

MAKING THE CASE FOR CONTINUOUS IMPROVEMENT

Sample generation processes & the impact on participant performance

Mary Ann Latko and Angela Oler, AIHA Proficiency Analytical Testing Programs, Falls Church VA, USA ♦ Daniel Tholen, Dan Tholen Statistical Consulting, Traverse City MI, USA

Relative Standard Deviation Trends

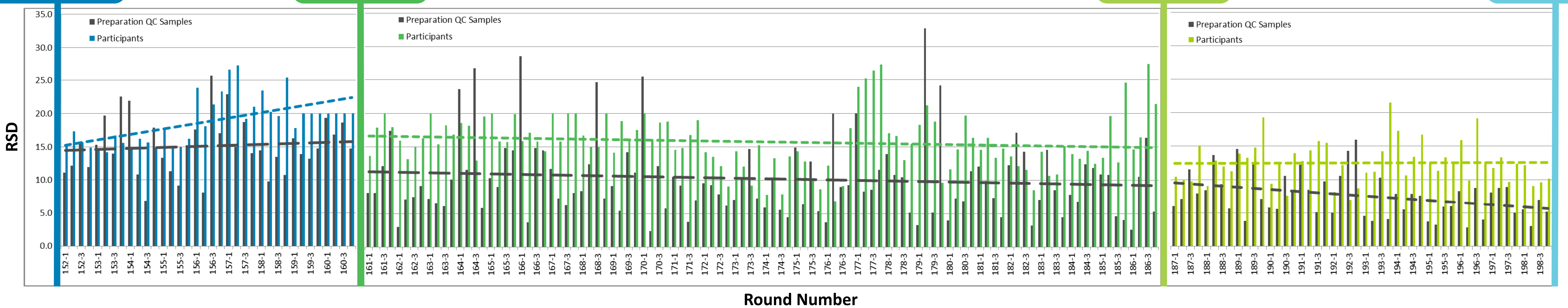
(% of assigned value)

2003

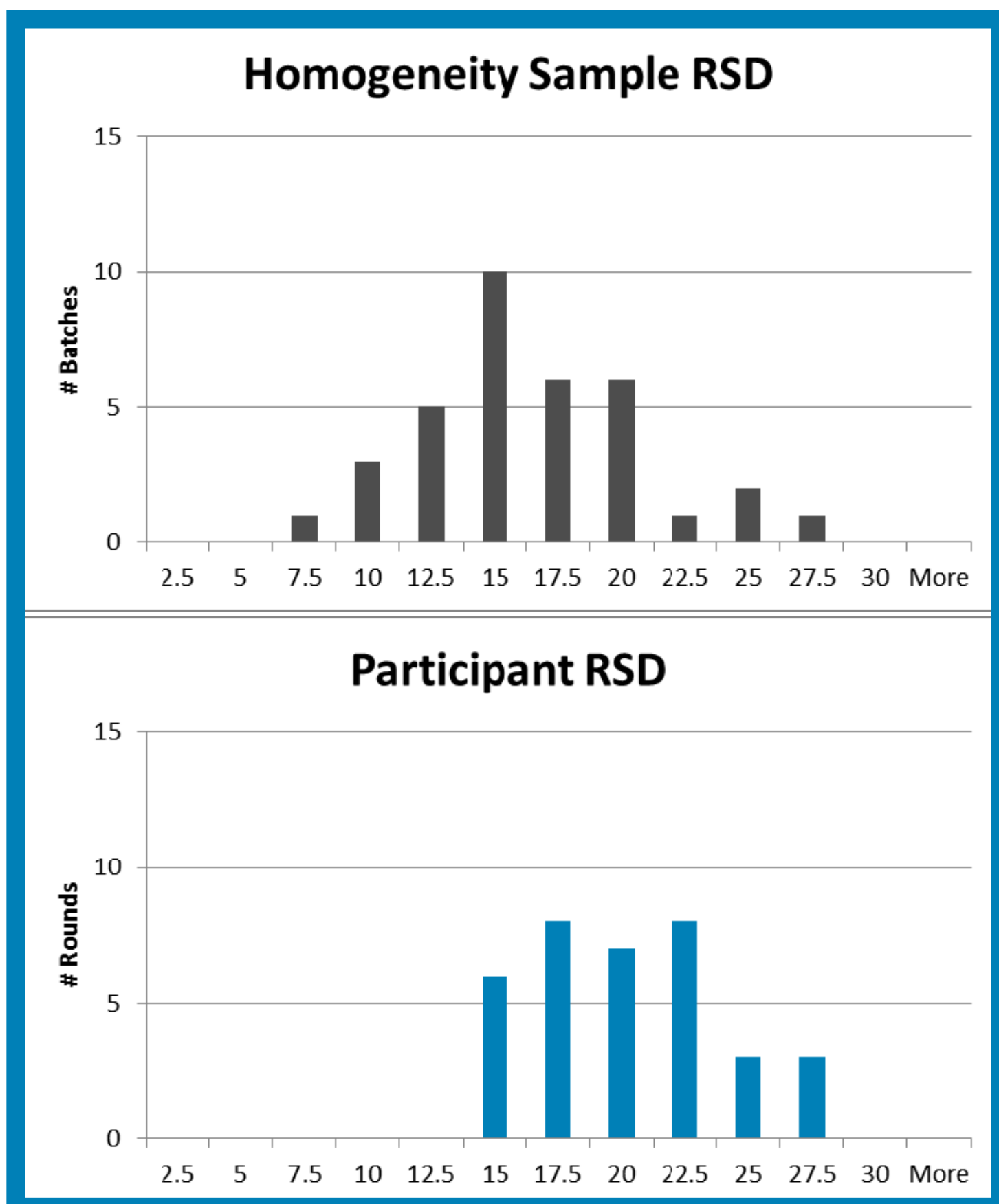
2005

2011

2015

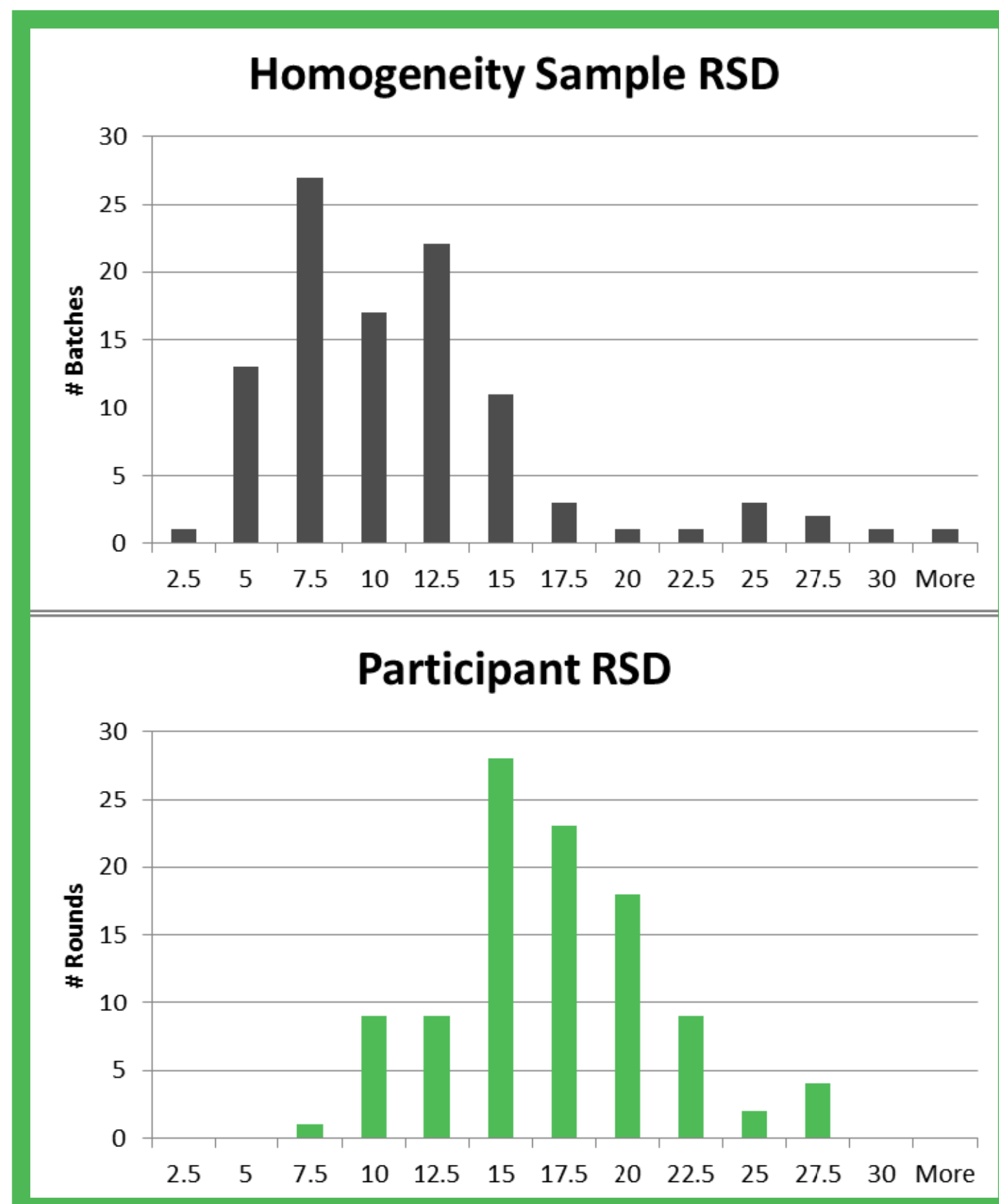


Round Number



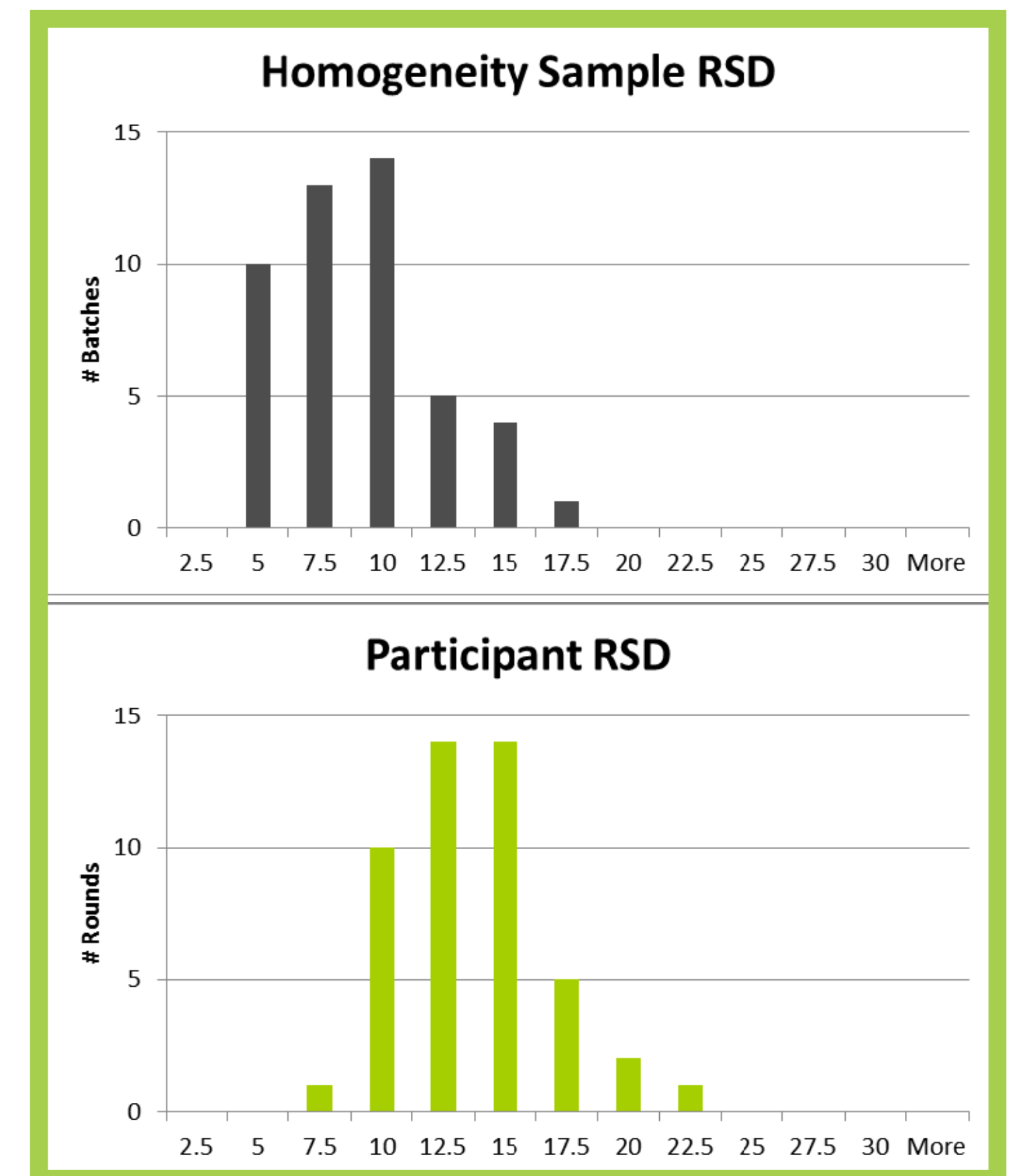
2003-2004

- ♦ Air generation method
- ♦ Minusil 5 reference material



2005-2010

- ♦ Liquid generation method
- ♦ Minusil 5 reference material



2011-present

- ♦ Liquid generation method
- ♦ NIST 1878a reference material

IMPROVEMENT OPPORTUNITIES

- ♦ Study indicates variable deposition of aerosol between filters & internal surfaces of cassettes contributes to variability in analysis
- ♦ Study shows liquid generation method has better accuracy & agreement among participants

RESULTS: Immediate & steady improvements

- ♦ Sample consistency & population performance improving (Lower RSD)

IMPROVEMENT OPPORTUNITIES

- ♦ Study shows large variance in reference material purity
- ♦ NIOSH validated analytical method for crystalline silica specifically requires the use of NIST SRM 1878a, which is derived from Minusil 5, has well characterized size distribution, & closely matches respirable dust criteria
- ♦ Study shows x-ray diffraction & infrared methods more precise than colorimetric method

RESULTS: Immediate improvements

- ♦ Population performance has plateaued
- ♦ Sample consistency continues to steadily improve
- ♦ Population & sample generation RSD trending lower

CONCLUSIONS

- ♦ Reference material, analytical method, & sample generation method can be factors in participant performance
- ♦ Conducting and publishing studies can improve the PT program & can provide critical information for participants to improve their operations by influencing test method & reference material selection