# Use of the Hummi Micro Draw System for Blood Transfer from Other Central Line Catheters. Advantages in Use for Neonates and Pediatric Patients

The Hummi Micro Draw Device is indicated for blood transfer from any catheter to a blood collection device.

- One of its key benefits which happens to improve blood drawing in the neonate is the ability to provide a clean sample of blood while reducing the amount of blood and fluid that has to be cleared in order to get the clean blood for sampling while maintaining a closed system in use.

Those same benefits take on a slightly different meaning when using the Hummi Micro Draw for Pediatric transferring blood from catheters **when low volume of blood/fluid movement is not required.**

- Because the Hummi is a closed system in use, the clearance blood that is taken does not need to be discarded, but **could be optionally discarded for PICU patients**.
  This is primarily due to the low volume of clearance blood required by the Hummi Micro Draw in order to obtain a clean blood sample, usually 70% less waste blood is required for clearance.

- In the **pediatric population**, central line catheter blood draws are done routinely, and much of the time the clearance blood is discarded, not returned to the patient.

- **This is one of the main causative factors for anemia and blood transfusions in PICU** critical care settings and has been documented by various authors and can contribute to increased CLABSI rates.

- Routinely 1mL to 3mL of blood is taken from Pediatric patients for clearance of central line catheters and discarded as it is considered contaminated when removed from the line unless a closed system is in use.

DISCUSSION: Because the **Hummi Micro Draw can provide clearance with 70% less volume required** than with other methods, discarding the small clearance volume becomes an **option** based on the clinical needs of the patient to conserve blood and the policies of the institution**.**

**If the clearance blood is discarded, the overall amount of discard is 70% lower than with current methods, and provides a closed system in use**. **Or, the clearance can be returned to the patient as it is still attached to the closed system, thus reducing the risk of anemia and blood transfusions.**

At the same time, **flush volumes after drawing are also up to 80% lower because only the catheter needs to be flushed**, not the entire inline setup as with other closed blood draw systems.

**This could be especially important in a patient who is volume sensitive**.
Heart patients for example are often volume sensitive and volumes of flush and fluid intake are carefully monitored.

## See Chart: Recommended PAL – UAC – UVC- PICC – Central Line Clearance and Flush Volumes When Using the Hummi Micro Draw

### Important Notes Regarding Blood Drawing From Central Lines:

- When drawing blood from **a dual lumen catheter**, ALWAYS **use largest lumen** for blood draw.
- **If a Central Catheter is cut, to obtain the proper clearance volume,** divide the original length (cm) into the original draw lumen volume (mL) and multiply that resulting number by **the new length** to get new clearance volume (mL). (Usually applies to PICC lines which can be cut)

  **Example: 60cm length, lumen volume 0.18mL. Divide .18 by 60 = .003mL/cm volume. If new length is 30cm, multiply .003 by 30 = .09mL, new lumen volume for clearance of shorter line.**
- Any time TPN or Lipids, Glucose, HyperAl etc. are running, use at least 5x to 6x clearance volume of the dead space.
- **Aspirating syringes** should be used on all **dual lumen** catheters and **all venous** placed catheters. **A 3mL or 5mL aspirating syringe should be used when drawing from venous catheters**.

  A 1mL syringe does not have enough negative pressure to collect a sample in a timely manner from smaller catheter lumens.
- **Self-venting** syringes are optional for use **with arterial catheters 3.5 Fr. or larger**.
  A **self-venting syringe may not provide good blood flow if the mean patient pressure is in low 20mm/hg range or if the catheter is difficult to draw from due to placement, position or lengthy indwell time.**
- The PAL draw using the Hummi on a 22ga or 24ga catheter provides for a 7x to 10x clearance when holding the blood volume of .045mL in the waste side tube.
  No flush is required after the draw is completed. The pump will flush the catheter when T-connector is unclamped.

### Frequently Asked Questions About Blood Drawing

### What is “clearance volume” and why is it important?

Blood draws have been a necessity for all patient populations for many decades.
Over time it became known that the volume of the fluid in the line and catheter being drawn from had to be removed before taking clean blood for the test sample.
Blood samples containing contaminants are not reliable for diagnostic needs.

The general “acceptable” amount of clearance has developed to be a minimum of 3x the “dead space” that needs to be cleared for arterial blood sampling.

In some circumstances higher clearance volumes are required, ie. 6x to 8x “dead space” volume depending on the type of fluid being administered through the catheter.

## What does the term “dead space” mean?

The term “dead space” is defined as the volume of fluid/blood from the tip of the catheter the sample is being taken from to the site or spot in the line where clean blood can be sampled.

Often this sample site is a stopcock or sample port either attached to the catheter or in the line behind the catheter. The volume in this “dead space” needs to be cleared or removed equal to 3x to 6x the volume of the “dead space” in order to obtain a clean blood sample from the catheter.

## Why does clearance of the dead space volume vary for different types of catheters?

The volume of the dead space does certainly increase due to different lumen sizes of catheters, and due to the differing length of the catheters. But this is not the primary reason for large differences needed in clearance volumes.

The answer lies in the location or site the catheter is placed, and what fluids are being administered through the catheter.

For example……catheters placed in the arterial vasculature generally are being used to monitor pressure and for drawing blood.

Acceptable clearance of the dead space in arterially placed catheters is usually around 3x the dead space in order to obtain a clean blood sample.

The fluids used for maintenance of these catheters placed arterially is usually Saline with added Heparin, and may contain some other clear fluids.

Examples of these type catheter placements are UAC Catheters (Umbilical Arterial Catheters) and radially placed catheters. (Radial Artery catheter placement in wrist area)

On the other hand, catheters placed in the venous vasculature are often used to administer drugs and are also used for feeding and nutrition.

It is not uncommon for Glucose, Hyperal, Lipids, and TPN (Total Parenteral Nutrition) to be administered through these venous lines. These nutritional substances are more viscous (thicker) than saline, and often sticky in nature, and are much more difficult to clear from the line than saline alone.

Almost always this requires an increase in the clearance volume from 3x the dead space to 6x the dead space or more.

These higher clearance volumes can be a problem when drawing blood from the neonate due to alteration in Cerebral Blood flow during the draw.

This need for increased clearance volume to remove the lipids, glucose, etc. from the catheter prior to sampling can lead to significant problems for alteration in Cerebral Blood Flow when the clearance volumes increase to a greater degree than is safe for the neonatal low gestational age patient.

Examples of these type catheter placements are UVC Catheters (Umbilical Venous Catheters) and PICC Catheters (Peripherally Inserted Central Catheters)

## How does the Hummi Micro Draw Device improve blood drawing from both arterially placed catheters and venous placed catheters such as Umbilical and PICC catheters?

The Hummi Micro Draw device is the first device to eliminate the need to draw blood into the line for clearance and sampling purposes.

The Hummi device uses a blunt capillary sized tube that is placed through a split septum T-connector directly into the catheter hub.

The Hummi blunt tube then transfers fluid and blood directly from the catheter itself through the tube and into a collection device. All "dead space" except what is in the catheter is bypassed and clearance is eliminated for the bypassed area.

The dead space needing clearance is now only the catheter itself.
No clearance is need for the catheter hub or the line attached to the catheter.

Clearance volume is reduced approximately 70% and no blood is ever required to be drawn into the line for sampling purposes.

For UAC catheters a clearance of 3x the dead space may only require a 0.5mL clearance vs. a 1.5 to 2.0mL clearance for inline systems.

Venous placed catheters (PICC, UVC) with HyperAl, TPN, Lipids, and Glucose etc. running in the catheter do require a higher clearance.

However, the dead space needing clearance is still only the catheter itself.

This smaller dead space results in a much smaller clearance being needed, even for catheters running TPN, Lipids, Glucose, HyperAl, etc.

## Does use of the Hummi Micro Draw result in lower flush volumes needed after a blood draw from either venous or arterial catheter sampling?

**The short answer is yes**.

Having a lower dead space to clear in order to obtain clean blood also provides the opportunity for lower flush volumes needed to clear just the catheter.

As no blood is brought into the line for sampling using the Hummi, there is no need to use extra flush to clear the line.

The dead space needing flush is only the catheter, and this usually represents an 80% reduction in flush volume compared to using inline methods of blood sampling.

This applies to both arterial and venous catheter sampling.