Background: Historically, infants identified and diagnosed with Neonatal Abstinence Syndrome (NAS) at SVH were treated without guidelines for best practices and therefore received variable interventions. Families and staff were poorly educated about scoring and non-pharmacologic treatment for infants with NAS.

Aims: Our SMART aim was to decrease length of stay (LOS) by 10% (from 17.5 days to 15.75 days) by June 2015. Secondary aims were to improve identification and treatment of infants exposed to narcotics, improve education to parents and staff on scoring and non-pharmacologic treatment, and encourage a family centered approach.

Setting: SVH NICU and mother-newborn units, a regional hospital serving Billings, Eastern Montana, Northern Wyoming, and Western North Dakota, with 1500 deliveries/year, 22 NICU beds and 200 NICU admits/year (80% inborn). Staffing includes 35 NICU nurses, 25 maternity nurses, 4 neonatologists, and 3 lactation consultants. We have a relatively low volume of admits for pharmacologic treatment of NAS (5-10/year).

Mechanisms/Drivers of Change: In 2013, a multidisciplinary team was assembled and felt standardization of pharmacologic treatment, use of breast milk, family centered care, and standardized scoring would decrease LOS and improve quality. This team took steps towards improvement starting in Jan. 2014, using distinct PDSA cycles related to specific drivers of improving our NAS care. (Figure 1)

Methods: In 2013, we joined the VON NAS iNICQ collaborative and identified gaps in practice. We created a driver diagram and standardized our guidelines based on best evidence. Our PDSA cycles began in Mar. 2014. The first implemented standardized guidelines for pharmacologic treatment, breast milk use, and maternal and neonatal drug screening. The aim was to standardize care, increase breast milk use, and decrease LOS. Our second PDSA cycle began in June 2014, when we introduced education on Finnegan scoring with testing for inter-rater reliability. The aim was to improve nursing care and confidence. The third PDSA cycle began in Sep. 2014 and our aim turned to family support. We focused on improving identification of at risk dyads and providing education in the prenatal period with a parent education booklet and prenatal consults. Parents were taught to help with scoring, non-pharmacologic measures, and overall care of their infant. Lastly, our fourth PDSA cycle began in June 2015 when we registered 102 SVH staff for the VON NAS Universal training (Figure 5). (PDSA Cycles in Figure 4)

Measures: Data was collected via chart audits and survey results. Our NICU treated 17 babies diagnosed with NAS out of 585 NICU admits between Jan. 2013 and Aug 2015.

Primary Measure: Average length of hospital stay in days for babies admitted to NICU with the diagnosis of NAS that received pharmacologic treatment. This measure was assessed approximately every 6 months.

Secondary Measures:
- Percentage of babies that received breast milk –defined as any baby who received any amount of available maternal or donor breast milk while hospitalized
- inter-rater reliability in Finnegan NAS scoring –measured during a mandatory training opportunity where all nursing staff were all required to accurately assign a Finnegan score to the same baby, scores could vary 2 points either direction
- increased ability of nursing staff to treat the narcotic exposed mother/baby dyad and to provide effective non-pharmacologic interventions –measured by a staff survey conducted in July 2015 (Figure 2) and completion of NAS universal training through VON (figure 5)
- increased level of parental education after prenatal consults –measured indirectly via nursing staff through staff survey (Figure 2)
Data: Our population of infants with NAS was 4/204 in 2013, 8/215 in 2014, and 5/166 year to date in 2015. Before the initiative, Jan. 2013 to Dec. 2013, our average LOS was 17.5 days. It was decreased to 14.2 days in the first six months of 2015. (Figure 3). From Jan. 2012 to Dec. 2013 0% (0/4) of infants with NAS were fed breast milk and in 2014 50% (5/10) of babies received breast milk. The 2014 scoring training achieved a 93% inter-rater reliability. Our June 2015 survey shows 87.7% of nurses surveyed (n=39) agree that they are more prepared to provide family centered care. This survey also shows that 90.4% of nurses feel more able to provide effective non-pharmacologic treatment, resulting in better outcomes and potentially decreased LOS.

Discussion: Even in a center with low NAS volumes, we have demonstrated an improvement in the care of infants with NAS through standardization based on potentially better practices. Our NAS QI initiative has decreased our LOS by 18.86%. Variability in LOS has decreased and the occurrence of NAS admits appears to be increasing over time. We have successfully encouraged breast milk in applicable situations and therefore have increased the number of babies that receive breast milk during their hospitalization. NAS education among staff is ongoing (figure 5). We hope to be designated as a Center of Excellence in NAS treatment by October 2015 with the completion of the VON NAS universal training (Figure 5), improve prenatal diagnosis and consultation, and to provide outreach education to our regional hospitals.

Team Acknowledgement: Sammy Twito RN (Nursing Manager), Vicki Birkeland RN (Director of Women’s and Children’s Services), Alison Rentz MD (Medical Director of Newborn Services/Neonatologist), Jeffrey Carroll MD (Neonatologist), Kristi Washburn-Tolsma MD (Neonatologist), Kari Barrett MD (Neonatologist), Carissa Brewer RN (Women’s and Children’s Float Pool), Katheryn Krivitz RN (NICU), Cassie Enderson RN (Mom/Baby), Debra Hulbert RN (Lactation), Karen Bowers RN (Lactation), Elizabeth Bartlett RN (Lactation), Kathy Fox (Social Work)
Figure 1: NAS QI Initiative Driver Diagram with key drivers and interventions all aimed a decreasing LOS and improving the compassionate care of babies with NAS at St. Vincent Healthcare.
NAS at St. Vincent Healthcare: Then and Now

Please take a few minutes to rate these 10 statements based on how you feel the NAS protocol is working in your unit.

1. I am more prepared to care for a baby exhibiting withdrawal symptoms.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

2. I understand how to care for the family as a dyad and involve mothers (and other applicable caregivers) in NAS care.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

3. I think that the families that we care for now have better outcomes and are more satisfied with the care they receive.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

4. Babies with symptoms of NAS are cared for more appropriately and have better outcomes.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

5. I understand more about the non-pharmacologic treatment of NAS and feel that fewer babies exhibit symptoms of withdrawal when these techniques are used effectively.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

6. My practice as a nurse has changed as a result of the new NAS guidelines.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

7. Mothers are encouraged to use breast milk more often (as appropriate per guideline).
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

8. I have an easier time talking with families about NAS.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

9. Prenatal consults have been effective in preparing families for the hospitalization.
   - Strongly Agree
   - Agree
   - Neutral
   - Disagree
   - Strongly Disagree

10. The new NAS protocol has a beneficial effect on my nursing practice and leads to increased satisfaction and improved outcomes for families.
    - Strongly Agree
    - Agree
    - Neutral
    - Disagree
    - Strongly Disagree

**Figure 2:** Survey distributed to all nursing staff in Mom/Baby, Labor and Delivery, and NICU. Staff were given 10 days to complete the survey.
Figure 3: Graph shows LOS from 2013 to 2015. Each data point represents one patient. PDSA cycles identified.

| PDSA Cycle #1: Implementation of standardized NAS guidelines | March 2014: implementation of standardized guidelines for pharmacologic treatment, breast milk use, and maternal and neonatal drug screening |
| PDSA Cycle #2: Finnegan scoring education for staff | June 2014: introduction of education for Finnegan scoring with testing for inter-rater reliability among nursing staff |
| PDSA Cycle #3: Prenatal identification and parental education | September 2014: aimed at improving identification of at risk dyads and providing education in the prenatal period with a parent education booklet and prenatal consults with a neonatologist |
| PDSA Cycle #4: Staff enrolled in VON NAS universal training | June 2015: 102 SVH staff enrolled in VON NAS universal training |

Figure 4: All PDSA cycles used for this project

<table>
<thead>
<tr>
<th>Description</th>
<th># of Users</th>
<th>% of Users</th>
</tr>
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<tbody>
<tr>
<td>Completed all 17 Lessons</td>
<td>45</td>
<td>44%</td>
</tr>
<tr>
<td>Distance from 85% goal</td>
<td>42</td>
<td>41%</td>
</tr>
</tbody>
</table>

Figure 5: Current (as of 9/9/15) SVH staff completion of VON NAS universal training. 102 members of our staff were registered and we aim to have at least 85% (87/102) finished with the training by 10/1/15.