An internationally recognized mid-Atlantic academic medical center provides a wide range of services including a center for cardiovascular research and treatment. The 257-bed medical center remains committed to improving the health and well-being of its local, national and global communities. Their focus on delivering high-quality patient care has driven performance improvement efforts at the institution. Specifically, one of these efforts sought to address the elevated rate of hemolysis in blood specimens received at the laboratory, particularly those collected from IV catheters on patients in the Emergency Department.

### The Challenges

Blood collections are performed for various laboratory tests from outpatients, nursing floors, and the Emergency Department (ED); many specimens collected from the ED are from IV catheters. As such, a high rate of hemolysis has been documented, particularly from specimens collected in the ED. Following an assessment by a BD Care Consultant, the following observations were made:

- **High number of hemolyzed specimens (153), particularly from the ED. This was 83% of the total hemolyzed specimens (184) received in the laboratory per month—an average of 5.1 hemolyzed specimens per day**
- **High rate of hemolysis in the ED as compared to other hospital units (e.g., ICU, Cath Lab, Outpatient)**
- **Non-standardized practices for collection of blood specimens from IV catheters:**
  - Collection with a syringe and transfer of blood from the syringe with a straight or blunt needle
  - Variable use of an extension set
  - Collection via BD Vacutainer® Luer Adapter, BD Vacutainer® One-Use Holder and/or Saf-T Holder® Device (Smiths Medical)
- **Potential for exposure to blood and/or needlestick injury when transferring the specimen from syringe to tube using a sharp needle**
- **Reporting of results with caution statements about specimen quality due to the presence of hemolysis**
- **Lack of data for rejected specimens and no method for recording; patients are simply re-drawn and treated as a new draw; non-capture of waste of time and products**
- **Blood leakage encountered with current blood collection system (Saf-T Holder® Device) (increased blood exposure to healthcare workers)**
- **Non-adherence to an order of draw or to tube filling recommendations**

### The Solution

Subsequent observation of current blood collection practices identified problem areas; the BD Care Consultant collaborated with the staff at the Medical Center to address these areas, specifically, the issue of increased hemolysis. The Medical Center then implemented the following:

- **Converted to BD Vacutainer® Luer-Lok™ Access Device (LLAD) for blood collection from an IV catheter, facilitating direct draw of specimen from the catheter to the evacuated tube.**
  - The one-piece transfer device of the LLAD provides a secure connection that enables sufficient blood flow and the best quality sample. It also minimizes the potential for blood exposure.
- **Adhered to CLSI recommended blood collection best practices (e.g. allowing alcohol to dry before venipuncture, reducing tourniquet time)**
- **Developed a color wall chart to distinguish order of draw and tube filling requirements as per CLSI guidelines**
- **When a syringe collection was warranted, the use of a BD Vacutainer® Blood Transfer Device was recommended. This practice will help in the prevention of accidental needlestick injuries during transfer of the specimen from the syringe to the evacuated tubes, as well as better management of blood to additive ratio in the evacuated tubes.**
- **Conducted training with the staff to review specimen quality recommendations and improve current practices**
Results

The laboratory experienced significant qualitative and quantitative progress following conversion to the LLAD and in-service training for the staff:

- Significant reduction in hemolysis demonstrated over a 6-month period (from a total of 184 hemolyzed specimens in the first month to 38 in the sixth month) (see Table)
- Substantial decrease in hemolysis in specimens from the ED (from 153 in the first month to 34 in the sixth month; a 78% decrease in incidence of hemolysis) (see Table)
- Standardized blood collection practices for specimens from IV catheters
- Better specimen quality = improved accuracy of test results and overall patient care
- Improved healthcare worker safety by minimizing exposure to blood and/or potential needlestick injury
- Enhanced staff morale and communication between departments (e.g. Emergency department, nursing floors, laboratory)

Table. Number of Hemolyzed Specimens Per Month

Following the introduction of BD Vacutainer® Luer-Lok™ Access Device (LLAD), the number of hemolyzed specimens received in the laboratory substantially decreased. Although the ED continues to have the highest incidence of hemolysis, the rate of hemolysis decreased by 78% after the introduction of LLAD.