Quality Reporting and Management: Closing the Reporting Gap

Cottage Health

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Learning Objectives

- Describe effective strategies to identify trends in quality reporting data.
- Discuss the creation of dashboards for specific core measures that can be used to implement meaningful process improvements.

Background

Core measure data is expensive to collect and often difficult to report, analyze and use to drive improvement. To better understand how sepsis bundle compliance affects patient mortality, readmissions and length of stay and to implement meaningful process improvements, we created interactive dashboards that tie together quality and patient-level data. These dashboards allow all core measure results to be reported monthly and easily aggregated/disaggregated to identify trends. By linking patient demographics to core measures, we can also look for potential health care disparities by language or ethnicity.

Problem

1. **Delay between when core measures data are internally available and reported to the clinical database.**

2. **Patient level data elements are not available in the clinical database.**
   - Language
   - Order set utilization
   - Sepsis bundle element failure points

Solution

To receive more timely data with these value-added data elements, three data streams were combined into a singular data model via an encounter specific key.

| Clinical Database Download	Quality Reporting Software	EHR

Figure 1. displays how the Clinical Database Download, Quality Reporting Software, and EHR tables are joined. This model was created with data visualization software that publishes final reports on a secure server.

Fig 1. Data Model
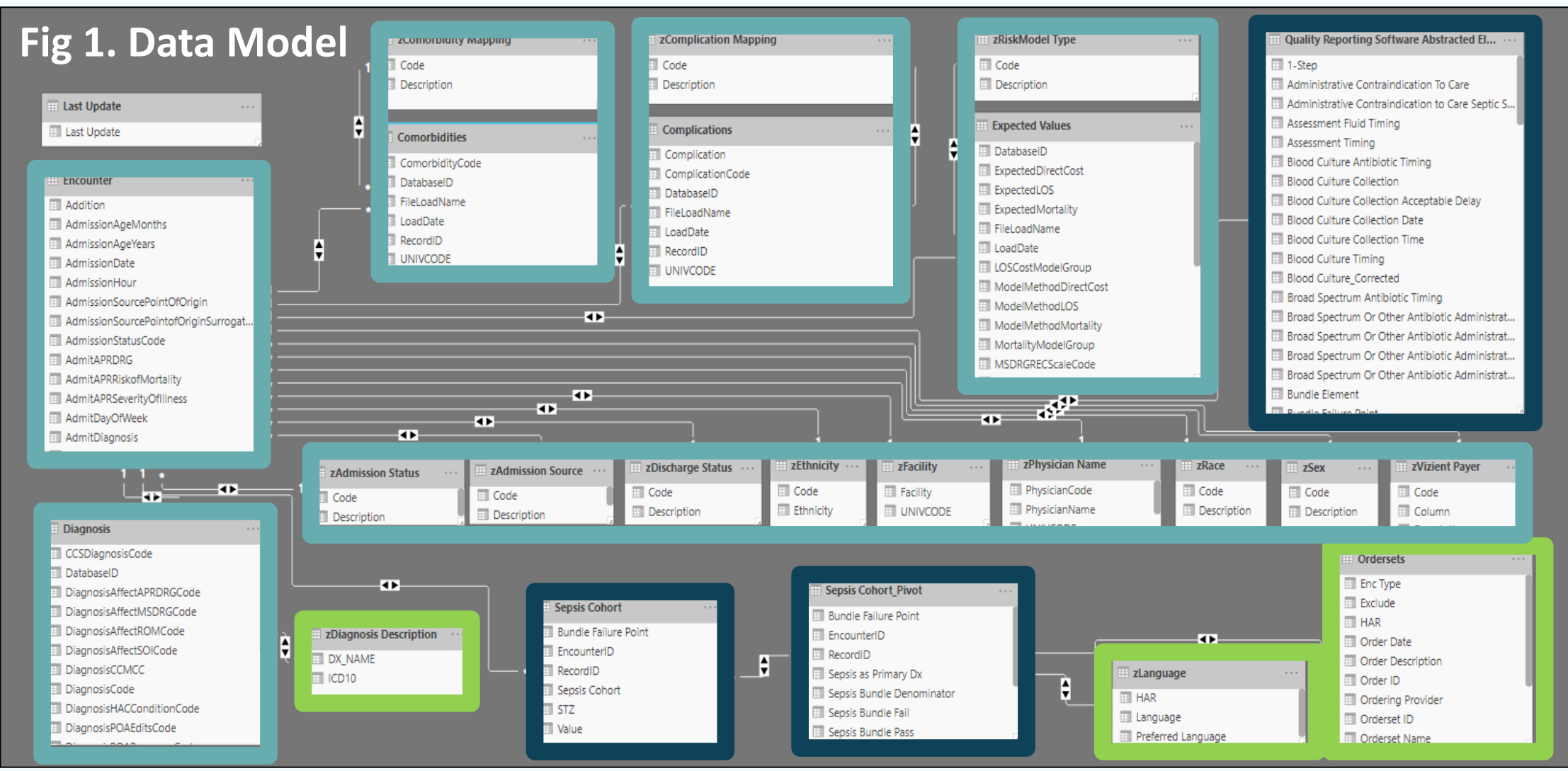
Use Case: Sepsis Bundle Compliance

- **Visualizing sepsis outcomes** (Figure 2): Sepsis patients were divided into cohorts based on diagnostic and chart abstracted core measure criteria. The interactive dashboard demonstrates how each cohort has differing outcomes of care which can be trended over time. The filters allow for selection of facility, age groups, discharge dates, and Vizient risk model.
- **Compliance data** (Figure 3): Used to monitor compliance of individual sepsis bundle element. This data is abstracted and managed using Quality Reporting Software and then exported to be used in subsequent data models on a regular refresh interval. Abstracted data is then joined to patient outcomes data for additional analysis.
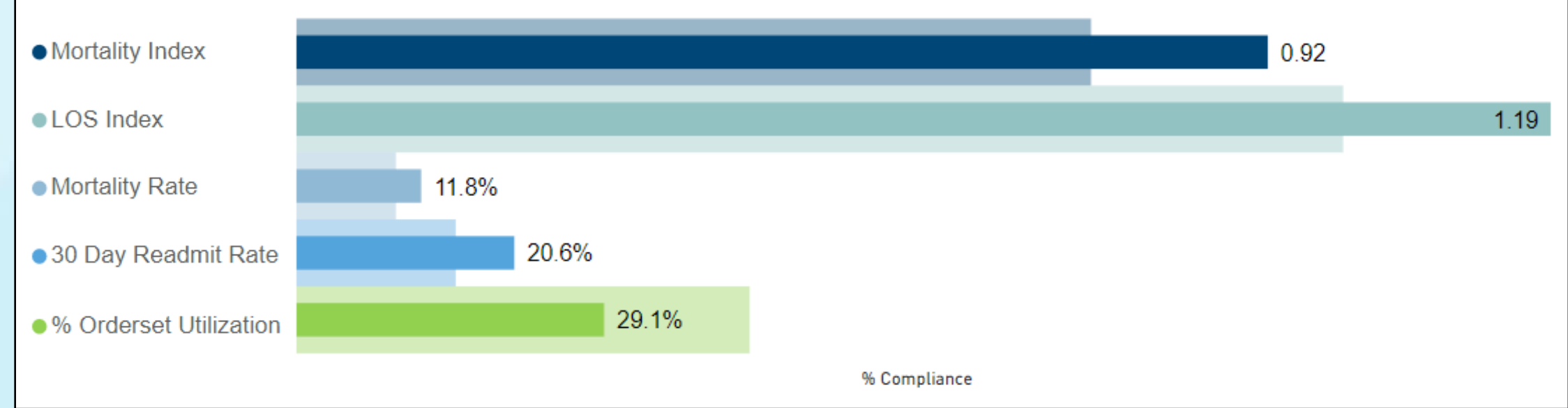
Fig 2. Sepsis Outcomes Dashboard
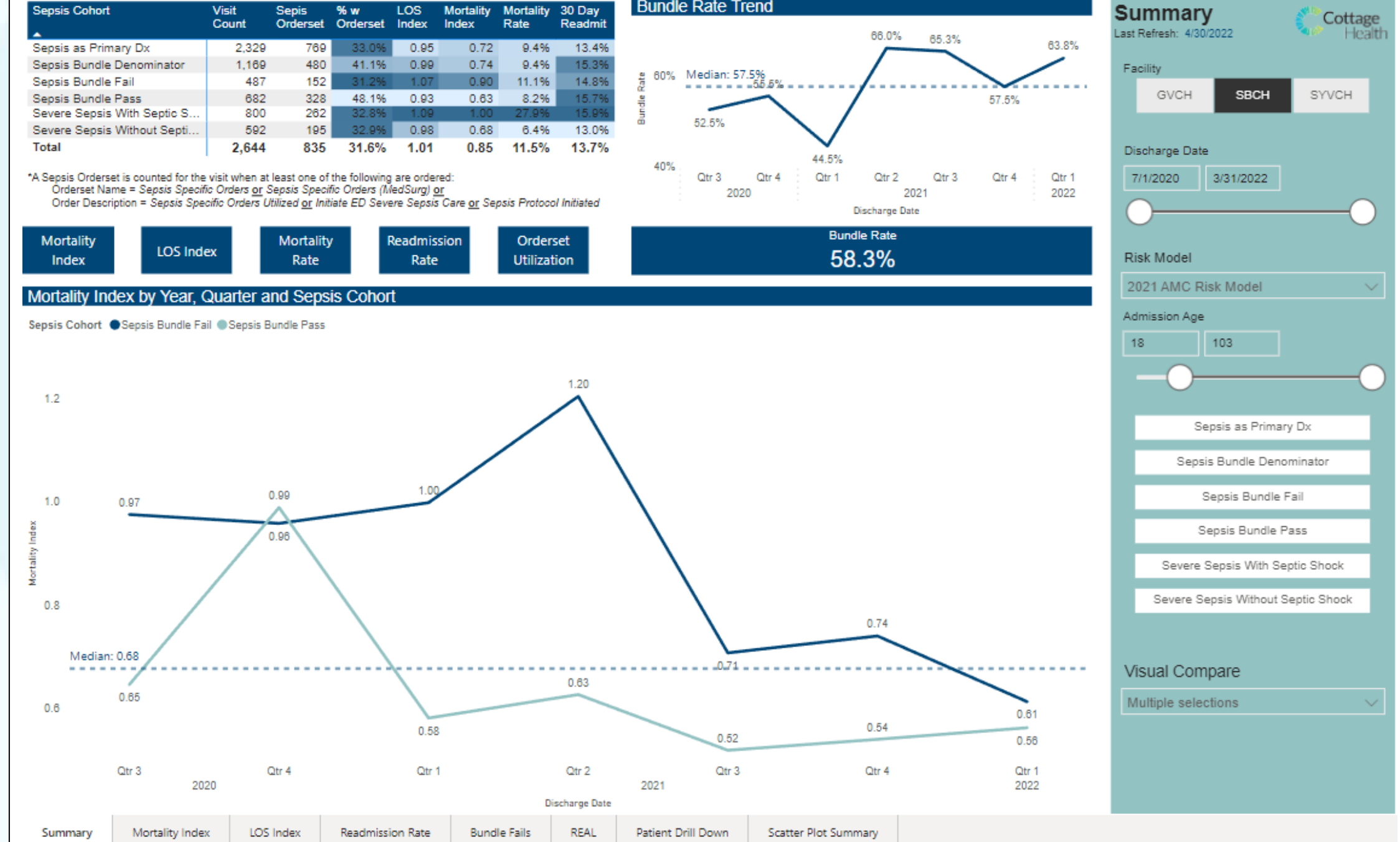
Fig 3. Sepsis Bundle Compliance by Bundle Element
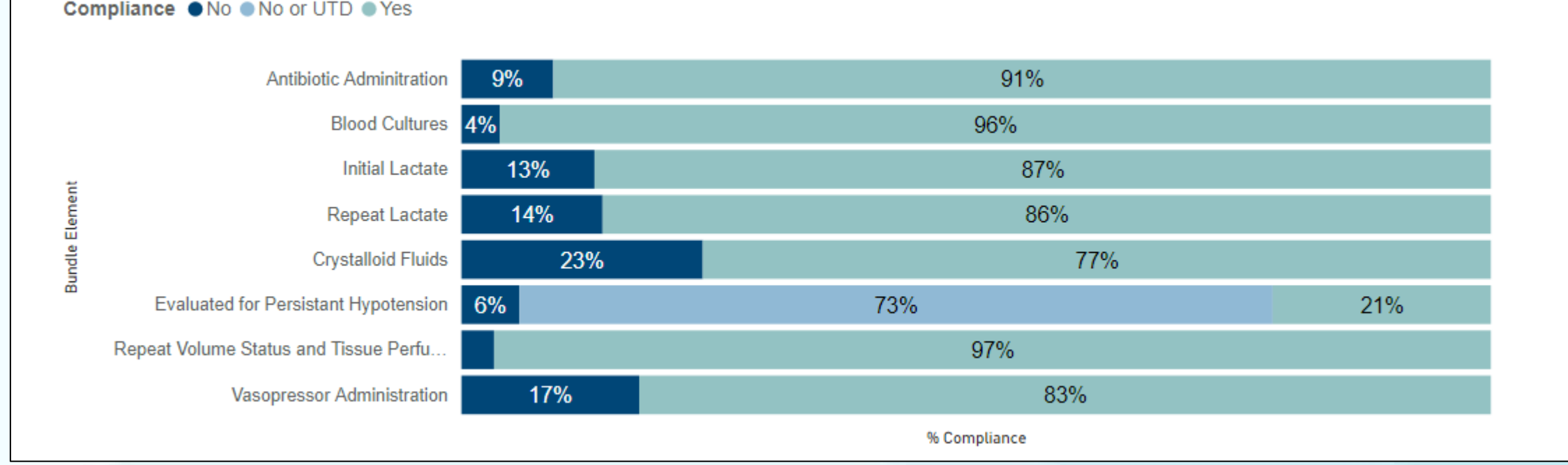
Analysis: Sepsis Bundle Compliance

- **Additional analysis** (Figure 4): When analyzing appropriate antibiotic administration, only 9% of cases failed, however patient outcomes are notably worse for the patients who failed this step compared to the denominator population. Non-highlighted bars are the denominator population outcomes.

Fig 4. Outcomes for patients who failed antibiotic administration

Mortality Index	0.92
LOS Index	1.19
Mortality Rate	11.8%
30 Day Readmit Rate	20.6%
% Orderset Utilization	29.1%

Discussion:

- All core measures data can be joined to additional data sources in a similar fashion as the sepsis data. Identification of healthcare disparities across all core measures is readily available. Rates by ethnicity and language are accurately represented on a consistent refresh. (Figures 5 and 6).
- Easier to demonstrate complex measures to key stakeholders and senior executives.
- Outcomes data presented to clinical leaders to encourage physician best practice behavior.

Fig 5. SEP-1 Rate By Ethnicity
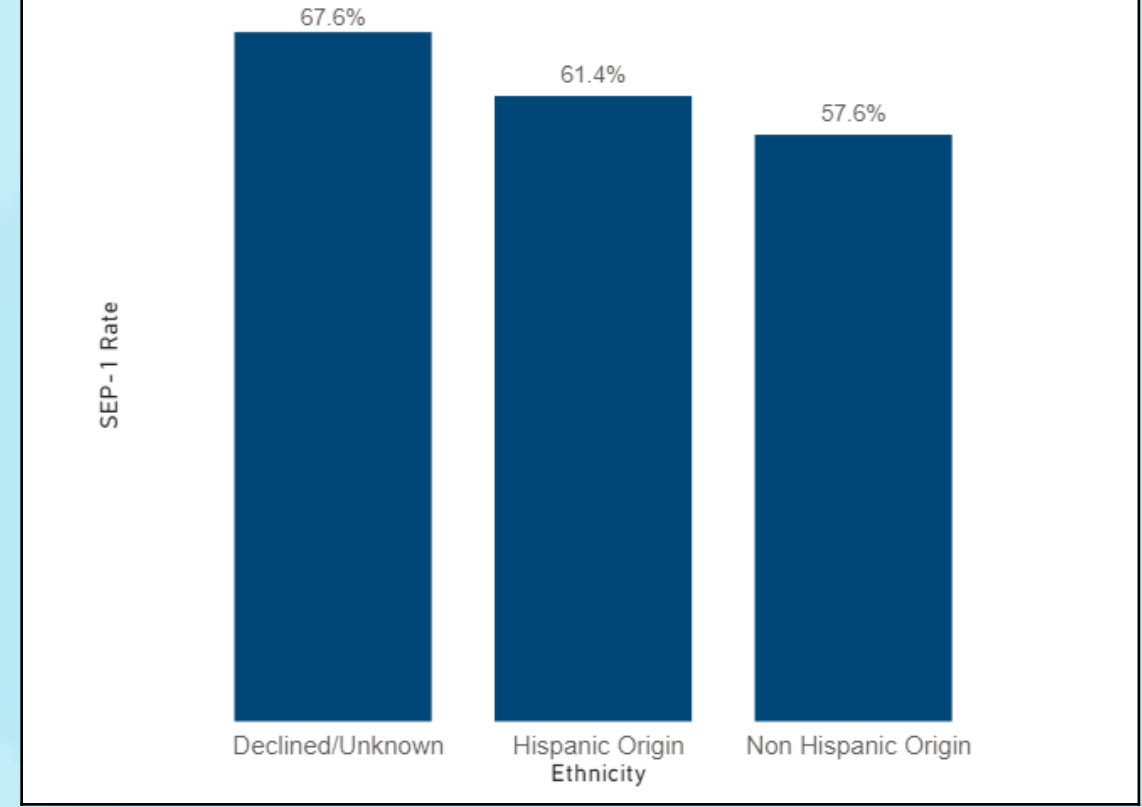
Fig 6. SEP-1 Rate By Language

Contact Information

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Data Model

zComorbidity Mapping ...
- Code
- Description

zComplication Mapping ...
- Code
- Description

zRiskModel Type ...
- Code
- Description

Quality Reporting Software Abstracted El... ...
- 1-Step
- Administrative Contraindication To Care
- Administrative Contraindication to Care Septic S...
- Assessment Fluid Timing
- Assessment Timing
- Blood Culture Antibiotic Timing
- Blood Culture Collection
- Blood Culture Collection Acceptable Delay
- Blood Culture Collection Date
- Blood Culture Collection Time
- Blood Culture Timing
- Blood Culture_Corrected
- Broad Spectrum Antibiotic Timing
- Broad Spectrum Or Other Antibiotic Administrat...
- Broad Spectrum Or Other Antibiotic Administrat...
- Broad Spectrum Or Other Antibiotic Administrat...
- Broad Spectrum Or Other Antibiotic Administrat...
- Bundle Element
- Bundle Failure Point

Last Update ...
- Last Update

Comorbidities ...
- ComorbidityCode
- DatabaseID
- FileLoadName
- LoadDate
- RecordID
- UNIVCODE

Complications ...
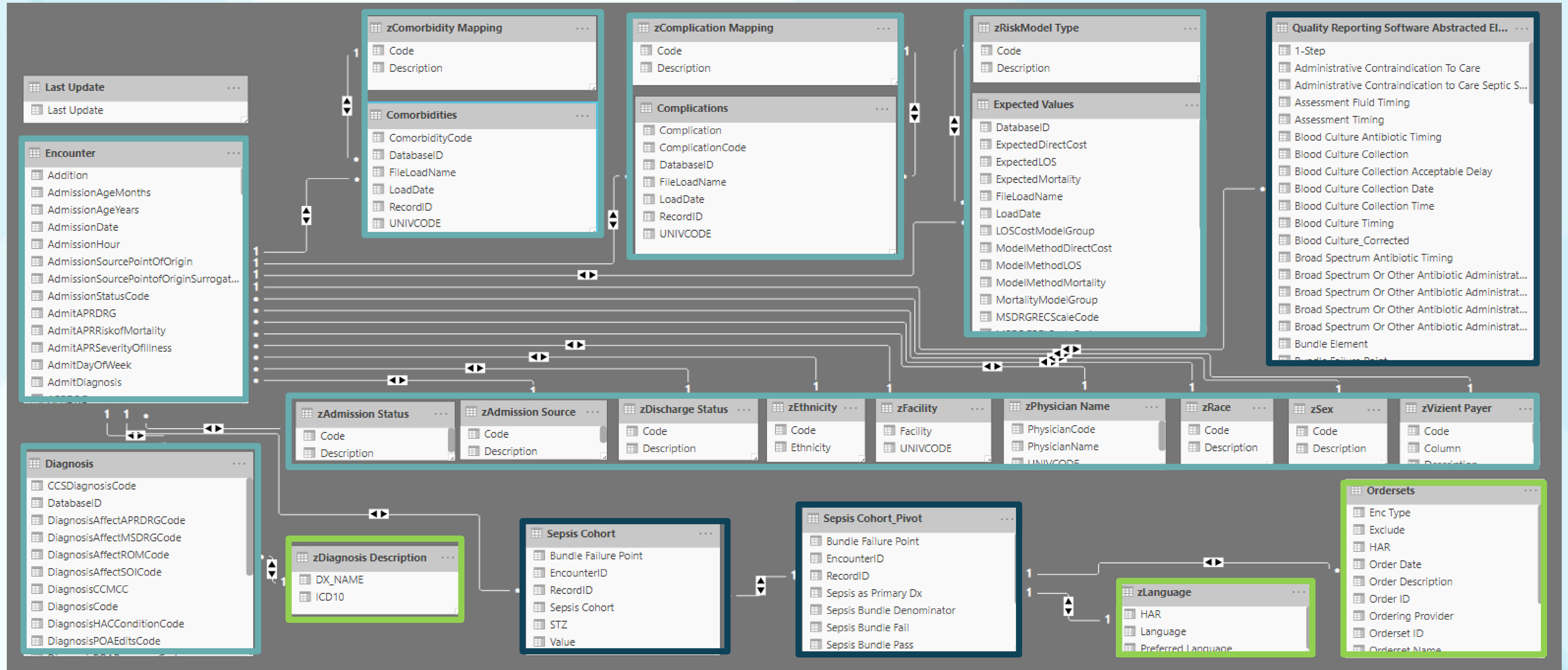- Complication
- ComplicationCode
- DatabaseID
- FileLoadName
- LoadDate
- RecordID
- UNIVCODE

Expected Values ...
- DatabaseID
- ExpectedDirectCost
- ExpectedLOS
- ExpectedMortality
- FileLoadName
- LoadDate
- LOSCostModelGroup
- ModelMethodDirectCost
- ModelMethodLOS
- ModelMethodMortality
- MortalityModelGroup
- MSDRGRECScaleCode

Encounter ...
- Addition
- AdmissionAgeMonths
- AdmissionAgeYears
- AdmissionDate
- AdmissionHour
- AdmissionSourcePointOfOrigin
- AdmissionSourcePointofOriginSurrogat...
- AdmissionStatusCode
- AdmitAPRDRG
- AdmitAPRRiskofMortality
- AdmitAPRSeverityOfIllness
- AdmitDayOfWeek
- AdmitDiagnosis

zAdmission Status ...
- Code
- Description

zAdmission Source ...
- Code
- Description

zDischarge Status ...
- Code
- Description

zEthnicity ...
- Code
- Ethnicity

zFacility ...
- Facility
- UNIVCODE

zPhysician Name ...
- PhysicianCode
- PhysicianName
- UNIVCODE

zRace ...
- Code
- Description

zSex ...
- Code
- Description

zVizient Payer ...
- Code
- Column
- Description

Diagnosis ...
- CCSDiagnosisCode
- DatabaseID
- DiagnosisAffectAPRDRGCode
- DiagnosisAffectMSDRGCode
- DiagnosisAffectROMCode
- DiagnosisAffectSOICode
- DiagnosisCCMCC
- DiagnosisCode
- DiagnosisHACConditionCode
- DiagnosisPOAEditsCode

zDiagnosis Description ...
- DX_NAME
- ICD10

Sepsis Cohort ...
- Bundle Failure Point
- EncounterID
- RecordID
- Sepsis Cohort
- STZ
- Value

Sepsis Cohort_Pivot ...
- Bundle Failure Point
- EncounterID
- RecordID
- Sepsis as Primary Dx
- Sepsis Bundle Denominator
- Sepsis Bundle Fail
- Sepsis Bundle Pass

zLanguage ...
- HAR
- Language
- Preferred Language

Ordersets ...
- Enc Type
- Exclude
- HAR
- Order Date
- Order Description
- Order ID
- Ordering Provider
- Orderset ID
- Orderset Name

Clinical Database Download

Quality Reporting Software

EHR

Sepsis Outcomes Dashboard

Sepsis Cohort	Visit Count	Sepis Orderset	% w Orderset	LOS Index	Mortality Index	Mortality Rate	30 Day Readmit
Sepsis as Primary Dx	2,329	769	33.0%	0.95	0.72	9.4%	13.4%
Sepsis Bundle Denominator	1,169	480	41.1%	0.99	0.74	9.4%	15.3%
Sepsis Bundle Fail	487	152	31.2%	1.07	0.90	11.1%	14.8%
Sepsis Bundle Pass	682	328	48.1%	0.93	0.63	8.2%	15.7%
Severe Sepsis With Septic S...	800	262	32.8%	1.09	1.00	27.9%	15.9%
Severe Sepsis Without Septi...	592	195	32.9%	0.98	0.68	6.4%	13.0%
Total	**2,644**	**835**	**31.6%**	**1.01**	**0.85**	**11.5%**	**13.7%**

*A Sepsis Orderset is counted for the visit when at least one of the following are ordered:
  Orderset Name = *Sepsis Specific Orders* or *Sepsis Specific Orders (MedSurg)* or
  Order Description = *Sepsis Specific Orders Utilized* or *Initiate ED Severe Sepsis Care* or *Sepsis Protocol Initiated*
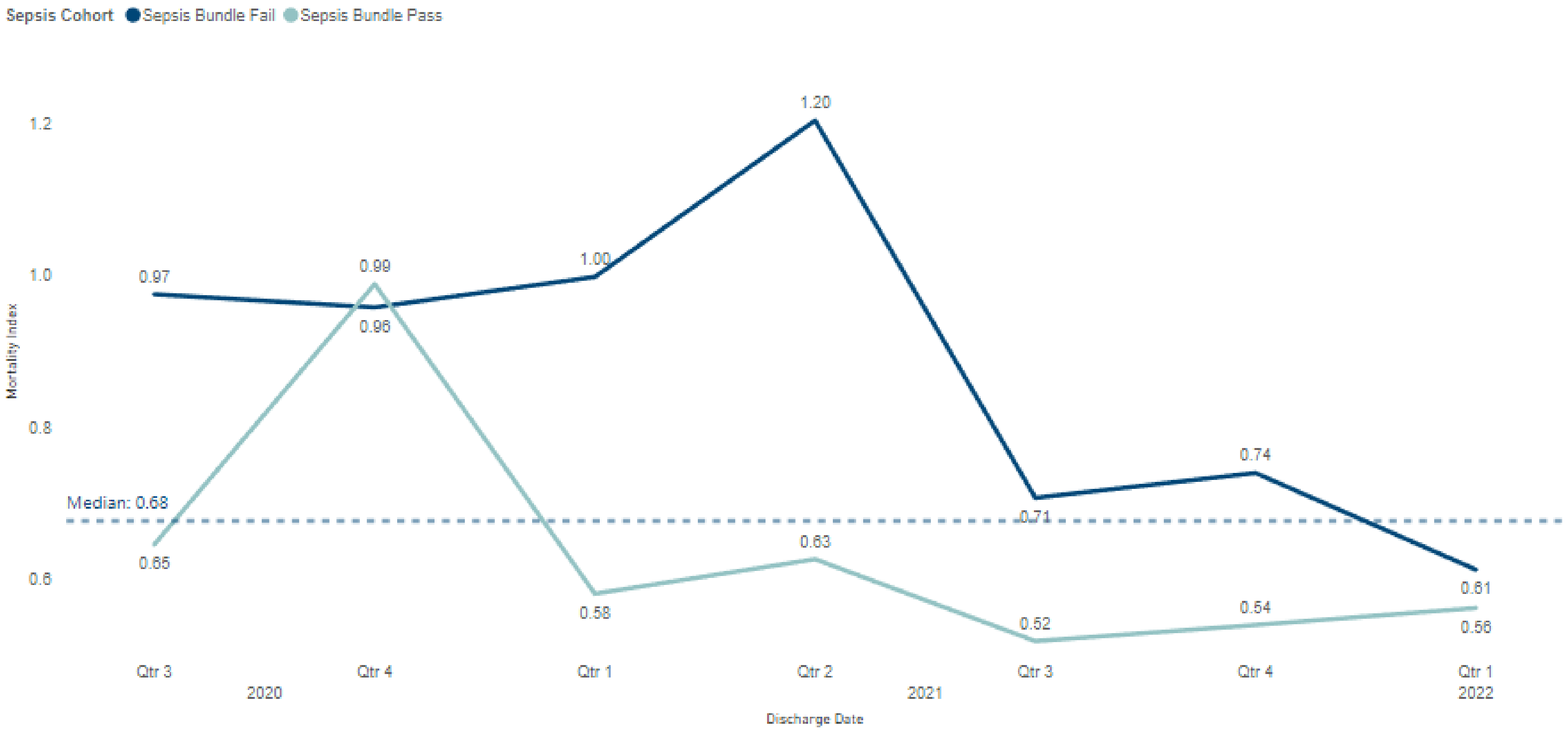
Mortality Index	LOS Index	Mortality Rate	Readmission Rate	Orderset Utilization

Bundle Rate Trend
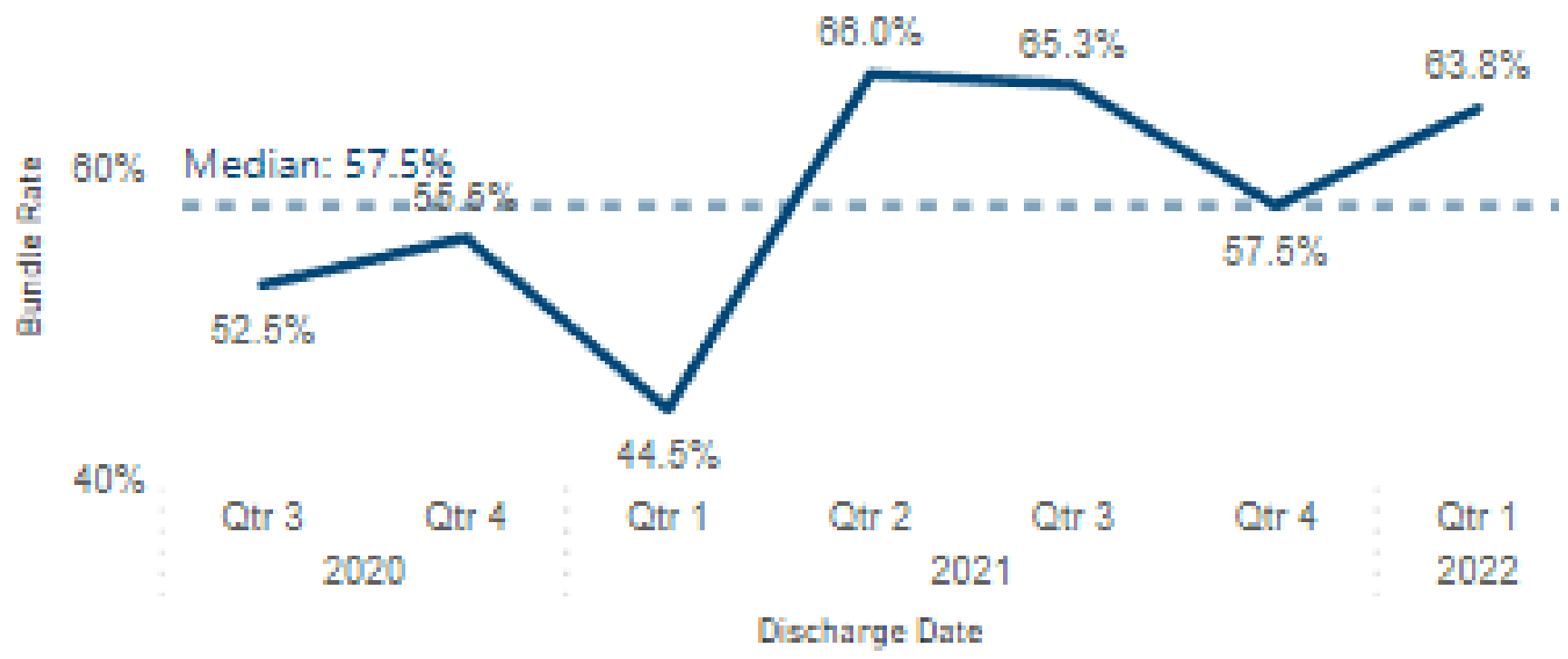
Bundle Rate
58.3%

Mortality Index by Year, Quarter and Sepsis Cohort

Sepsis Cohort ● Sepsis Bundle Fail ● Sepsis Bundle Pass

Summary
Last Refresh: 4/30/2022

Cottage Health

Facility

GVCH	**SBCH**	SYVCH

Discharge Date

7/1/2020	3/31/2022

Risk Model

2021 AMC Risk Model

Admission Age

18	103

Sepsis as Primary Dx

Sepsis Bundle Denominator

Sepsis Bundle Fail

Sepsis Bundle Pass

Severe Sepsis With Septic Shock

Severe Sepsis Without Septic Shock

Visual Compare

Multiple selections

Summary	Mortality Index	LOS Index	Readmission Rate	Bundle Fails	REAL	Patient Drill Down	Scatter Plot Summary