SOURCE IDENTIFICATION PROTOCOL PROJECT METHOD EVALUATION STUDY

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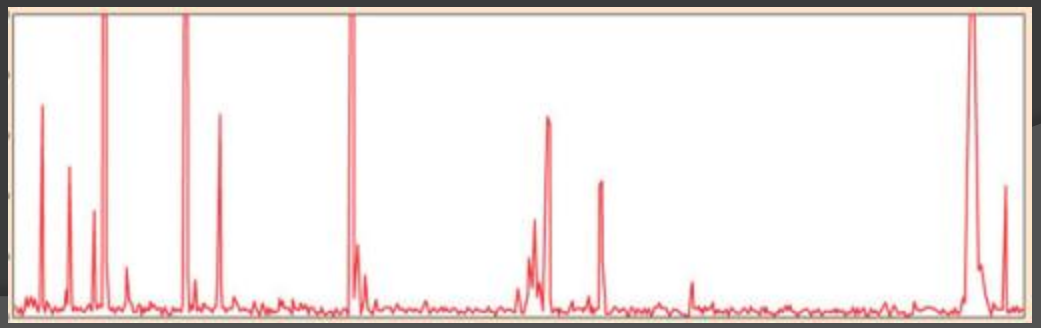
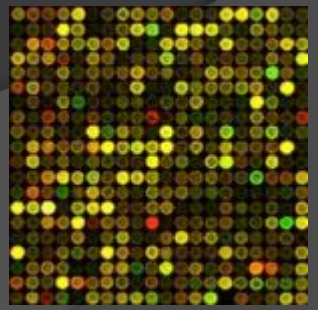
BACKGROUND

- Some beaches are chronically contaminated
- Source identification must precede mitigation
- Appropriate source ID methods must be selected for source ID studies

BACKGROUND

- It’s been almost a decade since the last comprehensive methods evaluation study
  - Most methods did not perform well
  - Since then
    - Many new markers discovered
    - Different types of methods developed





QUESTIONS

- Which methods are most sensitive?
  - Always ID a target source that is present
- Which methods are most specific?
  - Rarely mistakenly ID a source that is absent
- Are the methods reproducible?
  - Produce the same ID answer by different labs

STUDY DESIGN

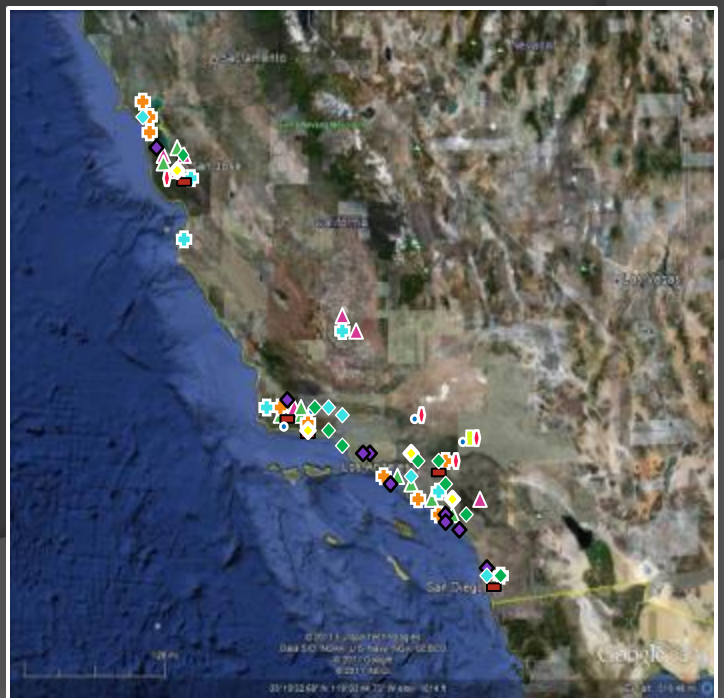
- Challenge each method with 64 blind samples
  - 32 samples in duplicate
  - 12 sources: human, animals
  - 2 sample types
    - Single source: 2 concentrations
    - Dual source: various ratios

- 50 methods evaluated
  - 26 top labs

- A subset of methods run by multiple labs using same standard operating procedure

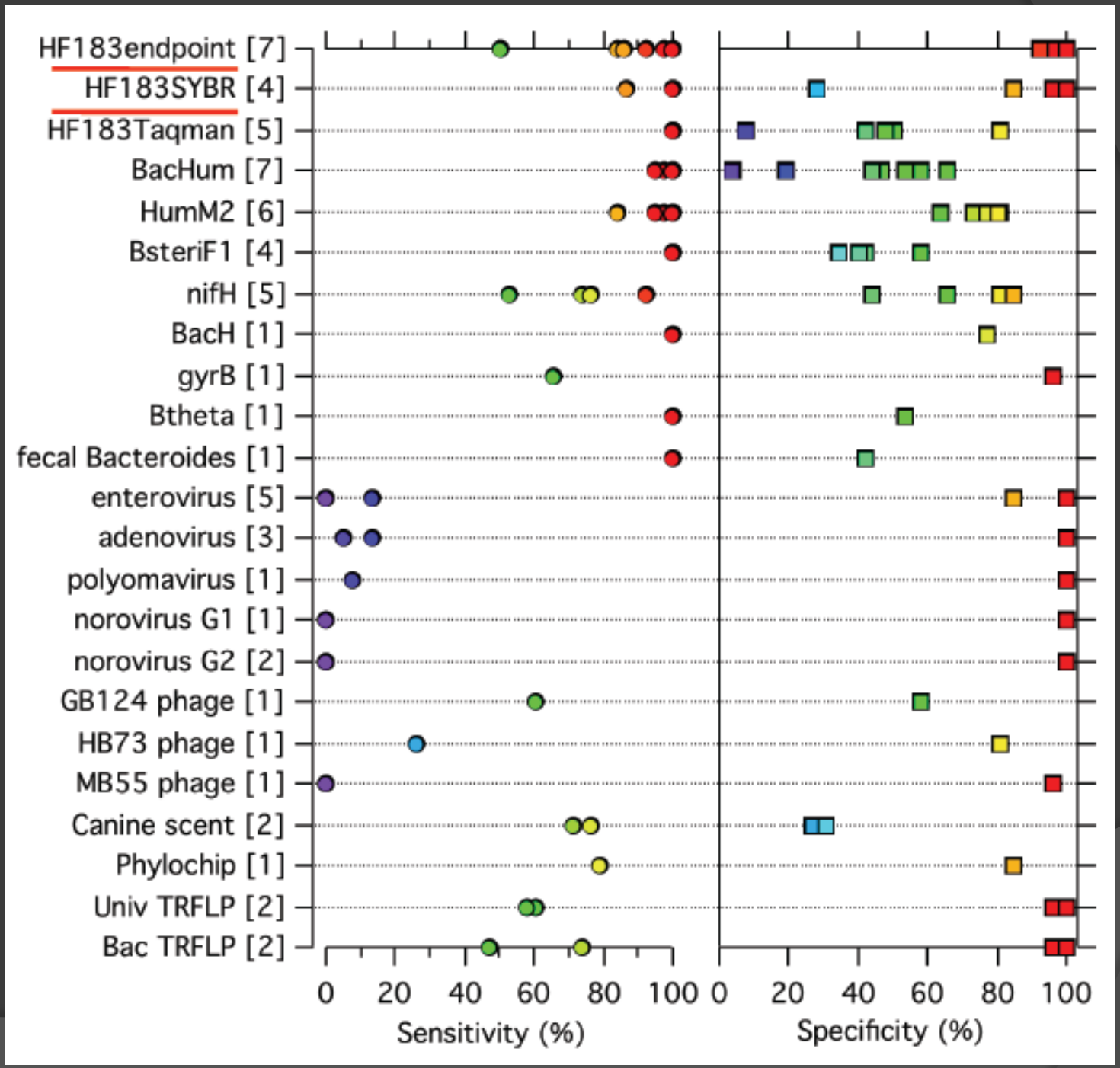
CHALLENGE SOURCES

- Composite from representative geographic regions
- Composite from donors/hosts
  - Human, cow, dog, pig, horse, deer:
  - Gull, chicken, goose, pigeon:
  - Sewage
  - Septage
- Fresh source
  - Up to 2 days for some sources



SOURCE ID METHODS

- By target sources
  - Human: 20
  - Gull: 4; cow: 9; dog: 2; Pig: 3; Horse: 1
  - Non targeted: 4 community analysis methods
- By type of methods
  - Canine scent tracking
  - Culture-based
  - (q)PCR
  - Community analysis
- By target organisms
  - Bacteria
  - Virus

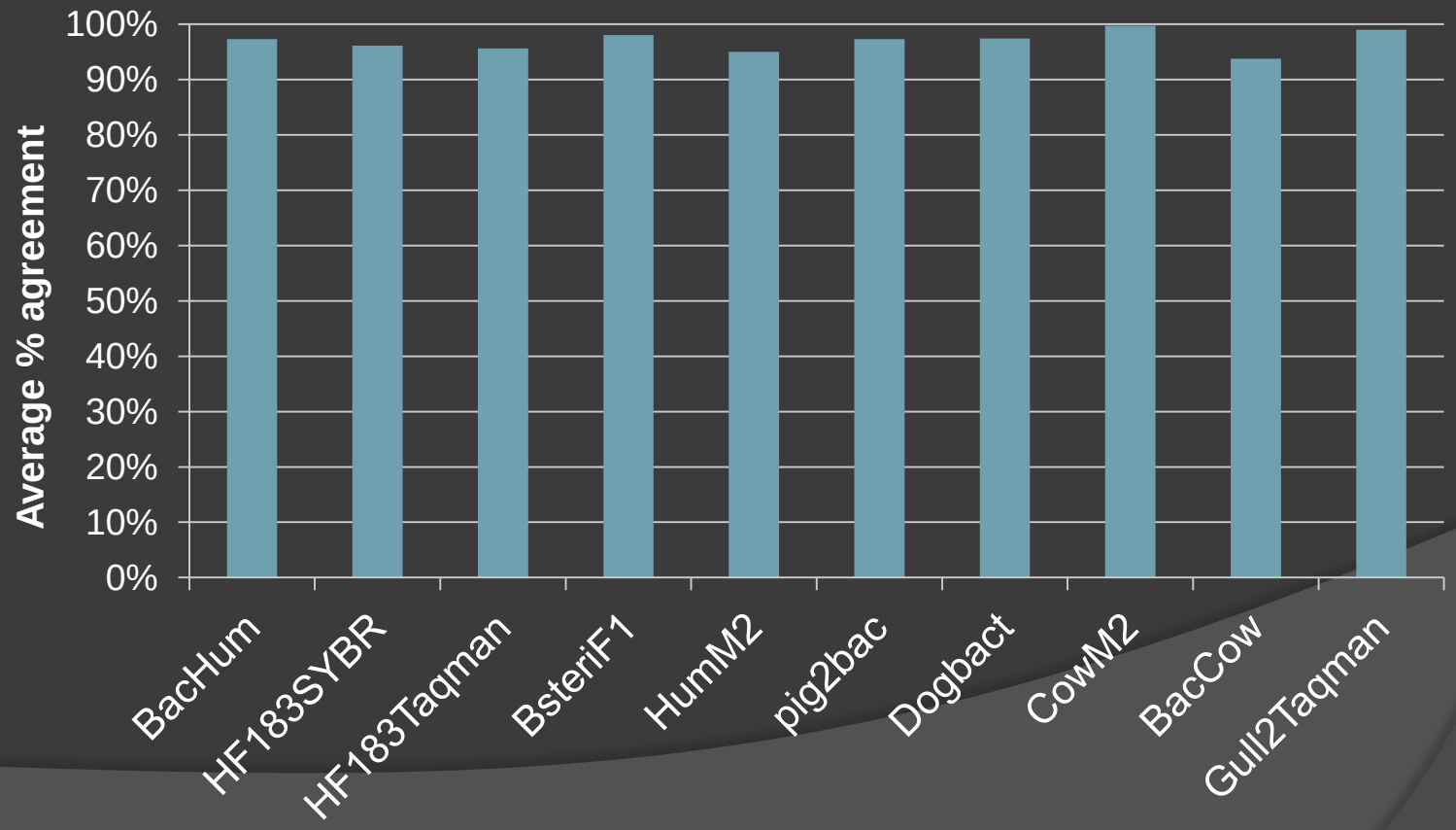

HF183endpoint [7]
HF183SYBR [4]
HF183Taqman [5]
BacHum [7]
HumM2 [6]
BsteriF1 [4]
nifH [5]
BacH [1]
gyrB [1]
Btheta [1]
fecal Bacteroides [1]
enterovirus [5]
adenovirus [3]
polyomavirus [1]
norovirus G1 [1]
norovirus G2 [2]
GB124 phage [1]
HB73 phage [1]
MB55 phage [1]
Canine scent [2]
Phylochip [1]
Univ TRFLP [2]
Bac TRFLP [2]
0 20 40 60 80 100
Sensitivity (%)
0 20 40 60 80 100
Specificity (%)

SENSITIVITY AND SPECIFICITY – SUMMARY

Source	Method (Sensitivity ≥ 80% and Specificity ≥ 80%)
Human	HF183Entpt, HF183SYBR
Cow	CF193, CowM2, CowM3, Rum2Bac
Dog	BacCan
Gull	Gull2Endpt, Gull2SYBR, LeeSeaGull
Pig	PF163, mtPigDNA, Phylochip, Bac16S-TRFLP
Horse	HoF597, Phylochip, Bac16S-TRFLP
Deer	PhyloChip, Bac16S-TRFLP, Univ16S-TRFLP
Chicken	PhyloChip
Septage	Univ16S-TRFLP, Bac16S-TRFLP
Goose	-
Pigeon	-

REPRODUCIBILITY

- Did the labs following the same SOP gave the same answer?



NEXT STEPS

- Implement the “winning” methods in the field source ID studies
- Explore multiple indicator methods
- Provide standardized, automated end user platform for data interpretation
- Quantitative Microbial Risk Assessment

Stay Tuned!

Thank you!

Questions?