Building Data Capacity within the Community Health Center

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Mission: to improve the health and well-being of the individuals, families and communities we serve
Current Department Structure

- Value Improvement Director
  - Data and Analytics Manager
    - Data Analyst
    - Data Analyst
  - Quality Improvement Manager
  - Population Health Manager
    - Pop Health/QI Specialist
    - Pop Health/QI Specialist
Objectives for the Analytics Team

• Produce knowledge from our new EMR database
• Improve data quality and build trust
• Create an SSOT (single source of truth)
• Focus on KPIs, trended and benchmarked
• Enable discovery and drill-down “in the moment”
• Work efficiently with disparate and continuously evolving data sources
• Understand, improve, predict
• KPIs/dashboards for every Mosaic program/key function
**CWRF: Becoming Data Informed: What Does It look like?**

<table>
<thead>
<tr>
<th>Crawl</th>
<th>Walk</th>
<th>Run</th>
<th>Fly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacks consistent data collection</td>
<td>Data collection consistent but not shared</td>
<td>Data from multiple sources</td>
<td>Org Wide KPIs</td>
</tr>
<tr>
<td>No reporting or synthesis</td>
<td>Data not linked to results, could be wrong data</td>
<td>System and structure for data collection</td>
<td>Organizational Dashboard with different views, sharing</td>
</tr>
<tr>
<td>Decisions based on gut</td>
<td>Rarely makes decisions to improve</td>
<td>Discussed at staff meetings, decisions made using it</td>
<td>Data visualization, real-time reporting, formal reflection process</td>
</tr>
</tbody>
</table>

**Analysis**

**Tools**

**Sense-Making**
Baseline: Basic Excel work, basic operational reporting, financials; not strategic, not systematically supporting improvement projects

Having a dedicated data analyst, at least one BI tool, building simple dashboards (e.g., single program, siloed data sources)

Warehousing, automating, broadening of scope

Predicting, correlating, integrating multiple data types quickly
Hiring the Right Analyst

• Understand current assets (e.g., report writer vs. analyst)
• Posting the position
• Prioritizing applicants for interviewing
  – Must haves: 1) some kind of quantitative background, and 2) experience manipulating datasets in some significant manner (e.g., SQL, coding/scripting, statistical analysis)
  – Bonus: data visualization, program evaluation, quality improvement, health plan claims analysis, teaching/presenting
• Conducting the interview
  – Verifying technical skills
  – Verifying communication, people skills, and attitude
• Finding the right starting salary
Healthcare Data Analyst (Exempt)

POSITION SUMMARY:

This position is responsible for producing clinical and operational business intelligence (BI) from many complex data sources, using various analytic methods. The Analyst 1 provides guidance and advice regarding the availability and validity of data to answer questions regarding organizational and provider performance. The Analyst 1 provides interpretation of trends and drivers of performance and evaluates the effect of improvement projects.
CORE JOB RESPONSIBILITIES:

Data Management (10%)
• Maintains thorough understanding of data sources, information architecture, and documentation workflows
• Coordinates with external partners to ensure secure, reliable and accurate data file transmission
• Develops and maintains procedures for accommodating new data sources, including processing, cleaning, merging, validating, and storing.
• Keeps reports up to date with organizational changes (e.g., staffing, provider moves), and metric changes.
• Conducts thorough data QA to ensure resulting statistics are valid.

Data Analysis (35%)
• Builds and tests performance metrics, ensuring validity
• Builds advanced reports using programming language and software best suited for the task
• Builds and maintains performance measurement dashboards
• Conducts complex analytic tasks and develops creative data visualizations to promote efficient knowledge acquisition by customers.

Education and Advising (25%)
• Serves as internal consultant for identifying potential data sources and developing new performance measures.
• Uses data to assist improvement teams in developing change strategies and evaluate improvement efforts.
• Provides access to and interpretation of business intelligence for monitoring organizational performance and developing business strategy.
• Presents summaries of trends in writing, graphically, and orally.
The New Analyst: First 100 Days

• Training needs assessment and planning
  – OCHIN-specific, Epic database structure, Epic user interface
  – Software-specific training
  – Healthcare business, Triple Aim, transformation, payment, etc.
  – SQL training, data analysis skills, visualizing data
  – Quality improvement methods, definitions and workflows for key metrics
  – Population health management

• Office space, tech setup, allowing “deep thought,” etc.

• Leader interviews: What data would help you be successful in managing your area? Key measures of success?

• Establish and meet your CCO data contact

• Clinic observations: workflows and data capture

• Dataset inventory (e.g., EMR, claims, practice management, telephone system, HR, patient surveys, various “lists”)

• “Data” webinars (OPCA, OCHIN, Tableau, Alteryx)
Next

• Executives must help your new analyst focus on the right things, understand and support key decisions
• Develop guidelines and mechanism for report requests
• Agree on first dashboard to produce (start small!)
• Attend key leadership team meetings
• Develop key metrics dictionary
• Develop data marts with frequently-used data elements
• Get face time in the clinics: attend quality huddles, meet with leaders, staff, providers to understand their world and help ensure data/metrics are understood and used effectively
Further Down the Road

- Automating data processes
- Bringing in more data sources
- Securing more granular data
- Advanced statistics, correlations, regression
- Prediction
- Custom risk-stratification and clinical pathways
How Many Analysts Do You Need?

- How data driven do you want to be?
- How complex is your organization (services, locations)?
- What types of analytics will be supported (e.g., clinical, operational, financial, strategic)
- Do you need to round out the team’s skillsets?
- Number of patients is not that important.
Monday morning “Analytics Briefing”
Keeping Your Analysts Engaged

• Let them know they are appreciated and trusted; ask for their opinion
• Bring them in on major decisions and ask them to propose data to help make a wise choice; treat them as “consultants” not “data servants”
• Show how their work made an impact by explaining the “why” of requests and closing the loop
• Regular 1:1 meetings, preferably weekly
• Career advancement (e.g., job levels, conference presentations, consulting)
• Acknowledge diversity in thinking and speaking styles; analysts like to ponder
• “Tag-teaming” oral presentations often good
• Keep them connected with the clinical work, teams, PDSAs, etc.
• Send them to a national conference each year
• Pay them well; it’s a white-hot job market
Mosaics Data Analysis Framework

**Raw Data**
- (flat files / DB connections)
  - EPIC
  - Finance
  - OHA
  - Pac Source
  - Metrix Matrix
  - Aceure
  - Collective Medical

**Data Marts**
- (.YXDB, .TDE, .YXMB)
  - Encounters
  - ED / IP Utilization
  - Patients
  - Clinical KPIs
  - Problem List

**ETL Via Alteryx**

**At Time of Analysis**
1. Data Cubing (joining of data marts, can be in Tableau or Alteryx)
2. Exploration and Visualization via Tableau
3. Predictive Models / Further Data Munging via Alteryx
Nimble Data Visualization Examples Using Tableau

Or: Why you need analytics in-house
What is Tableau?

A Data Visualization Tool.

(a way for you to “see” trends in clinical and operational metrics)

Clinical Quality KPIs (Adult)

- use dropdown at left to switch between adult and pediatric measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Current Rate</th>
<th>Strategic Plan Target</th>
<th>6 Month Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Alcohol, Drug, and Depression Screening</td>
<td>68%</td>
<td>50%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Breast Cancer Screening</td>
<td>56%</td>
<td>64%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Colorectal Cancer Screening</td>
<td>47%</td>
<td>47%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Diabetes A1C Control (&lt;8 in 6 months)</td>
<td>45%</td>
<td>53%</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Effective Contraception (Age 18-50)</td>
<td>48%</td>
<td>50%</td>
<td>3.9%</td>
</tr>
<tr>
<td>HTN BP Control (HEDIS)</td>
<td>67%</td>
<td>71%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

Report Date Range: 1/1/2017 to 6/11/2018
Before Tableau: Deciding on a New Clinic

Redmond, OR (pop. 28,000)

• Clinic Opened August 2013
• Decision Support
  • Price Per Square Foot
  • Potential for Hospital Partnership
Before Tableau: Deciding on a New Clinic

Geocoding later revealed that our clinic was not near most of our patients.

We also outgrew the space within a few months due to Medicaid expansion.
Re-doing the Decision (using Tableau)

Geocoding of our patients

![Map showing geocoding of patients with a comparison between the current clinic and a potential site in Redmond. The table on the left compares the number of patients closer to the current clinic (2,935) versus the potential site in Redmond (1,362).]
Forecasting patient volumes using multi-factorial “what-if” tool.
And easily-repeatable analyses to inform similar strategic decisions...
Population Segmentation

Data-based segmentation models help us identify patients who may need extra support.
Hot Spotting; Cold Spotting

Used “R” to develop predictive model based on patient demographics and chronic physical and mental health diagnoses.

Outliers at both ends are opportunities.
Pushing Out KPIs Daily

Automated daily pushes of dashboard to leaders ensures aggressive management of KPIs.

Improves awareness and accountability.
Identifying Star Performers

Clinical Quality KPI Provider Scorecard

Provider Distribution
(Current Rate, Pediatric Providers Colored Pink)

KPI Trend: 3/1/2017 to 8/7/2018
(Gray line = Mosaic Average)

Provider Name

Quality Measure Program
Clinical Quality KPIs (Adult)
 Revealing Variation

PCP View of Clinical Quality KPIs (Adult)

(Black line = Mosaic Average)

Report Date Range: 3/1/2017 to 8/7/2018

Colorectal Cancer Screening
% of Panel with Clinical Support Touch or Visit
(black line = Median Mosaic FP / IM Provider)
Note: Bridges and Herriman PCPs are outliers above the range of these graphs

% of Charts Closed in 24 Hours
Comparative View Trend
(last 12 months)
(black line = Mosaic average)

# of Patients With Controlled Med Order
(Provider Comparison, past 4 months)
Load-leveling and Staffing
Reducing “No-Show”

This Tableau viz clearly demonstrates that the further in advance a patient makes an appointment, the less likely they are to show up for that appointment.

New scheduling approaches were implemented.
Supporting Weekly PDSAs

High Blood Pressure Follow Up PDSA - Teal Team

- Percent of Patients with a 2nd BP Check in Visit by MA
- $100.0\%$, n=5
- $50.0\%$, n=8
- $0.0\%$, n=2

- % of Patients Receiving 2nd BP Check in Single Visit - Teal
  - Includes only patients whose first BP was systolic $>$ 140 or diastolic $>$ 90

- Target: 55\%
- Baseline: 28\%

- Percent of Patients With Follow Up Appt in 2 Weeks - Teal

- 12/24/17 to 7/8/18

- Percent of Patients with a 2nd BP Check in Visit by Provider
  - 100\%
  - 67\%
  - 64\%
  - 80\%
  - 100\%
  - 69\%
Mosaic Emergency Department Utilization and Follow-Up Dashboard

% of Patients with Timely ED Follow Up **
By Week Since 8/3/2017


Most Common ED Diagnoses
- Primary Dx Only, Last 12 Months
- Yellow = Avoidable

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain, unspecified</td>
<td>29</td>
</tr>
<tr>
<td>Acute upper respiratory infection, unspecified</td>
<td>27</td>
</tr>
<tr>
<td>Acute pharyngitis, unspecified</td>
<td>19</td>
</tr>
<tr>
<td>Influenza due to unidentified influenza virus w...</td>
<td>17</td>
</tr>
<tr>
<td>Unspecified abdominal pain</td>
<td>16</td>
</tr>
<tr>
<td>Urinary tract infection, site not specified</td>
<td>16</td>
</tr>
<tr>
<td>Streptococcal pharyngitis</td>
<td>15</td>
</tr>
<tr>
<td>Periapical abscess without sinus</td>
<td>14</td>
</tr>
<tr>
<td>Low back pain</td>
<td>13</td>
</tr>
<tr>
<td>Headache</td>
<td>12</td>
</tr>
<tr>
<td>Acute bronchitis, unspecified</td>
<td>11</td>
</tr>
<tr>
<td>Epigastric pain</td>
<td>11</td>
</tr>
<tr>
<td>Otitis media, unspecified, left ear</td>
<td>11</td>
</tr>
<tr>
<td>Viral infection, unspecified</td>
<td>11</td>
</tr>
<tr>
<td>Nausea with vomiting, unspecified</td>
<td>10</td>
</tr>
<tr>
<td>Influenza due to other identified influenza virus vi...</td>
<td>9</td>
</tr>
<tr>
<td>Pneumonia, unspecified organism</td>
<td>9</td>
</tr>
<tr>
<td>Laceration without foreign body of other part ...</td>
<td>8</td>
</tr>
<tr>
<td>Otitis media, unspecified, right ear</td>
<td>8</td>
</tr>
<tr>
<td>Syncope and collapse</td>
<td>8</td>
</tr>
</tbody>
</table>
Innovative Care Encounters
Distinct Patients With Touch Per Month by Encounter Type
(includes non-PCP -- except group visits -- and qualifying CareSteps)
Building Blocks Self-Assessment:
Component-Level Scores

Block 1: Engaged Leadership 7.3
1. Executive leaders
2. Clinical leaders
3. The responsibility for conducting quality improvement activities
4. Quality improvement activities
5. Quality improvement activities are conducted by
6. Goals and objectives for quality improvement

Block 2: Data-driven improvement using computer-based technology 6.7
7. Performance measures
8. Reports on care processes
9. Registry or panel-level data
10. Registries on individual patients
11. An electronic health record that is meaningful was certified

Block 3: Empowerment 10.0
12. Patients
13. Non-physician practice team members
14. Providers (Physicians, NPs/PAs) and clinical support staff
15. Workflows for clinical teams
16. The practice
17. Standing orders that can be acted on by non-physician under
18. The organization’s hiring and training processes

Block 4: Team-based care 8.5
19. Assessing patient and family values and preferences
20. Involving patients in decision-making and care
21. Patient comprehension of verbal and written materials
22. The principles of patient-centered care
23. Comprehensive, guideline-based information on prevention or
24. Care plans
25. After visit summaries
26. Measurement of patient-centered interactions

Block 5: Patient-team partnership 7.3
27. A patient who comes in for an appointment and is overdue for
28. A patient who comes in for an appointment and is overdue for
29. When patients are overdue for preventive (e.g., cancer screen
30. When patients are overdue for chronic care (e.g., diabetes lab
31. Self-management support
32. Clinical care management services for high risk patients
33. Visits

Block 6: Population management 8.0
34. Patients are encouraged to see their panel provider and care
35. The approach to providing same-day access relies on
36. Appointment systems
37. Contacting the practice team during regular business hours
38. After hours access
Here are some of the colorectal cancer screen grant data points you requested:

- There were 1,542 referrals for colonoscopies in 18 months.
- The referral completion rate for colonoscopies is 33.6% according to our data (looking at data from Feb 2017 to April 2018 to allow time for completion)
  - This could be a low estimate if we don’t receive some results from some external providers
- No Cologuard orders found
- 194 patients had a positive fit test (out of 1305 patients screened)
- Of the 194 patients who had a positive fit test, there were 51 who did NOT have a referral for colonoscopy. The remaining 143 did have a referral to colonoscopy and the referral completion rate for these patients was closer to 50%.
- Of the 51 positive fits with no referral here is the payor distribution

<table>
<thead>
<tr>
<th>MRN</th>
<th>PAYOR_NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>PACIFICSOURCE COMMUNITY SOLUT</td>
</tr>
<tr>
<td>12</td>
<td>MEDICARE PART B</td>
</tr>
<tr>
<td>7</td>
<td>PACIFICSOURCE MEDICARE</td>
</tr>
<tr>
<td>5</td>
<td>SELF PAY</td>
</tr>
<tr>
<td>3</td>
<td>DMAP MEDICAL FFS</td>
</tr>
<tr>
<td>2</td>
<td>PACIFICSOURCE HEALTH</td>
</tr>
<tr>
<td>2</td>
<td>TRICARE FOR LIFE MEDICARE SUPP</td>
</tr>
<tr>
<td>1</td>
<td>AETNA US HEALTHCARE</td>
</tr>
<tr>
<td>1</td>
<td>MODA</td>
</tr>
<tr>
<td>1</td>
<td>ODS MEDICARE SUPPLEMENTAL</td>
</tr>
<tr>
<td>1</td>
<td>SCREENWISE</td>
</tr>
<tr>
<td>1</td>
<td>STATE FARM HEALTH INS</td>
</tr>
</tbody>
</table>

Did I miss any of the data points you were requesting?
Attached please find some Encounter and Inbasket data to support this workgroup. Much of this is new and a little difficult to explain so I’m planning to review with (at least) Michelle prior to the Thursday meeting.

The basics for slides 5-14: These graphs show, for one Inbasket message conversation (a ‘thread’), how many individual Inbasket messages were created on average.

For example on slide 5: an InBasket message conversation with Message Type of ‘Patient Calls’ has about 5.5 messages bouncing back and forth on average before the conversation ends (i.e., the encounter is closed).

Hope this makes a little sense and happy to explain further but phone or inperson might be easier 😊.

marshall

Marshall Greene
Analytics Manager, Bend Admin
7404
Attached is a .pdf that has all the graphs we discussed. Let me know if there is any other way you want to look at it.

-Michael
Alteryx for Data Manipulating, Formatting, and Predicting
For Big-Data Scientists, ‘Janitor Work’ Is Key Hurdle to Insights

Data Analysts / Data Scientists:

“50 percent to 80 percent of their time mired in [the] more mundane labor of collecting and preparing unruly digital data”
Alteryx helps:

• Combine data from different places
  • Example: Emergency department claims from PacSource with Epic EMR data

• Reformat data for a specific analysis or building a data warehouse
  • Example: Grouping Bridges patients by their Truven score at the time of their Bridges referral to compare patient profiles and utilization

• Documentation of our work and consistency in reporting
  (data governance / quality assurance)

• Make predictive analytics easy
Risk Score In Code

```r
library(Amelia)

setwd("C:/Tableau/Dashboards/Empanelment/Panel size weighting/Files for Empanelment Database")
patients <- read.csv("C:/Tableau/Dashboards/Empanelment/Panel size weighting/Files for Empanelment database/patient_population.csv")
attach(patients)

#amelia(patients)
#patients[,1:43][is.na(patients[,1:43])]<-0
patients[is.na(patients)]<-0
patients$Medical.Primary.Insurance.Type[is.null(patients$Medical.Primary.Insurance.Type)] <- "unknown"
names(patients)[names(patients)="Count_12m_PC_Visit"] <- "visits"

infants <- patients[ which ((patients$Age<2) ), ]
peds <- patients[ which ((patients$Age<2) & (patients$Age<18) ), ]
adults <- patients[ which ((patients$Age<18) & (patients$Age<65) ), ]
seniors <- patients[ which ((patients$Age>=65) ), ]

visitsc <- patients$visits-mean(patients$visits)

agec <- patients$Age-mean(patients$Age)   #centering of variables for multiplication

afib <- as.numeric(patients$A_Fib)  #dummy variables to make categorical into numeric
anxiety <- as.numeric(patients$Anxiety)
arthritis <- as.numeric(patients$Arthritis)
asthma <- as.numeric(patients$Asthma)
cad <- as.numeric(patients$CAD)
cancer <- as.numeric(patients$Cancer)
clf <- as.numeric(patients$Heart_Failure)
pain <- as.numeric(patients$Pain)
copd <- as.numeric(patients$COPD)
cf <- as.numeric(patients$Cystic_Fibrosis)
depression <- as.numeric(patients$Depression)
devdelay <- as.numeric(patients$Dev_Delay)
diabetes <- as.numeric(patients$Diabetes)
hiv <- as.numeric(patients$HIV)
hyperlipid <- as.numeric(patients$Hyperlipidemia)
hypertension <- as.numeric(patients$Hypertension)
liver_disease <- as.numeric(patients$Liver_disease)
low_back_pain <- as.numeric(patients$Low_back_pain)
migraine <- as.numeric(patients$Migraine)
myocard_infarct <- as.numeric(patients$Myocard_Infarct)
obesity <- as.numeric(patients$Obesity)
pregnant <- as.numeric(patients$Pregnant)
ptsd <- as.numeric(patients$PTSD)
renal_failure <- as.numeric(patients$Renal_Failure)
sex <- ifelse(patients$Sex="F" , TRUE)

# PREDICTORS TESTED BUT EXCLUDED

emphysema <- as.numeric(patients$Emphysema)  #not sig
hep_A <- as.numeric(patients$Hep_A)  #switched to liver disease
hep_B <- as.numeric(patients$Hep_B)  #switched to liver disease
kidney_disease <- as.numeric(patients$Kidney_disease)  #lows visits by a lot (patients dying?)

trauma <- as.numeric(patients$Trauma)
```

• Creates visual data workflows
• Drag-and-drop
  ★ Can be scheduled to run automatically ★
Weighing a pig... does not make it fatter

--African proverb
Data Awareness and Use

- Executive priority
- Board engagement
- Easy access to data (e.g., Tableau)
  - Phased rollout
  - E-mail push for key dashboards
- Quality huddle boards, PDSA support
- All “program” leaders own at least one dashboard
- Site leader data review meetings
- Executive data review meetings
- Provider performance reviews
Thank you for your time!

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