

# INVESTING IN DATA ANALYTICS TO IMPROVE PATIENT CARE

# Objectives:

- Use of Data Analytics in improving patient wellness and clinical decision support.
- Use of Data Analytics in ***Mission's Sepsis Advanced Analytical application*** to drive care for Sepsis Patients by capturing 3-hour bundle compliance

## Key Questions

- Who is Mission Health?
- Why Data Analytics?
- How did we implement analytics to drive improvement?
- How do we use analytics to drive care for Sepsis Patients ?
- What's next?

# Mission Health System

- Based in Asheville, NC
- 130-year history
- 10,700 employees and 2,000 volunteers
- Over 1,000 physicians on staff
- Six hospitals and numerous outpatient, surgery, and post-acute care facilities
- Mission Hospital is the flagship, licensed for 763 beds
- Truven Top 15 health system 5 consecutive years

# Why Data Analytics?

- Healthcare organizations are focused on two primary goals:
  - Improving the quality of patient care and
  - Reducing overall organizational costs.
- Huge amount of data growing exponentially:
  - Electronic health records,
  - Medical history, Orders and prescriptions, Lab reports,
  - Insurance claims, phone calls and more.
- Unstructured data: drawing valuable insights from the data is more complicated
- Holistic Patient View
- Predictive Analysis

# Clinical Redesign

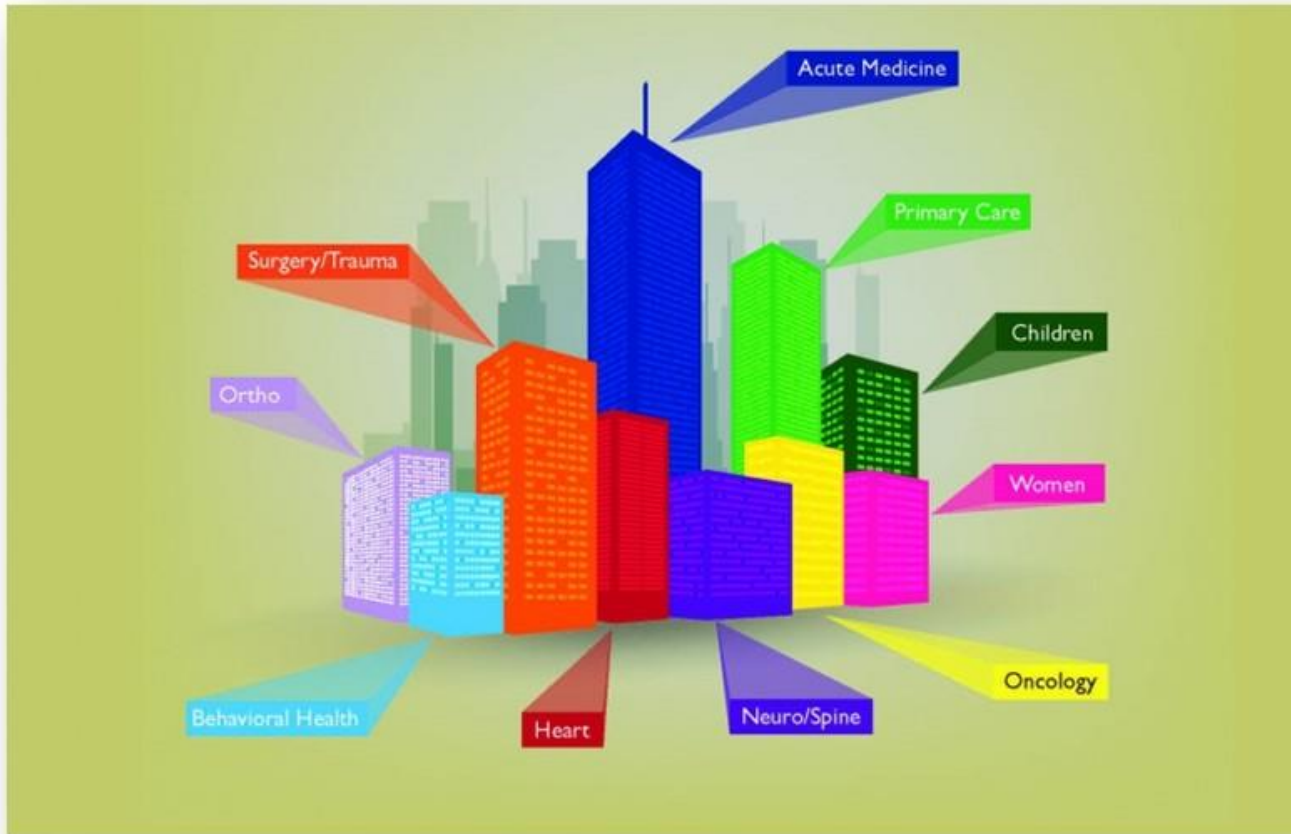
Population Health

Evidence-based Decisions

Clinical Programs



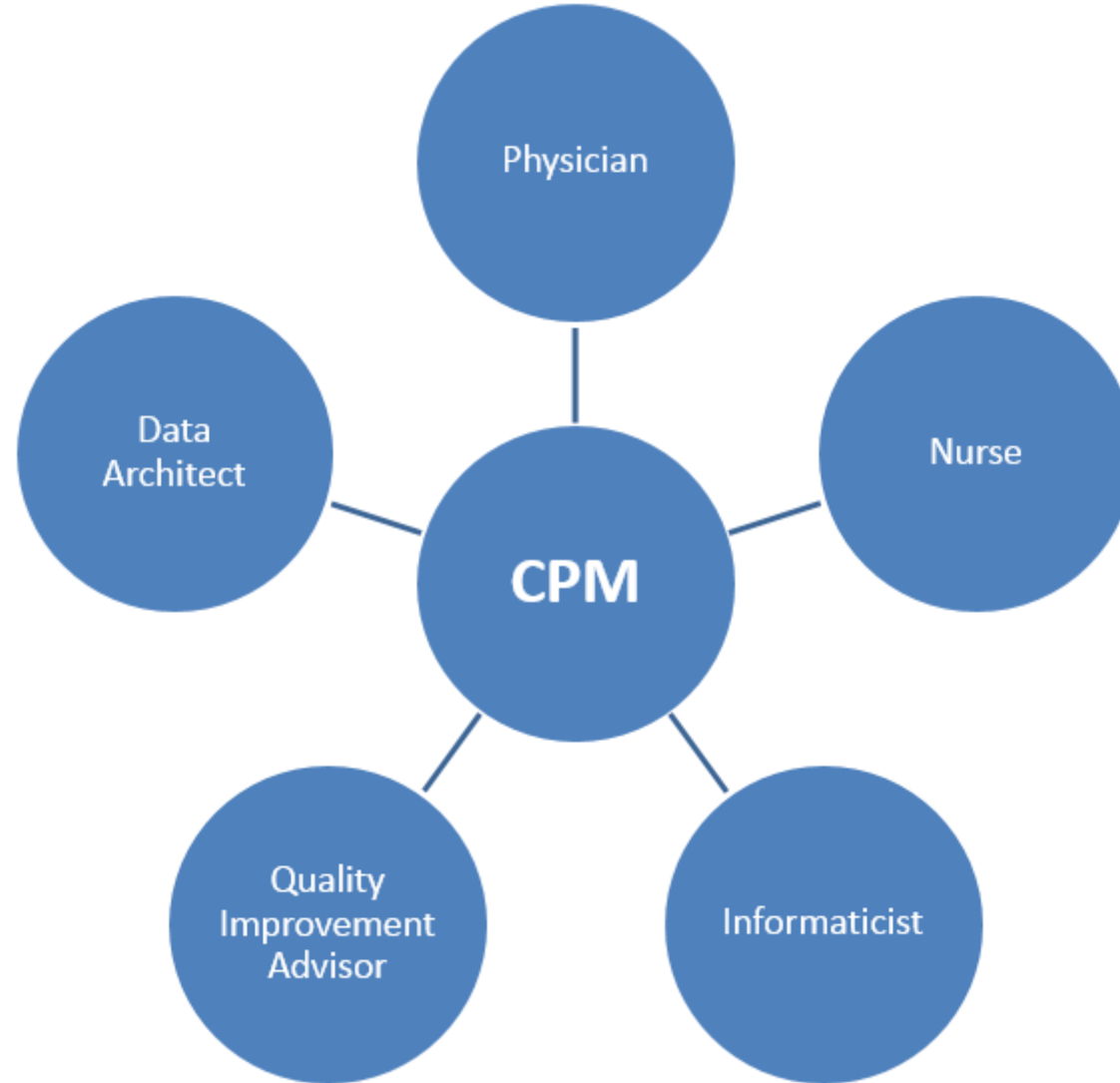
# Care Process Models



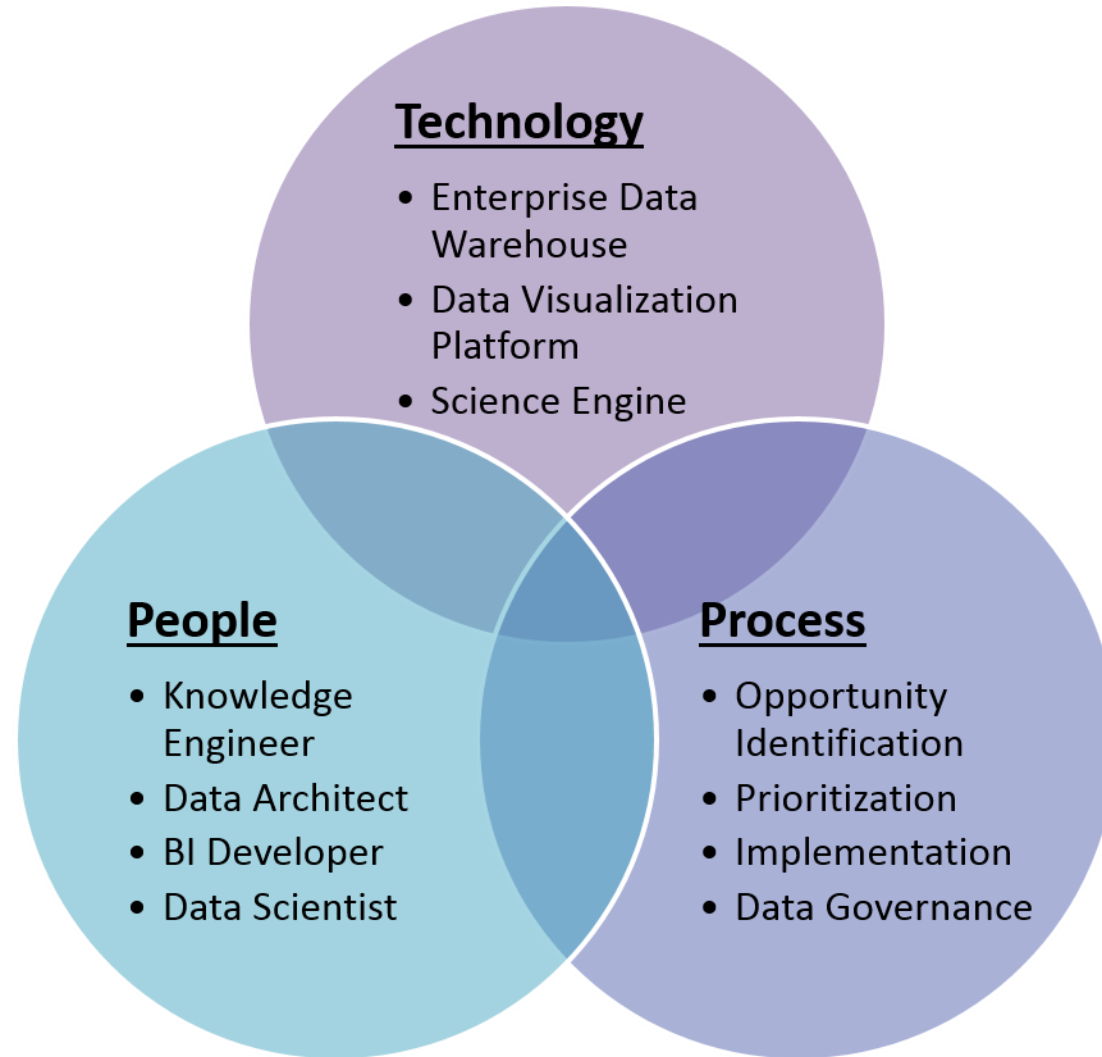
- Decision tree / algorithm of care
- Education for provider, patient, and family
- Hard-wire into the EHR workflow
- Key performance metrics



# CPM Core Team



# Mission Analytics





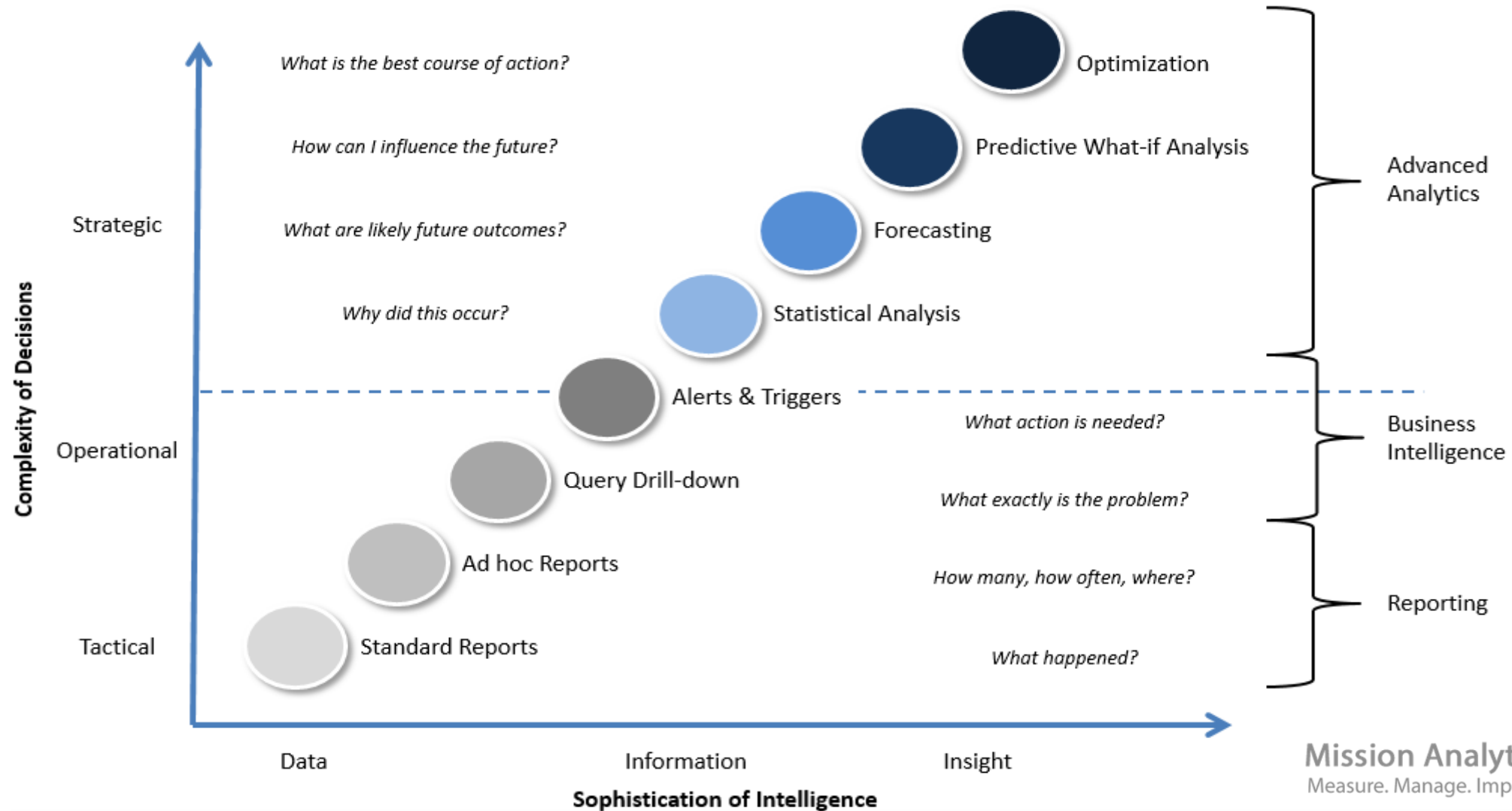
# Mission Analytics Vision

Where are we headed?

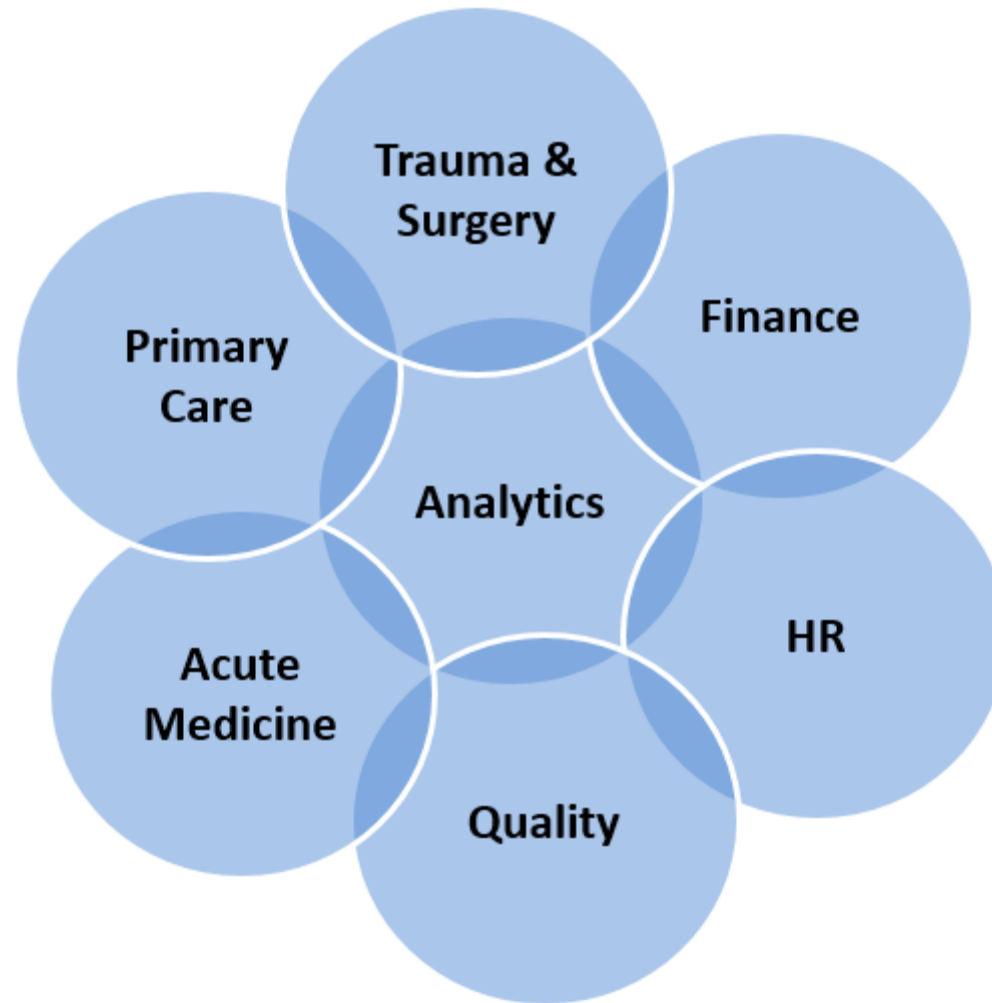
- Data accessibility & integrity
- Predictions
- Recommendations



# Functionality Sophistication



# Analytics Support Service



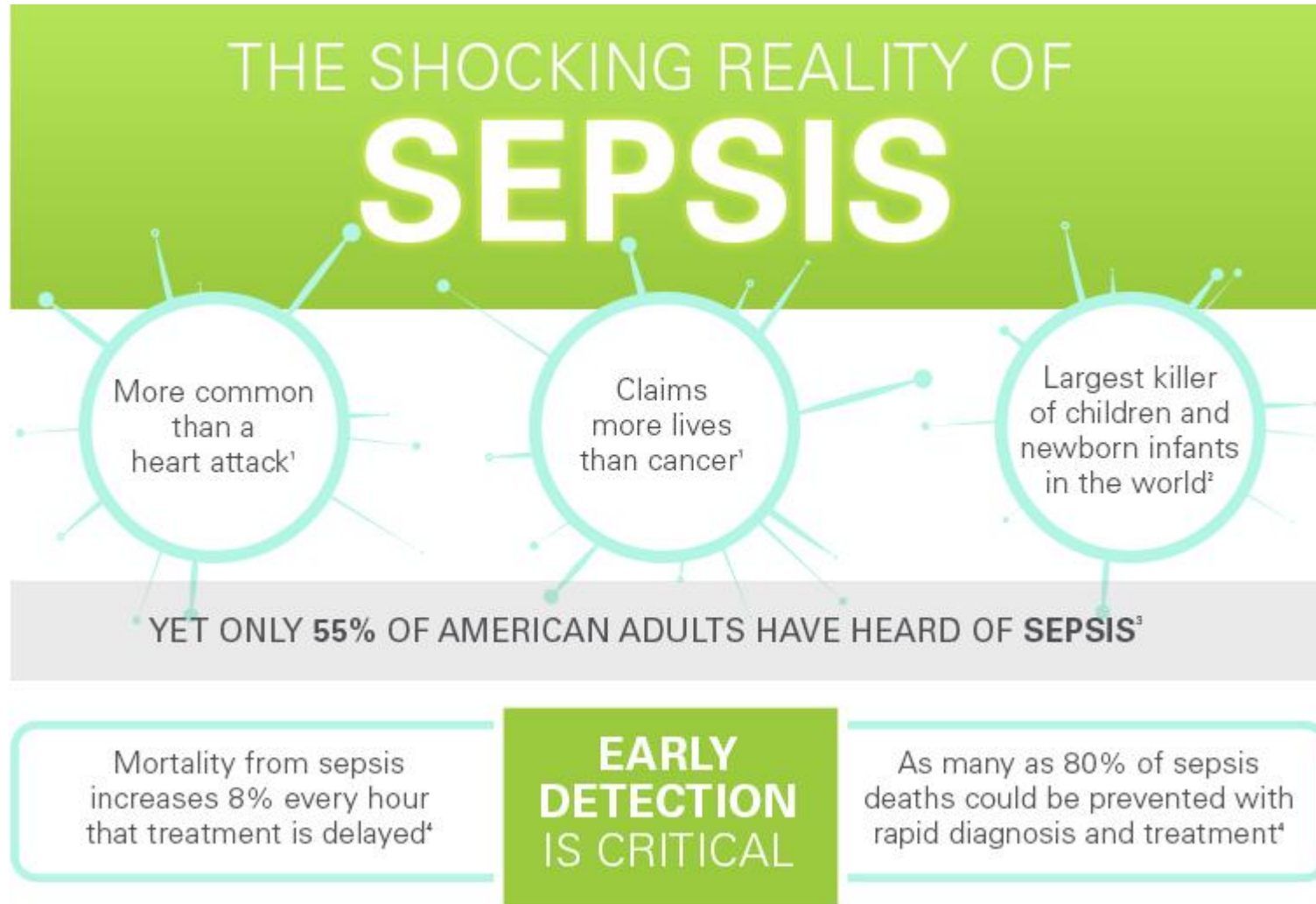
Mission has implemented several successful analytics tools to support decision-making for huge number of Physicians, care providers and senior leaders.

The most successful tool is the implementation of an

***“Advanced sepsis analytics application”***

# SEPSIS

A life-threatening complication of an infection.



# NEED FOR SEPSIS ADVANCED APPLICATION

Mission Health is actively involved in reducing sepsis mortality rates.

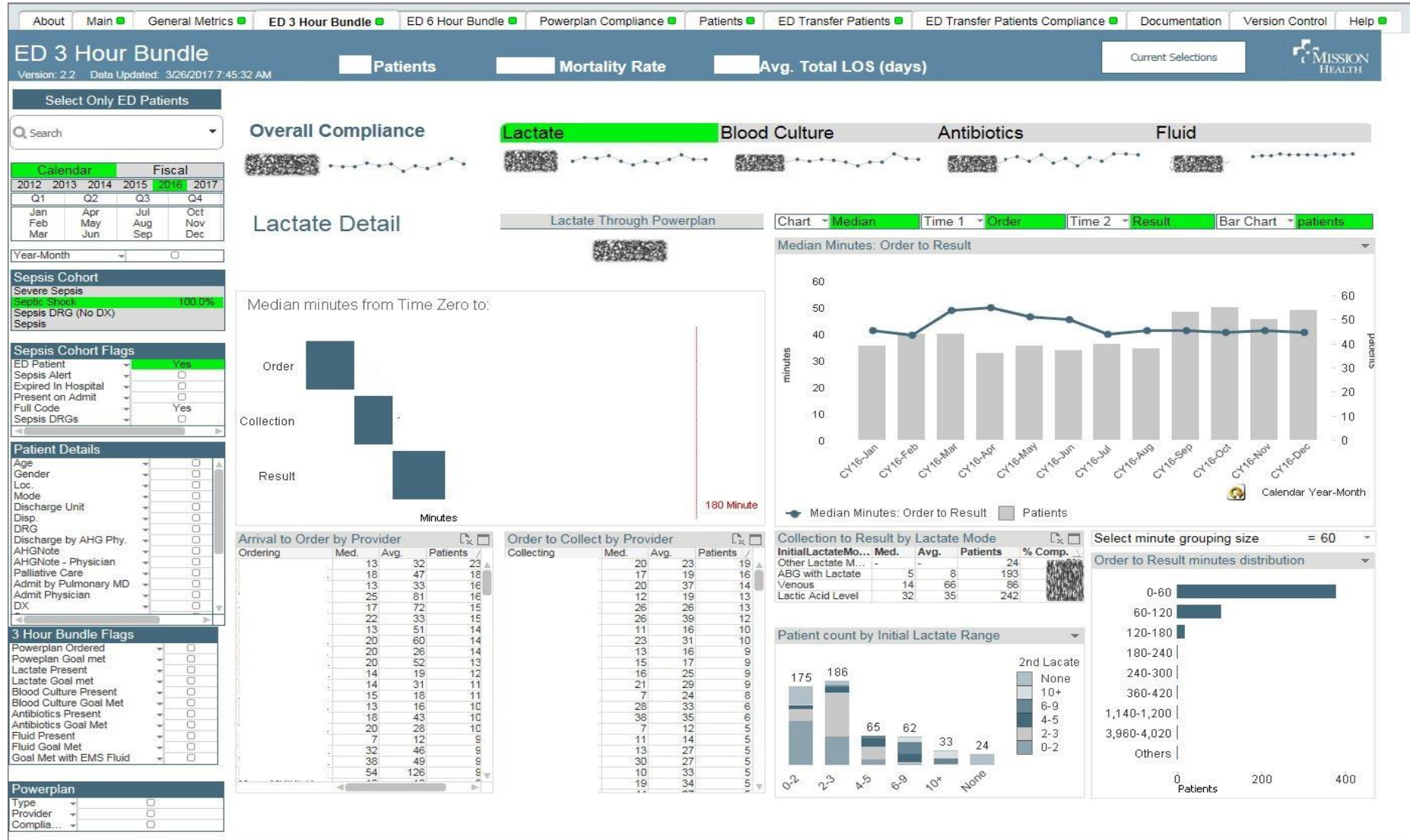
A care team coordinator spends roughly 15 hours a week reviewing charts, confirming sepsis diagnoses and tracking overall bundle compliance and individual compliance with each element of care—which included

- Fluid resuscitation;
- Lactate measurement;
- Antibiotic administration within 3 hours; and
- Blood cultures drawn prior to antibiotic administration

An algorithm built within Mission's electronic health record (EHR) continuously monitors patients for early signs of sepsis, and automatically alerts caregivers when a patient screens at-risk.

As there are multiple ways to measure and code for the condition's varying degrees of severity, Mission needed an effective way to combine ICD and DRG codes to accurately define and track the sepsis patient cohort

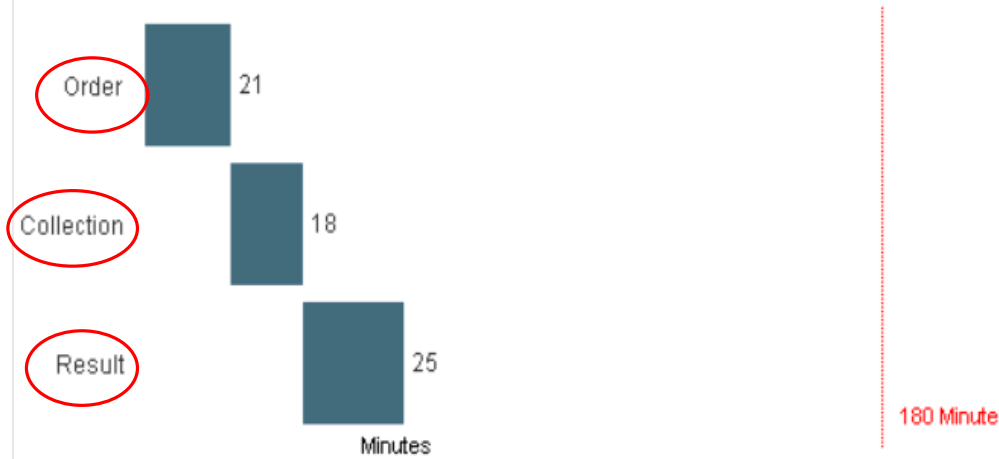
# DATA-DRIVEN INSIGHT : 3 – HOUR BUNDLE TAB



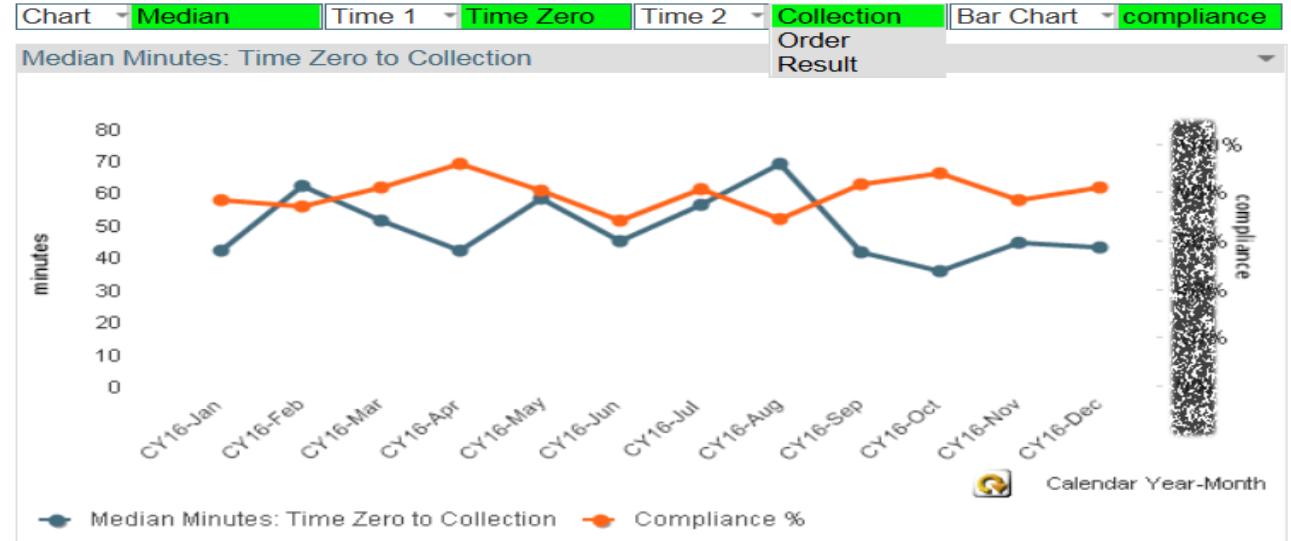
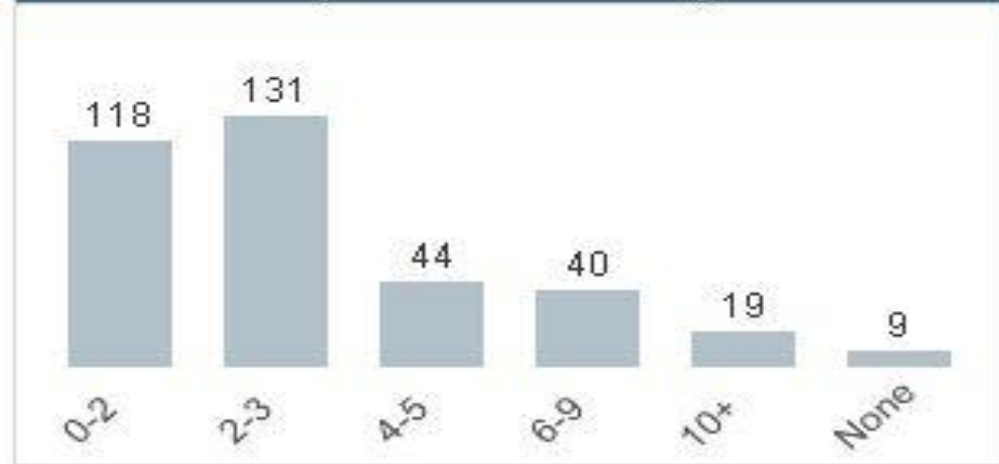


# 3-HOUR BUNDLE COMPLIANCE: SERUM LACTATE

Median minutes from Time Zero to:



Patient count by Initial Lactate Range



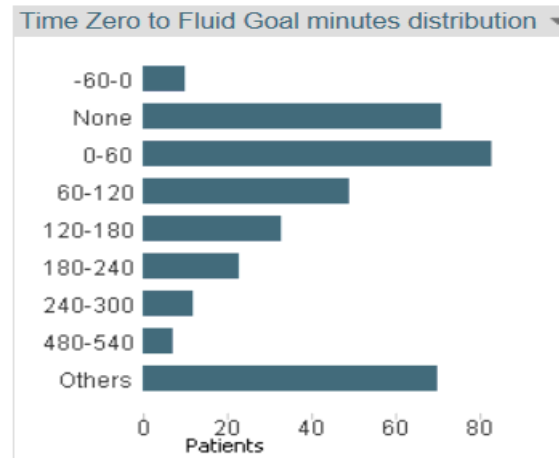
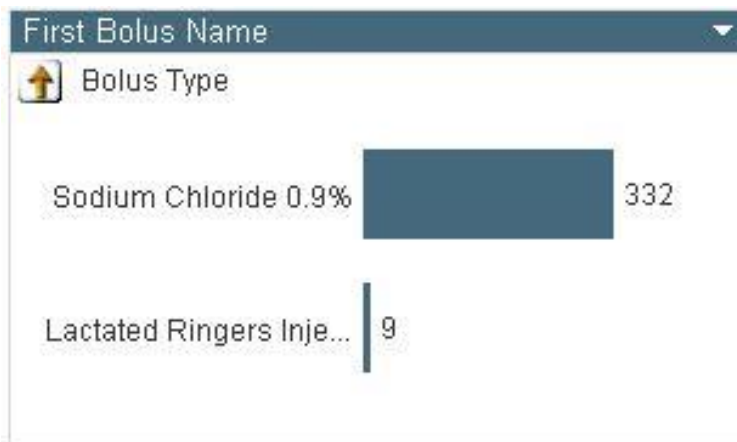
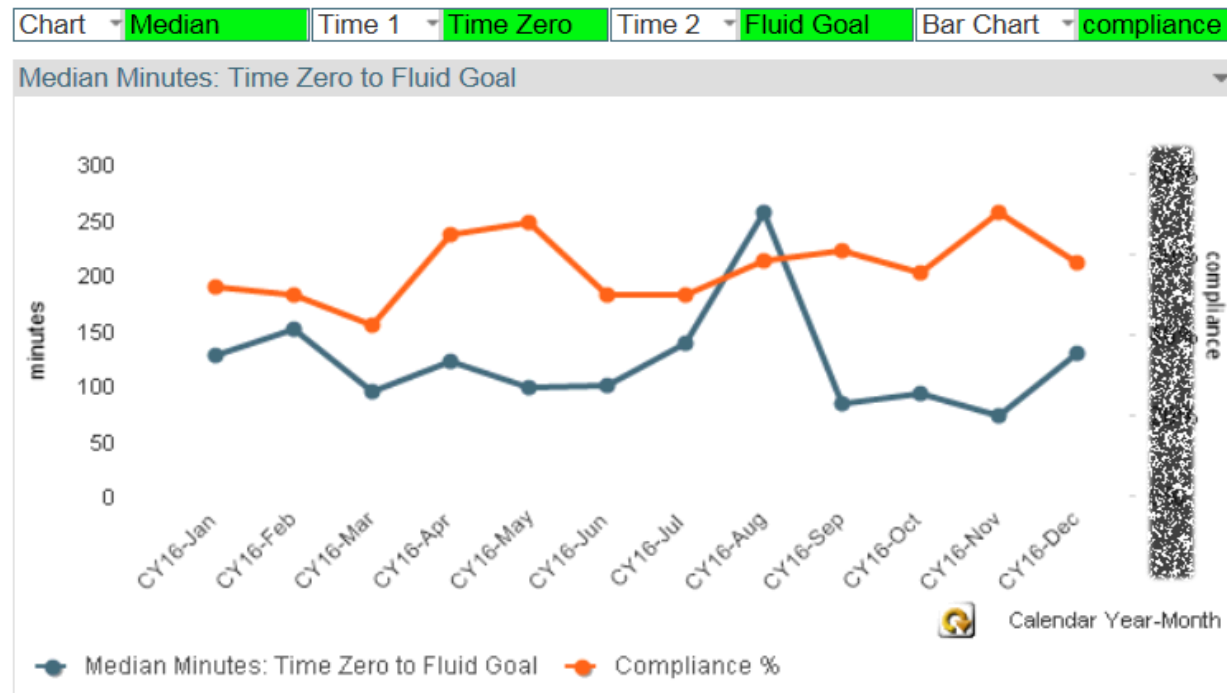
The lactate bundle table gives the user the ability to drill down into the different components of the process. PDSA cycles can then be generated for any particular process. This data is displayed via two different graphic designs.

- How many patients had an initial lactate of 0-2 and greater 4?
- Is lactate compliance lower at certain hours of the day?





# Fluid Goal Measures: Septic Shock Cohort



This tab gives the user the ability to examine median time from triage to fluid goal.

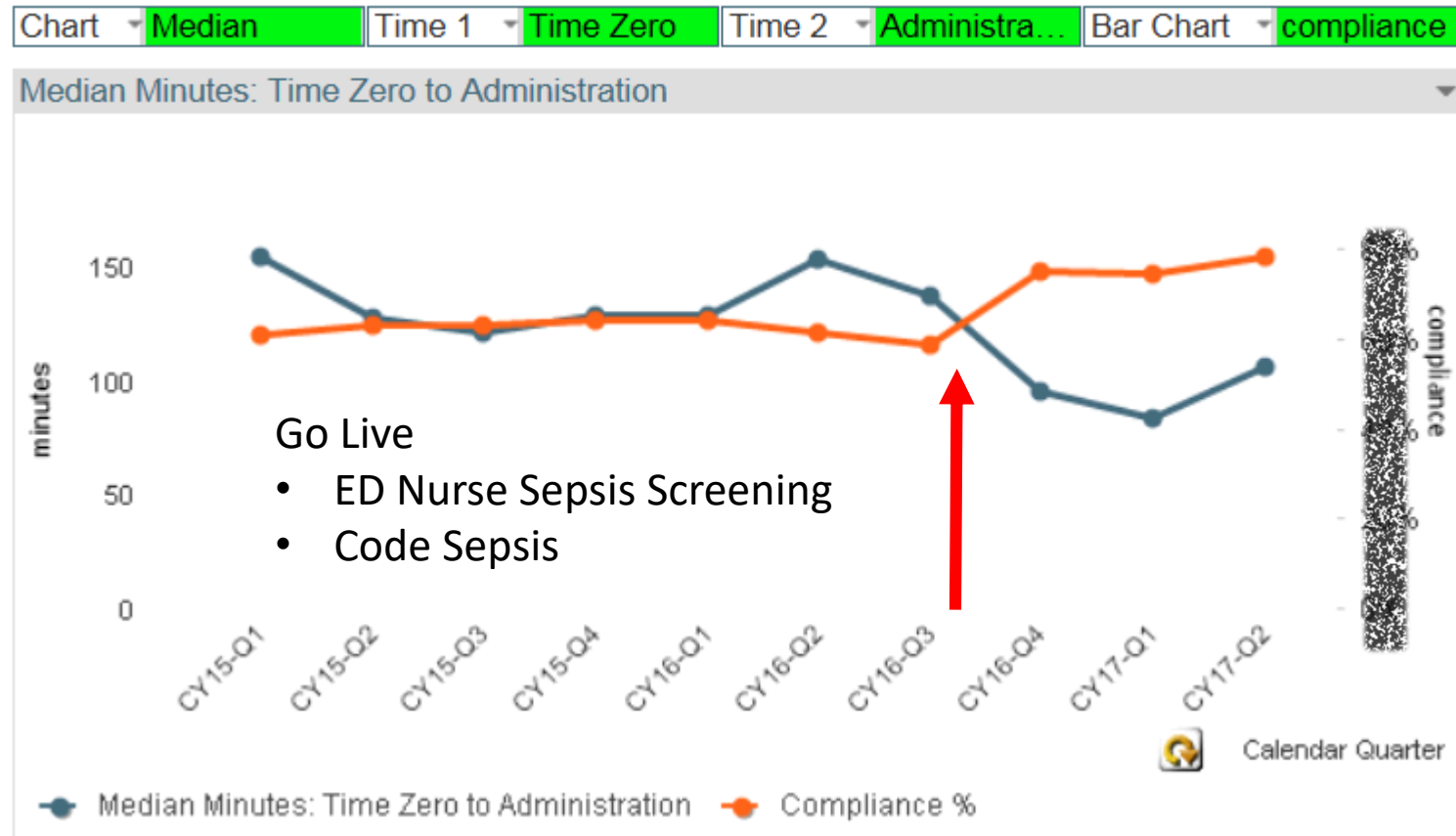
The *Time Zero to Fluid Goal* graph at the bottom right will help the sepsis team examine the number of patients that receive fluid by EMS prior to arrival and correlate that with outcome data.

- Jeanie Bollinger MSN,RN,  
ACCNS-AG, CCRN  
Clinical Nurse Specialist,  
Acute Medicine



# Mission Emergency Department - Antibiotic Bundle Compliance

## Severe Sepsis and Septic Shock Present on Admission



The advance sepsis application provides the data to measure PDSA cycles. The graph to the right represents the increase in compliance with the antibiotic bundle along with the median minutes from time zero to antibiotic administration before and after we incorporated nurse sepsis screening in the ED and a “Code Sepsis” process.

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Acute Medicine

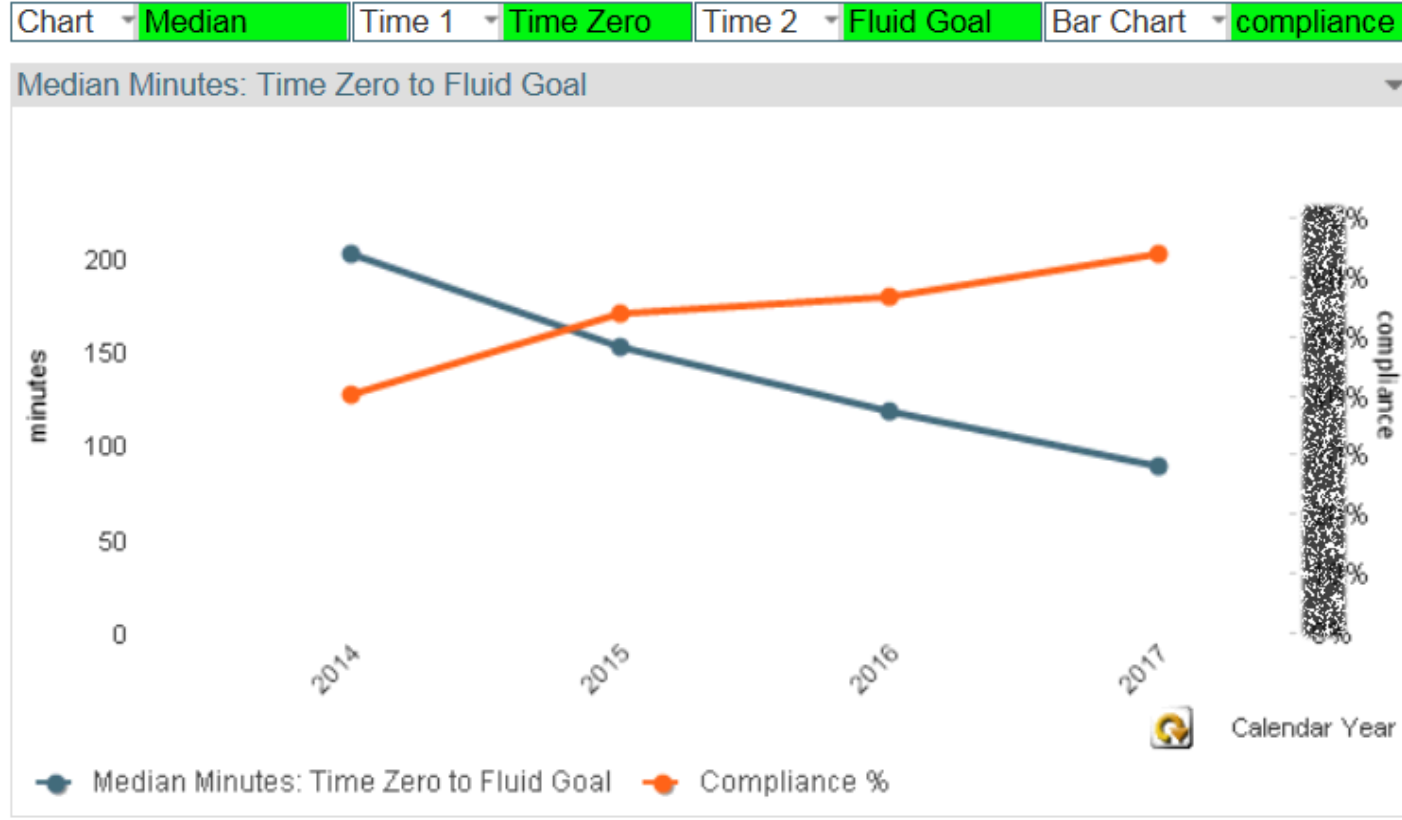


Mission Analytics  
Measure. Manage. Improve



# Mission Emergency Department - Fluid Bundle Compliance

## Septic Shock: Present on Admission



The Surviving Sepsis Campaign Guidelines recommends that 30 ml/kg be administered to patients that are hypotensive or have a LA >4mol/dl. The advance app gives me the ability to look at fluid compliance for the septic shock cohort.

In addition, the app gives the Sepsis CPM team the ability to view our success from “30,000 feet” thus celebrating our success with this difficult measure.

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ACCNS-AG, CCRN  
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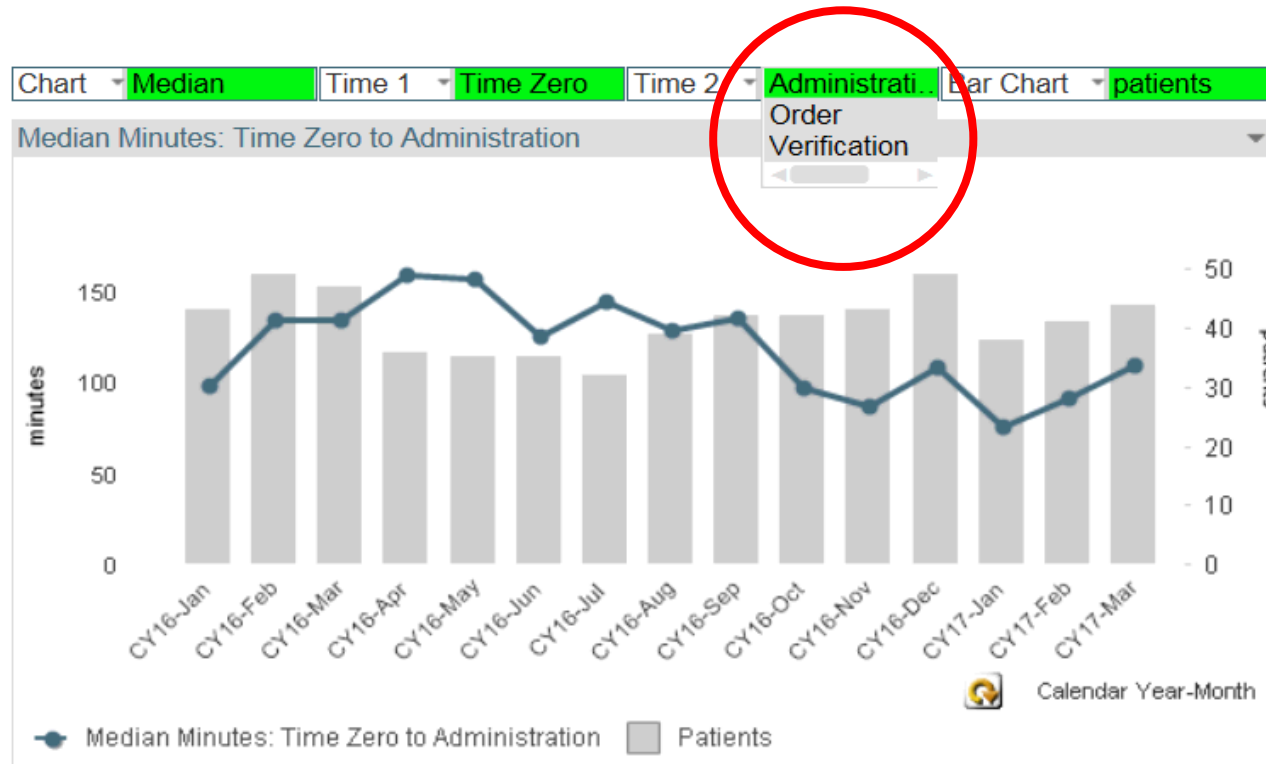




# Mission Emergency Department - Antibiotic Bundle Compliance

## Severe Sepsis and Septic Shock

### Present on Admission



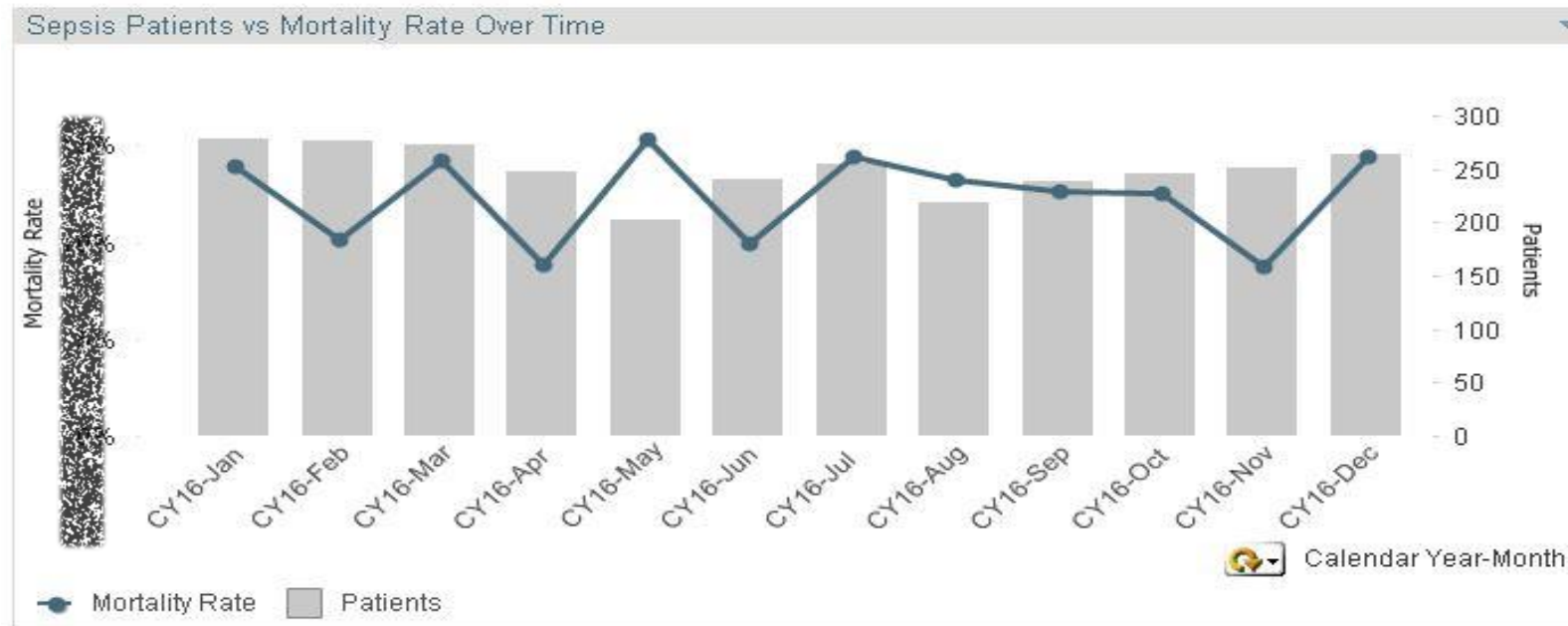
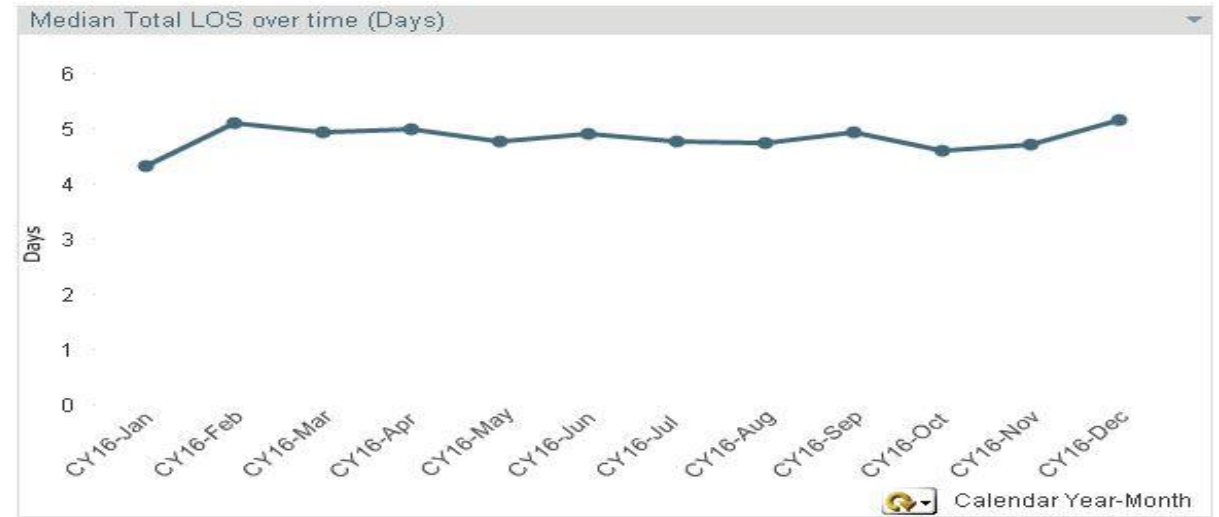
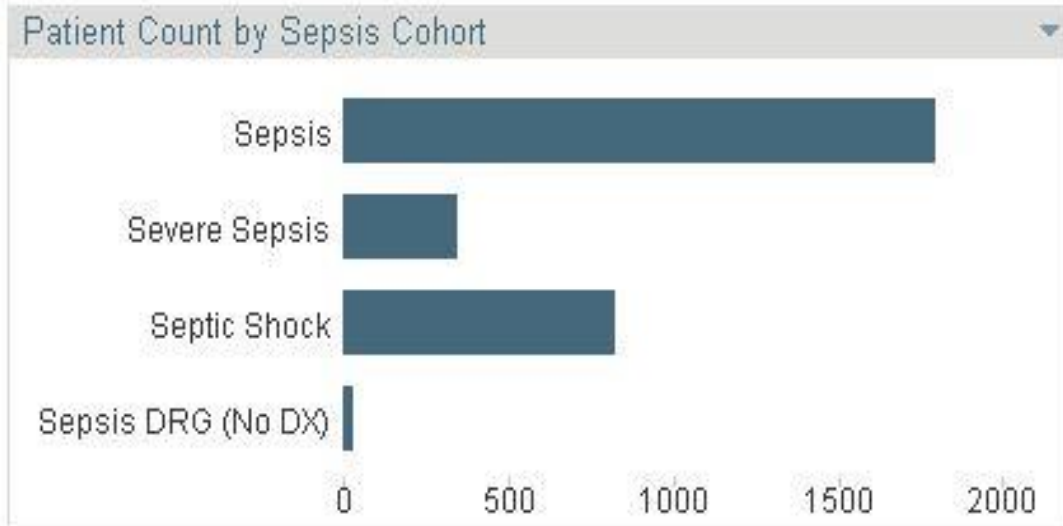
- Is there any delay in ordering the Antibiotics? or
- Did the pharmacist delay to verify treatment? or
- Did the nurse delay in administering the antibiotics?

The advance app gives the user the ability to drill down to a specific process for improvement. For example, antibiotic compliance can be segregated from time zero to time of order, time of pharmacy verification, or time from pharmacy verification to antibiotic administration. This data gives us the ability to target components of a process to remain nimble in our improvement efforts.

- Jeanie Bollinger MSN,RN,  
ACCNS-AG, CCRN  
Clinical Nurse Specialist,  
Acute Medicine



# Other General Metrics



# Filters in the dashboard

Calendar			Fiscal		
2012	2013	2014	2015	2016	2017
Q1		Q2	Q3		Q4
Jan		Apr	Jul		Oct
Feb		May	Aug		Nov
Mar		Jun	Sep		Dec

Year-Month  ☐

**Sepsis Cohort**

- Severe Sepsis
- Septic Shock
- Sepsis DRG (No DX)
- Sepsis

**Sepsis Cohort Flags**

ED Patient	<input type="checkbox"/>	<input type="checkbox"/>
Sepsis Alert	<input type="checkbox"/>	<input type="checkbox"/>
Expired In Hospital	<input type="checkbox"/>	<input type="checkbox"/>
Present on Admit	<input type="checkbox"/>	<input type="checkbox"/>
Full Code	<input type="checkbox"/>	<input type="checkbox"/>

**Patient Details**

Age	<input type="checkbox"/>	<input type="checkbox"/>
Gender	<input type="checkbox"/>	<input type="checkbox"/>
Loc.	<input type="checkbox"/>	<input type="checkbox"/>
Mode	<input type="checkbox"/>	<input type="checkbox"/>
Discharge Unit	<input type="checkbox"/>	<input type="checkbox"/>
Disp.	<input type="checkbox"/>	<input type="checkbox"/>
DRG	<input type="checkbox"/>	<input type="checkbox"/>
Discharge by AHG Phy.	<input type="checkbox"/>	<input type="checkbox"/>
AHGNote	<input type="checkbox"/>	<input type="checkbox"/>

**3 Hour Bundle Flags**

Powerplan Ordered	<input type="checkbox"/>	<input type="checkbox"/>
Poweplan Goal met	<input type="checkbox"/>	<input type="checkbox"/>
Lactate Present	<input type="checkbox"/>	<input type="checkbox"/>
Lactate Goal met	<input type="checkbox"/>	<input type="checkbox"/>
Blood Culture Present	<input type="checkbox"/>	<input type="checkbox"/>
Blood Culture Goal Met	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics Present	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics Goal Met	<input type="checkbox"/>	<input type="checkbox"/>

**Alerts with Description**

Type	<input type="checkbox"/>	<input type="checkbox"/>
Alert	<input type="checkbox"/>	<input type="checkbox"/>
Location	<input type="checkbox"/>	<input type="checkbox"/>

**Alerts**

PositiveNurseScreen	<input type="checkbox"/>	<input type="checkbox"/>
qSOFA Alert	<input type="checkbox"/>	<input type="checkbox"/>
Code Sepsis	<input type="checkbox"/>	<input type="checkbox"/>

**CRRT & Vent powerplan**

CRRT PowerplanRenal ...	<input type="checkbox"/>	<input type="checkbox"/>
RC Respiratory Adult Vent...	<input type="checkbox"/>	<input type="checkbox"/>

**Other Diagnosis**

ESRD Present	<input type="checkbox"/>	<input type="checkbox"/>
ESRD PresentOnAdmit	<input type="checkbox"/>	<input type="checkbox"/>
CHF Present	<input type="checkbox"/>	<input type="checkbox"/>
CHF PresentOnAdmit	<input type="checkbox"/>	<input type="checkbox"/>
Pulmonary Edema Present	<input type="checkbox"/>	<input type="checkbox"/>
Pul.Edema PresentOnAdmit	<input type="checkbox"/>	<input type="checkbox"/>



# What's next?

Mission is in the midst of an even broader rollout of the sepsis application. As physicians begin to use the tool to track and access their performance and compliance to the bundle, sepsis patient outcomes are expected to improve even further.

- 6-hour sepsis bundle
- Inpatient tab to improve care for in-hospital patients



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