

# NATIONAL QUALITY FORUM

## Measure Submission and Evaluation Worksheet 5.0

This form contains the information submitted by measure developers/stewards, organized according to NQF's measure evaluation criteria and process. The evaluation criteria, evaluation guidance documents, and a blank online submission form are available on the [submitting standards web page](#).

NQF #: 0482      NQF Project: <a href="#">Perinatal and Reproductive Health Project</a>
(for Endorsement Maintenance Review) Original Endorsement Date: <a href="#">Oct 24, 2008</a> Most Recent Endorsement Date: <a href="#">Oct 24, 2008</a>
<b>BRIEF MEASURE INFORMATION</b>
De.1 Measure Title: <a href="#">First NICU Temperature &lt; 36 degrees Centigrade</a>
Co.1.1 Measure Steward: <a href="#">Vermont Oxford Network</a>
De.2 Brief Description of Measure: <a href="#">Proportion of infants with birth weights between 501 to 1500 grams with first temperature measured within one hour of admission to the neonatal intensive care unit (NICU) below 36 degrees centigrade.</a>
2a1.1 Numerator Statement: <a href="#">Infants whose birth weight is between 501-1500 grams and whose temperature first measured within one hour of admission to the NICU and is less than 36 degrees centigrade.</a>
2a1.4 Denominator Statement: <a href="#">Number of infants with birth weights between 501 and 1500 grams whose temperature was measured within one hour of admission to the NICU.</a>
2a1.8 Denominator Exclusions: <a href="#">1. Infants outside the birth weight range 501 to 1500 grams. 2. Outborn infants admitted more than 28 days after birth. 3. Outborn infants who have been home prior to admission. 4. Infants not admitted to the NICU. 5. Infants whose temperature is not measured within one hour of admission to the NICU.</a>
1.1 Measure Type: <a href="#">Outcome</a> 2a1. 25-26 Data Source: <a href="#">Administrative claims, Electronic Clinical Data : Registry, Paper Records</a> 2a1.33 Level of Analysis: <a href="#">Facility</a>
1.2-1.4 Is this measure paired with another measure? <a href="#">No</a>
De.3 If included in a composite, please identify the composite measure (title and NQF number if endorsed): <a href="#">N/A</a>

<b>STAFF NOTES</b> <i>(issues or questions regarding any criteria)</i>
Comments on Conditions for Consideration:
Is the measure untested? Yes <input type="checkbox"/> No <input type="checkbox"/> If untested, explain how it meets criteria for consideration for time-limited endorsement:
1a. Specific national health goal/priority identified by DHHS or NPP addressed by the measure (check De.5): 5. Similar/related <a href="#">endorsed</a> or submitted measures (check 5.1): Other Criteria:
Staff Reviewer Name(s):

### 1. IMPACT, OPPORTUNITY, EVIDENCE - IMPORTANCE TO MEASURE AND REPORT

NQF #0482 First NICU Temperature < 36 degrees Centigrade

Importance to Measure and Report is a threshold criterion that must be met in order to recommend a measure for endorsement. All three subcriteria must be met to pass this criterion. See [guidance on evidence](#).  
**Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.**  
[\(evaluation criteria\)](#)

1a. High Impact: H  M  L  I

(The measure directly addresses a specific national health goal/priority identified by DHHS or NPP, or some other high impact aspect of healthcare.)

De.4 Subject/Topic Areas (Check all the areas that apply): Perinatal

De.5 Cross Cutting Areas (Check all the areas that apply): Safety

1a.1 Demonstrated High Impact Aspect of Healthcare: Affects large numbers, Frequently performed procedure, Patient/societal consequences of poor quality, Severity of illness

1a.2 If "Other," please describe:

1a.3 Summary of Evidence of High Impact (Provide epidemiologic or resource use data):

Hypothermia on admission to the NICU is frequent for very low birth weight and preterm neonates, varies significantly among hospitals, and is associated with increased risks for morbidity and mortality. In the Vermont Oxford Network Database for 2006, 61% of the 46,000 infants 501 to 1500 grams from 632 hospitals had admission temperatures below 36.5 deg C; 25% of the hospitals had rates over 76%; and rates varied dramatically among different units (VON 2007). The median temperatures on admission ranged from 35.3 degrees at 23 weeks to 36.4 degrees at 29 weeks. In the EPICure study of all infants born under 26 weeks at 276 hospitals in the UK and Ireland during a ten month period in 1995, 40% had admission temperatures below 35 deg C and infants with admission temperatures over 35 deg C had lower mortality (adjusted OR 0.58 (0.39- 0.85) (Costeloe 2000). In a study of over 5,000 infants 401 to 1499 grams from 15 centers in the NICHD Neonatal Research Network in 2002 and 2003, 50% had admission temperatures under 36 deg C (Laptook 2007). Furthermore, after adjusting for patient characteristics, admission temperature was inversely related to the risks for mortality and late onset sepsis.

1a.4 Citations for Evidence of High Impact cited in 1a.3: 1. Vermont Oxford Network Annual VLBW Database Summary. Horbar JD, Carpenter JH, Kenny M, eds. Vermont Oxford Network Burlington, VT.2008.

2. Costeloe K, Hennessy E, Gibson AT, et al. The EPICure Study: Outcomes to Discharge From Hospital for Infants Born at the Threshold of Viability. Pediatrics 2000;106:659-71.

3. 3. Laptook AR, Salhab W, Bhaskar B, and the Neonatal Research Network. Admission Temperature of Low Birth Weight Infants: Predictors and Associated Morbidities. Pediatrics 2007;119:e643-e649.

1b. Opportunity for Improvement: H  M  L  I

(There is a demonstrated performance gap - variability or overall less than optimal performance)

1b.1 Briefly explain the benefits (improvements in quality) envisioned by use of this measure:

Given the wide variation in admission temperatures observed among different units it is likely that improved attention to thermoregulation in the delivery room and during transport to the NICU can substantially reduce the frequency of hypothermia on admission, and may improve mortality and morbidity.

1b.2 Summary of Data Demonstrating Performance Gap (Variation or overall less than optimal performance across providers):

**[For Maintenance** – Descriptive statistics for performance results for this measure - distribution of scores for measured entities by quartile/decile, mean, median, SD, min, max, etc.]

In the Vermont Oxford Network Database for 2006, 61% of the infants 501 to 1500 grams from 632 hospitals had admission temperatures below 36.5 deg C; 25% of the hospitals had rates over 76%; and rates varied dramatically among different units (VON 2007).

1b.3 Citations for Data on Performance Gap: **[For Maintenance** – Description of the data or sample for measure results reported in 1b.2 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included]

46,000 infants 501 to 1500 grams birth weight at 632 hospitals

**1b.4 Summary of Data on Disparities by Population Group:** [*For Maintenance – Descriptive statistics for performance results for this measure by population group*]

Not available

**1b.5 Citations for Data on Disparities Cited in 1b.4:** [*For Maintenance – Description of the data or sample for measure results reported in 1b.4 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*]

N/A

**1c. Evidence** (*Measure focus is a health outcome OR meets the criteria for quantity, quality, consistency of the body of evidence.*)  
 Is the measure focus a health outcome? Yes  No  **If not a health outcome, rate the body of evidence.**

Quantity: H  M  L  I  Quality: H  M  L  I  Consistency: H  M  L  I

Quantity	Quality	Consistency	Does the measure pass subcriterion1c?
M-H	M-H	M-H	Yes <input type="checkbox"/>
L	M-H	M	Yes <input type="checkbox"/> IF additional research unlikely to change conclusion that benefits to patients outweigh harms: otherwise No <input type="checkbox"/>
M-H	L	M-H	Yes <input type="checkbox"/> IF potential benefits to patients clearly outweigh potential harms: otherwise No <input type="checkbox"/>
L-M-H	L-M-H	L	No <input type="checkbox"/>

Health outcome – rationale supports relationship to at least one healthcare structure, process, intervention, or service

**Does the measure pass subcriterion1c?**  
 Yes  IF rationale supports relationship

**1c.1 Structure-Process-Outcome Relationship** (*Briefly state the measure focus, e.g., health outcome, intermediate clinical outcome, process, structure; then identify the appropriate links, e.g., structure-process-health outcome; process- health outcome; intermediate clinical outcome-health outcome*):

Health outcomes: neonatal morbidity and mortality

Intermediate clinical outcome and process: temperature on admission to the NICU influenced by the process of care in the delivery room and the interventions (heat source and setting, room temperature, thermal protection such as plastic wrap, bubble wrap bag, thermal hat ) used by the delivery room team.

Structure: delivery team composition and training, equipment and supplies in the delivery room

Team structure and delivery room equipment and supplies are closely linked with the ability of a team to perform and execute appropriate thermal control in the delivery room. In turn, these will influence admission temperature. Body temperature has a major effect on oxygen consumption, CO2 production and metabolic rate which are presumed to mediate the effects of hypothermia on morbidity and mortality.

**1c.2-3 Type of Evidence** (*Check all that apply*):

Clinical Practice Guideline, Selected individual studies (rather than entire body of evidence), Systematic review of body of evidence (other than within guideline development)

**1c.4 Directness of Evidence to the Specified Measure** (*State the central topic, population, and outcomes addressed in the body of evidence and identify any differences from the measure focus and measure target population*):

The evidence applies to very low birth weight infants.

**1c.5 Quantity of Studies in the Body of Evidence** (*Total number of studies, not articles*): A Cochrane review of seven interventional studies involving 391 infants used additional preventative actions in the first 10 minutes of life to prevent problems with hypothermia. Results showed that the use of special plastic wraps or bags, plastic caps, heated mattresses and skin-to-skin contact kept the infants warmer than routine preventative action. Limitations included the small numbers of infants and studies

included; variations in the methods and definitions of normal body temperature, routine care; and the use of different materials. Although this review confirmed that some of these measures are effective in preventing hypothermia, we do not yet know the long-term consequences of these interventions therefore the authors recommend that further research is carried out. (McCall 2010)

**1c.6 Quality of Body of Evidence** (Summarize the certainty or confidence in the estimates of benefits and harms to patients across studies in the body of evidence resulting from study factors. Please address: a) study design/flaws; b) directness/indirectness of the evidence to this measure (e.g., interventions, comparisons, outcomes assessed, population included in the evidence); and c) imprecision/wide confidence intervals due to few patients or events): **Observational data of good quality and limited data from randomized trial.**

**1c.7 Consistency of Results across Studies** (Summarize the consistency of the magnitude and direction of the effect): **The studies of association are consistent.**

**1c.8 Net Benefit** (Provide estimates of effect for benefit/outcome; identify harms addressed and estimates of effect; and net benefit - benefit over harms):  
**Uncertain**

**1c.9 Grading of Strength/Quality of the Body of Evidence.** Has the body of evidence been graded? **No**

**1c.10** If body of evidence graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias: **N/A**

**1c.11 System Used for Grading the Body of Evidence:** **Other**

**1c.12** If other, identify and describe the grading scale with definitions: **N/A**

**1c.13 Grade Assigned to the Body of Evidence:** **N/A**

**1c.14 Summary of Controversy/Contradictory Evidence:** **There is good evidence of an association between hypothermia on admission and adverse outcomes for very low birth weight infants as well as plausible physiologic reasons to expect the association. However, data from randomized controlled trials are limited and do not allow any conclusions regarding the effectiveness of specific interventions to prevent hypothermia in this population.**

**1c.15 Citations for Evidence other than Guidelines**(*Guidelines addressed below*):  
**N/A**

**1c.16 Quote verbatim, the specific guideline recommendation** (Including guideline # and/or page #):  
Guidelines for Perinatal Care. Sixth Edition. American Academy of Pediatrics. American College of Obstetricians and Gynecologists. Elk Grove, IL. 2007

Pages 207 to 210.

"The premature infant is at particular risk for cold stress. In addition to increasing the temperature of the delivery room, the use of a preheated radiant warmer and warmed towels to dry the infant off, other special measures should be considered, including the use of portable warming pads under towels. For the very premature infant (under 28 weeks of gestation), consider placing her below the neck in a food grade reclosable one-gallon polyethylene bag that has been cut on the end to allow the head to pass through. The infant is placed in this bag before drying and should remain in the bag from the neck down until arrival in the nursery. Temperature must be monitored to avoid the risk of hyperthermia with this technique."

**1c.17 Clinical Practice Guideline Citation:** **None**

**1c.18 National Guideline Clearinghouse or other URL:** **N/A**

**1c.19 Grading of Strength of Guideline Recommendation.** Has the recommendation been graded? **No**

1c.20 If guideline recommendation graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias:

1c.21 System Used for Grading the Strength of Guideline Recommendation: [Other](#)

1c.22 If other, identify and describe the grading scale with definitions: [N/A](#)

1c.23 Grade Assigned to the Recommendation: [N/A](#)

1c.24 Rationale for Using this Guideline Over Others: [Guidelines for Perinatal Care is the authoritative source on this issue.](#)

Based on the NQF descriptions for rating the evidence, what was the developer's assessment of the quantity, quality, and consistency of the body of evidence?

1c.25 Quantity: [Moderate](#) 1c.26 Quality: [Moderate](#) 1c.27 Consistency: [Moderate](#)

Was the threshold criterion, *Importance to Measure and Report*, met?

(1a & 1b must be rated moderate or high and 1c yes) Yes  No

Provide rationale based on specific subcriteria:

**For a new measure if the Committee votes NO, then STOP.**

**For a measure undergoing endorsement maintenance, if the Committee votes NO because of 1b. (no opportunity for improvement), it may be considered for continued endorsement and all criteria need to be evaluated.**

## 2. RELIABILITY & VALIDITY - SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. ([evaluation criteria](#))

Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. Testing information and results should be entered in the appropriate field. Supplemental materials may be referenced or attached in item 2.1. See [guidance on measure testing](#).

S.1 **Measure Web Page** (*In the future, NQF will require measure stewards to provide a URL link to a web page where current detailed specifications can be obtained*). Do you have a web page where current detailed specifications for this measure can be obtained? [Yes](#)

S.2 If yes, provide web page URL: <http://www.vtoxford.org/about/NQF%20Measure%200482.pdf>

2a. RELIABILITY. Precise Specifications and Reliability Testing: H  M  L  I

2a1. Precise Measure Specifications. (*The measure specifications precise and unambiguous.*)

2a1.1 **Numerator Statement** (*Brief, narrative description of the measure focus or what is being measured about the target population, e.g., cases from the target population with the target process, condition, event, or outcome*):

[Infants whose birth weight is between 501-1500 grams and whose temperature first measured within one hour of admission to the NICU and is less than 36 degrees centigrade.](#)

2a1.2 **Numerator Time Window** (*The time period in which the target process, condition, event, or outcome is eligible for inclusion*):  
[From birth until one hour after admission to the neonatal intensive care unit \(NICU\) at the reporting hospital.](#)

2a1.3 **Numerator Details** (*All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, codes with descriptors, and/or specific data collection items/responses*):

[Number of infants with birth weights between 501 and 1500 grams whose temperature within one hour of admission to the NICU was less than 36 degrees centigrade.](#)

2a1.4 **Denominator Statement** (*Brief, narrative description of the target population being measured*):

[Number of infants with birth weights between 501 and 1500 grams whose temperature was measured within one hour of admission to the NICU.](#)

**2a1.5 Target Population Category** (Check all the populations for which the measure is specified and tested if any): [Children's Health](#)

**2a1.6 Denominator Time Window** (The time period in which cases are eligible for inclusion):  
[From birth until one hour after admission to the neonatal intensive care unit \(NICU\) at the reporting hospital.](#)

**2a1.7 Denominator Details** (All information required to identify and calculate the target population/denominator such as definitions, codes with descriptors, and/or specific data collection items/responses):

[Infants born at and admitted to a NICU at the reporting hospital whose birth weight is between 501 and 1500 grams are included if their temperature is measured within one hour of admission to the NICU.](#)  
[Outborn infants whose birth weight is between 501 and 1500 grams and who are admitted the reporting hospital within 28 days of birth, without first having gone home, and whose birth weight is between 501 and 1500 grams are included if they are admitted to a NICU in the reporting hospital and their temperature was taken within one hour of admission to the NICU.](#)

**2a1.8 Denominator Exclusions** (Brief narrative description of exclusions from the target population):

- [1. Infants outside the birth weight range 501 to 1500 grams.](#)
- [2. Outborn infants admitted more than 28 days after birth.](#)
- [3. Outborn infants who have been home prior to admission.](#)
- [4. Infants not admitted to the NICU.](#)
- [5. Infants whose temperature is not measured within one hour of admission to the NICU.](#)

**2a1.9 Denominator Exclusion Details** (All information required to identify and calculate exclusions from the denominator such as definitions, codes with descriptors, and/or specific data collection items/responses):

[See 1a1.8 above.](#)

**2a1.10 Stratification Details/Variables** (All information required to stratify the measure results including the stratification variables, codes with descriptors, definitions, and/or specific data collection items/responses):

[The measure is separately determined by birth location \(inborn, outborn\), as well for all eligible infants. The measure is reported by birth weight category \(four levels and 10 levels\), by gestational age and gestational age category \(five levels\) and by birth location \(inborn, outborn\).](#)

**2a1.11 Risk Adjustment Type** (Select type. Provide specifications for risk stratification in 2a1.10 and for statistical model in 2a1.13): [No risk adjustment or risk stratification](#) 2a1.12 If "Other," please describe:

**2a1.13 Statistical Risk Model and Variables** (Name the statistical method - e.g., logistic regression and list all the risk factor variables. Note - risk model development should be addressed in 2b4.):

[N/A](#)

**2a1.14-16 Detailed Risk Model Available at Web page URL** (or attachment). Include coefficients, equations, codes with descriptors, definitions, and/or specific data collection items/responses. Attach documents only if they are not available on a webpage and keep attached file to 5 MB or less. NQF strongly prefers you make documents available at a Web page URL. Please supply login/password if needed:

**2a1.17-18. Type of Score:** [Rate/proportion](#)

**2a1.19 Interpretation of Score** (Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score): [Better quality = Lower score](#)

**2a1.20 Calculation Algorithm/Measure Logic**(Describe the calculation of the measure score as an ordered sequence of steps

NQF #0482 First NICU Temperature < 36 degrees Centigrade

*including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; aggregating data; risk adjustment; etc.):*

1. Identify the population of eligible infants: all infants born in the hospital or admitted within 28 days of birth without having been discharged home whose birth weight is between 501 and 1500 grams, who are admitted to a NICU in the hospital and whose temperature is measured within one hour of NICU admission.
2. Count the number of inborn infants with a body temperature measured within 1 hour of admission to the NICU. This number is the denominator for eligible inborn infants: DENOM INBORN.
3. Count the number of outborn infants with a body temperature measured within 1 hour of admission to the NICU. This number is the denominator for eligible outborn infants: DENOM OUTBORN.
4. Count the total number of eligible infants with a body temperature measured within 1 hour of admission to the NICU. This number is the denominator for all eligible infants: DENOM ALL.
5. Count the number of inborn infants whose body temperature measured within one hour of NICU admission is less than 36 degrees centigrade. This number is the numerator for eligible inborn infants: NUM INBORN.
6. Count the number of outborn infants whose body temperature measured within one hour of NICU admission is less than 36 degrees centigrade. This number is the numerator for eligible outborn infants: NUM OUTBORN.
7. Count the total number of eligible infants whose body temperature measured within one hour of NICU admission is less than 36 degrees centigrade. This number is the numerator for all eligible infants: NUM ALL.
8. Calculate the measure for eligible inborn infants:  
NUM INBORN/ DENOM INBORN  
This measure represents the proportion of eligible inborn infants whose birth weight is between 501 and 1500 grams and whose body temperature is less than 36 degrees centigrade on NICU admission.
9. Calculate the measure for eligible outborn infants:  
NUM OUTBORN/ DENOM OUTBORN  
This measure represents the proportion of eligible outborn infants whose birth weight is between 501 and 1500 grams and whose body temperature is less than 36 degrees centigrade on NICU admission.
10. Calculate the measure for all eligible infants:  
NUM ALL/ DENOM ALL  
This measure represents the proportion of all eligible infants whose birth weight is between 501 and 1500 grams and whose body temperature is less than 36 degrees centigrade on NICU admission.

2a1.21-23 Calculation Algorithm/Measure Logic Diagram URL or attachment:

URL

<http://www.vtoxford.org/about/NQF%20Measure%200482.pdf>

2a1.24 **Sampling (Survey) Methodology.** If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate):

Data for all eligible infants born during the reporting period are collected.

2a1.25 **Data Source** (Check all the sources for which the measure is specified and tested). If other, please describe:

Administrative claims, Electronic Clinical Data : Registry, Paper Records

2a1.26 **Data Source/Data Collection Instrument** (Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.): Vermont Oxford Network Database

2a1.27-29 Data Source/data Collection Instrument Reference Web Page URL or Attachment: [URL  
http://www.vtoxford.org/about/network\\_db.aspx](http://www.vtoxford.org/about/network_db.aspx)

2a1.30-32 Data Dictionary/Code Table Web Page URL or Attachment:  
URL  
<http://www.vtoxford.org/tools/ManualofOperationsPart2.pdf>

2a1.33 Level of Analysis (Check the levels of analysis for which the measure is specified and tested): Facility

2a1.34-35 Care Setting (Check all the settings for which the measure is specified and tested): Hospital/Acute Care Facility

2a2. Reliability Testing. (Reliability testing was conducted with appropriate method, scope, and adequate demonstration of reliability.)

2a2.1 Data/Sample (Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):

Data for infants born between 2006 and 2010 by birth weight category are shown below.

Admission

Temperature	Birth Weight Category			
< 36 d C	501-750	751-1000	1001-1250	1251-1500
Yes	18,918	16,910	15,605	17,295
No	22,718	39,724	48,472	61,357

2a2.2 Analytic Method (Describe method of reliability testing & rationale):

The number and percent of infants whose temperature was < 36 degrees centigrade are reported, along with Network mean values and the 25th and 75th percentile values for all hospitals in the Network.

2a2.3 Testing Results (Reliability statistics, assessment of adequacy in the context of norms for the test conducted):  
N/A

2b. VALIDITY. Validity, Testing, including all Threats to Validity: H  M  L  I

2b1.1 Describe how the measure specifications (measure focus, target population, and exclusions) are consistent with the evidence cited in support of the measure focus (criterion 1c) and identify any differences from the evidence:

Very low birth weight infants with hypothermia (temperature < 36 degrees centigrade) are at higher risk of mortality (e.g., Knobel R and Holditch-Davis D, "Thermoregulation and Heat Loss Prevention after Birth and During Neonatal Intensive-Care Unit Stabilization of Extremely Low Birthweight Infants", *Advances in Neonatal Care* (2010), 10, S7-S14), yet the prevalence of hypothermia is quite common. There is a continuing need to monitor the temperature of these infants (e.g., Knobel RB, Wimmer JE and Holbert D, "Heat Loss Prevention for Preterm Infants in the Delivery Room", *J of Perinatology* (2005), 25, 304-308).

2b2. Validity Testing. (Validity testing was conducted with appropriate method, scope, and adequate demonstration of validity.)

2b2.1 Data/Sample (Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):

Data for this measure have been collected since 2006. The number of hospitals submitting data for the measure, with minimum and maximum number of submitted records for eligible infants born between 2006 and 2010 is shown below.

Birth Year	Hospitals	Minimum Infants	Maximum Infants
2006	625	1	300
2007	669	1	318
2008	741	1	380
2009	809	1	291



2010 844 1 270

**2b2.2 Analytic Method** (*Describe method of validity testing and rationale; if face validity, describe systematic assessment*): Comprehensive business rules have been implemented in software applications so that each record submitted is tested for consistency, completeness and accuracy. Submitted records with errors must be corrected before data are finalized and reports of the measure are provided to hospitals.

**2b2.3 Testing Results** (*Statistical results, assessment of adequacy in the context of norms for the test conducted; if face validity, describe results of systematic assessment*):

There is an annual assessment of item definitions by the Network Database Advisory Committee. The annual assessment results in modifications to the definitions for measures. Expert advisors to the registry directors provide recommendations for measure improvement and clarification of item criteria.

**POTENTIAL THREATS TO VALIDITY.** (All potential threats to validity were appropriately tested with adequate results.)

**2b3. Measure Exclusions.** (*Exclusions were supported by the clinical evidence in 1c or appropriately tested with results demonstrating the need to specify them.*)

**2b3.1 Data/Sample for analysis of exclusions** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):

Infants who die prior to admission to the NICU or are not admitted to the NICU for other reasons are excluded, as are infants whose temperature is not measured within one hour of admission to the NICU.

**2b3.2 Analytic Method** (*Describe type of analysis and rationale for examining exclusions, including exclusion related to patient preference*):

Exclusions are enforced by business rules that assure database integrity.

**2b3.3 Results** (*Provide statistical results for analysis of exclusions, e.g., frequency, variability, sensitivity analyses*):

The following table shows the number of infants, number of records excluded and percent excluded for birth years 2006-2010.

Birth Year	Number of Infants	Number Excluded	Percent Excluded
2006	47,160	4,390	9.3%
2007	50,867	4,309	8.5%
2008	53,735	3,996	7.4%
2009	55,193	3,799	6.9%
2010	53,869	3,331	6.2%

**2b4. Risk Adjustment Strategy.** (*For outcome measures, adjustment for differences in case mix (severity) across measured entities was appropriately tested with adequate results.*)

**2b4.1 Data/Sample** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):

Reported data are stratified by birth weight category (either 10 levels or 4 levels), gestational age or gestational age category (5 levels) and birth location (inborn, outborn). Data are not risk adjusted.

**2b4.2 Analytic Method** (*Describe methods and rationale for development and testing of risk model or risk stratification including selection of factors/variables*):

Infants at lower birth weight, lower gestational age and outborn infants are at higher risk of hypothermia, as well as at higher risk for poor outcomes when hypothermia is present.

**2b4.3 Testing Results** (*Statistical risk model: Provide quantitative assessment of relative contribution of model risk factors; risk model performance metrics including cross-validation discrimination and calibration statistics, calibration curve and risk decile plot, and assessment of adequacy in the context of norms for risk models. Risk stratification: Provide quantitative assessment of relationship of risk factors to the outcome and differences in outcomes among the strata*):

The number of infants and percent where admission temperature was less than 36 degrees centigrade are shown below by birth

weight category for infants 501-1500 grams born between 2006 and 2010.

Birth Weight	Number of Infants	Percent < 36 d C
501-750 g	41,636	45.4%
751-1000 g	56,634	29.9%
1001-1250 g	64,077	24.4%
1251-1500 g	78,652	22.0%

**2b4.4** If outcome or resource use measure is not risk adjusted, provide rationale and analyses to justify lack of adjustment: Temperature at admission is stratified by birth weight, gestational age and birth location in hospital reports. These strata are primary risk factors.

**2b5. Identification of Meaningful Differences in Performance.** (The performance measure scores were appropriately analyzed and discriminated meaningful differences in quality.)

**2b5.1 Data/Sample** (Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):

In 2010 reports for this measure were sent to 844 hospitals, and the measure was applicable for 50,538 infants.

**2b5.2 Analytic Method** (Describe methods and rationale to identify statistically significant and practically/meaningfully differences in performance):

Results for hospitals are stratified by birth weight category, gestational age and birth location. The distribution of 2010 results among hospitals for key percentiles was analyzed univariately.

**2b5.3 Results** (Provide measure performance results/scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningful differences in performance):

The hospital distribution of 2010 results among 844 hospitals for specific percentiles is shown below (lower percent is better).

Percentile	Percent Temperature < 36 degrees C
10th	0.8%
25th	8.0%
50th	18.8%
75th	36.4%
90th	53.8%

**2b6. Comparability of Multiple Data Sources/Methods.** (If specified for more than one data source, the various approaches result in comparable scores.)

**2b6.1 Data/Sample** (Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):

N/A

**2b6.2 Analytic Method** (Describe methods and rationale for testing comparability of scores produced by the different data sources specified in the measure):

N/A

**2b6.3 Testing Results** (Provide statistical results, e.g., correlation statistics, comparison of rankings; assessment of adequacy in the context of norms for the test conducted):

N/A

**2c. Disparities in Care:** H  M  L  I  NA  (If applicable, the measure specifications allow identification of disparities.)

**2c.1** If measure is stratified for disparities, provide stratified results (Scores by stratified categories/cohorts): N/A

2c.2 If disparities have been reported/identified (e.g., in 1b), but measure is not specified to detect disparities, please explain:

N/A

2.1-2.3 Supplemental Testing Methodology Information:

URL

<http://www.vtoxford.org/about/NQF%20Measure%200482.pdf>

Steering Committee: Overall, was the criterion, *Scientific Acceptability of Measure Properties*, met? (Reliability and Validity must be rated moderate or high) Yes  No

Provide rationale based on specific subcriteria:

If the Committee votes No, STOP

### 3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

C.1 Intended Purpose/ Use (Check all the purposes and/or uses for which the measure is intended): Public Reporting, Quality Improvement (Internal to the specific organization), Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

3.1 Current Use (Check all that apply; for any that are checked, provide the specific program information in the following questions): Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

3a. Usefulness for Public Reporting: H  M  L  I

(The measure is meaningful, understandable and useful for public reporting.)

3a.1. Use in Public Reporting - disclosure of performance results to the public at large (If used in a public reporting program, provide name of program(s), locations, Web page URL(s)). If not publicly reported in a national or community program, state the reason AND plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement: [**For Maintenance** – If not publicly reported, describe progress made toward achieving disclosure of performance results to the public at large and expected date for public reporting; provide rationale why continued endorsement should be considered.]

Performance results are made available to the members of the Vermont Oxford Network at: <https://nightingale.vtoxford.org>  
Participants in the Vermont Oxford Network may access a fully featured Internet reporting system (Nightingale), as well as printed reports, which document patient characteristics, treatment practices, morbidity, mortality, and length of stay for the institution. The reports also track performance over time, comparing the institution's performance to that of the Network as a whole and with subgroups of similar institutions.

Vermont Oxford Network members may make their performance available to the public at their discretion.

3a.2. Provide a rationale for why the measure performance results are meaningful, understandable, and useful for public reporting. If usefulness was demonstrated (e.g., focus group, cognitive testing), describe the data, method, and results: Given the wide variation in admission temperatures observed among different units it is likely that improved attention to thermoregulation in the delivery room and during transport to the NICU can substantially reduce the frequency of hypothermia on admission, and may improve mortality and morbidity. Measuring and reporting performance allows care providers to identify and address areas of opportunity for more consistent and improved practices.

3.2 Use for other Accountability Functions (payment, certification, accreditation). If used in a public accountability program, provide name of program(s), locations, Web page URL(s): N/A

3b. Usefulness for Quality Improvement: H  M  L  I

*(The measure is meaningful, understandable and useful for quality improvement.)*

**3b.1. Use in QI.** If used in quality improvement program, provide name of program(s), locations, Web page URL(s):  
**[For Maintenance – If not used for QI, indicate the reasons and describe progress toward using performance results for improvement].**

Performance results are used for quality improvement by the members of the Vermont Oxford Network:  
<http://www.vtoxford.org/about/membership.aspx>. Participants in the Vermont Oxford Network may access a fully featured Internet reporting system (Nightingale), as well as printed reports, which document patient characteristics, treatment practices, morbidity, mortality, and length of stay for the institution. The reports also track performance over time, comparing the institution's performance to that of the Network as a whole and with subgroups of similar institutions.

Performance results are also used by participants in the Vermont Oxford Network's Quality Improvement Collaboratives:  
<http://www.vtoxford.org/quality/nicq/nicq.aspx>

**3b.2. Provide rationale for why the measure performance results are meaningful, understandable, and useful for quality improvement.** If usefulness was demonstrated (e.g., QI initiative), describe the data, method and results:

Temperature on admission to the NICU is influenced by the process of care in the delivery room and the interventions used by the delivery room team. Measuring frequency of admission of neonates to the NICU with hypothermia allows care providers to identify opportunities for improving practices. Team structure and delivery room equipment and supplies are closely linked with the ability of a team to perform and execute appropriate thermal control in the delivery room. In turn, these will influence admission temperature with the goal of improving morbidity and mortality.

Overall, to what extent was the criterion, *Usability*, met? H  M  L  I

Provide rationale based on specific subcriteria:

#### 4. FEASIBILITY

Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)

**4a. Data Generated as a Byproduct of Care Processes:** H  M  L  I

**4a.1-2 How are the data elements needed to compute measure scores generated?** (Check all that apply).

Data used in the measure are:

generated by and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition, Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims), Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry)

**4b. Electronic Sources:** H  M  L  I

**4b.1 Are the data elements needed for the measure as specified available electronically** (Elements that are needed to compute measure scores are in defined, computer-readable fields): ALL data elements are in a combination of electronic sources

**4b.2 If ALL data elements are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources:**

**4c. Susceptibility to Inaccuracies, Errors, or Unintended Consequences:** H  M  L  I

**4c.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measurement identified during testing and/or operational use and strategies to prevent, minimize, or detect. If audited, provide results:**

A manual of operations for the registry is published annually, with definitions and criteria clearly operationalized for the measure. Comprehensive business rules are implemented in software to verify records for consistency, completeness and accuracy. A definitive process is in effect to assure that the measure is not reported until data are complete and correct. Hospital contacts must verify that data for all eligible infants are submitted prior to finalization.

**4d. Data Collection Strategy/Implementation:** H  M  L  I

**A.2 Please check if either of the following apply** (regarding proprietary measures):

4d.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues (e.g., fees for use of proprietary measures):  
 Patient identifiers are not collected in the registry. Confidentiality for each hospital member is strictly maintained. Procedures in place assure reasonable confidence that data are complete and accurate. There are no specific fees for this measure, although members of the Vermont Oxford Network pay an annual membership fee.

Overall, to what extent was the criterion, *Feasibility*, met? H  M  L  I   
 Provide rationale based on specific subcriteria:

### OVERALL SUITABILITY FOR ENDORSEMENT

Does the measure meet all the NQF criteria for endorsement? Yes  No   
 Rationale:

**If the Committee votes No, STOP.**  
**If the Committee votes Yes, the final recommendation is contingent on comparison to related and competing measures.**

### 5. COMPARISON TO RELATED AND COMPETING MEASURES

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure before a final recommendation is made.

5.1 If there are related measures (either same measure focus or target population) or competing measures (both the same measure focus and same target population), list the NQF # and title of all related and/or competing measures:

#### 5a. Harmonization

5a.1 If this measure has EITHER the same measure focus OR the same target population as [NQF-endorsed measure\(s\)](#): Are the measure specifications completely harmonized?

5a.2 If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden:

#### 5b. Competing Measure(s)

5b.1 If this measure has both the same measure focus and the same target population as NQF-endorsed measure(s): Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible):

### CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner): [Vermont Oxford Network, 33 Kilburn St, Burlington, Vermont, 05401](#)

Co.2 Point of Contact: [Beth, Anderson, banderson@vtoxford.org, 802-865-4814-237](#)

Co.3 Measure Developer if different from Measure Steward: [Vermont Oxford Network, 33 Kilburn St, Burlington, Vermont, 05401](#)

Co.4 Point of Contact: [Beth, Anderson, banderson@vtoxford.org, 802-865-4814-237](#)

Co.5 Submitter: [Beth, Anderson, banderson@vtoxford.org, 802-865-4814-237, Vermont Oxford Network](#)

Co.6 Additional organizations that sponsored/participated in measure development:

Co.7 Public Contact: [Beth, Anderson, banderson@vtoxford.org](#), 802-865-4814-237, Vermont Oxford Network

**ADDITIONAL INFORMATION**

Workgroup/Expert Panel involved in measure development

Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.

Ad.2 If adapted, provide title of original measure, NQF # if endorsed, and measure steward. Briefly describe the reasons for adapting the original measure and any work with the original measure steward:

Measure Developer/Steward Updates and Ongoing Maintenance

Ad.3 Year the measure was first released: [2008](#)

Ad.4 Month and Year of most recent revision: [10, 2011](#)

Ad.5 What is your frequency for review/update of this measure? [Annual](#)

Ad.6 When is the next scheduled review/update for this measure? [09, 2012](#)

Ad.7 Copyright statement: [Copyright © 2011 Vermont Oxford Network, Inc.](#)

Ad.8 Disclaimers:

Ad.9 Additional Information/Comments:

Date of Submission (MM/DD/YY): [10/17/2011](#)