

## Underfilling

### **Factors and Their Possible Consequences:**

Excessive concentrations of additives can cause RBC rupture (e.g., potassium oxalate, EDTA) and impact test results.

### Corrective Action:

- Ensure that tubes are filled to their proper draw volume for proper blood to additive ratio.

### References:

1. CLSI. *Collection of Diagnostic Venous Blood Specimens*. 7<sup>th</sup> ed. CLSI Standard GP41. Wayne, PA: Clinical and Laboratory Standards Institute; 2017.
2. Insufficient filling of vacuum tubes as a cause of microhemolysis and elevated serum lactate dehydrogenase levels. Use of a data-mining technique in evaluation of questionable laboratory test results. Tamechika Y, Iwatani Y, Tohyama K, Ichihara K. *Clin Chem Lab Med* 2006;44:657-661.