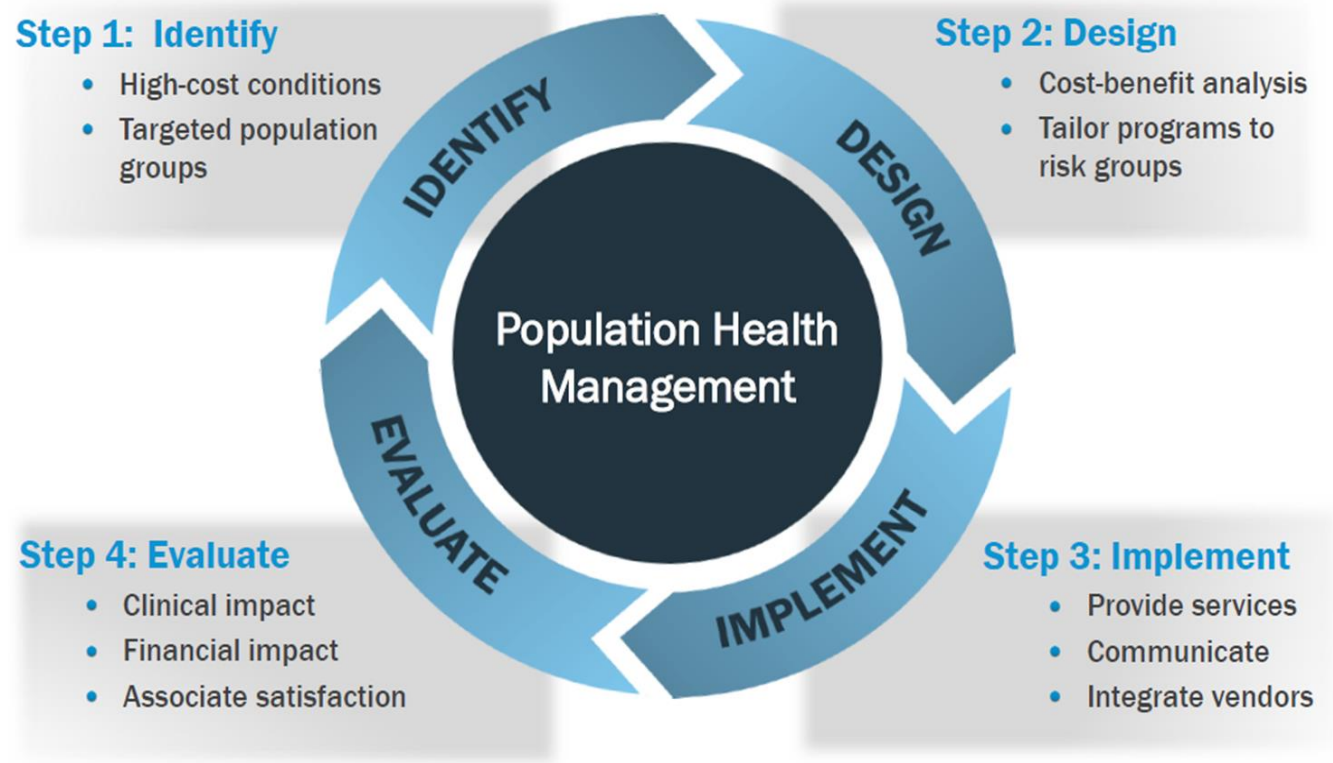
Beyond the Enterprise Medical System

- Emergence of the population health framework
- Risk management shifts from insurers to providers
- Population health "assets" will not come from one organization
- Big data and analytics will be the next foundation system
- Patient and member engagement

Strategic Approach to Managing Our Population



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Solutions that Drive System Transformation

- Wellness Management
  - Health risk assessment and biometric screening
- Benefits Administration
- On-site Health Center
- On-site Pharmacy
- Health Competitions

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Big Tech Brands Versus Healthcare-Specific Analytics for Providers

- Hospitals and networks with over 200 beds expressed perceptions of leaders in the business intelligence (BI) market
- Fragmented market with dynamics along two key dimensions:
  - BI Product Depth
  - Healthcare Specificity

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Big Tech Brands Versus Healthcare-Specific Analytics for Providers

- BI product depth consists of front-end user presentation, back-end data integration, and management BI tools
  - Microsoft, SAP, and SAS have product depth, but little healthcare-specific BI support
  - IBM and Oracle have depth and some healthcare-specific tools, such as data models and templates
  - Qlik View and Tableau are largely presentation tools

Big Tech Brands Versus Healthcare-Specific Analytics for Providers

- Healthcare specificity – having a healthcare focus and vision, including BI content, models, and prebuilt functionality for healthcare use cases
  - Explorys is noted for structured and unstructured data
  - Health Catalyst is noted for its data warehouse
  - McKesson is noted for its data range of healthcare products
  - Humedica is noted for population health support

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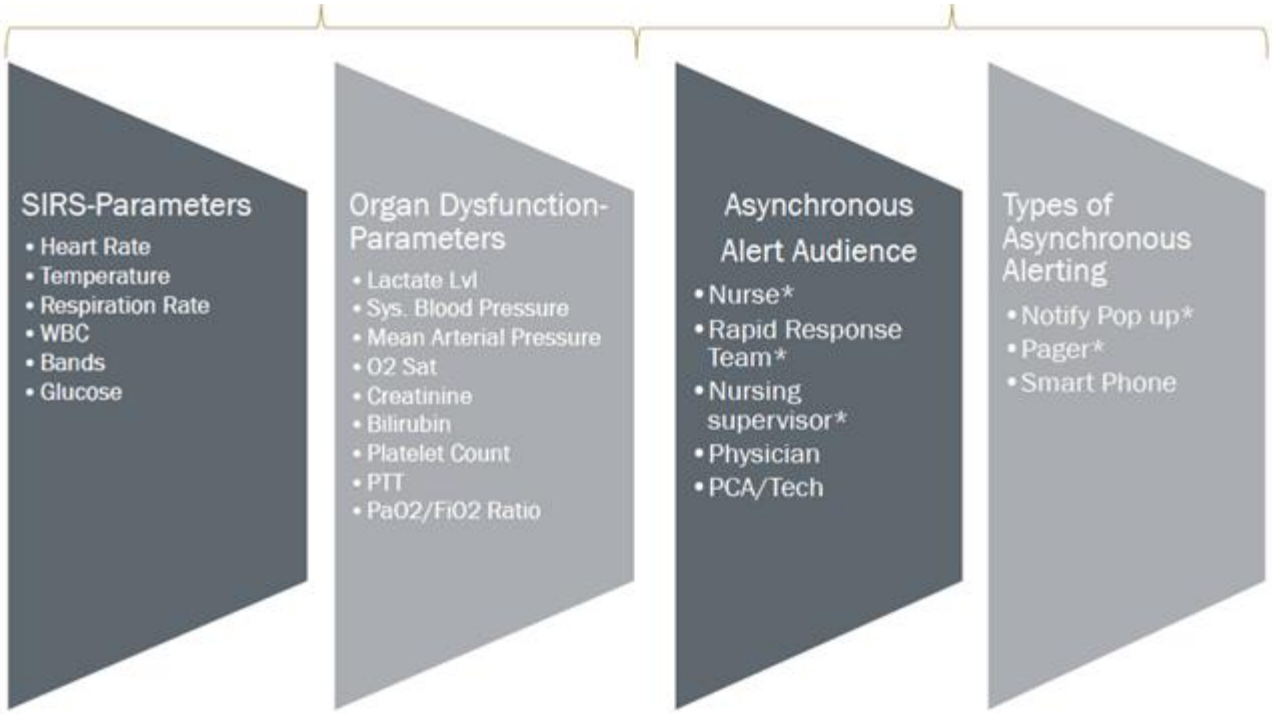
Running Clinical Decision Support from Cloud - Sepsis

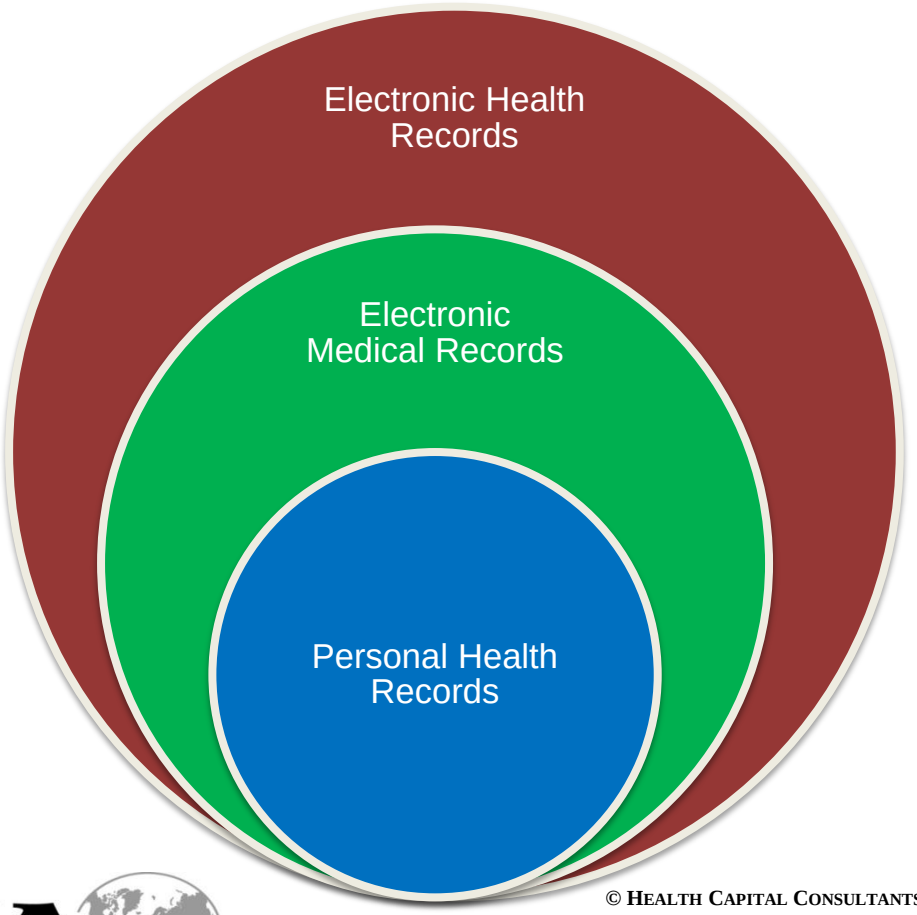
Within Cloud Within Millennium Domain



Electronic Records

- Electronic patient records may avoid some of the pitfalls of paper records, including:
  - Wasted resources
  - Storage concerns
  - Misplacement
  - Retrieval issues
  - Legibility, accuracy, and validity

Scope of Electronic Record Systems



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- All electronic records containing health information
- All interoperable electronic records containing health information maintaining certain standards
- All interoperable electronic records containing health information maintaining certain standards that allow a level of control by the patient

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"Defining Key Health Information Technology Terms," The National Alliance for Health Information Technology, To The National Coordinator for Health Information Technology – Department of Health & Human Services, April 28, 2008, p. 15.

Electronic Records

- Facilities that use EHR systems increase practitioners' efficiency at:
  - Filing, managing, organizing, and finding patients' demographic data
  - Recording progress notes, problems, medications, vital signs, past medical histories, immunizations, laboratory data, and radiology reports
- Modern EHR systems are:
  - Based on the research and pilot testing conducted in academic medical centers
  - Developed for use by governmental clinical care organizations

"Electronic Health Record" Health Information Management System Society, http://www.himss.org/ASP/topics_ehr.asp (Accessed 6/22/09);

Electronic Health Records and Meaningful Use

- Medicare and Medicaid EHR Incentive Programs provide financial incentives for the *"meaningful use"* of certified EHR technology to improve patient care

- To receive an EHR incentive payment, providers must show they are *"meaningfully using"* EHRs by meeting certain objectives

- Applies to eligible professionals, hospitals, and critical access hospitals

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"EHR Incentive Programs: Meaningful Use," Centers for Medicare & Medicaid Services, http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html (Accessed 4/14/14).

Meaningful Use

- ***Meaningful Use*:** Vague standard coined by CMS to determine whether providers are eligible for EHR incentive payments
- Achieving *meaningful use* has fallen as a top priority for healthcare IT executives
    - 2014 – 25% identified *meaningful use* as a top priority
        - Down from 28% in 2013, and 50% in 2011
- Implies that many organizations believe they have achieved *meaningful use*

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"2014 HIMSS Leadership Survey: Senior IT Executive Results" Healthcare Information and Management Systems Society, February 24, 2014, p. 8.

Meaningful Use

Stages of Meaningful Use:

- **Stage 1** – Focused on collecting data and moving toward the use of clinical decision support (2011-2012)
- **Stage 2** – Designed to improve care and lay the foundation for Stage 3 (2014)
- **Stage 3** – Promote quality outcomes (2016)

Electronic Health Health and Meaningful Use

- 78% of office-based physicians have adopted some sort of EHR system
  - 48% of these physicians have a basic EHR system
    - Twice the 2009 percentage
- 59% of hospitals have adopted some sort of EHR system
  - Four times the 2010 percentage
  - Only 5.8% of hospitals have met Stage 2 criteria

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"Despite Substantial Progress In EHR Adoption, Health Information Exchange And Patient Engagement Remain Low In Office Settings," Michael F. Furukawa, Jennifer King, Vaishali Patel, Chun-Ju Hsiao, Julia Adler-Milstein and Ashish K. Jha, Health Affairs, Vol. 33, No. 9 (September 2014), p. 3-4. "More Than Half of US Hospitals Have At Least A Basic EHR, But Stage 2 Criteria Remain Challenging For Most," Julia Adler-Milstein, Catherine M. DesRoches, Michael F. Furukawa, Chantal Worzala, Dustin Charles, Peter Kralovec, Samantha Stalley and Ashish K. Jha, Vol. 33, No. 9 (September 2014), p. 4.

Electronic Health Records

- Among those that do use EHRs for managing population health, they report it's not always easy
  - About 50% indicate most of the functions are easy
  - About 20% indicate that EHR is difficult to use

Patient Health Records (PHRs)

- PHRs provide individuals with the means to document, track, and evaluate their health conditions to:
  - Facilitate more informed healthcare decisions
  - Improve personal health status
  - Reduce costs
  - Improve the quality of healthcare

"Defining Key Health Information Technology Terms" By The National Alliance for Health Information Technology, To The National Coordinator for Health Information Technology – Department of Health & Human Services, April 28, 2008, p. 17.

Health Information Exchanges (HIE)

- Transmission of healthcare-related data among facilities, health information organizations, and government agencies
- Essential for:
  - Monitoring and identifying population health trends
  - Identifying opportunities for population health interventions
  - Predicting impact of population health interventions
- 97% of hospital executives predict their organization will participate in an HIE that allows sharing of health information among providers by 2019

"Coordinating Care to Provide Effective Population Health Management," By Heather Jorna, et al., FutureScan 2014, p. 7-8; "Health Information Exchange (HIE)," Healthcare IT News, http://www.healthcareitnews.com/directory/health-information-exchange-hie (Accessed 4/15/2014).

Electronic Prescribing: Computerized Physician Order Entry (CPOE)

- In 2008, one adverse drug effect (ADE) added, on average, $2,000 to the cost of hospitalization
- In 2010, $21 billion in healthcare spending was wasted on preventable medication errors
- CPOE allows physicians and providers to electronically order laboratory, pharmacy, and radiology services
- Objective - Minimizing error by eliminating the difficulties and ambiguity associated with hand-written orders
- As of 2013, 616 U.S. hospitals had *some form of CPOE* system in place.

"Preventing Medication Errors: A $21 Billion Opportunity" National Quality Forum, Compact Action Brief: A Roadmap for Increasing Value in Health Care, December 2010, p. 1.; Electronic Health Records Overview" MITRE Center for Enterprise Modernization, To National Institutes of Health, National Center for Research Resources, McLean, VA: MITRE, April 2006, p. 7; "Welcome to CPOE.org" Oregon Health and Science University, http://www.ohsu.edu/academic/dmice/research/cpoe/index.php (Accessed 6/22/09). "Results of the 2013 Leapfrog Hospital Survey" The Leapfrog Group" July 2014, http://www.leapfroggroup.org/media/file/2013LeapfrogHospitalSurveyResults_Final071714.pdf (Accessed 3/13/15), p. 9..

Telemedicine and Telehealth

- Cost-Benefit Analysis
  - For hospitals incurring physician shortages, telemedicine facilitates hospitalist recruitment
    - Provides more attractive work hours and the ability for a single practitioner to provide services to multiple hospitals at one time
  - Telemedicine:
    - Enhanced access
    - Expanded service area
    - Increased quality
    - Cost efficiencies
    - Patient-centered

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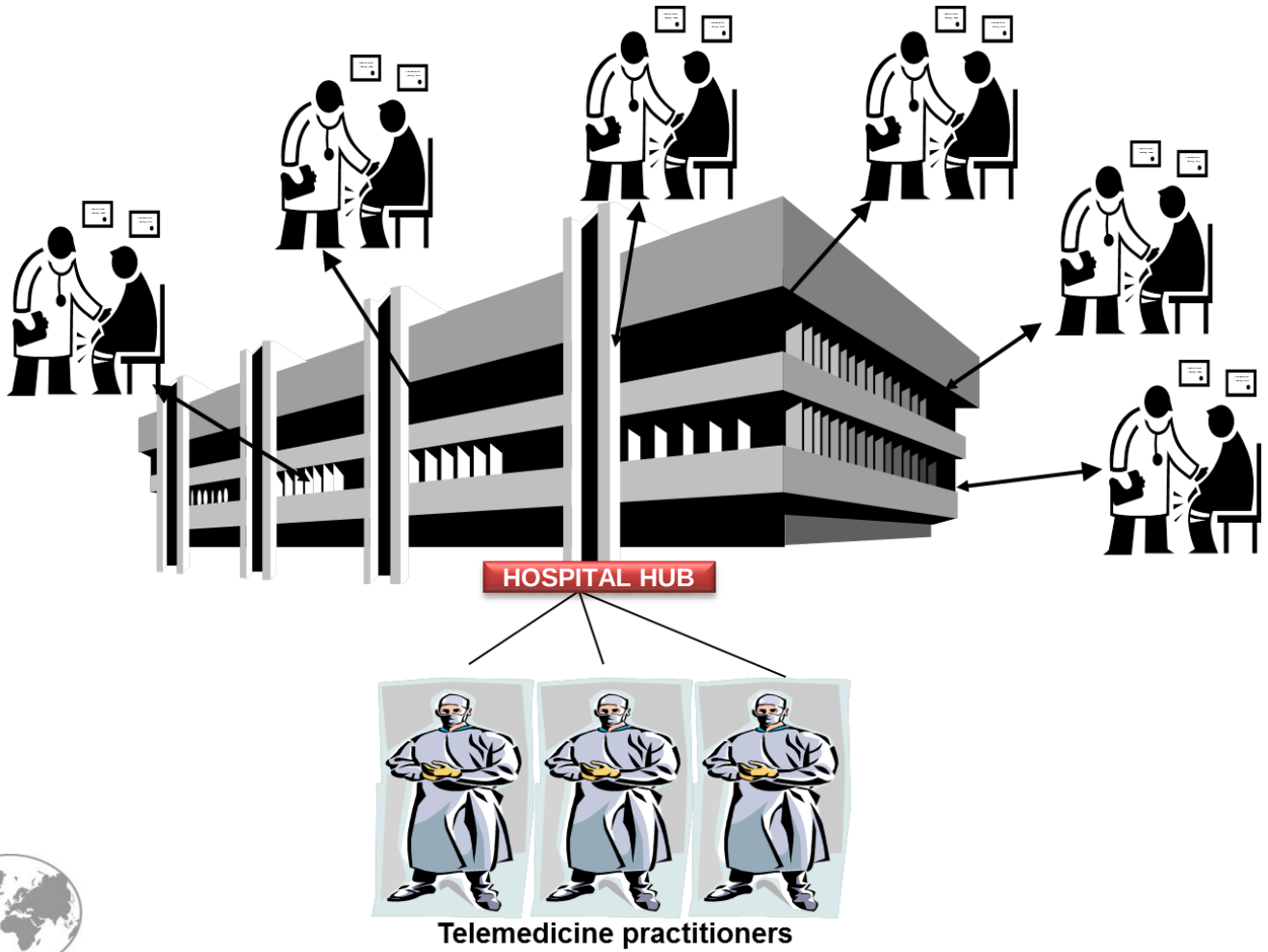
"Night-Shift Solutions" By Lisa Ryan, The Hospitalist, April 2009, http://www.thehospitalist.org/detains/article/183090/NightShift_Solutions.html (Accessed 6/20/09).

Traditional Telemedicine Model



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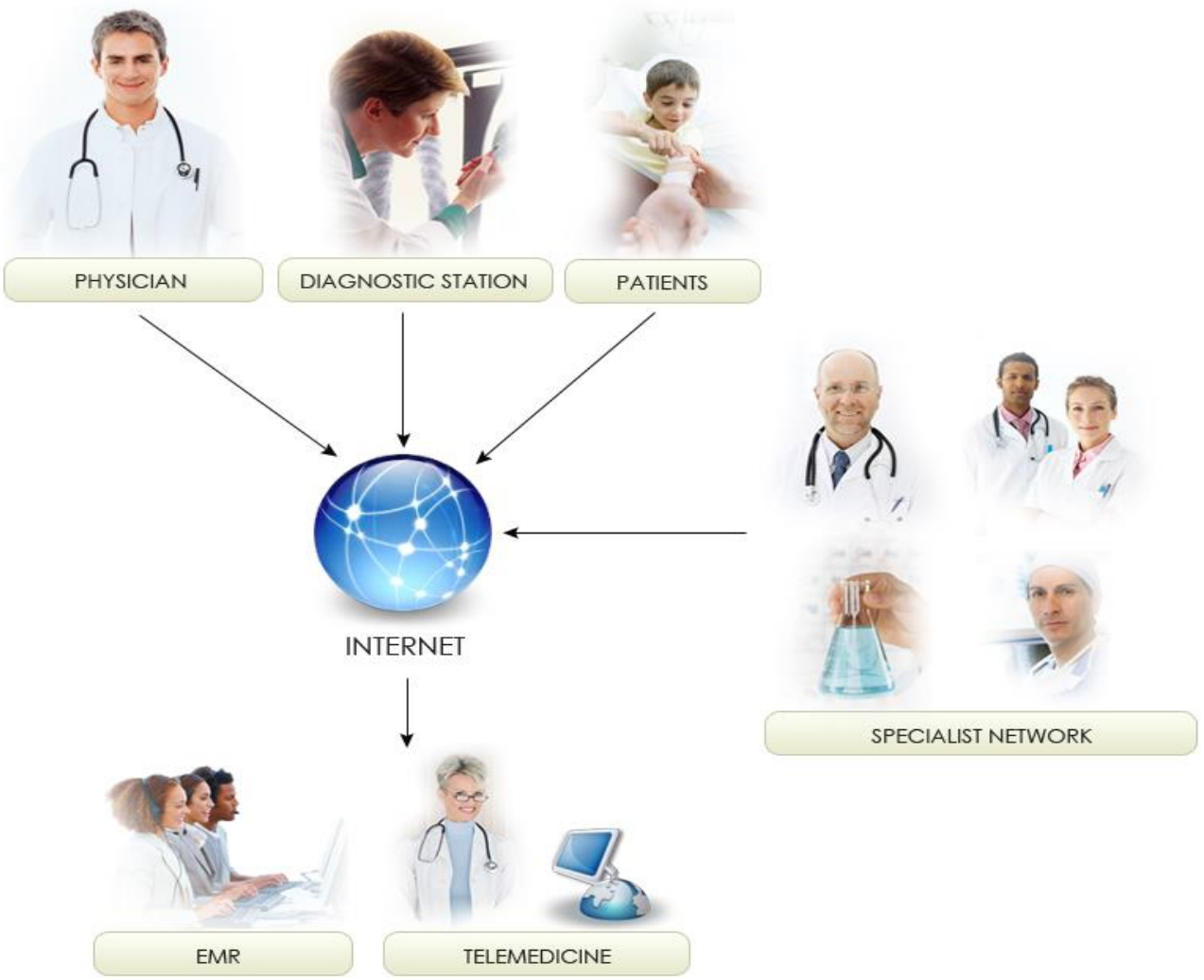
New Telemedicine Model



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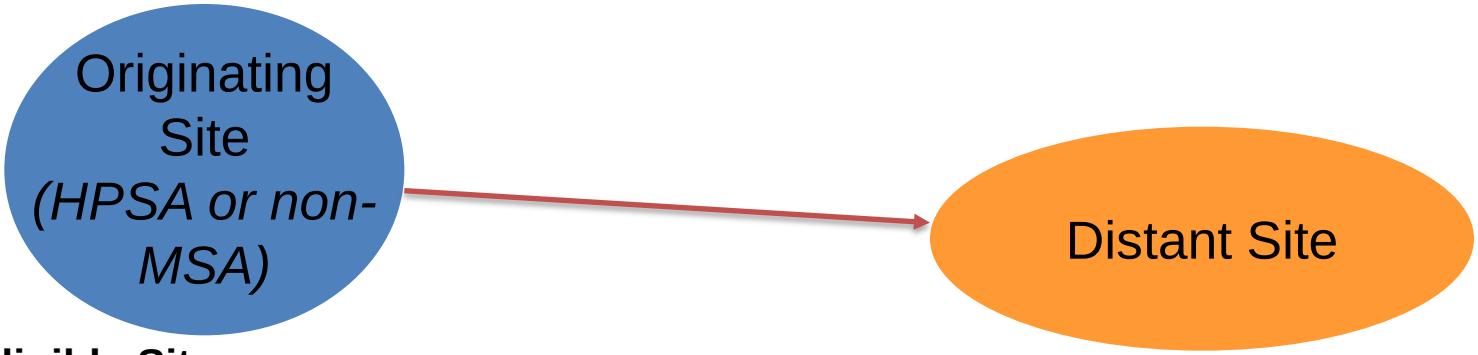
Telehealth & Medicare Reimbursement



Eligible Sites

- Physician or practitioner office
- Inpatient or outpatient hospital
- Critical access hospital
- Federally qualified health center
- Rural health clinic
- Hospital-based or critical access hospital ESRD
- Skilled nursing facility
- Community mental health center

Eligible Providers

- Physician
- Nurse Practitioner
- Physician Assistant
- Nurse midwife
- Clinical nurse specialist
- Clinical psychologist
- Clinical social worker
- Registered dietitian

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"Telehealth Services: Rural Health Fact Sheet Series," Centers for Medicare & Medicaid Services, December 2012, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf (Accessed 4/23/14).

Medicare Eligible Telehealth Services

- Initial inpatient and follow-up inpatient consultations
- Subsequent hospital care services
- Subsequent nursing facility care services
- Office or other outpatient visits
- Individual psychotherapy
- Pharmacologic management
- Psychiatric diagnostic interview examination
- End stage renal disease related services

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"Telehealth Services: Rural Health Fact Sheet Series," Centers for Medicare & Medicaid Services, December 2012, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf (Accessed 4/23/14).

Medicare Eligible Telehealth Services, continued

- Individual and group medical nutritional therapy
- Neurobehavioral status exam
- Individual and group health and behavior assessment and intervention
- Individual and group kidney disease education services
- Individual and group diabetes self-management training services
- Smoking cessation

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"Telehealth Services: Rural Health Fact Sheet Series," Centers for Medicare & Medicaid Services, December 2012, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf (Accessed 4/23/14).

Medicare Eligible Telehealth Services, continued

- Alcohol and/or substance abuse assessment and intervention
- Alcohol misuse screening and behavioral counseling
- Depression screening
- Behavioral counseling to prevent STIs
- Behavioral therapy for cardiovascular disease
- Behavioral counseling for obesity

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"Telehealth Services: Rural Health Fact Sheet Series," Centers for Medicare & Medicaid Services, December 2012, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf (Accessed 4/23/14).

New 2014 Medicare Eligible Telehealth Services

CY 2014 Physician Fee Schedule

- Added transitional care management (TCM) services
- Expanded definition of "*rural*" to allow more Health Professional Shortage Areas (HPSAs) to qualify as originating sites for telehealth services

"Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule, Clinical Laboratory Fee Schedule & Other Revisions to Part B for CY 2014," Centers for Medicare & Medicaid Services, Fed. Reg., Vol. 78, No. 237, December 10, 2013, 74399-74403.

Medicare Conditions of Payment for Telehealth Services

- Telehealth provider reimbursed per Medicare fee schedule
- Telepresenter not required
- Facility fee for originating site (currently $24.43)

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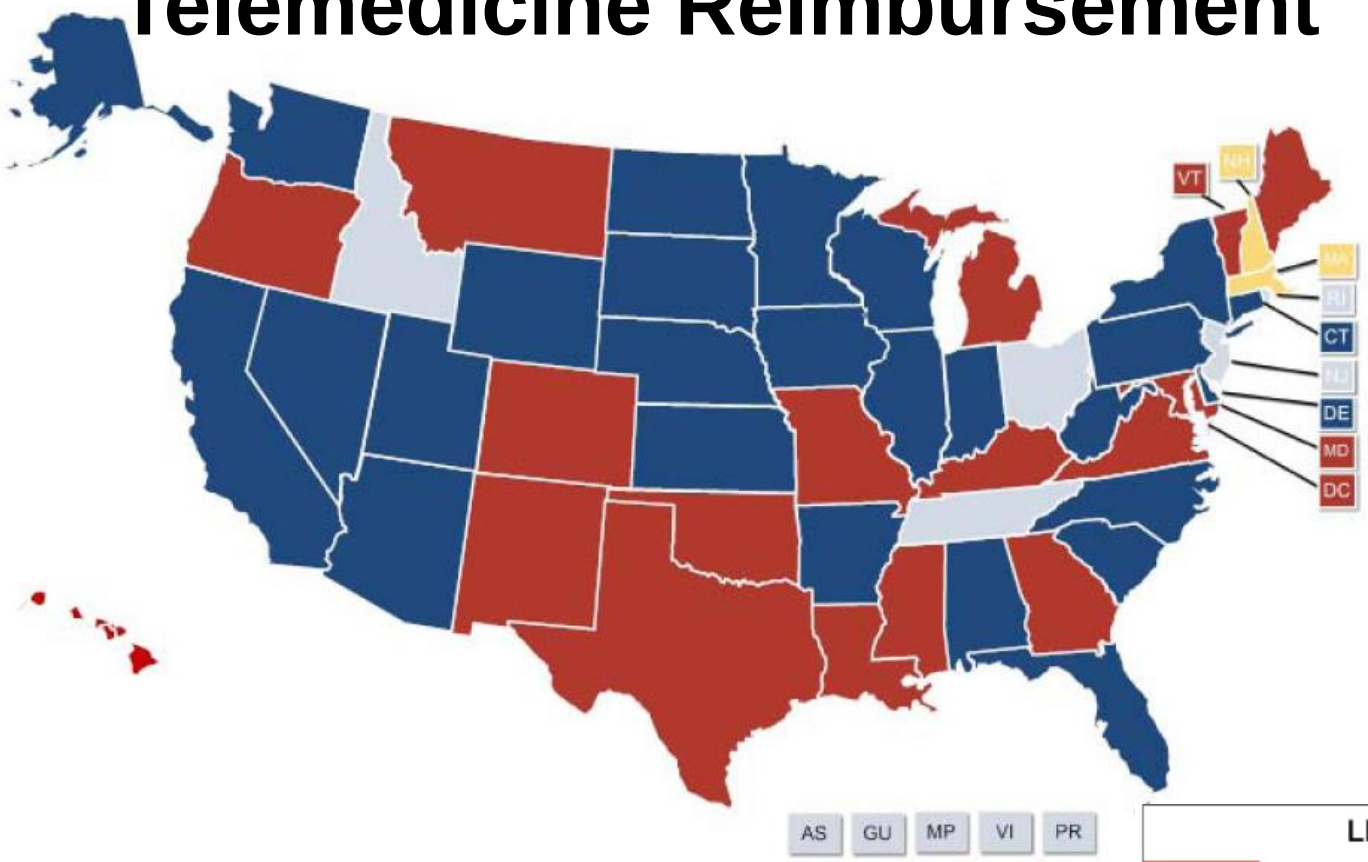
"Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule, Clinical Laboratory Fee Schedule & Other Revisions to Part B for CY 2014," Centers for Medicare & Medicaid Services, Fed. Reg., Vol. 78, No. 237, December 10, 2013, 74399-74405.

Telemedicine Reimbursement



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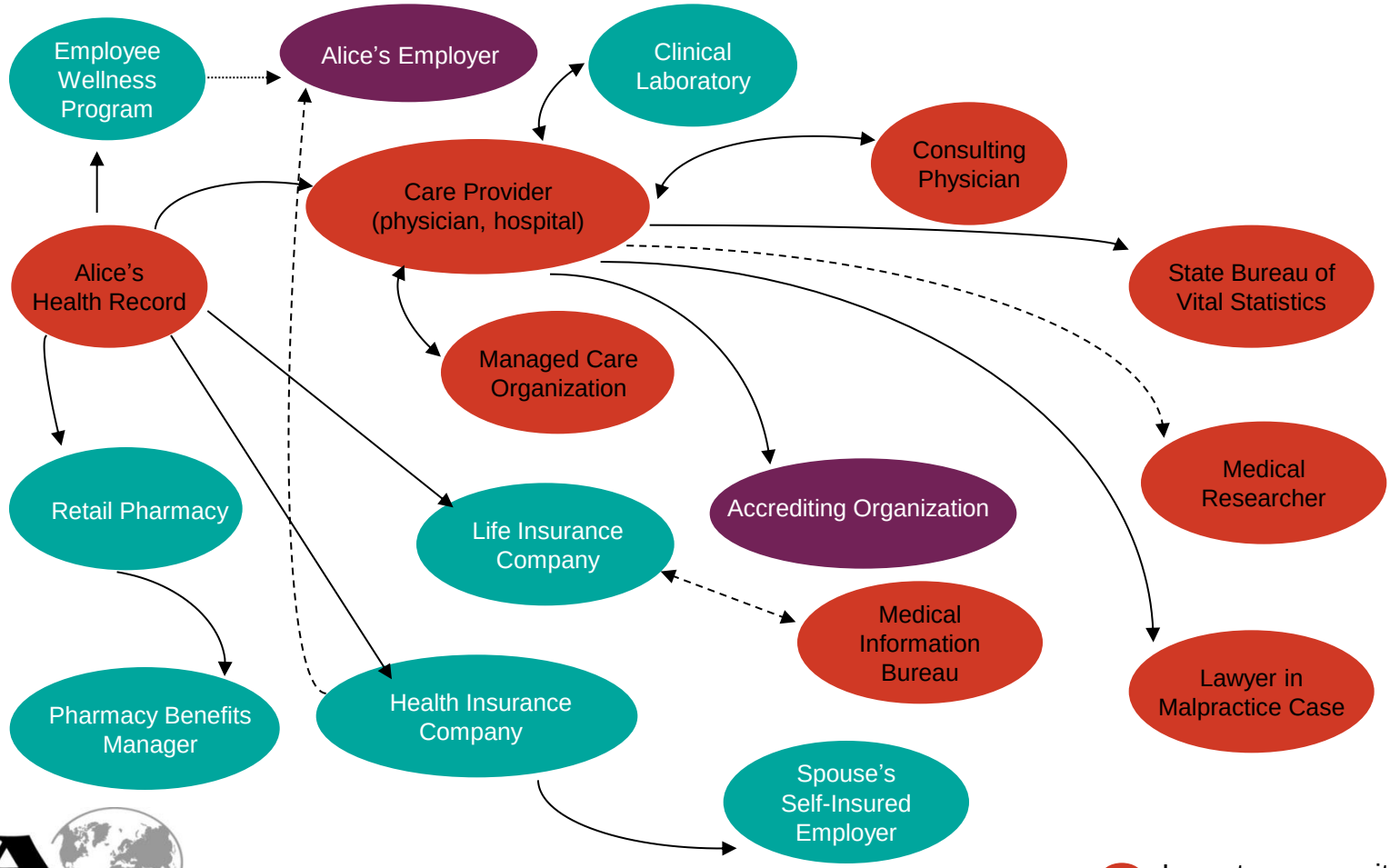
"State Coverage For Telehealth Services" National Conference of State Legislatures, http://www.ncsl.org/research/health/state-coverage-for-telehealth-services.aspx (Accessed 4/21/2015).

The Flow of Medical Information



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SOURCE: National Research Council, Computer Science and Telecommunications Board
For the Record: Protecting Electronic Health Information (Washington, DC: National Academy Press, 1997).

"Bring Your Own Device"

- Policy permitting employee to bring personally owned mobile devices to the health care workplace and use them to access restricted information and applications
- This is a cost effective means of implementing the use of technology in the health care workplace, but raises data security and HIPAA issues
  - "*BYOD*" policies and procedures

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Medical Devices

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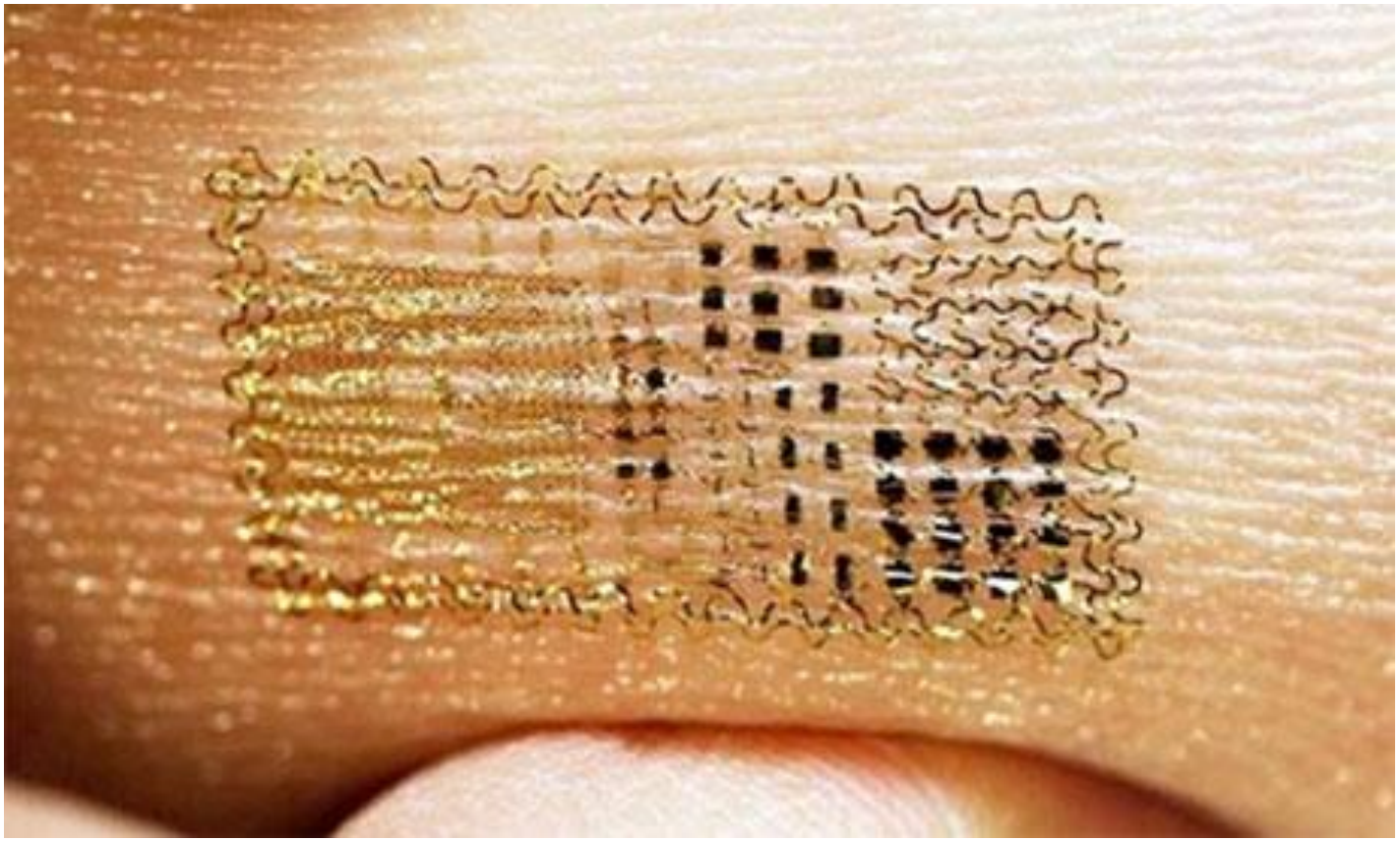
Medical App/Device?



Medical App/Device?

Medical App/Device?

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Medical App/Device?

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Medical App/Device?

iPhone EKG

iPhone Ultrasound

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Osirix Intra-Operative Software

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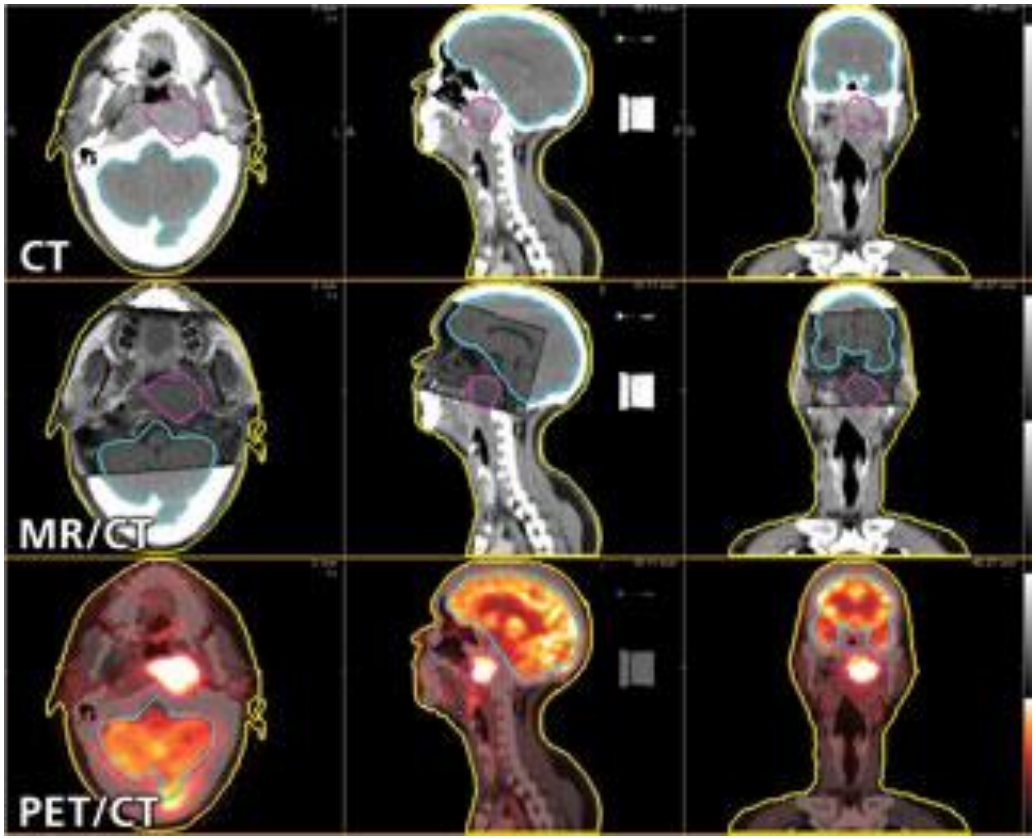
MIM Image Overlay Software



MDDS

Hackers

Physicians are Using Smartphones and Tablets in Their Practices

- Smartphones and tablets are getting significant use by physicians in their practice
  - Smartphones are used by 80% of physicians
  - Tablets are used by 45% of physicians

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"2014 Mobile Trends Report Overview", Epocrates, 2014, http://www.epocrates.com/oldsite/2014MobileTrendsReport/MT14_WP_03.pdf (Accessed 4/21/2015).

Physicians are Using Smartphones and Tablets in Their Practices

- Samsung is dominant brand, with about 25% of the smartphone market by volume
- Top tasks for smartphones and tablets
  - Smartphones: Email, applications, communicating with physicians or staff
  - Tablets: Email, accessing EHR, researching info about medications, accessing diagnostics
  - Using tablet's browser is more common than using a vendor's EHR mobile app to login
- Leading apps: Epocrates and Medscape

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"Xiaomi Becomes the World's 5th Larges Smartphone Vendor in Q2 2014", Strategy Analytics, July 31, 2014, http://blogs.strategyanalytics.com/WSS/post/2014/07/31/Xiaomi-Becomes-Worlds-5th-Largest-Smartphone-Vendor-in-Q2-2014.aspx (Accessed 9/4/2014).

Cerner

Mobile Health Apps

- Health management applications for mobile devices
  - App v. Medical Devices
    - FDA regulation
  - Data Security
    - HIPAA concerns

Clinical Technology

- Clinical technology encompasses any method or device utilized for patient treatment procedures
- Examples:
  - Pharmaceuticals
  - Surgical devices
  - Minimally invasive techniques

Clinical Technology

- Advancements in clinical technology:
  - Allow for more procedures to be offered in outpatient settings
  - Make available:
    - Less invasive procedures
    - Shorter recovery times
    - Lower probability of *complications* during and after a procedure

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"Chart 3.14: Percentage Share of Inpatient vs. Outpatient Surgeries, 1990-2010" in "Trendwatch Chartbook 2012: Supplemental Data Tables, Utilization, and Volume" American Hospital Association, 2012, http://www.aha.org/research/reports/tw/chartbook/2012/chart3-14.pdf (Accessed May 14, 2012).

Genetics, Genomics & Genome Technology – The Rise of Personalized Medicine

- Genomics is the evaluation of the hereditary information provided by an organism's DNA and the application of research findings to the fields of:
  - Genetic engineering and enhancement
  - Cloning
  - Stem cell research
  - Eugenics

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"Issues in Genetics and Health" By the National Human Genome Research Institute, February 23, 2009, http://www.genome.gov/10001740 (Accessed 06/29/2009).

Genetics, Genomics & Genome Technology – The Rise of Personalized Medicine

- Mapping of the human genome
  - First step toward much technological advancement
  - Served as the foundation for a new genre of pharmaceutical and therapeutic medicine
- Biotechnology and biopharmaceuticals account for as much as 93% of the total dollars spent on healthcare merger and acquisition activity in recent years

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"Drug Deals Dominate M&A: Biotech and Pharma Outspend All Other Sectors" Irving Levin Associates, Inc., Healthcare M&A Monthly, Vol. 14, No. 6, June 2009, p. 1.

Genetics, Genomics & Genome Technology – The Rise of Personalized Medicine

- "*Personalized medicine*" has been used in several venues, including customized pharmaceuticals and customized diagnoses
  - Realities of *personalized medicine*, i.e., *pharagogenetics* and *genetic testing*, create a multitude of regulatory and reimbursement issues
  - Although *the Health Insurance Portability and Accountability Act of 1996* (HIPAA) was designed to protect individuals' health information, the advancement of genetic testing has surpassed the regulatory standards set under HIPAA

Diagnostic Technology

- Diagnostic medicine is utilized in both the acute and chronic patient treatment setting for the purposes of:
  - Prevention
  - Screening
  - Disease detection
  - Care management
- Diagnostic technology is the backbone of much technological advancement, including:
  - Minimally invasive surgery
  - Preventive procedures
  - Telemedicine
  - Therapeutics

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Imaging Technology

- Medical imaging: A "*non-invasive process used to obtain pictures of the internal anatomy or function of the anatomy using one of many different types of imaging equipment and media for creating the image*"

- Utilization of diagnostic imaging has grown at a rate much greater than other physician services, likely due to advances in technology allowing for more efficient, effective, and safe procedures

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"Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices," Government Accountability Office, June 2008, GAO-08-452.

Medicare Spending on Diagnostic Imaging

- According to the *American Journal of Roentgenology* (*AJR*), although diagnostic imaging was in the 80th percentile of all medical services in 2001, it had slowed to the point that it was only in the 2nd growth percentile by 2011

"Medicare Spending for Medical Imaging Sustains Dramatic Slowdown Compared With Other Services," Imaging Technology News, December 6, 2013, http://www.itnonline.com/article/medicare-spending-medical-imaging-sustains-dramatic-slowdown-compared-other-services (Accessed 4/21/14).

X-Ray

- Developed in 1895 by Wilhelm Conrad Roentgen
- Many forms of imaging advancements have evolved from the basic *x-ray technology,* including:
  - CT
  - MRI
  - PET
- Although imaging technology has developed far beyond the original *tubes and coils*, the presence of this technology has persisted in the field of *diagnostic imaging*

Computed Tomography (CT)

- Transformed both *diagnostic* and *interventional* medicine, as the quality of CT images, due to the *cross-sectional scanning* capabilities they afford, surpasses the *anatomical detail* of *competing imaging technologies,* such as x-ray
- One of the most recent developments in *CT technology,* specifically, d*ynamic volume CT technology*, is that it is capable of imaging an *entire organ* with *isotropic (uniform) resolution* in one rotation and as a complete volume
  - Thereby reducing the chance of *artifacts* and *misregistrations* in the image caused by creating a *composite image*

"A Data Book: Health Care Spending and the Medicare Program," MedPAC, June 2012, p. 111; "CT Beyond 64 Slices: 'Dynamic Volume CT' Promises to Streamline Workflow, Improve the Bottom Line," By Tony DeFrance, Cardiovascular Business, January 9, 2009, p.24.

Magnetic Resonance Imaging (MRI)

- Uses powerful *magnetic fields*, *radio waves*, and often, a *contrast solution* to produce *cross-sectional images* of *internal structures*
- *Functional MRI* (fMRI), a combined technology utilizing *Positron Emission Tomography* (PET) and *MRI system*, enables physicians to *observe brain function* while patients perform *physical* and *mental tasks*

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"MRI Systems Market: Clinical Application Trends" Frost and Sullivan, October 10, 2007, http://www.frost.com/prod/servlet/market-insight-top.pag?docid=108958393 (Accessed 06/29/2009).

"Fusion" Imaging – Nuclear Medicine and Combined Technologies

- *Nuclear imaging* uses trace quantities of *radiopharmaceuticals* that target specific organs, bones, or tissue being imaged to *noninvasively* provide information related to potential abnormalities, e.g., differentiating a tumor from the surrounding swollen tissue

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"Usefulness of Whole Body FDG18 PET-CT Imaging in Comprehensive Oncologic Management – Initial Experience" By Ashish S. Kumar, et al., Journal of Cancer Research and Therapeutics, Vol. 6, No. 3, July/September 2010, p. 290, 294.

Ultrasound

- Ultrasound technology continues to undergo extremely promising improvements, with greater speed and enhanced quality affording:
  - Higher frequency
  - Better resolution
  - Three-dimensional imaging
- The increased use of "*hybrid interventional suites*" in the cardiology arena may drive further demand and use of ultrasound equipment in *interventional radiology* procedures that combine the capabilities of a typical *operating room* with *imaging technology* such as *X-ray, CT, MRI* and *ultrasound*

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"Ultrasound in Interventional Radiology: Small Market, Big Future" By: Carly Reed, Diagnostic Imaging, February 23, 2012, http://www.diagnosticimaging.com/interventional-radiology/content/article/113619/2036609 (Accessed 10/5/2012).

Molecular Diagnostics

- Although the field of molecular diagnostics has grown beyond its original focus on screening for infectious disease, this function is still the fastest growing segment of the molecular diagnostics market

- Many *molecular diagnostic* technologies are not subject to the stringent compliance requirements set by the FDA for most *device technologies*

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"Market Overview" in "Global Molecular Diagnostics Market and Future Forecast 2010 – 2014, Renub Research, July 2011, p. 3.

Therapeutic Technology

- Range of uses for therapeutic technologies has grown substantially in the last century, and innovation in the field continues to lead to groundbreaking medical discoveries in:
  - Radiation therapy
  - Minimally invasive surgery
  - Transplant technologies
  - Home infusion therapy
  - Pain management
  - Molecular pharmacology

Radiation Therapy

- Uses high energy light beams or charged particles to stunt the proliferation of cancer cells by damaging the DNA within the cell, eliminating the cell's ability to divide, or killing the cell
- The development of *linear accelerators* and *gamma knives* has increased the therapeutic capability, precision, and ease of use, in which they deliver radiation therapy used during:
  - Intensity modulated radiation therapy - An advanced form of radiation therapy using *three-dimensional* (3D) imaging and treatment delivery
  - Stereotactic radiosurgery - A non-surgical procedure involving the single, *high-dose delivery* of *targeted gamma-ray* or *x-ray beams* used to treat tumors and functional abnormalities in the brain

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"Stereotactic Radiosurgery (SRS) and Stereotactic Body Radiotherapy (SBRT)" Radiological Society of North America and American College of Radiology, 2012, http://www.radiologyinfo.org/en/info.cfm?PG=stereotactic, (Accessed 11/1/2012).

Minimally Invasive Surgery

- Minimally invasive surgery procedures typically lessen many risks traditionally associated with surgery through the use of several small incisions to guide fiber-optic cameras to the area(s) of interest

- Developments in *laparoscopic technologies* and an increasing demand for *minimally invasive surgery* are driving growth in the minimally invasive surgical procedures market with advancements such as the creation of new and more precise *endo-mechanical devices* (small devices utilized minimally invasive surgery) and *camera systems*

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"Minimally Invasive Surgery" Mayo Clinic, 2009, http://www.mayoclinic.org/minimally-invasive-surgery/ (Accessed 4/6/09).
"Trends in MIS, Part I: Pushing Surgical Boundaries" By Anne Staylor, Medtech Insight, Vol. 14, No. 5, May 2012, p. 18.

Minimally Invasive Surgery

- Robotic Assisted Surgery
  - Of the various *minimally invasive surgery* technologies on the market, *surgical robots* may be best equipped to enable surgeons to perform complex open procedures with a minimally invasive approach
  - The *da Vinci System,* developed by *Intuitive Surgical Inc*. in 1998 and approved by the FDA in 2000, revolutionized minimally invasive surgery by overcoming the limitations of both traditional surgical procedures and conventionally implemented non-invasive laparoscopic technology

"Trends in MIS, Part II" By Anne Staylor, Medtech Insight, Vol. 14, No. 6, June/July 2012, p. 18.

Minimally Invasive Surgery

- Implantable Devices
  - *Implantable devices* are also on the forefront of *minimally invasive surgery* as new technologies related to monitoring chronic conditions, such as *diabetes* and *heart failure*, are expanding
  - Example - *CardioFit* system
    - Similar to a pacemaker, the *CardioFit* system is a subcutaneous heart monitor that automatically reacts to changes in heart activity with *unidirectional stimulation* to the *vagus nerve*

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"Heart Failure Devices: Raising Roadblocks To Readmission" By Mary Thompson, Medtech Insight, Vol. 14, No. 1, January 2012, p. 10.

Home Health Infusion Technology

- Infusion therapy involves the administration of medications, nutrients, or other solutions:
  - Intravenously (i.e., bloodstream)
  - Subcutaneously (i.e., under the skin)
  - Enterally (i.e., into the digestive system)
  - Epidurally (i.e., into the membranes surrounding the spinal cord)

Pain Management Technology

- Pain may be the most common reason patients seek medical care, accounting for approximately half of all physician office visits in the U.S.
  - As the U.S. population continues to age and chronic diseases, as well as surgical interventions, become more prevalent among this age group, appropriate pain management is likely to become an increasingly important focus of emerging technology developments

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"U.S. Pain Management Device Market: Catering to An Aging Population" By Mary Thompson, MedTech Insight, August 2011, p. 42.

Molecular Pharmacology

- The FDA has approved drugs and *biologics* in eight categories of *biopharmaceuticals:*
  - Recombinant blood factors
  - Recombinant thrombolytics and anticoagulants
  - Recombinant hormones
  - Recombinant growth factors
  - Recombinant interferons and interleukins
  - Recombinant vaccines
  - Monoclonal antibody-based products
  - Miscellaneous recombinant products

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"Biopharmaceutical Benchmarks 2006: The Rate of Biopharmaceutical Approvals has Leveled Off, But Some Milestones Bode Well for the Future" By Gary Walsh, Nature Biotechnology, Vol. 24, No. 7, July 2006, p. 769-776.

Legal Issues in Healthcare Technology

Legal Issues

- Stark
- Anti-kickback
- Medicare Billing
- HIPAA & HITECH
- FDA
- Professional Licensing
- Intellectual Property
- Professional and Other Liability
- Contractual Obligations

The American Recovery & Reinvestment Act of 2009 (ARRA)

- Signed into law on February 17, 2009
- Allotted $19.2 billion to ensure that every patient has a complete, interoperable EHR by 2014
- Beginning in 2011, reimbursement funding increased for Medicare and Medicaid providers who use EHRs
  - Up to $65,000 per physician
  - Up to $11 million per hospital

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"Signed, sealed, delivered: ARRA," By Macon Phillips, The White House, February 17, 2009, http://www.whitehouse.gov/blog/09/02/17/signed-sealed-delivered-arra, (Accessed May 15, 2012); "Health Care and the American Recovery and Reinvestment Act," By Robert Steinbrook, The New England Journal of Medicine, Vol. 360 No. 11 (March 12, 2009), p. 3.

The American Recovery & Reinvestment Act of 2009 (ARRA)

- In 2015, physicians who are not using EHRs will be penalized through reduced reimbursement
- Established:
  - The Health Information Technology for Economic and Clinical Health (HITECH) Act
  - Office of National Coordinator for Health Information Technology (ONC) within the Department of Health and Human Services (HHS)

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"Department of Health and Human Services" President Obama's 2010 Budget, The White House, http://www.whitehouse.gov/omb/assets/fy2010_new_era/Department_of_Health_and_Human_Services1.pdf (Accessed 10/10/12), p. 68. "Office of the National Coordinator for Health Information Technology," 42 U.S.C. § 300JJ-11 (July 9, 2010); "American Recovery and Reinvestment Act of 2009, Sec. 13101" Public Law 111-5, 123 Stat. 115 (February 17, 2009), p. 226, 230-234.

The HITECH Act

- Medicare providers must have obtained "*meaningful use*" of EHR by the end of 2014 to avoid reimbursement penalties
- Provides both financial incentives and programmatic support
- Medicaid also requires that healthcare providers receiving incentives under the HITECH Act must indicate efforts to *"adopt, implement, or upgrade certified EHR technology"* wherever possible

"American Reinvestment and Recovery Act, Sec. 13101" Pub. Law 111-5, 123 Stat. 115 (February 7, 2009), p. 231.
"Meaningful Use of Health Information Technology: From Public Policy to Changing Care" By Paul Tang, Future Scan 2011: Healthcare Trends and Implications 2011-2016, 2011, p. 33; "Medicare and Medicaid Programs; Electronic Health Record Incentive Program; Final Rule", Federal Register, Vol. 75, No. 144 (July 28, 2010), p. 44503.

Delays to Meaningful Use

- 2013 Proposal - Extending the timeline for adoption of Stage 2 and 3 of Meaningful Use
  - Stage 2 extended through 2016
  - Stage 3 will begin in 2017
- Why?
  - To allow CMS and ONC to focus on proper implementation of Stage 2
  - To use data collected from Stage 2 to inform policy decisions in Stage 3

Progress on Adoption of Electronic Health Records," Centers for Medicare & Medicaid Services, http://www.cms.gov/eHealth/ListServ_Stage3Implementation.html (Accessed 4/21/14).

ICD-10 Conversion

- Significant costs associated with the transition raised concerns in the healthcare industry
  - Providers already burdened with ACA obligations and other healthcare reform mandates
- Increased specificity of ICD-10 has potential to provide more thorough information, allowing providers to improve patient outcomes
  - 72% of providers agree that ICD-10 will ultimately help with achieving increased patient quality initiatives
- ICD-10 conversion effective October 1, 2015

"ICD-10 Cost, Timing Concerns Explain AMA Vote" By Cheryl Clark, HealthLeaders Media, November 17, 2011, http://www.healthleadersmedia.com/print/TEC-273412/ICD10-Cost-Timi (Accessed 11/18/2011); "Administrative Simplification: Adoption of a Standard for a Unique Health Plan Identifier; Addition to the National Provider Identifier Requirements; and a Change to the Compliance Date for the International Classification of Diseases, 10th Edition (ICD-10-CM and ICD-10-PCS) Medical Data Code Sets: Final Rule" 45 CFR Part 162 (Pre-Federal Registrar Publication), August 24, 2012; "ICD-10 Puts Revenue at Risk" By Karen Minich-Pourshadi, HealthLeaders Media Intelligence Report, July 2011, p. 23; "CMS Finalizes One-Year Delay of ICD-10 to October 2015," Reuters, April 1, 2014, http://www.reuters.com/article/2014/04/01/precyse-advice-on-sgr-idUSnPn3VXkds+98+PRN20140401 (Accessed 4/15/14).

HIPAA Risks of mHealth

- Digital devices enable storage of large amounts of data in small spaces
- Networked information is accessible from anywhere at any time
- New databases and different types of data sets are more easily created
- Information is easily gathered, exchanged and transmitted

Other Data Privacy and Security Laws

- State laws
- EU Privacy Directive
- Other foreign data privacy laws
- FTC
  - Truth in advertising
  - Honor your privacy promises
  - Clear, easy-to-read on small screen
  - Revisions
- Voluntary Privacy Code of Conduct
  - Short-form notice

Data Protection and Privacy Considerations in mHealth

- BYOD
  - Where is data stored?
  - Where is it being backed up?
  - Comingling work and personal data
- Data security in the cloud
- Expanded role of BAs
- Avoiding data breaches

Recent Healthcare Data Breaches

- *Ponemon Institute* Study
  - 90% of the nearly 200 business associates and healthcare organizations surveyed experienced at least one data breach
  - 40% of those surveyed experienced more than 5 breaches in the past 2 years
- Examples
  - Premera Blue Cross
  - Anthem Inc.
  - Care First
  - Community Health Systems

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"Fifth Annual Benchmark Study on Privacy & Security of Healthcare Data" Ponemon Institute, May 2015, http://lpa.idexpertscorp.com/acton/attachment/6200/f-037a/1/-/-/-/-/Fifth%20Annual%20Privacy%20and%20Security%20of%20Healthcare%20Data%20Report.pdf?cm_mmc=Act-On%20Software-_-email-_-Thank%20you%20for%20downloading%20the%20Fifth%20Annual%20Benchmark%20Study%20on%20Privacy%20and%20Security%20of%20Healthcare%20Data-_-Click%20here%20to%20download%20the%20report.&sid=232CUrdKz (Accessed 6/3/15).

Unique Technology Valuation Issues

- Changes in technology are driven by initiatives toward evidence-based medicine and value-based reimbursement that utilize quality metrics
  - Examples:
    - "*Meaningful Use*" standards for electronic health records
    - Computerized Physician Order Entry
  - ACA established incentive payments for health plans and providers that apply health information technology in ten process of improving outcomes

"American Recovery and Reinvestment Act of 2009," Public Law 111-5, February 17 2009 (Accessed 8/15/11). Federal Register, Vol. 75, No. 21, Government Printing Office, February 2, 2010, http://www.gpo.gov/fdsys/pkg/FR-2010-02-02/pdf/FR-2010-02-02.pdf (Accessed 10/8/15), p. 263-264. ""Patient Protection and Affordable Care Act," Public Law 111-48, March 23, 2010 (Accessed 8/16/11), p. 263-264. "Provider Incentive Programs: An Opportunity for Medicaid to Improve Quality at the Point of Care," By Diane Hasselman, Center for Health Care Strategies, Inc., March 2009, http://www.chcs.org/resource/provider-incentive-programs-an-opportunity-for-medicaid-to-improve-quality-at-the-point-of-care/ (Accessed 10/8/15).

Unique Technology Valuation Issues

- The value of certain services may be reduced for physicians using outdated techniques and/or lacking sufficient experience in advanced procedures
- Advancements seen in several areas of clinical technology
  - Genetics, Genomics, and Genome Technology
  - Stem Cell Research
  - Robotics and Surgical Technology
- While contributing to a higher quality of care, advances in pharmaceutical (e.g., the *Purple Pill*), surgical, and management technology (e.g., Electronic Health Records) may drive up healthcare costs

Sample Technology Transaction Issues

- Intellectual property
- Reimbursement for services
- Licensing fees
- Licensing agreements
- Cost savings
- Meaningful Use

Concluding Remarks

Concluding Remarks

Pursuing Interdisciplinary Collaboration

Healthcare Industry Specific Appraisal Assignments

Real Estate Appraisal • Machinery & Technical Specialties

Personal Property • Business Valuation • Intangible Assets/IP

Separate and Distinct Disciplines in the Same Profession

- Similar Tools to Solve Similar Problems
- Shared Clients
- Interdisciplinary Approach Yields Significant Benefit to Both ***Clients*** and ***Appraisers***

We CAN Work Together!

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Concluding Remarks

We Can (and should) All Work Together!

- To obtain the requisite background for forecasting the future performance of healthcare enterprises, assets, and services in the current dynamic era of healthcare reform, valuation professionals should develop and maintain an in-depth understanding of the history and the development of healthcare delivery, as well as, the unique dynamics of those often complex business arrangements that comprise newly emerging healthcare organizations and the various elements of property value involved in each.
- A multidisciplinary project team of appraisers has the potential to provide an enhanced scope and diversity of knowledge and breadth of experience to the benefit of both the ***appraisers*** and the ***client***.

Concluding Remarks

We Can (and should) All Work Together!

- When developing an understanding of the forces and stakeholders that have the potential to drive healthcare markets, valuation professionals must examine the subject enterprises, assets, and services as they relate to and within the context of:
- ***"The Four Pillars of the Healthcare Industry"***
  - Reimbursement
  - Regulatory
  - Competition
  - Technology
- These four elements serve as a conceptual framework for analyzing the viability, efficiency, efficacy, and productivity of the subject property interest(s)

Concluding Remarks

We Can All Work Together!

- More informed and uniform valuation practice would benefit the users of healthcare valuations and *improve public confidence in appraisers*
- To enhance competency, significant specialized education and training is an important benefit for healthcare appraisers and clients
- Given these issues, a multidisciplinary approach toward advanced education related to healthcare industry valuation is an important initiative of the ASA, as the premier multidisciplinary valuation society of professional appraisers

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Willamette Management Associates
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Analee McClellan, ASA
Acanthus Appraisals and Consultation Services LLC
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Lez A. McKenzie, ASA
Director of Healthcare Valuations & Remarketing Services
VCG Companies
Scottsdale, AZ

Jason L. Ruchaber, CFA, ASA
Managing Director
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Multidisciplinary Advanced Education in Healthcare Valuation Program

		A	B	C	D	E	F	G	H	I	J	K	
			Session Details				Time				Speakers		
		Program Events	Course Title	Session #	Presentation Day	Time of Day	Date	Start	End	Duration	Presenter	Co-Presenter	
1	DAY 1	Registration and Breakfast			Friday	Morning	10/16/2015	7:30 AM	8:15 AM	45 Minutes			1
2		Session 1	*Overview of Healthcare Industry*	1	Friday	Morning	10/16/2015	8:15 AM	9:15 AM	1 Hour	Todd Zigrang, ASA		2
3		Session 1	*Regulatory Environment of the Healthcare Industry*	1	Friday	Morning	10/16/2015	9:15 AM	10:30 AM	1 Hour 15 Minutes	John Kirnser, Esq.	Todd Zigrang, ASA	3
4		Break			Friday	Morning	10/16/2015	10:30 AM	10:45 AM	15 Minutes			4
5		Session 1	*Regulatory Environment of the Healthcare Industry*	1	Friday	Morning	10/16/2015	10:45 AM	12:30 PM	1 Hour 45 Minutes	John Kirnser, Esq.	Todd Zigrang, ASA	5
6		Lunch			Friday	Afternoon	10/16/2015	12:30 PM	1:30 PM	1 Hour			6
7		Session 1	*Regulatory Environment of the Healthcare Industry*	2	Friday	Afternoon	10/16/2015	1:30 PM	2:15 PM	45 Minutes	John Kirnser, Esq.	Todd Zigrang, ASA	7
8		Session 2	*Healthcare Reimbursement Environment in an Era of Reform*	2	Friday	Afternoon	10/16/2015	2:15 PM	3:00 PM	45 Minutes	Lisa Han, Esq.	Todd Zigrang, ASA	8
9		Break			Friday	Afternoon	10/16/2015	3:00 PM	3:15 PM	15 Minutes			9
10		Session 2	*Healthcare Reimbursement Environment in an Era of Reform*	2	Friday	Afternoon	10/16/2015	3:15 PM	5:30 PM	2 Hour 15 Minutes	Lisa Han, Esq.	Todd Zigrang, ASA	10
11	DAY 2	Breakfast			Saturday	Morning	10/17/2015	7:30 AM	8:00 AM	30 Minutes			11
12		Session 3	*Impact of Competitive Forces*	3	Saturday	Morning	10/17/2015	8:00 AM	10:15 AM	2 Hours 15 Minutes	Jack Beal, Esq.	Todd Zigrang, ASA	12
13		Break			Saturday	Morning	10/17/2015	10:15 AM	10:30 AM	15 Minutes			13
14		Session 4	*Technology Development*	3	Saturday	Morning	10/17/2015	10:30 AM	12:45 PM	2 Hours 15 Minutes	Hal Katz, Esq.	Todd Zigrang, ASA	14
15		Lunch			Saturday	Afternoon	10/17/2015	12:45 PM	2:00 PM	1 Hour 15 Minutes			15
16		Session 4	*Q & A - Discussion Conclusion and Course Review*	4	Saturday	Afternoon	10/17/2015	2:00 PM	3:15PM	1 Hour 15 Minutes	Todd Zigrang, ASA		16
17		Break			Saturday	Afternoon	10/17/2015	3:15 PM	3:30 PM	15 Minutes			17
18		Session 4	*Examination*	4	Saturday	Afternoon	10/17/2015	3:30 PM	4:30 PM	1 Hour			18