Transitioning to a New EHR:

Data Conversion Strategies to Engage Providers and Operations

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No real or apparent conflict(s) of interest that may have a direct bearing on the subject matter of this CME activity.
Data Conversion
What’s the Goal?

Doctors and Staff
• Everything I need to do my job

Technical Team
• Good Data
• Technically possible
Who We Are

• 5 hospital campuses
• 1 children’s hospital
• 140+ physician practices
• 17 community clinics
• 13 health centers
• 80 testing and imaging locations

• 11 express care locations
• 13,100 employees
• 1,340 physicians
• 582 APC’s
• 1,161 acute care beds
LVPG Ambulatory Practices

• One of the largest medical groups in the country
• 1,000+ Practitioners and 2,255 Colleagues:
  – 673 Physicians (590 FTEs)
  – 332 APCs (285 FTEs)
• 45 Specialties
• 1.8 Million visits/year
• 400,000 Patients (>1/2 Lehigh Valley’s population)
Implementation in Waves

Wave 1
- Practices
- Clinics
- Rehabilitation Locations

Go-Live: February 2015

Wave 2
- Inpatient
- Emergency Department
- Operation Room
- Hospital Outpatient Departments (e.g. radiology)

Go-Live: August 2015

Registration, scheduling, billing, patient portal

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## Source Systems – Best of Breed

<table>
<thead>
<tr>
<th>Source System</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centricity Enterprise</td>
<td>• Inpatient Data</td>
</tr>
<tr>
<td>Centricity Business</td>
<td>• Practice Scheduling Data</td>
</tr>
<tr>
<td>PHS (Pathways Healthcare Scheduling)</td>
<td>• Hospital Department Scheduling Data</td>
</tr>
<tr>
<td>CPN (Centricity Perinatal)</td>
<td>• Perinatal Data Elements</td>
</tr>
<tr>
<td>CPO EMR</td>
<td>• Ambulatory Data</td>
</tr>
<tr>
<td>Sunquest /Quest</td>
<td>• Lab Results</td>
</tr>
</tbody>
</table>

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The Three Basic Questions

- What Data to Convert?
- How Much Data to Convert?
- How to do it? (Tools)?
Defining Conversion Scope

- Conversion Stakeholder Meetings
  - Clinicians and end-users define business need
  - Technical team analyzes technical feasibility
  - Together define proposed conversion scope
Data Conversion
What’s the Goal?

- Efficiency of Access
- Longitudinal Care
- Operational Bolus
- Quality Metrics
- Storage
Data Conversion
What’s the Goal?

✔ Efficiency of Access
  • In-line with workflows (ex. Labs)
  • Legacy Lookback available
  • Minimize scanning

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Data Conversion
What’s the Goal?

✓ Longitudinal Care
– Where prior data is important to interpret current data
(Ex. Growth Chart, Vitals, etc.)
Data Conversion
What’s the Goal?

✓ Operational Bolus

– Minimize data availability
  slowing down the transition

(Ex. Future Appointments)
Data Conversion
What’s the Goal?

✓ Quality Metrics

– Value is simply higher with some data

(Ex. Mammography, ejection fraction)
Data Conversion

What’s the Goal?

✓ Storage

– Value electronic storage over paper

(Ex. Scanned advanced directive)
Data Forensics

Prioritize data elements & source systems.

Plan

Conduct quantitative & qualitative analysis of data. Review & validate findings with SMEs.

Do

Full Cycle Forensics

Act

Decide remediation efforts &/or process changes.

Study

Analyze captured profile information and categorize data (High, Medium, Low reliability).
## Data Forensics Examples

<table>
<thead>
<tr>
<th>Data Subject Area</th>
<th>Number of Distinct Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunizations (Influenza &amp; Pneumonia)</td>
<td>26</td>
</tr>
<tr>
<td>Smoking &amp; Tobacco Use</td>
<td>20</td>
</tr>
<tr>
<td>Vital Signs</td>
<td>12</td>
</tr>
<tr>
<td>Height/Weight/Head Circumference</td>
<td>8</td>
</tr>
</tbody>
</table>
## Data Forensics Examples

<table>
<thead>
<tr>
<th>EMR Table Element Name</th>
<th>PAS Cig Smok</th>
<th>SMOK HX Tota</th>
<th>SMOK HX PPD</th>
<th>SMOK YR St</th>
<th>SMOKSTARTAGE</th>
<th>QUIT SMK STG</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMR Field Description</td>
<td>Passive smoke exposure</td>
<td>Pack Years</td>
<td>Packs/day smoking</td>
<td>Year started smoking</td>
<td>Age started smoking</td>
<td>Smoke cessation stage</td>
</tr>
<tr>
<td>Expected Data Type Format</td>
<td>Text string AA or AAA</td>
<td>Numeric x.xx-xx</td>
<td>Numeric Text string</td>
<td>Numeric XXXX</td>
<td>Numeric x or xx</td>
<td>Text string</td>
</tr>
<tr>
<td>Field Expected Duplicate (Y/N)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Field Reference Table (Y/N)</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Field Default Values (Y/N)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Mandatory (Y/N)</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Data Field Description</td>
<td>Quantitative</td>
<td>Qualitative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMOKSTATODAY SMOK STATUS TOBACCO USE SMOKES CIGARET SMKG</td>
<td>Numeric &amp; text string; Compliance with reference table values range: 92-98%.</td>
<td>SMOKSTATODAY: interfaced field. Multiple fields capture similar clinical assessments. Can map observed values to common field values. SMOK STATUS data capture is most consistent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADV TO QUIT SMOK ADVICE</td>
<td>Text string; Compliance with reference table values range: 90%-99%.</td>
<td>Multiple fields capture similar clinical assessments. Can map observed values to common field values. ADV TO QUIT data capture is most consistent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Data Forensics
### Low Reliability

<table>
<thead>
<tr>
<th>Data Element Name</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIGARIPEUSE</td>
<td>Numeric &amp; text string; Free text fields except for TOBACCOTYPE which is free text and reference list field.</td>
<td>Multiple fields capture similar clinical assessments. Data capture is highly inconsistent.</td>
</tr>
<tr>
<td>CIGARS WEEK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOBACCOTYPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORALTOBACUSE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMOK HX PPD</td>
<td>Numeric &amp; text string; 30-40% reference table compliance.</td>
<td>Data capture is highly inconsistent.</td>
</tr>
<tr>
<td>SMOK HX TOTA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMOKSTARTAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMOK YR ST</td>
<td>Numeric &amp; text string; one field utilizes a reference table and the others utilize free text; 60-75% reference table compliance.</td>
<td>All fields capture similar clinical assessments. Data capture is highly inconsistent between fields.</td>
</tr>
</tbody>
</table>
## Data Forensics

### Discrete Elements

<table>
<thead>
<tr>
<th>OBS Term</th>
<th>Total Values</th>
<th>% after filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac EF</td>
<td>17990</td>
<td>95%</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>21510</td>
<td>73%</td>
</tr>
<tr>
<td>Diab Eye Ex</td>
<td>35626</td>
<td>34%</td>
</tr>
<tr>
<td>DIAB FOOT CK</td>
<td>54243</td>
<td>89%</td>
</tr>
<tr>
<td>DIABFOOTDPM</td>
<td>3099</td>
<td>75%</td>
</tr>
<tr>
<td>FEV1</td>
<td>426</td>
<td>96%</td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td>306</td>
<td>96%</td>
</tr>
<tr>
<td>INR</td>
<td>390527</td>
<td>98%</td>
</tr>
<tr>
<td>MAMMOGRAM</td>
<td>138712</td>
<td>97%</td>
</tr>
<tr>
<td>PAP SMEAR</td>
<td>170234</td>
<td>99%</td>
</tr>
<tr>
<td>PEF</td>
<td>4091</td>
<td>90%</td>
</tr>
<tr>
<td>PREV C-SECT</td>
<td>22102</td>
<td>100%</td>
</tr>
<tr>
<td>PSA</td>
<td>39724</td>
<td>96%</td>
</tr>
<tr>
<td>PSA FREE</td>
<td>5404</td>
<td>67%</td>
</tr>
<tr>
<td>PSA-TOTAL</td>
<td>28931</td>
<td>100%</td>
</tr>
<tr>
<td>SIGMOID</td>
<td>129</td>
<td>46%</td>
</tr>
</tbody>
</table>
Top 10 Allergies

10. Purple cough medicine
9. Down
8. English
7. Weird sugar
6. Butt Paste
5. Anything orange
4. Anything that causes bleeding
3. Medications in Puerto Rico
2. ‘cillins
1. Anything furry
Top 10 Allergies

DANGEROUS

1. Allergic to a lot of Medications
2. Allergic to most antibiotics
3. An antibiotic given at hospital
4. All pain meds per patient
5. Med given before surgery to calm him
6. 32 meds on patient’s list - scanned 11/11/10
7. ADHD medication
8. All ACE
9. All meds from pharmaceutical company
10. All vaccines
How Did We Benefit from Data Forensics?

By having the data forensic analysis, we had the ammunition needed to support our decision to electronically migrate data to the new EHR.

The data forensic results provided us with the guidelines that we needed to support our data migration (such as coding special rules) to ensure that data presentation on the receiving EHR side was clean.

The prerequisite data forensics effort validated to the EHR vendor, as well as ourselves, which data was “healthy” enough to migrate.
Conversions: Expectations (Ours and Theirs)

Vendor recommends minimal to no conversion of data

Users expected full conversion of data

Previous EHR – significant variability in input and process
Governance

• Conversion Sub-Committee

40+ participants:
- Physicians
- Nursing
- Legal Services
- Health Information Management
- Internal Audit
- Risk Management
- Registration
- Finance

• Definition of Requirements

15 Data Sets:
- Allergies
- Ambulatory Problem List
- Discrete Mammography Results
- Future Appointments
- Imaging Results
- Lab Results
- Patient Data
- Vaccination History
- Ambulatory Medications
- Clinical Observations
- EKG
- Historical Encounters
- In-House Charge Conversion
- Onbase/Scanned Documents
- Transcribed Notes/Documents

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Data Migration Strategies

- **Data Conversion**: Migrated from one system to the other
- **Clinical Reconciliation**: Presented in the new system for validation
- **Chart abstraction**: Hand-entered from one system to the other
Only active problems, allergies and medications were converted.
Desired Conversions - Summary

Foundation Converted
- Patients
- Historic Encounters
- Future Appointments

Clinical Reconciled
- Allergies
- Problems
- Medications

Clinical Converted
- Lab Results
- Imaging Results
- Notes/Transcriptions
- Scanned Notes
- Vaccination History
- Clinical Observations (vitals)
Migration Time Frames

- Master Patient Index from Legacy
- Encounters – 10 years
- Imaging Results/Transcriptions – 3 years
- Labs – 3 years except for identified tests and titers
- All Allergies
- All Current Problems
- All Current Medications
Communication
Where’s My Data?

- Converted
- Paper Charts
- Legacy System Access
Engagement

• Validation
  – Data loads required varying degrees of testing and validation, including clinical and operational staff.
  – This provided opportunity to visualize the data in the new system and an excellent engagement activity for end users.
Engagement

• Change Management
  – Quality of the data being converted is important to maintain
  – For safety reasons, data such as medications, allergies and problems would be converted but need to be manually reconciled
  – Non-discrete data or data that didn’t have a corresponding field match would not be converted
  – The data conversion was a starting point to build the new record
## Communication

**Data Set Description** | **Source System** | **Additional Information** | **Scope**
--- | --- | --- | ---
**Ambulatory Problem List** | Amb | • Patient problem/diagnosis list  
• Reconciliation via CCD. Clinicians can either click Add or Discard for each item. Clicking Add will prompt you to confirm the item details and will add the item to the Problems list. | All Active

**Ambulatory Problem List** | Amb | • Patient problem/diagnosis list  
• Subset used for registries  
• Conversion of discrete allergy data into the Epic Chart (directly imported into Epic chart without reconciliation from a clinician) | Active registry data - 700 diagnosis codes being sent directly into Epic chart to populate the patient registries.

**Immunization** | InPt | • Specific immunization data such as name of immunization, date given, and source system | All Available

**Immunization** | Amb | • Specific immunization data such as name of immunization, date given, and source system | All Available

**Clinical Observations** | InPt | • This category includes discrete data elements like vitals and growth chart data | 3 Years, Starting 1/1/2012

**Clinical Observations** | Amb | • This category includes discrete data elements like vitals and growth chart data | 3 Years, Starting 1/1/2012

**Clinical Observations** | Perinatal | • This category includes discrete data elements for the baby like Apgar scores, head circumference, etc. | 3 Years, Starting 1/1/2012

**Imaging Results** | PACS | • This includes the images, results and mammography bi-rad codes. Also includes EKGs. | 3 Years, Starting 1/1/2012
Training

• Training – Data conversion education was incorporated into the formal EHR training including where to find data and how to reconcile problems, medications and allergies through a Continuity of Care Document (CCD) process.
## Challenges & Opportunities

<table>
<thead>
<tr>
<th>Category</th>
<th>Opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider buy-in and the need for all data –</td>
<td>• Opportunity for standard education and communication to comprehend technical aspects and decision making for data conversion and process.</td>
</tr>
<tr>
<td>Data integrity &amp; quality –</td>
<td>• Opportunity to scrub the data through the conversion process</td>
</tr>
<tr>
<td>Dual systems –</td>
<td>• Opportunity to reconcile disparate, current-state clinical data</td>
</tr>
<tr>
<td>Establish a place for data to be clinically effective for end users –</td>
<td>• Opportunity to define and teach standard processes for the continued use of data sets</td>
</tr>
<tr>
<td>Some data required human intervention –</td>
<td>• Opportunity for engagement of staff and providers through pre-visit planning and chart preparation prior to go-live.</td>
</tr>
</tbody>
</table>
Recommendations

Embed clinical and operational staff and champions in the project

Maintain access to legacy systems through view-only.

Use existing governance forums to vet critical decisions.

Data volume is important only as it relates to efficiency and clinical needs. Quality and network initiative needs trump volume. Emphasis on quality of the data itself supersedes them all.

Change management, communication and training are integral parts of the conversion project.

Maintain an active process for converting and reconciling some data (problems, medications and allergies for example).
Outcomes

- Successfully converted over 160 million rows of historical data comprised of more than one billion discreet data elements
- 200-thousand converted future appointments
- All critical demographic information converted except for insurance information which needed to be current
- 2.7 million vaccines converted
- Preloaded 700 types of problems from the problem list to prepopulate 12 registries (625,000)
- 33 Discrete clinical observation data elements converted providing longitudinal and quality data sources (30 million)

Highly successful go-live efficiency metrics within 2 months including an average registration time of 5:24 (stable benchmark of 7 minutes) and a 97% documentation and chart closure rate within four days for providers
QUESTIONS?

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