You can make a difference in your patients’ outcomes through effective patient blood management.
Conserve blood, reduce infection and decrease transfusion risk through effective blood management.

Your hospital’s current blood sampling practices may benefit from implementing Patient Blood Management (PBM) procedures designed to more effectively conserve blood, improve patient outcomes and avoid costs.

Patient Blood Management (PBM)

PBM is the timely application of evidence-based medical and surgical concepts designed to maintain hemoglobin concentration, optimize hemostasis and minimize blood loss in an effort to improve patient outcomes.1,2

Clinical and economic impact of conventional blood sampling

Conventional blood sampling procedures can result in notable blood loss, unnecessary blood waste and risk of contamination. Clinical implications may include anemia, transfusions, and hospital-acquired infections that may lead to poor patient outcomes. Increased hospital costs are also associated with routine blood collection utilizing conventional sampling methods.3,4

Benefits of Closed Blood Sampling (CBS) as part of Patient Blood Management (PBM)

CBS can be adopted as part of your hospital’s PBM program. Clinical evidence demonstrates that CBS may reduce iatrogenic blood loss, decrease hospital infections, lower the risk of developing anemia and reduce the need for transfusion. Adopting CBS as standard operating procedure in your OR and ICU may help you achieve positive patient outcomes while providing cost-effective care.5–7

Closed Blood Sampling is an evidence-based solution

<table>
<thead>
<tr>
<th>Closed Blood Sampling</th>
<th>Patient outcome improvement</th>
<th>Supporting evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce blood loss</td>
<td>Decrease in total blood drawn and discarded1–2,5,6,8</td>
<td>CBS forms a closed infusion line and may reduce complications caused by intraluminal contamination. CBS has demonstrated a decrease in intraluminal fluid contamination compared to a 3-way stopcock system (7% vs. 61%, respectively).9 A randomized controlled trial found lower rates of intraluminal fluid contamination with CBS (1.8%) vs. 3-way stopcock system (8.2%).10 In critically ill patients, CRBSI account for 19% of infections.32</td>
</tr>
<tr>
<td>Reduce iatrogenic anemia</td>
<td>Lowered decline in Hb levels2,5,6,8</td>
<td>In critically ill patients, CRBSI account for 19% of infections.32</td>
</tr>
<tr>
<td>Reduce hospital infections</td>
<td>Lower contamination risk may present potential for reduction in catheter-related bloodstream infections (CRBSI).1,6,9</td>
<td>In critically ill patients, CRBSI account for 19% of infections.32</td>
</tr>
<tr>
<td>Reduce transfusion needs</td>
<td>Reduced need for transfusion compared to conventional blood sampling2,5,6,8</td>
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Reduce blood loss

Comparison of total blood drawn and discarded

<table>
<thead>
<tr>
<th>Total blood drawn</th>
<th>Blood discarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBS</td>
<td>Conventional</td>
</tr>
<tr>
<td>350</td>
<td>250</td>
</tr>
</tbody>
</table>

Discarded blood can account for 24–30% of total daily blood loss in critically ill patients.1

In the ICU, blood may be drawn 5–24 times a day.1,2

Volume drawn per day may be 26–427 mL.2

Blood discarded with each blood draw varies from 2–10 mL.1,2,5

Reduce transfusion needs and related complications

Percentage of patients transfused after sampling with Closed Blood Sampling vs. conventional sampling1,4,6,11

<table>
<thead>
<tr>
<th>Percentage of patients transfused after sampling</th>
<th>Closed Blood Sampling (CBS)</th>
<th>Conventional</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thorpe 2000 Catheter tip CBS</td>
<td>2%</td>
<td>10%</td>
<td>0.05</td>
</tr>
<tr>
<td>Oto 2010 Catheter tip CBS</td>
<td>3%</td>
<td>10%</td>
<td>0.05</td>
</tr>
<tr>
<td>Oto 2012 Intraluminal tip CBS</td>
<td>0%</td>
<td>10%</td>
<td>0.05</td>
</tr>
</tbody>
</table>

In the ICU, reducing blood loss from sampling through improved patient blood management may reduce the need for transfusions and lead to fewer transfusion-related complications.10,13,14,15,16,18 which include:

- Allergy, anaphylactic and hemolytic transfusion reactions, transfusion-related acute lung injury (TRALI), transfusion associated circulatory overload (TACO), acute respiratory distress syndrome (ARDS), infections and ventilator-associated pneumonia10
- RBC transfusion has been associated with a higher rate of post-operative infection10
- Transfused patients have increased mortality both in the ICU and hospital, increased infection rates, organ failure, longer ICU stays10

Reduce iatrogenic anemia

Decrease in Hb levels from admission to discharge (g/dL)

In critically ill patients, CRBSI account for 19% of infections.32

Blood loss from phlebotomy in critically ill infants (birth – 2 weeks) is the primary contributor to early anemia and red blood cell (RBC) transfusion needs.19

Anemia is associated with substantial burden and increased risk of organ injury and mortality.19,20

Reducing blood draw-induced anemia diminishes the need for blood transfusion.1 Moreover, iatrogenic anemia may be reduced through a culture of blood management.2

• Every 50 mL of blood drawn increases the risk of moderate to severe iatrogenic anemia by 18%3

• Patients with >21 days LOS who experience an increase in blood draw above 3.5 mL/day risk a twofold increase in blood transfusions to correct their anemia3

Clinical and economic impact of blood sampling

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• Pediatric ICU patients are particularly vulnerable to anemia secondary to blood draws due to small body size/blood volume24

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Closed Blood Sampling: evidence-based decision making for cost-effective care.

Data analysis supports the economic value of Closed Blood Sampling (CBS) to hospitals.\textsuperscript{37}

Reduce hospital costs
CBS may help avoid hospital costs by reducing transfusion incidence, with one transfusion averted in every 6 to 8 patients.\textsuperscript{26,28,37}

Transfusion-related adverse events, both short- and long-term, are among the costliest contributors to healthcare expenditures.\textsuperscript{35}

Additionally, CBS may help you avoid proposed penalties for hospital-acquired complications (HAC) through reduced contamination risk.\textsuperscript{16}

You can make a difference in your patients’ outcomes through effective patient blood management, starting today.

Edwards Lifesciences offers a host of resources to help your hospital implement Closed Blood Sampling including education, clinical evidence, and a value estimator. Visit Edwards.com/CBS
References for the Edwards Closed Blood Sampling brochure