

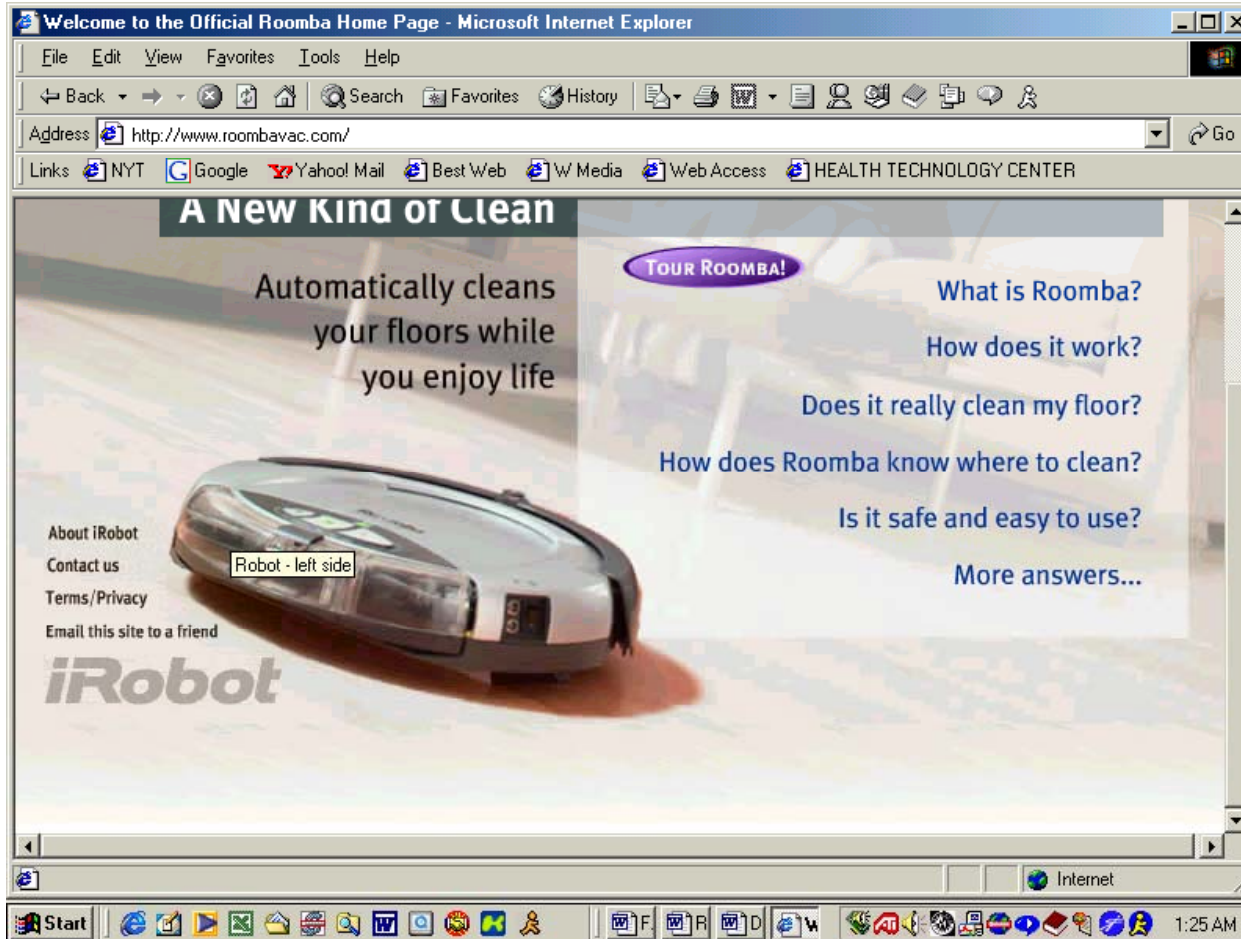


Quality and Medical Error Reduction: The Role of Technology

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Disruption Hits Home





Today's Presentation

- Disruption defined
 - Identifying emerging technologies
 - Forecasting:
 - Positive and adverse effects
 - Defensive and offensive strategies
- A broader view of disruptive technologies:
 - Disrupting and advancing the delivery of evidence-based care
 - Reducing variation and generating savings
- A changing policy environment
 - HHS, CMS, FDA speed the introduction of new technologies
 - Tentative steps toward a National Healthcare Information Infrastructure
 - Need for national dialogue about future regulation of and access to technologies



Broadening the Definitions of Medical Error and Quality

- IOM Committee on Patient Safety Data Systems, EHR Report
 - Chronic diseases as well as acute adverse events
 - Errors of omission as well as commission
 - A constantly changing play sheet
- To understand the role that technology may play in quality, begin with the more conservative assumption. Technology may
 - Increase medical error
 - Introduce new sources of medical error
 - Require new forms of monitoring and scrutiny to control medical error
 - Require new protocols, guidelines and work process re-engineering to promote best practices in the delivery of medical care
 - Be introduced before the basis for new protocols, guidelines and work process designs are fully understood



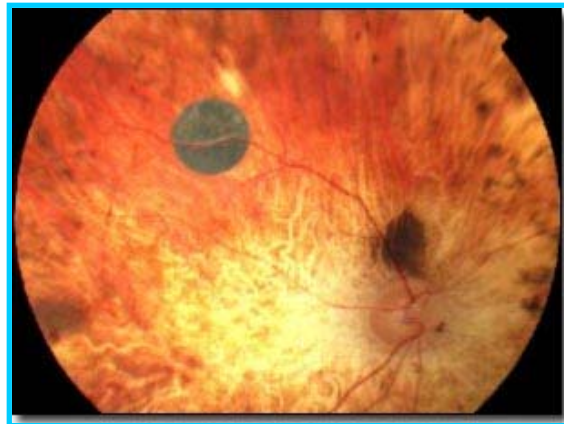
Potentially Beneficial Effects of Future Technologies

- Clinical technology: improve clinical outcomes, increase health expenditures
 - *Example: hepatic dialysis*
- Clinical technology: improve clinical outcomes, decrease health expenditures
 - *Example : retinal implantation*
- Information technology: enhance delivery of evidence-based medicine, increase health expenditures
 - *Example: community data exchange platforms, provider connectivity*
- Information technology: enhance delivery of evidence-based medicine, decrease health expenditures
 - *Example: remote management of ICU, remote ambulatory patient monitoring*

Emerging Clinical Technologies Will Disrupt Processes of Care

Organ Assistance and Substitution in the next 2-5 years:

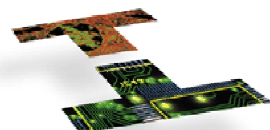
- Bioartificial liver assist device that utilizes live hepatocytes
- Intravenous membrane oxygenator (IMO), that will perform short-term rescue in patients with acute respiratory distress
- Artificial retina that can restore limited sight in blind patients with retinal diseases
- Ventricular assist devices for extended use/destination therapy



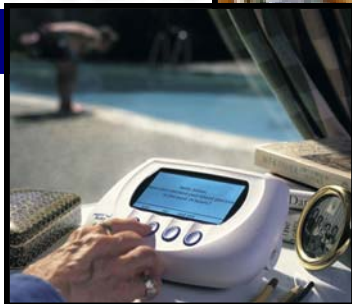
Optobionics' Artificial Silicon Retina (ASR)



Thoratec LVAD



Emerging IT Technologies Will Also Disrupt Patient Management



Diabetes Self-management for Uninsured, High-risk Diabetic Population*

- Emergency Room Admissions ▼ 32%
- Physician Encounters ▼ 34%
- Hospitalizations ▼ 49%

(Diabetes Technology & Therapeutics Journal, 2002)

Asthma Self-management for High-risk Pediatric Population*

- Activity Limitation ▼ (p = .03)
- High Peak Flow Readings ▲ (p = .01)
- Urgent Calls to Hospital ▼ (p = .05)

(Arch Pediatr Adolesc Med. 2002)

Care Coordination: Hypertension, Heart Failure, COPD, and Diabetes*

- Emergency Room Visits ▼ 40%
- Hospital Admissions ▼ 63%
- Hospital Bed Days of Care ▼ 60%
- Nursing Home Admissions ▼ 64%
- Nursing Home Bed Days of Care ▼ 88%

(Disease Management, 2002)

**HealthHero*



Delivery Systems, Health Plans Create Pooled Research Program To Track Emerging Technology

HealthTech – a nonprofit research organization

Baylor Health Care System
Bon Secours Health System
Carolinas HealthCare System
Catholic Healthcare West
Centers for Medicare and Medicaid Services
CHRISTUS Health
Medisys Healthcare System
Parkview Health
Partners HealthCare System
Presbyterian Medical Services
The Queen's Medical Center
Ryan Community Health
Veterans' Health Administration

Ascension Health
CAPH
Group Health Cooperative
Kaiser Permanente
Mills-Peninsula Health Services
PeaceHealth
Premier, Inc.
Providence Health System
Sequoia Healthcare District
Sutter Health
VHA Inc.
WellPoint Health Networks
Texas Health Resources
El Camino Hospital
Overlake Hospital Medical Center
Lenox Hill Hospital

*Partners set the research agenda
and co-design planning tools*



The Goal Is To Identify Beneficial Technologies and Speed Their Adoption



The Vision

Advancing the use of new technologies to make people healthier.



The Mission

To create a trusted source of objective, expert and useful information about the future of healthcare technologies.

Nonprofit pooled research for healthcare delivery systems, health plans and policy development. Funding independent of the developers or vendors of technology. Methodology developed collaboratively with ECRI, CMS and IFTF.



Technology Forecast Reports™

Identify Technologies, Impact

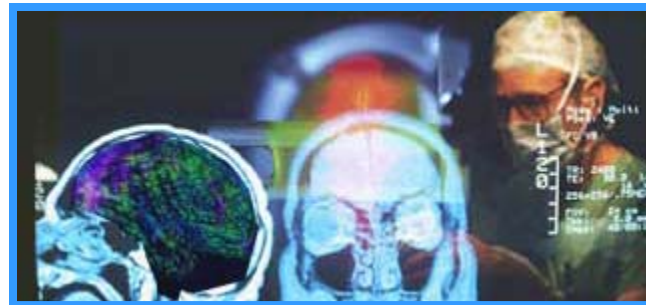
Research

Research based on broad, comprehensive expertise of national leaders in biotechnology, pharmaceutical, device and information systems development:

- Minimally Invasive Surgery
- Drug Delivery Devices
- Sensors for Monitoring
- Organ Assistance and Substitution
- Stem Cells
- Genetic Testing
- Imaging
- Tissue and Fluid Bioengineering
- PACS and CAD
- Point of Care: Mobile Computing
- Networking
- Cancer Pharmaceuticals and Biologics
- Anti-microbial Pharmaceuticals
- Cardiovascular Pharmaceuticals
- Robotics in HealthCare
- Remote Patient Management
- Security Technologies
- Neuropharmaceuticals
- Gene Therapy
- *Wireless Technologies*
- *Voice Recognition*
- *Web Services*

A Broad Range of Technologies Will Disrupt Chronic Disease Management

- Remote Patient Management
- Organ Assistance and Substitution
- Novel Drug Delivery
- Imaging and PACS
- Sensors for Monitoring
- Mobile Computing





Organ Assistance and Substitution - Impact on IT and Communications

Two to five years:

- Implanted devices with built-in data capture and transmittal will create the need for real-time monitoring of patients
- Data links for devices will initially connect hospitals to manufacturer; then link will be from home to hospital to manufacturer
- Internet transmission of monitoring data will become common: remote control of devices unlikely because of reliability concerns and the push by developers for self-regulatory devices

Beyond five years:

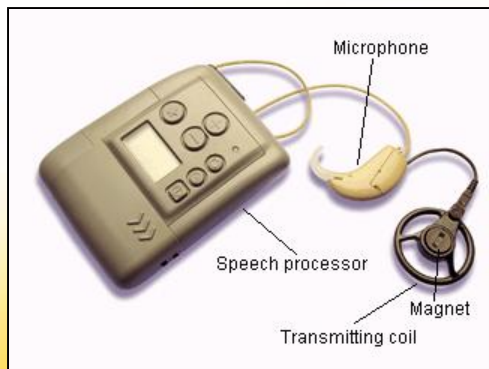
- Wireless data transmission will become more practical as the issues of privacy and confidentiality are likely to be resolved
- Monitoring functions will become widespread and the demand on community resources will increase
- Monitoring will become a standard part of long-term and custodial care



Building a Balanced Forecast: A More Conservative Assessment of Remote Patient Management

- Simple tools with multiple potential applications
- Organizational capacity is paramount:
 - Identifying appropriate/optimal applications
 - Integrate existing communications technologies
 - Receive and integrate data
 - Apply knowledge management and decision support
- Key technology issues:
 - Physical interfaces with devices
 - Specific conditions: obstructive sleep apnea
 - Population vs. case management
 - Enabling case management
 - Expediting physician rounding in long term care
- Culture eats technology as well as strategy
 - Economic studies incomplete and inadequate
 - Few organizations, providers, consumers are truly oriented to prevention and early management
 - Relative contribution to outcomes, acceptability still not fully characterized

- Diffusion stymied:



Cochlear implants



Appropriate antibiotic use in community-acquired pneumonia



Intensive insulin therapy



Remote patient monitoring and management for chronic disease



Disruptive Technologies x 2

Table 1: Disruptive Technologies Applied to Clinical Care

<u>Established Technology</u>	<u>Disruptive Technology</u>
Physicians.....	Advanced Practice Nurses
General Hospitals.....	Outpatient Clinics, Home Care
Open Surgery.....	Arthroscopic and Endoscopic Surgery
CABG.....	Angioplasty

Table 2: Disruptive Technologies Applied to the Diffusion of Innovations

<u>Established Technology</u>	<u>Disruptive Technology</u>
Journals, CME.....	Decision Support Integrated into EHR
Accreditation.....	Leapfrog Initiatives, CMS Conditions of Participation
Media Coverage.....	Direct-to-consumer Advertising
Patient Education.....	Closed-Loop Device Systems



Speeding and *Improving* the Adoption of New Technology

Beneficial technologies:

- Remote management of intensive care units
- Hemofiltration for diuretic-resistant congestive heart failure
- Remote patient management of chronic disease

Beneficial technologies with potential quality problems in introductory phases:

- Minimally invasive surgery
- Intravenous membrane oxygenator

Beneficial technologies for the enhancement of workforce productivity:

- Staff communication systems – wireless
- Robotic service delivery systems
- Information systems – connectivity, integration



A Changing Policy Environment

“Medical technology is valuable if the benefits of medical advances exceed the costs....We conclude that medical spending as a whole is clearly worth the cost. This finding has immediate policy relevance.”

(Cutler, McClellan, 2001)

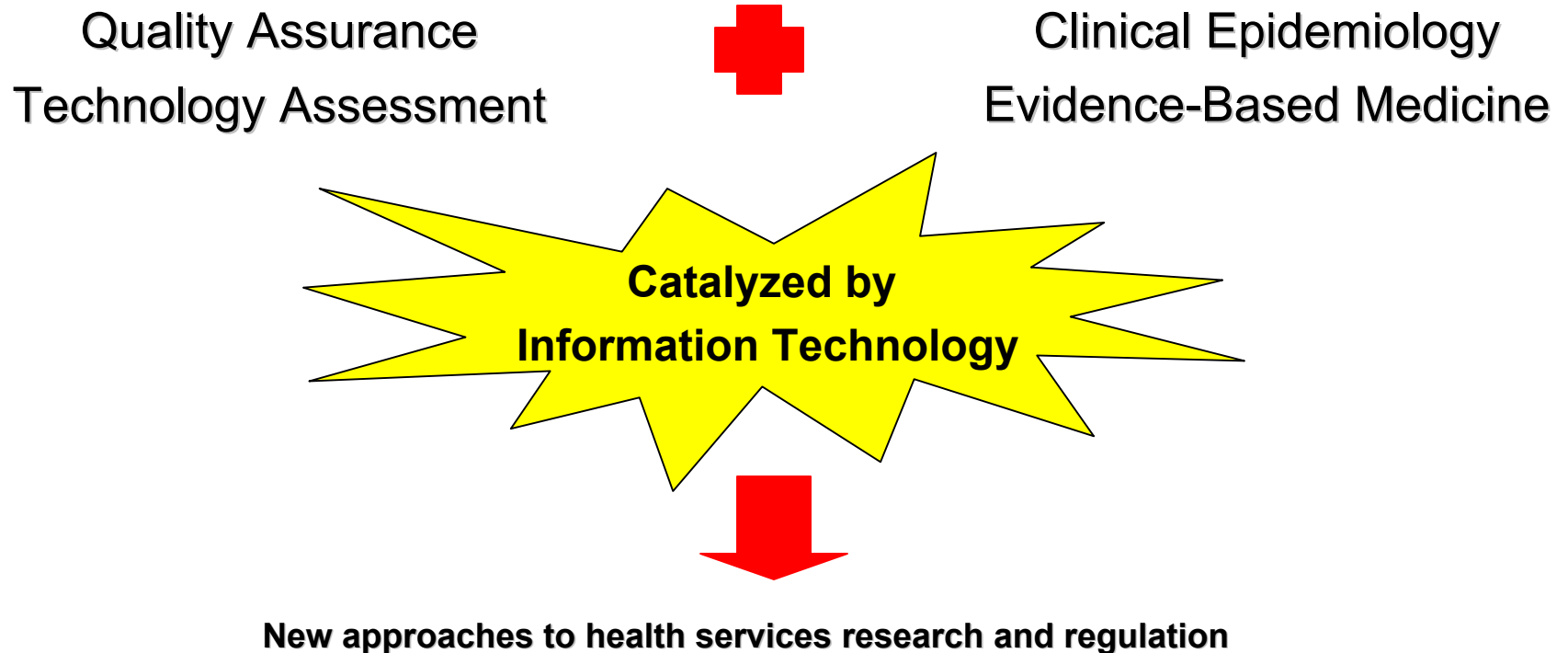


Sharpening the Scrutiny of Emerging Technologies

- CMS Coverage Division and HealthTech
 - What will we need to know beyond the requirements for FDA approval?
 - Populations, indications
 - Efficacy vs. competing technologies
 - Impact on healthcare stakeholders
 - The attempt to promulgate criteria for coverage
 - New approaches through disease management and accountability for outcomes
 - New approaches to the introduction of new technologies
 - Capacity to collect data on post-market experience is critical
 - Channeling introduction to healthcare delivery systems that provide data
 - Potential certification programs
- Funding for National Healthcare Information Infrastructure
 - HealthTech policy recommendation: go to www.healthtech.org

“...Evidence-based medicine labors under the onslaught of new knowledge.”

(Newhouse, 2002)

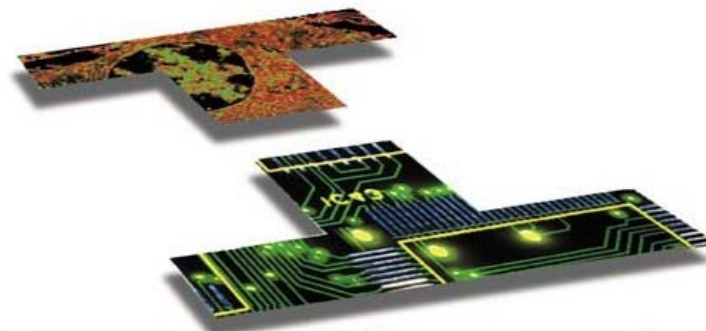




Four Strategies for Intentional Disruption

Intentional Disruption to Improve Care

- *Work at the level of delivery systems and health plans – build on organizational capacity*
- *Anticipate the disruptive effects of technology – marshal defensive and offensive strategies*
- *Adopt new approaches to research and policy – rapid cycle methodologies, new post-market phases of approval*
- *Re-align economic incentives and invest in information technology*



HealthTech

An independent, non-profit research organization

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