Clinical Administration PRN Focus Session—Patient Monitoring Prioritization and Productivity Measurement to Grow and Sustain Pharmacy Services

Activity Number: 0217-0000-15-119-L04-P, 1.50 hours of CPE credit; Activity Type: A Knowledge-Based Activity

Monday, October 19, 2015
1:30 p.m. to 3:00 p.m.
Plaza Room A

Note: This session is being recorded for future playback. A complimentary copy of these recordings will be available to all 2015 ACCP Global Conference on Clinical Pharmacy registrants approximately two weeks after the conclusion of the conference.

Moderator: Angela Smith, Pharm.D., BCPS, MHA
Director of Pharmacy at North Carolina Department of Health and Human Services, Division of State Operated Healthcare Facilities Raleigh, North Carolina

Agenda

1:30 p.m. Clinical Practice Innovation: Use of Productivity Dashboards in Electronic Health Records to Direct Clinical Workflow
Richard H. Parrish, II, Ph.D., FCCP, BCPS
Clinical Practice Leader - Pharmacy Perioperative Care, Alberta Health Services, Edmonton, Alberta, Canada

2:15 p.m. Departmental Excellence: Undiscovered Opportunities and Metrics in Pharmacy
Kyle H. Townsend, Pharm.D., BCPS
Director, Pharmacy Services Billings Clinic Billings, Montana

Conflicts of Interest Disclosure
Richard H. Parrish: no conflicts to disclose.
Angela Smith: no conflicts to disclose.
Kyle H. Townsend: no conflicts to disclose.

Learning Objectives

1. Describe ways to utilize Electronic Health Record systems to quantify productivity, including estimating projected savings and developing benchmarking within a peer group.
2. Describe the development of productivity dashboards in Electronic Health Record systems, including ways to capture clinical work, and use data to drive workflow decisions.
3. Demonstrate ways to use Electronic Health Record systems to identify opportunities for clinical
intervention, manage clinical workflow, including ways to stratify patients for pharmacist intervention, and document clinical work more efficiently in various Electronic Health Record systems.

4. Discuss the importance of metrics to measure efficiency and manage departmental workflow.
5. Define key metrics and describe their application to improve pharmacy productivity and efficiency.
6. Define basic methodologies and tools involved in process improvement.
7. Discuss the importance of metrics to measure efficiency and manage departmental workflow and describe their application to improve pharmacy operations.

Self-Assessment Questions

Self-assessment questions are available online at www.accp.com/gc15.
Clinical Practice Innovation:
Use of Productivity Dashboards in Electronic Health Record Systems to Direct Clinical Workflow
Richard H. Parrish II, PhD, FCCP, BCPS
October 19, 2015

Conflict of Interests

- No conflicts to disclose

Acknowledgements

- Dr. Kelly Cochran, University of Missouri at Kansas City and Cerner Corporation
  - Patient Centered Medical Home dashboards
- Keith Streckenbach
  - HighFive RXO workflow optimizer
- VigiLanz Corporation - Dynamic Monitoring Suite
- Truven – Micromedex - webpage
- Asolva – Medici - webpage

Learning Objectives

- Describe the development of productivity dashboards in Electronic Health Record (EHR) systems,
  - including ways to capture clinical work, and
  - use data to drive workflow decisions; and
- Demonstrate ways to use EHR systems to
  - identify opportunities for clinical intervention,
  - manage clinical workflow, including ways to stratify patients for pharmacist intervention, and
  - document clinical work more efficiently in various EHR systems.

What is a dashboard?

- Idea originates from automobile dashboard
  - Indicators of major functions at a glance
  - Both positives and negatives

History of dashboard use

- Appeared in business and executive literature in 1990s
- Became popular with Key Performance Indicator (KPI) use in 2000s
- Introduction of Kaplan and Norton – Balanced Scorecard
- Evolved into strategic, analytical, operational, and information
Balanced Scorecard

- Early work at GE – 1950-1980
- Helps managers keep track of execution of activities
- Gives managers a fast and comprehensive view of business
- Based on cause-and-effect relationship of actions to outcomes

A good dashboard...

- Is simple and communicates easily at a glance
- Minimum distractions
- Supports key performance measures
- Applies human visual perception to visual presentation of information
- Enables instantaneous, informed decisions

What types of work data have been captured?

- Operational
- Clinical
- Financial

- Typically, a common denominator such as occupied bed, adjusted patient-day, or 1000 patients days has been used in patient-focused activity dashboards

How dashboard data have driven decisions

- Patient location-based
- Drug-specific
  - TDMs and anticoagulation
  - Other high alert medications (MTX)
- Laboratory results tied to drug use
- Real-time v. retrospective audit (report) driven
- Organization-related quality indicators
  - CMS, SCIP, NSQIP

Operational

- Doses dispensed
  - Sub-divided by dose preparation intensity
    - Oral, parenteral, unit-dose liquid, narcotic, etc.
- Order-screening functions
  - Formulary compliance
  - Organ function dosing
  - Allergy assessment
  - Drug interactions
  - Therapeutic duplication
  - Dose-range checking

Clinical practice

- Number of clinical “consults”
  - Sub-divided by patient type and/or 1st diagnosis
- Number of patient visits
- Functions performed and time during visit
  - Holistic clinical activities centered on eight DTPs
- Task-specific activities
  - Route conversion
  - Medication error prevention
  - Renal and/or hepatic dosing
  - VTE prophylaxis
  - Antimicrobial stewardship
  - Falls prevention

Financial

- Total cost
- Cost avoidance
- Indigent care cost accounting
- Impact on “never events” and re-admissions

What is the configuration of your staff’s practice?

- Team-based
- Unit-based
- Program-based
- Dispensary-based
- Pharmacist-based

What is the meaning of a “pharmacist intervention?”

- Any action to modify (initiate/change/discontinue)
  - the existing order of another provider?
  - the existing order for and/or condition of a patient as another provider has identified?
  - the existing condition of the patient as you assess it?
  - All of the above?
- Does any intervention require that the patient is assigned to your care?

Meaningful use – Stage 1

- Providers have to show CMS that they are using their EHRs in ways that can positively affect the care of their patients
  - Thirteen core objectives (all)
  - Nine menu objectives (meet 5 of 9)
  - Nine clinical quality measures (meet 9 of 64)

13 core objectives

- Computerized provider order entry (CPOE)
- Drug-drug and drug-allergy checks
- Maintain an up-to-date problem list of current and active diagnoses
- E-Prescribing (eRx)
- Maintain active medication list (80%)
- Maintain active medication allergy list
- Record demographics
- Record and chart changes in vital signs
- Record smoking status for patients 13 years or older
- Implement clinical decision support - at least one rule implemented
- Provide patients with the ability to view, download, or transmit their health information online
- Provide clinical summaries for patients for each office visit
- Protect electronic health information

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Nine menu objectives (need 5)

- Submit electronic data to immunization registries
- Submit electronic syndromic surveillance data to public health agencies
- Drug formulary checks
- Incorporate clinical lab-test results
- Generate lists of patients by specific conditions
- Send reminders to patients for preventive/follow-up care
- Patient-specific education resources
- Medication reconciliation
- Summary of care record for transitions of care

Clinical quality measures

- 2011 through 2013: 6 of a possible 44 measures
  - 3 required core measures or 3 alternate core, as necessary
  - 3 of 38 additional measures
- In 2014 & beyond: 9 out of 64 measures

Stage 2 meaningful use

- Eligible hospitals and CAHs must meet: 16 core objectives
- 3 menu objectives that they select from a total list of 6
- Total of 19 objectives

Laboratory-linked alert


Infrastructure configuration for methotrexate dashboard

- Barrett et. al. BMC Med Inform Dec Mak 2008, 8:6

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Dashboards embedded within EHR – ambulatory care example meeting Stage 3 meaningful use

Clinic view – registries tree map for 9 chronic conditions
- Displays the met percentage, number of qualified persons and completion percentage for each registry specific to that clinic.
- Patients qualify for registries based on problems from their problem list, diagnosis codes and procedure codes. Can be included in multiple registries if they qualify appropriately on any of those factors.
- Clinical pharmacists may use this view to guide their selection of which populations they could target for pharmacotherapy interventions.

Physician view
Physician view

- Zoomed in to the Diabetes Registry and click on the measure "HbA1c > 9" to generate a patient list.
- Patient lists can be generated in two different ways.
  - If you click on a Registry tile within the tree map, Diabetes for example, then the patient list will include all of the patients that qualify for the Diabetes registry who are in X physician’s panel.
  - If you generate a patient list by click on an individual measure, like we have here, then the patient list will include all of these physicians’ patients who are not met for that measure.
- The results for HbA1c are looking for clinical results so that would pull in from a lab result.

Patient list – diabetes registry

Patient list from registries – individual provider

- Provider A’s patients who qualified for Diabetes Registry & measure, “HbA1c >9”
- MARA Risk Score assigned to each patient found in the top blue bar by the patient’s name
  - Milliman Advanced Risk Adjustor.
    - Milliman is one of the leading companies in insurance claim analysis & reporting.
  - Entire patient population is normalized & average patient in the population has a score of 1.
    - A patient with a score of 25 would be expected to cost 25 times as much as the average patient.

Patient view – A1C selected

- Each tile represents a measure within that Registry.
- This view shows quality measures within Diabetes specific to Patient A.
  - Clicking on a tile allows you to see what results were pulled in to qualify that patient as met or not met.
  - You can also see where the results pulled form and when.
  - This patient is “not achieved” because they are out of date - pulled from 2012.
  - Want a result within the last 365 to qualify the patient as met.
    (data can be pulled from PowerChart, IDX Billing Data &/or insurance information.)
Patient view – lipids selected

- Selected LDL Controlled instead of HbA1c > 9 looking for LDL > 100 OR
- For the specifics if they help: patients with any of the following documented during the measurement period:
  - A most recent LDL >100 mg/dL OR
  - All of the following components, from the same date, for a calculated LDL.
    - Total cholesterol
    - AND HDL-Cholesterol
    - AND Triglycerides
  - AND the calculated LDL result < 100 mg/dL.
- If LDL (measured) < 100 mg/dL & calculated LDL result < 100 mg/dL, measured < 100 mg/dL is preferred value.
- OR Patient has been prescribed Statin Therapy.
Individual physician scorecard
Comparison within teams

- Ranked by easiest to achieve for each measure.
- Hovering over a measure shows:
  - met percentage,
  - target for that measure, and
  - number of more patients that physicians needs to achieve to meet the target.
- Composite score is similar to the quality score but for the scorecard:
  - Composite Score: The total number of points achieved divided by the total number of points eligible (weighted by category, if applicable), calculated for scorable people only.
  - Points are related back to the point values assigned each measure.
  - Each measure has a point or a weight of 1 - considered equal.
  - Can put a heavier weight on certain measures which would then contribute more to these composite scores.
  - Picked values based on preference - driven by anything within EMR.

Clinic-to-clinic comparisons

- Can use scorecard metrics to compare teams, locations, departments and clinics
- Top Opportunities (orange) or the "lowest hanging fruit."
- Targets are decided upon by our project team, but soon Medical Director of Population Health will decide
- Administrators can change/adjust/update those scores at any time.
- For these screenshots, all of the targets are at 50% because that's what we used for the pilot.

Clinic view – asthma care

- Zoomed in on the quality measures within Asthma Care.
- This dashboard contains data that clinical pharmacists may readily address medication management and immunization metrics.
Patient view – asthma care

Patient view – medication management within asthma

Clinic-to-clinic comparisons

Asthma care

Dashboards created from external clinical surveillance systems

CDSS companies for clinical intervention documentation

- Dynamic Monitoring by VigiLanz Corporation
- Medici by Asolva, Inc
- MedMined by CareFusion
- Micromedex Pharmacy Intervention by Truven Health Analytics
- RXO by Highfive
- Sentri7 by Pharmacy One Source
- TheraDoc by Premier

Clinical surveillance systems
Patient prioritization schemes

- Setting: New Zealand acute care hospital
- Based on ADE monitors
  - Assessment of risk tool - IHI
  - High alert medications
- During one 8-month period
  - 765 high-risk patients prioritized for discharge services
  - 526 medication errors (MEs) were prevented
    - including 174 errors deemed to pose moderate-to-major patient harm potential

Falconer et al. AJHP 2014 Feb 15;71(4):311-20

Patient prioritization schemes

- Colorado out-patient family medicine clinic
- EPIC EHR used
- Clinical pharmacy priority score algorithm
  - Patient age, cardiovascular diseases and diabetes, eGFR, A1c, blood pressure, active items on medication list
- From 1107 patients, clinical pharmacist made 223 medication recommendations for 101 patients and 132 (59.2%) were accepted and implemented


Patient prioritization schemes
diabetes medication adherence

- Orders verified in EMR
- Orders entered into EMR (oral)
- Orders discontinued
- Patient profile review
- Progress notes
- Medication event reporting
- Resuscitation code attendance

Metric | Weighted value
--- | ---
Orders verified in EMR | 1
Orders entered into EMR (oral) | 2
Orders discontinued | 2
Patient profile review | 5
Progress notes | 5
Medication event reporting | 4
Resuscitation code attendance | Duration (in minutes) / by 2


System functionality

- Quality data mining software programs:
  - Allow for user customization
  - HIPPA-compliant
  - Description, prediction, and prescriptive analytics
  - Must be real-time
Bottom line:

- EHR systems facilitate patient safety and quality improvement through:
  - use of checklists, alerts, and predictive tools;
  - embedded clinical guidelines that promote standardized, evidence-based practices;
  - electronic prescribing and test-ordering that reduces errors and redundancy; and
  - discrete data fields that foster use of performance dashboards and compliance reports.

Conclusion

- Development of effective clinical dashboards depends on clinical practice vision and mission
  - Integration of medication management quality measures

- Prioritization of patients for pharmacist direct care has been based on patient factors, drug therapy intensity, and patient location

- Future prioritization efforts need to account for how the patient is responding to drug therapy
  - Assessment and documentation of patient’s clinical “micro” outcomes and/or prevention of complications
  - Stage 3 – meaningful use

References


References

Learning Objectives

- Define basic methodologies and tools involved in process improvement
- Define key metrics and describe their application to improve pharmacy productivity and efficiency
- Discuss the importance of metrics to measure efficiency and manage departmental workflow and describe their application to improve pharmacy operations
- Describe ways to utilize the electronic health record systems to quantify productivity, including estimating projected savings and developing benchmarking within a peer group.

Billings Clinic

- Based in Billings, Montana, Billings Clinic is a not-for-profit, community-owned healthcare organization
- Billings Clinic is comprised of:
  - Multi-specialty physician group practice
  - 272 bed level II trauma & tertiary referral hospital
  - 90 bed assisted living and rehab center
  - 3600+ employees, including 241 physicians and 87 PAs/NPs

Billings Clinic

- Organizational Vision: Billings Clinic will be a national leader in providing the best clinical quality, patient safety, service and value
- Obsessive dedication to our vision, resulting in awards including
  - Ranked #1 for safety by Consumer Reports
  - Accredited Accountable Care Organization
  - Top 100 Hospitals by Truven Health Analytics
Why Lean Six Sigma?

- Healthcare faces tremendous pressure to improve.
- Need a common approach to solving difficult problems.
- We must understand and manage our processes.
- To enhance our work environment, a better place to work.

All healthcare organizations are facing major challenges over the next decade.

Billings Clinic Lean Six Sigma Journey

- In 2008, 6 full time resources were hired and trained for “Operational Excellence” department – key to success.
- Projected total savings from 2009 through June 2015 is $50 Million.
- Currently, 8 full time resources (Black Belts).
- 600+ Yellow Belts – staff and leadership with basic LSS training.

Lean and Six Sigma

LEAN \[\downarrow\] SIX SIGMA

WASTE ELIMINATION \[\downarrow\] UNNECESSARY VARIATION REDUCTION

The 5 Principles Of Lean

Lean techniques are used to reduce unnecessary steps, eliminate rework, save time, save cost, and extend capacity of valuable resources by:

1. Specifying the value of the process
2. Identifying the value stream for each process
3. Allowing value to flow without interruptions
4. Letting the customer pull value from the process
5. Continuously pursuing perfection

Identifying waste and making it visible is the first step.

Lean Drives Out Waste

There are 8 types of Waste:
- Transportation
- Inventory
- Motion
- Waiting
- Overproduction
- Over Processing
- Defects
- Intellect

Six Sigma

Wait time for a STAT medication

Customers remember variation, not the average.
Pharmacy Overview

- Problem: As a combined clinical & distributional department, daily pharmacy volumes can be difficult to predict. Staffing shortages and non-standardized processes impact inventory, productivity, and staff satisfaction.

- Goal: Utilize Lean and Six Sigma tools to standardize work and improve overall flow

Value Stream Mapping

Main Pharmacy Value Stream Map - Preliminary

Categorize functions into value streams

Clinical | Distribution | Purchasing | Outpatient

What are the key metrics within each value stream?

Purchasing
- Dollars of expired product
- Contract compliance
- Number of drugs on shortage list
- Stockouts
- Top 10 expired products
- Inventory turns

Clinical
- Dollars saved from interventions
- Formulary compliance
- Decentralized pharmacist efficiency
- Centralized pharmacist efficiency
- Verification turn around time

Why do we need a dashboard?

- Pharmacy is a complex department with multiple business models
- Allows department leadership to easily see the overall “health” of the department
  - Clinical functions (mostly pharmacists)
  - Distributional functions (mostly techs)
  - Purchasing
  - Outpatient services (retail, coag clinic, nursing home)
- Has prompted monthly business meetings to review the metrics
The pharmacy struggled with an appropriate metric to track pharmacist productivity and a way to include the clinical aspects of the job. This custom-built tool allows for comparison of pharmacists against a standardized value as well as a way to identify high and low performance.

### Clinical Efficiency

| Month | Normal Rate | Orders Int IV Chart | New Formulating | New Order | Median IAT | Yes
|-------|-------------|---------------------|----------------|-----------|------------|-----
| Jul-15 | 17.7 | 258 | 1490 | 0 | 12.27 | 13.65 | 9
| Jul-15 | 16.0 | 259 | 3247 | 250 | 37.20 | 74.87 | 2.13
| Jul-15 | 18.9 | 2175 | 380 | 877 | 17.80 | 17.40 | 3.47
| Jul-15 | 15.1 | 6188 | 6415 | 0 | 48.53 | 17.40 | 14.74
| Jul-15 | 13.9 | 5657 | 5994 | 8 | 42.65 | 16.47 | 21.94
| Jul-15 | 4.3 | 5782 | 7792 | 399 | 90.00 | 29.21 | 22.88
| Jul-15 | 3.0 | 5460 | 444 | 18 | 46.00 | 19.24 | 26.94
| Jul-15 | 10.6 | 5560 | 160 | 0 | 30.27 | 21.51 | 1.02
| Jul-15 | 8.2 | 3272 | 1394 | 3 | 46.00 | 18.38 | 15.22
| Jul-15 | 3.0 | 0 | 1065 | 1337 | 0
| Jul-15 | 3.1 | 2152 | 0 | 0
| Jul-15 | 0 | 7880 | 2465 | 234 | 56.58 | 18.90 | 31.83
| Jul-15 | 0 | 7880 | 4480 | 379 | 39.12 | 14.70 | 5.17

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### Low-Tech Intervention Tracking

Low-Tech Intervention Tracking

| Month | Normal Rate | Orders Int IV Chart | New Formulating | New Order | Median IAT | Yes
|-------|-------------|---------------------|----------------|-----------|------------|-----
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### High-Tech Intervention Tracking

Highest Efficiency

- Type of duties (clinical vs. distributional) varies greatly amongst staff
- Combines the duties to form a standard efficiency metric
- Assists with performance reviews
- Assists with showing the value of pharmacy services, especially when productivity consultants come knocking
- Staff buy-in…?

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### EHR Extracts (Automatic Interventions)

EHR Extracts (Automatic Interventions)

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### Benefits & Lessons Learned

- Clinical Pharmacist Efficiency
  - Type of duties (clinical vs. distributional) varies greatly amongst staff
  - Combines the duties to form a standard efficiency metric
  - Assists with performance reviews
  - Assists with showing the value of pharmacy services, especially when productivity consultants come knocking
  - Staff buy-in…?
Benefits & Lessons Learned

- **Purchasing Value Stream**
  - Top 10 expired drugs by dollars reviewed at monthly business meeting
    - Adjust pars
    - Remove items from formulary where practice may have changed and formulary not adjusted
  - Stockouts and shortages of little value as these have been excessive since inception of dashboard
  - Inventory turns are low, but difficult to obtain monthly

- **Distributional Efficiency**
  - How do we improve the distributional model and monitor its effects on productivity?
    - Inventory Control
    - Workflow
    - Communication

A Problem...

- IV Room production levels fluctuate drastically yet the scheduled production time is constant.
  - Little correlation (20%) to hospital “patient days” or any typical hospital volume indicator

Using data to drive decisions allows for objective, positive improvements

**ADC Inventory Management**

- Reorder at 5, order 25
- Reorder at 7, order 10

Peak order volume significantly reduced
- Increasing reorder point slightly kept stockout % unchanged
- % of restocking days increased
- Lower average inventory
- Much better opportunity to level production qty!
New Inventory Analysis Tool

Daily Usage

Graphically shows consecutive days with no usage

Summary of issued, expired, and supplemental restocks

Graphically shows usage with no usage

Visual Status Board & Daily Briefing

Red indicates an ADC where removal should be considered

Suggested reorder levels

Pharmacy Tech Schedule

The schedule methodology is the root cause of limiting performance.

Tasks are scheduled at fixed times of the day (even though some don't have to be).

No motivation to work more efficiently other than to have some "free time" before the next task starts

Scheduled task durations (for techs) are fixed yet both volume and expertise can mean either free time or rushing to finish on schedule

Activity varies between chaos and crickets chirping

Schedule, demand, and tech behaviors cause uneven workload

Distributional Efficiency

Monthly Graph

Monthly Summary

Benefits & Lessons Learned

Inventory Analysis

Allows data to be displayed numerically and graphically to make quick par and stocking decisions.

Workflow

Data collection and analysis to verify changes is the key to assuring the theory will be successful in real life.
Benefits & Lessons Learned

- **Communication**
  - Staff participation in modifying visual status board is paramount to its success.
  - The visual status board must remain fluid.

- **Distributional Efficiency**
  - Creates a baseline to determine the efficiency of staff and gives the ability to identify and review why deviations occurred.

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Outpatient Value Stream

- **Overall Return Efficiency**

Retail Pharmacy Efficiency

- **Overall Value Stream**

Anticoag Clinic Efficiency

- **Individual staff member**

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Benefits & Lessons Learned

- **Retail Pharmacy**
  - A significant portion can be extracted from the PIS
  - Many items require a “tick sheet” for tracking additional work
  - Able to separate techs and pharmacist work and weight appropriately

- **Anticoagulation Clinic**
  - Majority is extracted based on scheduled visits
  - Led to a FTE reorganization and clinic hour adjustment
  - Led to review of no-show rates

- **Ambulatory Clinics**
  - Still under development
Executive Summary

- Challenges addressed
  - No accepted pharmacist-efficiency metrics when combining dispensing, order review, and clinical duties
  - Difficult to predict pharmacy volumes
  - Non-standardized processes
  - No reliable way to know how well department is running
- Steps/process created
  - Departmental Dashboard
  - Visual Status Board/Daily Briefing
  - Data analysis tools

Executive Summary

- Key players involved
  - Pharmacy leadership
  - Operational Excellence (Lean Six Sigma dept.)
  - Pharmacy staff
- Outcomes achieved
  - Improved productivity and reduced waste
  - Communication improvements
  - Reliable method of tracking productivity and efficiency, department-wide

Executive Summary

- Success factors/pre-requisites
  - Staff buy-in and participation
  - Dedicated resource with significant experience in workflow analysis & data analysis
  - IS support to extract data and run monthly reports
  - Technical support to maintain and update dashboard

Learning Objectives

1. T/F? Lean is about eliminating waste and Six Sigma is about reducing process variation. True
2. T/F? A visual status board allows staff to identify issues with daily workflow in real time. True
3. T/F? When identifying departmental metrics, you should only choose those for which you already have data. False
4. T/F? A departmental dashboard should encompass all metrics necessary for leadership to understand the overall “health” of the department. True
5. T/F? Staff understanding and buy-in of the value of the metrics is essential. True

Questions?