CONTROL OF SENSITIVITY, PRECISION, AND BIAS
AT TWO LEVELS: QC AND SURVEY DESIGN

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ABSTRACT

In many water quality or contaminants projects, for the QC (each data point) level, sensitivity is often controlled with detection limits, precision is often controlled with duplicates, and bias (still wrongly termed accuracy by some) is controlled by percent recoveries of reference materials, spikes, and/or blanks. New information is presented on an alternate measurement sensitivity way to control sensitivity at the QC level when low-level detection limits are not applicable or optimal. The standard way to report precision is still with a relative percent difference (RPD). The new (interagency recommended) standard way to report bias is with a percent difference (PD).

On the survey design level (covering multiple measurements of different environmental samples), these aspects have not been as universally controlled. However, sensitivity can and often should be controlled with pre-project performance goals for minimum detectable differences. What statisticians have been calling survey design precision is really just the length of confidence intervals and is therefore more akin to accuracy in a summary statistic estimate. Ways to track the magnitude of and changes in survey design precision and survey design bias over time are discussed.

KEYWORDS

QC Sensitivity, QC Precision, QC Bias, Survey Design Sensitivity, Survey Design Precision, Survey Design Bias