TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Performance Characteristics of Different Sample Preparation Methods

Charlie Carter, Ph.D.

Richard Burrows, Ph.D.

March 17, 2015

Comparing Methods

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

- Lots of variables
  - 3510, Separatory Funnel Extraction
    - How vigorous is the shake?
    - What is the Sep funnel material?
    - How skilled is the analyst?
    - Variables in concentration technique
  - 3520, Continuous Liquid / Liquid Extraction
    - Design of extractor
    - Solvent cycling rate
    - Condenser temperature
    - Variables in concentration technique

Two options

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

- Control all the variables
- Use a lot of data
  - Many different labs
  - Many different analysts
  - Many detail differences in technique

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Method 8270, Semivolatiles GCMS

Prep methods

- 3510 – Separatory funnel
- 3520 – Continuous Liquid Liquid Extraction

Data Collection

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

25 labs

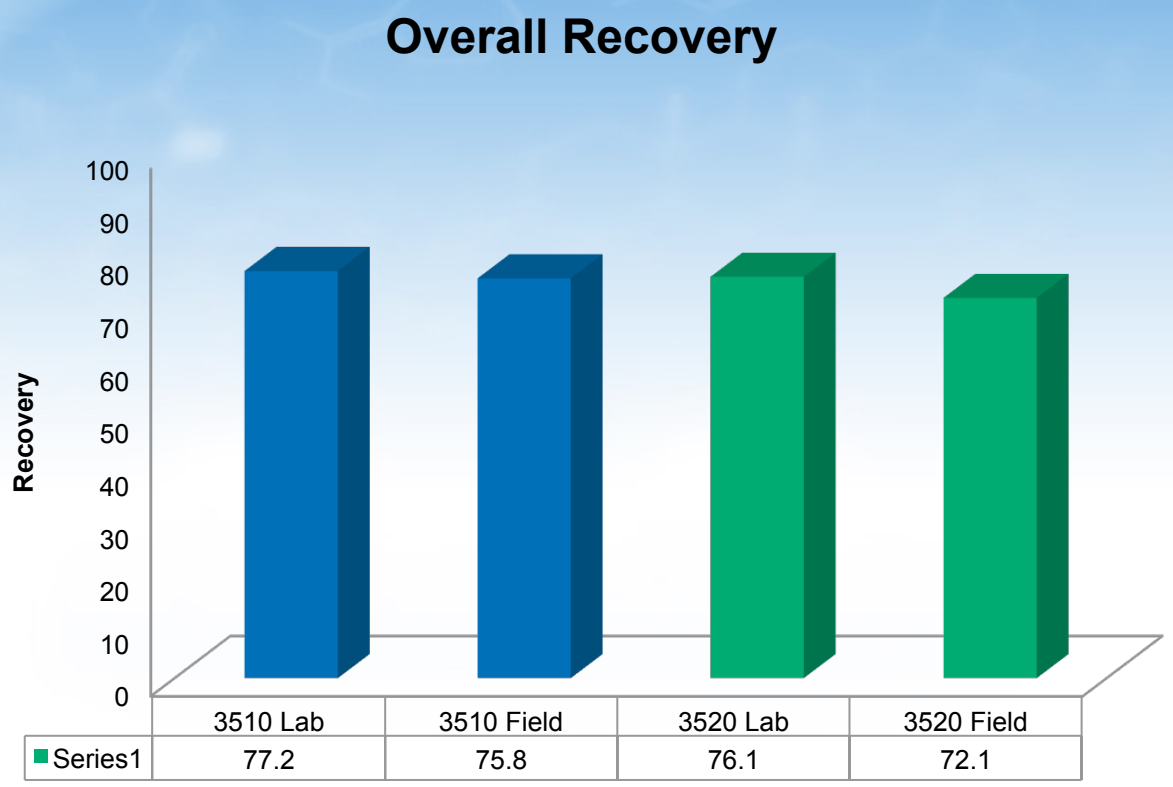
- 106 common analytes
- 57 uncommon analytes (< 10 LCS or MS per month for one of the methods)

Measure recovery for LCS, MB. MS and MSD

200,000 lines of data per month

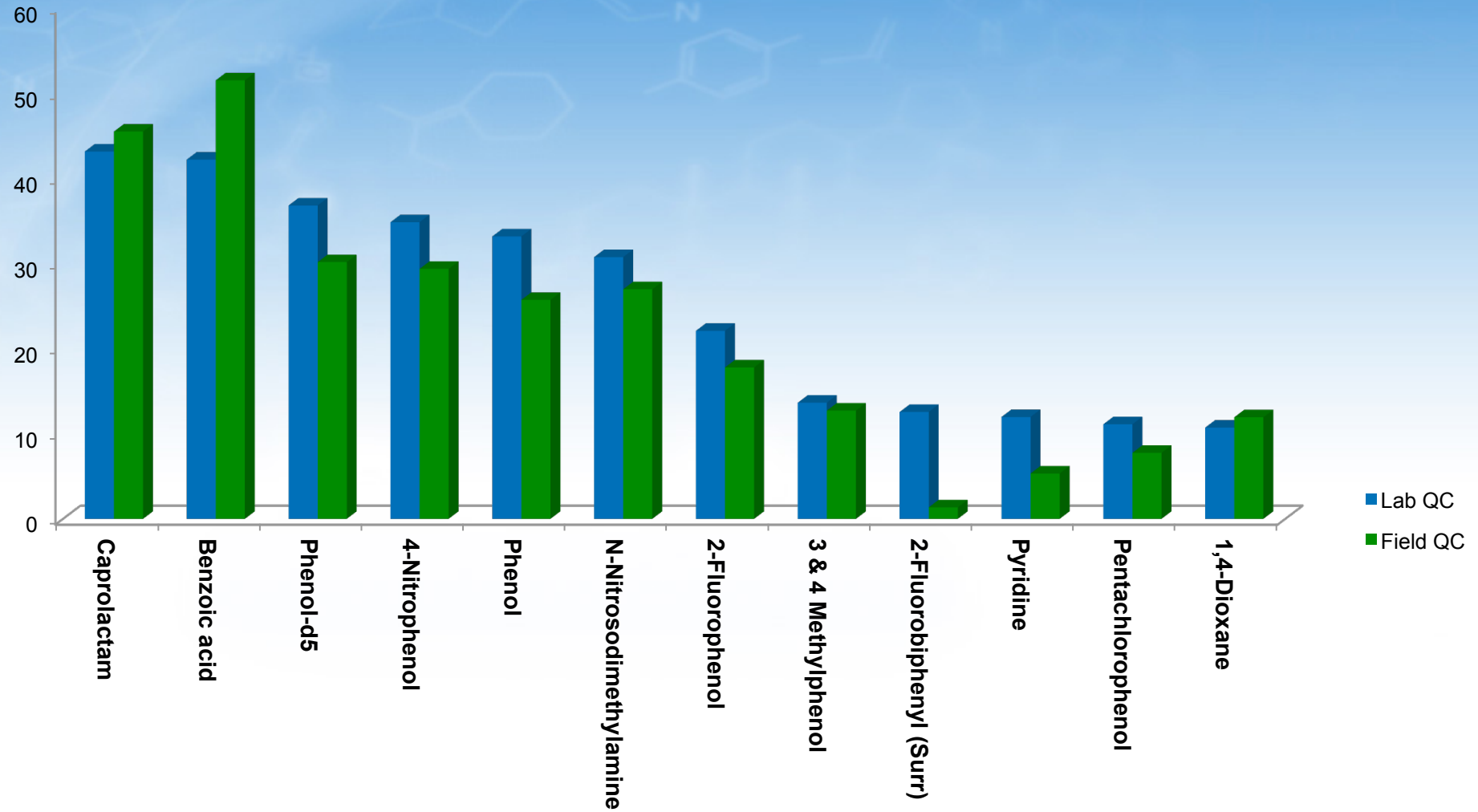
3510 vs 3520 overall

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



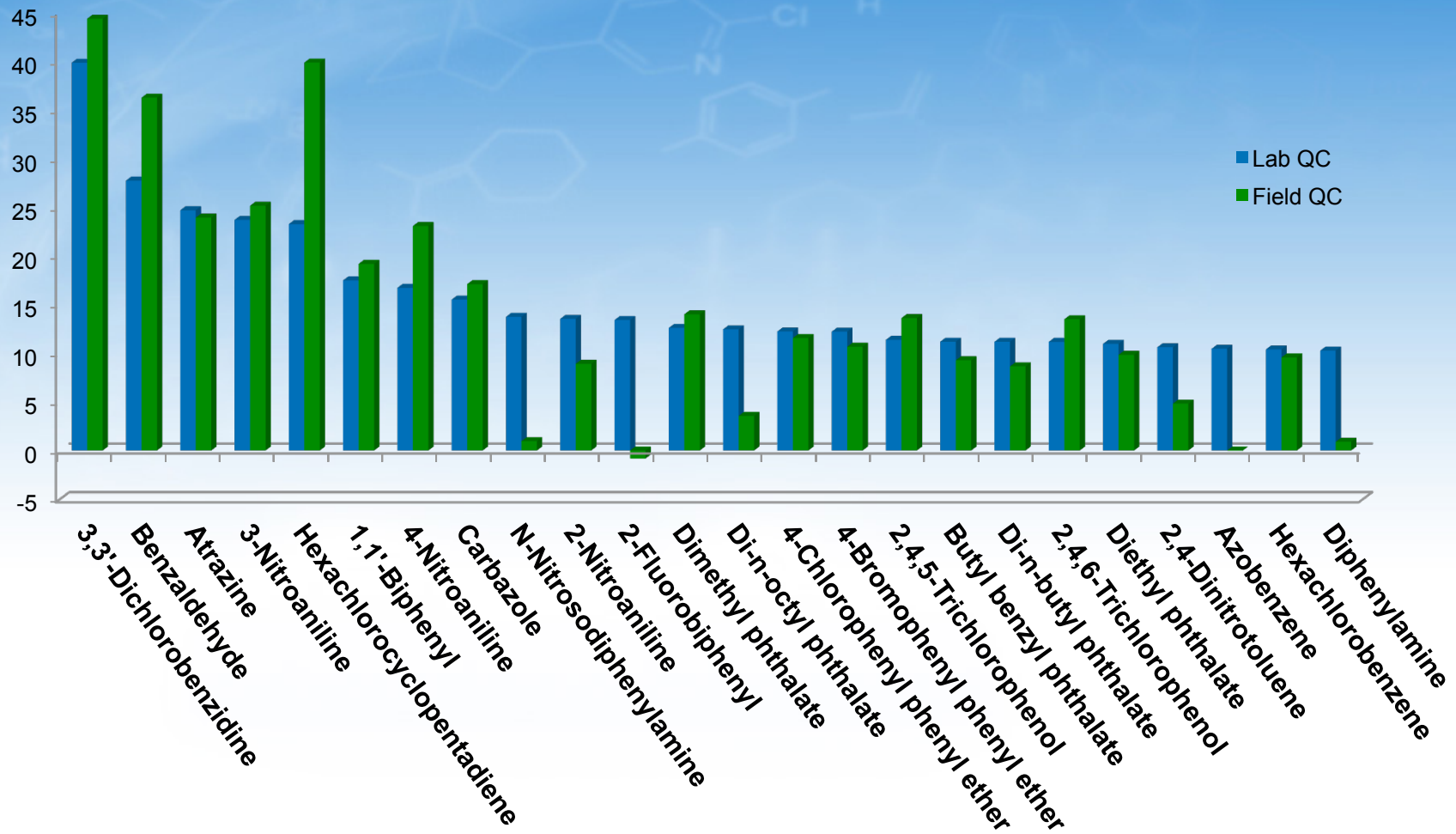
3520 better than 3510

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



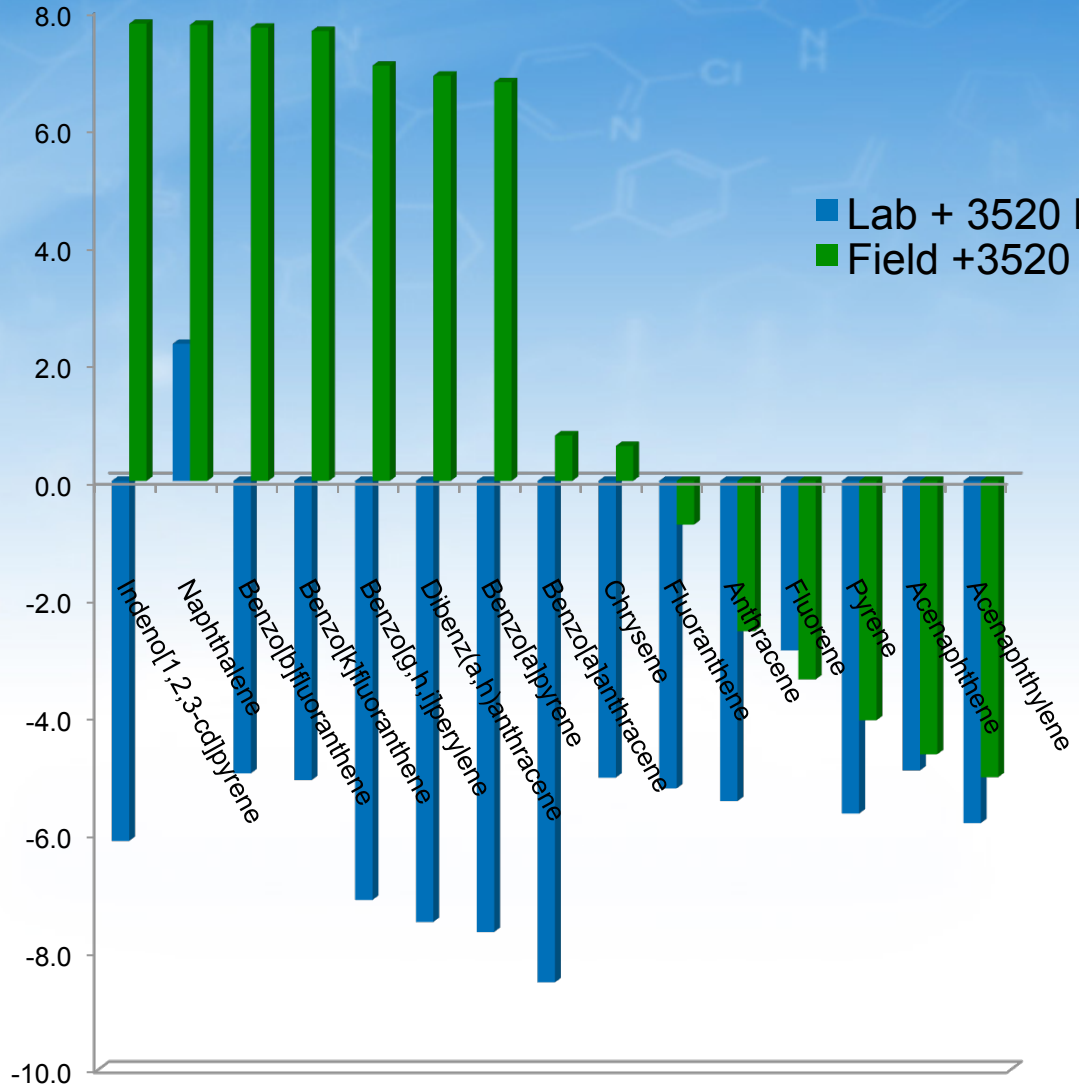
3510 better than 3520

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



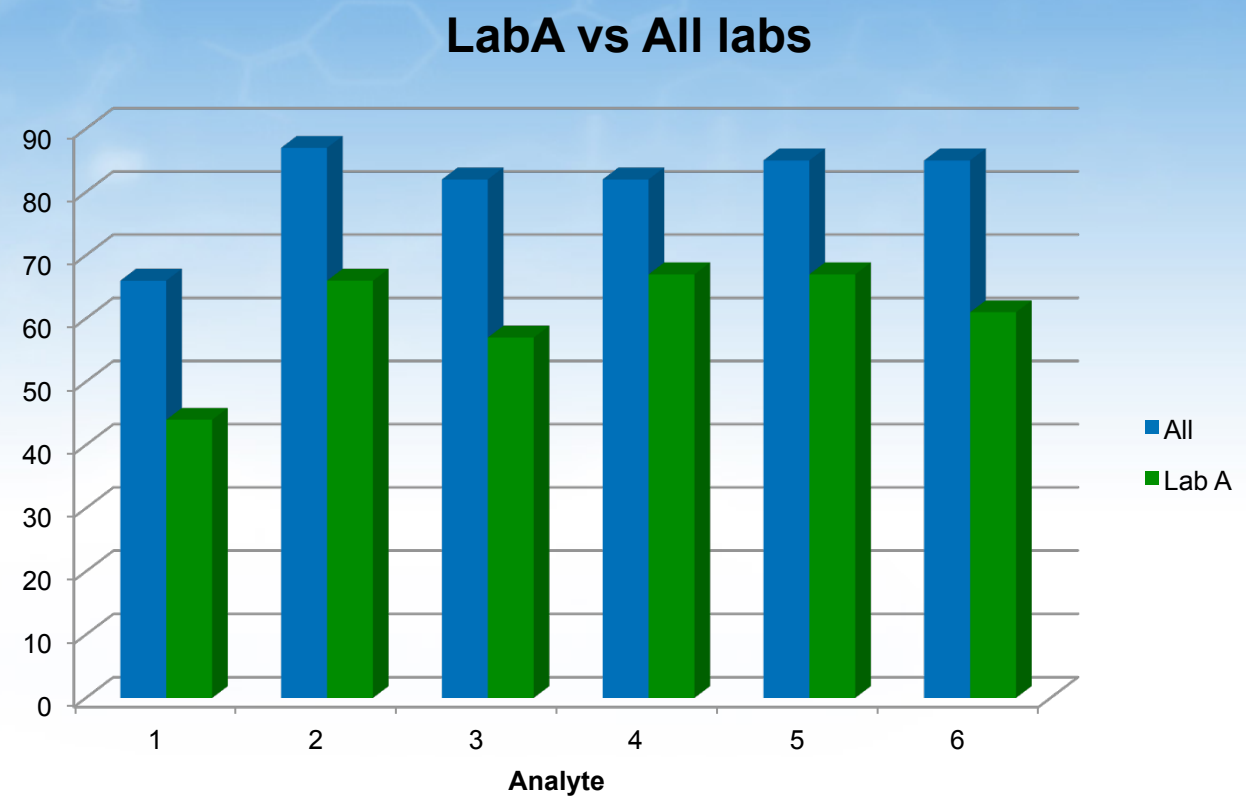
PAH

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



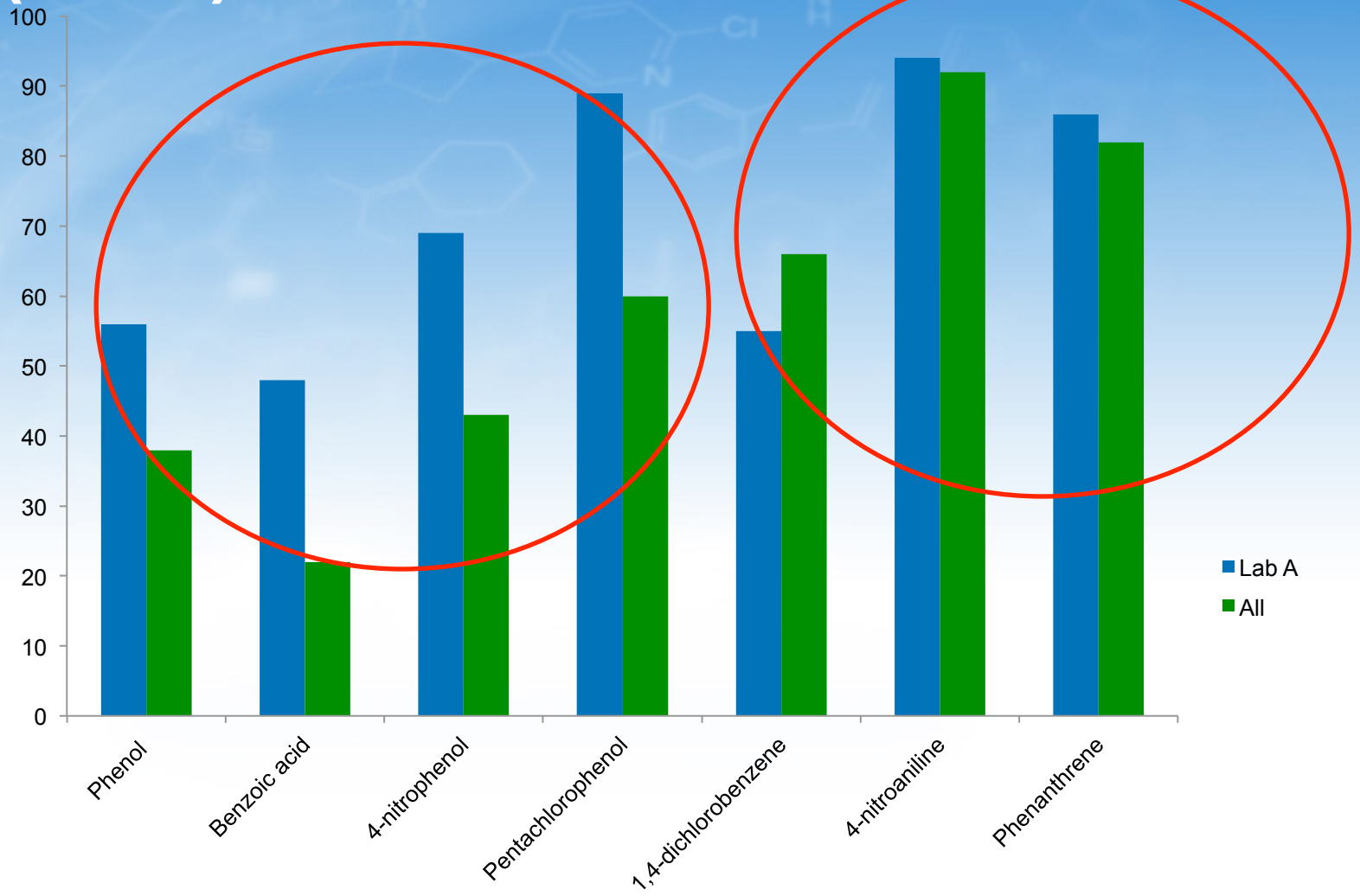
Identifying Problems

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



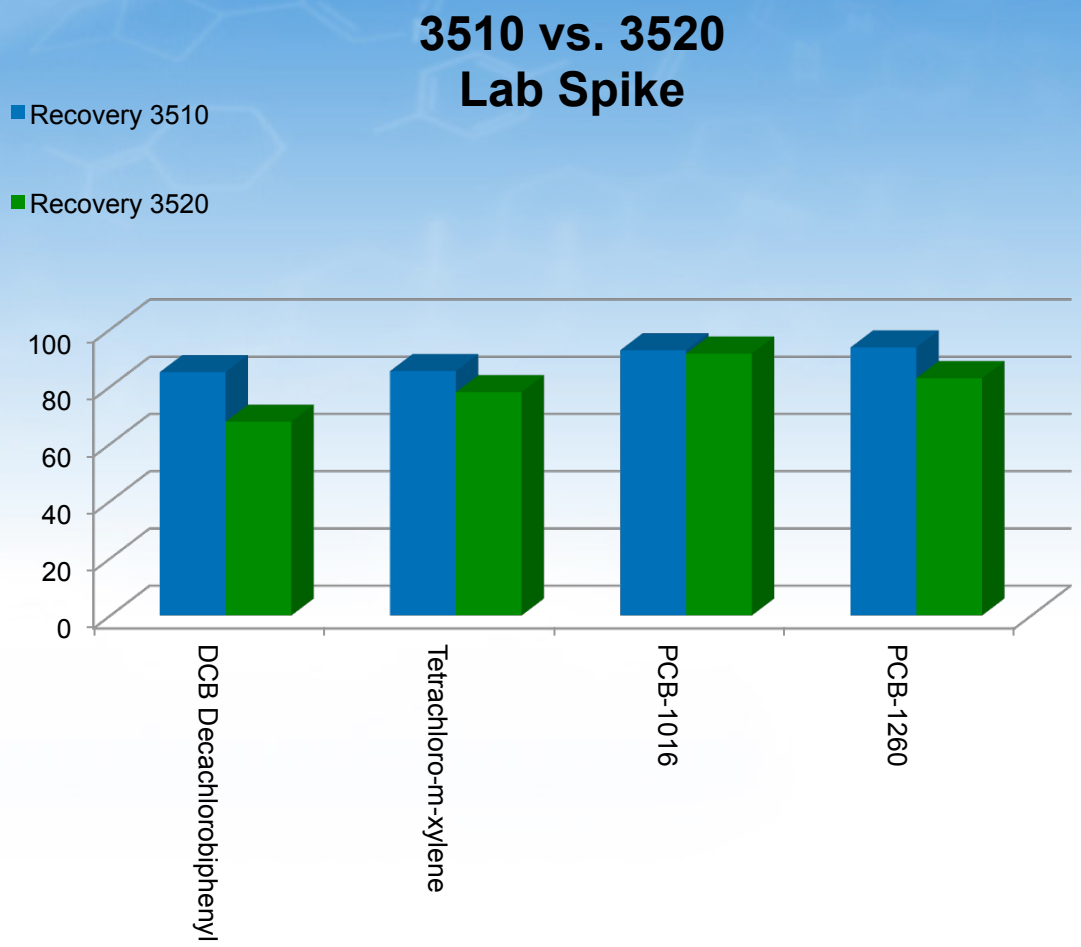
Identifying star performers (3510)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



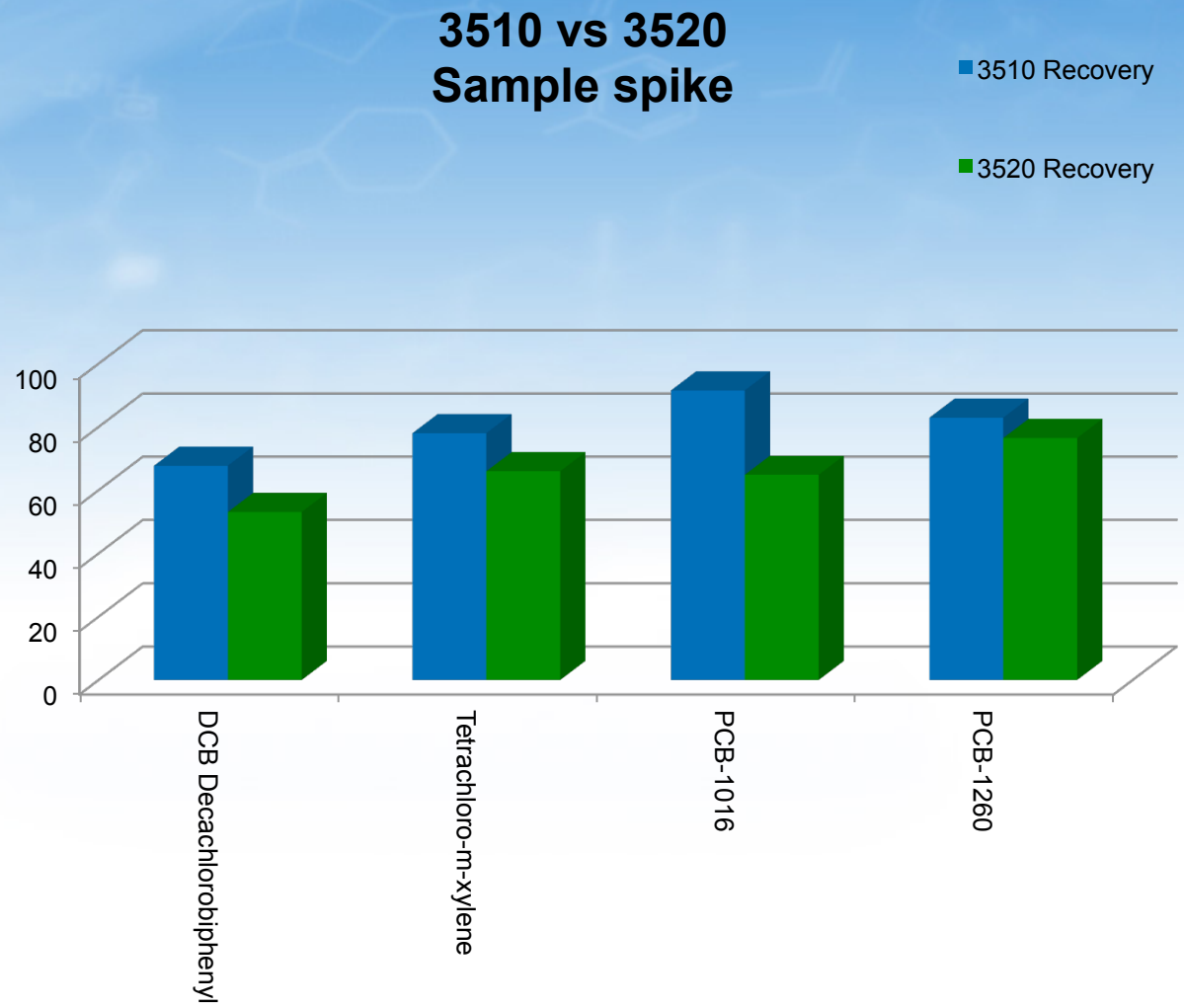
PCBs 3510 vs 3520

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



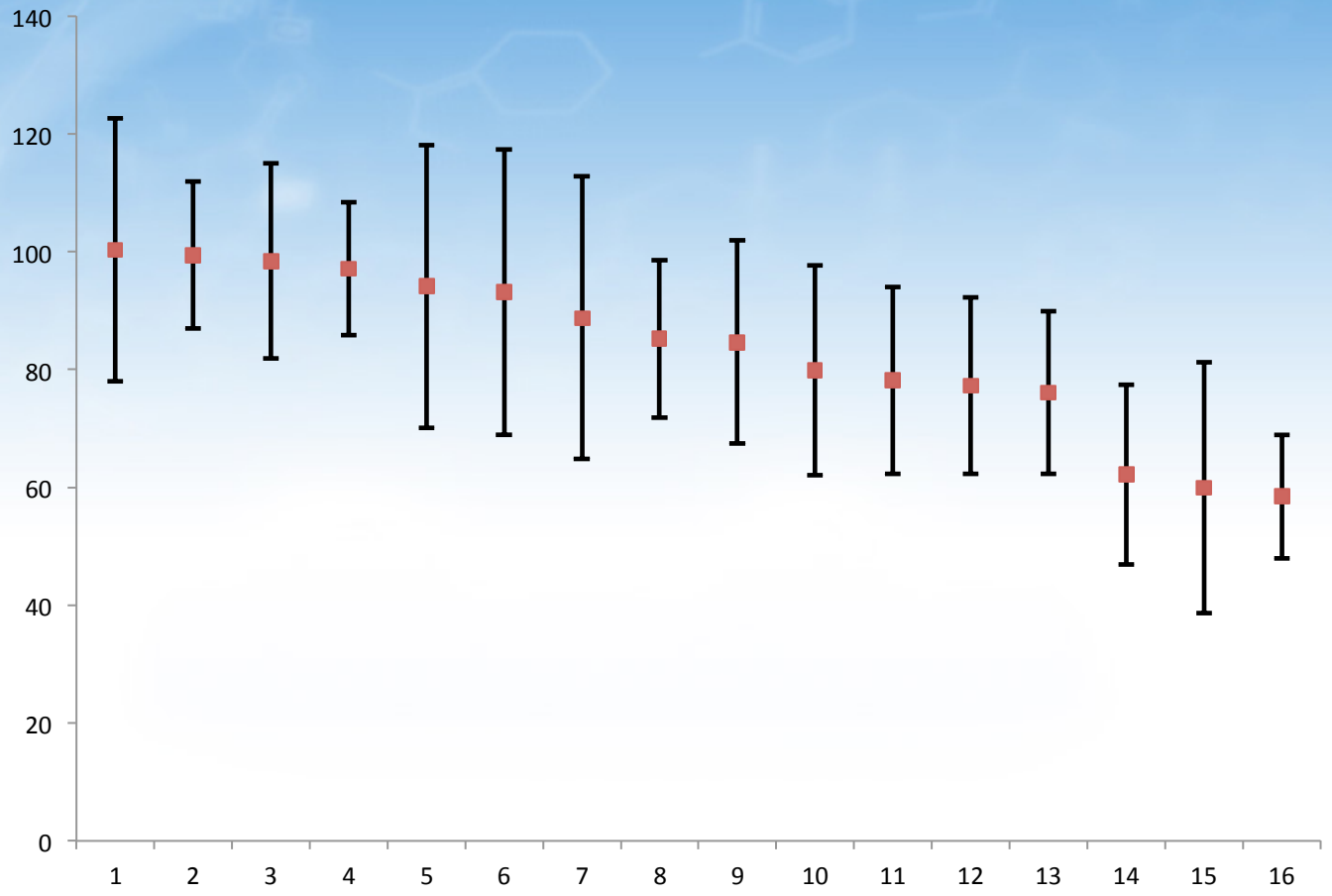
PCBs 3510 vs 3520

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



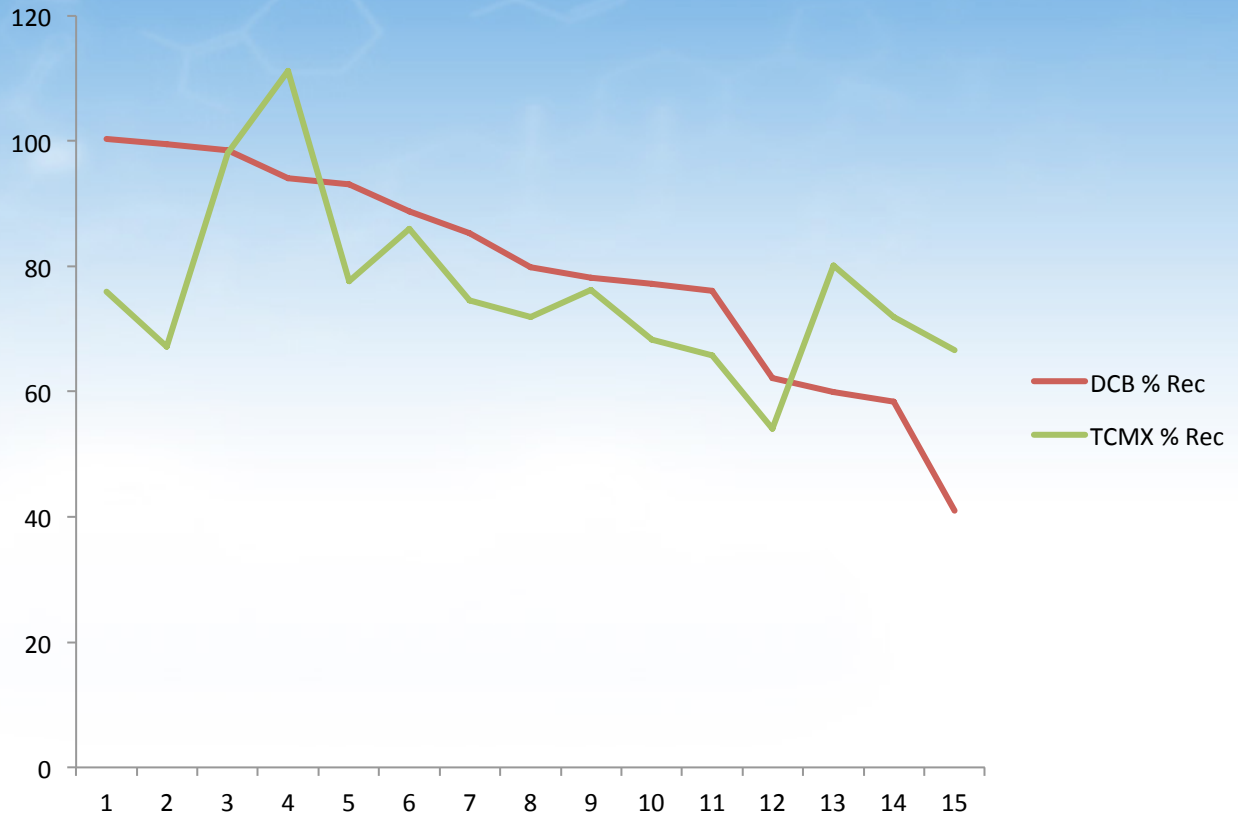
DCB % recovery by lab

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



DCB and TCMX percent recovery by lab

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



Conclusions

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

- As expected, 3520 is better than 3510 for acidic analytes
  - But, 3510 is better than 3520 for many “active” analytes
- 3510 appears better than 3520 for PAH for LAB QC
  - But not so much for samples
- 3510 is overall better than 3520 for PCBs
- Large data sets can be used to identify both low performing and high performing labs

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Questions?