Where Precision Medicine meets Population Health

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Topics to discuss today:

• Healthcare trends around Precision Medicine and Population Health
• Customer’s experience
• Technology investments can simplify clinical care management
• Discussion
The Healthcare Storm
The Healthcare Storm: Precision Medicine Can Fix It

- Lower Cost
- Improve Outcomes

Precision Medicine

Healthcare
USA market shift towards value driven care

Total Public and Private Accountable Care Organizations, 2011 to January 2015

Aggressiveness of Organizations’ PHM Efforts

Precision Medicine: Delivering on the Promise

Life Sciences Perspective

A New Landscape for the Pharmaceutical Industry

PMC research illustrates the biopharmaceutical industry’s deep commitment to personalized medicine.

- 42% of all drugs in development are personalized medicines.
- 73% of oncology drugs in development are personalized medicines.
- 13% of approved medicines have genomic information in their label.

Healthcare Perspective

Personalized Medicine Improves Health Outcomes

- Myelogenous Leukemia 5-year Survival Rate: Following introduction of imatinib, a targeted therapy, 2x.
- Colorectal Cancer 5-year Survival Rate: Following discovery of molecular receptors associated with tumor growth, 15%.
- Heart Patient Hospitalization Rate: Documented when genetic information was used in dosing warfarin, 30%.

Precision Medicine Can Drive Health System Efficiency

- Chemotherapy Use: If women with breast cancer received genetic testing prior to Tx, 34%.
- Colorectal Cancer Costs: If metastatic colorectal cancer patients received genetic testing prior to Tx, $604M.
- Strokes Prevented: If a genetic test was used to properly dose blood thinners, 17K.

Source: Biopharmaceutical Companies’ Personalized Medicine Research Yields Innovative Treatments for Patients. PMC/PhRMA, 2015.
Precision Medicine Can Help Fix It

Precision Medicine

Healthcare

Improve Outcomes

Lower Cost
Precision Medicine Enables Population Health
Global trends

• Volume to value
  – Changing reimbursement models
  – Triple Aim

• Regulatory reform
  – MACRA, DISRIP

• Genetic sequencing

• Consumerism
Major National US Health System - Business Need

- **Business drivers**
  - **Increase revenue**
    - Improve rev cycle/contract performance, physician productivity
    - Increase value based payments
    - Sell data services
  - **Reduce costs/improve operational excellence**
    - Optimize resource use, supply chain costs, clinical labor
    - Reduce IT delivery costs
  - **Improve care quality**
    - Standardize care delivery
    - Improve patient experience
    - Manage population health

- **Why now**
  - Strategic enterprise analytics initiative to address performance variation
Challenges

• Corresponding technical requirements
  – Deliver a sustainable and national single source of truth
  – Create enterprise data warehouse (EDW)
    • Initial Use Case: data quality, standardization and cost/quality data mart
  – Provide self service analytics to ministries

• Challenges
  – 3700 systems, 10 source systems in 1st phase
  – Multiple EMRs
  – 131 facilities, 20 in 1st phase
  – Data mapping, integration, information silos
  – Data duplication, data quality

Enterprise Data Warehouse

2 Yr Hx Backload – 900M records
10 systems:
• Cerner
• Siemens(3)
• Meditech(2)
• CPSI, McKesson(3)

Daily file load 220+

Production Environment – 1+ TB
Anticipated Benefits

• Improve revenues, reduce costs and related operational efficiencies, and improve overall quality of care

• Reduce costs of maintaining many localized data warehouses
  – Drive efficiency/standardize across the various ministries

• Free up local resources to analyze data instead of gather data

• Enable true enterprise reporting and analytics

• Govern data collection, storage and use through structured processes

• Enable consistent enterprise KPI reporting
16 year old male, plays high school sports, injures his knee in basketball.
16 year old male, plays high school sports, injures his knee in basketball
Oracle Healthcare Foundation
Enables Population Health Management
Oracle Healthcare Foundation
Self Service Analytics
Ask New Questions Across the Spectrum

**Patient Care**
What trends do we see in outcomes?

**Reimbursements**
What procedures have the highest % of readmissions?

**Finance**
Which dept has the highest cost?

**Procurement**
Cost associated with a physician supply preference card?

**Human Resources**
Does high overtime lead to emp. dissatisfaction?

**Supply Chain**
Which depts. have the highest inventory on hand?
Oracle Healthcare
Accelerating the Evolution of Human Care

Population Health
Clinical-Operational Performance
Quality Metrics
Cost of Care Delivery

Oracle Healthcare Foundation

Precision Medicine

Molecular Lab Workflow
Patient Stratification
Statistical & Scientific Analysis
Biomarker Discovery

Patient-Centric Care Coordination
Patient and Provider Validation
Healthcare Data Repository

Health Information Exchange

Health Science Network

Research Collaboration
Clinical Trial Patient Recruitment
Penn and Precision Medicine

Penn Medicine: The 2016 Healthcare Informatics Innovator Awards

Goal: Lead in Delivering Individualized Medicine

Strategy: Focus on high acuity patients needing advanced diagnostic, therapeutic and procedural services

Actions to Achieve Goal:

• Center for Personalized Diagnostics
  In-house oncology diagnostic lab for liquid / solid tumors

• Institute for Biomedical Informatics

• Large bio-bank focused on disease-based initiatives

• Precision Medicine Initiative
  focused investment in demonstration of personalized medicine approach beyond oncology

• Significant investment in advanced IT infrastructure
Precision Medicine Warehouse **PennOmics**

- Studies
- Outcome
- Consents
- ‘Omics
- Samples
- Protocol
- Tumors
- Subjects/Patients
- Treatment

Discrete Data Only

Penn Data Store
- Phenotype and Limited Genotype Data from Health System Operations

Research Data
- Clinical Trials Registries Bio-banks ‘Omics

“Translational Research” Penn Researchers and Clinicians

Industry
- Cohort Identification

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How is the world of advanced clinical care changing?
Oracle Healthcare: A Solid Foundation Built to Scale

• Enterprise grade
• Fit for Purpose
• Flexible
The Evolving Structure of Research Teams

- Traditionally Research has been a linear process
- Each team member responsible for expertise in their domain
- Limited sharing of data prior to fully qualified results
- Complicated structure for integrated data exploration
Integrated research teams now work in dynamic combinations

- Physicians, Research Scientists and Bioinformatics specialists form integrated teams

- Data is shared between members at an earlier form for exploration

- Communication about data is complicated by domain specific terminology and data structure
Multiple data types and structures result in complicated analysis environments that impede progress.
Integrated and Structured Datasets Enable Diverse Research Teams

- Team members have immediate access to all data
- Removes the energy barrier in launching new studies
- Simplified interface tools levels the field for access to data regardless of domain expertise
- Data is available in consistent structures
- Access control allows regulation of data use and sharing
Simplified workflows for filtering, annotation and reporting of genomic variants support data driven treatment decisions
Precision Medicine is Becoming the New Norm
Precision Medicine Enables Population Health

**Actionable insights**
- Specialized services produce clinically actionable “knowledge”
- Centers of excellence sharing new care standards in “Real Time”
- Personalized therapies based upon individual genetic profiles linked to better outcomes

**Oracle**
- Provide an integrated view of all healthcare related data
- Simplify patient stratification across care settings
- Deliver faster and deeper visibility into operational and financial drivers
- Empower system wide action planning

**Accelerate change**
- Genetic data integrated into everyday care
- Proven treatment plans for targeted populations
- Easily merge new forms of data
  - “Internet of Things”
- Bio marker discovery, clinical trial design and patient recruitment occur more rapidly