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

BY MEGAN RUTKAI

© MEGAN RUTKAI, SAABR

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

© MEGAN RUTKAI, SAABR

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-Procedure 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)*

© MEGAN RUTKAI, SAABR

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"

© MEGAN RUTKAI, SAABR

Findings

MHAC Scores are representative of PPHAI Scores in few cases.

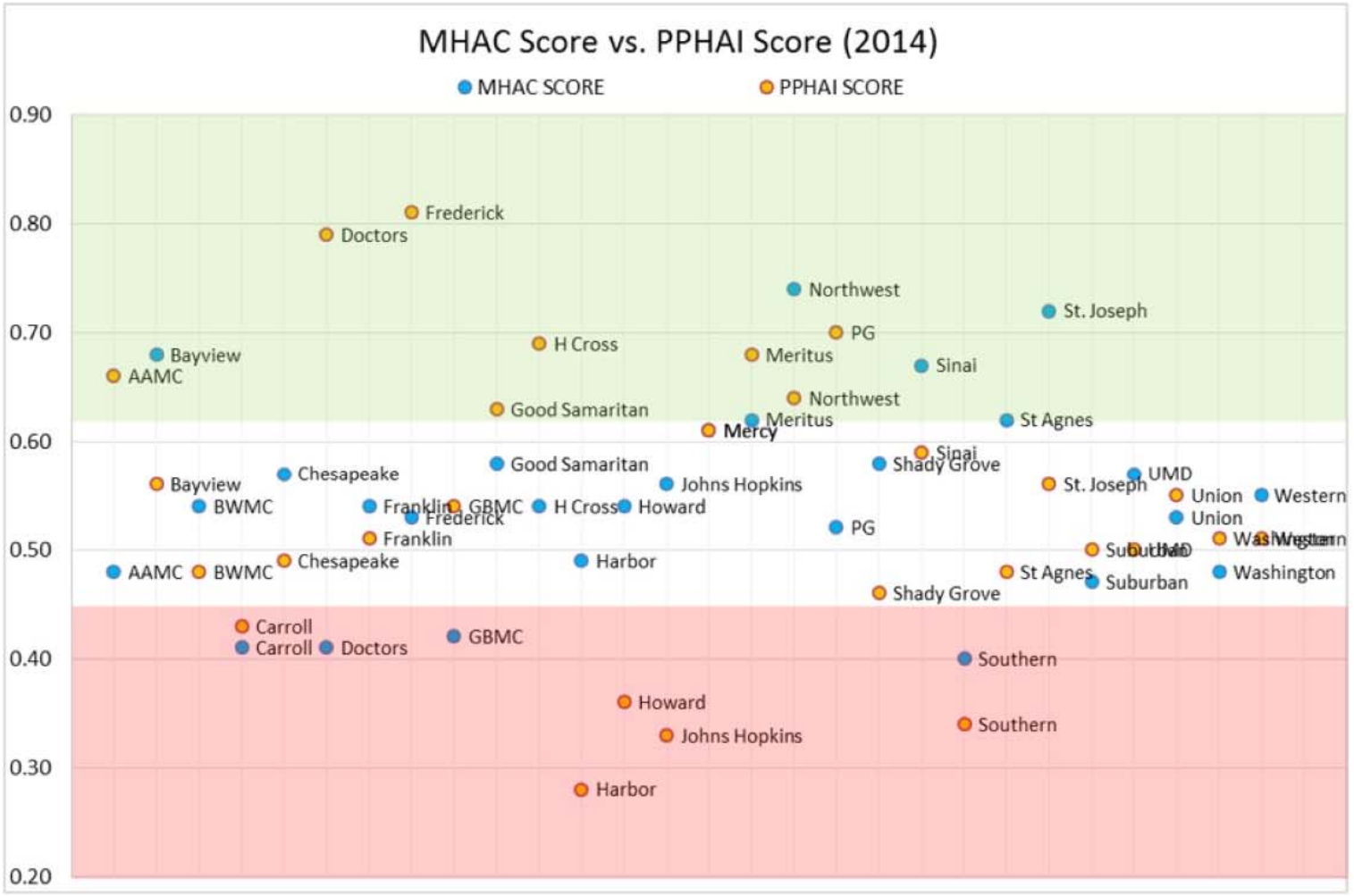
- 20 hospitals have considerable score differences
  - Over 70% of hospitals
- Average difference of .11
- 12 hospitals have higher PPHAI Scores than MHAC Scores (Including AAMC)
- 15 hospitals have lower PPHAI Scores than MHAC Scores
- 1 hospital received the same score (Mercy)
- Doctors Community has 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)

MHAC Score and PPHAI Score Comparison (2014)			
Hospital	**MHAC Score**	**PPHAI Score**	**Difference**
Frederick Memorial	0.53	0.81	0.28
Doctors Community	0.41	0.79	0.38
Prince George	0.52	0.70	0.18
Holy Cross	0.54	0.69	0.15
Meritus	0.62	0.68	0.06
AAMC	0.48	0.66	0.18
Northwest	0.74	0.64	-0.10
Good Samaritan	0.58	0.63	0.05
Mercy	0.61	0.61	0.00
Sinai	0.67	0.59	-0.08
UM St Joseph	0.72	0.56	-0.14
Hopkins Bayview	0.68	0.56	-0.12
Union Memorial	0.53	0.55	0.02
GBMC	0.42	0.54	0.12
Western MD	0.55	0.51	-0.04
Franklin Square	0.54	0.51	-0.03
Washington Adventist	0.48	0.51	0.03
University of Maryland	0.57	0.50	-0.07
Suburban	0.47	0.50	0.03
Upper Chesapeake	0.57	0.49	-0.08
St Agnes	0.62	0.48	-0.14
BWMC	0.54	0.48	-0.06
Shady Grove	0.58	0.46	-0.12
Carroll	0.41	0.43	0.02
Howard	0.54	0.36	-0.18
Southern	0.40	0.34	-0.06
Johns Hopkins	0.56	0.33	-0.23
Harbor	0.49	0.28	-0.21

(CY 2014 Scores)

© MEGAN RUTKAI, SAABR

Comparison of MHAC Scores and PPHAI Scores per Hospital:

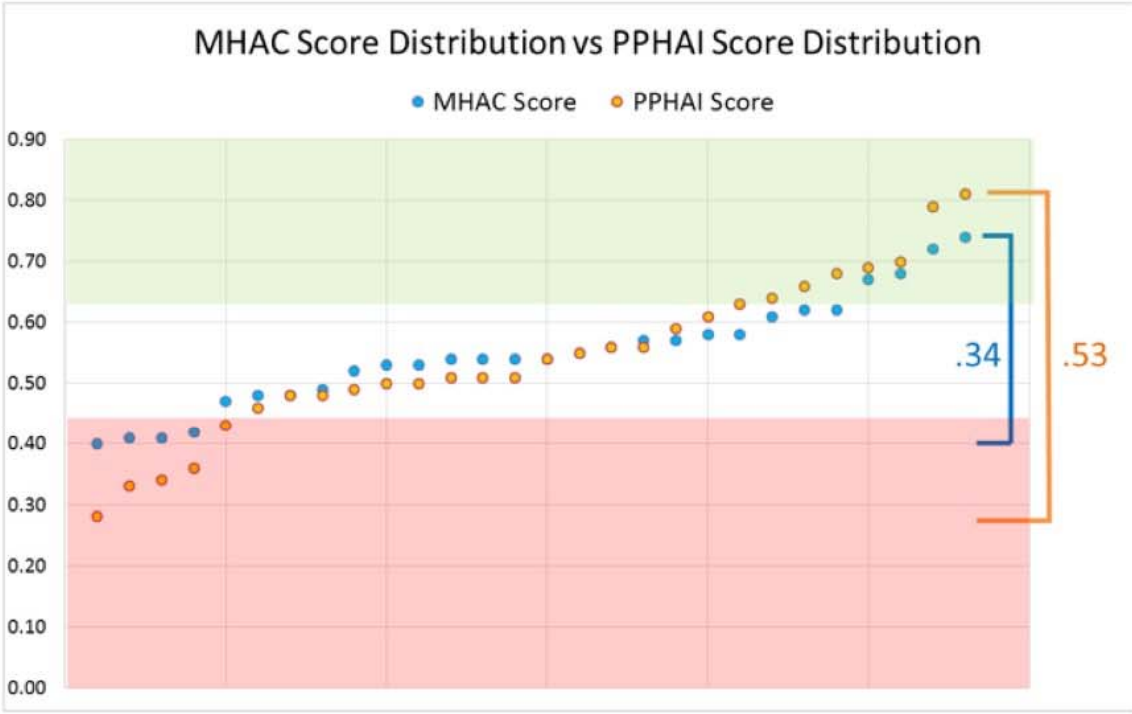


© MEGAN RUTKAI, SAABR

- 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



© MEGAN RUTKAI, SAABR

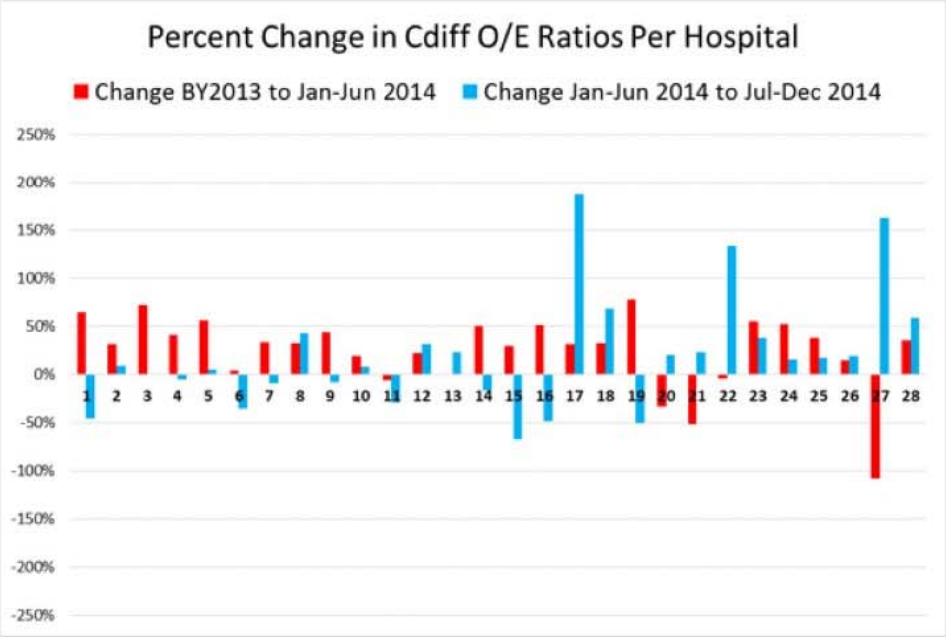
Individual PPHAI Scores Over Time

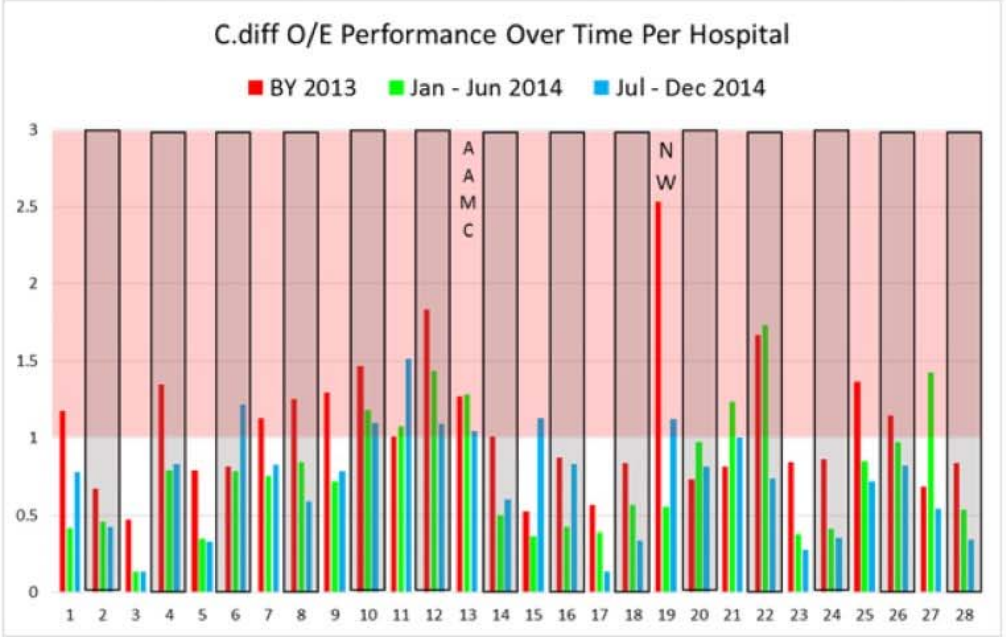
- Each hospital is assigned a score for each PPHAI
- This score is derived from each PPHAI's Observed/Expected Ratio (O/E Ratio)
- Performance is at standard or better when O/E = 1 or less
- O/E Ratios of each PPHAI from three time periods are compared
  - 2013: Q1, Q2, Q3, Q4
  - 2014: Q1, Q2
  - 2014: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

© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		

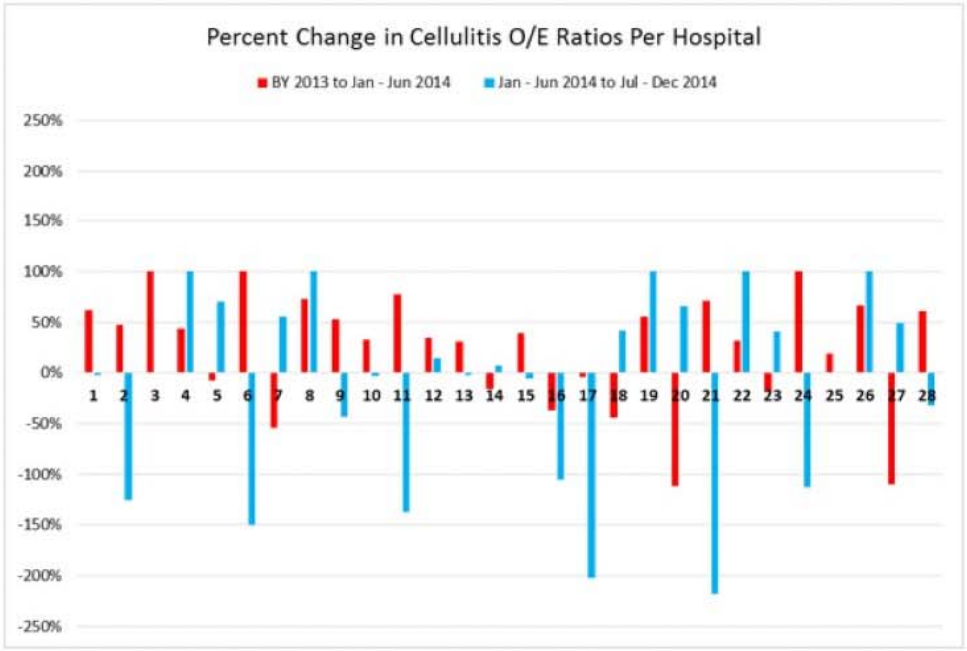


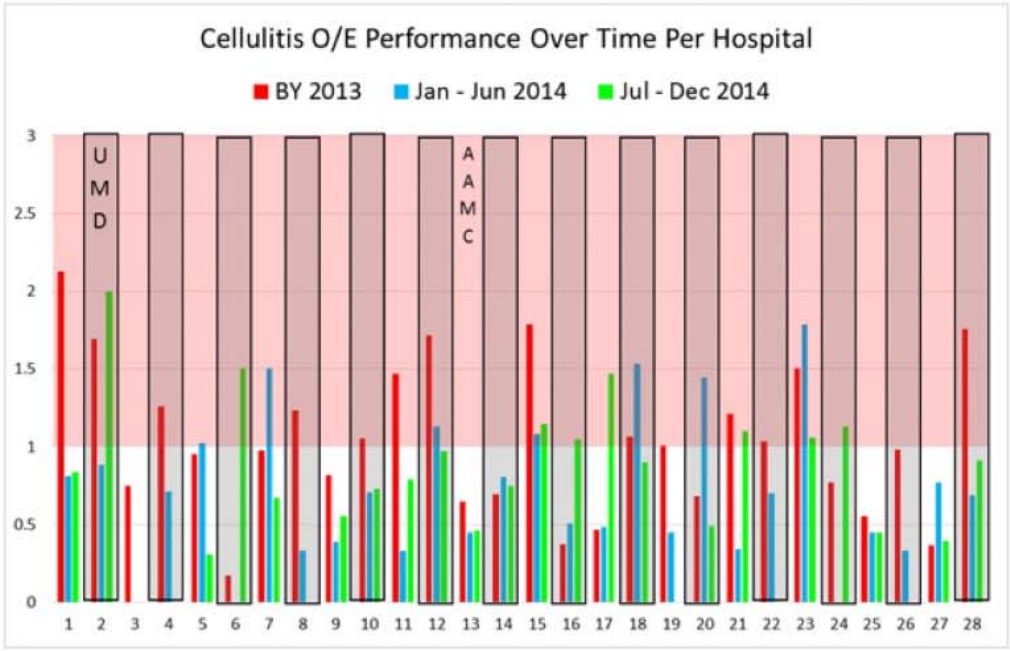


© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		

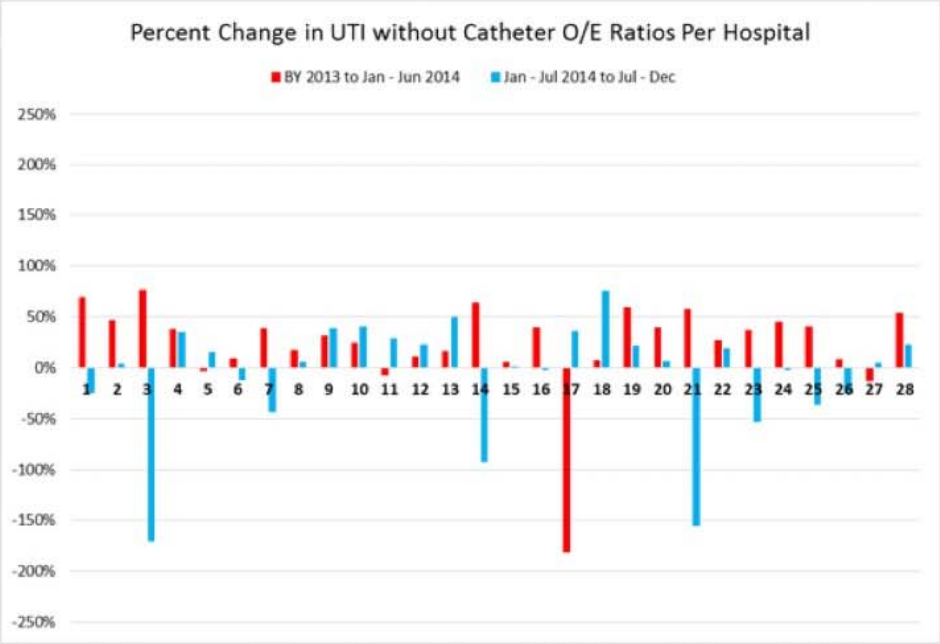


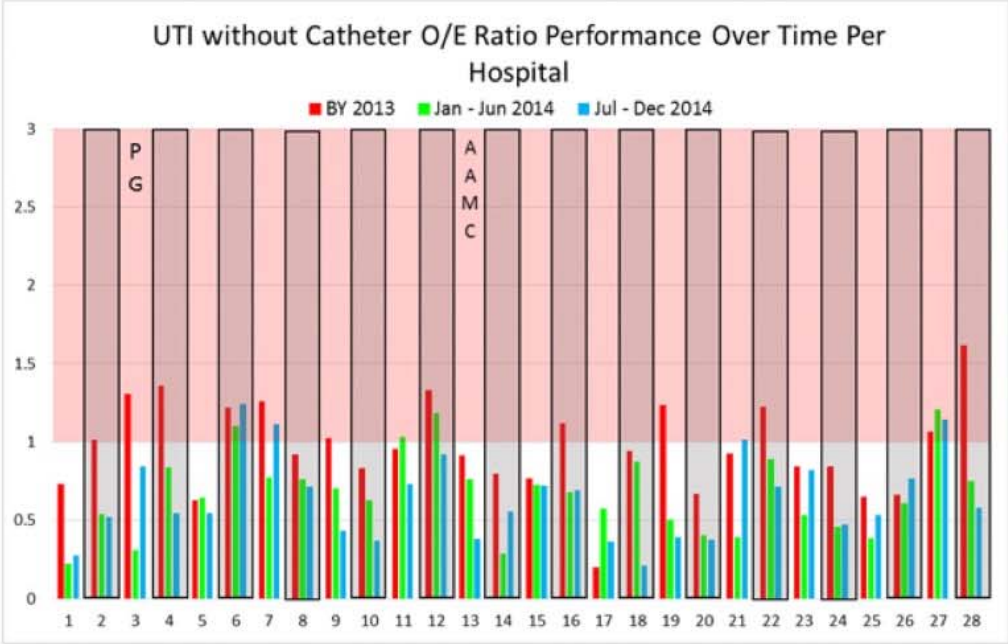


© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		

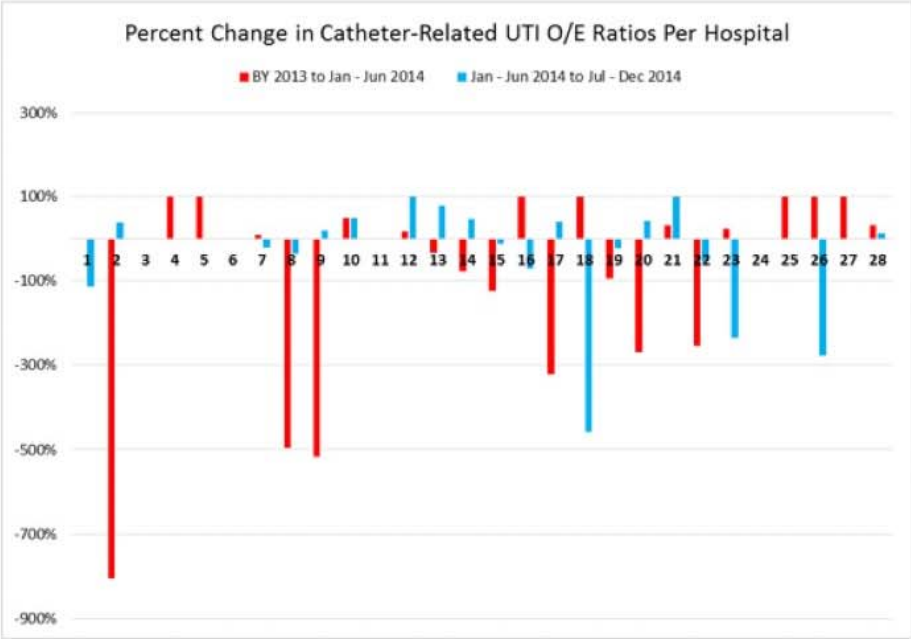


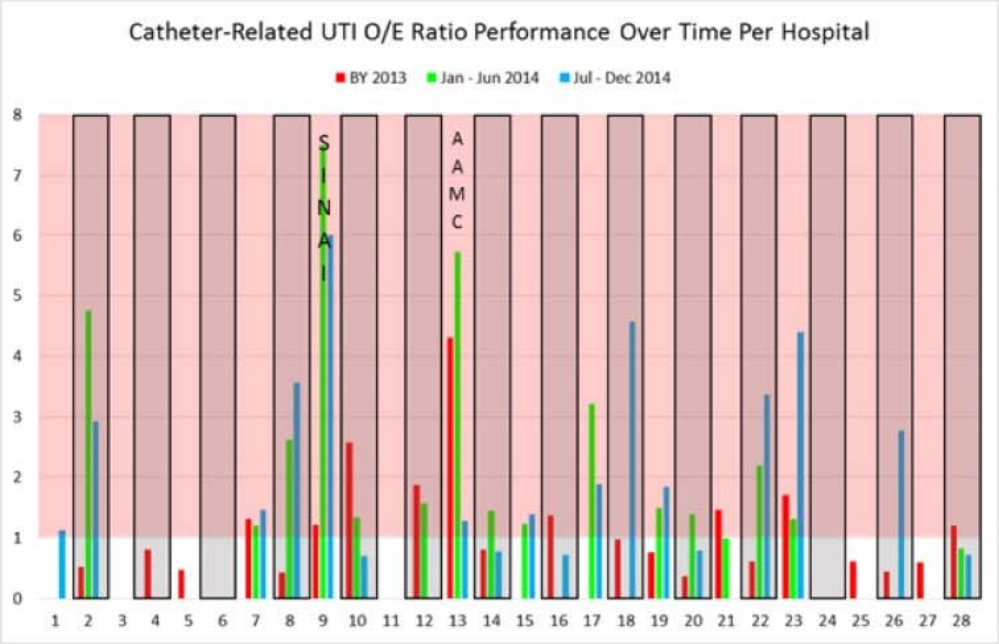


© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		

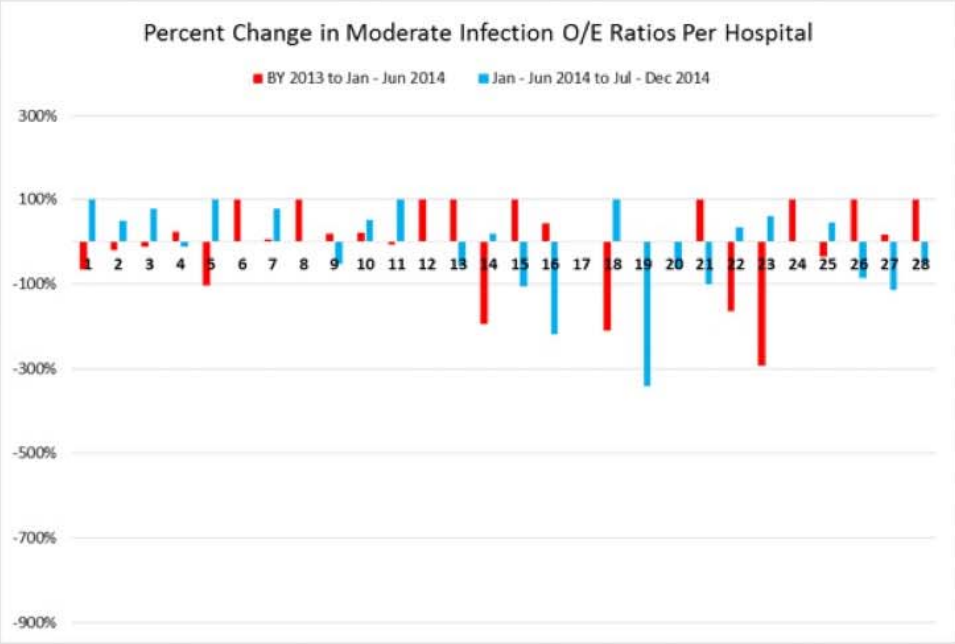


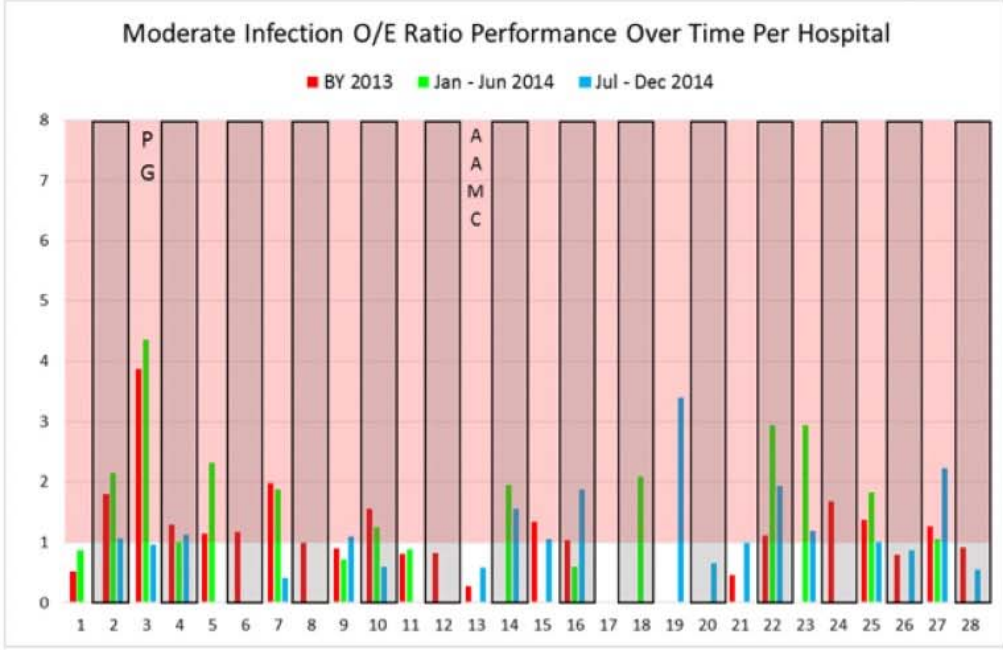


© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		

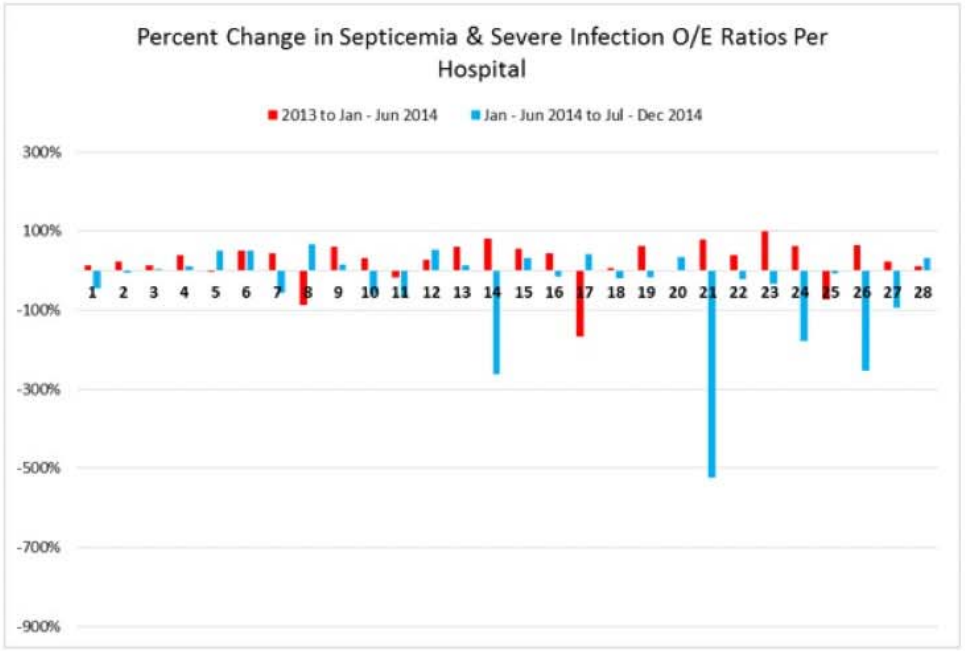


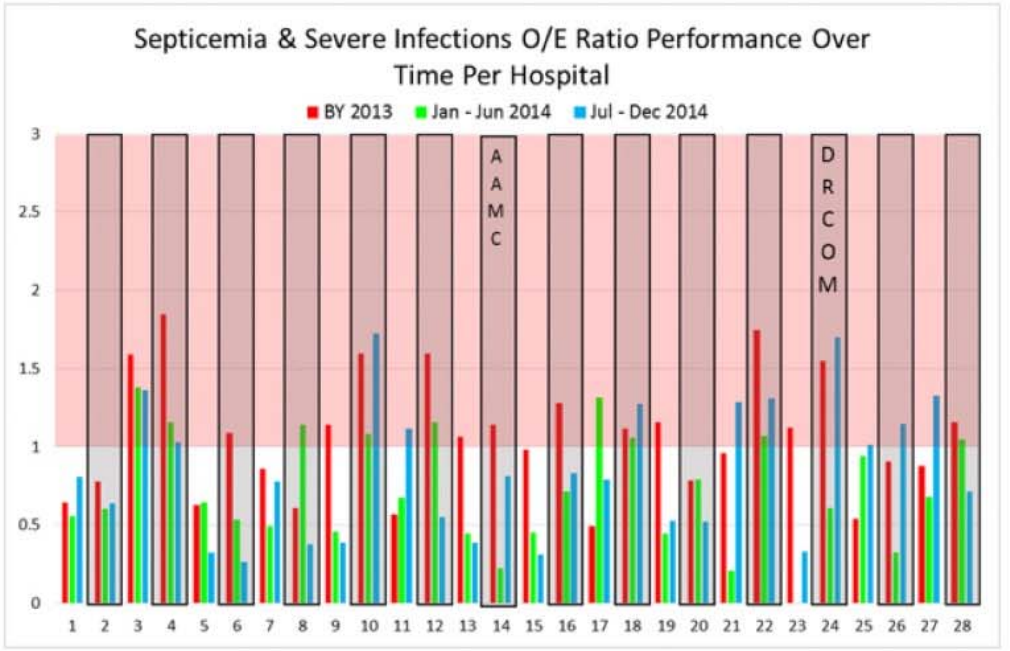


© MEGAN RUTKAI, SAABR

Individual Trends

1	MERITUS	11	WASHINGTON ADVENTIST	21	G.B.M.C.
2	UNIVERSITY OF MARYLAND	12	SUBURBAN	22	HOWARD COUNTY
3	PRINCE GEORGE	13	ANNE ARUNDEL	23	UPPER CHESAPEAKE HEALTH
4	HOLY CROSS	14	UNION MEMORIAL	24	DOCTORS COMMUNITY
5	FREDERICK MEMORIAL	15	WESTERN MARYLAND	25	GOOD SAMARITAN
6	MERCY	16	HOPKINS BAYVIEW	26	SHADY GROVE
7	JOHNS HOPKINS	17	CARROLL COUNTY	27	SOUTHERN MARYLAND
8	ST. AGNES	18	HARBOR	28	UM ST. JOSEPH
9	SINAI	19	NORTHWEST		
10	FRANKLIN SQUARE	20	BALTIMORE WASHINGTON		





© MEGAN RUTKAI, SAABR

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

© MEGAN RUTKAI, SAABR

Suggestions and Inquiries

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

- Email research inquiries, suggestions, and other comments to
  meganrutkai@gmail.com

Thank you!

© MEGAN RUTKAI, SAABR

Copyright Statement

All of the information and material inclusive of text and images is the property of Megan Rutkai and Sanitize Against AntiBiotic Resistance (SAABR). The information may not be distributed, modified, displayed, reproduced — in whole or in part— without the prior written permission of Megan Rutkai.

Disclaimer

The information contained in this document is compiled from various sources and provided on an "AS IS" basis for general information purposes only without any representations, conditions, or warranties whether express or implied, including any implied warranties or satisfactory quality, completeness, accuracy, or fitness for a particular purpose.

Megan Rutkai and SAABR disclaim any and all liability for all use of this information, including losses, damages, claims, or expenses any person may incur as a result of the use of this information, even if advised of the possibility of such loss or damage.