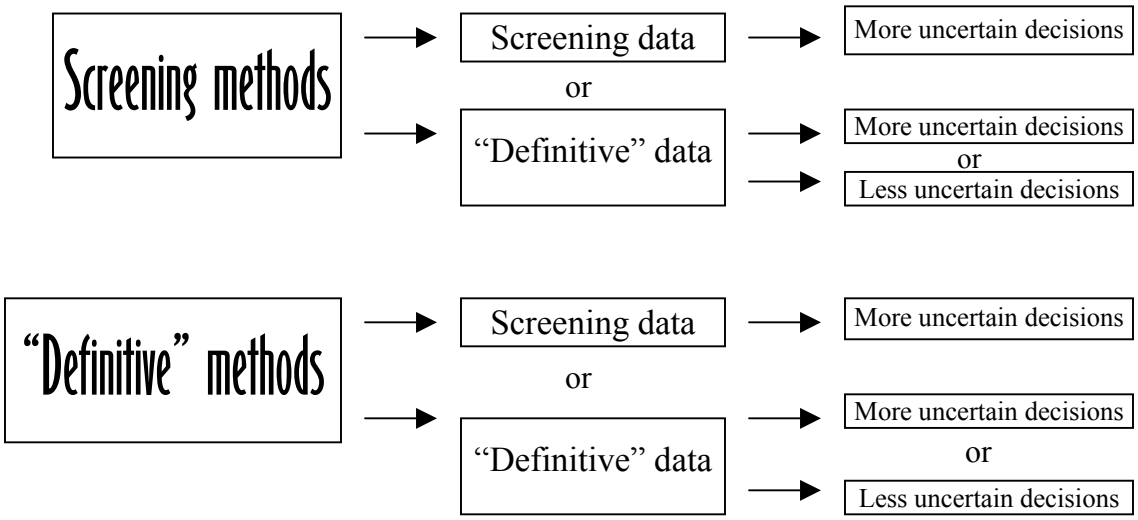
Fostering Accurate Concepts and Communication

MYTHS about Analytical Chemistry Methods, Data and Decisions

Screening methods → Screening data → Uncertain decisions

"Definitive" methods → "Definitive" data → Certain decisions

FACTS about Analytical Chemistry Methods, Data and Decisions



"Field Screening"

What do you intend to communicate by using that term?

Implication	Veracity	Accurate Alternative
All methods run in the field are screening methods?	False	Use terms "field analytical" or "on-site analysis"
Screening methods are not used in the fixed-base lab?	False	This is highly cost-effective, under-utilized option
Data generated in the field are all of screening quality?	False	Data quality depends on data of known quality matched to intended use
Decisions based on field-generated data are uncertain?	False	Decision quality depends on the evidence (e.g., data) + proper interpretation of that evidence

11/4/01

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The MYTH about Environmental Data Quality

Good analytical quality → Good data quality → Good project quality/decision

The FACTS about Environmental Data Quality

Management of Sampling Uncertainties (sample support, location & integrity)
Data of known sampling quality

+

Management of Analytical Uncertainties (lab-specific QA & sample-specific QA)
Data of known analytical quality

=

Data of known quality

Data of known quality

+

- Data reduction procedures
- Data interpretation or modeling
- Select assumptions to fill minor or unknowable data gaps
- Is the data actually used? Or must other considerations over-ride the evidence at hand?

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Project decision quality

Project Quality Assurance: Organize project work plans and reports around the concept of uncertainty management by providing

- a clear description of the goals of the project and state the decision(s) to be made (e.g., investigate to determine whether further action may be required, delineate and remove or contain known contamination, etc.);
- a clear description of the level of certainty (whether statistically-based or not) to be attained in the decision(s) (i.e., a discussion of what types and levels of decision errors will not be tolerable);
- a transparent listing and brief description of potential sources of uncertainty that could lead to decision errors beyond what is tolerable (e.g., unacceptable amounts of contamination being missed by the sampling strategy, interference with the analytical chemistry methods with generation of biased results, misunderstanding the factors controlling fate and transport, etc.); and
- for each identified uncertainty, include a brief discussion of the strategies to be used with each that will manage the overall decision uncertainty to tolerable levels (such as using existing information, or developing mechanisms that manage sampling and analytical uncertainties relevant to the data's intended use, etc.).