

2008 CCS Report - Guide to Interpretation

Please contact the CPQCC data center at support@cpqcc.org if you have any questions about this document. This document was last updated on 06/15/2009.

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Introduction

The annual CPQCC-CCS Report serves a dual purpose of fulfilling the CCS requirement to report on all NICU activity of CCS-accredited hospitals, as well as, efficiently utilizing the mortality and morbidity-specific outcomes based on the CPQCC database. In previous years, hospitals were required by CCS to report activity on all infants. Through CPQCC membership, some of the data that was previously required of hospitals is now directly abstracted from the CPQCC database, and then combined with data submitted by Centers through the annual CCS Supplemental form.

This year's CPQCC-CCS final report format has been revised to facilitate presentation and interpretation. The report contains data from two sources, the CCS supplemental form, and the CPQCC database.

The CCS supplemental form includes the number of live births at your hospital, and NICU admission, transfer, and mortality information that is based on ALL NICU admissions, provided that the infant was born during 2008 and was less than a year old at the time of admission. This information is used to propagate the All Births, NICU Admissions, and NICU Transfer statistics on Tables A and C of the CCS report. It is also used to propagate the All Admissions Mortality table on Table B of the CCS report.

The CCS supplemental form is based on ALL NICU admissions in order to include infants who otherwise would be excluded from the CPQCC database. These include: 1) any infant who is admitted or transported-in to the NICU after Day 28; 2) any infant whose birth weight is less than 401 grams AND whose gestational age is outside of the 22 weeks 0 days and 29 weeks 6 days (inclusive) range; 3) any infant weighing greater than 1,500 grams who does not have evidence of significant illness (severe acuity) such as death, acute transfer in or out, major surgery, prolonged ventilation, hyperbilirubinemia and/or exchange transfusion; 4) any infant weighing greater than 1500 grams who is transported for convalescent care.

The CPQCC database is used to generate birth weight specific mortality and morbidity data and is based on a subset of your NICU admissions. This data is used to generate Tables D to H, and J of the CCS Report. To be included in the CPQCC database an infant must be admitted to the NICU prior to 28 days of life. In addition, if the infant is over 1,500 grams there must be evidence of significant illness such as death, acute transfer in or out, major surgery, prolonged ventilation, etc. These restrictions are in order to be able to compare your outcomes with those reported in similar national databases. Information from the CPQCC database is used to propagate the CPQCC mortality and the CPQCC birth weight specific Morbidity tables found in the report.

In summary, the CCS supplemental information is used to provide a synopsis of the overall activity in your NICU based on ALL admissions. The CPQCC database is used to provide birth weight specific mortality and morbidity rates that can be compared across California and the nation based on the subset of 401 to 1,500 grams or 22 to 29 6/7 weeks gestation and > than 1,500 gram high acuity infants admitted in the first 28 days of life.

Section A. Hospital Births and NICU Admissions by Birth Weight

All quantities described below are displayed by birth weight group for 2008.

- Total Live Births in your Center - Includes ALL live births of babies born anywhere in your hospital.
- Total Admissions to your NICU - Includes ALL inborn and outside admissions admitted to your NICU.
- Inborn Admissions to your NICU - Includes ALL infants who were admitted to your NICU after birth without being previously discharged or transferred out.
- Outside Admissions to your NICU - Includes 1) transfers into your NICU of an inpatient from another facility (inborn or outborn); or 2) admissions to your NICU of any outborn infant regardless of location, e.g., home, another area in you hospital, ER, doctor's office; or 3) inborn re-admissions. Note that one infant might have had multiple outside admissions.
- Acute Outside Admissions to your NICU - An Acute Outside Admission is defined as the admission of an infant with medical problems that require urgent care. If the infant is an acute transfer-in, then the care that is medical, diagnostic, or surgical therapy is not provided, or cannot be provided due to temporary staffing / census issues, or insurance restrictions at the referring hospital.
- Non-Acute Outside Admissions to your NICU - A Non-Acute Outside Admission is an admission for growth care, discharge planning care, chronic care, convalescent care, and/or hospice care. If an infant is a non-acute transfer-in, then the infant's initial medical, diagnostic, and surgical needs have been met, and the infant's condition has been stabilized. The medical needs of non-acute transfers-in may range from extensive and extremely complex care to minimal care for feeding and growth.

Section B. NICU Deaths for 2008 by Birth Weight

All quantities described below are displayed by birth weight group for 2008.

- In-Hospital Infant Mortality Rate per 1,000 NICU Admissions - Calculated as the ratio of the sum of neonatal and neonatal deaths to infants while in your NICU or under the care of your NICU staff regardless of the location in your hospital divided by the total number of NICU admissions and multiplied by 1,000.
- Total Number of Deaths of Infants Admitted to your NICU - Number of deaths of infants admitted to your NICU or under the care of your NICU staff regardless of the location in your hospital.
- Total Number of Deaths Prior to and Including Day 28 - Number of deaths of infants admitted to your NICU or under the care of your NICU staff regardless of the location in your hospital that occurred prior to or on the day on which the infant was 28 days (neonatal deaths).
- Total Number of Deaths After Day 28 - Number of deaths of infants admitted to your NICU or under the care of your NICU staff regardless of the location in your hospital that occurred after the day on which the infant was 28 days (postneonatal deaths).

- **Delivery Room Deaths** - Number of deaths that occurred in your Delivery Room or initial resuscitation area within 12 hours of birth and prior to NICU admission.

Section C. NICU Transfers Out by Birth Weight

All quantities described below are displayed by birth weight group for 2008.

- **Total Number of Infants Transferred Out** - Number of infants transferred out of your NICU to another facility or another unit in your hospital. The total number of infants transferred out is the sum of acute and non-acute transfers out.
- **Acute Transfers Out** - The number of infants with medical problems that require acute resolution for survival who are transferred out in order to obtain medical, diagnostic, or surgical therapy that is not provided, or that cannot be provided due to temporary staffing / census issues, or insurance restrictions at your hospital. A transfer is considered acute if the primary reason for the transfer was NOT feeding / growing or convalescent reasons. Acute transfers occur to get resources that are not available at your hospital.
- **Non-Acute Transfers Out** - The number of infants whose initial medical / surgical needs have been met; whose condition has been stabilized; and who are transferred-out in order to obtain growth care, discharge planning care, chronic care, or hospice care. The medical needs of non-acute transfers may range from extensive and extremely complex care to minimal care for feeding and growth.

Section D. NICU Activity and Outcomes Overview

All high-level summary statistics are displayed for 2008.

- **Average Daily Census** - The occupancy of all on-site, licensed NICU beds. Does not include other hospitals or satellite facilities in the same system.
- **Total Number of Surgeries** - The total number of surgeries reported in the CPQCC database that was performed at your facility. Circumcision is not included in the total number of surgeries. ECMO, ECMO cannulation, ECMO decannulation, peritoneal dialysis, placement or removal of peritoneal dialysis catheters, chest tube placement, or central line placement are not considered surgeries and not included in the total number of surgeries. For a complete list of all surgeries included, please review the surgeries coded in CPQCC.
- **Number of Inborn Infants > 1,500 grams admitted to NICU** - Displays the total number of infants weighing more than 1,500 grams that were born at your facility and then admitted to your NICU without a prior discharge.
- **Number of Severe Acuity (CPQCC) Inborn Infants > 1,500 grams Admitted to NICU** - The number of infants weighing more than 1,500 grams that were born at your facility and were admitted to your NICU and for whom a CPQCC record was submitted. A CPQCC record is submitted for all infants > 1,500 grams who are admitted to your NICU within 28 days of birth and who experienced one of the following events: infant death, surgery, ventilation > 4 hours, acute transfer in, acute transfer out, early bacterial sepsis, or re-admission for hyperbilirubinemia.

- Average LOS for Infants 401 to 1,500 grams or 22 to 29 Weeks Gestation Discharged Home - The average length of stay (in days) for inborn or outborn infants 401 to 1,500 grams or 22 to 29 completed weeks of gestation at birth who were admitted to your NICU and discharged home from your NICU.
- Observed to Expected Ratio with 95% Confidence Limits - The ratio of your average LOS described above to a statistically expected LOS based on the entire population of CPQCC infants and upon risk factors in your patients. A ratio lower than 1 means your infants were discharged home sooner than predicted by the statistical model. A ratio higher than 1 means your infants were discharged home later than predicted by the statistical model. The two numbers shown in parentheses are the 95% confidence limits for the O/E ratio. A lower confidence limit exceeding 1 indicates that the length of stay in your center was statistically significantly longer than expected; an upper confidence limit less than 1 indicates that the length of stay in your center was statistically significantly shorter than expected. The statistical model uses multivariable logistic regression and takes into account your facility's mix of infant race, sex, gestational age, severity of congenital malformation, birth weight, 5-minute Apgar score, location of birth (inborn/outborn), multiple gestation, and whether or not the mother received prenatal care.
- In-Hospital Mortality Rate per 1,000 Infants 401 to 1,500 grams or 22 to 29 weeks Gestation - The in-hospital death rate for inborn or outborn infants 401 to 1,500 grams or 22 to 29 completed weeks of gestation at birth who were admitted to your NICU.
- Observed to expected ratio with 95% confidence limits - The ratio of your in-hospital mortality rate described above to a statistically expected rate based on the entire population of CPQCC infants and upon risk factors in your patients. A ratio lower than 1 means your mortality rate was lower than predicted by the statistical model. A ratio higher than 1 means your mortality rate was higher than predicted by the statistical model. The two numbers shown in parentheses are the 95% confidence limits for the O/E ratio. A lower confidence limit exceeding 1 indicates that the mortality in your center was statistically significantly higher than expected; an upper confidence limit less than 1 indicates that the mortality in your center was statistically significantly lower than expected. The statistical model uses multivariable logistic regression and takes into account your facility's mix of infant race, sex, gestational age, severity of congenital malformation, birth weight, 5-minute Apgar score, location of birth (inborn/outborn), multiple gestation, and whether or not the mother received prenatal care.

Section E. California Hospital Assessment and Reporting Task Force (CHART) Measures

Selected CHART measures are displayed for 2008.

- % Nosocomial Infection for Infants 401 to 1,500 grams or 22 to 29 Weeks of Gestation - The percent of infants 401 to 1,500 grams or 22 to 29 weeks of gestation who acquire a nosocomial

infection at your facility. Nosocomial infections include late bacterial, Coag Neg Staph, and fungal infections.

- Observed to Expected Ratio with 95% Confidence Limits - The ratio of your nosocomial infection rate to a statistically expected rate based on the entire population of CPQCC infants and upon risk factors in your patients. A ratio lower than 1 means your infection rate was lower than predicted by the statistical model. A ratio higher than 1 means your infection rate was higher than predicted by the statistical model. The two numbers shown in parentheses are the 95% confidence limits for the O/E ratio. A lower confidence limit exceeding 1 indicates that the incidence of nosocomial infections in your center was statistically significantly higher than expected; an upper confidence limit less than 1 indicates that the incidence of nosocomial infections in your center was statistically significantly lower than expected. The risk-adjustment is based on a multivariable logistic regression model and takes into account your facility's mix of infant race, sex, gestational age, severity of congenital malformation, birth weight, 5-minute Apgar score, location of birth (inborn/outborn), multiple gestation, and whether or not the mother received prenatal care.
- % of Discharges of Infants 401 to 1,500 grams or 22 to 29 Weeks Gestation to Home on Any Breast Milk - The percent of infants 401 to 1,500 grams or 22 to 29 weeks of gestation at birth discharged home from your center who were either exclusively breastfed or who received a mix of formula and breast milk. For infants with unknown breast milk use, it is assumed that the infant did not receive breast milk.
- Observed to Expected Ratio with 95% Confidence Limits - The ratio of your breast milk percentage to a statistically expected percentage based on the entire population of CPQCC infants and upon risk factors in your patients. A ratio lower than 1 indicates breast milk use at home discharge was lower than expected based on our statistical model. A ratio higher than 1 indicates breast milk use at home discharge was higher than expected. The two numbers shown in parentheses are the 95% confidence limits of the O/E ratio. A lower confidence limit exceeding 1 indicates that the breast milk use at home discharge was statistically significantly higher than expected; an upper confidence limit less than 1 indicates that breast milk use at home discharge was statistically significantly lower than expected. The risk-adjustment is based on multivariable logistic regression and takes into account your facility's mix of infant race, sex, gestational age, severity of congenital malformation, birth weight, 5-minute Apgar score, location of birth (inborn/outborn), multiple gestation, and whether or not the mother received prenatal care.
- % of Discharges of Infants 401 to 1500 grams or 22 to 29 Weeks Gestation Evaluated for ROP - The percent of discharged infants 401 to 1,500 grams or 22 to 29 weeks of gestation at birth who were evaluated for retinopathy of prematurity (ROP). Only infants are included in this percentage that were eligible to receive an eye exam as determined by gestational age at birth, age in days at admission to, length of stay at, and discharge status from your facility. In other words, infants who were not at your facility at the time when they should have received their eye exam relative to their gestational age at birth are not included. Note that if an infant is transferred out from and transferred back to your center, it is included in the set of infants

eligible for an eye exam if gestational age criteria are met and the baby is at either your facility or at the facility of the interim stay when it should have received the ROP evaluation. For infants with unknown eye exam status, it is assumed that the infant did not receive an eye exam.

Section F. Percent of Eligible Infants 401 to 1,500 grams or 22 to 29 Weeks Gestation Receiving Interventions Associated with Improved (ANS, Cranial Imaging, ROP Exam, Breast Milk) or with Compromised (Postnatal Steroids) Outcomes

This graph shows the percentage of your facilities' infants 401 to 1,500 grams or 22 to 29 weeks of gestation at birth who received the listed interventions.

The red star represents the percentage of infants receiving the intervention at your center. The blue line is the interquartile (25th to 75th percentile) range for all CPQCC centers. In other words, 25% of CPQCC centers had an observed intervention percentage lower than the left endpoint of the blue line; and 25% of CPQCC centers had an observed intervention higher than the right end point of the blue line.

The calculation of each measure is based on the appropriate subset of eligible infants as explained below:

- For Antenatal Steroids, only those infants are included who were born at your center and who were 24 to 33 completed weeks of gestation at birth. Infants with unknown antenatal steroid usage are assumed to not have received antenatal steroids.
- The measure Cranial Imaging Prior to Day 28 is based on all babies. Infants for whom cranial imaging prior to day 28 is reported as unknown are assumed to not have had cranial imaging.
- ROP Eye Exam Prior Discharge is based on those infants who are eligible for an eye exam as determined by gestational age at birth, age in days at admission to, length of stay at, and discharge status from your facility. For infants with unknown eye exam status, it is assumed that the infant did not receive an eye exam.
- The Home Discharge on at least Some Breast Milk measure only includes infants who were discharged home from your center. For infants with unknown breast milk use, it is assumed that the infant did not receive breast milk.
- The Postnatal Steroids for CLD measure is based on a) infants with evidence of CLD; and b) infants who received postnatal steroids for CLD at your center. A different definition for infants with evidence of CLD has been adopted for the 2008 CCS report compared to prior CCS reports. For the purpose of this report, an infant is considered as having CLD if i) the infant is hospitalized and on oxygen at 36 weeks adjusted gestational age; ii) the infant is discharged home on oxygen at 34 or 35 weeks adjusted gestational age; iii) the infant is transferred out on oxygen at 34 or 35 weeks adjusted gestational age and not transferred back to your center.
Note that starting from the 2008 CCS report, the postnatal steroids for CLD measure does not include infants who received postnatal steroids for CLD outside your facility.

Section G. Percent of Infants 401 to 1,500 grams or 22 to 29 Weeks Gestation with Selected Morbidities

Section G shows the observed percentage of your facility's infants who were 401 to 1,500 grams or 22 to 29 weeks gestation at birth with selected morbidities. Note that the numbers shown in Section G are not adjusted for your center's case mix. Section J displays risk-adjusted numbers.

The red star represents the percent of infants with the observed morbidity. The blue line shows the interquartile (25th to 75th percentile) range for all CPQCC centers. In other words, 25% of CPQCC centers had an observed morbidity percentage lower than the left endpoint of the blue line; and 25% of CPQCC centers had an observed morbidity percentage higher than the right end point of the blue line.

For all morbidities shown in Section G, only observations with non-missing observations for the listed outcome are included. For instance, if it is not known whether or not an infant has NEC, this infant is not included in the percentage calculations for NEC.

- The percent of infants with Pneumothorax only includes those infants with evidence of pneumothorax at your facility.
- A revised definition of Chronic Lung Disease (CLD) has been adopted for the 2008 CCS reports. For the purpose of this report, an infant is considered as having CLD if i) the infant is hospitalized and on oxygen at 36 weeks adjusted gestational age; ii) the infant is discharged home on oxygen at 34 or 35 weeks adjusted gestational age; iii) the infant is transferred out on oxygen at 34 or 35 weeks adjusted gestational age and not transferred back to your center. Infants who were transferred out prior to 34 weeks of adjusted gestational age and not on oxygen at discharge are included in the denominator as they are assumed to not have had CLD; however infants who were transferred out prior to 34 weeks adjusted gestational age and on oxygen at the time of discharge are not included in any calculations since their CLD status is unknown. All other infants who were not hospitalized at 36 weeks adjusted gestational age are not included in the CLD percentage.
- The percent of infants Discharged Home on Oxygen only includes infants with known oxygen at discharge status who went home from your center (possibly after being transferred out from and transferred back to your center).
- The percent of infants with a Nosocomial Infection is based on infants with a late bacterial, Coag Neg Staph, or fungal infection that was first diagnosed at your facility. This measure includes infants who were in your hospital on or after day 3 of birth; infants who were never in your center on or after day 3 are excluded.
- The percent of infants with a Coag Neg Staph Infection is based on infants who were first diagnosed with Coag Neg Staph at your center. Only infants who were hospitalized in your facility on or after day 3 are included.
- The percent of infants with a Fungal Infection is based on infants who were first diagnosed with a fungal infection at your center. Only infants who were hospitalized in your facility on or after day 3 are included.

- The Any IVH morbidity outcome is the percentage of infants with any grade of peri-intraventricular hemorrhage relative to all infants with a cranial exam within 28 days of birth.
- The Severe IVH morbidity outcome is the percentage of infants with grades 3 and 4 of peri-intraventricular hemorrhage relative to all infants with a cranial exam within 28 days of birth.
- The percent of IVH with Shunt for IVH is the number of infants who had peri-intraventricular hemorrhage (grades 1 through 4) who also had a shunt placed relative to all infants with peri-IVH.
- The PVL morbidity outcome is based on infants diagnosed with PVL relative to all infants who ever had a cranial image done.
- The Any ROP morbidity outcome is the percentage of infants with evidence of retinopathy of prematurity stages 1 through 5 relative to all infants with an eye exam.
- The Severe ROP morbidity outcome is the percentage of infants with evidence of stage 3 through 5 ROP relative to all infants with an eye exam.
- The NEC morbidity outcome is based on all infants admitted to your NICU.
- The percent of infants with NEC surgery is calculated as the number of infants with NEC surgery at your facility relative to all infants with evidence of NEC.
- An infant is considered Cold-Stressed if its first temperature within 1 hour of NICU admission ranges from 36 to 36.4°C. An infant is considered Hypothermic if its first temperature within 1 hour of NICU admission is under 36°C. The percentages are based on all infants admitted to your NICU with known first temperature at NICU admission.

Section H. Observed to Expected Ratios for Major Morbidities of Infants 401 to 1,500 Grams or 22 to 29 Weeks Gestation

For Section H the measures shown in Section G are risk-adjusted using multivariable logistic regression. The red star shows your facility's observed to expected ratio for each morbidity measure. The observed to expected ratio compares the observed number of events to those expected based on the entire population of CPQCC infants and upon the specific risk factors in your patients. A ratio lower than 1 means fewer of your infants had the condition than predicted by the statistical model. A ratio higher than 1 means more of your infants had the condition than predicted by the statistical model.

The blue line shows the 95% confidence limits of the O/E ratio: A lower confidence limit exceeding 1 indicates that the morbidity experience in your center was statistically significantly higher than expected; an upper confidence limit less than 1 indicates that the morbidity experience in your center was statistically significantly lower than expected.

The risk-adjustment is based on multivariable logistic regression taking into account your facility's case mix of infant race, sex, gestational age, severity of congenital malformation, birth weight, 5-minute Apgar score, location of birth (inborn/outborn), multiple gestation, and whether or not the mother received any prenatal care.

For the specific definition of each measure displayed in Section H please consult the narrative for Section G.

Section I. Inventory of Active Perinatal Quality Improvement Projects

This section summarizes quality improvement projects actively pursued in your center in 2008. It was designed to fulfill several purposes:

1. To support the California Children's Services' goal to monitor quality improvement efforts for all CCS-approved units.
2. To fulfill the American Board of Pediatrics' requirement for Quality Improvement Competency Validation for Sub-specialty Recertification for neonatologists.
3. To provide CPQCC Members a convenient summary of neonatal improvement activities that would be useful to submit to the Joint Commission and other similar organizations.

For each project, its title, specific aim, target population, project leader, project leader contact information, description, start date, and project Institute for Health Improvement (IHI) Level are shown. The IHI level assessment may be based on preliminary CPQCC data available in December of the report year with final updates if indicated when CPQCC database for the report year closes.

Section J. Frequency of Surgical Procedures

Only surgeries that were performed at your center are included in Section J. If an infant that was hospitalized in your center had surgeries outside your facility, those surgeries are not counted in Section J.

J-1 PDA Ligations by Birth Weight

Section J-1 displays the number of PDA ligations performed in your center by birth weight along with the percentage of infants that was discharged home, transferred out, or died.

J-2 Surgical Procedures by Discharge Status

Section J-2 shows the number of surgical procedures performed in your center by broad surgical category along with the percentage of infants that was discharged home, transferred, or died.

J-3 Select Individual Surgery Cases

Section J-3 shows for selected surgeries the birth weight and disposition of each baby who underwent the surgery in your center.

J-4 Frequency of Surgical Complications

This section shows whether or not a surgical complication occurred, regardless of the location of the complication and regardless of location of the surgery/surgeries.

Section K. Inventory of Inborn Expirations

Section K lists the birth date, death date, age at death, birth weight, gestational age, primary cause of death, and location of death for each inborn infant that died in your facility. Section K does not include stillbirths, delivery room deaths, or infants who expired within 12 hours of birth who were never admitted to the NICU. All inborn deaths with no birth weight, gestational age, or age at death limitation are listed.

Section L. Inventory of Transfer-In Expirations

Section L lists the birth date, death date, age at death, birth weight, gestational age, primary cause of death, and location of death for each infant that was transferred to your facility and then died in your facility. The outside admissions expirations include all acute and non-acute outside admissions with no birth weight, gestational age, age at admission, or age at death limitation.

Section M. Inventory of Delivery Room Expirations

Section M lists birth date, birth weight, gestational age, primary cause of death, and location of death for each infant that died in your delivery room or initial resuscitation area within 12 hours of birth and prior to NICU admission with no limitation on birth weight or gestational age. Stillbirths are not included.

Section N. Confirmation

This section shows when the 2008 CCS report was confirmed.