State of Michigan Reporting
Z-Scores Explained

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10:40

Performance index measure

Measure	Weight	Michigan Trauma Quality Improvement Program (MTQIP) 2019 Performance Index January 1, 2019 to December 31, 2019	Points
		Measure Description	
#7	10	**Serious Complication Rate-Trauma Service Admits (3 yr: 7/1/16-6/30/19)**	
		Z-score: < -1 (major improvement)	10
		Z-score: -1 to 1 or serious complications low-outlier (average or better rate)	7
		Z-score: > 1 (rates of serious complications increased)	5
#8	10	**Mortality Rate-Trauma Service Admits (3 yr: 7/1/16-6/30/19)**	
		Z-score: < -1 (major improvement)	10
		Z-score: -1 to 1 or mortality low-outlier (average or better rate)	7
		Z-score: > 1 (rates of mortality increased)	5

Goal

We want to answer the (important!) question:

Is my hospital improving over time?

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How would you answer this question?

We are interested in *trends*.
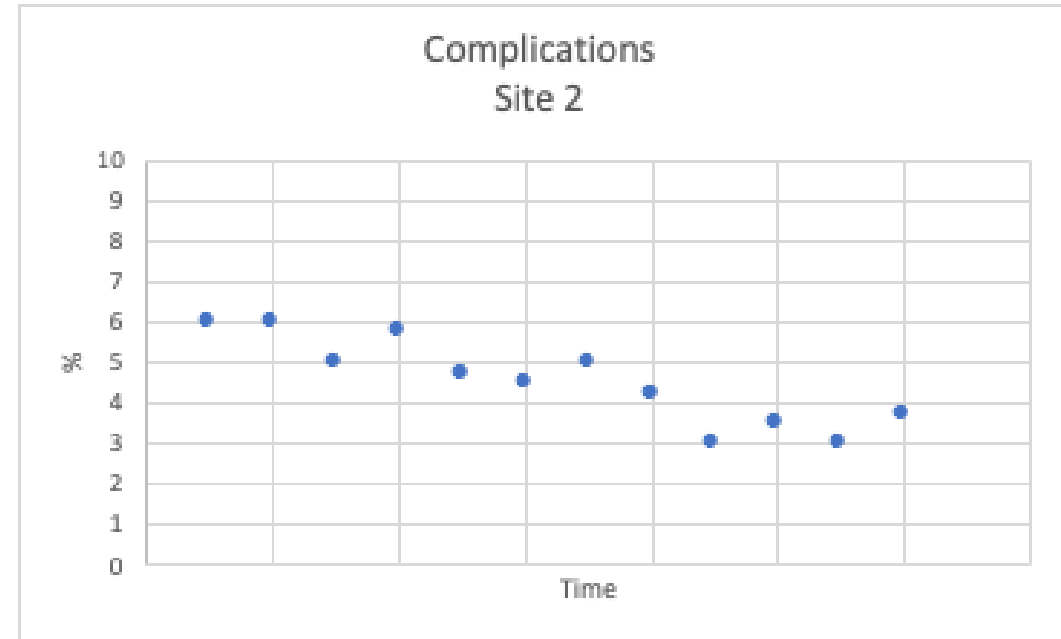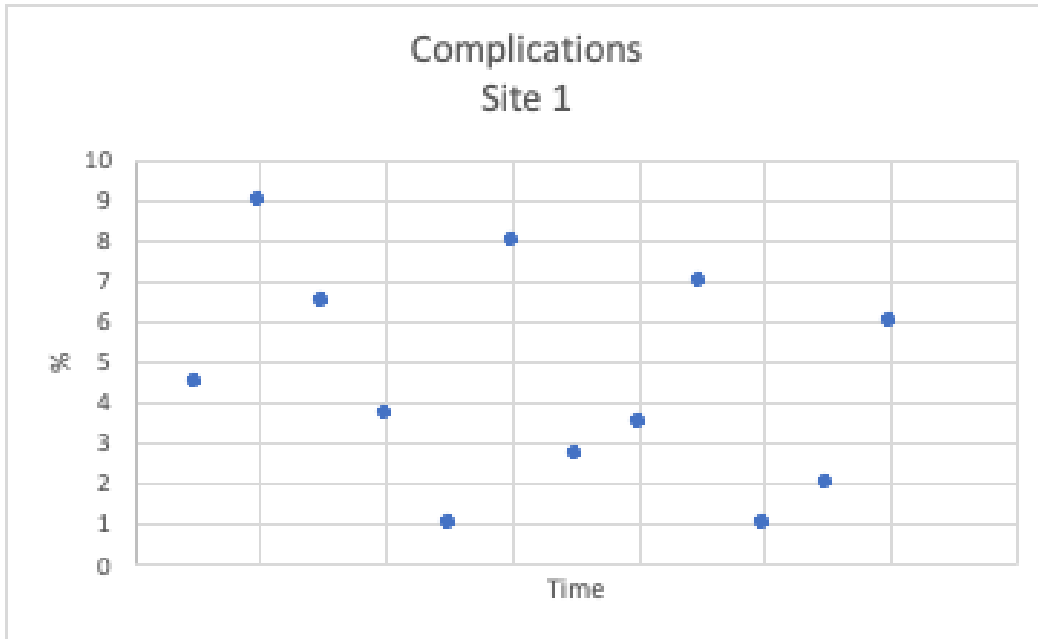The z-score tests whether a trend exists.

What does my trend look like?

- Am I trending upwards, downwards, or flat?
- How do we know?
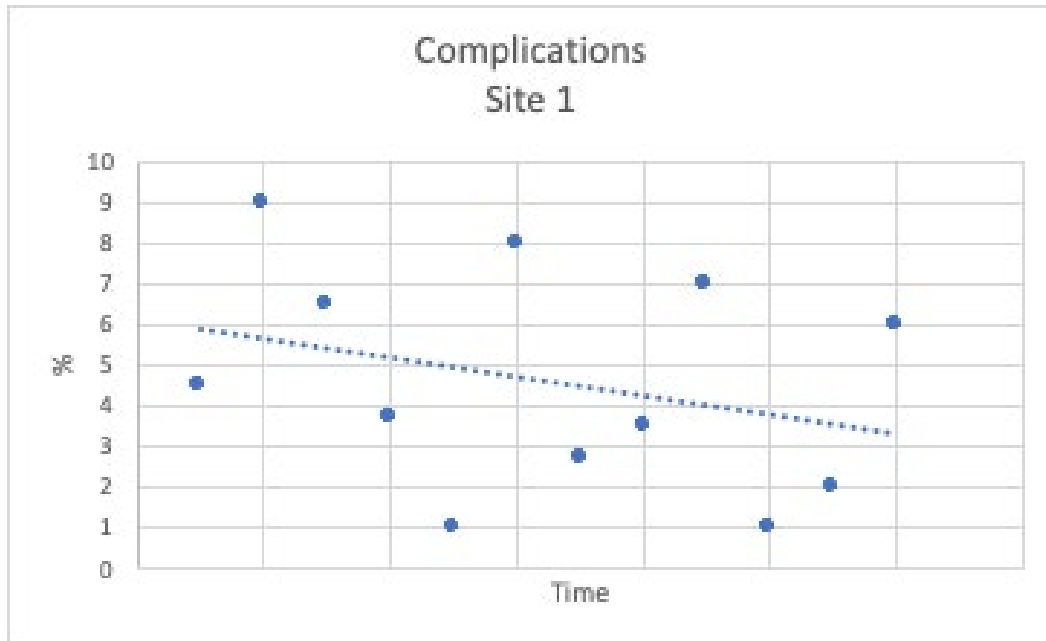- Let's try just looking at the data first.

Who is improving more?

Site #1

Site #2

Complications
Site 1

Complications
Site 2

Same slope, different variability
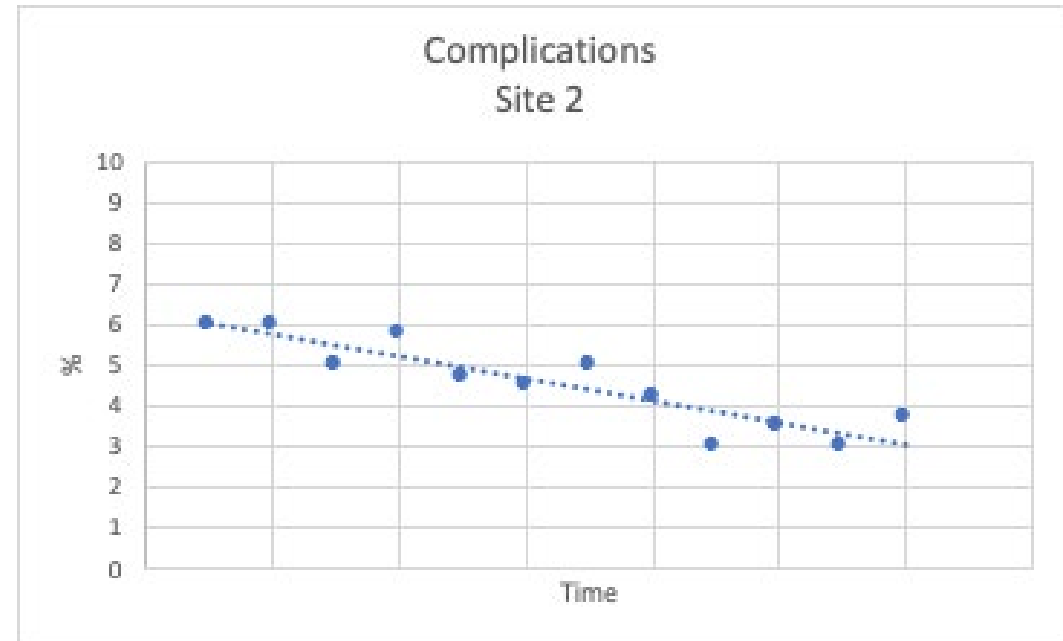
Site #1
High variability

Site #2
Low variability

Testing for trend

- Visual inspection only gets us so far.
- We can *test* whether our trend is actually going downwards (or upwards).
- We need:
    - Slope of the trend line
    - Measure of the variability around that trend line

Calculation

- Test for whether trend *over time* is flat.
- (Whether the slope of the line for time = 0).
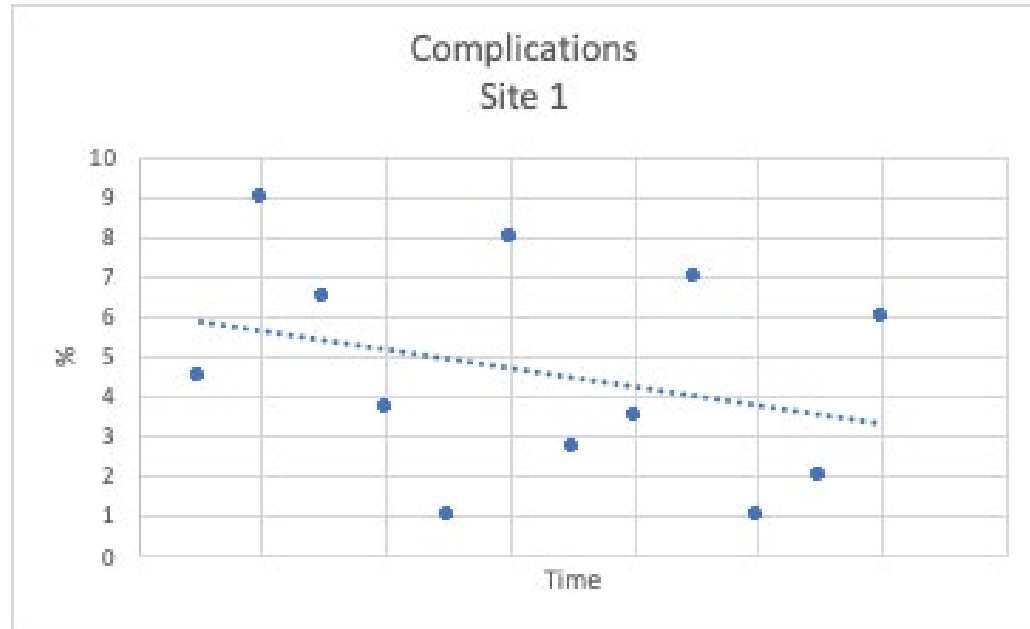
Z = Slope / Variability around slope

$Z = \beta_{time} \ / \ se(\beta_{time})$

*Note: Slope will be negative for downwards trends
*Note: Z will be bigger (farther from 0) if variability is small
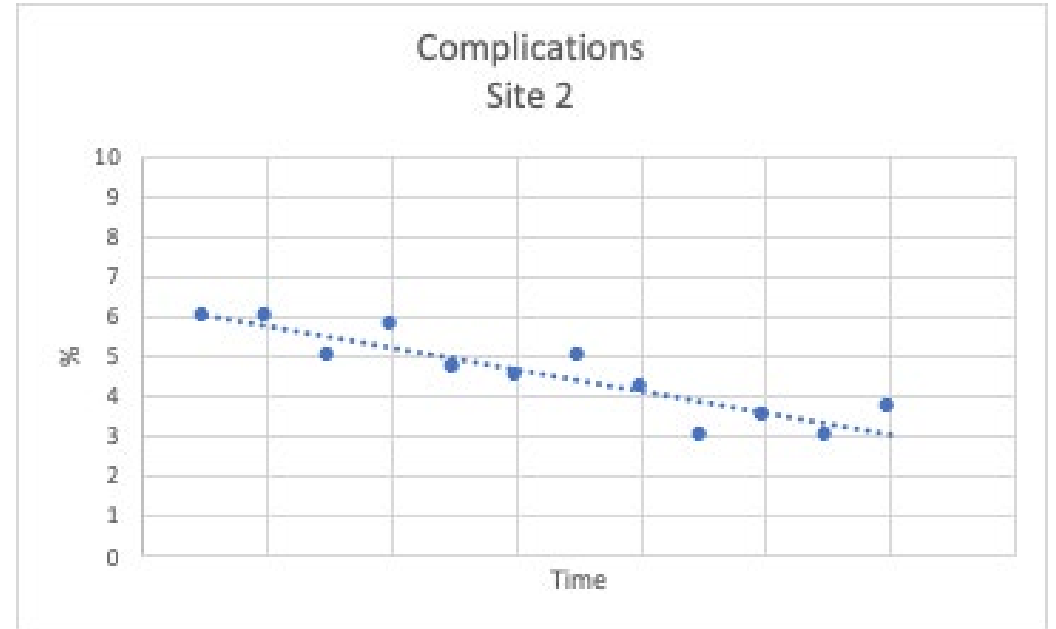
Site #1
High variability

Site #2
Low variability

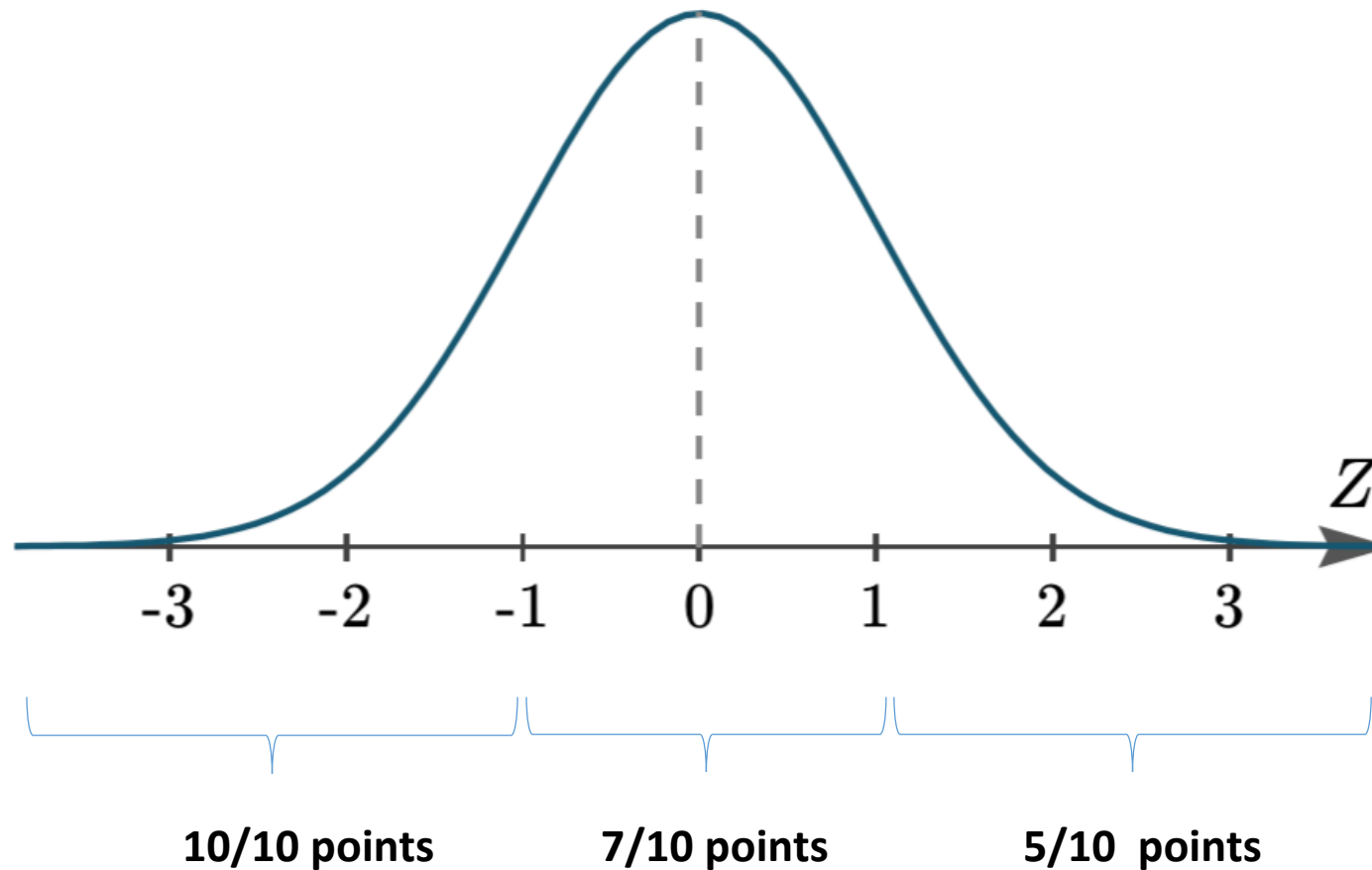Z = slope / standard error of slope
Z= -0.25 / 0.3
Z = -0.83

Z = slope / standard error of slope
Z= -0.25 / 0.05
Z = -5.0

Z-score follows a normal distribution

Me vs Me

- Calculations use **_your hospital's data only_**
- Adjusts for **_your patients'_** injury severity, ED vitals, comorbidity burden, demographics