Evaluation of Potentially Preventable Hospital-Acquired Infection Rates in Maryland Hospitals

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Maryland Hospital-Acquired Conditions Initiative (MHAC)

- Assesses 46 Maryland hospitals based on rates of “Potentially Preventable Conditions” (PPCs)
- “Harmful events or negative outcomes that may result from the process of care and treatment rather than from a natural progression of underlying disease”
- Hospitals report the number of cases of PPCs experienced each quarter
- MHAC has a scoring system to score and rank hospitals based on performance
- Observed/Expected Ratio accounts for differences in hospital size, demographics
- MHAC “Percent At Risk Scaling” is used to determine a “good,” “bad,” or “average” score
- Hospitals can be financially penalized or rewarded for their scores
PPC Classifications

- 65 types of PPCs
- PPCs are arranged into 8 Groups
  
  **Group 1: Extreme Complications**
  - Shock (9)
  - Cardiac Arrest (14)
  
  **Group 2: Cardiovascular-Respiratory Complications**
  - Pneumonia (5)
  - Acute Myocardial Infarction (11)
  
  **Group 3: Gastrointestinal Complications**
  - Major Liver Complications (19)
  - Major Gastrointestinal Complications with Transfusion or Significant Bleeding (18)
  
  **Group 4: Perioperative Complications**
  - Post-Procedural Foreign Bodies (45)
  - Reopening Surgical Site (39)
  
  **Group 5: Infection Complications**
  - Urinary Tract Infection without Catheter (65)
  - Clostridium difficile Colitis (21)
  
  **Group 6: Malfunctions, Reactions, etc.**
  - Iatrogenic Pneumothorax (49)
  - Central Venous Catheter-Related Blood Stream Infection (54)
  
  **Group 7: Obstetrical Complications**
  - Obstetrical Hemorrhage without Transfusion (55)
  - Delivery with Placental Complications (62)
  
  **Group 8: Other Medical and Surgical Complications**
  - Other In-Hospital Adverse Events (64)
  - Other Surgical Complication – Moderate (44)
My Research

- MHAC databases are used to identify the rates of the 6 PPCs in Group 5 ("Infectious Complications")
  - “Potentially Preventable Hospital-Acquired Infections” – PPHAIs
    - Clostridium difficile Colitis (PPC 21)
    - Cellulitis (PPC 33)
    - Moderate Infections (PPC 34)
    - Septicemia & Severe Infections (PPC 35)
    - Urinary Tract Infection without Catheter (PPC 65)
    - Catheter-Related Urinary Tract Infection (PPC 66)
- Data from the 6 PPHAIs is isolated
- MHAC Scoring Methodology is used to generate “PPHAI Scores” for 28 hospitals
  - Only hospitals which reported data for all 6 PPHAIs are included
- Each hospital’s “PPHAI Score” is compared to its “MHAC Score”
Findings

MHAC Scores are representative of PPHAI Scores in few cases.

- 20 hospitals have considerable score differences
  - Over 70% of hospitals

- Average difference of .11

- 12 hospitals have higher PPHAI Scores than MHAC Scores (Including AAMC)

- 15 hospitals have lower PPHAI Scores than MHAC Scores

- 1 hospital received the same score (Mercy)

- Doctors Community has one of the lowest MHAC Scores and one of the highest PPHAI Scores, with a difference of .38
  - Larger than the entire spread of MHAC Scores (.34)
Comparison of MHAC Scores and PPHAI Scores per Hospital:
- The distributions of MHAC Scores and PPHAI Scores vary considerably.

- PPHAI Score distribution is wider (.19) than the distribution of MHAC Scores
  - PPHAI Spread: .53
  - MHAC Spread: .34
  - PPHAI Scores are more polarized
  - Suggests varied performance between hospitals

- PPHAI Scores are generally slightly lower than MHAC Scores
  - Average PPHAI Score: .54
  - Average MHAC Score: .55
  - Hospitals generally show lower performance in PPHAI Scores than in MHAC Scores
Individual PPHAI Scores Over Time

- Each hospital is assigned a score for each PPHAI
- This score is derived from each PPHAI’s Observed/Expected Ratio (O/E Ratio)
- Performance is at standard or better when O/E = 1 or less
- O/E Ratios of each PPHAI from three time periods are compared
  - 2013: Q1, Q2, Q3, Q4
  - 2014: Q1, Q2
  - 2014: Q3, Q4
Individual Trends

Percent Change in Cdiff O/E Ratios Per Hospital
- Change BY2013 to Jan-Jun 2014
- Change Jan-Jun 2014 to Jul-Dec 2014

C.diff O/E Performance Over Time Per Hospital
- BY 2013
- Jan - Jun 2014
- Jul - Dec 2014
Individual Trends

Percent Change in Cellulitis O/E Ratios Per Hospital

Cellulitis O/E Performance Over Time Per Hospital
Individual Trends

Percent Change in UTI without Catheter O/E Ratios Per Hospital

UTI without Catheter O/E Ratio Performance Over Time Per Hospital

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Individual Trends

Percent Change in Catheter-Related UTI O/E Ratios Per Hospital

Catheter-Related UTI O/E Ratio Performance Over Time Per Hospital
Individual Trends

Percent Change in Moderate Infection O/E Ratios Per Hospital

Moderate Infection O/E Ratio Performance Over Time Per Hospital

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Individual Trends

Percent Change in Septicemia & Severe Infection O/E Ratios Per Hospital

Septicemia & Severe Infections O/E Ratio Performance Over Time Per Hospital

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Conclusion and Applications

The PPHAI Score Measurement provides:

- Increased accuracy in measuring infection prevention performance
- Ability to assess the efficacy of new infection-reduction methods over time
Suggestions and Inquiries

- For more information about methodology and findings:
  www.saabr.org

- Email research inquiries, suggestions, and other comments to
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