QUARTERLY MONITORING ADVERSE OUTCOME INDEX REPORT

SAMPLE HOSPITAL
Q1 2013 – Q4 2016
CONFIDENTIAL

The Adverse Outcome Index (AOI) Report is designed to measure the volume and magnitude of ten adverse events that may occur during the delivery process and could potentially expose an obstetrical team to malpractice liability. These events were selected by the original developers, because they were deemed definable, and possibly modifiable, through improved team training and communication.[1]

I. AOI EVENTS AND DESCRIPTION OF INDICES

Each type of event has a severity weight associated with it, and there are three indices calculated from the count and weight of the events occurring at your facility.

WEIGHTS FOR ADVERSE OUTCOMES	
In-hospital Maternal Death	750
In-hospital Neonatal Death ≥ 2500 grams and ≥ 37 weeks gestation	400
Uterine Rupture During Labor	100
Unplanned Maternal Admission to the ICU	65
Birth Trauma	60
Unanticipated Operative Procedure	40
Admission to NICU of neonate birthweight ≥ 2500 grams and ≥ 37 weeks gestational age for > 1 day	35
APGAR 5 < 7	25
Maternal Blood Transfusion	20
3rd and 4th degree perineal laceration	5

THE ADVERSE OUTCOME INDEX (AOI) - The number of patients with one or more identified adverse events, divided by the total number of deliveries.

THE WEIGHTED ADVERSE OUTCOME SCORE (WAOS) - The total weights of all the adverse events, divided by the total number of deliveries.

THE SEVERITY INDEX (SI) - The total weights of all the adverse events, divided by the number of patients with an adverse event. *(Note: each delivery is only counted once, but each event is counted.)*

**Due to the limitations of using an administrative data set (the mother and the baby data are not linked), we can only determine the number of patients with an adverse event, not the number of*

deliveries with an adverse event. This may result in an overstatement in the number of deliveries with adverse events if there are cases where a mother and linked baby each had events.

II. DATA SUBMISSION AND DISCUSSION

Your AOI report covers the quarterly monitoring period **1/01/13 - 12/31/16** and reflects data files, containing **20,747** perinatal discharges, submitted to NPIC/QAS, under the direction of (*name and title of individual submitting the file*).

The source file for this quarter was submitted in the NPIC/QAS format for the above period. There were no problems noted with the data.

Note: some hospitals submit copies of state database files, in lieu of programming to our NPIC layout specifications. If a hospital does not include numeric gestational age in their data file, then gestational age is calculated for the inborns with missing information using the logic described in the Appendix at the end of this report.

Please take note of the following:

We are currently working with the developer of the AOI report, Dr. Susan Mann, to review new ICD-10 codes that went into effect Q4 2016. She will be dong a complete review of all the metrics to determine what updates to the algorithms are required. The review process will be completed with the Q1 2017 reports and any updates to your Q4 2016 data will be reflected then. We appreciate your patience as we work through these ICD-10 challenges.

- ***The neonatal death in Q3, 2014 was removed per request of the Director of Women's and Children's Services.***

- ***There is variability in the "Admission to NICU of neonate" metric. (i.e., the range is from 0 cases to 15 cases, with 7 cases currently in Q4 2016; the average is 9).***

- ***As previously described, due to ICD-10 coding, some "Maternal Admission to the ICU" cases may require review (O14.13 severe preeclampsia, third trimester). There were no cases with this code, exclusively, this quarter that require review.***

III. TABLE AND GRAPH DISPLAYS

Table 1 displays a quarter-by-quarter count of cases by adverse event, along with the count of total deliveries, and the average counts for the quarterly monitoring period.

Table 2 displays your hospital's AOI, WAOS and SI quarterly rates, along with the average rates for the quarterly monitoring period, the NPIC/QAS comparative rate, and the target benchmark.

Note: the NPIC/QAS comparative rate reflects follow-up data from 24 NPIC/QAS member hospitals that have received AOI reports for the four year period of 2012 – 2015.

The target benchmark reflects data from 6 of these 24 hospitals. These six hospitals were selected as part of the target benchmark group, because they were in the top performance quartile for the WAOS metric.

Graphs 1-3 show a graphic display of each index by quarter, as well as the average rate for your hospital for the quarterly monitoring period. Each data point includes a vertical error bar that represents the margin of error (90% confidence interval). The graph includes a horizontal dashed line that represents the target benchmark value and a dashed dotted line that represents the NPIC/QAS comparative rate. If the error bar crosses the horizontal lines representing the target benchmark and/or the NPIC/QAS comparative rate, the data point is not significantly different from the line value it crosses. If the error bar does not cross the horizontal lines, the data point is significantly different (higher or lower) than the target benchmark and/or the NPIC/QAS comparative rate. These graphs also include a trend line when there are four or more quarters of data, with the analysis of the trend noted in the box on the lower right of each of the three graphs.

IV. RESULTS OF THE ANALYSIS FOR YOUR HOSPITAL

The **AOI** reflects the overall rate of cases with an adverse event.

- Your quarterly monitoring average rate is the same as the NPIC/QAS comparative rate and higher than the target benchmark rate.
- This rate is significantly different from (higher than) the target benchmark.
- Your trend indicates no significant change.

The **WAOS** reflects the severity of adverse events relative to all deliveries.

- Your quarterly monitoring average rate is higher than the NPIC/QAS comparative rate and higher than the target benchmark rate.
- This rate is significantly different from (higher than) the target benchmark.
- Your trend indicates no significant change.

The **SI** reflects the severity of the events relative to all cases with an adverse event.

- Your quarterly monitoring average rate is higher than the NPIC/QAS comparative rate and higher than the target benchmark rate.
- This rate is significantly different from (higher than) the target benchmark.
- Your trend indicates no significant change.

This report reflects Version 3.0 of the AOI algorithm. The algorithm logic, and the specific codes associated with each type of adverse event, is available in the Appendix.

Note: *These data represent one way to interpret the findings from your hospital. Each hospital must determine meaningful goals for their own institution.*

Review of the counts of each measure (in Table 1) will clarify the data that are contributing to your hospital's AOI, WAOS and SI quarterly rates.

We strongly encourage case review to verify the accuracy of the AOI metrics and to identify underlying processes that increase the likelihood of errors. We would be happy to provide a list of cases for your review, upon request.

Case list requests or questions regarding this report may be directed to your hospital's Data Coordinator/Hospital Liaison, via email: mservices@npic.org

V. ACKNOWLEDGEMENT

The AOI Report was developed by the National Perinatal Information Center/Quality Analytic Services (NPIC/QAS) in conjunction with the Team Performance Plus (TPP™) Training Program.

The specific measures profiled in this report were developed, beginning in 2001, by a panel of experts from the American College of Obstetrics and Gynecology (ACOG), the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), The Society for Obstetric Anesthesia and Perinatology (SOAP), the Armed Forces Institute of Pathology (AFIP), the US Navy Bureau of Medicine and Surgery (BUMed), the Office of the Surgeon General - US Army, TRICARE Management Activity (the US military health system), and participants from the hospitals selected for a team training study co-sponsored by the Department of Defense, the Risk Management Foundation of the Harvard Medical Institutions, and the Beth Israel Deaconess Medical Center Obstetrics/Gynecology Foundation.

The types of events, and the weights associated with them, were developed by this panel of experts through a rigorous consensus process to determine appropriate "weights". For example, it was agreed that "maternal death" should have the highest severity weight (750); the sum of the weights of all other events is equal to the severity weight for maternal death.

[1] Nielson, P., Goldman, M., Mann, S., Shapiro, D., Marcus, R., Pratt, S., Greenberg, P., McNamee, P., Salisbury, M., Birnbach, D., Gluck, P., Pearlman, M., King, H., Tornberg, D., & Sachs, B. Effects of Teamwork Training on Adverse Outcomes and Process of Care in Labor and Delivery: A Randomized Controlled Trial. American College of Obstetrics & Gynecology. 2007; 109 (1): 48 – 55.

NPIC/QAS Adverse Outcome Index (AOI) Report
Table 1: Count of Adverse Events by Indicator
AOI Version 3.0

SAMPLE HOSPITAL - MEMBERS	Q1, 2013	Q2, 2013	Q3, 2013	Q4, 2013	Q1, 2014	Q2, 2014	Q3, 2014	Q4, 2014	Q1, 2015	Q2, 2015	Q3, 2015	Q4, 2015	Q1, 2016	Q2, 2016	Q3, 2016	Q4, 2016	Avg. For Period
Total Deliveries	721	742	762	128	654	681	684	604	667	667	660	663	610	636	681	680	640
Total Inborns	740	757	782	130	674	697	698	626	675	687	678	675	625	665	700	698	657
In-hospital Maternal Death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
In-hospital Neonatal Death, ≥ 2500 grams and ≥ 37 weeks gestation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uterine Rupture During Labor	1	1	2	0	0	0	0	0	1	0	0	0	1	0	2	0	1
Unplanned Maternal Admission to ICU	0	3	1	0	0	3	1	3	0	2	1	2	2	3	1	1	1
Birth Trauma	2	1	0	0	1	2	3	1	3	1	0	1	1	0	2	0	1
Unanticipated Operative Procedure	2	6	2	0	2	5	1	5	2	2	4	3	1	2	0	1	2
Admission to NICU of neonate ≥ 2500 grams and ≥ 37 weeks gestation, for > 1 day	8	9	13	0	4	7	5	9	13	6	14	12	9	10	15	7	9
APGAR 5 < 7, Inborn Neonate, ≥ 2500 grams and ≥ 37 weeks gestation	2	0	6	0	1	3	2	3	6	4	5	4	0	6	4	4	3
Maternal Blood Transfusion	10	17	11	1	9	12	18	12	6	17	9	15	8	6	2	0	10
3rd or 4th Degree Perineal Laceration	11	14	11	3	14	11	8	10	13	11	14	11	12	10	9	17	11
Total of Adverse Events	36	51	46	4	31	43	38	43	44	43	47	48	34	37	35	30	38
Total of Adverse Events Patients (duplicate patients removed)	36	47	41	4	31	36	35	34	39	37	41	44	32	31	30	28	34

(AOI) Report
Table 2: Indices by Quarter
AOI Version 3.0

SAMPLE HOSPITAL - MEMBERS	Q1, 2013	Q2, 2013	Q3, 2013	Q4, 2013	Q1, 2014	Q2, 2014	Q3, 2014	Q4, 2014	Q1, 2015	Q2, 2015	Q3, 2015	Q4, 2015	Q1, 2016	Q2, 2016	Q3, 2016	Q4, 2016	Avg. for Period	NPIC/QAS Comparative Rate*	Target Benchmark
Adverse Outcome Index (AOI)	0.050	0.063	0.054	0.031	0.047	0.053	0.051	0.056	0.059	0.056	0.062	0.066	0.053	0.049	0.044	0.041	0.052	0.052	0.037
Weighted Adverse Outcome Score (WAOS)	1.23	1.78	1.61	0.27	0.85	1.66	1.33	1.88	1.72	1.46	1.65	1.79	1.42	1.49	1.61	0.79	1.41	1.33	0.83
Severity Index (SI)	24.58	28.09	29.88	8.75	17.90	31.39	26.00	33.38	29.49	26.35	26.59	26.93	27.03	30.48	36.50	19.11	26.40	25.64	22.79

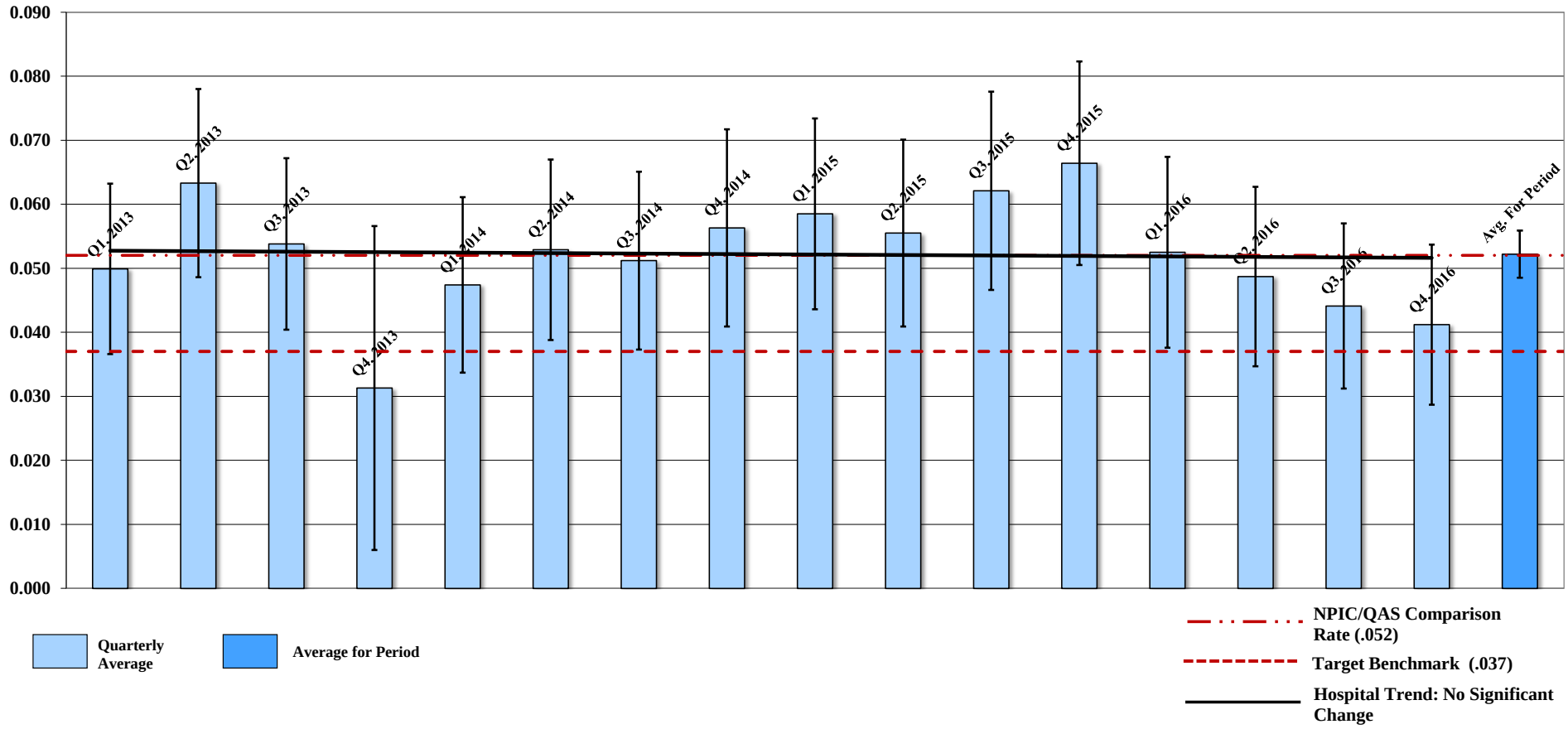
*NPIC/QAS Comparative Rate Range:
AOI: 0.027 - 0.086
WAOS: 0.54 - 2.30
SI: 19.14 - 30.21

Adverse Outcome Index (AOI) -- Number of patients with an adverse event divided by total number of deliveries
Weighted Adverse Outcome Score (WAOS) -- Total weights of all adverse events divided by total number of deliveries
Severity Index (SI) -- Total weights of all adverse events divided by number of patients with an adverse event

SAMPLE HOSPITAL - MEMBERS

Adverse Outcome Index(AOI)
(Number of Patients with an adverse event divided by the total number of deliveries)
AOI Version 3.0

Quarterly Monitoring

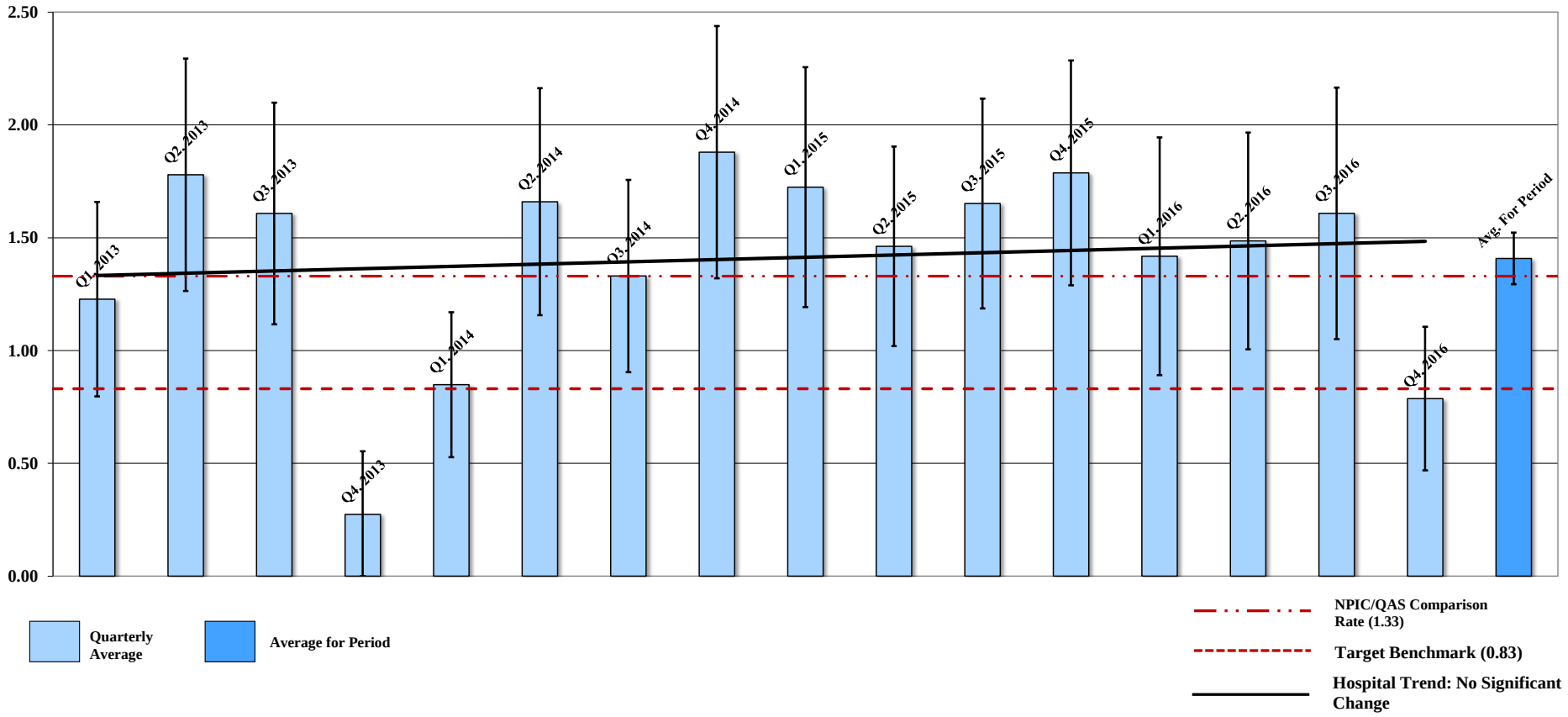


Error Bars represent Margin of Error (90% Confidence Interval).

SAMPLE HOSPITAL - MEMBERS

Weighted Adverse Outcome Score (WAOS)
(Total weights of all adverse events divided by total number of deliveries)
AOI Version 3.0

Quarterly Monitoring

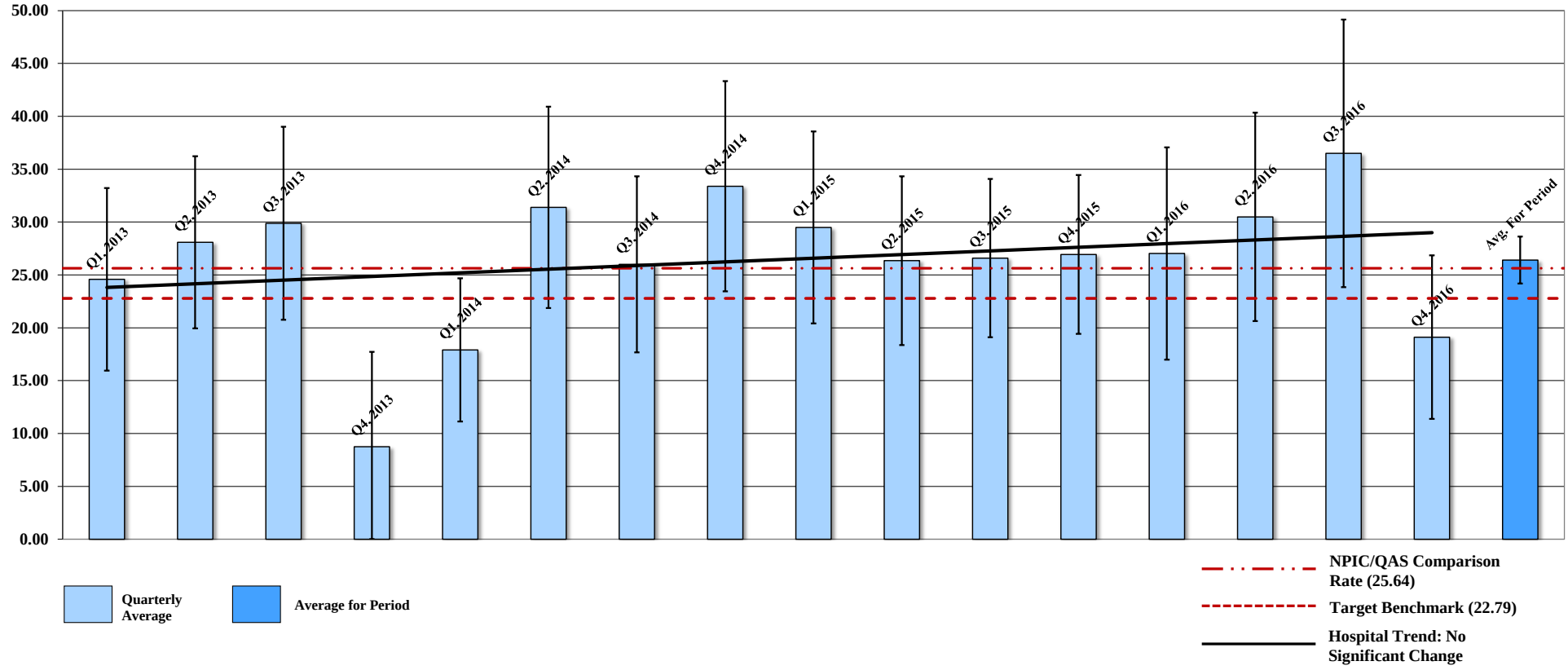


Error Bars represent Margin of Error (90% Confidence Interval).

SAMPLE HOSPITAL - MEMBERS

Severity Index (SI)
(Total weights of all adverse events divided by number of patients with an adverse event)
AOI Version 3.0

Quarterly Monitoring



Error Bars represent Margin of Error (90% Confidence Interval).

APPENDIX

The 10 indicator definitions and the ICD-10 codes used to determine each indicator count for the Adverse Outcome Index can be found at: http://www.npic.org/Services/AOI_ICD-10_Codes.pdf.

AOI ALGORITHM DEFINITIONS (VERSION 3.0)

Definition Deliveries: Cases assigned to any of the following MS DRGs: 765-768, 774-775, or ≥ 981 with an ICD-10- PCS delivery code, and also assigned to any of the following APR-DRGs: 540-542, 560

Definition Inborns: All neonates born in your hospital

In-hospital Maternal Death {Case Weight: 750}
Delivery DRGs and discharge disposition = died

In-hospital Neonatal Death ≥ 2500 grams and ≥ 37 weeks gestation {Case Weight: 400}
Inborns *(Appendix B.1.1; see definition above)* only; neonate ≥ 2500 grams and ≥ 37 weeks gestation with discharge disposition of died within 7 days of birth and excluding cases with congenital anomalies *(Appendix B.2.1)*

Uterine Rupture During Labor {Case Weight: 100}
Delivery DRGs (*Appendix M.1.1; see definition above)* with diagnosis code 071.1 (rupture of uterus during labor) in the primary, first or second diagnosis code positions only

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Unplanned Maternal Admission to the ICU {Case Weight: 65}
Delivery DRGs (*Appendix M.1.1; see definition above)* with DX codes in *Appendix M.3.1* and with an ICU day or charge

OR

Delivery DRGs (*Appendix M.1.1; see definition above)* with DX codes in *Appendix M.3.1* and discharged to another hospital (UB92/UB04 disp=02)

OR

Delivery DRGs (*Appendix M.1.1: see definition above)* with any DX and OPP codes in *Appendix M.3.1*

Birth Trauma {Case Weight: 60}
Inborns *(Appendix B.1.1; see definition above)* only ≥ 2000 grams *(Appendix B.4.1)*; diagnosis codes in *Appendix B.3.1*

Unanticipated Operative Procedure {Case Weight: 40}
Delivery DRGs *(Appendix M.1.1: see definition above)* with procedure codes in *Appendix M.4.1* in the **first** or **second procedure** field

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Admission to NICU of neonate birthweight ≥ 2500 grams and ≥ 37 weeks Gestational Age (GA) for >1 day {Case Weight: 35}**
Inborns *(Appendix B.1.1; see definition above)* only; BW ≥ 2500 grams, GA ≥ 37 weeks, and NICU admission within one day of birth for greater than a day. Excludes cases with congenital anomalies *(Appendix B.2.1)*, fetal hydrops (P83.2), dwarfism (E34.3), or neonatal abstinence syndrome (P96.1 and P96.2, *Appendix B.5.1*)

OR

Inborns *(Appendix B.1.1; see definition above)* with BW ≥ 2500 grams and GA ≥ 37 weeks and transferred to another hospital (UB92/UB04 disp=02 or =05) within 1 day of birth and excludes cases with congenital anomalies *(Appendix B.2.1)*, fetal hydrops (P83.2), dwarfism (E34.3), or neonatal abstinence syndrome (P96.1 and P96.2, *Appendix B.5.1*)

APGAR 5 < 7 {Case Weight: 25}
Inborns *(Appendix B.1.1; see definition above)* only; Birthweight ≥ 2500 grams and ≥ 37 weeks completed gestation and APGAR 5 < 7, excludes cases with congenital anomalies *(Appendix B.2.1)*, fetal hydrops (P83.2) or dwarfism (E34.3)

Maternal Blood Transfusion {Case Weight: 20}
Delivery DRGs **(***Appendix M.1.1; see definition above**)* with procedure codes in *Appendix M.5.1* or Blood Transfusion Indicator = 1 on submitted file.

3rd or 4th Degree Perineal Laceration {Case Weight: 5}
Delivery DRGs *(Appendix M.1.1; see definition above**)*** with diagnosis codes listed in *Appendix M.6.1*.

Delivery MS DRGs effective beginning with 10/1/07 discharges; prior to 10/1/07, Delivery DRGs 370-375 apply.

****Gestational age is determined by the numeric value or ICD-10-CM coding. Cases missing gestational age information default to ≥ 37 weeks if birthweight is ≥ 2000 grams.**