Preventing Surgical Site Infections: The SSI Bundle
Why SSI?

New York State 30,000 hospital discharges 1984

- 3.7% of patients experience serious adverse events related to medical management
- The top three causes were:
  - Medication-related (19%)
  - Wound infections (14%)
  - Technical complications (13%)
- All of these events led to disability or prolonged stay; death occurred in 13.6% of these patients
- 58% of these events were preventable
Opportunity to Prevent Surgical Infections

- An estimated 40-60% of SSIs are preventable:
  - Appropriate timing, selection, and duration of prophylactic antibiotics (occurs in as few as 25-50% of operations)
  - Appropriate Hair Removal
  - Post-operative glucose control (major cardiac surgery patients)*
  - Post-operative normothermia (colorectal surgery patients)*

* These components of care are supported by clinical trials and experimental evidence in the specified populations; they may prove valuable for other surgical patients as well.
## Impact of SSI

<table>
<thead>
<tr>
<th></th>
<th>Infected</th>
<th>Uninfected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality (in-hospital)</td>
<td>7.8%</td>
<td>3.5%</td>
</tr>
<tr>
<td>ICU admission</td>
<td>29%</td>
<td>18%</td>
</tr>
<tr>
<td>Readmission</td>
<td>41%</td>
<td>7%</td>
</tr>
<tr>
<td>Median initial LOS</td>
<td>11d</td>
<td>6d</td>
</tr>
<tr>
<td>Median total LOS</td>
<td>18d</td>
<td>7d</td>
</tr>
</tbody>
</table>

SSI bundle

1. Appropriate use of antibiotics
2. Appropriate hair removal
3. Post-operative glucose control (major cardiac surgery patients)*
4. Post-operative normothermia (colorectal surgery patients)*

* These components of care are supported by clinical trials and experimental evidence in the specified populations; they may prove valuable for other surgical patients as well.
Use of Antibiotics

Appropriate use of prophylactic antibiotics

– Selection
– Timely administration
– Timely discontinuation of prophylaxis
Timing of Antibiotics

• Most studies indicate that optimum timing for prophylactic antibiotic is within one hour of incision time.

• Up to 2 hours if drug requires a longer infusion time
Steps to Prevent SSI

1. Appropriate use of antibiotics
2. Appropriate hair removal
3. Post-operative glucose control (major cardiac surgery patients)*
4. Post-operative normothermia (colorectal surgery patients)*

* These components of care are supported by clinical trials and experimental evidence in the specified populations; they may prove valuable for other surgical patients as well.
Hair Removal

• Appropriate:
  – No hair removal at all
  – Clipping
  – Depilatory use

• Inappropriate:
  – Razors
### Influence of Shaving on SSI

<table>
<thead>
<tr>
<th>Group</th>
<th>No Hair Removal</th>
<th>Depilatory</th>
<th>Shaved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>155</td>
<td>153</td>
<td>246</td>
</tr>
<tr>
<td>Infection rate</td>
<td>0.6%</td>
<td>0.6%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

# Razor Use vs. Clipper Use in Cardiac Surgery

<table>
<thead>
<tr>
<th>Method</th>
<th>Number</th>
<th>Infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaved</td>
<td>990</td>
<td>13 (1.3%)</td>
</tr>
<tr>
<td>Clipped</td>
<td>990</td>
<td>4 (0.4%)</td>
</tr>
</tbody>
</table>

\[ p < 0.03 \]

Steps to Prevent SSI

1. Appropriate use of antibiotics
2. Appropriate hair removal
3. **Post-operative glucose control (major cardiac surgery patients cared for in an ICU)**
4. **Peri and post-operative normothermia (colorectal surgery patients)**

* These components of care are supported by clinical trials and experimental evidence in the specified populations; they may prove valuable for other surgical patients as well.
Steps to Prevent SSI

1. Appropriate use of antibiotics
2. Appropriate hair removal
3. Post-operative glucose control (major cardiac surgery patients cared for in an ICU)*
4. Peri and post operative normothermia (patients with colorectal surgery)*

* These components of care are supported by clinical trials and experimental evidence in the specified populations; they may prove valuable for other surgical patients as well.
Peri and post operative operative
Normothermia

• Hypothermia reduces tissue oxygen tension by vasoconstriction.

• Hypothermia reduces leukocyte superoxide production.

• Hypothermia increases bleeding and transfusion requirements.

• Hypothermia increases duration of hospital stay even in uninfected patients.
Measures

- Surgical patients with appropriate hair removal
- Appropriate selection of prophylactic antibiotics
- Timely prophylactic antibiotic administration
- Timely prophylactic antibiotic discontinuation
- Major cardiac surgery patients with controlled post-operative glucose
- Colorectal surgery patients with normothermia
- Measuring Surgical Infection Rate