

# Adverse Outcome Index Quarterly Monitoring Report

NPIC ID: SA1 Q1 2017 – Q4 2020

## INTRODUCTION

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<sup>1</sup>.

## 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	Unanticipated Operative Procedure	40
In-hospital Neonatal Death ≥ 2500 grams and ≥ 37 Weeks Gestation*	400	Admission to NICU of Neonate Birthweight ≥ 2500 grams and ≥ 37 Weeks Gestational Age for > 1 Day	35
Uterine Rupture During Labor	100	APGAR 5 < 7	25
Maternal Intensive Care	65	Maternal Blood Transfusion	20
Birth Trauma	60	4th Degree Perineal Laceration	5

*\*In-hospital Maternal Death and In-hospital Neonatal Death ≥ 2500 grams and ≥ 37 Weeks Gestation events are reviewed and confirmed.*

**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.)*

## II. DATA SUBMISSION

**Reporting Period:** 01/01/17 - 12/31/20      **Total Deliveries for the Period:** 10,147      **Total Inborns for the Period::** 10,363

## III. REPORT ANALYSIS FOR YOUR HOSPITAL

The following data represent one way to interpret the findings from your hospital. Each hospital must determine meaningful goals for their own institution. The event counts in Table 1 will help to provide a better understanding of the data contributing to your hospital’s AOI, WAOS and SI quarterly rates. We strongly encourage hospitals to review AOI cases to ensure the accuracy of AOI metrics and to identify any underlying processes that increase the likelihood of errors.

**Table 1: Count of Adverse Events by Indicator** - Displays a quarter-by-quarter count of cases by adverse event, the reporting period average count, and count of deliveries by quarter.

*Note: Due to the limitations of using an administrative data set with separate (non-linked) mother and baby records, we can only determine the number of patients with an adverse event for reporting. This may result in an overstatement of the actual number of deliveries with adverse events if there are cases where a mother and her baby each had events.*

### Q4 2020 Events to Note:

- The total count of Adverse Events decreased from 42 in Q3 2020 to 33 Q4 2020. The average for the reporting period is 31.
- The 1 case in the “In-hospital maternal death” indicator in Q4,2020 was reviewed and confirmed. Severity weight = 750.
- There is 1 case in the “Uterine Rupture During Labor” indicator in Q4 2020. Severity weight = 100.



**Table 2: Indices by Quarter** - Displays hospital AOI, WAOS and SI quarterly rates, the average rates for the reporting period, the NPIC Comparative Rate<sup>1</sup>, and the Target Benchmark rate<sup>2</sup>.

- The AOI rate decreased 15% from .060 in Q3 2020 to .051 in Q4 2020. The reporting period average is .044.
- The WAOS rate increased 66% from 2.04 in Q3 2020 to 3.39 in Q4 2020. The reporting period average is 1.80.
- The SI rate increased 94% from 34.25 in Q3 2020 to 66.55 in Q4 2020. The reporting period average is 40.08.

<sup>1</sup>**NPIC (Comparative) Rate:** Hospitals participating in AOI reporting for CY 2019 = 22 Hospitals

<sup>2</sup>**Target Benchmark:** A subset of comparative rate hospitals with WAOS scores in the top quartile = 6 Hospitals

**Graphs 1- 3:** Display each index by quarter, including average rate for the reporting period, confidence intervals for each data point, NPIC Comparative rate, and Target Benchmark rate.

**Confidence Interval:** Vertical error bars representing the margin of error (90% confidence interval) for each data point.

- **Not Significantly Different:** Data points with error bars that cross the horizontal Target Benchmark or the NPIC Comparative rate,
- **Significantly Different (higher or lower):** Data points with error bars that do not cross the horizontal Target Benchmark or the NPIC Comparative rate.

- **Hospital Trend:** Trend lines with significance are displayed when the reporting period includes four or more quarters of data.
- . - **NPIC (Comparative) Rate:** Dashed dotted horizontal line
- - - **Target Benchmark:** Dashed horizontal line

**Graph 1: Adverse Outcome Index (AOI)** - Reflects the overall rate of cases with an adverse event.

- **The average rate of 0.044** is above the NPIC Comparative Rate (0.042) and significantly higher than the Target Benchmark (0.026).
- The hospital trend is showing a **significant upward trend**.

**Graph 2: Weighted Adverse Outcome Score (WAOS)** - Reflects the severity of adverse events relative to all deliveries.

- **The average rate of 1.80** is above than the NPIC Comparative Rate (1.48) and significantly higher than the Target Benchmark (0.78).
- The hospital trend is showing a **significant upward trend**.



**Graph 3: Severity Index (SI)** - Reflects the severity of the events relative to all cases with an adverse event.

- **The average rate of 40.08** is higher than the NPIC Comparative rate (34.70) and significantly higher than the Target Benchmark (30.91).
- The hospital trend is showing **no significant change in trend**.

*The Version 4.0.1 algorithm logic, and the specific codes associated with each type of adverse event, is available in the Appendix.*

#### **IV. ACKNOWLEDGEMENT**

The AOI Report was developed by the National Perinatal Information Center (NPIC) 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.

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<sup>1</sup>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.



## ADVERSE OUTCOME INDEX (AOI) REPORT

**Table 1: Count of Adverse Events by Indicator**

NPIC ID: SA1	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Avg. For Period
Total Deliveries	634	649	723	594	623	667	704	593	619	650	640	596	642	571	672	570	634
Total Inborns	648	659	737	617	623	682	701	612	653	649	641	615	663	600	675	588	648
In-hospital Maternal Death	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	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	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Maternal Intensive Care	0	0	0	1	1	3	1	1	0	0	3	3	1	1	0	2	1
Birth Trauma	0	0	0	1	2	1	2	1	1	0	0	2	0	0	1	2	1
Unanticipated Operative Procedure	1	1	2	0	4	0	4	4	2	5	3	3	4	1	3	3	3
Admission to NICU, Neonate ≥ 2500 grams and ≥ 37 Weeks Gestation, for > 1 day	12	12	26	22	10	19	16	11	17	30	20	19	21	24	29	17	19
APGAR 5 < 7, Inborn Neonate, ≥ 2500 grams and ≥ 37 Weeks Gestation	3	2	11	2	4	1	3	5	2	3	3	4	2	2	2	2	3
Maternal Blood Transfusion	0	1	1	2	1	4	4	3	1	3	1	2	2	3	6	3	2
4th Degree Perineal Laceration	1	2	3	0	1	4	2	3	0	1	1	2	0	1	1	1	1
<b>Total Adverse Events</b>	<b>17</b>	<b>18</b>	<b>44</b>	<b>28</b>	<b>23</b>	<b>32</b>	<b>33</b>	<b>29</b>	<b>23</b>	<b>42</b>	<b>31</b>	<b>35</b>	<b>30</b>	<b>32</b>	<b>42</b>	<b>32</b>	<b>31</b>
<b>Total Patients with one or more Adverse Events</b>	<b>15</b>	<b>17</b>	<b>35</b>	<b>26</b>	<b>21</b>	<b>31</b>	<b>31</b>	<b>27</b>	<b>21</b>	<b>39</b>	<b>29</b>	<b>31</b>	<b>29</b>	<b>30</b>	<b>40</b>	<b>29</b>	<b>28</b>



# ADVERSE OUTCOME INDEX (AOI) REPORT

**Table 2: Indices by Quarter**

NPIC ID: SA1	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Avg. for Period	NPIC Rate*	Target Benchmark
Adverse Outcome Index (AOI)	0.024	0.026	0.048	0.044	0.034	0.047	0.044	0.046	0.034	0.060	0.045	0.052	0.045	0.053	0.060	0.051	0.044	0.042	0.026
Weighted Adverse Outcome Score (WAOS)	0.85	0.83	1.94	1.66	1.32	1.57	1.66	2.73	1.30	2.14	1.74	2.10	1.64	1.86	2.04	3.39	1.80	1.48	0.78
Severity Index (SI)	36.00	31.76	40.00	37.88	39.05	33.71	37.74	60.00	38.33	35.64	38.45	40.32	36.21	35.33	34.25	66.55	40.08	34.70	30.91

**\*NPIC Comparative Rate Range:**

AOI: 0.018 - 0.076

WAOS: 0.56 - 3.15

SI: 25.13 - 41.95

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

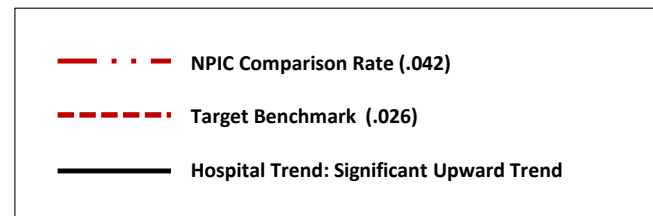
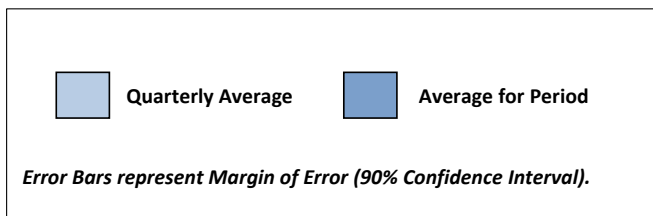
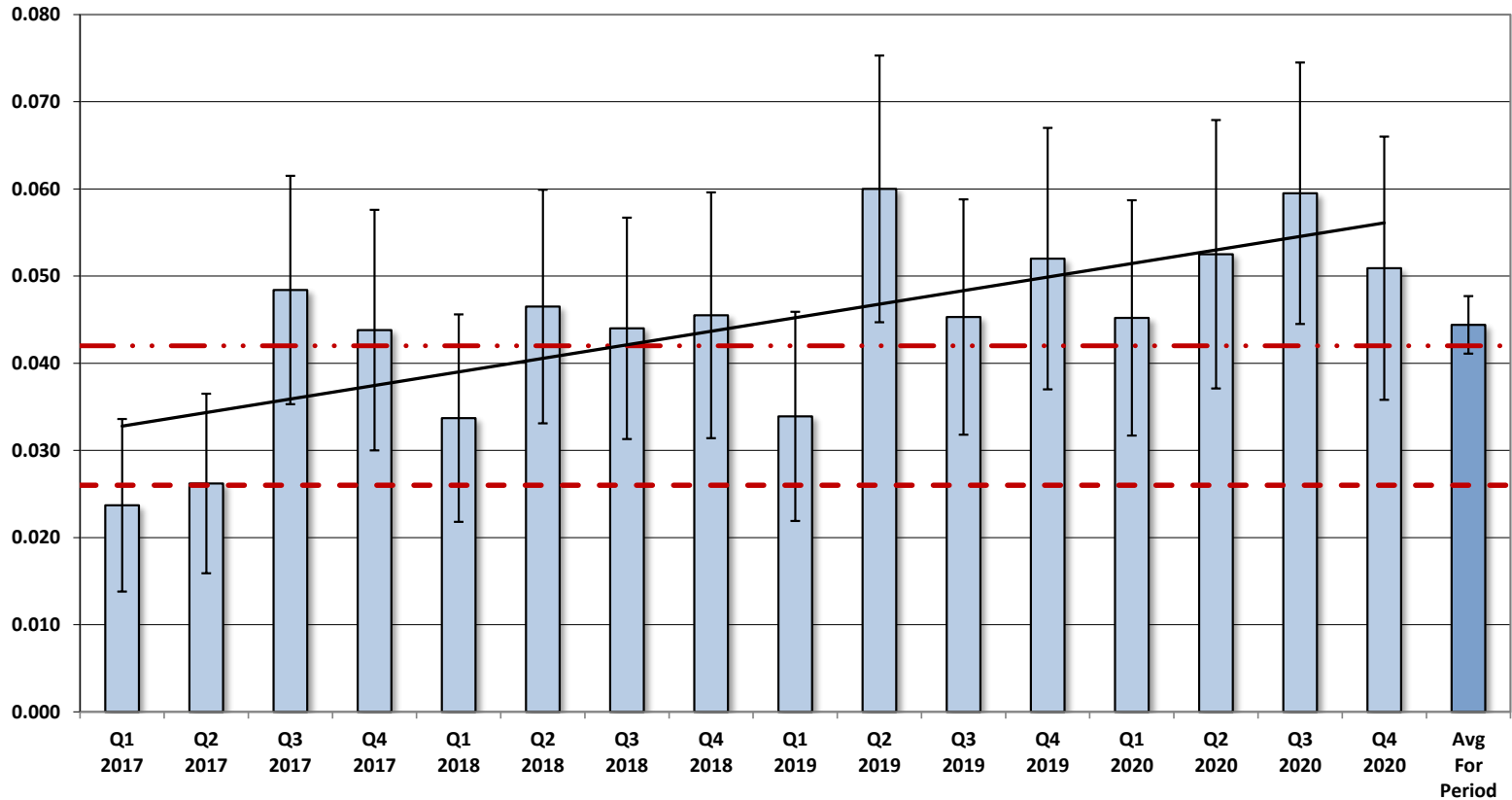


# ADVERSE OUTCOME INDEX (AOI) REPORT

## The Adverse Outcome Index (AOI):

(Number of Patients with an adverse event divided by the total number of deliveries)

NPIC ID: SA1

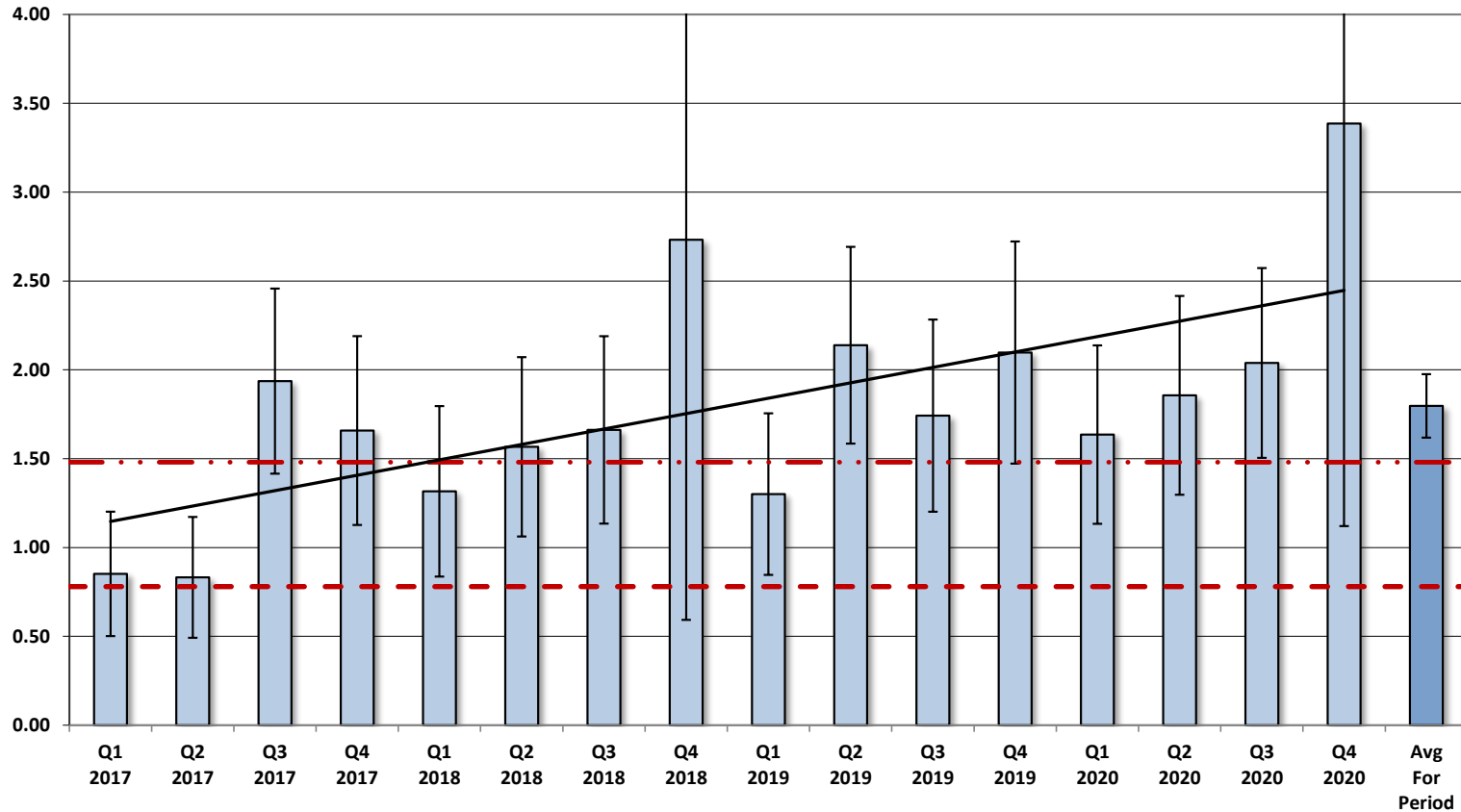




# ADVERSE OUTCOME INDEX (AOI) REPORT

**The Weighted Adverse Outcome Score (WAOS):**  
(Total weights of all adverse events divided by the total number of deliveries)

**NPIC ID: SA1**



Quarterly Average      Average for Period

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

NPIC Comparison Rate (1.48)

Target Benchmark (0.78)

Hospital Trend: Significant Upward Trend



# ADVERSE OUTCOME INDEX (AOI) REPORT

## The Severity Index (SI)

(Total weights of all adverse events divided by the total number of patients with an adverse event)

NPIC ID: SA1

