

FIND a Process to Improve

Use information from the completed Problem Identification Worksheets in the previous section to find a process that “constitutes an opportunity for improvement.”¹ The last column of Worksheet IIA will in some cases “explain” why certain patients did not receive steroids (e.g., infants with gestational age greater than 34 weeks). In finding a process to improve, focus on infants without such an explanation.

Processes identified for improvement from Worksheet I:

- 1. Undercounting of mothers treated with antenatal steroids.** Is the administration of antenatal corticosteroid therapy being reported to CPQCC accurately? Are maternal charts accurate and being read carefully for the purposes of CPQCC reporting? In reviewing Table One, do you find any infants to whom steroids were administered? If yes, your hospital’s rate of antenatal steroid administration according to CPQCC data may be depressed because some treated mothers are not being counted.
- 2. Steroid administration as noted on various sources is not consistently being reviewed and/or reported to CPQCC.** Which sources of information about steroid treatment are not consistently being reviewed for CPQCC reporting purposes? In column 5 of Table One, what sources of information are listed? If “charts” are listed, it may be that information about steroid administration is not easily discerned from the chart and was missed when CPQCC reports were completed. If an alternate source of information is listed, meaning that you had to look at sources other than charts, it may be that information on steroid administration is not being recorded at all on the charts.
- 3. Treated mothers of infants who died in the delivery room are less likely to be counted.** Of infants who die in the delivery room (yes in column 2), do you find evidence of steroid administration? If so, is there a problem in recording steroid administration to mothers of such infants?
- 4. Treated mothers of infants who were transferred to/from another hospital are less likely to be counted.** Of infants who were transferred (yes to column 3), do you find evidence of steroid administration? You may have to search to find maternal charts from the hospital at which the mother was treated.
- 5. The rate of antenatal steroid administration is low at hospitals that transfer infants to your hospital.** Your sample may reveal that mothers who deliver at particular hospitals are not being given steroids when it is appropriate to do so. Though not related to processes within your hospital, this problem once identified should be addressed through education, consultation and outreach.
- 6. Women who were previously admitted and who received steroids at a prior admission are incorrectly counted.** Women who received antenatal corticosteroid treatment during a

¹ Caldwell, Chip. *Mentoring Strategic Change in Health Care: An Action Guide*. 1995

prior admission may not have their previous medical record readily available when CPQCC data is collected and entered.

7. **Antenatal corticosteroids were ordered, but not administered.** If there is a discrepancy between columns 4 and 5, this should be a concern.

Processes identified for improvement from Worksheet II:

- 1. Even in the absence of advanced cervical dilation, steroids are not consistently administered.** Lack of antenatal corticosteroid administration may be explained by relatively advanced cervical dilation at admission and inadequate time for antenatal corticosteroid administration. For patients without advanced cervical dilation and with, presumably, adequate time for steroid administration, other factors correlating with lack of antenatal corticosteroid administration should be pursued from the worksheet.
- 2. Women who deliver less than 24 hours after admission to not receive antenatal corticosteroids.** There is evidence to support steroid administration for women who deliver less than 24 hours after receiving the first dose². Do you notice that the Admission/Delivery interval is less than 24 hours for many of the women who did not receive steroids? If so, this may be an area for improvement.
- 3. Some obstetricians administered steroids less consistently than others.** In column 4, do some physicians appear more frequently than others? If so, there may be significant variation in corticosteroid administration based on the attending obstetrician.
- 4. When tocolysis is administered for preterm labor, steroids are less consistently administered.** The information in column 5 might suggest that antenatal corticosteroids are not being administered to women in preterm labor with tocolysis. Examine the charts of patients listed in the worksheet. Was there adequate time for corticosteroid administration? If so, this may be an area for improvement.
- 5. Antenatal corticosteroids are not consistently administered in the case of Premature Preterm Rupture of Membranes (PPROM).** The information in column 6 might suggest that corticosteroids are not being administered in the case of PPRM. Again, examine the charts of patients with PPRM listed in the worksheet. Was there adequate time for corticosteroid administration? If so, this may be an area for improvement.
- 6. Antenatal corticosteroids are not consistently administered to women with Gestational diabetes, vaginal bleeding/abruption/previa, preeclampsia/eclampsia/HELLP, or “other” condition.** Based on the information in the worksheet, are any of these “other” conditions correlated with absence of antenatal corticosteroid administration? If so, this may be a problem to be addressed by your hospital.

² NIH Consensus Development Panel on the Effect of Corticosteroids for Fetal Maturation on Perinatal Outcomes. Effect of Corticosteroids for Fetal Maturation on Perinatal Outcomes. JAMA. 1995; 273: 413-418.

ORGANIZE a Team that Knows the Process

Once a process has been targeted for improvement, the next step is to identify individuals who have “ownership” of the process, have insights into the process and/or play key roles in the process. Their participation in efforts to improve the process is critical. When identifying participants, consider both their current role, position and perspective within the hospital, and their appropriate role and position within the quality improvement effort.

There is no set formula for team composition. Depending on the process to be improved, a team might consist of one or two members or could require a larger, multidisciplinary group. The team will also depend on the factors unique to each hospital, such as schedules and priorities of staff. The following table provides examples of teams constructed to address the processes identified in the previous section. These examples are meant to be illustrative, not exhaustive, and should be adapted to the resources and constraints of your hospital.

Once appropriate team members have been identified, their participation should be secured. Individuals identified as potential team members may not be entirely enthusiastic about participating. Clearly stated hospital/department commitment to improving the process will encourage individual participation. Inclusion of well-reputed and/or neutral parties in teams will also serve to encourage those who might feel threatened or challenged by the activity.

Table I. Processes to be improved and corresponding sample teams

| Process To Be Improved | Example Of Team Members |
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| <p>1. Undercounting of mothers treated with antenatal corticosteroids.</p> <p>2. Corticosteroid administration as noted on various sources is not consistently being reviewed and/or reported to CPQCC.</p> <p>3. Treated mothers of infants who died in the delivery room are less likely to be counted.</p> | <p>Person(s) responsible for CPQCC reporting; other senior data personnel; general obstetricians; perinatologists; OB nurses; neonatologists; medical records manager; administrative staff; Billing's Office personnel; respiratory therapist; unit secretary; L&D staff; pharmacist.</p> |
| <p>4. Treated mothers of infants who were transferred to another hospital are less likely to be counted.</p> <p>5. The rate of antenatal corticosteroid administration is low at hospitals that transfer infants to your hospital.</p> | <p>Physicians from your hospital and those hospitals either sending you or accepting your transported mothers/infants; representatives from other hospitals interested in outcomes/quality improvement; transport coordinator; others involved in transfer procedures; regional coordinator; outreach coordinator.</p> |
| <p>6. Women who were previously admitted and who received steroids at a prior admission are incorrectly counted.</p> | <p>Person(s) responsible for CPQCC reporting; other senior data personnel; general obstetricians; perinatologists; OB nurses.</p> |
| <p>7. Antenatal corticosteroids ordered, but not administered.</p> | <p>OB nurses, general obstetricians; perinatologists; pharmacy personnel.</p> |
| <p>8. Even in the absence of advanced cervical dilation, antenatal corticosteroids are not consistently ordered/administered.</p> <p>9. Women who deliver less than 24 hours after admission do not receive antenatal corticosteroids.</p> | <p>General obstetricians; perinatologists; outcome/quality management personnel; OB nurses.</p> |
| <p>10. Some obstetricians administer antenatal corticosteroids less consistently than others.</p> | <p>Obstetricians who administer less and administer more antenatal corticosteroids; quality management personnel; well-reputed persons from within or outside hospital with depth of understanding of issue.</p> |
| <p>11. When tocolysis is administered for preterm labor, antenatal corticosteroids are less consistently administered.</p> <p>12. Antenatal corticosteroids are not consistently administered in the case of PPRM.</p> <p>13. Steroids are not consistently administered to women with GDM, vaginal bleeding, preeclampsia or other conditions.</p> | <p>Well-reputed persons from within or outside hospital with depth of understanding of issue; general obstetricians; perinatologists.</p> |

CLARIFY the Current Knowledge of the Process

Once a team has been constructed, several issues should be presented to the team members. These are:

- The rationale for the promotion of antenatal corticosteroid administration. Section 2 of the Tool Kit, *Rationale for Promotion of Antenatal Corticosteroid Therapy*, provides consensus statements from ACOG and the NIH about appropriate usage of antenatal corticosteroids. These statements and/or other background material should be made available to team members.
- Update on the current rate of antenatal corticosteroid administration within your center, along with comparative data such as national or state median rates. This information is presented in Section 3 of the Tool Kit, *Benchmarking*.
- The method by which your hospital identified a process to be improved, and the evidence that the process needs improvement. Provide team members with the completed Problem Identification Worksheets (with some information removed to ensure confidentiality) and the results that it provided. Demonstrate to the Team how the worksheet gave rise to the “process to be improved”.
- Details of the process as it currently stand. For example, if the Problem Identification Worksheets suggest that antenatal corticosteroids are being ordered but not administered, you will want to review and discuss current procedures and controls for ordering and/or administering antenatal corticosteroids, as well as all the steps in between related to procurement, delivery and so forth. A flowchart is a useful tool for describing the current process.
- In clarifying current knowledge, consider calling upon team members, other hospital staff and outside sources with appropriate expertise to assist. The mechanism chosen for clarifying knowledge will depend on the process to be improved, the team and its needs, and the resources available. You may wish to distribute articles in advance and then provide a venue for discussion and exchange, such as a team meeting. Alternately, it may be effective to review information together or to re-package the information. For example, summaries can be sent around via e-mail.

UNDERSTAND the Causes of Process Variation

Process variation should be discussed following the previous activity, *clarification of current knowledge of the process*. The key points related to process variation are:

- The possible range of process variation. For example, consider administration of antenatal corticosteroids to patients with preeclampsia, eclampsia or HELLP. In some hospitals, antenatal corticosteroids are consistently administered despite evidence of this pregnancy complication. In other hospitals, antenatal corticosteroids are rarely administered, even to patients with mild or uncertain preeclampsia. Between these extremes, antenatal corticosteroids could be administered regularly to all patients except those with severe preeclampsia.
- The acceptable range of process variation. Consider a scenario in which the process to be improved is documentation of antenatal corticosteroid administration. It may be difficult to obtain such documentation for mothers of infants who are not born at the hospital in question, and one could therefore expect documentation to be accurate less than 100% of the time.
- The apparent range of process variation within your hospital. You may find that antenatal corticosteroids are always administered, never administered, or sometimes administered to patients with certain conditions. Charts, histograms and diagrams will help the team assess process variation.
- An assessment of the probable reason for process variation within your hospital. Does the process vary according to severity of the condition? Does the process vary depending on the physician?

The extent to which process variation is justified. For example, antenatal corticosteroid administration is likely to correlate with the length of the admission/delivery interval. For patients who deliver immediately, lack of antenatal corticosteroid administration can be justified. However, antenatal corticosteroids should be given if delivery is not imminent, even if the

SELECT the Process Improvement

Restate the process to be improved as an actual improvement. This should be a team activity, with attention given to the methods used to select the process improvement. The following chart provides an example of an improvement for each previously identified process.

Table II. Process to be Improved and Examples of Improvement

| Process to be Improved | Examples of Improvement |
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| 1. Undercounting of mothers treated with antenatal corticosteroids. | Designate staff member with clear responsibility for documenting and reporting antenatal corticosteroid administration. |
| 2. Antenatal corticosteroid administration as noted on various sources is not consistently being reviewed and/or reported to CPQCC. | Revise patient report/chart format so that area for reporting antenatal corticosteroid administration is more obvious. |
| 3. Treated mothers of infants who died in the delivery room are less likely to be counted. | Assure that CPQCC delivery room death forms (which have an antenatal corticosteroid question) are filled out at time of delivery; establish procedure whereby L&D logs are reviewed for deaths; establish procedure whereby mother's nurse completes CPQCC death form. |
| 4. Treated mothers of infants who were transferred to/from another hospital are less likely to be counted. | Maintain regular contact between NICU data managers from different hospitals to ensure complete patient record is transferred; involve transport teams in data collection pertaining to antenatal corticosteroids; request complete copy of chart from referring hospital; include CPQCC data on sheet to be completed by referring hospital at time of transfer. |
| 5. The rate of antenatal corticosteroid administration is low at hospitals that transfer infants to your hospital. | Establish inter-hospital dialogue on antenatal corticosteroid administration; review yearly data to demonstrate antenatal corticosteroid administration rates and rate variation to hospital staff at referring hospitals; encourage other hospitals to use the ANS Tool Kit; circulate <i>Rationale</i> section of Tool Kit to referring hospitals; review issue at Morbidity and Mortality conferences. |
| 6. Women who were previously admitted and who received antenatal corticosteroids at a prior admission were incorrectly counted. | Write and circulate memorandum on timing of antenatal corticosteroid administration and on relevant CPQCC reporting guidelines. |
| 7. Antenatal corticosteroids ordered but not administered. | Develop standards for treatment; establish procedures that promote physician follow-up on ordered medications to ensure that they are administered; standing orders; STAT orders. |
| 8. Even in the absence of advanced cervical dilation, antenatal corticosteroids are not consistently ordered/administered. | Organize educational session about importance of antenatal corticosteroids, including delivering physicians and pediatricians/neonatologists; circulate consensus paper and other documents from <i>Rationale</i> section of |

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| | Tool Kit to all delivering physicians. |
| 9. Women who deliver less than 24 hours after admission do not receive antenatal corticosteroids. | Organize education session about benefits of antenatal corticosteroids when administered within 24 hours of delivery; circulate <i>Rationale</i> section of Tool Kit to delivering physicians and OB nurses. |
| 10. Some obstetricians administer antenatal corticosteroids less consistently than others. | Organize education session about the importance of antenatal corticosteroids; be sure that targeted physicians are able to attend; copy <i>Rationale</i> section of Tool Kit and distribute to physicians. |
| 11. When tocolysis is administered for preterm labor, antenatal corticosteroids are less consistently administered. | Organize education session about benefits of antenatal corticosteroids regardless of whether tocolysis is administered for preterm labor; utilize standard order sheets; develop “care map” of protocol for preterm labor. |
| 12. Antenatal corticosteroids are not consistently administered in the case of PPROM. | Organize educational session about benefits of antenatal corticosteroid regardless of incidence of PPROM. |
| 13. Antenatal corticosteroids are not consistently administered to women with GDM, vaginal bleeding, preeclampsia or “other” conditions. | Organize educational session about benefits of antenatal corticosteroids irrespective of these conditions. |

PLAN the Improvement and Continue Data Collection

This stage involves visualizing how the specified improvements will be made. The first column of the table below re-states “examples of improvements” from the previous table. The second column provides key steps toward realizing the specified improvement. Note that only the key steps are described. You may want to go into more detail, outlining intermediate steps. Be sure to include target dates for completing each step. Use the Implementation Worksheet at the end of this section to document the proposed improvement, key steps planned towards realizing the improvement, and actual steps taken (see next heading, *Do the Improvement*). Entries into the Implementation Worksheet are to be made on a regular basis, thereby charting the progress of quality improvement efforts.

Table III. Improvements and Key Steps Towards Making Improvements

| Example of Improvement | Examples of Key Steps Toward Realizing Improvement |
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| 1. Designate staff member with clear responsibility for documenting and reporting antenatal corticosteroid administration. | Team nominates/agrees upon staff member(s) to take on responsibility; responsibilities clarified; relationship between team responsibilities and staff member responsibility clarified. |
| 2. Revise patient report/chart format so that area for reporting antenatal corticosteroid administration is more obvious. | Team reviews current format and alternate models; revisions made. |
| 3. Assure that CPQCC delivery room death forms (which have an antenatal corticosteroid question) are filled out at time of delivery. | Team reviews current process for completing delivery room death forms and reasons why data on antenatal corticosteroids administration is not complete. New procedures proposed and agreed upon. |
| 4. Establish direct contact between NICU data managers from different hospitals. | Team researches current methods of communication and possible shortcomings/limitations to these methods. Enhanced methods proposed, agreed upon. |
| 5. Establish inter-hospital dialogue on antenatal corticosteroid administration; encourage other hospitals to use the ANS Tool Kit. | Team considers current system of dialogue; propose and enact improved system. Devise strategy for promotion of Tool Kit in other hospitals. |
| 6. Write and circulate memorandum on timing of antenatal corticosteroid administration and on relevant CPQCC reporting guidelines. | Team discusses NIH guidelines, specifically related to timing of doses. Team writes memorandum, establishes target audience, disseminates memorandum. |
| 7. Establish procedures that promote physician follow-up on ordered medications to ensure that they are administered. | Team reviews current checks and balances for administration of ordered medication; propose and enact improved procedures. |
| 8. Organize educational session about importance of antenatal corticosteroids. | Team adapts a consensus statement on importance of ANS; discusses best way of reaching physicians with this statement; outline plan for outreach. |
| 9. Organize education session about benefits of | Team discusses literature related to this issue; forms |

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| antenatal corticosteroids when administered within 24 hours of delivery. | consensus about appropriate treatment; discusses best way of reaching physicians; outline plan for outreach. |
| 10. Organize education session about the importance of antenatal corticosteroids. Be sure that targeted physicians are able to attend. | Team meets for open forum discussion where different opinions can be voiced; literature discussed; consensus reached by Team; method of reaching physicians adapted; outline plan for outreach. |
| 11. Organize education session about benefits of antenatal corticosteroids regardless of whether tocolysis is administered for preterm labor. | Team discusses issue – pros/cons of ANS administration with tocolysis; relevant literature/studies reviewed; consensus reached; outline plan for outreach. |
| 12. Organize educational session about benefits of antenatal corticosteroid regardless of incidence of PPROM. | Team discusses issue – pros/cons of ANS administration with PPROM; relevant literature/studies reviewed; consensus reached; outline plan for outreach. |
| 13. Organize educational session about benefits of antenatal corticosteroids irrespective of these (GDM, vaginal bleeding, preeclampsia, or “other”) conditions. | Team discusses issue; relevant literature/studies reviewed; outline plan for outreach. |

DO the Improvement, Data Collection and Analysis

The planning is complete and the next step is implementation. Fundamental to CQI is timely feedback on the progress and success of improvement efforts. Thus, implementation is accompanied by ongoing data collection, analysis and planning. Important activities during this stage are to:

- Revisit lessons learned from the Problem Identification Worksheets (PIWs). Regularly collect data using the PIWs. This allows the team to chart progress towards achieving the stated improvement, to determine whether the strategy in place is working, and to identify new or evolving areas for improvement.
- Describe planned steps toward realizing the proposed improvement. This should be repeated at regular intervals. Based on changes and/or new information from the PIW, the Team may decide to adjust the Proposed Improvement and to update, revise and refine the plan (see next two headings, *Check and Study the Results* and *Act to Hold the Gain and to Continue to Improve the Process*).
- Update and document actual steps taken. Note what has been accomplished including Team meetings, agreements reached, new procedures and so forth. Use the Implementation Worksheet or similar tool to keep track of progress.

Depending on the improvement and on the resources at hand, the Team may decide to update the Implementation Worksheet weekly, monthly or quarterly.

CHECK and Study the Results

The completed Implementation Worksheet serves as a one-page results summary. This summary should be copied and distributed to team members. When discussing and analyzing results, the team should consider:

- Changes over time in process identified for improvement.
- What caused the change? That is, which elements of the plan were effective?
- If no change over time, why not? Which elements of the plan were not effective or were not effectively carried out?
- Change over time in other process. Have the steps taken toward improving a process helped or hindered other processes?
- The lessons learned for each component of the FOCUS-PDCA activity. Reflect on what was done well, and what can be improved. Write down the most important lessons learned.

ACT to Hold the Gain...

Now that improvements have been made, how will the Team ensure that new systems and behaviors become permanent? One way to accomplish this is to continue to complete the Problem Identification Worksheets and Implementation Worksheet. Though worksheets should be completed regularly, the Team may decide that for monitoring/maintenance purposes, worksheets can be filled out less frequently.

and to Continue to Improve the Process

Using lessons learned from the previous section, revise your plan to improve the process at hand. Activities that proved useful may be enhanced, while others that were less useful may be de-emphasized. The Team should work together, coming to a consensus if possible, to make revisions. These revisions should be documented in the Implementation Worksheet, under Key Planned Steps.