Building Data Capacity within the Community Health Center

Ken House, MS
Value Improvement Director
Ken.house@mosaicmedical.org

Marshall Greene, MS
Analytics Manager
Marshall.greene@mosaicmedical.org

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

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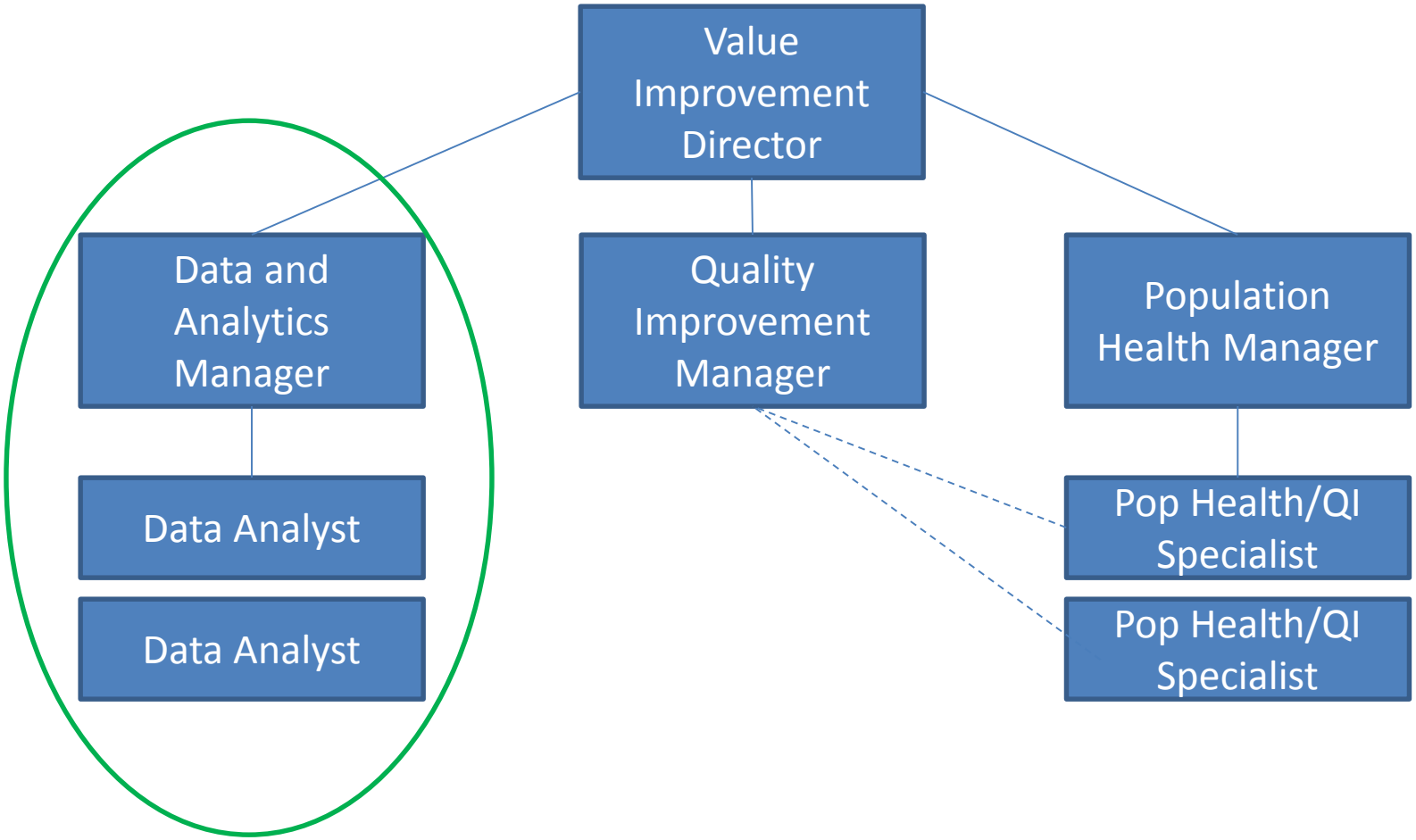
Current Department Structure



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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

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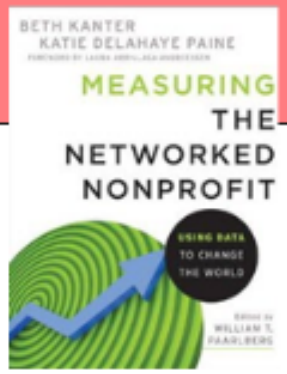
CWRF: Becoming Data Informed: What Does It look like?

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



Analysis
Tools
Sense-Making

Analytics Roadmap

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

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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.

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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)

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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

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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

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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.

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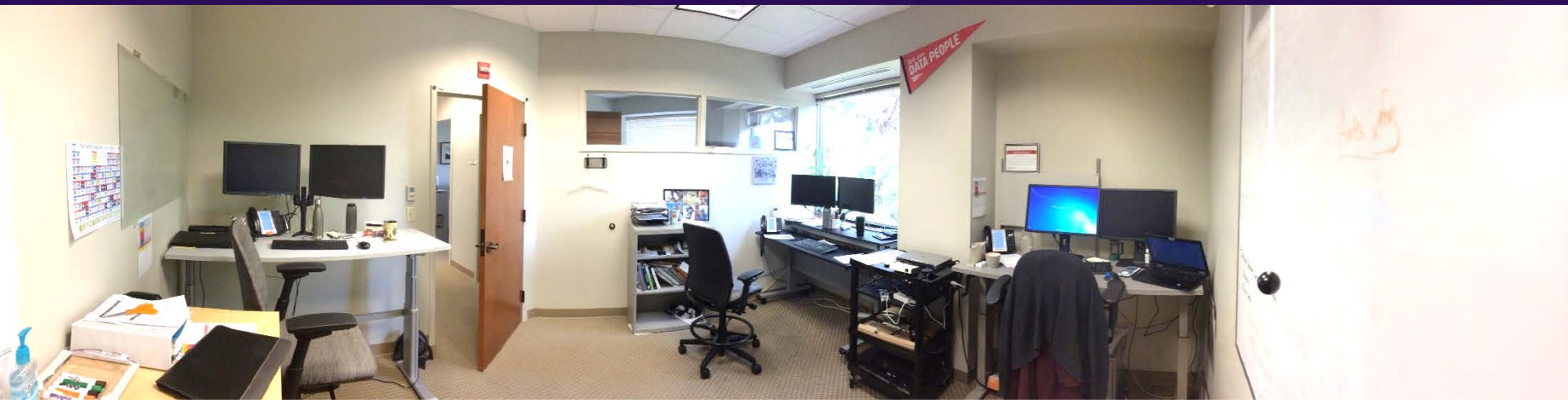

Monday morning “Analytics Briefing”

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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

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Mosaic's Data Analysis Framework

Raw Data
(flat files / DB connections)

- Metrix Matrix
- Pac Source
- Aceure
- OHA
- Collective Medical
- EPIC
- Finance

ETL Via Alteryx

Data Marts
(.YXDB, .TDE, .YXMB)

- Encounters
- ED / IP Utilization
- Patients
- Clinical KPIs
- Problem List

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

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Nimble Data Visualization Examples Using Tableau

Or: *Why you need analytics in-house*

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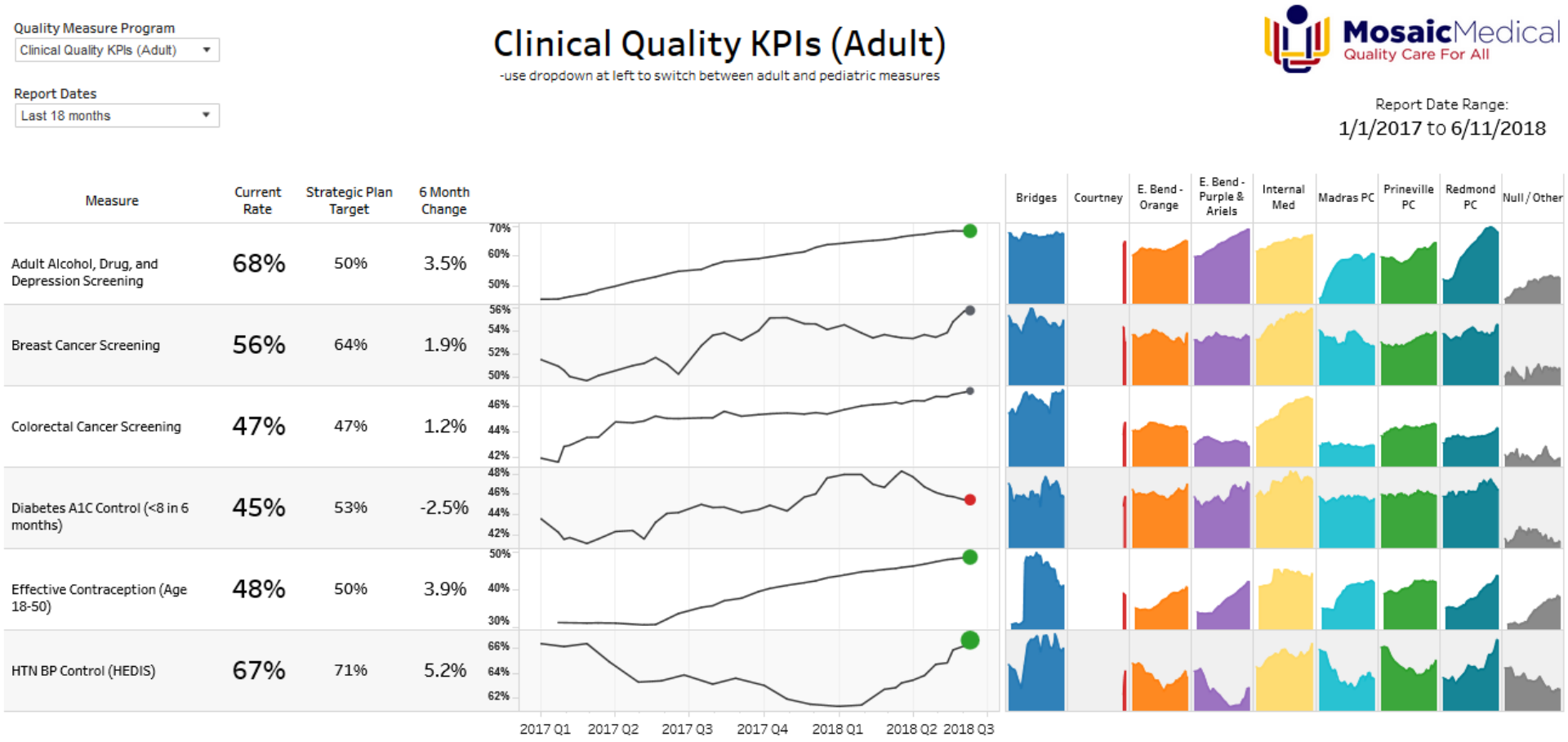
What is Tableau?

A Data Visualization Tool.

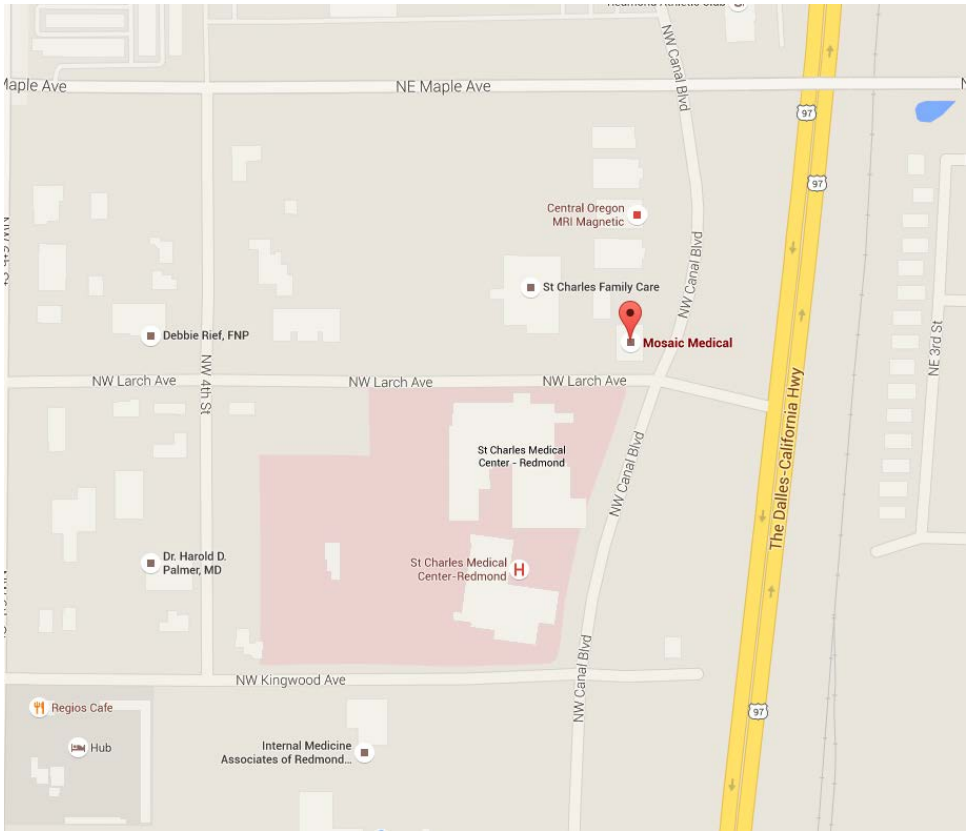
(a way for you to “see” trends in clinical and operational metrics)



Before Tableau: Deciding on a New Clinic

<u>Redmond, OR (pop. 28,000)</u>

- Clinic Opened August 2013
- Decision Support
  - Price Per Square Foot
  - Potential for Hospital Partnership



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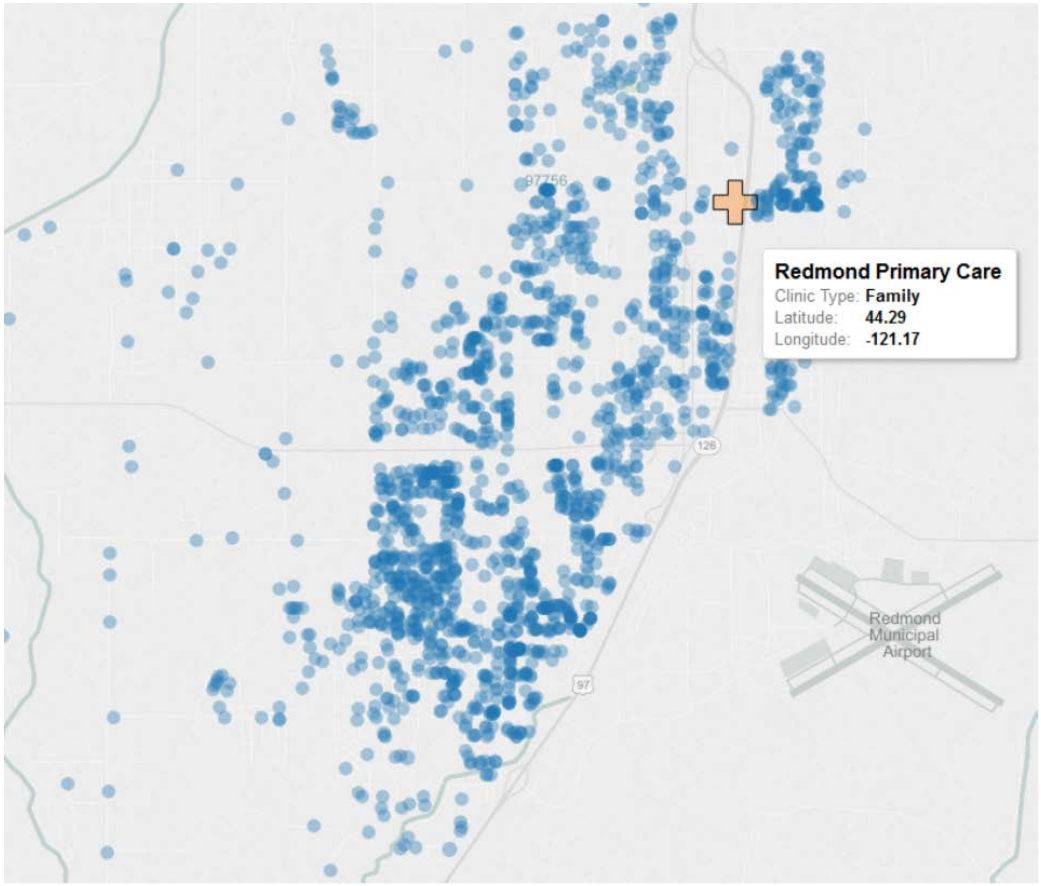
Before Tableau: Deciding on a New Clinic

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.



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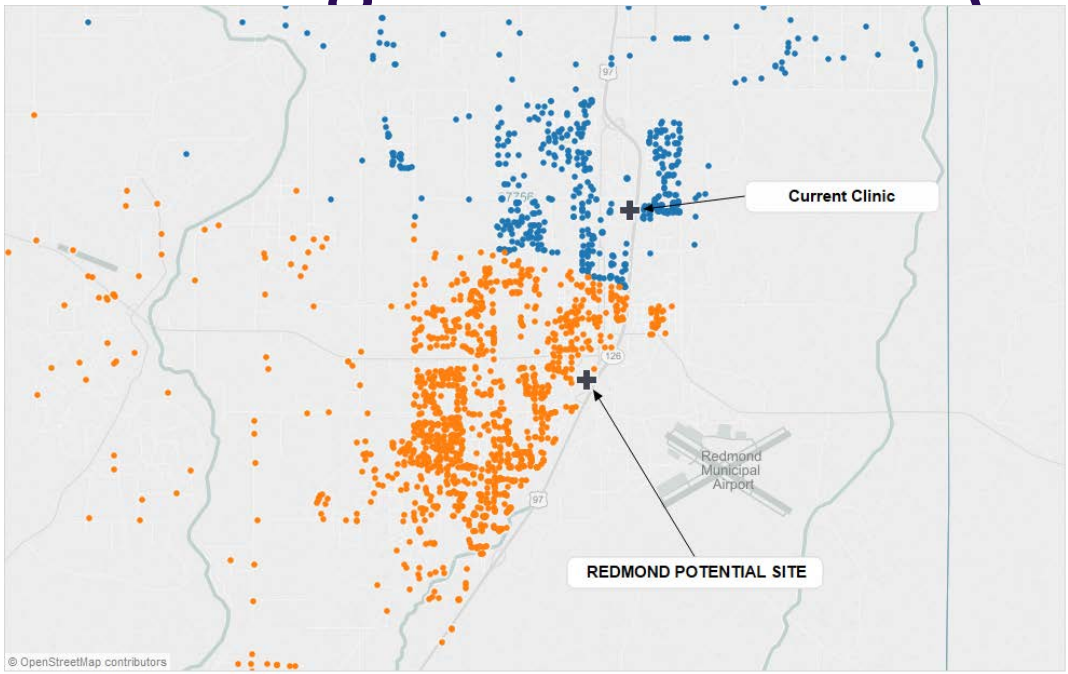
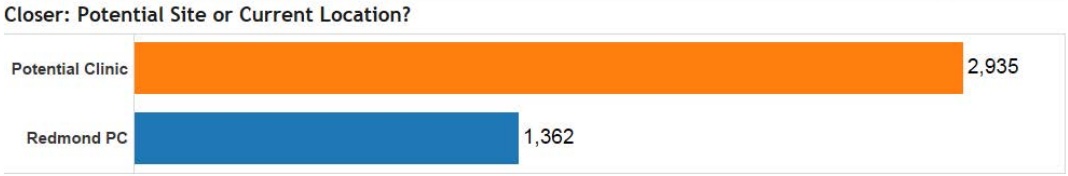
Re-doing the Decision (using Tableau)



Geocoding of our patients



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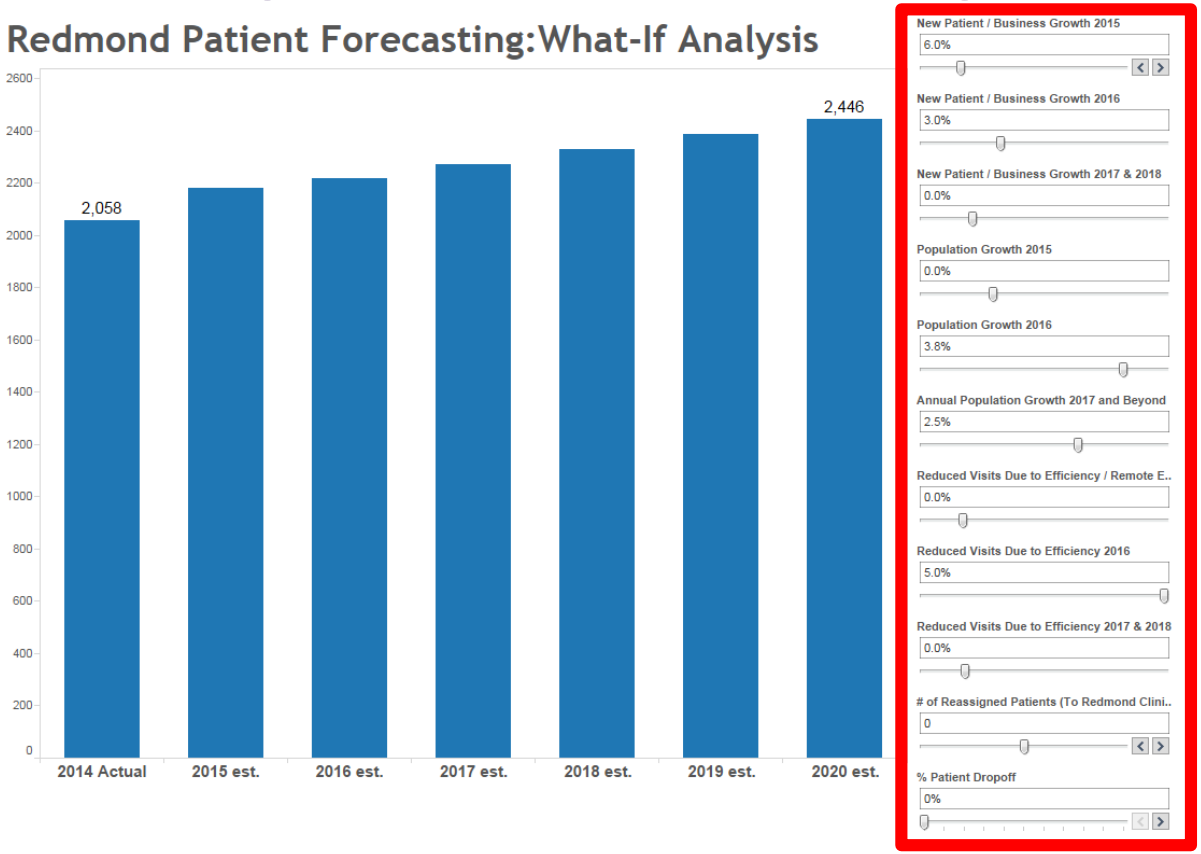
Re-doing the Decision (using Tableau)



Forecasting patient volumes using multi-factorial “what-if” tool.

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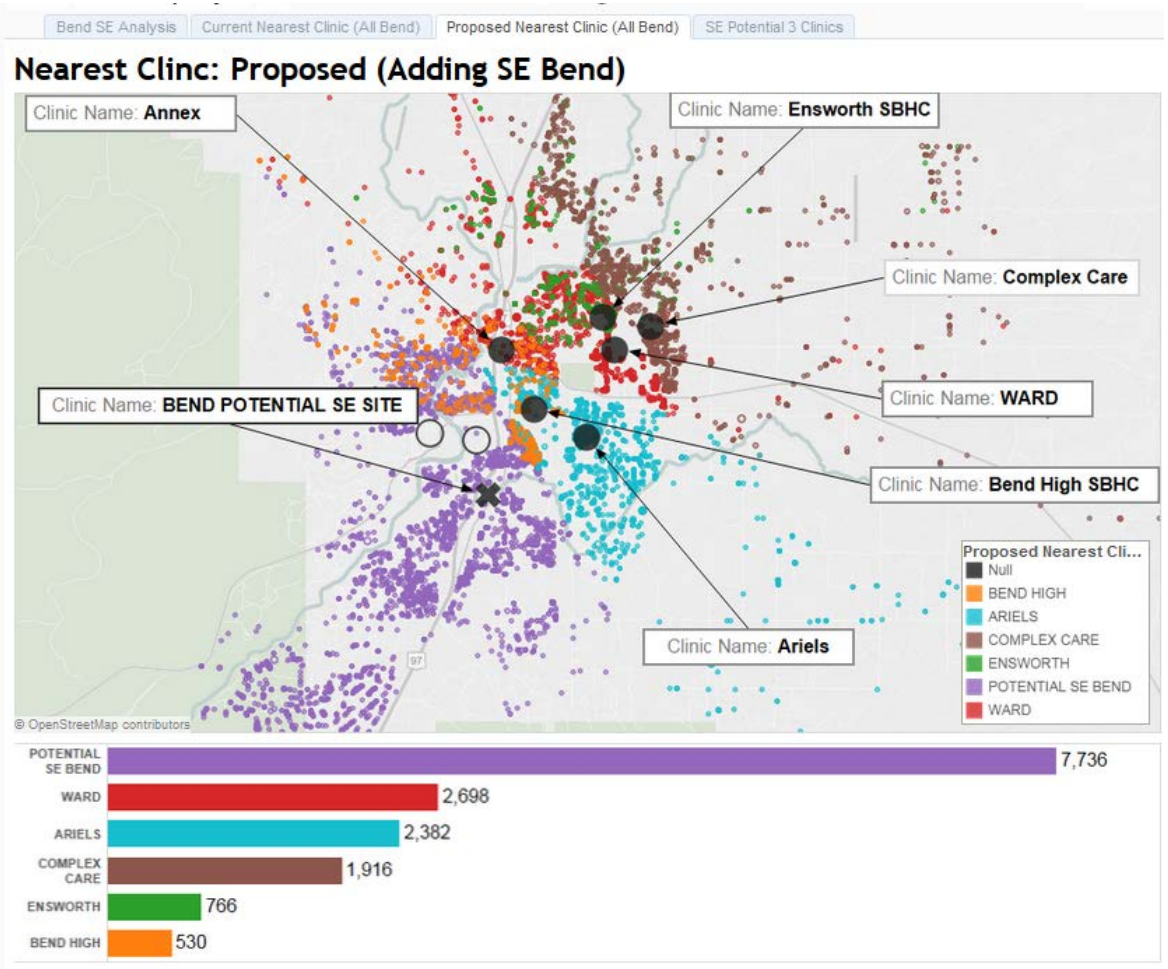
And easily-repeatable analyses to inform similar strategic decisions…



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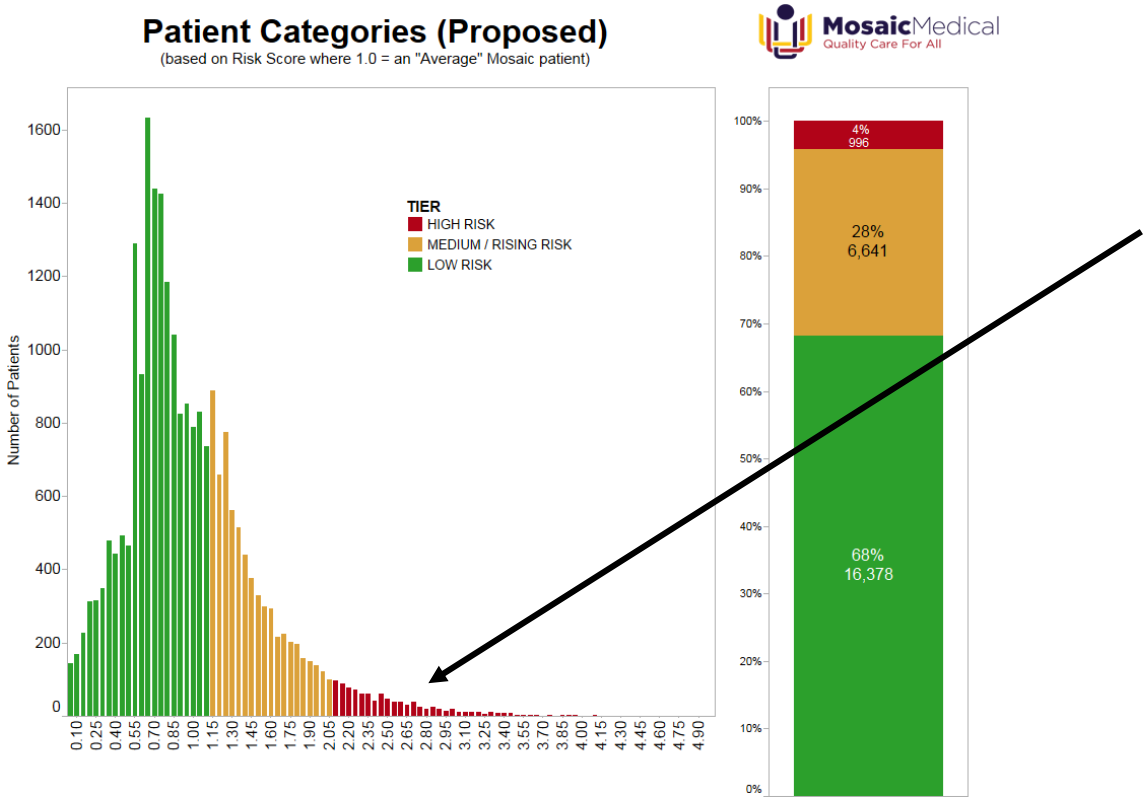
Population Segmentation

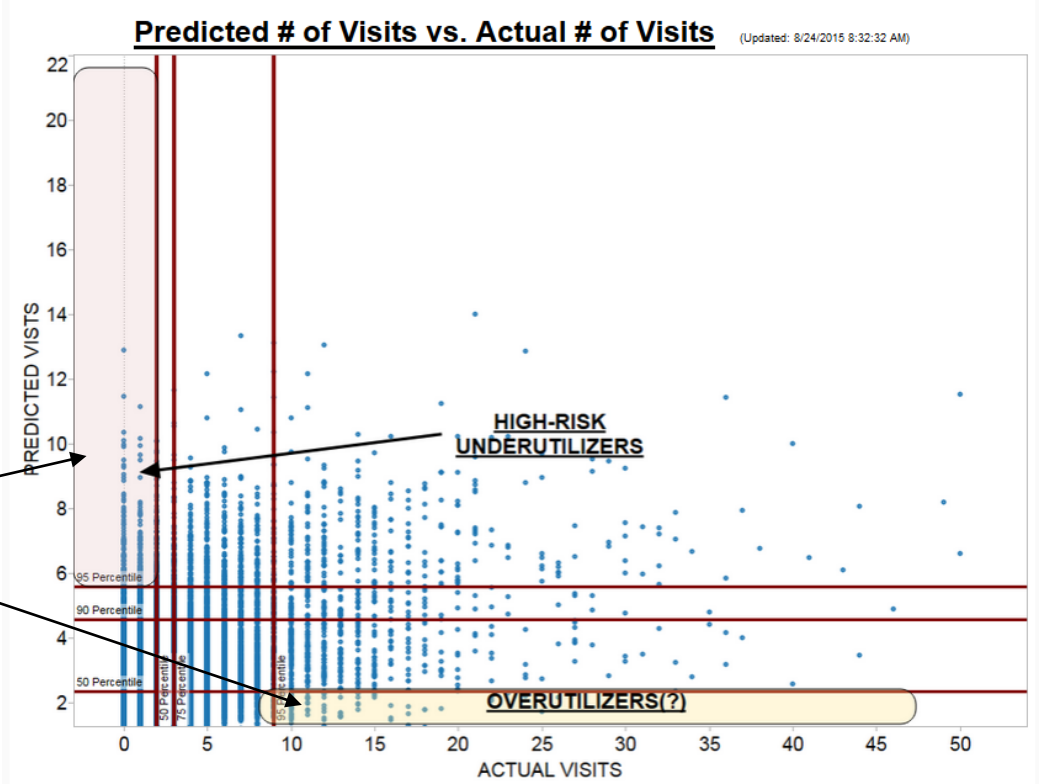


Data-based segmentation models help us identify patients who may need extra support.

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.



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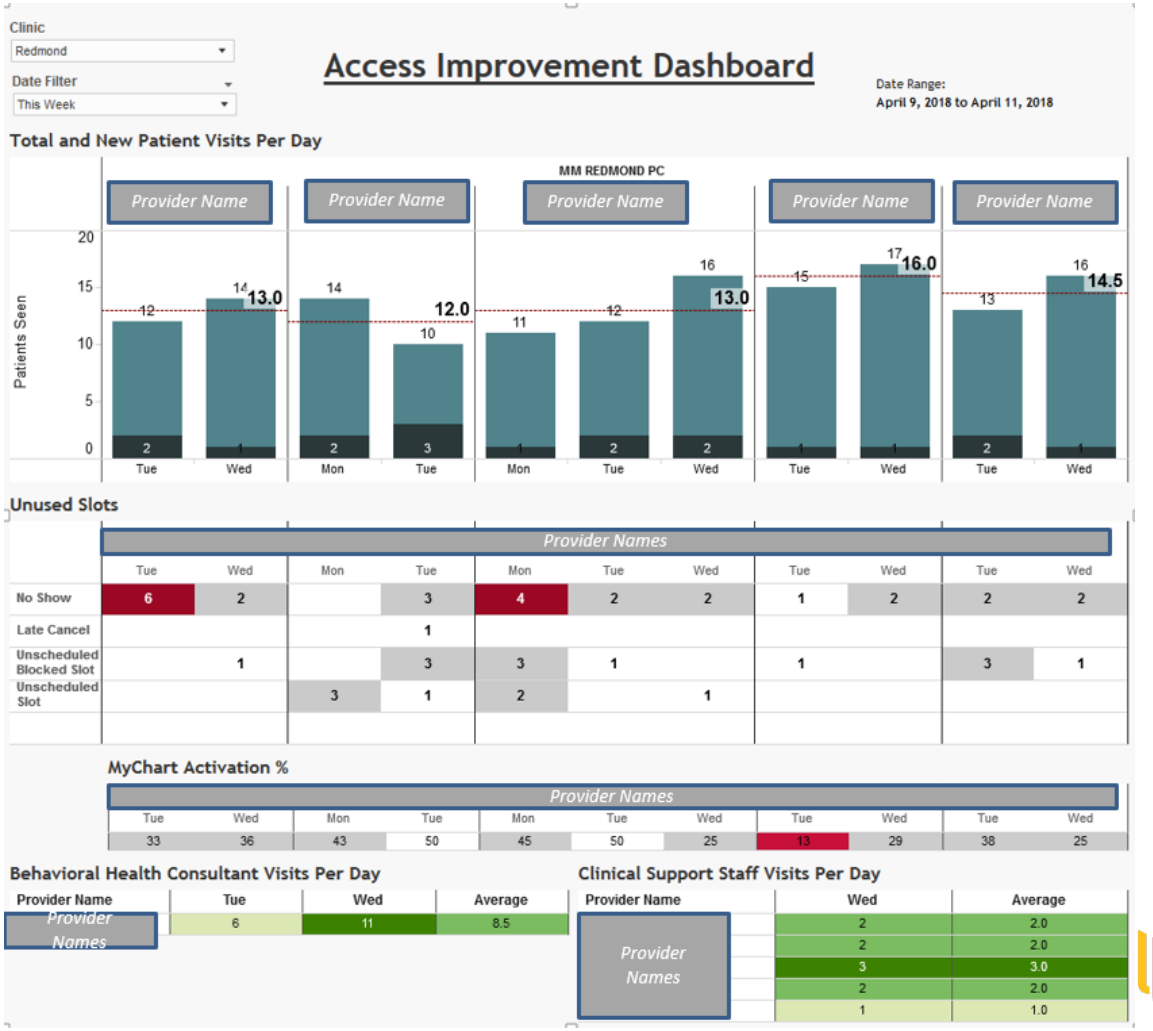
Pushing Out KPIs Daily

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

Improves awareness and accountability.



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Identifying Star Performers

Clinical Quality KPI Provider Scorecard

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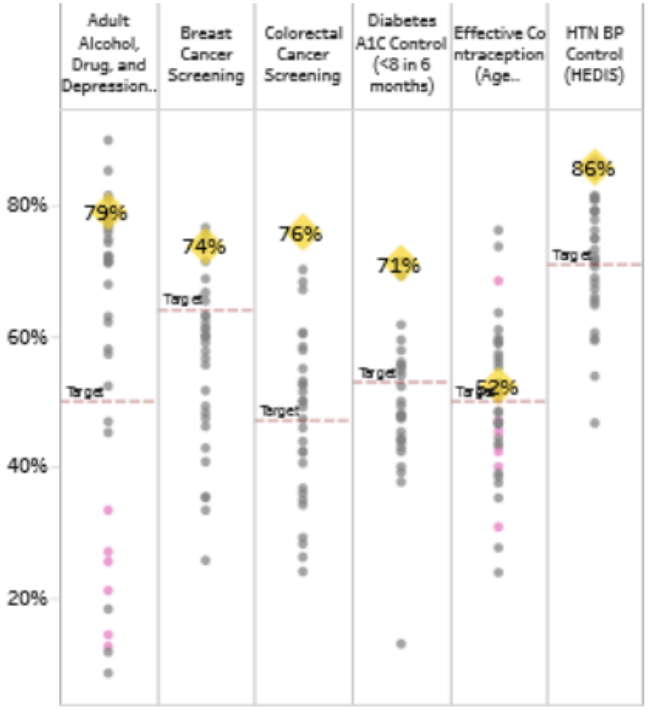
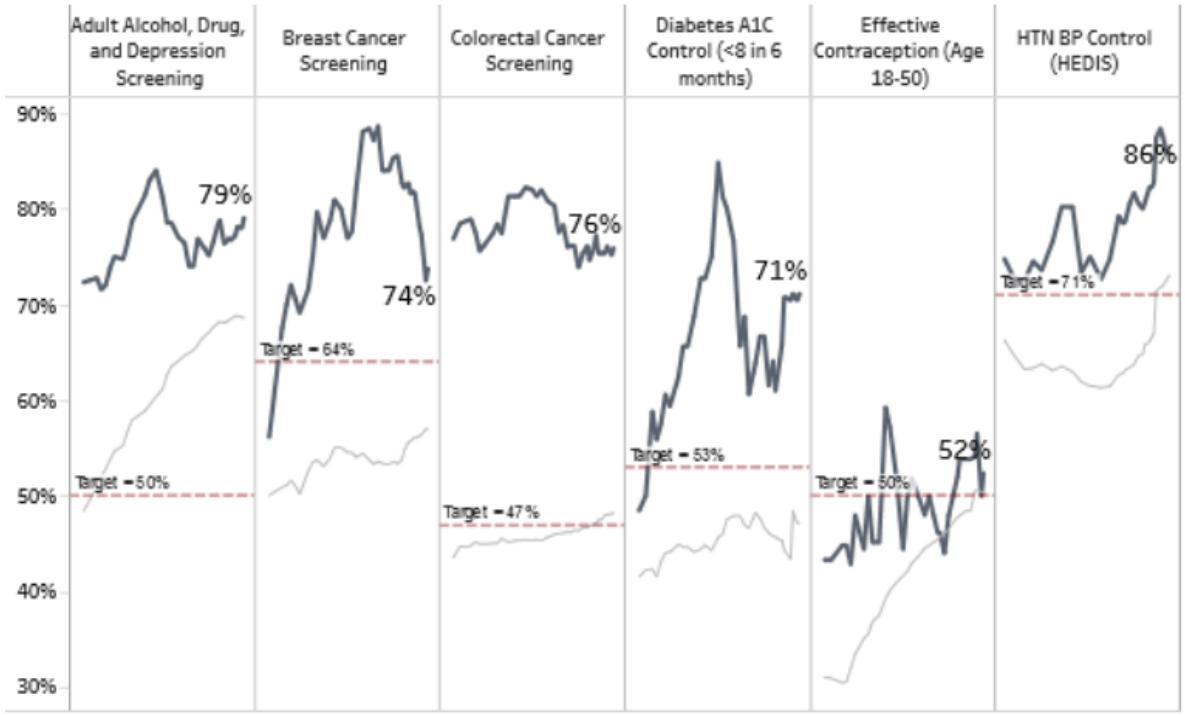
PCP
Provider Name

Quality Measure Program
Clinical Quality KPIs (Adult)

Provider Distribution
(Current Rate, Pediatric Providers Colored Pink)



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



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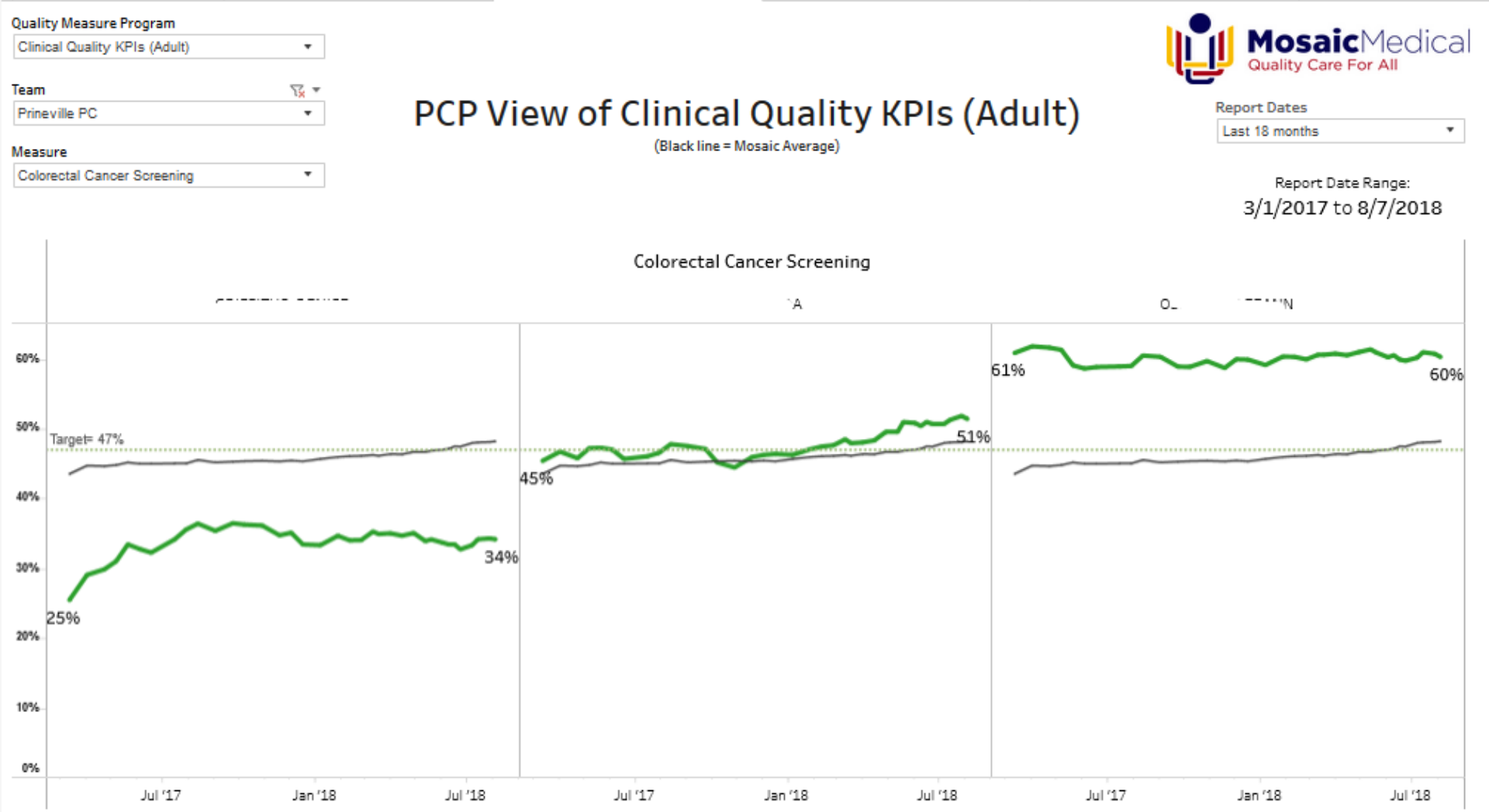
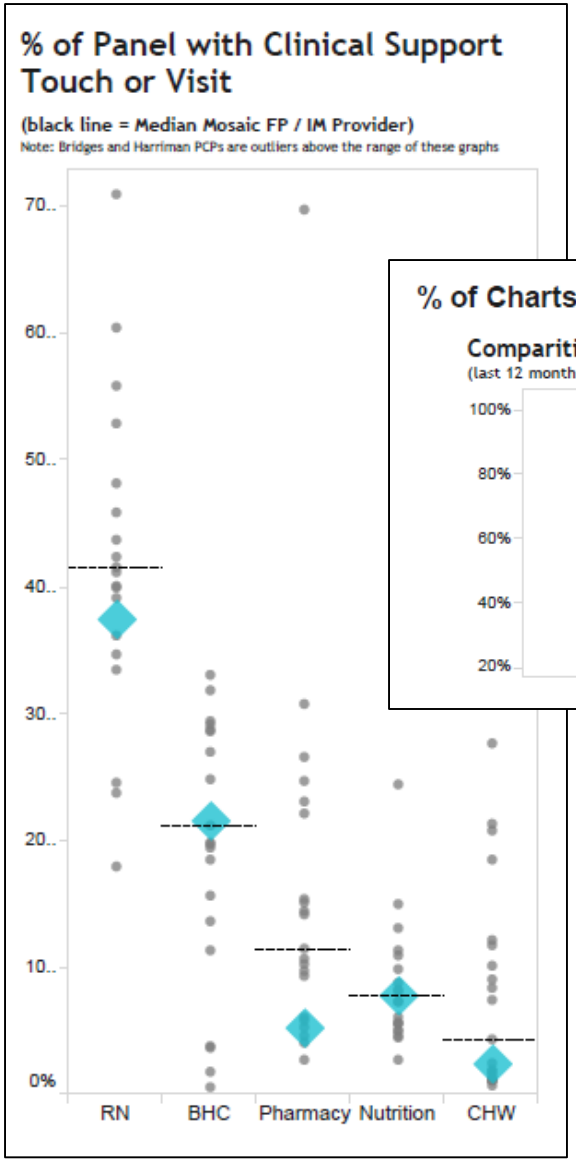
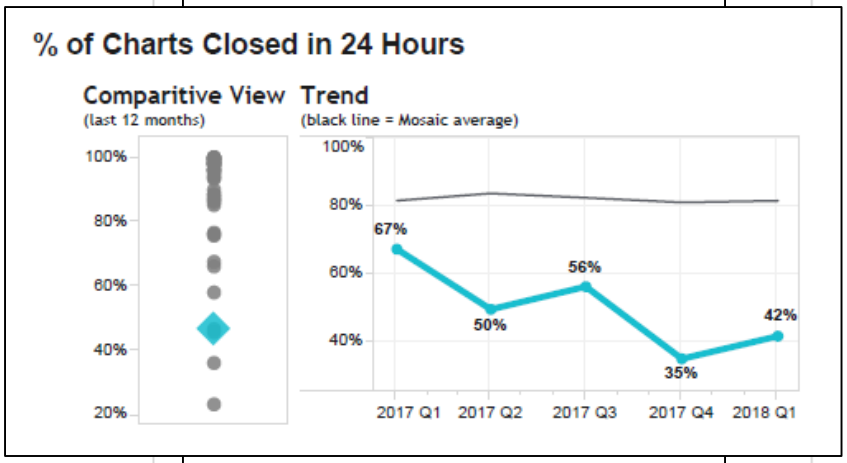
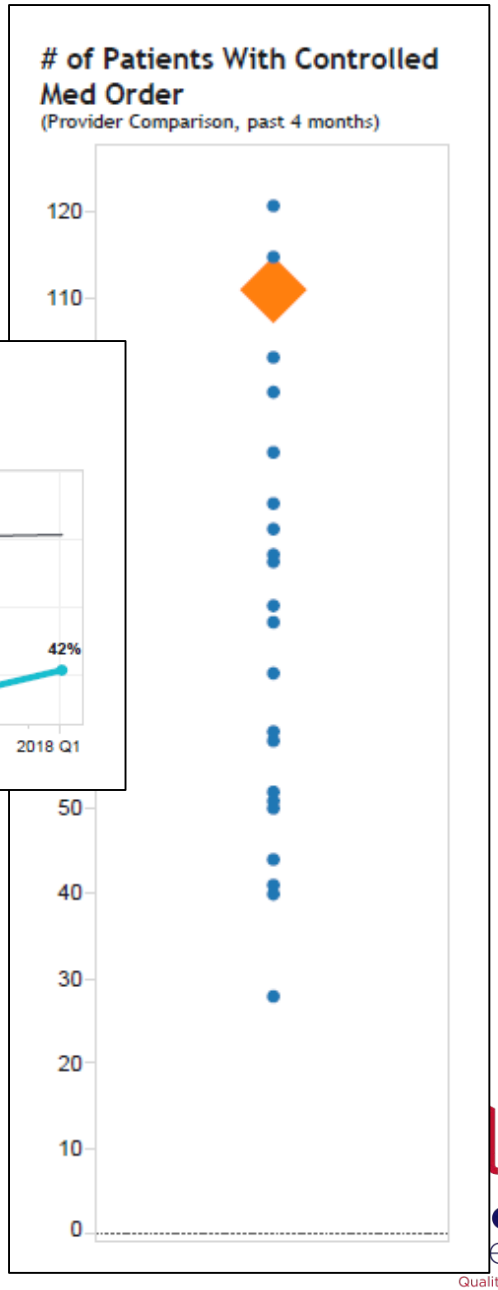
Revealing Variation









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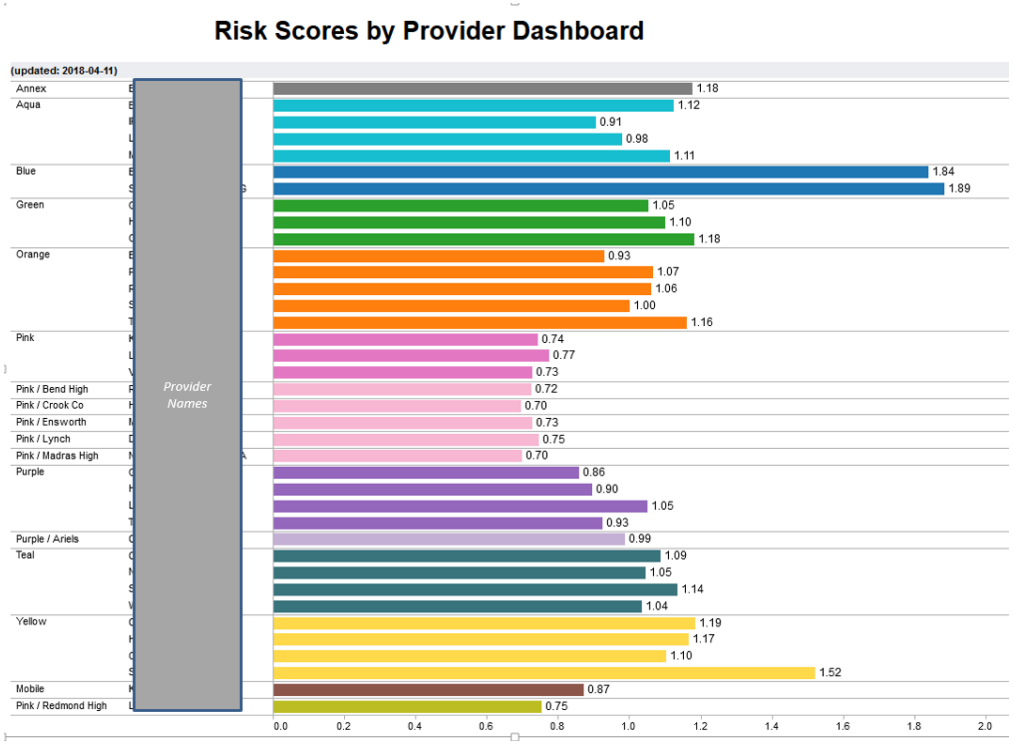
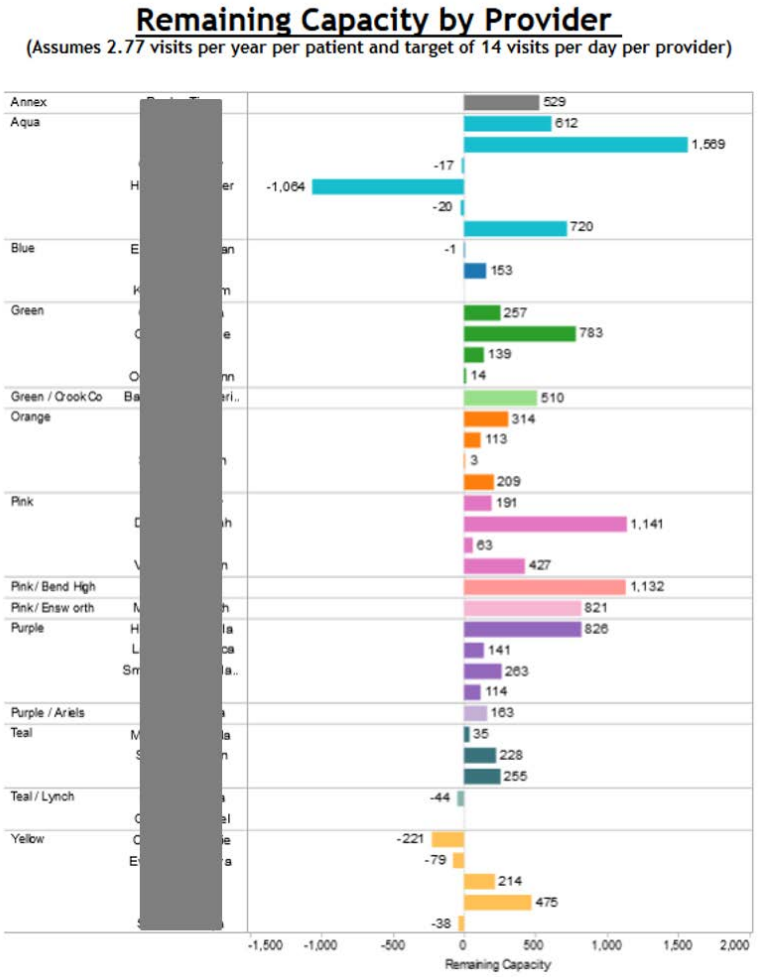
Load-leveling and Staffing





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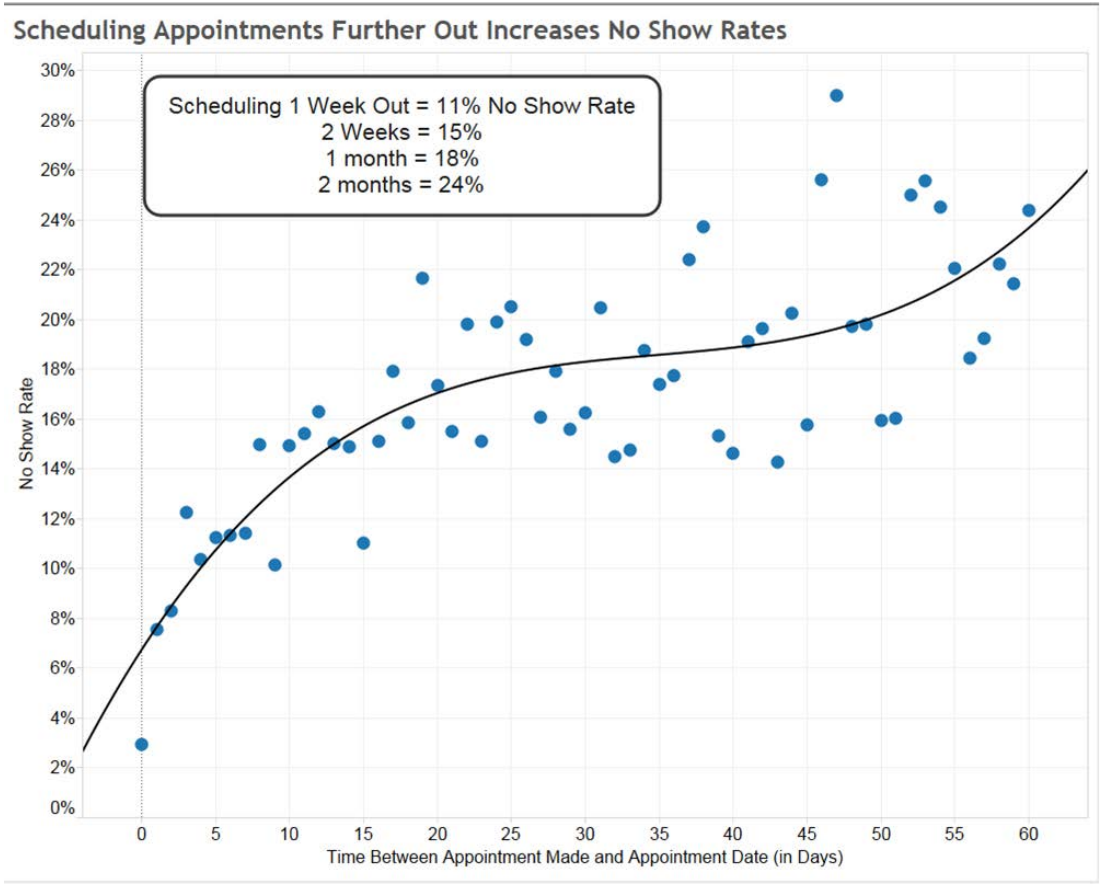
Reducing “No-Shows”

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.



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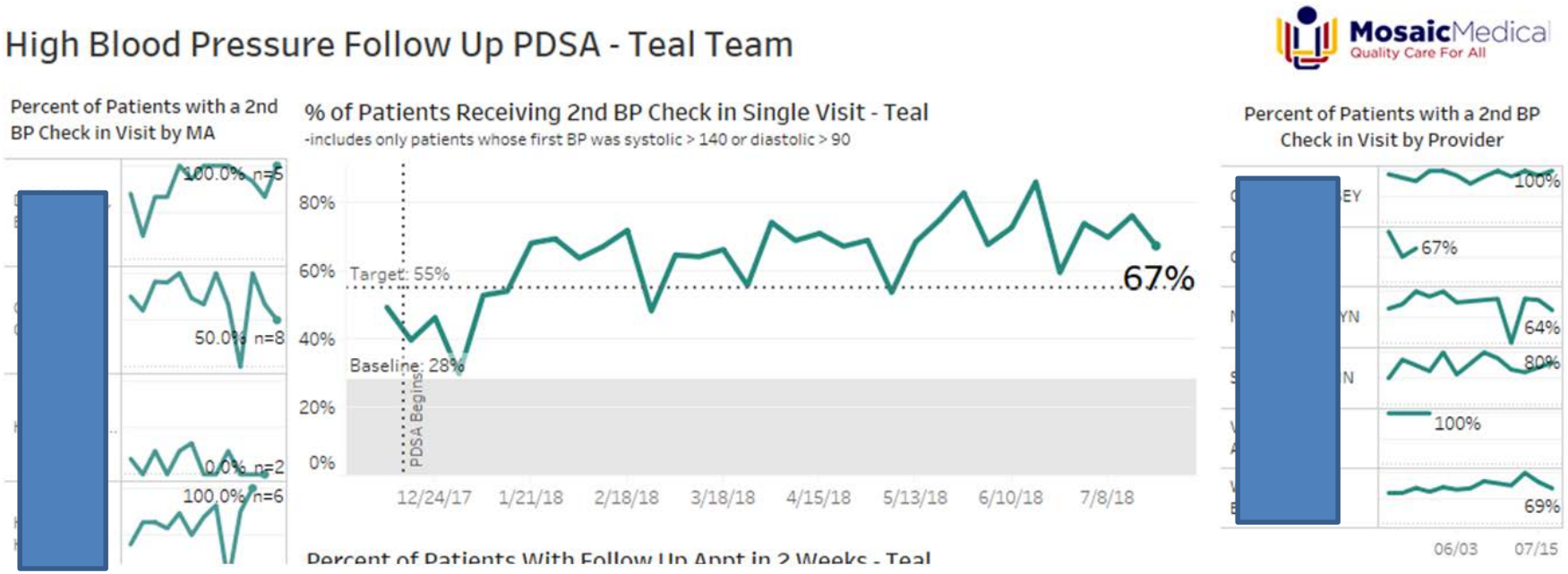
Supporting Weekly PDSAs



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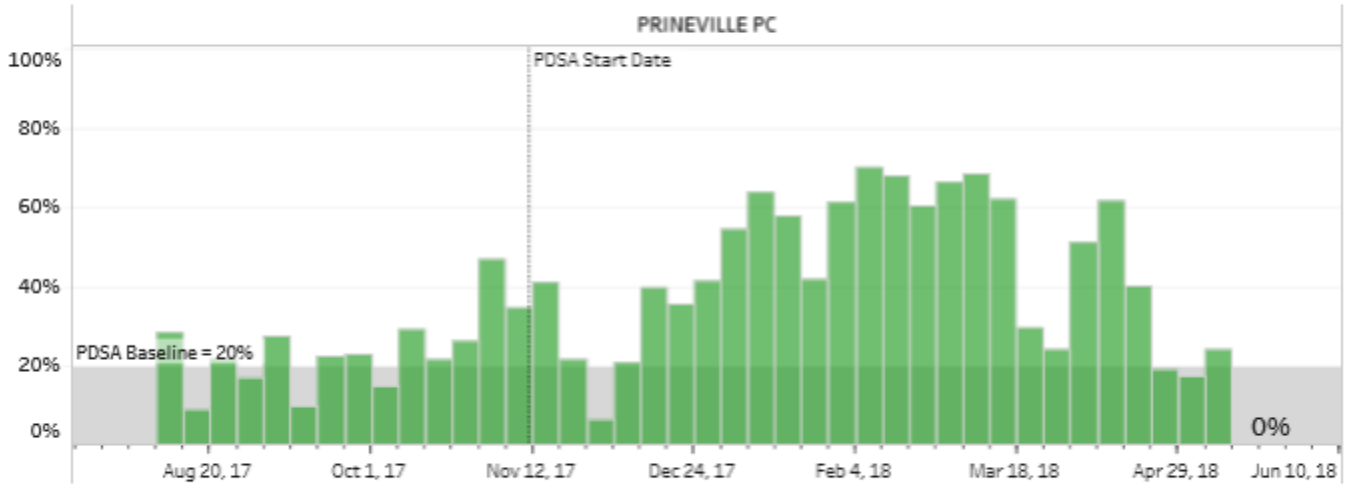
Mosaic Emergency Department Utilization and Follow-Up Dashboard

% of Patients with Timely ED Follow Up **

By Week Since 8/3/2017

Select Team: PRINEVILLE PC



** **Timely ED Follow Up** = Telephone Encounter or Visit with Encounter Reason / Chief Complaint of: 'Emergency Room Follow Up', 'Emergency Room Visit Note', 'Hospital Admission', 'Hospital F/U', 'Admission', 'Deceased', 'Establish Care' within two weeks of ED visit

Most Common ED Diagnoses

-Primary Dx Only, Last 12 Months

-Yellow = Avoidable

Chest pain, unspecified	29
Acute upper respiratory infection, unspecified	27
Acute pharyngitis, unspecified	19
Influenza due to unidentified influenza virus w..	17
Unspecified abdominal pain	16
Urinary tract infection, site not specified	16
Streptococcal pharyngitis	15
Periapical abscess without sinus	14
Low back pain	13
Headache	12
Acute bronchitis, unspecified	11
Epigastric pain	11
Otitis media, unspecified, left ear	11
Viral infection, unspecified	11
Nausea with vomiting, unspecified	10
Influenza due to other identified influenza viru..	9
Pneumonia, unspecified organism	9
Laceration without foreign body of other part ..	8
Otitis media, unspecified. right ear	8
Syncope and collapse	8

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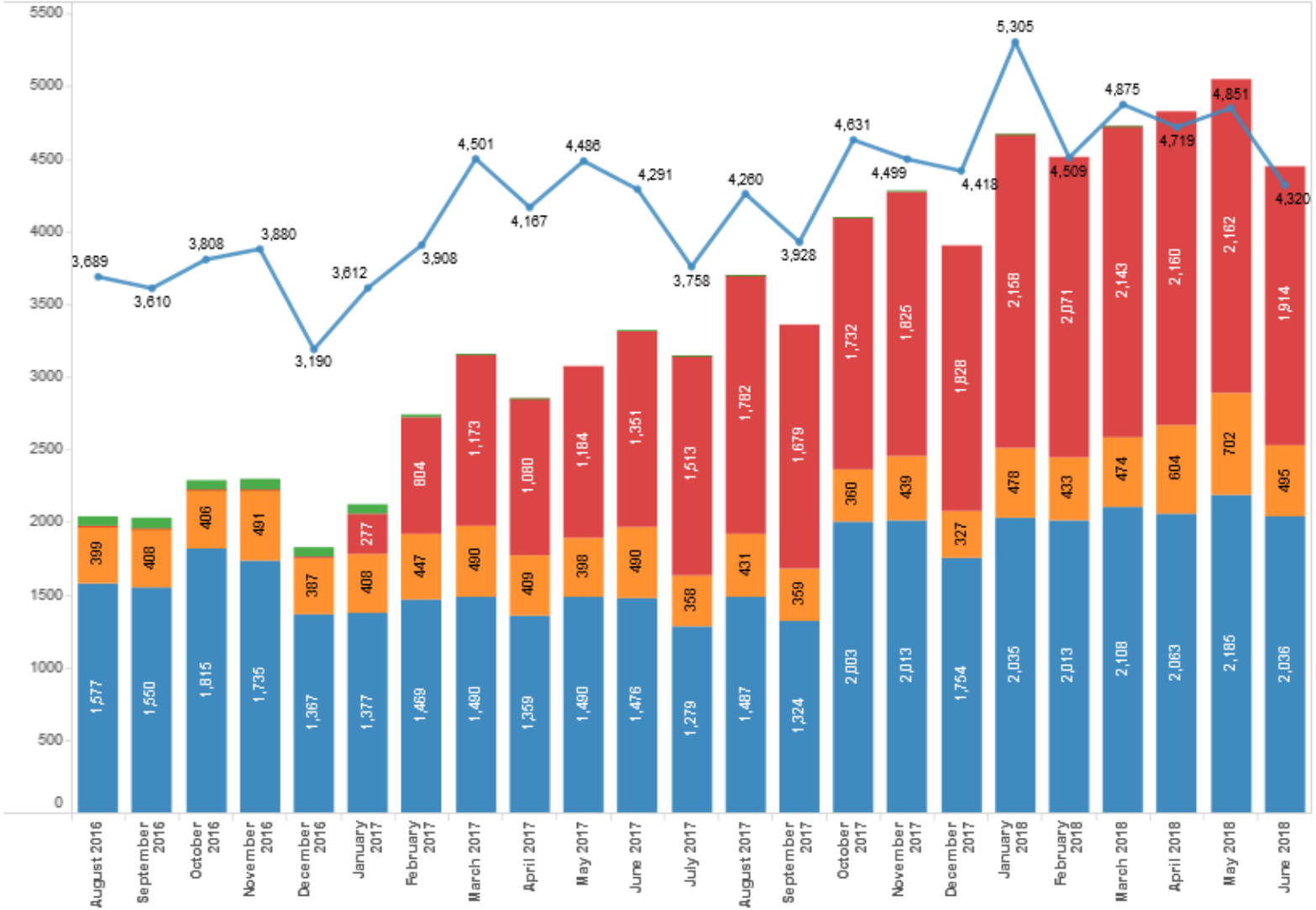
Innovative Care Encounters

Distinct Patients With Touch Per Month by Encounter Type

(includes non-PCP -- except group visits --and qualifying CareSteps)



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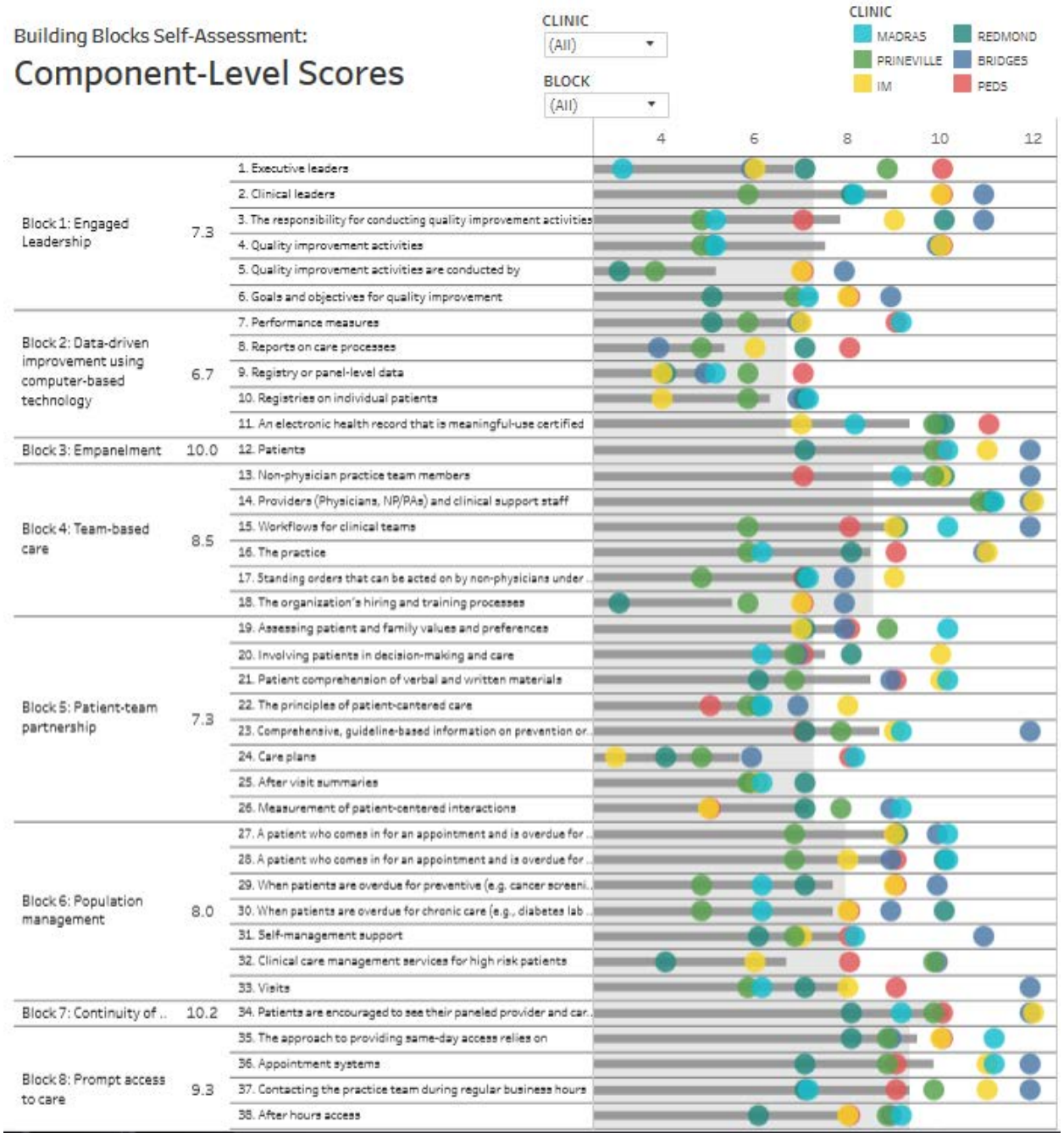
Building Blocks Self-Assessment:

Component-Level Scores



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Wed 8/8/2018 5:09 PM

Karly Hedrick

RE: Colorectal Cancer Screen Data for Grant

To Maria Hatcliffe RN, MPH; Ken House

Cc Marshall Greene

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

MRN	PAYOR_NAME
15	PACIFICSOURCE COMMUNITY SOLUT
12	MEDICARE PART B
7	PACIFICSOURCE MEDICARE
5	SELF PAY
3	DMAP MEDICAL FFS
2	PACIFICSOURCE HEALTH
2	TRICARE FOR LIFE MEDICARE SUPP
1	AETNA US HEALTHCARE
1	MODA
1	ODS MEDICARE SUPPLEMENTAL
1	SCREENWISE
1	STATE FARM HEALTH INS

Did I miss any of the data points you were requesting?

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Mon 7/23/2018 9:16 AM

Marshall Greene

RE: Data analysis pre-task for process improvement effort: Pools/Inboxes

To Michelle Dickinson; ⊞ **data**

Cc Bill Winnenberg; Richard Bennett; Lindsi Bilyeu, RN BSN; Chelsea Pointer; Kristen Tingue

Message Encounter_Closing_and_IB_Message_Per_Thread.pdf (965 KB)

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.

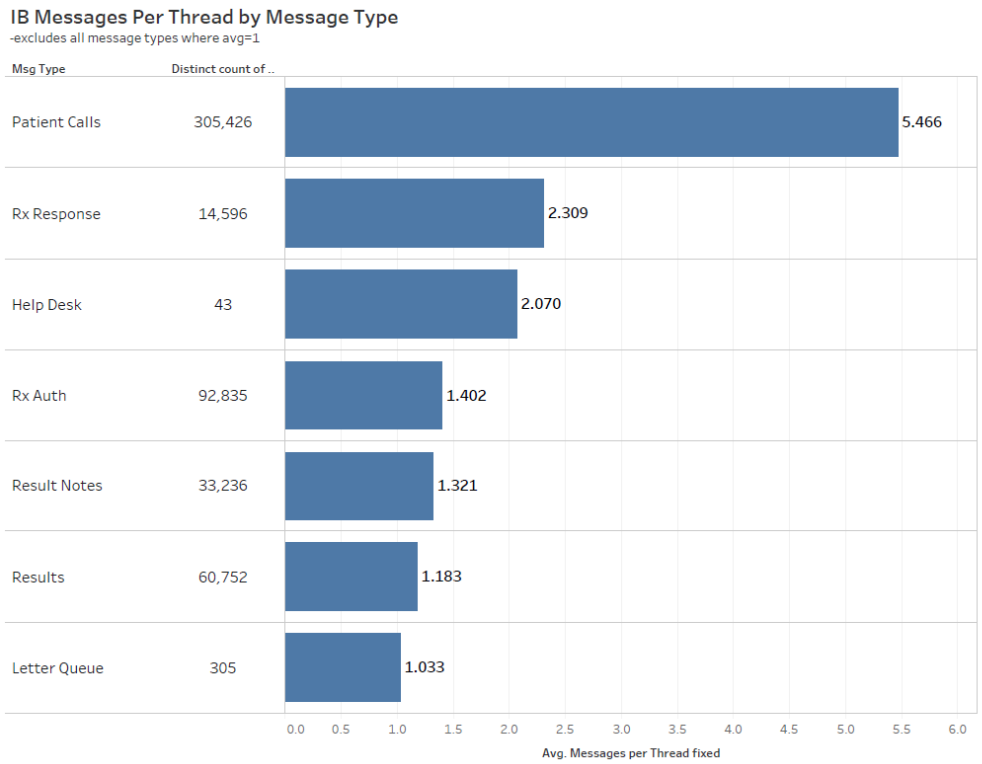
The basics for slides 5-14: These graphs show, for one Inbasket message conversation (a 'thread'), how many individual Inbasket messages were created on average.

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 (ie 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



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Tue 5/15/2018 3:40 PM

Michael Salvage

RE: overall health rating

To Ken House

Cc Marshall Greene

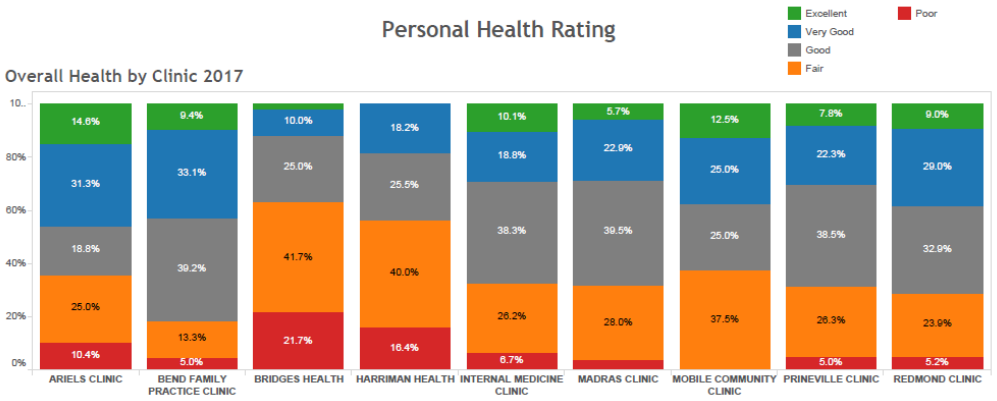
Message | Personal Health Rating Breakdown.pdf (135 KB)

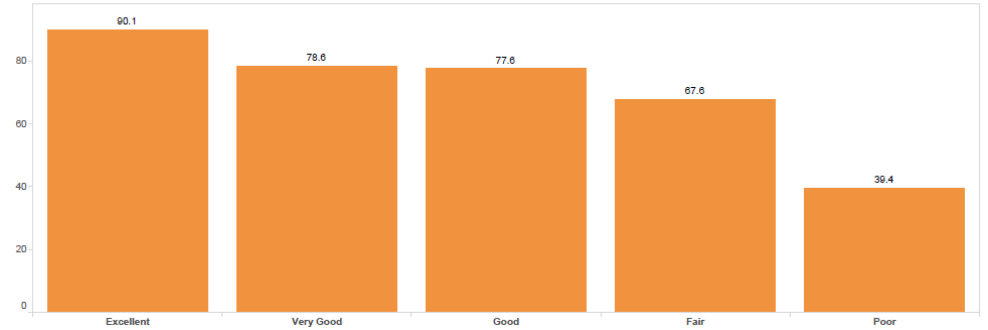
Action Items

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

Michael Salvage
Healthcare Data Analyst II, Bend Admin
7375





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Alteryx for Data Manipulating, Formatting, and Predicting

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The New York Times

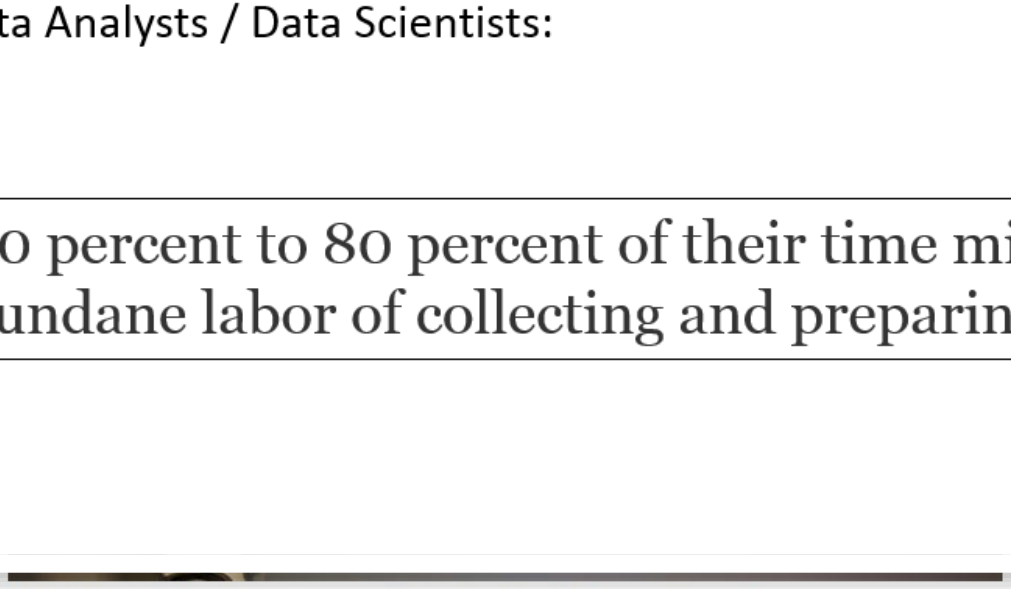
TECHNOLOGY

For Big-Data Scientists, 'Janitor Work' Is Key Hurdle to Insights

By STEVE LOHR AUG. 17, 2014

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"



Monica Rogati, Jawbone's vice president for data science, with Brian Wilt, a senior data scientist.
Peter DaSilva for The New York Times

Technology revolutions come in measured, sometimes foot-dragging steps. The lab science and marketing enthusiasm tend to underestimate the bottlenecks to progress that must be overcome with hard work and practical engineering.

The field known as "big data" offers a contemporary case study. The

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

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Risk Score In Code

```
##library(Amelia)


setwd("O:/Tableau/Dashboards/Empanelment/Panel Size Weighting/Files for Empanelment Database")

patients=read.csv("O:/Tableau/Dashboards/Empanelment/Panel Size Weighting/Files for Empanelment Database/Patient_Population_

attach(patients)

#amelia(patients)
#patients[,1:43][is.na(patients[1:43])]<-0
patients[is.na(patients)]<-0
patients$Mdical.Primary.Insurance.Type[is.null(patients$Mdical.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)
chf<-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$Migraine)
myocard_infarc<-as.numeric(patients$Myocard_Infarc)
obesity<-as.numeric(patients$Obesity)
pregnant<-as.numeric(patients$Pregnant)
PTSD1<-as.numeric(patients$PTSD)
renal_fail<-as.numeric(patients$Renal_Failure)
sex<-ifelse(patients$Sex=="F",1,0)            #females visit more often
substance<-as.numeric(patients$Subtance_Abuse)
trauma<-as.numeric(patients$Trauma)

##  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)   lowers visits by a lot (patients dying?)
```

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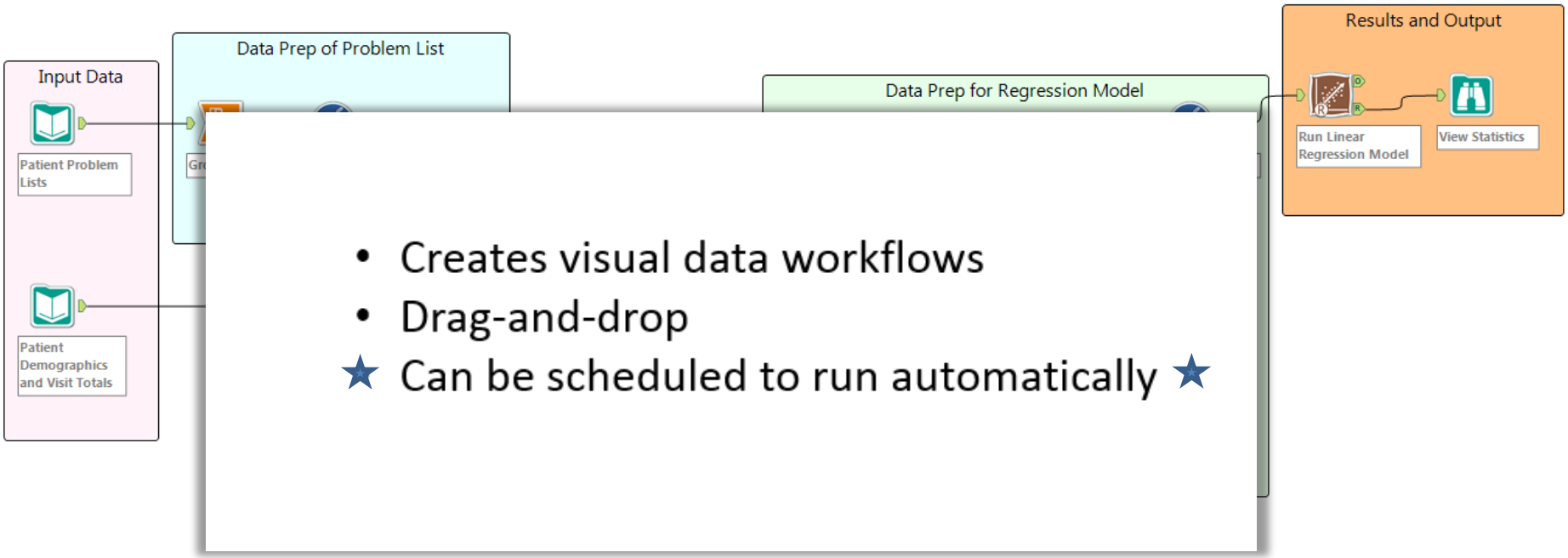
Risk Score in Alteryx



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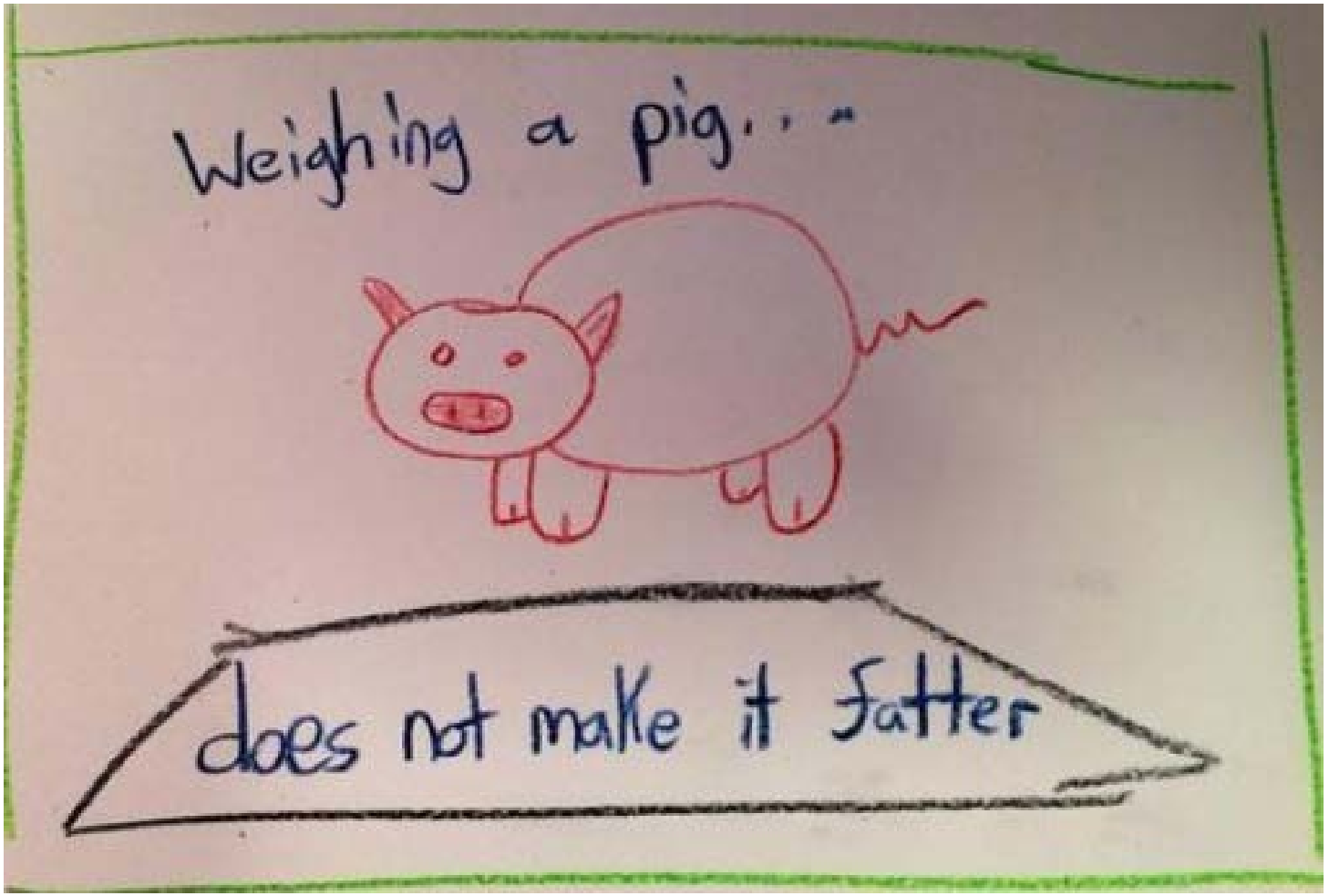

--African proverb

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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

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Thank you for your time!

Ken House, M.S.
Director, Value Improvement
Ken.house@mosaicmedical.org

Marshall Greene, M.S.
Manager, Data and Analytics
Marshall.greene@mosaicmedical.org

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