Introduction
The Centers for Disease Control and Prevention (CDC) reports the rate of women having C-sections increased 53% 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-section1. Surgical site infection (SSI) rate for C-sections is as high as 3.82%. SSI can add over $3,500 in additional care to each C-section2. 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-sections) infected surgeries are:

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>% found in SSI</th>
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<tbody>
<tr>
<td>Coagulase Negative Staph</td>
<td>52.8%</td>
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<tr>
<td>Coagulase Positive Staph</td>
<td>24.6%</td>
</tr>
<tr>
<td>E. coli</td>
<td>9.5%</td>
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<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 savings. 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.

OB care has a cost cap in the state of Washington. Surgical costs are bundled and reimbursed at a “complicated vaginal delivery rate”. No additional costs for OR time or supplies can be added to the care with successful reimbursement by patient insurers. Post-surgical complications and infections most often result in a cost that is absorbed by MultiCare Health System (MHS). Therefore, reducing rates of complications and infections is critical both financially and from a quality of care focus. At MHS the current average costs of patients with complications are as follows:

- Non-readmitted: added cost to C-section = $25,000. Can be as high as $100,000-$200,000 per patient depending on severity of complication and requirements/time for treatments.
- Readmitted: added cost to C-section = $50,000. Can run as high as $10-$20,000 depending on severity of complication and requirements/time for treatments.

Purpose
To describe a program that has successfully demonstrated reduced SSIs. C-section patients have a five to twenty-fold greater risk for infection as compared to vaginal delivery. A single re-admission due to post-op infection can range from $5,000-$100,000.

Method
This is a proposal for implementation of steps to further reduce C-section infections and complications. Four pathogens are responsible for over 56% of OB/GYN surgical site infections. Surgical costs are bundled and reimbursed at a “complicated vaginal delivery rate”. No additional costs for OR time or supplies can be added to the care with successful reimbursement by patient insurers. Post-surgical complications and infections most often result in a cost that is absorbed by MultiCare Health System (MHS). Therefore, reducing rates of complications and infections is critical both financially and from a quality of care focus. At MHS the current average costs of patients with complications are as follows:

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Proposed bundle includes:
1. Standardization of suture materials to antibacterial (CHG pre-op) and consideration to closure of all tissue layers (fascia, muscle, subcutaneous and dermis)
2. Standardized closure of subcutaneous layer in 2 cm in depth.
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-Octyl Cynanocrylate topical skin adhesive
- Skin prep around incision prior to dressing placement
- Nanocrystalline Silver antimicrobial dressing (1/2” x 1/2”)
- 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-Octyl Cynanocrylate topical skin adhesive
- Skin prep around incision prior to dressing placement
- Nanocrystalline Silver antimicrobial dressing (1/2” x 1/2”)
- Carless/Single use/disposable NPWT system with 10” x 4” dressing placed
- Skin prep then around edges of dressing to seal

Initial review of current practice and materials revealed the following costs:
- Low-risk patient = $3.68
- High-risk patient requiring pressure dressing = $34.20
- High risk with incisional bolstering with conventional negative pressure – 3 day therapy = $245.30 (savings $103.32/patient)

Proposed changes for incisional closure, dressing and post-partum incisional management:
- Low-risk patient = $42.69 (increase of $9.75/patient)
- High-risk with incisional bolstering with the PCGO® negative pressure system – 7 day therapy = $245.30 (savings $103.32/patient)

Results
SSIs infection reduction from January 2007 through 2012. 92 C-section SSIs have been avoided since intervention yielding approximate cost savings of $5,000,000 (average of $50,000/readmission). We have stopped the increase of 92 C-sections. Good Samaritan has not had a single C-section infection since we started this bundle here.

Approximate cost savings:
- C-section SSIs can range from $1,200-$25,000
- Average readmission rate = $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 per year = $250,000 and still not done
- Over the past 4 years 92 post-op C-section infections avoided
- Approximate cost savings of $5,000,000

Conclusion
Patient involvement 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 clinical education, outcomes, and will soon be utilized to facilities.

References