AACC Better health through laboratory medicine.

PEARLS OF LABORATORY MEDICINE

Utility of HIL in Clinical Chemistry

Yachana Kataria, PhD, DABCC

Clinical Chemistry Fellow

Boston Children's Hospital

DOI: 10.15428/CCTC.2016.264754

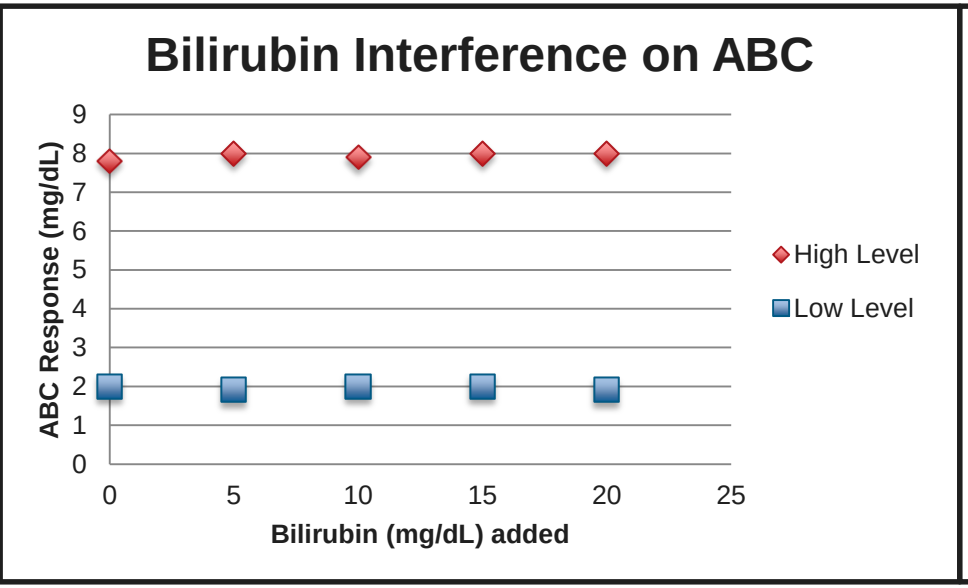
What are serum indices?

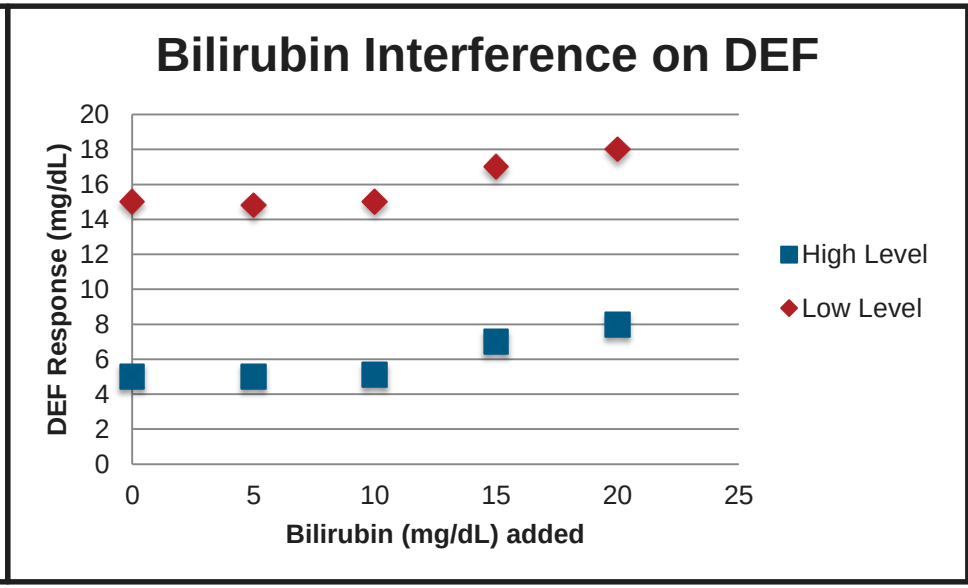
- Hemolysis, icterus and lipemia (HIL) are the most common specimen integrity issues
- Objective way to detect interferences compared to visual inspection
- Standardized and reproducible tool

Limitations of HIL on automated analyzers

	Method	Limitations
Hemolysis	• Spectral Interference	• Different manufacturers have different cut-off values • More than one HIL interferent may be present simultaneously in a patient sample • Other interferents may still be present • Does not replace assays of hemoglobin, bilirubin, or triglycerides
Icterus	• Spectral Interference	
Lipemia	• Light Scattering	

Determination of HIL Cut-Off Limits





CCTC
Clinical Chemistry Trainee Council

Hemolysis index (H) is assessed by the amount of red pigmentation associated with free hemoglobin

Analytes affected by hemolysis

Positive Interference

- Elevated intracellular concentration
  - Potassium, magnesium and phosphate
  - Lactate dehydrogenase (LDH)
  - Aspartate aminotransferase (AST)

Negative Interference

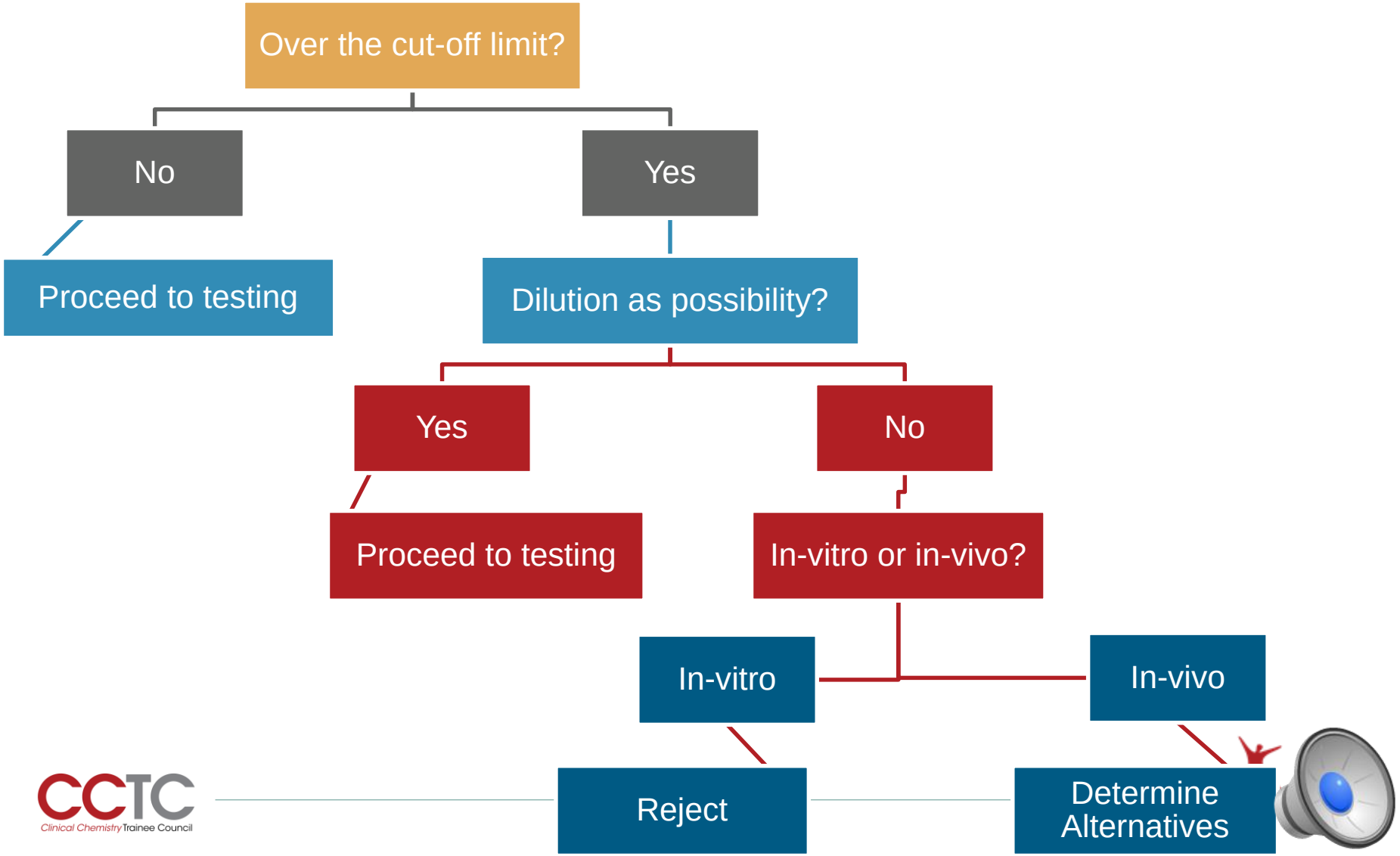
- Haptoglobin

Positive or Negative Interference

- Troponin

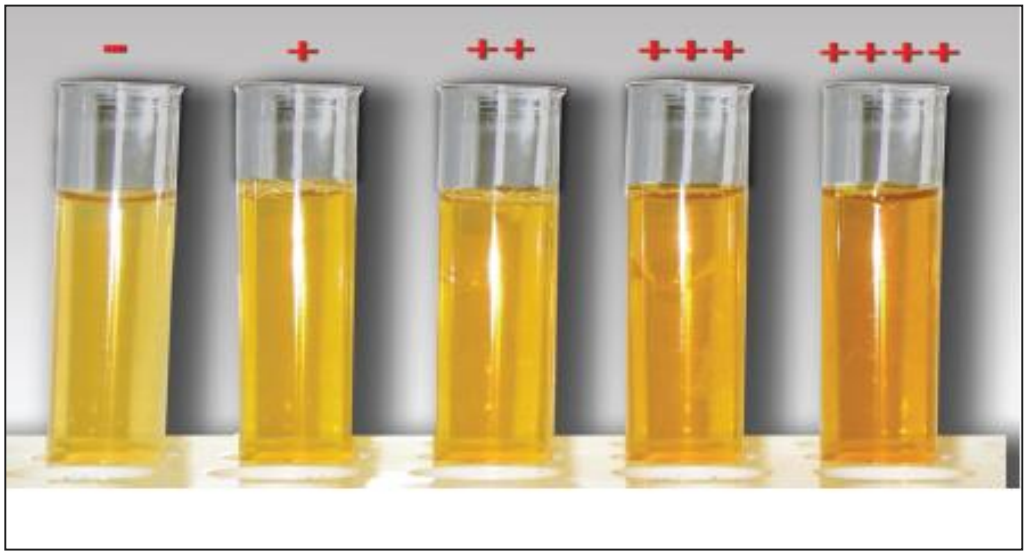
AACC Better health through laboratory medicine.

How to deal with hemolyzed specimens



CCTC Clinical Chemistry Trainee Council

Icteric index (I) is assessed by yellow pigmentation due to increased bilirubin concentration

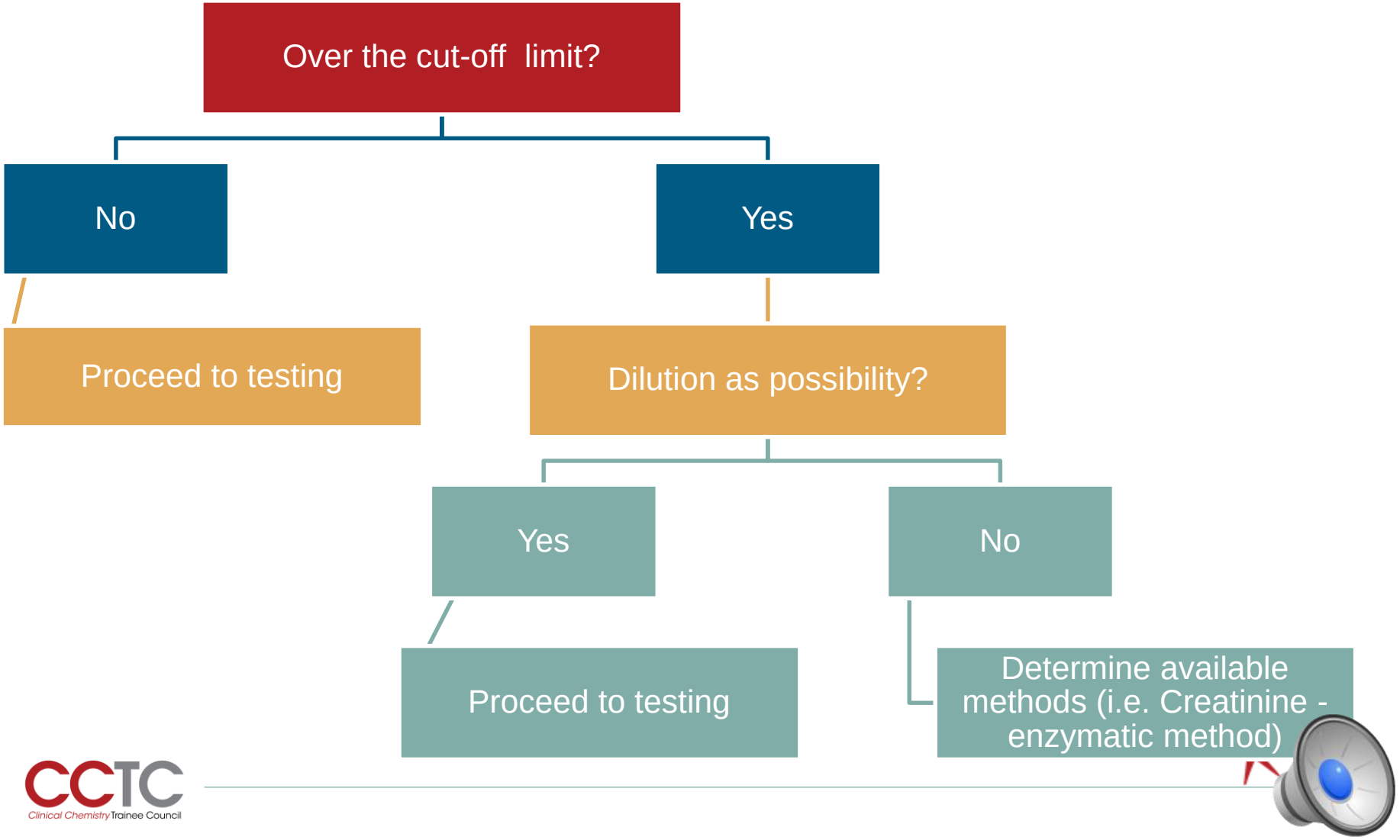


Analytes affected by icterus

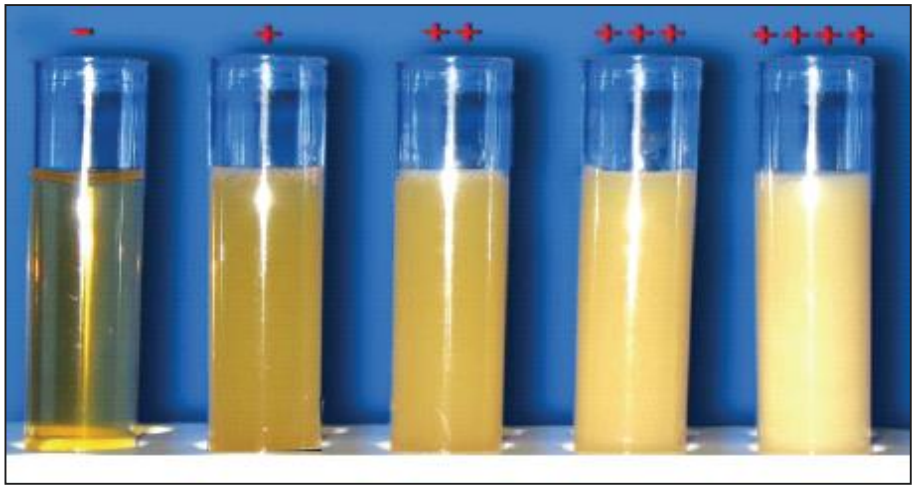
- Peroxidase catalyzed reactions
  - Examples: cholesterol, glucose and triglycerides
- Creatinine – Jaffe Method

Creatinine + Picric Acid → Janovsky Complex *(orange-red color)*

How to deal with icteric specimens



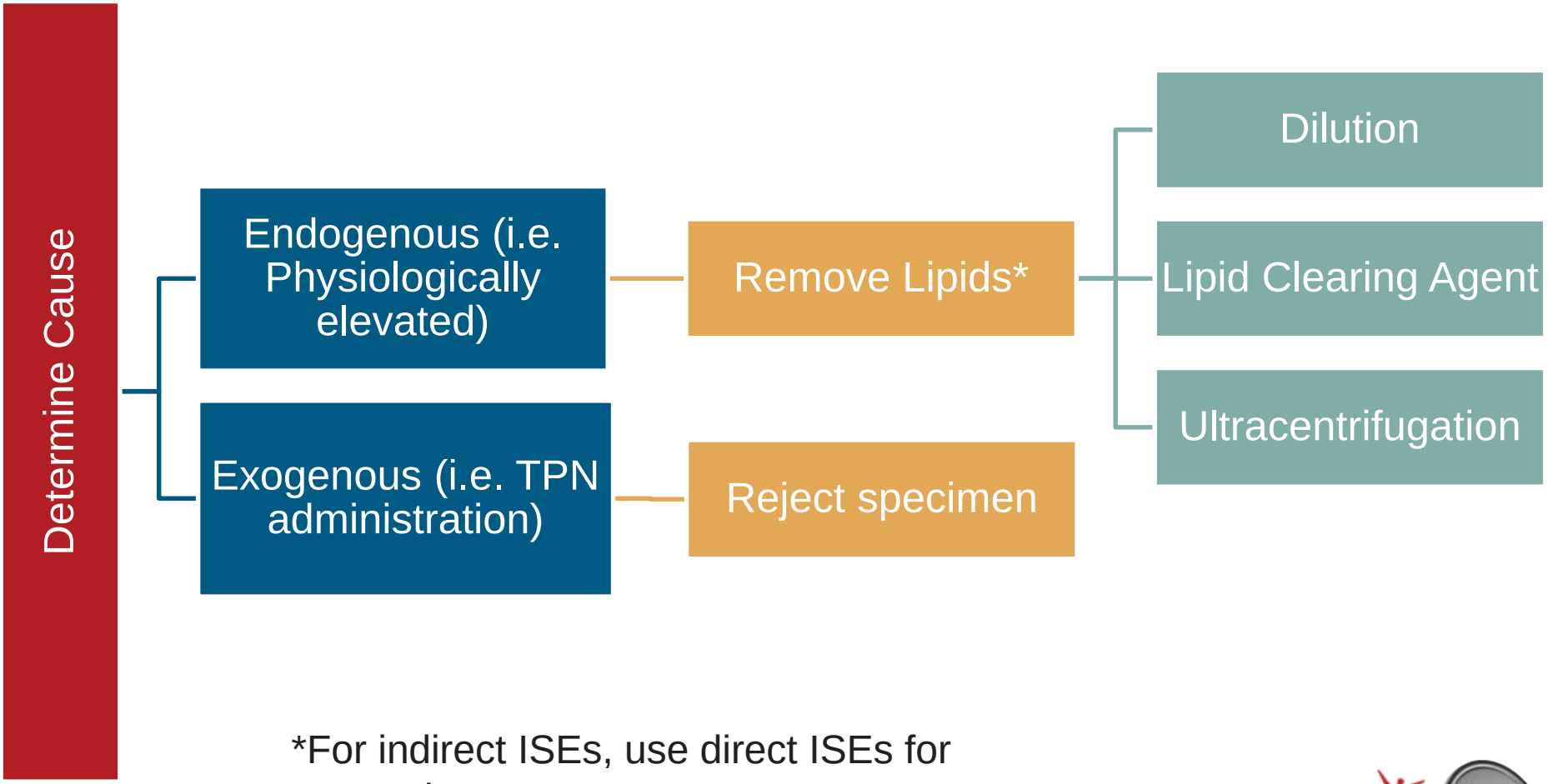
Lipemic index (L) is assessed by turbidity due to elevated lipoproteins



Lipemia causes volume displacement

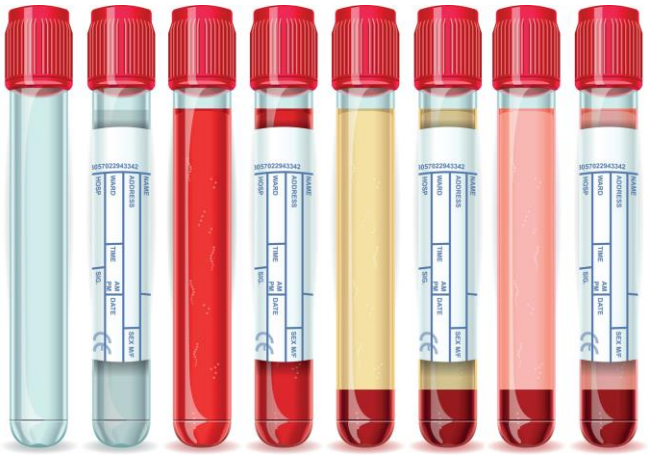
	'Normal' Plasma	Lipemic Sample
Water Content	93%	84%
Lipids	7%	16%
Na [mmol/L] *Indirect ISE*	140	126

How to deal with lipemia



*For indirect ISEs, use direct ISEs for comparison

Automated assessment of hemolysis, icterus, & lipemia (HIL) provides the laboratory a standardized, reproducible and efficient tool to detect possible interference related to sample integrity



References

1. Clinical and Laboratory Standards Institute (CLSI) ” Hemolysis, icterus, and lipemia/turbidity indices as indicators of interference in clinical laboratory analysis; Approved guideline." *CLSI document C56-A, Wayne, Clinical and Laboratory Standards Institute* (2012).
2. Dimeski, Goce. "Interference testing." *The Clinical Biochemist Reviews* 29.Suppl 1 (2008): S43.
3. Nikolac, Nora. "Lipemia: causes, interference mechanisms, detection and management." *Biochemia medica* 24.1 (2014): 57-67.
4. Bowen, Raffick AR, et al. "Impact of blood collection devices on clinical chemistry assays." *Clinical biochemistry* 43.1 (2010): 4-25.

http://www.clinchem.org/site/info_ar/info_authors.xhtml#References

Disclosures/Potential Conflicts of Interest

Upon Pearl submission, the presenter completed the Clinical Chemistry disclosure form. Disclosures and/or potential conflicts of interest:

- **Employment or Leadership**: No disclosures
- **Consultant or Advisory Role:** No disclosures
- **Stock Ownership:** No disclosures
- **Honoraria:** No disclosures
- **Research Funding:** No disclosures
- **Expert Testimony:** No disclosures
- **Patents:** No disclosures

AACC Better health through laboratory medicine.

Thank you for participating in this *Clinical Chemistry* Trainee Council Pearl of Laboratory Medicine.

Find our upcoming Pearls and other Trainee Council information at www.traineecouncil.org

Download the free *Clinical Chemistry* app on iTunes today for additional content!

Follow us:

CCTC Clinical Chemistry Trainee Council