

## EVIDENCE-BASED PRACTICE (EBP) GUIDELINE

# Drawing Labs from Peripheral IV Sites

### CLINICAL PRACTICE

Occasionally, nurses perform phlebotomy through new or established intravenous lines. Because the laboratory reported a higher incidence of hemolysis in samples obtained in the Emergency Department for chemistry and coagulation studies, the Nursing Research Council began investigating this practice. This higher rate of hemolysis was attributed to the ED practice of obtaining blood samples through IV catheters. This problem may be wider spread as in a review of a random month of housewide lab data revealed that 80% of rejected lab samples were due to hemolysis.

In a survey of this practice at United Hospital in 12/03, 51% of the nurses who responded (N=215) stated they drew labs from either a new or an established IV line. While this practice may be employed to reduce the number of sticks for a patient, it is also associated with a higher incidence of hemolysis. Higher rates of hemolysis can then lead to delays in patient diagnosis and treatment, potentially affecting length of stay, while labs are redrawn and analyzed.

### REVIEW OF EVIDENCE

#### 1. United Hospital Policy

The United Hospital Infection Control Core Policy and Procedure states “blood specimens shall not be withdrawn through intravascular lines, except from vascular access devices and tunneled lines” (p. 10).

#### 2. IV Nurses Society Standards

The Intravenous Nurses Society’s standards do not support the practice of drawing blood specimens from peripheral IV lines.

#### 3. Manufacturer’s Guidelines (Becton-Dickinson and Co.)

IV catheter material consists of soft plastic. This material stays open under positive pressure of IV fluids or medication delivery. However, the soft plastic can collapse under the negative pressure of drawing blood, causing turbulence and hemolysis. In addition, a fibrin sheath also begins to develop as the IV catheter is exposed to blood. This sheath allows infusion into the vein but closes over the catheter tip under negative pressure associated with aspiration which can disrupt the integrity of the IV access.

#### 4. Nursing Research Studies

Two recent studies have investigated the effect of blood drawing techniques and equipment on hemolysis rates.<sup>1-2</sup> In these studies, three factors were associated with significantly increased the rates of hemolysis and test cancellation compared to phlebotomy using a straight needle, including:

- ◆ Smaller IV catheter gauges (p=.05)
- ◆ Use of Vacutainer (p=.02)
- ◆ Drawing from new IV catheters (p=.001)

The combination use of an IV catheter and Vacutainer caused increased hemolysis compared to the use of an IV catheter and syringe in one study.<sup>1</sup> Other factors including syringe size, blood transfer from syringe, and personnel performing phlebotomy were tested and found to be non-significant in relation to hemolysis rates.

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The evidence from the literature, nursing standards and manufacturer's guidelines provides at least Class IIa evidence. More investigation is indicated.

### EBP RECOMMENDATION

- A. Blood samples should NOT be drawn from either new or established IV catheters.
- B. Peripheral lab samples should be obtained using a straight needle and either the Vacutainer or syringe method. Straight needles are preferred because the needle provides a smooth solid inner lumen surface that is unaffected by drawing pressure.

### REFERENCES

1. Grant, M. The effect of blood drawing techniques and equipment on the hemolysis of ED laboratory blood samples. *Journal of Emergency Nursing*. 2003; 29 (2): 116-121.
2. Kennedy, C, Angermuller S, King R, Noviello S, Walker J, Warden J, & Vang S. A comparison of hemolysis rates using intravenous catheters versus venipuncture tubes for obtaining blood samples. *Journal of Emergency Nursing*. 1996; 22 (6): 566-569.
3. *Infusion Nursing Standards of Practice*. Cambridge, MA: Intravenous Nurses Society; 2000.

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**LEVELS OF EVIDENCE**

<b>Class of EBP Recommendation</b>	<b>Criteria</b>	<b>Clinical Definition</b>
<b>Class I</b> Definitely recommended	Supported by <b>excellent</b> evidence, with <b>at least 1 prospective randomized, controlled trial</b> .	<b>Class I</b> interventions are always acceptable, safe & effective. Considered definitive standard of care
<b>Class IIa</b> Acceptable & useful	Supported by <b>good to very good</b> evidence. Weight of evidence and expert opinion strongly in favor.	<b>Class IIa</b> interventions are acceptable, safe & useful. Considered intervention of choice by majority of experts.
<b>Class IIb</b> Acceptable & useful	Supported by <b>fair to good</b> evidence. Weight of evidence and expert opinion not strongly in favor.	<b>Class IIb</b> interventions are also acceptable, safe and useful. Considered optional or alternative interventions by majority of experts.
<b>Indeterminate</b> Promising, evidence lacking, immature	Preliminary research stage. Evidence: <b>No harm but no benefit</b> . Evidence insufficient to support a final class decision.	<b>Indeterminate</b> : Describes treatments of promise but limited evidence.
<b>Class III</b> May be harmful; no benefit documented	Not acceptable, not useful, <b>may be harmful</b> .	<b>Class III</b> refers to interventions with no evidence of any benefit; often some evidence of harm