Introductions

The Centers for Disease Control and Prevention (CDC) reports the rate of women having C-sections increased 33% from 1996 to 2007. 32% of all deliveries were by C-section in 2007, and the upward trend continues today. 48% of women 40-54 giving birth will have a C-section! Surgical site infection (SSI) rate for C-sections is as high as 83.8%* and SSI can add over $3,500 in additional care to each C-section.4-5 Four pathogens are responsible for over 56% of OB/GYN surgical site infections, including those in C-sections. The most common pathogens found in OB/GYN (including C-section) infected surgeries are:

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>% found in SSSIs</th>
<th>Coagulase Negative Staph.</th>
<th>12.4%</th>
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</thead>
<tbody>
<tr>
<td>S. faecalis</td>
<td>28.3%</td>
<td>E. coli</td>
<td>9.5%</td>
</tr>
<tr>
<td>E. faecalis</td>
<td>6.3%</td>
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</tbody>
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Since 2007 we have reduced C-section infections and complications by 96% with a corresponding significant cost saving. An estimated 90 complications have been avoided at Tacoma General since 2008 when the initial infection reduction bundle and vigilance was implemented. An increase in C-section infections and complications has recently been identified at Good Samaritan. C-sections have a five to twenty-fold greater risk for infection as compared to vaginal delivery. A reduction in readmissions due to post-op infection can range from $5,000-$500,000.

Method

This is a proposal for implementation of steps to further reduce C-section infections and complications. Current supplies and costs for C-section surgery supplies to close wound, dressings and tapes used, post-pam care time and supplies were obtained and reviewed. Multiple factors were identified using LEAN (http://www.lean.org/howto/whatiskanpourinciples/). The principles: 1. Practices vary from provider to provider as to incisional closure technique. 2. Multiple preferences for each provider are time consuming for nursing staff to setup C-are have to provide requestors for each surgery in time frame for ordering and storage of supplies and increased cost for unused contaminated supplies. 3. Providers continue using dated practices and not moving to newer products that have improved outcomes and increase safety for the patient. 4. Multiple patient infections have occurred from inappropriate taping and dressing techniques - resulting in need for wound care consult and an increased cost of wound supplies (micro-foam tape used for pressure dressings and the “strapping” tape that is used as well as conventional negative pressure dressings for incisional bolsters). 5. Patient demographics and co-morbidities have changed in the last 10 years, increasing potential for post-operative complications and infections. 6. Injuries to skin are being caused immediately post-op with inappropriate removal of adhesive drapes. 7. Post-surgical practices for major abdominal surgery (C-section) do not parallel those for general surgery with comparable length and complexity of surgery. 8. Surgical dressings are being removed at post-op day one and patients are allowed to shower. With the use of staples as closure, there are gaps in the layers of closure and skin flora is allowed to enter a new open surgical incision. a. Staples are removed at day 2-3 after skin incision formation of the new surgical incision. b. Initial bundle changes have made a significant impact on reduction of post C-section infections and complications - but, additional improvements can be implemented to reduce further.

Proposed bundle includes: 1. Standardization of suture materials to antibacterial ICG pre-op and consideration to closure of all tissue layers fascia, muscle, subcutaneous and dermal. 2. Standardization of adhesive materials to subcutaneous layer. 3. Standardization of dressing material based on risk factors and co-morbidities – to decrease patient injury, facilitate healing, promote patient safety and increase patient satisfaction.

Low-risk or standard dressing for C-section patients in the OR (2011) 2-0 Cyanoacrylate topical skin adhesive Skin prep around incision prior to dressing placement Nanocrystalline Silver antimicrobial dressing (cut 1/2 longer than incision lengthwise and then placed end to end with a little overlap over incision) Water/bacteria proof cover dressing (4" x 10" dressing size) Skin prep then around edges of dressing to seal

High-risk dressing for C-section patients in the OR (2012) 2-0 Cyanoacrylate topical skin adhesive Skin prep around incision prior to dressing placement Nanocrystalline Silver antimicrobial dressing (cut 1/2 longer than incision lengthwise and then placed end to end with a little overlap over incision) Careless/single use/disposable NPWT system with 10" x 4" dressing placed Skin prep then around edges of dressing to seal

Results

Infection reduction from January 2007 through 2011. 92 C-section SSIs have been avoided since intervention yielding approximate cost savings of $5,000,000 (average of $15,000/readmission). We have stopped the increase of SSI C-sections. Good Samaritan has not had a single C-section infection since we started this bundle. Approximate cost savings:

C-section SSIs can range from $2,500 to $250,000.
Approximate cost savings = $50,000 and 7 patient days.
One case: 2 readmits, 2 I&D, on-going wound care and clinic visits and costs.
Total added patient days = 25.
Current SSIs charges = $230,000 and still not done.
Over the past 4 years 92 post-op C-section infections avoided.
Approximate cost savings of $5,000,000+

Conclusion

Infection reduction is crucial for success. C-section SSI is avoidable as shown by this clinical prevention program, even in high-risk populations. It is hoped that studies of this type will allow for enhanced clinician education, collaboration, and will prove beneficial to facilities.