Improving Understanding of Publicly Reported Healthcare-Associated Infection (HAI) Data

Max Masnick, PhD[1], Daniel Morgan, MD, MS[1,2], Mark D Macek, DDS, DrPH[3], John D Sorkin, MD, PhD[4,5], Jessica P Brown, PhD[1], Penny Rheingans, PhD[6], and Anthony D Harris, MD, MPH[1]

UNIVERSITY *of* MARYLAND
SCHOOL OF MEDICINE

Abstract

Background: Hospital acquired infection (HAI) data are reported to the public on the Centers for Medicare and Medicaid Services (CMS) Hospital Compare website (http://medicare.gov/hospitalcompare). We previously found that public understanding of these data is poor.

Methods: We developed a new method for presenting HAI data to the public, and compared it to CMS Hospital Compare's method in a randomized controlled trial. The trial was conducted among patients randomly selected within 24 hours of admission to a 760-bed tertiary referral hospital. Participants were shown HAI data formatted either (a) as done on the CMS Hospital Compare website (control arm), or (b) our method (experimental arm). We compared the percentage of subjects who correctly interpreted the HAI data in each study arm.

Results: Sixty-one patients were randomized to the control (n=31) and experimental (n=30) study arms. There were no statistically significant demographic differences between arms. Although 47% of participants said a website for comparing hospitals would have been helpful, only 10% had ever used such a website. Participants viewing data using the new presentation strategy compared hospitals correctly 56% of the time, compared with 32% in the control arm (p=0.0002).

Conclusions: Understanding of HAI data increased significantly with the new data presentation method compared to the method currently used on the CMS Hospital Compare website. Many participants expressed interest in a website for comparing hospitals. Improved methods for presenting CMS HAI data, such as the one assessed here, should be adopted to increase public understanding.

Background

- Hospital acquired infection data are reported to the CDC and then to the public on the CMS Hospital Compare website (http://medicare.gov/hospitalcompare)
- We previously found that that public understanding of the data presented on the website is poor (http://pubmed.com/26592554)
- The current CMS website requires understanding of rates, ratios and standardized infection ratios
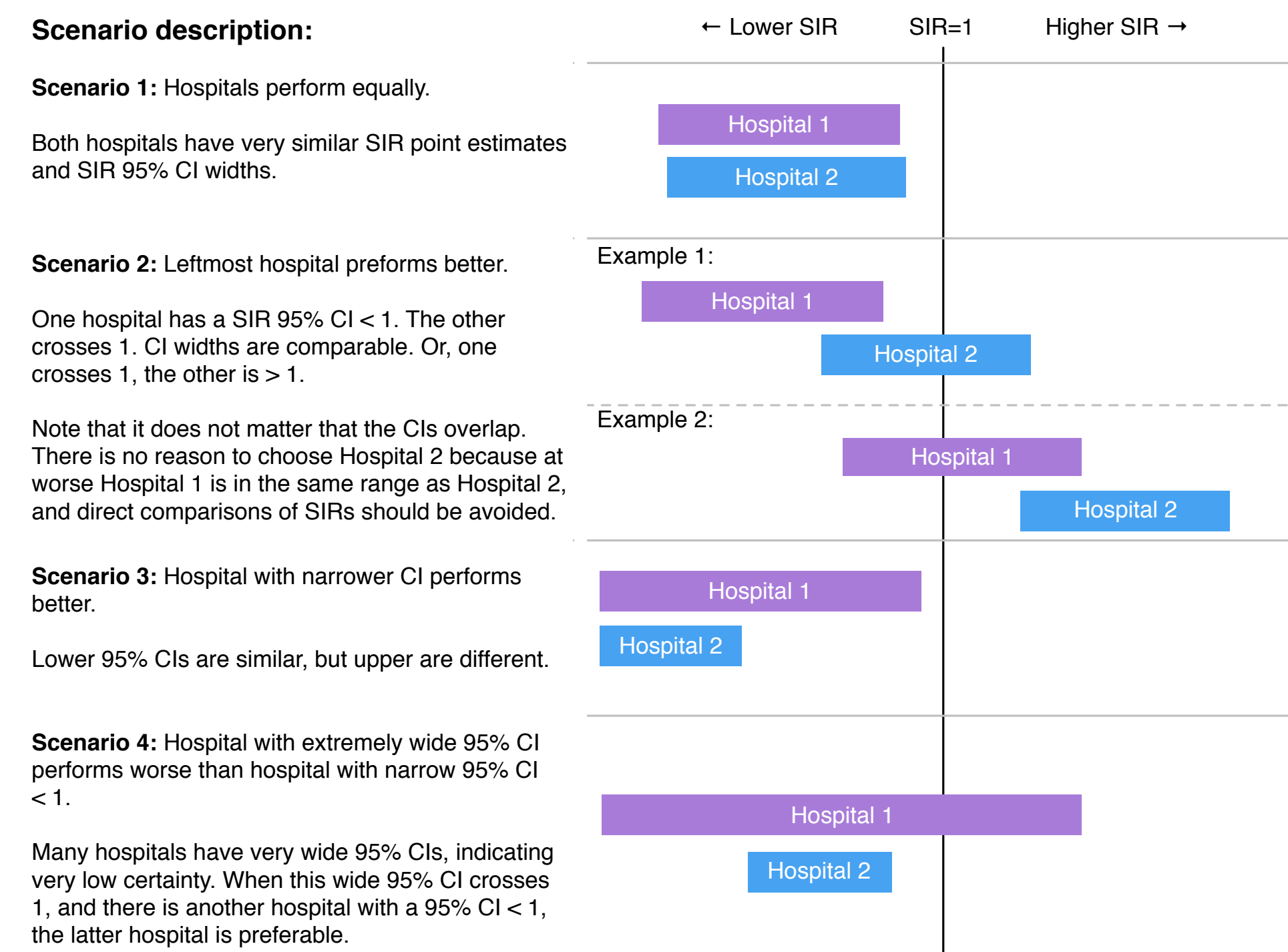
Objective

- Develop a new method for presenting HAI data to the public and compare it to CMS Hospital Compare's method in a randomized controlled trial

Methods

- Trial conducted among patient randomly selected within 24 hours of admission
- Study conducted at University of Maryland Medical Center
- Participants were shown HAI data formatted as done on the CMS Hospital Compare website (control arm) or new method (experimental arm)
- We compared the percentage of correct answers in each study arm
- The new method for presenting the HAI data was developed based on best practices for user-centered design and visual presentation of data
- New method was improved iteratively through one-on-one testing with naive users
- Hospital comparison section consisted of 4 scenarios with 3 questions
  - **Scenario 1**: Two hypothetical hospitals performed equally well
  - **Scenario 2**: One hospital was better than the other hospital
  - **Scenario 3**: Both hospitals were above-average, but one performed better due to a narrower 95% confidence interval
  - **Scenario 4**: One hospital had a very wide 95% confidence interval

Results

Figure 1. Scenarios for comparing hospitals based on healthcare-associated infection (HAI) data.

Notes: Bars represent bounds of 95% SIR CIs. The scales on either side of 1 are equal (i.e. SIR=[0, 1] has the same width as SIR=[1,∞]).

Results, cont.

- 61 patients randomized (31 to control and 30 to experimental)
- No statistically significant demographic differences between arms
- Experimental arm performed better for all scenarios (p=0.0002; see Table 1)
  - Control arm answered hospital comparison questions correctly 32% of the time
  - Intervention arm answered hospital comparison questions correctly 56% of the time
- 47% of patients said a website for comparing hospitals would have been helpful

Table 1. New method of data presentation versus CMS method.

	Experimental arm (% correct)	Control arm (% correct)	*p* value
All questions	55.8	31.5	0.0002
By scenario:			
Scenario 1	67.8	47.3	0.0446
Scenario 2	62.2	39.8	0.0209
Scenario 3	41.1	12.9	0.0016
Scenario 4	52.2	25.8	0.0064

Conclusions

- New data presentation method increased understanding
- Many participants expressed interest in a website comparing hospitals
- Further work is needed to improve methods for presenting HAI data to improve public understanding

Contact information:
Anthony D Harris, MD, MPH
University of Maryland
685 W. Baltimore Street,
Baltimore, MD 21201
aharris@epi.umaryland.edu

Author affiliations:
1. Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD
2. VA Maryland Healthcare System, Baltimore, MD
3. University of Maryland School of Dentistry, Baltimore, MD
4. University of Maryland School of Medicine, Baltimore, MD
5. VA Healthcare System Geriatrics Research, Education, and Clinical Center, Baltimore, MD
6. Department of Computer Science and Electrical Engineering, University of Maryland Baltimore County, Baltimore, MD