The Roles of the Labs in the Evolution of Precision Medicine

An Era of Unprecedented Change and Opportunity

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Purpose of my remarks today

Reality Check - Top 10 list
Once grounded in reality, there is opportunity

Success
Ask the right question - what problem are we trying to solve?

Failure
Ask the wrong questions, pick the wrong problems
16 \times 10^{12}

$51,382$ per citizen

$141,161$ per taxpayer
Number 10

Define a Trillion

Historic definition of advancement in medicine

The track record of the US Government in health care when it comes to cost....

DRGs

Do less with less
Number 9

What Business are you in?

Clinicians are in the Time Management Business
Health Care vs. Patient Care Administration vs. Management

Sears

Grocery Store business
Clash of Titans

Health Care

Population
“Resources”
Industry
Organizations
“Boards”

Patient Care

Individuals
Science
Profession
Licenses
Physicians
Number 9

Health Care has invested in IT but has failed to realize the benefit of the investment.

Health Care knows the cost of everything and the value of nothing.

Clinical lab 2-3% of spend, 70% of the data.
Number 8

Science of medicine
Human Genome Project
Microbiome
“You are what you eat”
Obesity
Number 7

Precision Medicine
  Evidence based medicine
  Predictive vs. Descriptive statistics
Family centric
Defining Personalized Healthcare

“Personalized medicine refers to the tailoring of medical treatments to the individual characteristics of each patient … Preventive or therapeutic interventions can then be concentrated on those who will benefit, sparing expense and side effects for those who will not.”

President’s Council of Advisors on Science and Technology (PCAST), Priorities for Personalized Medicine, September, 2008
ENCODE

ENCyclopedia Of DNA Elements

Gourmet Meal Analogy

- Common ingredients that make up the genome
- When mixed together in the right proportions, they constitute the information needed to build all types of cells, organs, and ultimately an entire person from a single genome
Number 6

Oncology
  On the clinical forefront of Precision Medicine
Pathology
  Ground zero
Targeted Treatments Require Knowledge of the Mutation (somatic genotype)

Patient A
Mutation A
Drug A
Malignant Cell Growth

Patient B
Mutation B
Drug B
Malignant Cell Growth

Patient C
Mutation C
Drug C
Malignant Cell Growth

Slide courtesy Dr Barrett Rollins
Changing Paradigms for Cancer Care

Generic Cancer Care 1990

Stratified Cancer Care 2010

Individualized Cancer Care 2020

Leukemia
Breast cancer
Lymphoma
Ovarian cancer
Pancreatic cancer
Who Knows What This is?
Does this Help?
Analogy

Tumor size, tumor type, nuclear grade, vascular/lymphatic invasion; nodal status, ER/PR/Her2
Precision Medicine
Signal Transduction Pathways

Cell signaling pathways that mimic electronic integrated circuits in complexity/finesse
Number 5

Reality of the EHR

The New York Times

Medicare Bills Rise as Records Turn Electronic

By REED ABELSON, JULIE CRESWELL and GRIFF PALMER

When the federal government began providing billions of dollars in incentives to push hospitals and physicians to use electronic health records not only to improve efficiency and patient safety, but also to reduce health care costs.

But, in reality, the move to electronic health records may be contributing to billions of dollars in higher costs for Medicare for hospitals and physicians to bill more for their services, whether or not they provide additional care.

Hospitals received $1 billion more in Medicare reimbursements in 2010 than they did five years earlier, at least in part because emergency rooms, according to a New York Times analysis of Medicare data from the American Hospital Directory. Rural hospitals, for example, saw their payments increase by billions of dollars as well.

The most aggressive billing — by just 1,700 of the more than 440,000 doctors in the country — cost Medicare as much a recent report, noting that the largest share of those doctors specialized in family practice, internal medicine and emergency medicine.

For instance, the portion of patients that the emergency department at Faxton St. Luke’s Healthcare in Utica, N.Y., claimed to provide higher reimbursements — rose 43 percent in 2009. That was the same year the hospital began using electronic health records.

The share of highest-paying claims at Baptist Hospital in Nashville climbed 82 percent in 2010, the year after it began using an electronic system.
Number 5

Reality of the EHR

Digital health records incentive challenged

October 6, 2012 12:12 am
By Bill Toland / Pittsburgh Post-Gazette

Four Republican House leaders sent a letter Friday to U.S. Health & Human Services Secretary Kathleen Sebelius, asking the department to suspend payments to hospitals and physicians practices that switch from paper to electronic health records.

Number 5

Myth of the EHR
Organizational Priorities
  Have you attempted to see consult on an inpatient with an EHR?
Patient care priorities
Lab priorities
Number 4

CIOs/Health Care IT organizations

Commercial products

Project management

Value has accrued downstream from the providers of care
Number 3

Clinical Programs

Organizational bridge to patient care
<table>
<thead>
<tr>
<th>Functional Matrix</th>
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<td>Community/Patient</td>
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<tr>
<td>Clinical Program</td>
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<tr>
<td>Access</td>
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<tr>
<td>Care Team/Services/Support</td>
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<tr>
<td>Education</td>
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<tr>
<td>Luminaries</td>
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<tr>
<td>Research/Clinical Trials</td>
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<tr>
<td>Scientific/Technology Platform</td>
</tr>
<tr>
<td>Biobank</td>
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<tr>
<td>Research Database/EHR/www.</td>
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Number 2

Pathology
  Ground zero for Precision Medicine
LIS myth
  Patient Safety
AP vs. CP
Hemepath on the leading edge
Genetic Counseling
Biobanking
med fusion IT Applications
Supporting the New Operating Model

Integration
- Robust clinical/quality reporting
- Advanced data mining and management

Applications
- Interoperability
- Flexibility/scalability

Knowledge tools
- Rules engine
- Biostatistical modeling

Advanced client connectivity
3 Value drivers for return on investment in Information Technology
Communication

Collaboration in patient management
Make the right thing to do the easy thing to do

Simplify

Automate

Efficiency
Quality

The highest quality product is the by product of an efficient process and productive people

Management

Process based knowledge
Alignment of work flow to application software
Informed Decisions

“I just want the computer to show me what I need to see”

“I usually wait 2 weeks to talk to a patient about their pathology; I figure all the data is back by then and it’s safe to do so”
3 Pivotal Components

Every Patient is profiled to identify genetic alterations present in a specific cancer.

Caregivers have access to this information in a form that provides relevant contextual information.

This information can be obtained within a timeframe that permits its incorporation into the decision-making process.
A Time of Unprecedented Change and Challenges

15 Trillion Dollars in Debt
Noise to Signal ratio
  Lost time as filter
Identity Crisis
  Global vs. Regional vs. National
Disruptive Forces
  Science and Technology
  Differences vs. Common Ground
  Lack of Balance
Pace of Change is profound
Conflicts and Challenges

Profession vs. an Industry (ies)
  Autonomy vs. Regulation
Cost vs. Value
Safety vs. Quality
Administration vs. Management
The Bill vs. Patient Management
Descriptive vs. Predictive
What Business are “We” In?

Who is the customer?
Where does value accrue?
What are the Value Drivers?

*Success is predicated on knowing what questions to ask, not simply answers.*
Clash of Titans

- Public Policy (Healthcare domain)
  - “Prediction is difficult, especially about the future”
    
    *Niels Bohr, 1957*

- Science of Medicine (Patient Care domain)
  - We tend to overestimate the short term impact of a technology and underestimate the long term impact.

  *Dr. Francis Collins*
Public Policy (Healthcare domain)

Government/Organizational Paradigm
  Healthcare Systems-CIOs
Populations of Patients
Risk Management
  Costs
  Rationing
Descriptive Statistics
EHR-myth and reality
Science of Medicine
(Patient Care domain)

Patients
Professionals
Safety
Quality
Research
Precision Medicine
Value Drivers in IT Investments

Communication
Make the right thing to do the easy thing to do

Informed Decisions
“Show me what I need to see”
Work smarter, not harder.
Do less with less.
Expressway