Big Data in Cancer Care, Hopes, Dreams and Hard Realities

Kevin Fitzpatrick
CEO CancerLinQ
CancerLinQ™ Major Supporters

Winning the fight against cancer, every day.

Raj Mantena, RPh
Chan Soon-Shiong
Family Foundation

Astellas
AstraZeneca
Boehringer Ingelheim Pharmaceuticals, Inc.

Thomas G. Roberts, Jr., MD, and
Susan M. DaSilva

CancerLinQ is supported in part through the
CONQUER CANCER FOUNDATION
Cancer Moonshot

ASCO ANNUAL MEETING
COLLECTIVE WISDOM

THE FUTURE OF PATIENT-CENTERED CARE AND RESEARCH
Cancer Moonshot

A very modern challenge yet an ancient scourge

Evidence of a cancerous tumor in the fossil of a 1.7M year old ancient human
The Promise of a Rapid Learning Health System

“... a system in which science, informatics, incentives, and culture are aligned for continuous improvement and innovation—with best practices seamlessly embedded in the delivery process and new knowledge captured as a by-product of the delivery experience”

Best Care at Lower Cost: The Path to Continuously Learning Health Care in America – September 6, 2012
What If...

We could bring all the electronic data that is collected from the every day care of every cancer patient into one rapid learning network?
What If...

We could match similar patients in real-time
Lung cancer: from one cancer to many

One disease

7 + molecular drivers—and more to be discovered
Only 3% enroll in clinical trials.

1.7 MM people diagnosed with cancer in the US.
... and everyday patients tend to be ...

older...  
25% of clinical trial patients are 65+ vs 61% of real-world patients are 65+  

less healthy...  
40% of kidney cancer patients were not healthy enough to qualify for the trials that supported the approval of their treatments vs 90% of patients in NCI trials are white  

& more diverse...  
23% of the US population is non-white vs 61% of real-world patients are 65+  

...than clinical trial patients.

Increase in Clinical Data Relative to Human Cognitive Capacity

Diagnostic imaging: functional and anatomical

Proteomics and other effector molecules

Functional genetics: gene expression profiles

Structural genetics: eg, SNPS, haplotypes

Decisions by clinical symptoms

Gene sequencing data

$1K
10 PB/yr
2012

25K genes
New Challenges

Our ability to sequence genes has gotten ahead of our ability to know what it means.

- Eric P. Winer, director of the breast oncology program at Dana-Farber Cancer Institute

New Challenges

And Information is not the same as understanding

Cancer Biomarkers, Vogelstein 2013

Hieroglyphs on stone tablet, circa 5000 BC
The Challenges

1. To learn from every patient
2. To harness data in powerful new ways
An Incredibly straightforward data architecture
Current State of CLQ

- 1,600,000 individual patient records
- 73 participating institutions
- > 2000 Oncologists
- > 100 institutions in the pipeline
- Onboarding one health system per week
- Collaborations with major health systems
  - UVA Health System
  - Intermountain Healthcare
  - Vanderbilt University Medical Center
  - Rush University Medical Center
  - Catholic Health Initiatives
  - Sanford Health
Current State of CLQ

Interfaces with a wide variety of EHR systems:

1. MosaiQ
2. Varian
3. Epic via Data Warehouse
4. Epic via CDA
5. I Know Med via CDA
6. IntrinsiQ
7. GE Centricity
8. All Scripts – Sunrise Clinical Manager (SCM)
9. OncoEMR

Interfaces in development:

Next Gen
MosaiO Hosted
Varian Hosted
Cure MD
How Big is CLQs Big Data?

• Just over 1M reported patients have >800M reported clinical events

• 85% of the clinical events reported to CLQ fall into four categories:
  – Clinical Observations
  – Labs
  – Medications, Ordered
  – Medications, Administered

• An average CLQ patient has:
  – 312 Clinical Observations
  – 90 Lab Results
  – 66 Drug Order Events
  – 36 Drug Administration Events
Building the Coalition

Personalized.
Predictive.
Precise.
Powerful.
Patient-Driven.
Proportion of Breast Cancer Patients by Gender (2006-2015)

Female, 98.8%
Male, 1.2%


N = 18420 Patients
Proportion of Breast Cancer Cases by AJCC Stage Group (2006-2015)

- Stage I: 42%
- Stage II: 28%
- Stage III: 12%
- Stage IV: 9%
- Stage 0: 9%

N = 18420 Patients

Percent of Breast Cancer Patients with ER/PR Test Results Recorded in Structured Data (2006-2015)

- Percent of Patients with ER/PR Test: 45%

Percent of Breast Cancer Patients With Her2Neu Test Results Recorded in Structured Data (2006-2015)

- Percent of Patients with Her2Neu Test: 40%
Therapeutic Interventions:
1,043 Stage IV Melanoma Patients

- Immunotherapy: 39%
- Other Therapy: 32%
- Cytotoxic Therapy: 23%
- Targeted Therapy: 6%
CancerLinQ

Committed to Improving Lives in the Fight Against Cancer

ASCO IS LIVE.
The American Society of Clinical Oncology and CancerLinQ use SAP HANA to collect and process patient data from around the world, generating medical insights at an unprecedented scale. So doctors can provide patients with live, personalized care informed by the data of every patient treated before them.

ASCO runs live. ASCO runs simple.
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