



Birthing Care Measure Specifications

Contents

Background.....	3
AHRQ Quality Indicators: Crosswalk and Composite Specifications	3
Preface.....	3
Crosswalk to HCUP Coding Conventions.....	3
Race.....	3
Gender.....	3
Discharge Year/Quarter	4
Payer	5
Source of Admission.....	5
Point of Origin	6
Patient Disposition.....	7
Age in Days.....	8
Composite Specifications.....	10
Composite Calculation.....	11
Primary Cesarean Sections (AHRQ IQI 33): Overview	14
Primary Cesarean Sections (AHRQ IQI 33): Exclusions	14
Primary Cesarean Sections (AHRQ IQI 33): Numerator	15
Primary Cesarean Sections (AHRQ IQI 33): Statistical Testing.....	16
OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Overview	17
OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Denominator	18
OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Statistical Testing	18
OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Overview	19
OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Exclusions.....	20
OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Statistical Testing	21
Cost (3M TM APR TM DRGs): Overview	22
Cost (3M APRs): Severity Adjustment.....	23
Aggregate Scoring	23

Background

The goal of this document is to provide transparency in how the quality measures for Birthing Care were calculated. Methodologies for the inclusion of Illinois hospital data with Wisconsin Hospital Association data were audited by an external vendor, Metastar, to ensure fairness between datasets. The foundation of the measure methodology stems from use within prior published reports and relies heavily on the AHRQ software WinQI v4.5.

For questions and comments please contact The Alliance.

AHRQ Quality Indicators: Crosswalk and Composite Specifications

Preface

This document provides the following technical specifications related to the Agency for Healthcare Research Quality Indicator (AHRQ QI):

- Crosswalk to HCUP coding conventions
- Composite specifications

The Crosswalk to HCUP coding conventions is in regard to all AHRQ QIs that appear in Find a Doctor. The composite specifications are for all instances of indexing the AHRQ QIs on the Find a Doctor website with the exception of the third and fourth degree lacerations index, which is AHRQ PSI 18 and 19. Since a distinct composite method is used in this instance, it is discussed in the measure specifications for the lacerations measure.

Crosswalk to HCUP Coding Conventions

The AHRQ QI software requires that users recode data elements in the input files to be consistent with the HCUP coding specifications expected by the software. Several recoding adjustments were made to Wisconsin's all payer inpatient data set. More specifically, the inpatient data set used for Find a Doctor report is as follows (hereafter referred to as "data set"):

UB inpatient claim form data. (All inpatient claims data in the State of Wisconsin). WHA Information Center, LLC, Inpatient Discharge Data, (relational datasets: 4th Quarter 2011 through 3rd Quarter 2013). Includes UB inpatient claim form data and other items as required by Wisconsin State Statutes. This data was supplemented by extracts of Illinois Hospitals with which The Alliance is contracted and merged into a similar format.

The creation of a crosswalk was required for several fields. The specifics of the crosswalk are described below.

Race

Race is a required variable in the AHRQ QI software, without which the software will generate errors. The values 1, 2, and 3 (white, black, Hispanic) are used directly in the AHRQ QI software and all other ethnicity codes are mapped to an "other" category. A dummy variable is created for the race data element setting all observations to missing.

Gender

7/21/2014

Unknown genders were discarded from the data set. There were 6 records matching this criteria for the more than 200K records evaluated

Discharge Year/Quarter

The AHRQ QI software includes two data elements: 1) the patient's year of discharge ("YEAR") and 2) the quarter of discharge ("DQTR"). The data set presents these data elements together. Two separate variables were created "YEAR" and "DQTR" out of the one variable from the data set.

Payer

The following table depicts the crosswalk redefinitions that were necessary for the data set to meet the HCUP coding conventions in regard to primary payer ("First Payer Identifier Group" in the data set).

HCUP Code	HCUP Category	Data Set Code	Data Set Category	Data Set Redefined as:
1	Medicare	1	Medicare	1
2	Medicaid	2	Medical Assistance/BadgerCare	2
3	Private, incl. HMO	3	Other Government (51.42/51.437/46.23 Board, CHAMPUS/CHAMPVA/ TRICARE, Non-Wisconsin Medicaid, General Relief, Wisconsin Care, other government)	6
4	Self-pay	4	Private Insurance (includes self-funded plans and workers' compensation)	3
5	No charge	5	Self Pay	4
6	Other	6	Other or unknown	6

Source of Admission

The following table depicts the crosswalk redefinitions that were necessary for the data set to meet the HCUP coding conventions for WHA data.

HCUP Code	HCUP Category	Data Set Code	Data Set Category	Data Set Redefined as:
			ASOURCE = blank. Newborn ATYPE = 4 (newborn)	5
0	Missing	0	ASOURCE = 0. Newborn ATYPE = 4 (newborn)	5
1	ER	1	Physician Referred	5
2	Another Hospital	2	Clinic Referred	5
3	Another facility, incl. LTC	3	HMO Referred	5
4	Court/Law enforcement	4	Transfer from a Hospital	2
5	Routine/birth/other	5	Transfer from a Skilled Nursing Facility	3
		6	Transfer from another Health Care Facility	3
		7	Emergency Room	1
		8	Court / Law Enforcement	4
		9	Information not Available	5
		A	Transfer from a Critical Access Hospital	2
		B	Transfer from Another Home Health Agency	5
		C	Readmitted to this facility's home health agency within the existing 60 day home health payment episode	0
		D	Admitted to this facility as transfer from another hospital inpatient within this facility resulting in a separate claim to the payer	2
		E	Transfer from Ambulatory Surgery Center	3
		F	Transfer from Hospice-Under Plan or Program	3

The Illinois extract information did not contain admission source (only point of origin and type of visit. For this data a separate crosswalk was created for Source of Admission:

HCUP Code	HCUP Category	Data Set Point of Origin	Data Set Category / Additional Qualifier	Data Set Redefined as:
		6	And Type of Visit=4	2
0	Missing	Any but 6	Type of Visit=4	5
1	ER	Any	And Type of Visit=1	1
2	Another Hospital	5	Transfer from a Skilled Nursing Facility	3
3	Another facility, incl. LTC	6	Transfer from another Health Care Facility	3
4	Court/Law enforcement	D	Admitted to this facility as transfer from another hospital inpatient within this facility resulting in a separate claim to the payer	3
5	Routine/birth/other	E	Transfer from Ambulatory Surgery Center	3
		F	Transfer from Hospice-Under Plan or Program	3
		4	Transfer from a Hospital	2
		8	Court / Law Enforcement	4
		Other	Information not Available	0

Point of Origin

The values in Admission Source or Admission Type are used to determine the values of this data element. This table depicts the crosswalk redefinitions that were necessary for the data set to meet the HCUP coding conventions.

HCUP Code	HCUP Category	Data Set Code (Admission Source)	Data Set Category	Dataset redefined as:
		1	Physician Referred	1
1	Physician Referred	2	Clinic Referred	2
2	Clinic Referred	3	HMO Referred	1
4	Transfer from a Hospital	4	Transfer from a Hospital	4
5	Transfer from a Skilled Nursing Facility or Intermediate Care Facility	5	Transfer from a Skilled Nursing Facility	5
6	Transfer from another Health Care Facility	6	Transfer from another Health Care Facility	6
7	Emergency Room	7	Emergency Room	7
8	Court / Law Enforcement	8	Court / Law Enforcement	8
9	Information not Available	9	Information not Available	9
11	Transfer from Another Home Health Agency	A	Transfer from a Critical Access Hospital	4
12	Readmitted to this facility's home health agency within	B	Transfer from Another Home Health Agency	11

	the existing 60 day home health payment episode			
13	Admitted to this facility as transfer from another hospital inpatient within this facility resulting in a separate claim to the payer	C	Readmitted to this facility's home health agency within the existing 60 day home health payment episode	12
14	Transfer from Ambulatory Surgery Center	D	Admitted to this facility as transfer from another hospital inpatient within this facility resulting in a separate claim to the payer	13
15	Transfer from Hospice-Under Plan or Program	E	Transfer from Ambulatory Surgery Center	6
		F	Transfer from Hospice-Under Plan or Program	15
			ATYPE = 4 (newborn)	1

Patient Disposition

The following table depicts the crosswalk redefinitions that were necessary for the data set to meet the HCUP coding conventions.

HCUP Code	HCUP Category	Data Set Code	<i>Inpatient Data Set Category</i>	Inpatient Data Set Redefined as:
1	Routine	01	Discharged to home or self care (routine discharge)	1
2	Short-term hospital	02	Discharged/transferred to another short-term general hospital	2
3	Skilled Nursing Facility	03	Discharged/transferred to a skilled nursing facility (SNF)	3
4	Intermediate care	04	Discharged/transferred to an intermediate care facility (ICF)	4
5	Another type of facility	05	Discharged/transferred to another type of institution for inpatient care	5
6	Home health care	06	Discharged/transferred to home under care of organized home health service	6
7	Against medical advice	07	Left against medical advice or discontinued care	7
20	Died in hospital	08	Transferred or discharged to a home intravenous provider	6
		09	Admitted as an inpatient to this hospital	omit from denominator
		20	Expired (or did not recover-Christian Science Patient)	20
		21	Transferred to Law Enforcement	5
		40	Expired at home; used only on Medicare and CHAMPUS claims for hospice care	omit from denominator
		41	Expired in a medical facility; used only on Medicare and CHAMPUS claims for hospice care	omit from denominator

		42	Expired – place unknown; used only on Medicare and CHAMPUS claims for hospice care	omit from denominator
		43	Discharged/transferred to a federal hospital	2
		50	Discharged to a Hospice-home	6
		51	Discharged to Hospice-medical facility	5
		61	Discharged/transferred to Medicare approved swing bed	4
		62	Discharged/transferred to another rehab facility	4
		63	Discharged/transferred to a long-term care hospital	3
		64	Discharged/transferred to a nursing facility certified under Medicaid but not certified under Medicare	3
		65	Discharged/transferred to a psychiatric hospital or psychiatric distinct part/unit of a hospital	5
		66	Discharged/transferred to a critical access hospital. CMS approved for Medicare patients (eff. Jan 2006)	2
		70	Discharged/transferred to another type of health care institution not defined elsewhere in this code list (eff. Oct 2007)	5

Age in Days

The AHRQ QI software expects that when the value in the “age” field is zero, there will be a value in the “age in days” field, which would be a number from 0 to 365. If the “age” field contains a figure that is greater than 0, then the value in the field “age in days” will be ignored. A crosswalk needs to be developed in that the inpatient data set does not have a specific value for age in days. Thus, we have to look at two of the inpatient data set fields to determine a reasonable value for age in days to input to the AHRQ QI software. Those fields are:

- “1) newborn”: contains a value indicating which of four ranges the person’s age in days fell within, and
- 2) “admission type”: used to determine if the baby was born in the hospital admission.

If the field “newborn” contains a 1 (age 0 to 7 days) and the “admission type” field contains a 4 (baby born within the hospital), we assign a value of 0 to the fields of “age” and “age in days”. If the “newborn” field contains a 1 (0 to 7 days) and the “admission type” is any value other than 4 *, we assign a 4 (in the middle of the range 0 to 7) to the “age in days” field. If the “newborn” field contains a 2 (age 8 to 28 days), we assign a value of 18 to the “age in days” field. If the “newborn” field contains a 3 (29 to 365 days) we assign a value of 200 to the “age in days” field. In other words, the value assigned to age in days is in the middle of the range indicated by the inpatient data set except where the claim is for a newborn, where the value will be 0.

Finally, if “newborn” field contains a 0, 0 is passed to the “age in days” field. In this case, the inpatient data set record will contain a value for the “age” field which will be passed to the AHRQ QI software, which will, in turn, ignore the value in the “age in days” field.

The following states the above in a table format:

<i>Data Set</i>		<i>AHRQ QI Software</i>			
newborn	+	admission type	=	HCUP age	Category age in days
1 (0 to 7 days)		4 (i.e. newborn)	=	0	0
1 (0 to 7 days)		any other value *	=	0	4

7/21/2014

2 (8 through 28 days)	not relevant	=	0	18
3 (29 through 365 days)	not relevant	=	0	200
0 (1 year or over)	not relevant	=	* *	0

* "admission type" codes other than 4:

- 1 – Emergency: Generally admitted through the emergency room.
- 2 – Urgent: Generally admitted to the first suitable accommodation
- 3 – Elective: Condition permitted adequate time to schedule a suitable accommodation
- 5 – Trauma: Trauma center / licensed/designated by state/local government

* * A figure to denote age in years is inserted from the inpatient data set "age in years" field.

For Illinois extract data age in days is not available for some datasets. For these data Age in days is set to 0 for all patients identified as newborns by Admission Type and 18 days for all other patients of age 0.

7/21/2014

Composite Specifications

Care areas and AHRQ QI composite measures

The composite complication measure for Birthing Care (care area 12), the OB trauma composite (Significant Tearing), includes the following AHRQ QIs:

- Vaginal delivery with instrument (AHRQ PSI 18)
- Vaginal delivery without instrument (AHRQ PSI 19)

Composite Calculation

In 2006 AHRQ announced a call for committee members to construct a composite methodology for the AHRQ QIs. The members were selected from a nomination process and a composite method was identified as a result of the proceedings from the workgroup. The method was released by AHRQ in 2007. The same formula serves as the composite methodology for both the AHRQ PDIs & AHRQ PSIs. The following are the steps to compute the composite methodology are from “AHRQ Quality Indicators Patient Safety Indicators (PSI) Composite Measure”, which can be found on www.ahrq.gov.

Step 1: Compute the risk-adjusted rate and confidence interval

The AHRQ QI risk-adjusted rate is computed based on a logistic regression model for calculating a predicted value for each case, and then summing the predicted value among all the cases in the hospital to compute the expected rate. The risk-adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate multiplied by the reference population rate. The current reference population is the states participating in the HCUP program for 2002 to 2004, consisting of approximately 37 states and 88 million discharges.

Step 2: Scale the risk-adjusted rate using the reference population

The levels of the rates of the AHRQ QIs vary from indicator to indicator. In order to combine the component indicators using a common scale, each indicator is first divided by the reference population rate. The components of the composite are therefore defined as deviations (i.e. a ratio) from the overall mean for each indicator.

Step3: Compute the reliability-adjusted ratio

The reliability-adjusted ratio is computed as the weighted average of the risk-adjusted ratio and the reference population ratio, where the weights vary from zero to one, depending on degree of reliability for the indicator and provider (or other unit of analysis).

reliability-adjusted ratio = [risk-adjusted ratio * weight] + [reference population ratio * (1 – weight)]

For small providers, the weight is closer to zero. For large providers, the weight is closer to one. For a given provider, if the denominator is zero, then the weight assigned is zero (i.e., the reliability-adjusted ratio is the reference population ratio).

Step 4: Compute the component weights

The composite measure is the weighted average of the scaled and reliability-adjusted ratios for the component indicators.

Step 5: Construct the composite measure

The composite measure is the weighted average of the component indicators using the selected weights and the scaled and reliability-adjusted indicators.

Composite = [indicator1 * weight1] + [indicator2 * weight2] + . . . + [indicatorN * weightN]

7/21/2014

The confidence interval on the composite is based on the standard error of the composite, which is the square root of the variance. The variance is computed based on the signal variance-covariance matrix and the reliability weights. Details of the computation are provided below.

Detail 1: Introduction

The AHRQ Quality Indicator risk-adjustment modules begin with estimating a simple logistic model of a 0/1 outcome variable and a set of patient-level covariates as dependent variables, and using the results to form the predicted outcome for each patient (e.g. $P = \text{pr}(\text{outcome}=1)$).

Notation:

Y_{ij} = 0 or 1, outcome for patient j in hospital i.

X_{ij} = covariates (e.g., gender, age, DRG, comorbidity)

P_{ij} = predicted probability from logit of Y on X

$$= \exp(X_{ij}\beta) / [1 + \exp(X_{ij}\beta)]$$

where β is estimated from logit on entire sample.

$e_{ij} = Y_{ij} - P_{ij}$ = logit residual (difference between actual and expected).

n_i = number of patients in sample at hospital i.

α = average outcome in the entire sample (e.g. \bar{Y}).

Detail 2: Computing the Noise Variance

Estimate the Risk Adjusted Ratio (RAR) and Noise Variance using the Ratio Method of Indirect Standardization for each Hospital:

Detail 2.1: Estimating RAR:

let $O_i = (1/n_i)\sum(Y_{ij})$ be the observed rate at hospital i

let $E_i = (1/n_i)\sum(P_{ij})$ be the expected rate at hospital i

RAR_i

$$= \alpha(O_i/E_i) = \alpha [(1/n_i)\sum(Y_{ij})] / [(1/n_i)\sum(P_{ij})] \quad (\text{where sum is for } j = 1 \text{ to } j = n_i)$$

= population rate * observed/expected at hospital i.

Detail 2.2: Estimating Variance of RAR (SE is the square root):

$\text{Var}(RAR_i)$

$$= \text{Var}[\alpha(O_i/E_i)]$$

$$= (\alpha/E_i)^2 \text{Var}[O_i] \quad (\text{since } \text{var}(aX) = a^2 \text{var}(X) \text{ for any constant } a)$$

$$= (\alpha/E_i)^2 \text{Var}[(1/n_i)\sum(Y_{ij})] \quad (\text{by the definition of } O_i)$$

$$= (\alpha/E_i)^2 (1/n_i)^2 \text{Var}[\sum(Y_{ij})] \quad (\text{since } \text{var}(aX) = a^2 \text{var}(X) \text{ for any constant } a)$$

$$= (\alpha/E_i)^2 (1/n_i)^2 [\sum \text{Var}(Y_{ij})] \quad (\text{since } \text{var}(\sum X_i) = \sum \text{var}(X_i) \text{ if } X_i \text{ are independent})$$

$$= (\alpha/E_i)^2 (1/n_i) \sum [P_{ij}(1 - P_{ij})] \quad (\text{since } Y \text{ is } 0/1, \text{ so } \text{var}(Y) = P(1-P))$$

Detail 3: Computing the Composite Variance

1) Setup

a) Let M be a $1 \times K$ vector of observed quality measures (for a given hospital, suppress hospital subscript for convenience), noisy measures of the true underlying $1 \times K$ quality vector μ , so that:

i) $M = \mu + \varepsilon$

ii) Let the $K \times K$ signal variance-covariance be $\text{Var}(\mu) = \Omega_\mu$

iii) Let the $K \times K$ noise variance-covariance be $\text{Var}(\varepsilon) = \Omega_\varepsilon$

b) Let $\hat{\mu}$ ($1 \times K$) be the posterior (filtered) estimate of μ , so that:

i) $\hat{\mu} = \mu + v$, where the $1 \times K$ vector v represents the prediction error of the posterior estimates, and $\text{Var}(v)$ is the $K \times K$ variance-covariance matrix for these posterior estimates.

c) The goal is to estimate the variance for any weighted average of the posterior estimates. For a given ($K \times 1$) weighting vector (w), this is given by:

i) $\text{Var}(vw) = \text{Var } w' (v) w$

Thus, we simply need an estimate of $\text{Var}(v)$.

2) Special Case: Filtered estimates are formed in isolation for each measure (univariate) and the estimation error is assumed not correlated across measures (e.g. each measure based on different sample of patients or independent patient outcomes).

a) Forming each measure in isolation, using superscripts to indicate the measure ($k=1, \dots, K$)

as above, so:

i) $\hat{\mu}^k = M^k \beta^k = M^k [\Omega^{kk} + \Omega^{kk}]^{-1} \Omega^{kk}$

ii) $\text{Var}(v^k) = \Omega_\mu^{kk} - \Omega_\mu^{kk} (\Omega_\mu^{kk} + \Omega_\varepsilon^{kk})^{-1} \Omega_\mu^{kk} = \Omega_\mu^{kk} (1 - \beta^k)$

iii) Note that in this simple case the filtered estimate is a simple shrinkage estimator and:

(1) β^k is the signal ratio of measure k , also is the reliability of the measure, and is the r -squared measuring how much of the variation in the true measure can be explained with the filtered measure.

(2) The variance of the filtered estimate is simply the signal variance times one minus the signal ratio. Thus, if the signal ratio is zero (no information in the measure), the error in the estimate is equal to the signal variance. But as the signal ratio grows, the error in the estimate shrinks (to zero if there is a signal ratio of 1 – no noise).

b) The formula for $\text{Var}(v^k)$ above provides the diagonal elements of $\text{Var}(v)$ (the full $K \times K$ variance-covariance matrix of the filtered estimates). So, get the covariance elements, which are (for $j \neq k$):

i) $\text{Cov}(v^j, v^k) = E[(\mu^j - \hat{\mu}^j)(\mu^k - \hat{\mu}^k)]$

ii) After some algebra (assuming independent estimation error in the two measures), one gets the following simple expression:

(1) $\text{Cov}(v^j, v^k) \Omega_\mu^{jk} = (1 - \beta^j)(1 - \beta^k)$

iii) Note that this is just the signal covariance, times one minus the signal ratio for each of the measures. Thus, if the signal ratio is zero for each measure, the covariance in the estimates is simply the signal covariance. As either measure gets a stronger signal ratio (becomes more precise), the covariance in the estimates shrinks to zero.

iv) Also note that if one measure is missing, then the signal ratio is simply set to zero – the filtered estimate is shrunk all the way back to the (conditional) mean, and the variance and covariance are as defined above.

Primary Cesarean Sections (AHRQ IQI 33): Overview

Measure Source

Agency for Healthcare Research and Quality Patient Safety Indicators (AHRQ PSIs) (release: technical specifications: version 4.5, May 2013)

Analysis Period

4th Quarter 2011 through 3rd Quarter 2013 inclusive

Data Sources

1. WHA Information Center, LLC, Inpatient Discharge Data, (relational datasets from the analysis period)
2. Illinois Hospital Extract data of Inpatient Claims as Provided by Hospitals over the Analysis Period

Denominator

All deliveries as defined by MS-DRG 765 - 768, 774, 775

Exclusions

1. Discharge Status: Admitted as an inpatient to this hospital
2. Cases with the following: Abnormal presentation, preterm delivery, fetal death, multiple gestation diagnosis codes, breech procedure codes, or a previous cesarean delivery diagnosis in any diagnosis field.

(See "Exclusions" section for specifics).

Numerator

Cesarean deliveries, identified by DRG, MS-DRG, or by ICD-9-CM procedure codes if they are reported without a hysterotomy procedure.

(See "Numerator" section for specifics).

Statistical Testing

Performance measured at the 95% confidence interval.

(See the "Statistical Testing" section for specifics).

Primary Cesarean Sections (AHRQ IQI 33): Exclusions

1. Discharge Status: Admitted as an inpatient to this hospital (discharge status = 09)
2. Exclude abnormal presentation, preterm delivery, fetal death, multiple gestation diagnosis, breech procedure, or a previous cesarean delivery diagnosis in any ICD-9-CM diagnosis field.

Abnormal presentation, preterm, fetal death and multiple gestation diagnosis codes

ICD-9-CM diagnosis codes	Description	ICD-9-CM diagnosis codes	Description
64420	EARLY ONSET DELIV-UNSPEC	65230	TRANSV/OBLIQ LIE-UNSPEC
64421	EARLY ONSET DELIVERY-DEL	65231	TRANSVER/OBLIQ LIE-DELIV
65100	TWIN PREGNANCY-UNSPEC	65233	TRANSV/OBLIQ LIE-ANTEPAR
65101	TWIN PREGNANCY-DELIVERED	65240	FACE/BROW PRESENT-UNSPEC
65103	TWIN PREGNANCY-ANTEPART	65241	FACE/BROW PRESENT-DELIV
65110	TRIPLT PREGNANCY-UNSPEC	65243	FACE/BROW PRES-ANTEPART
65111	TRIPLT PREGNANCY-DELIV	65260	MULT GEST MALPRESEN-UNSP
65113	TRIPLT PREG-ANTEPARTUM	65261	MULT GEST MALPRES-DELIV

65120	QUADRUPLET PREG-UNSPEC		65263	MULT GES MALPRES-ANTEPAR
65121	QUADRUPLET PREG-DELIVER		65640	INTRAUTERINE DEATH-UNSP
65123	QUADRUPLET PREG-ANTEPART		65641	INTRAUTER DEATH-DELIVER
65130	TWINS W FETAL LOSS-UNSP		65643	INTRAUTER DEATH-ANTEPART
65131	TWINS W FETAL LOSS-DEL		66050	LOCKED TWINS-UNSPECIFIED
65133	TWINS W FETAL LOSS-ANTE		66051	LOCKED TWINS-DELIVERED
65140	TRIPLETS W FET LOSS-UNSP		66053	LOCKED TWINS-ANTEPARTUM
65141	TRIPLETS W FET LOSS-DEL		66230	DELAY DEL 2ND TWIN-UNSP
65143	TRIPLETS W FET LOSS-ANTE		66231	DELAY DEL 2ND TWIN-DELIV
65150	QUADS W FETAL LOSS-UNSP		66233	DELAY DEL 2 TWIN-ANTEPAR
65151	QUADS W FETAL LOSS-DEL		66960	BREECH EXTR NOS-UNSPEC
65153	QUADS W FETAL LOSS-ANTE		66961	BREECH EXTR NOS-DELIVER
65160	MULT GES W FET LOSS-UNSP		67810	FETAL CONJOIN TWINS-UNSP
65161	MULT GES W FET LOSS-DEL		67811	FETAL CONJOIN TWINS-DEL
65163	MULT GES W FET LOSS-ANTE		67812	FETAL CONJOIN TWINS-ANTE
65180	MULTI GESTAT NEC-UNSPEC		7615	MULT PREGNANCY AFF NB
65181	MULTI GESTAT NEC-DELIVER		V271	DELIVER-SINGLE STILLBORN
65183	MULTI GEST NEC-ANTEPART		V272	DELIVER-TWINS, BOTH LIVE
65190	MULTI GESTAT NOS-UNSPEC		V273	DEL-TWINS, 1 NB, 1 SB
65191	MULT GESTATION NOS-DELIV		V274	DELIVER-TWINS, BOTH SB
65193	MULTI GEST NOS-ANTEPART		V275	DEL-MULT BIRTH, ALL LIVE
65220	BREECH PRESENTAT-UNSPEC		V276	DEL-MULT BRTH, SOME LIVE
65221	BREECH PRESENTAT-DELIVER		V277	DEL-MULT BIRTH, ALL SB
65223	BREECH PRESENT-ANTEPART			

Breech procedure codes

ICD-9-CM procedure codes	Description	ICD-9-CM procedure codes	Description
7251	PART BRCH EXTRAC W FORCP	7253	TOT BRCH EXTRAC W FORCEP
7252	PART BREECH EXTRACT NEC	7254	TOT BREECH EXTRAC NEC

Previous cesarean delivery diagnosis codes

ICD-9-CM diagnosis codes	Description
65420	PREV C-SECT NOS-UNSPEC
65421	PREV C-SECT NOS-DELIVER
65423	PREV C-SECT NOS-ANTEPART

Primary Cesarean Sections (AHRQ IQI 33): Numerator

Cesarean deliveries, identified by DRG, or by ICD-9-CM procedure codes if they are reported without a 7491 hysterotomy procedure code.

Cesarean delivery MS-DRGs

MS-DRG	Description
765	CESAREAN SECTION W CC/MCC
766	CESAREAN SECTION W/O CC/MCC

Cesarean delivery ICD-9-CM procedure codes

ICD-9-CM procedure	Description
--------------------	-------------

codes	
740	CLASSICAL C-SECTION
741	LOW CERVICAL C-SECTION
742	EXTRAPERITONEAL C-SECT
744	CESAREAN SECTION NEC
7499	CESAREAN SECTION NOS

Exclude the following ICD-9-CM procedure codes:

ICD-9-CM procedure codes	Description
7491	HYSTEROTOMY TO TERMIN PG

Primary Cesarean Sections (AHRQ IQI 33): Statistical Testing

1. Calculating Standard Errors for the Observed Rates

1) The root mean squared error (RMSE) for each QI for “Hospital J” is:

$$RMSE = \sqrt{RATE_j * (1 - RATE_j)}$$

where RATE_j is the observed rate for the AHRQ primary c section quality indicator and “Hospital J”

2) The standard error (SE) on the observed rate for “Hospital J” is:

$$SE = RMSE / \sqrt{N_j}$$

where N_j is the denominator for the AHRQ primary c section quality indicator and “Hospital J”

3) The 95% confidence interval (CI) on the observed rate for “Hospital J” for the AHRQ primary c section quality indicator is:

$$\text{Lower confidence interval} = \text{“Hospital J” observed rate} - (1.96 * SE)$$

$$\text{Upper confidence interval} = \text{“Hospital J” observed rate} + (1.96 * SE)$$

4) For example, if the rate for “Hospital J” for AHRQ primary c section quality indicator is Rate=0.10 and the denominator is N=200, then the lower bound 95% CI is:

$$\begin{aligned} 0.10 - 1.96 * \sqrt{(0.10 * (1 - 0.10)) / 200} &= \\ 0.10 - 1.96 * 0.021213 &= \\ 0.10 - 0.041578 & \end{aligned}$$

and the upper bound 95% CI is:

$$\begin{aligned} 0.10 + 1.96 * \sqrt{(0.10 * (1 - 0.10)) / 200} &= \\ 0.10 + 1.96 * 0.021213 &= \\ 0.10 + 0.041578 & \end{aligned}$$

2. Decision Rules

If the expected rate for the AHRQ quality indicator for the hospital was within the bounds of the risk adjusted confidence interval of the reference population rate (which is contained in the AHRQ QI software output), hospital J was marked to have the rate as expected, i.e.; not different than the expected.

On the other hand, if the reference population rate for the indicator for the hospital was out of bounds of the confidence interval of the risk adjusted rate, the hospital was marked to have a rate significantly different than the expected. In that case, if the upper bound of the confidence interval was less than the reference population rate, the performance of the hospital on this indicator was denoted as a smaller number of events than expected. Otherwise, if the lower bound of the confidence interval was greater than the reference population rate, the performance of the hospital on this indicator was noted as a higher number of events than expected.

Given the above, performance for a given hospital is viewed as follows:

Less than expected: the confidence interval is below the benchmark rate, this value is assigned 5 stars

As expected: the confidence interval contains the benchmark rate, this value is assigned 3 stars

More than expected: the confidence interval is above the benchmark rate, this value is assigned 1 star

OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Overview

Measure Source

Agency for Healthcare Research and Quality Patient Safety Indicators (AHRQ PSIs)
(release: technical specifications: version 4.5, May 2013)

Analysis Period

4th Quarter 2011 through 3rd Quarter 2013 inclusive

Data Sources

1. WHA Information Center, LLC, Inpatient Discharge Data, (relational datasets from the analysis period)
2. Illinois Hospital Extract data of Inpatient Claims as Provided by Hospitals over the Analysis Period

Denominator

All vaginal delivery discharges with any procedure code for instrument-assisted delivery
(see the "Denominator" section of this measure for specifics)

Exclusions

Exclusions include:

Discharge Status: Admitted as an inpatient to this hospital (discharge status = 09)

Numerator

An ICD-9-CM code for a third or a fourth degree laceration in any diagnosis or procedure field:

Third degree laceration ICD-9-CM diagnosis codes:

66420, 66421, 66424

Fourth degree laceration ICD-9-CM diagnosis codes:

66430, 66431, 66434

Severity Adjustment

Severity adjustment developed by the Agency for Healthcare Research and Quality.

Statistical Testing

Statistical testing applied for a composite of the following AHRQ PSIs:

1. OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18)
2. OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19)

(see the "Statistical Testing" section of this measure for specifics)

OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Denominator

All vaginal delivery discharges with any procedure code for instrument-assisted delivery.
(see below for specifics)

Vaginal delivery MS DRGs

MS DRG	Description
767	VAGINAL DELIVERY W/ STERILIZATION &/OR D&C
768	VAGINAL DELIVERY W O.R. PROC EXCEPT STERIL &/OR D&C
774	VAGINAL DELIVERY W COMPLICATING DIAGNOSES
775	VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES

Instrument-assisted delivery procedure codes

ICD-9-CM procedure codes	Description
720	Low forceps operation
721	Low forceps operation W/ episiotomy
7221	Mid forceps operation W/ episiotomy
7229	Other mid forceps operation
7231	High forceps operation W/ episiotomy
7239	Other high forceps operation
724	Forceps rotation of fetal head
7251	Partial breech extraction W/ forceps to aftercoming head
7253	Total breech extraction W/ forceps to aftercoming head
726	Forceps application to aftercoming head
7271	Vacuum extraction W/ episiotomy
7279	Vacuum extraction delivery NEC
728	Other specified instrumental delivery
729	Unspecified instrumental delivery

OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18): Statistical Testing

In order to combine the two OB trauma indicators into a single indicator, one needs to compute the weighted average of the risk-adjusted rates and the associated variances. Because the two indicators have mutually exclusive denominators, the weight is the relative denominator share.

PSI 18: OB Trauma - Vaginal Delivery with Instrument

PSI 19: OB Trauma - Vaginal Delivery without Instrument

1. Compute the combined risk-adjusted rate

$$W_{18} = \text{PPPS18} / (\text{PPPS18} + \text{PPPS19})$$

$$W_{19} = \text{PPPS19} / (\text{PPPS18} + \text{PPPS19})$$

Where PPPSxx is the denominator for all hospitals during the analysis period

$$\text{Combined rate} = (W_{18} * \text{RPPS18}) + (W_{19} * \text{RPPS19})$$

Where RPPSxx is the risk-adjusted rate for a given hospital.

2. Compute the combined variance (standard error)

Perform the following calculating for PSI 18:

$$X = (\text{Risk adjusted rate upper bound confidence interval} - \text{risk-adjusted rate}) / 1.96 \text{ or}$$

$$X = (\text{Risk adjusted rate lower bound confidence interval} - \text{risk-adjusted rate}) / -1.96$$

$$\text{Variance} = X * X$$

Perform the following calculating for PSI 19:

$$X = (\text{Risk adjusted rate upper bound confidence interval} - \text{risk-adjusted rate}) / 1.96 \text{ or}$$

$$X = (\text{Risk adjusted rate lower bound confidence interval} - \text{risk-adjusted rate}) / -1.96$$

$$\text{Variance} = X * X$$

$$\text{Variance of the combined rate} = ((W_{18} * W_{18}) * VPPS18) + ((W_{19} * W_{19}) * VPPS19)$$

Where VPPSxx is the Variance.

$$\text{Standard error of the combined rate} = \text{SQRT}(\text{Variance of the combined rate})$$

3. Compute a 95% confidence interval for the combined rate

$$\text{Upper bound} = \text{combined rate} + (1.96 * \text{standard error of the combined rate})$$

$$\text{Lower bound} = \text{combined rate} - (1.96 * \text{standard error of the combined rate})$$

4. Compute the benchmark rate

A. Compute the percent of occurrences of PSI 18 and 19 in all included data during the analysis period

B. Multiply the figure for PSI 18 yielded in "A" immediately above by the reference population rate (from the AHRQ QI output table) for PSI 18. Repeat the calculation for PSI 19.

C. Add the figures for PSI 18 and PSI 19 in "B" immediately above. This is the benchmark rate.

5. Comparing the confidence interval for the combined rate with the benchmark rate

Given the above, performance for a given hospital is viewed as follows:

Less than expected: the confidence interval is below the benchmark rate, this value is assigned 5 stars

As expected: the confidence interval contains the benchmark rate, this value is assigned 3 stars

More than expected: the confidence interval is above the benchmark rate, this value is assigned 1 star

OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Overview

Measure Source

Agency for Healthcare Research and Quality Patient Safety Indicators (AHRQ PSIs)
(release: technical specifications: version 4.5, May 2013)

Analysis Period

4th Quarter 2011 through 3rd Quarter 2013 inclusive

Data Source

1. WHA Information Center, LLC, Inpatient Discharge Data, (relational datasets from the analysis period)
2. Illinois Hospital Extract data of Inpatient Claims as Provided by Hospitals over the Analysis Period

Denominator

All vaginal delivery discharges (MS-DRG 767, 768, 774, 775)

Exclusions

Exclusions include:

Discharge Status: Admitted as an inpatient to this hospital (discharge status = 09)

2. Instrument-assisted deliveries

(see the "Exclusion" section of this measure for specifics)

Numerator

An ICD-9-CM code for a third or a fourth degree laceration in any diagnosis or procedure field:

Third degree laceration ICD-9-CM diagnosis codes:

66420, 66421, 66424

Fourth degree laceration ICD-9-CM diagnosis codes:

66430, 66431, 66434

Severity Adjustment

Severity adjustment developed by the Agency for Healthcare Research and Quality.

Statistical Testing

Statistical testing applied for a composite of the following AHRQ PSIs:

1. OB Trauma - Vaginal Delivery with Instrument (AHRQ PSI 18)
2. OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19)

(see the "Statistical Testing" section of this measure for specifics)

OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Exclusions

1. Discharge Status: Admitted as an inpatient to this hospital (discharge status = 9)
 2. Instrument-assisted deliveries
- (see below for details)

Instrument-assisted delivery procedure codes

ICD-9-CM procedure codes	Description
720	Low forceps operation
721	Low forceps operation W/ episiotomy
7221	Mid forceps operation W/ episiotomy
7229	Other mid forceps operation
7231	High forceps operation W/ episiotomy
7239	Other high forceps operation
724	Forceps rotation of fetal head
7251	Partial breech extraction W/ forceps to aftercoming head
7253	Total breech extraction W/ forceps to aftercoming head
726	Forceps application to aftercoming head
7271	Vacuum extraction W/ episiotomy

7/21/2014

7279	Vacuum extraction delivery NEC
728	Other specified instrumental delivery
729	Unspecified instrumental delivery

OB Trauma - Vaginal Delivery without Instrument (AHRQ PSI 19): Statistical Testing

In order to combine the two OB trauma indicators into a single indicator, one needs to compute the weighted average of the risk-adjusted rates and the associated variances. Because the two indicators have mutually exclusive denominators, the weight is the relative denominator share.

PSI 18: OB Trauma - Vaginal Delivery with Instrument

PSI 19: OB Trauma - Vaginal Delivery without Instrument

1. Compute the combined risk-adjusted rate

$$W_{18} = \text{PPPS18} / (\text{PPPS18} + \text{PPPS19})$$

$$W_{19} = \text{PPPS19} / (\text{PPPS18} + \text{PPPS19})$$

Where PPPSxx is the denominator for all hospitals during the analysis period

$$\text{Combined rate} = (W_{18} * \text{RPPS18}) + (W_{19} * \text{RPPS19})$$

Where RPPSxx is the risk-adjusted rate for a given hospital.

2. Compute the combined variance (standard error)

Perform the following calculating for PSI 18:

$$X = (\text{Risk adjusted rate upper bound confidence interval} - \text{risk-adjusted rate}) / 1.96 \text{ or}$$

$$X = (\text{Risk adjusted rate lower bound confidence interval} - \text{risk-adjusted rate}) / -1.96$$

$$\text{Variance} = X * X$$

Perform the following calculating for PSI 19:

$$X = (\text{Risk adjusted rate upper bound confidence interval} - \text{risk-adjusted rate}) / 1.96 \text{ or}$$

$$X = (\text{Risk adjusted rate lower bound confidence interval} - \text{risk-adjusted rate}) / -1.96$$

$$\text{Variance} = X * X$$

$$\text{Variance of the combined rate} = ((W_{18} * W_{18}) * \text{VPPS18}) + ((W_{19} * W_{19}) * \text{VPPS19})$$

Where VPPSxx is the Variance.

$$\text{Standard error of the combined rate} = \text{SQRT}(\text{Variance of the combined rate})$$

3. Compute a 95% confidence interval for the combined rate

$$\text{Upper bound} = \text{combined rate} + (1.96 * \text{standard error of the combined rate})$$

$$\text{Lower bound} = \text{combined rate} - (1.96 * \text{standard error of the combined rate})$$

4. Compute the benchmark rate

A. Compute the percent of occurrences of PSI 18 and 19 in all included data during the analysis period

7/21/2014

B. Multiply the figure for PSI 18 yielded in "A" immediately above by the reference population rate (from the AHRQ QI output table) for PSI 18. Repeat the calculation for PSI 19.

C. Add the figures for PSI 18 and PSI 19 in "B" immediately above. This is the benchmark rate.

5. Comparing the confidence interval for the combined rate with the benchmark rate

Given the above, performance for a given hospital is viewed as follows:

Less than expected: the confidence interval is below the benchmark rate, this value is assigned 5 stars

As expected: the confidence interval contains the benchmark rate, this value is assigned 3 stars

More than expected: the confidence interval is above the benchmark rate, this value is assigned 1 star

Cost (3M™ APR™ DRGs): Overview

Measure Source

3M™ APR™ DRG Classification System

(Release: Severity adjustment: 3M™ APR™ DRGs version 31, October 2013 release.

Severity of Illness (SOI) subclass values, outlier definitions and relative weights are contained in the APR DRG version 30 release.

Analysis Period

4th Quarter 2011 through 3rd Quarter 2013 inclusive

Data Sources

1. WHA Information Center, LLC, Inpatient Discharge Data, (relational datasets from the Analysis Period)
2. Illinois Hospital Extract data of Inpatient Claims as Provided by Hospitals over the Analysis Period

Denominator

All Care Areas

Exclusions

Exclusions include:

1. Discharged as dead (discharge status = 20, 40, 41, 42)
2. Discharge Status: Admitted as an inpatient to this hospital (discharge status = 09)
3. Transfers from an acute care facility (admit source (non-newborns) = 4, A or D)
4. Transfers to another acute care facility (discharge status = 02, or 66)
5. Left against medical advice (discharge status = 07)
6. Cases less than \$100 per day of charges (where LOS 0 is 1 day, LOS 1 is 2 days, etc)
7. Outliers (based on length of stay) as defined in 3M APR DRGs
8. Ungroupable cases (APR DRG 955 & 956)
9. Non-commercially insured cases (in other words, exclude all codes in the primary payer field except for "4")

Numerator

Not applicable to measure

Severity Adjustment

Severity adjusted using 3M™ APR™ DRGs where each case in the denominator is assigned a severity of illness. See "Severity Adjustment" section for specifics.

Statistical Testing

Not applicable to measure. Reporting of performance is based on percentiles/quartiles.

Percentiles are based on network hospitals with a minimum denominator of 30 that have quality findings in at least one quality measure in the care area. The cost information depicted on our provider directory will depict cost performance as follows:

7/21/2014

1st quartile: Icon indicating low cost choice
2nd, 3rd quartile, and 4th quartiles: No icon display

Cost (3M APRs): Severity Adjustment

Repricing

Denominator cases are repriced based on amounts and terms of the agreement between The Alliance and the hospital. Any performance adjustments (e.g. adjustments based on mortality, rate of electronic claims submission) are not calculated in the repriced figures in this measure.

Denominator cases are repriced prior to employing the severity adjustment discussed below.

Severity Adjustment

As noted in the "Overview" section, the severity adjustment occurs using 3M APR DRGs where each case in the denominator is assigned a severity of illness. After assigning a relative weight to each case in the denominator, the following steps are applied to calculate a hospital's severity adjusted cost (i.e. repriced amounts):

1. Add the relative weight for each case for a given hospital ("total hospital weight").

2. Compute the mean relative weight for each network hospital:

"total hospital weight" divided by denominator = "mean hospital weight"

3. Add the repriced amount for each case for a given hospital ("total hospital reprice").

4. Compute each hospital's mean repriced amount:

"total hospital reprice" divided by denominator = "mean hospital reprice"

5. Compute the mean relative weight for all network hospitals:

Add the relative weights for all denominator cases of the network hospitals and divide by the number of cases in the network = "network weight"

6. Compute a "hospital refined weight" for each network hospital:

"mean hospital weight" divided by "network weight" = "hospital refined weight"

7. Develop a severity adjusted repriced amount for each hospital, which reflects the repriced amount to serve the average consumer in regard to severity of illness:

"mean hospital reprice" divided by "hospital refined weight" = "severity adjusted reprice"

Aggregate Scoring

The results for quality scoring are determined by calculating the average of Primary C-Section score (1,3, or 5 stars) and the composite score for obstetrical trauma (1, 3, or 5 stars). Ties are resolved by looking at the hospital safety score and returning hospitals with the better hospital safety score first.