NCABSI

Where we were, where we’ve come and where we’re going

Florida Perinatal Quality Collaborative
Neonatal Focused Meeting
September 27, 2013
NCABSI statistics to date

- Now over 150 NICUs in 13 states
  - Florida had 16 centers participating in phase I
  - 5 centers did not submit data for phase II
- Over 40,000 central lines combined
  - Florida contributed over 7800
- Over 376,000 line days combined
  - Florida contributed over 86,000

Data as of August 31, 2013
Lines by State

Central Lines in NCABSI

- California: 1989
- Illinois: 2634
- Kentucky: 636
- Oregon: 751
- Colorado: 2036
- Florida: 7825
- Hawaii: 1482
- Massachusetts: 2504
- Michigan: 2452
- New Jersey: 5712
- North Carolina: 7226
- South Carolina: 4053
- Wisconsin: 2304
Line Days by State

Central Line Days in NCABSI

- California: 14,986
- Illinois: 23,759
- Kentucky: 5,907
- Oregon: 6,618
- Colorado: 16,237
- Florida: 86,107
- Hawaii: 11,800
- Massachusetts: 19,997
- Michigan: 22,402
- New Jersey: 40,739
- North Carolina: 74,736
- South Carolina: 35,124
- Wisconsin: 18,424
Line Days by State

Line Days in NCABSI

- Wisconsin
- South Carolina
- North Carolina
- New Jersey
- Michigan
- Massachusetts
- Hawaii
- Florida
- Colorado
- Oregon
- Kentucky
- Illinois
- California
Florida NCABSI Lines and Line Days by Center

Data as of August 31, 2013
Where We Started

- Individual hospitals tracked their own data and reported through CDC’s National Healthcare Safety Network (NHSN)
- Rates NOT reported through Vermont Oxford Network (VON)
- No comprehensive statewide plans for infection reduction
- National collaboratives combined had a baseline of 2.51 infections per 1000 line days
- Baseline rate in Florida from NHSN data was 2.96 infections per 1000 line days
## Where We Were

<table>
<thead>
<tr>
<th></th>
<th>National</th>
<th>Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central line days</td>
<td>376,630</td>
<td>86,107</td>
</tr>
<tr>
<td>Baseline CLABSI rate</td>
<td>2.51 / 1000 line days</td>
<td>2.96 / 1000 line days</td>
</tr>
<tr>
<td>Expected CLABSIIs</td>
<td>945</td>
<td>255</td>
</tr>
<tr>
<td>Expected deaths</td>
<td>116</td>
<td>31</td>
</tr>
<tr>
<td>Increased length of stay</td>
<td>7563</td>
<td>2039</td>
</tr>
<tr>
<td>Costs due to CLABSI</td>
<td>$50,103,089</td>
<td>$13,508,466</td>
</tr>
</tbody>
</table>

Based on baseline CLABSI rates from NHSN reporting over 6 months prior to NCABSI start. Mortality rate 12.3%, increased length of stay of 8 days and estimated average cost of $53,000 per infection.

Insertion Compliance

Most Recent Insertion Compliance

- National: 85.9%, 92.1%, 87.9%, 91.1%, 94.1%, 83.3%, 89.8%
- Florida: 92.1%, 89.7%, 91.1%, 94.1%, 100.0%, 100.0%, 100.0%

Data as of August 31, 2013
Maintenance Compliance by Center

Maintenance compliance

Data as of August 31, 2013
Aggressive Line Removal

Lines in place with enteral feeds > 120 ml/kg/day

- National
- Florida
Florida Center to Center Variation

Lines in place with enteral feeds > 120 ml/kg/day

Data as of August 31, 2013
Variation among Florida Centers

Average line life in days

Data as of August 31, 2013
Infection Rates

Infections per 1000 line days
NCABSI Project

58.8% reduction
66.1% reduction
Rate Reduction to Date

By end of phase 1, reduction in National rate was 52.6% and in Florida rate was 40.9%
NHSN Quarterly Reporting

NHSN Data by Quarter - combined umbilical and central line

- 63.4% reduction
- 81.5% reduction

Baseline  | Q4 2011 | Q1 2012 | Q2 2012 | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013
---|---|---|---|---|---|---|---
National | 2.96 | 2.51 | 2.30 | 1.90 | 1.41 | 1.37 | 1.26 | 0.92
Florida  | 2.96 | 2.51 | 2.30 | 1.90 | 1.41 | 1.37 | 1.26 | 0.55
Individual Rates by Phase

Infections per 1000 line days over entire NCABSI project

Data as of August 31, 2013
Phase 1 quartiles

Infections per 1000 line days - phase 1
Quartile rankings

Data as of August 31, 2013
Cumulative quartiles

Infections per 1000 line days - cumulative
Quartile rankings

Data as of August 31, 2013
Predilection for VLBW Babies

Data as of August 31, 2013
Catheter Type – Phase 1

Infections by type of line

- Umb: 26.5% (National), 40.3% (Florida)
- PICC: 61.5% (National), 46.3% (Florida)
- Broviac: 10.7% (National), 11.9% (Florida)
- Multiple: 1.3% (National), 1.5% (Florida)

Data as of February 28, 2013
Catheter Type – Entire Project

Infections by type of line

- Umb: 23.1% (National), 35.2% (Florida)
- PICC: 64.1% (National), 54.5% (Florida)
- Broviac: 11.7% (National), 9.1% (Florida)
- Multiple: 1.1% (National), 1.1% (Florida)

Data as of August 31, 2013
Line Days Attributable to Each Type

Percentage of Line Days by Type of Catheter by Center

- Other
- Broviac
- PICC
- LVIC
- UAC

Data as of August 31, 2013
## Where We’ve Come

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Central line days</td>
<td>376,630</td>
<td>86,107</td>
</tr>
<tr>
<td>Current CLABSI rate</td>
<td>0.85 / 1000 line days</td>
<td>1.22 / 1000 line days</td>
</tr>
<tr>
<td>CLABSIIs avoided</td>
<td>625</td>
<td>150</td>
</tr>
<tr>
<td>Deaths avoided</td>
<td>77 babies</td>
<td>18 babies</td>
</tr>
<tr>
<td>Length of stay reduced</td>
<td>5002 days</td>
<td>1199 days</td>
</tr>
<tr>
<td>Cost savings</td>
<td>$33,135,907</td>
<td>$7,940,788</td>
</tr>
</tbody>
</table>

Based on current CLABSI rates as of August 2013. Mortality rate 12.3%, increased length of stay of 8 days and estimated average cost of $53,000 per infection.

Where We’re Going

- Analysis of data on dwell times
  - Hazard functions
  - Individualized risks for each line type in your own unit

- Other indicators of infection burden
  - Nosocomial infection (VON)
  - Late infection (VON)
  - Staph infection (VON)
  - Antibiotic use (EMR)

- Antibiotic stewardship
Hazard Functions

\[ P(X \leq x) \]

- Orange line: \( \lambda = 0.5 \)
- Purple line: \( \lambda = 1 \)
- Light blue line: \( \lambda = 1.5 \)
Vermont Oxford Network as a source of QI data

The good, the bad and the ugly
The Good

- VON provides standard definitions for many issues to allow consistent benchmarking
- VON reporting allows comparison to similar
- VON is a extremely large database, with data from around the world
- VON supports a number of QI initiatives annually in their NICQ homerooms
- Comparison of individual data to a larger group, such as a state collaborative allows strengths and opportunities to be identified
The Bad

- While there are many standard issues tracked in VON, there are many common neonatal problems that are not, such as CLABSI.
- There is a long lag, up to 9 months or more, before end of year submission and report finalization:
  - Too long to be of use for rapid changes in QI work outside of the NICQ projects.
- Data is only entered by many centers for those infants < 1500 grams.
The Ugly

- VON is expensive!
  - This prevents many smaller centers from participating, or limits other centers to collecting data on infants < 1500 grams only
  - Participation in NICQ projects can be too costly for many centers
  - Analysis over time, or for collaborative groups incurs expenses above the baseline