Needle device selection for difficult venous access

**Obtaining a high-quality blood sample for laboratory testing can often prove challenging.** Studies have shown that 56% of blood collections are from patients with diagnoses associated with difficult venous access (DVA), a clinical condition in which multiple attempts and/or special interventions are required to achieve and maintain peripheral venous access. Furthermore, 95% of patients who report difficult collections also report that at least two attempts were required to have their blood drawn. Patient populations exhibiting DVA and fragile veins typically include children, the elderly, the critically ill and those fearful of having their blood drawn. To successfully obtain a sample, these patients may require collection devices other than the commonly chosen 21- or 22-gauge straight needle.

Selecting the appropriate device and gauge size may involve a trade-off between the ability to collect a sample at all and collecting one that may be compromised in quality. Use of needles with a smaller bore, such as a 25-gauge needle, has been discouraged due to risk of hemolysis, which can lead to rejected specimens and slower fill times. With these sample quality risks, the potential for necessary redraws increases. Multiple attempts to collect a specimen, as well as issues such as pain and bruising, may negatively impact the patient’s phlebotomy experience, and 8 out of 10 patients say their blood collection experience influences their overall satisfaction with the care they receive.
What assessment criteria are used for device selection?

Patient population

- Pediatric veins are typically smaller than veins in adults.
- Elderly patient veins can be elusive and/or complicated by dehydration, low blood pressure and limited range of motion from injury or structural diseases that may restrict the number of locations where blood can be collected. Veins also become more fragile throughout the aging process as loss of strength and elasticity decrease in connective tissue.

Clinical conditions

- Critically ill and/or oncology patients may demonstrate similar observations as the elderly with decreased elasticity.
- Oncology patients receiving chemotherapy may have veins that are harder to locate, and may exhibit sclerosis from multiple draws and injections.
- Critically ill, bedridden patients may exhibit edema due to treatment and lack of activity.

Vein location

- The antecubital or cephalic vein, located just below the elbow crease, is preferred for blood collection, however these veins may not be accessible due to location of IVs, multiple injections in the past or surgery involving the lymphatic system, which can cause lymphedema. Sometimes the only accessible veins may be located in the hand, and are significantly smaller than antecubital veins.5

Device considerations

- Traditional blood collection sets are available in 21-, 23- and 25-gauge needles. Gauge size and inner diameter are inversely proportional: the larger the gauge size, the smaller the inner diameter (bore).
- 23-gauge needles are the most widely used.
- Smaller-bore needles may be chosen for patients with DVA or smaller, fragile veins.3
Q. What aspects of a smaller-bore needle must be considered?

A. Use of smaller-bore needles can increase the risk of sample quality issues.
   - Hemolysis can occur due to shear forces exerted on fragile red blood cells as they travel through narrow openings of a beveled needle or the internal diameter of the cannula.
   - The narrow internal diameter can restrict blood flow and cause slower fill times.

Q. Have guidelines changed as technology has advanced?

A. Previous editions of Document GP41, Collection of Diagnostic Venous Blood Specimens, from The Clinical and Laboratory Standards Institute (CLSI) specifically instructed phlebotomists to avoid the use of 25-gauge needles because slower blood flow increases the risk of hemolysis and sample rejection by the laboratory.
   “Because the interior diameters of needles vary, avoid the use of 25-gauge needles if frequent hemolysis is observed.”

The most current 7th edition (April 2017) of the CLSI guidelines, GP41, reflects a modified view because of advances in technology, and states that the use of some 25-gauge needles may now be acceptable.
   “Typical sizes for venipuncture range from 21G through 23G. The use of some 25-gauge needles increases the risk of hemolysis and rejected specimens.”

New BD RightGauge™ Cannula Technology makes some 25-gauge needles acceptable for use. This technology:
   - Extends inner bore diameter while maintaining the outer diameter/gauge size, without compromising sample quality or fill times.
   - Allows for easier access to small, difficult veins.
   - Reduces patient discomfort.
References


Other references


