Clean Collect®
Blood Culture Diversion System

- Reduces contamination
- Improves patient outcomes
- Saves hospital resources

Clean Collect®
Blood Culture Kits

www.cleancollect.com
Blood Culture Contamination

Overview

- **Sources:** Primary source of contamination is the ER where blood cultures are often drawn through IVs by nurses.¹

- **Patient Impact:** Contaminated blood cultures result in or prolong unnecessary treatment with broad spectrum IV antibiotics.²

- **Hospital Impact:** Average cost per contaminant has been measured at $6,283 in published clinical trials.³⁴⁵⁶ These costs are not typically reimbursed.⁷

- **Solutions:** Clean Collect provides a means to permanently control contamination rates.⁸⁹

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Blood Culture Systems
(Bactec®, BacT/Alert®, and VersaTREK®)

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Stone Medical Corporation
www.stonemedcorp.com  •  888-762-1397

Clean Collect
(Diversion)
0.5%

National Average
2.9%

Phlebotomy
2.2%

Nursing (ERs)
4.3%

IV Drawn
6.5%

Average Contamination Rates¹⁸¹⁰
Sources of Contaminants

**Standard Methods**

1. **Peripheral Blood Cultures**
   - Standard Method: 2.2% contamination

2. **IV Drawn Blood Cultures**
   - Standard Method: 6.5% contamination

**Sources of Contamination:**
1. Re-palpation
2. Inadequate Antiseptic Use
3. Subsurface Bacteria
4. Equipment (luers, syringes)

**Contaminants drawn into blood cultures**

- Blood Culture Bottles*
- Other Non-Sterile Tubes

*Current standard method requires that blood cultures be drawn first in the order of draw

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Clean Collect Diversion Method

Diversion Method

Peripheral Blood Cultures
Standard Method: 2.2% contamination
Clean Collect: 0.3% contamination

IV Drawn Blood Cultures
Standard Method: 6.5% contamination
Clean Collect: 0.8% contamination

Sources Eliminated by Diversion:
1. Re-palpation
2. Inadequate Antiseptic Use
3. Subsurface Bacteria
4. Equipment (luers, syringes)

Sterile Diversion Tube*
Blood Culture Bottles
Non-Sterile Tubes

Contaminants drawn into diversion tube

0.5%
Average Rate of Contamination

*Diversion tube must be sterile. Non-sterile tubes can increase contamination rates up to 17%.

US Patent 6,913,580
Impact

Impact of Blood Culture Contamination

- Contamination results in unnecessary treatment of patients with broad spectrum IV antibiotics.\(^{2,3,4,5,6}\)

- Antibiotic treatment results in \textit{C. difficile} infections, anaphylactic shock, kidney and liver failure, and other side effects.

- Wasted resources include IV antibiotics, repeat testing, isolation for \textit{C. diff} patients, dialysis, and personnel costs. These costs average $6,283 per incident.\(^{3,4,5,6}\)

- Medicare and insurers using DRG and other fixed payment systems typically do not reimburse the costs of contamination.\(^7\)

- Additional penalties for \textit{C. diff} infection rates start in 2016 and can total millions annually.\(^{12,13}\)

Cost of Contamination Research
(Published Data – Inflation Adjusted to 2016)

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Journal</th>
<th>Cost per Contaminant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Rita Gander</td>
<td>Journal of Clinical Microbiology</td>
<td>$9,563 per contaminant</td>
</tr>
<tr>
<td>Dr. Oren Zwang</td>
<td>Journal of Hospital Medicine</td>
<td>$10,370 per contaminant</td>
</tr>
<tr>
<td>Dr. Sever Surdulescu</td>
<td>Clinical Perf. Quality Healthcare</td>
<td>$9,146 per contaminant</td>
</tr>
<tr>
<td>Dr. David Bates</td>
<td>JAMA</td>
<td>$7,670 per contaminant</td>
</tr>
<tr>
<td>Dr. William Dunagan</td>
<td>American Journal of Medicine</td>
<td>$10,240 per contaminant</td>
</tr>
</tbody>
</table>

Average (resource costs) $6,283 per contaminant

Resource Savings at a Mid-Sized US Hospital

<table>
<thead>
<tr>
<th>ER Blood Culture Data</th>
<th>Total Blood Culture Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Cultures (per month)</td>
<td>406</td>
</tr>
<tr>
<td>Contamination Rate</td>
<td>4.6%</td>
</tr>
<tr>
<td>Rate with Clean Collect</td>
<td>1.2%</td>
</tr>
<tr>
<td>Blood Cultures (per month)</td>
<td>1,218</td>
</tr>
<tr>
<td>Contamination Rate</td>
<td>2.7%</td>
</tr>
<tr>
<td>Rate with Clean Collect</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

ER Cost Reduction

<table>
<thead>
<tr>
<th>Current Cost ($6,283/cont.)</th>
<th>$1,408,096</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources Saved</td>
<td>$1,163,209</td>
</tr>
<tr>
<td>Added Cost (Annual)</td>
<td>$5,613</td>
</tr>
<tr>
<td>Net Savings</td>
<td>$1,157,597</td>
</tr>
</tbody>
</table>

Total Cost Reduction

<table>
<thead>
<tr>
<th>Current Cost ($6,283/cont.)</th>
<th>$2,479,473</th>
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</thead>
<tbody>
<tr>
<td>Resource Saved</td>
<td>$1,744,814</td>
</tr>
<tr>
<td>Added Cost (Annual)</td>
<td>$18,708</td>
</tr>
<tr>
<td>Net Savings</td>
<td>$1,726,106</td>
</tr>
</tbody>
</table>
Results

Clean Collect Results

- **Effective** – Clean Collect has reduced contamination rates by an average of 74% in practice.⁸

- **Standardized** – Promotes consistent use of a highly effective method to achieve long term reduction of contamination rates.⁸

- **Long Term Improvement** – Continually eliminates contaminants from re-palpation, inadequate antisepsis, and mishandling of equipment.

- **Cost Reduction** – Saves considerable resources that would have been wasted on unnecessary treatment and side effects (*C. diff* infections, etc.)

  “Our contamination rate is the lowest it has ever been”
  
  - **ER Director at a mid-sized hospital**

![Graph showing long term improvement with Clean Collect](image)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Department</th>
<th>Previous Rate</th>
<th>Clean Collect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - (3/01/13)</td>
<td>ER and floors</td>
<td>3.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2 - (3/12/13)</td>
<td>Emergency</td>
<td>4.6%</td>
<td>0.8%</td>
</tr>
<tr>
<td>3 - (5/01/13)</td>
<td>Emergency</td>
<td>6.3%</td>
<td>0.7%</td>
</tr>
<tr>
<td>4 - (07/01/13)</td>
<td>Emergency</td>
<td>4.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>5 - (1/22/14)</td>
<td>Emergency</td>
<td>4.0%</td>
<td>0%</td>
</tr>
<tr>
<td>6 - (4/15/14)</td>
<td>ER and floors</td>
<td>3.6%</td>
<td>0.4%</td>
</tr>
<tr>
<td>7 - (7/18/14)</td>
<td>ER and floors</td>
<td>4.1%</td>
<td>0.7%</td>
</tr>
<tr>
<td><strong>Averages</strong></td>
<td></td>
<td><strong>4.4%</strong></td>
<td><strong>0.5%</strong></td>
</tr>
</tbody>
</table>

Stone Medical Corporation
www.stonemedcorp.com ● 888-762-1397

www.cleancollect.com
Clean Collect Peripheral Kits

Clean Collect® CC-220 & CC-225
Peripheral Blood Culture Kits

Contains:
- Sterile Diversion Tube
- Prevantics® Swabstick
- Alcohol Pads
  (for bottle tops)
- Latex Free Tourniquet
- Tracking Decal Set
- Sterile Gloves
- Bandage

<table>
<thead>
<tr>
<th>SMC Number</th>
<th>Fisher Catalog #</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-220</td>
<td>23200100</td>
<td>K-Shield Butterfly</td>
</tr>
<tr>
<td>CC-220B</td>
<td>23200101</td>
<td>No butterfly</td>
</tr>
<tr>
<td>CC-222R</td>
<td>23200102</td>
<td>BD Push Button Butterfly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMC Number</th>
<th>Fisher Catalog #</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-225</td>
<td>23200104</td>
<td>K-Shield Butterfly</td>
</tr>
<tr>
<td>CC-225B</td>
<td>23200105</td>
<td>No butterfly</td>
</tr>
<tr>
<td>CC-225R</td>
<td>23200106</td>
<td>BD Push Button Butterfly</td>
</tr>
</tbody>
</table>

Butterfly Needle Options
- BD Push Button: CC-220R / 225R
- No Butterfly: CC-220B / 220B
- K-Shield Butterfly: CC-220 / 225
Clean Collect IV Blood Culture Kits

Clean Collect® CC-310 & CC-315
IV Method Blood Culture Kits

Contains:

- Sterile Diversion Tube
- Chloraprep® Frepp
- Gauze Pads
- Alcohol Pads (for bottle tops)
- Latex Free Tourniquet
- SureSite® IV Dressing
- Curad® Tape Roll
- Tracking Decal Set
- Sterile Gloves

<table>
<thead>
<tr>
<th>SMC Number</th>
<th>Fisher Catalog #</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC-310</td>
<td>23200103</td>
<td>Compatible with Bactec or VersaTrek</td>
</tr>
<tr>
<td>CC-315</td>
<td>23200107</td>
<td>Compatible with BacT/Alert</td>
</tr>
</tbody>
</table>

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In the United States:
For customer service, call 1-800-640-0640
To fax an order, use 1-800-290-0290
To order online: www.fisherhealthcare.com
Solutions

Comparison of Solutions

* Many previous solutions to blood culture contamination do not effectively handle blood cultures drawn through IVs, which are the primary source of contamination in ERs with an average rate of 6.5%.\(^1\)

* Clean Collect is a diversion system that has demonstrated significant reductions in contamination rates for both peripheral and IV drawn blood cultures with long term improvement of the problem.\(^8\)

<table>
<thead>
<tr>
<th>Solution</th>
<th>Peripheral</th>
<th>IV Drawn</th>
<th>Added Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure Trays</td>
<td>2.0%</td>
<td>6.5%</td>
<td>$3.50 per test</td>
<td>Less effective, IV draws are not handled</td>
</tr>
<tr>
<td>Blood Culture Kits</td>
<td>2.0%</td>
<td>6.5%</td>
<td>$1.50 per test</td>
<td>Less effective, IV draws are not handled</td>
</tr>
<tr>
<td>Retraining</td>
<td>1.7%</td>
<td>4.4%</td>
<td>$1,200 per event</td>
<td>Less effective overall. Rates often rebound within 45 days</td>
</tr>
<tr>
<td>Phlebotomy in ED</td>
<td>1.7%</td>
<td>N/A</td>
<td>$6.53 per test</td>
<td>Requires 3 - 5 needle sticks per patient, disrupts workflow, increases missed draws, and can lower patient satisfaction scores</td>
</tr>
</tbody>
</table>

**Clean Collect**\(^*\) 0.3% 0.8% $1.50 per test Effective for significant, long term reduction of contamination rates
**Frequently Asked Questions**

**Q1. Could we use regular blood collection tubes to draw the first sample and get the same effect?**

**Answer:** Regular tubes are not sterile on the exterior. If drawn first they can carry contaminants from the tube’s stopper into the blood cultures drawn afterwards, increasing contamination rates up to 17%. Clean Collect uses a pre-sterilized diversion tube to eliminate contaminants from multiple sources without creating a new contamination problem. Manually treating tube stoppers with antiseptics has proven inconsistent in practice with hospitals reporting increased contamination rates instead of reductions.

**Diversion Method**
(Sterile vs Non-sterile Diversion Tubes)

<table>
<thead>
<tr>
<th>Diversion Tube for 1st Sample</th>
<th>Volume</th>
<th>Standard Method</th>
<th>Diversion Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-sterile tubes</td>
<td>4mLs</td>
<td>N/A</td>
<td>16.8%</td>
</tr>
<tr>
<td>Manually treated tubes</td>
<td>4mLs</td>
<td>4.2%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Clean Collect (Sterile Tube)</td>
<td>4mLs</td>
<td>4.4%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

**Q2. What can the diverted sample be used for?**

**Answer:** The diverted red top tube sample can be used for more than 50 diagnostic tests on serum and is accepted by Labcorp, Quest, and other reference labs. These tests include: Viral (hepatitis, West Nile, influenza) Acute Phase Reactants/Markers (procalcitonin, C-reactive protein), Hormonal (thyroid stimulating hormone, thyroxine), Immunology (allergen profiles, anti-nuclear antibodies), serum antibiotic levels, and other testing.
References

1. Self WH, Speroff T, McNaughton CD. Blood Culture Collection through Peripheral Intravenous Catheters Increases the Risk of Specimen Contamination among Adult Emergency Department Patients. Infection Control and Hospital Epidemiology, Vol. 33, No. 5 (May 2012), pp. 524-526


11. Stone Medical Corporation. Importance of Discard Tube Sterility for Diversion Methods 2014
