Healthcare Analytics and Process Improvement (HAPI): New Opportunities for Pathology and Laboratory Medicine

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HAPI Groups

Healthcare Analytics & Process Improvement

Healthcare Analytics, Prediction, Process Improvement & Estimating Risk
Saint Helena Olive

The St Helena olive, Resea ediphas, is extinct. New and local conservationists collected cuttings from the last known wild plant before it died in 1994. In 2003 the last surviving individual succumbed to devastating termite attacks and fungal infection. Despite the best efforts from New's Conservation Biotechnology Ltd., none of the living materials could be salvaged.

It is difficult to confirm when a plant has gone extinct as it may be dormant or persisting with few members. We use the IUCN Red List criteria to assess the probability of extinction and to raise a warning flag before it is too late.
Commoditization?

A

- Ferritin 154 ng/mL
- FDA approved
- CLIA certified lab
- TAT = 8 hours
- $4.15 per test

Look! My test is obviously the best

B

- Ferritin 155 ng/mL
- FDA approved
- CLIA certified lab
- TAT = 2 hours
- $4.40 per test

Nonsense! Can’t you see my test is better

Look! My test is obviously the best

Nonsense! Can’t you see my test is better
Some Starting Questions

1. What do we do?
2. What do we produce?
3. How do our customers use what we produce?
4. How could our customers use what we produce?
Doing Something Different…

“Our first line of defense has been our product line itself. There’s always a minimum level of product quality and performance necessary to compete, but winning more deals requires that our products not just be different, but that they do something different in a [meaningful] sense. We’ve had to concentrate on innovation that satisfies our customers’ financial goals.”

Davies Hood
CEO, Induron (Industrial Coatings)
Laboratory Supply Chain—Leveraging Data

Other Operations

Laboratory

Equipment

Supplies

Labor

Payers

Providers

Patients

Admin

Others

Other Labs
HAPI: Internal Focus

Laboratory
Laboratory Data Warehouse

- Laboratory Test Data
- Hospital Administrative Data
- Middleware
- HTML
  - Operational & Medical Report
- Direct SQL Query Document
  - Statistical Analysis
    - Research & Trend Analysis Reports
Other Reports

Caution: Data for this system is 24 hours behind Corner

List Samples for Test

Submit Start Date End Date Mnemonic

List Low Samples for Test

Submit Start Date End Date Mnemonic Cutoff

List High Samples for Test

Submit Start Date End Date Mnemonic Cutoff

List Range of Samples for Test

Submit Start Date End Date Mnemonic Low High
Data Warehouse: Project ROI (Actual)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Realized Cost Savings (2005)</strong></td>
<td></td>
</tr>
<tr>
<td>Annual savings</td>
<td>$746,200</td>
</tr>
<tr>
<td>Pct of total laboratory costs</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Profitability (actual figures 1998-2005)</strong></td>
<td></td>
</tr>
<tr>
<td>Payback period (actual)</td>
<td>1.47 y</td>
</tr>
<tr>
<td>NPV</td>
<td>$2,968,639</td>
</tr>
<tr>
<td>MIRR</td>
<td>59.4%</td>
</tr>
</tbody>
</table>

**Still being used!**

*Brimhall BB, Hall TE, Walczak S. AMIA Annu Symp Proc 2006:865  
Hospital Blood Donor Center
Revenue and Expense view of operation

- Revenue: billed CPT codes for therapeutic phlebotomies
- Expenses greatly exceed revenue resulting in substantial net loss
- Therefore the operation should be closed and 7 employees laid off
## Contribution Analysis (TTM)

<table>
<thead>
<tr>
<th></th>
<th>Whole Blood</th>
<th>Platelet</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outside Cost</strong></td>
<td>$1,579,425</td>
<td>$579,960</td>
<td>$2,159,385</td>
<td>100.0%</td>
</tr>
<tr>
<td>Less Consumables</td>
<td>$218,632</td>
<td>$199,769</td>
<td>$418,401</td>
<td>19.4%</td>
</tr>
<tr>
<td>Less Testing</td>
<td>$312,380</td>
<td>$37,246</td>
<td>$349,626</td>
<td>16.2%</td>
</tr>
<tr>
<td>Less Supplies</td>
<td>$8,020</td>
<td>$956</td>
<td>$8,976</td>
<td>0.4%</td>
</tr>
<tr>
<td>Less Incentives</td>
<td>$87,557</td>
<td>$10,440</td>
<td>$97,997</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Contribution to Labor</strong></td>
<td>$952,835</td>
<td>$331,549</td>
<td>$1,284,384</td>
<td>59.5%</td>
</tr>
<tr>
<td>Less Labor</td>
<td>$352,642</td>
<td>$62,231</td>
<td>$414,873</td>
<td>19.2%</td>
</tr>
<tr>
<td>Less Recruiting</td>
<td>$92,604</td>
<td>$16,342</td>
<td>$108,946</td>
<td>5.0%</td>
</tr>
<tr>
<td><strong>Contribution to Local Fx</strong></td>
<td>$507,589</td>
<td>$252,976</td>
<td>$760,564</td>
<td>35.2%</td>
</tr>
<tr>
<td>Regulatory Costs</td>
<td>$3,698</td>
<td>$653</td>
<td>$4,351</td>
<td>0.2%</td>
</tr>
<tr>
<td>Common Supplies</td>
<td>$5,863</td>
<td>$1,035</td>
<td>$6,898</td>
<td>0.3%</td>
</tr>
<tr>
<td>Equipment Costs</td>
<td>$229,311</td>
<td>$40,466</td>
<td>$269,777</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Contribution to Overhead</strong></td>
<td>$268,716</td>
<td>$210,822</td>
<td>$479,538</td>
<td>22.2%</td>
</tr>
</tbody>
</table>
Seeing the Donor Center in New Light
Blood Product Collections

Zika virus testing requirement started
Donor Center Net Savings

[Bar graph showing net savings from $40,000 to $60,000 across various months from Jan-14 to Mar-17]
HAPI: Forward Vertical Integration

- Laboratory
- Providers
- Payers
- Patients
- Admin
- Others
Faster Testing for Meningitis

Meningitis panel
≈ $132,000/y
## Downstream Cost Calculations

<table>
<thead>
<tr>
<th>Patient</th>
<th>MS DRG</th>
<th>MS DRG_Desc</th>
<th>All Vbl per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>947</td>
<td>SIGNS  SYMPTOMS W MCC</td>
<td>$940.44</td>
</tr>
<tr>
<td>2</td>
<td>948</td>
<td>SIGNS  SYMPTOMS W/O MCC</td>
<td>$1,099.40</td>
</tr>
<tr>
<td>3</td>
<td>948</td>
<td>SIGNS  SYMPTOMS W/O MCC</td>
<td>$1,002.32</td>
</tr>
<tr>
<td>4</td>
<td>948</td>
<td>SIGNS  SYMPTOMS W/O MCC</td>
<td>$880.13</td>
</tr>
<tr>
<td>5</td>
<td>98</td>
<td>NON-BACTERIAL INFECT OF NERVOUS SYS EXC VIRAL MENINGITIS W CC</td>
<td>$1,210.67</td>
</tr>
<tr>
<td>6</td>
<td>103</td>
<td>HEADACHES W/O MCC</td>
<td>$1,151.85</td>
</tr>
<tr>
<td>7</td>
<td>75</td>
<td>VIRAL MENINGITIS W CC/MCC</td>
<td>$1,018.32</td>
</tr>
<tr>
<td>8</td>
<td>99</td>
<td>NON-BACTERIAL INFECT OF NERVOUS SYS EXC VIRAL MENINGITIS W/O CC/MCC</td>
<td>$811.39</td>
</tr>
<tr>
<td>9</td>
<td>555</td>
<td>SIGNS  SYMPTOMS OF MUSCULOSKELETAL SYSTEM  CONN TISSUE W MCC</td>
<td>$542.81</td>
</tr>
<tr>
<td>10</td>
<td>98</td>
<td>NON-BACTERIAL INFECT OF NERVOUS SYS EXC VIRAL MENINGITIS W CC</td>
<td>$928.82</td>
</tr>
<tr>
<td>11</td>
<td>99</td>
<td>NON-BACTERIAL INFECT OF NERVOUS SYS EXC VIRAL MENINGITIS W/O CC/MCC</td>
<td>$1,366.46</td>
</tr>
<tr>
<td>12</td>
<td>98</td>
<td>NON-BACTERIAL INFECT OF NERVOUS SYS EXC VIRAL MENINGITIS W CC</td>
<td>$538.07</td>
</tr>
<tr>
<td>13</td>
<td>866</td>
<td>VIRAL ILLNESS W/O MCC</td>
<td>$2,272.90</td>
</tr>
</tbody>
</table>

1044 884 ORGANIC DISTURBANCES MENTAL RETARDATION $828.42
Approval to modify contract #21501080-E with Biofire Diagnostics, Inc.

Background:

The UHS Virology Laboratory performs respiratory virus screens, gastrointestinal screens and blood culture identification panels using the Biofire molecular technology. Currently, patients presenting to the Health System, with signs and symptoms of possible meningitis, are evaluated for clinical diagnosis by obtaining fluid from a lumbar tap called cerebral spinal fluid (CSF). Approximately 1,044 patient samples for CSF testing are received in Virology annually.
Analysis with Downstream Effects

In addition, the anticipated downstream reduction of costs associated with patient waits for CSF and referral laboratory results will result in a net saving to UHS of $630,658.64 over two years.

<table>
<thead>
<tr>
<th></th>
<th>Current Annual First Year</th>
<th>Proposed Annual Second Year</th>
<th>Proposed Annual Third Year</th>
<th>Total 3-year Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current contract expense</td>
<td>$790,649.20</td>
<td>$790,649.20</td>
<td>$790,649.20</td>
<td>$2,371,947.60</td>
</tr>
<tr>
<td>ME supplies expense</td>
<td>$0</td>
<td>$198,018.00</td>
<td>$198,018.00</td>
<td>$396,036.00</td>
</tr>
<tr>
<td>Total Pathology expense</td>
<td>$790,649.20</td>
<td>$988,667.20</td>
<td>$988,667.20</td>
<td>$2,767,983.00</td>
</tr>
<tr>
<td>Net increase in Expense</td>
<td>$790,649.20</td>
<td>$988,667.20</td>
<td>$988,667.20</td>
<td>$396,036.00</td>
</tr>
<tr>
<td>Percent increase in Expense</td>
<td></td>
<td></td>
<td></td>
<td>16.7% increase</td>
</tr>
</tbody>
</table>

Savings associated with implementation

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in cost of CSF referral lab testing</td>
<td>$0</td>
<td>($45,053.00)</td>
<td>($45,053.00)</td>
<td>($90,106.00)</td>
</tr>
<tr>
<td>Reduction in cost of CSF Cryptococcal testing</td>
<td>$0</td>
<td>($2,658.80)</td>
<td>($2,658.80)</td>
<td>($5,317.60)</td>
</tr>
<tr>
<td>Reduction in downstream costs of patients waiting for referral lab results*</td>
<td>$0</td>
<td>($136,688.89)</td>
<td>($136,688.89)</td>
<td>($273,377.78)</td>
</tr>
<tr>
<td>Reduction in downstream costs of patients waiting CSF culture results*</td>
<td>$0</td>
<td>($328,946.72)</td>
<td>($328,946.72)</td>
<td>($657,893.44)</td>
</tr>
<tr>
<td>Total saving associated with implementation</td>
<td>$0</td>
<td>($513,347.41)</td>
<td>($513,347.41)</td>
<td>($1,026,694.64)</td>
</tr>
</tbody>
</table>

Net saving to UHS (net increase in expense less savings) $(630,658.64)


Strategic Note:

These new tests are directly related to the strategic initiatives of the Triple Aim Plus, specifically Improving Quality, Safety and Outcomes, they are necessary to provide
Heparin-Induced Thrombocytopenia (HIT)
Expensive Anticoagulants

- HIT Test Ordered

- Heparin

- Other Anticoagulant
Test Result Distribution

- Positive: 90%
- Negative: 10%
- Indeterminate: 0%
<table>
<thead>
<tr>
<th>Category</th>
<th>2 Points</th>
<th>1 Point</th>
<th>0 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrombocytopenia</td>
<td>Plt fall &gt;50% AND plt nadir ≥20K/uL</td>
<td>Plt fall 30%-50% AND plt nadir 10K-20K/uL</td>
<td>Plt fall &lt;30% AND plt nadir ≤10K/uL</td>
</tr>
<tr>
<td>Timing of platelet count fall</td>
<td>Clear onset fall 5-10 d OR plt fall ≤1 day IF heparin exposure within previous 30d</td>
<td>Consistent with fall 5-10d but not clear (e.g., missing data) OR onset after 10d OR fall ≤1d (previous heparin exposure prior 30-100d)</td>
<td>Platelet fall &lt;5d without recent heparin exposure</td>
</tr>
<tr>
<td>Thrombosis or other sequelae</td>
<td>New thrombosis (confirmed) OR skin necrosis at heparin injection sites OR acute systemic reaction after heparin bolus</td>
<td>Progressive or recurrent thrombosis OR non-necrotizing skin lesions OR suspected thrombosis (not proven)</td>
<td>None</td>
</tr>
<tr>
<td>Other causes of thrombocytopenia</td>
<td>None apparent</td>
<td>Possible</td>
<td>Definite</td>
</tr>
</tbody>
</table>

Adapted from: Cuker A. Semin Thromb Hemost 2014;40:106-114
Bayesian Analysis of HIT Testing

EMR Alert with Questions

Service Clinical Manager

Based upon your answers on this order form, the risk of HIT in this patient is HI+. Heparin should be stopped and anticoagulation with a Direct Thrombin Inhibitor started. Testing for Heparin-Platelet Antibodies is indicated.

OK
## Changes Over Time

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2011</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIT Tests</td>
<td>224</td>
<td>67</td>
<td>-157</td>
</tr>
<tr>
<td>Test Variable Cost</td>
<td>$26,320</td>
<td>$7,872</td>
<td>($18,448)</td>
</tr>
<tr>
<td>Drug Variable Cost</td>
<td>$313,964</td>
<td>$93,909</td>
<td>($220,055)</td>
</tr>
</tbody>
</table>
HAPI: Related Horizontal Integration

- Laboratory
- Other Labs
Multi-Institutional Lab Data Collaborative

pcornet
The National Patient-Centered Clinical Research Network
University of Texas Lab Collaboration

UT Pathology and Laboratory Medicine Collaboration: Outline of Two Opportunities to Achieve Quick Wins

In addition to pathology digital image management for telepathology services, taking inventory of subspecialty pathologists and scientists who may be available to cover at sister UT sites, and collaborative teaching of health professionals, there are two additional projects with the potential to result in quick wins for the UT pathology and clinical laboratory collaboration.

**Project 1**
Identification of laboratory testing sent to outside reference laboratories, often out of state, from each laboratory (either directly managed by a UT medical site or managed by an affiliated health system). In addition to send out tests, we would need to identify tests performed currently at the UT medical sites. An analysis with this information will permit rapid determination of potential UT
HAPI: Unrelated Horizontal Integration
Employee Badge Access

<table>
<thead>
<tr>
<th>Process</th>
<th>TAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>27.65 min</td>
</tr>
<tr>
<td>Proposed</td>
<td>4.5 min</td>
</tr>
</tbody>
</table>
# Results

<table>
<thead>
<tr>
<th>Parameter(s)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes per year</td>
<td>1,761</td>
</tr>
<tr>
<td>Investment (software, etc.)</td>
<td>$13,570</td>
</tr>
<tr>
<td>Ongoing annual cost</td>
<td>$500</td>
</tr>
<tr>
<td>Project profitability (pro forma)</td>
<td></td>
</tr>
<tr>
<td>Payback period</td>
<td>1.35 y</td>
</tr>
<tr>
<td>Net present value</td>
<td>$33,853</td>
</tr>
<tr>
<td>Modified internal rate of return</td>
<td>33.1%</td>
</tr>
<tr>
<td>Non-financial benefits</td>
<td></td>
</tr>
<tr>
<td>Decreased employee frustration</td>
<td></td>
</tr>
<tr>
<td>Improved workflow</td>
<td></td>
</tr>
</tbody>
</table>
Population Health Navigators
High Risk Population

Single nonprofit payer
City primary care clinic
≥18 years old
One or more of the following:
  • ≥ 2 hospitalizations
  • ≥ 3 ED visits

N = 117
HAPPY 😊 Protocol

Navigator:
Contact high utilizer patients (N=117) Q month: HAPPY

H  How are you? Are you feeling OK?
A  Appointment—do you know all your appointments?
P  Pills—do you have your medications? Are you taking them? Do you need any refills?
P  Problems—any problems we can assist you with?
Y  Your paperwork and meds—bring to your next visit
😊  “We are glad that you are feeling well”
         “It is our pleasure to serve you”
        “Thank you for choosing University Health System”
Implementation Timeline

Project Start

2016 [Baseline Year]

2017
Results for Nonprofit Payer
Nonprofit Patient Encounters

Year 2016: 217 Emergency Visits, 131 Hospitalizations
2017 Q1 Annualized: 112 Emergency Visits, 88 Hospitalizations
2017 Q2 Annualized: 72 Emergency Visits, 40 Hospitalizations
2017 Q3 Annualized: 60 Emergency Visits, 36 Hospitalizations

Payer Claims Data
Payer Annualized Paid Claims
Emergency Visits & Hospitalizations

Year 2016 2017 Q1 Annualized 2017 Q2 Annualized 2017 Q3 Annualized
$725,406 $385,188 $154,384 $208,021

Payer Claims Data
Hospitalizations & Emergency Visits

![Graph showing hospitalizations and emergency visits from 2016 Q1 to 2017 Q4.](image)

- **Emergency Visits**
- **Hospitalizations**

Health System Data
Health System Variable Costs

Inpatient:
- 2016: $455,654
- 2017 (Annualized): $313,600

Emergency Center:
- 2016: $23,035
- 2017 (Annualized): $9,817

Health System Data
Project Performance

Financial Parameters
Payback period = 41.1 days
Net present value (NPV) = $692,157
Modified internal rate of return (MIRR) = 116.9%

Non-Financial Advantages
Better communication with patients
Improved knowledge of patient needs
Higher employee productivity (population pool included health system employees)

Financial Analysis Assumptions
Annual free cash flows: variable cost difference (2016)-(annualized 2017)
5-year time window
Cost of capital (discount rate) = 3.5% per year
Healthcare inflation benchmark rate = 6.0% per year
Reinvestment rate (for MIRR) = 1.5% per year
Options: Next Steps with Navigators

- Include Additional Payers
- Expand Definition of High Utilizers
- Further Optimize Resource Use to Serve High-Utilizer Patients

Larger High-Utilizer Patient Pool
Predictive Model: High Utilizer Pts

One Downtown Primary Care Clinic
N = 3,423
High Utilizers (above 95\textsuperscript{th} %ile)
• $7,684 vbl cost per year
• N = 171

Predictive Factors 2015

Logistic Regression Model

Total UHS Variable Cost 2016
Baseline Model

Logit[p(High_Utilizer_Patient)] = -1.278 + 0.138(ED_visits) + 0.577(Hospitalizations)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.278</td>
<td>0.279</td>
<td>0.09</td>
<td>0.864</td>
</tr>
<tr>
<td>ED_Count</td>
<td>0.138</td>
<td>1.148</td>
<td>0.762</td>
<td>1.728</td>
</tr>
<tr>
<td>Inpatient_Count</td>
<td>0.577</td>
<td>1.78</td>
<td>1.157</td>
<td>2.74</td>
</tr>
</tbody>
</table>

AUC = 0.665 ± 0.064
### Improved Predictive Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>OR</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.601</td>
<td>0.010</td>
<td>0.000</td>
<td>1.128</td>
</tr>
<tr>
<td>ED_Count</td>
<td>0.342</td>
<td>1.408</td>
<td>0.627</td>
<td>3.164</td>
</tr>
<tr>
<td>SumOfLOS</td>
<td>0.147</td>
<td>1.158</td>
<td>1.071</td>
<td>1.253</td>
</tr>
<tr>
<td>Age</td>
<td>0.056</td>
<td>1.057</td>
<td>0.967</td>
<td>1.156</td>
</tr>
<tr>
<td>High_Risk_Medications</td>
<td>-1.643</td>
<td>0.193</td>
<td>0.043</td>
<td>0.874</td>
</tr>
<tr>
<td>(Gender=&quot;Male&quot;)</td>
<td>0.496</td>
<td>1.642</td>
<td>0.218</td>
<td>12.368</td>
</tr>
<tr>
<td>(Pts_Meeting_Afib=&quot;Yes&quot;)</td>
<td>0.761</td>
<td>2.140</td>
<td>0.295</td>
<td>15.498</td>
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<tr>
<td>(Pts_Meeting_Asthma=&quot;Yes&quot;)</td>
<td>0.686</td>
<td>1.986</td>
<td>0.232</td>
<td>17.019</td>
</tr>
<tr>
<td>(Pts_Meeting_CAD=&quot;Yes&quot;)</td>
<td>1.965</td>
<td>7.137</td>
<td>0.619</td>
<td>82.245</td>
</tr>
<tr>
<td>(Pts_Meeting_CHF=&quot;Yes&quot;)</td>
<td>0.004</td>
<td>1.004</td>
<td>0.126</td>
<td>7.974</td>
</tr>
<tr>
<td>(Pts_Meeting_COPD=&quot;Yes&quot;)</td>
<td>-0.642</td>
<td>0.526</td>
<td>0.023</td>
<td>11.999</td>
</tr>
<tr>
<td>(Pts_Meeting_DM=&quot;Yes&quot;)</td>
<td>-1.001</td>
<td>0.367</td>
<td>0.060</td>
<td>2.246</td>
</tr>
<tr>
<td>(Pts_Meeting_DYS=&quot;Yes&quot;)</td>
<td>-1.771</td>
<td>0.170</td>
<td>0.011</td>
<td>2.534</td>
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**ROC Curve of HCHU**

AUC = 0.933 +/- 0.026
HAPI: Building Better Data Tools
Unified Data Architecture / Organization

Sources: Healthadvance blog.com (Three models for population health) and datasciencebe.com (New survey and [big] data governance research...)}
Overview of Data Flow (2018)
Larger Data Stores (2018)

**Medical**
- GE Centricity RIS [Radiology]
- Allscripts Sunrise [Primary EHR]
- IDX [ADT, Billing, etc.]
- 3M Coding & Reimbursement [Medical codes]
- Teletracking Clinical Workflow [Bed Control]
- Provation [Endoscopy]
- Medgraph [Pulmonary Testing]
- ICNet [Infection Control]
- CERNER Copath [Pathology]
- Xper IM [Cath Lab]
- SCC Soft [Blood Bank]
- CareManager [Social Work]
- TIMS [Audiology]
- NK Sleep [Sleep Lab]
- Picis [OR Management]

**Finance**
- Allscripts EPSI [Cost Acctg]
- Lawson [Enterprise resource planning]
- PeopleSoft [HR/HCM]

**Other**
- Spacelabs [Monitors Mgmt]
- evariant [CRM system]
- NRC Health [HCAHPS]
- HASA Data [HIE]

**Aggregate**
- Allscripts DB Motion
- Optum Humedica
- MIDAS+
Health System Data Market
International Projects
First Project

Health at a Glance 2017

OECD INDICATORS
Opportunities for Us
Vacancy Rates by Specialty (2018)

- Anatomic Pathology
- Cytology
- Cytogenetics
- Molecular
- Histology
- Microbiology
- POCT
- Send-Outs
- Immunology
- Other
- Core Lab
- Phlebotomy
- Blood Bank
- Hematology/Coagulation
- Chemistry/Toxicology
- Specimen Processing
- Flow Cytometry
- LIS/QA/PI

**LIS/QA/PI**
- Lab information systems
- Quality assurance
- Process improvement

Retirement Rates by Specialty (next 5 y)

Dear Brad Brimhall,

The DIO from your sponsoring institution, University of Texas Health Science Center San Antonio Joe and Teresa Lozano Long School of Medicine, has initiated an application for ACGME accreditation for your Clinical informatics (Pathology) program: "University of Texas Health Science Center San Antonio Joe and Teresa Lozano Long School of Medicine Program". To complete this application, log into the ACGME's Accreditation Data System (ADS) - [https://apps.acgme.org/ads/](https://apps.acgme.org/ads/) using the username and password provided below. After logging into ADS you can view the necessary steps to complete your application on the program's Application Overview tab.

**Username:** ********
**Password:** ********

Program Directors are strongly encouraged to seek necessary clarification from the ACGME in order to fully and completely respond to every item on the application prior to submission through the Accreditation Data System (ADS). Once an application has been submitted to the ACGME through ADS it cannot be modified by the program. That being said, it is crucial that any guidance or clarification be sought prior to submission to the ACGME so the application includes all the necessary information.

ACGME
ADS@acgme.org

Additional comments from your DIO are included below:

GMEC approved
How Do We Start?

WHERE
Where are your data sources?
Where are your operations?

WHO
Who are your leaders?
Who are your data custodians?
Who are your key internal decision makers?
Who are key external networking partners?
Who has specific analytical skills?

WHAT
What are your current organizational projects?
What are your organizational points of “pain” and “pleasure”?
How Do We Start?

**HOW**
- How are data commonly structured?
- How are analyses carried out?
- How do I work as part of a HAPI group / team?

**DO**
- Start with something small
- Quantify project results
- Reach out beyond the laboratory
- Identify and work with colleagues (interested and trustworthy)
- Relentlessly market project results (internal and external)
- Cultivate new productive groups
- Help colleagues succeed
Questions