

# LT2 Round 1 *Cryptosporidium* Occurrence

by

Michael J. Messner, Ph.D.

USEPA Office of Ground Water and Drinking Water



# Outline

- *Cryptosporidium* Occurrence
  - ***Historical Data (next 4 slides)***
  - Round 1 Data
- Summary



## Historical Occurrence Data

- *Cryptosporidium* occurrence data used to develop the LT2 Rule and its Economic Analysis:
  - ICR Survey
  - ICR Supplemental Survey – Large (SS Large)
  - ICR Supplemental Survey – Medium (SS Medium)



## The Surveys

- **ICR** – All surface water and GWUDI systems serving at least 100K people tested sources monthly for 18 months using the ICR method. (Ended Dec. 1999)
- **SS Large** – The seven largest ICR systems plus a sample of 40 additional ICR systems tested twice per month for 12 months using method 1622/1623. (Ended Feb. 2000)
- **SS Medium** – A sample of 40 systems serving 10K to 100K tested twice per month for 12 months using method 1622/1623. (Ended Feb. 2000)



# Survey Summary Statistics for Occurrence

- ICR
  - 5838 source water measurements
  - 93% zeros (nondetects)
  - Average measured Crypto Conc. = 0.067/L
  - Average recovery was about 1/3 that for methods 1622 & 1623
- Supplemental Surveys
  - 2086 source water measurements
  - **86% zeros**
  - Average measured Crypto Conc. = **0.053/L**



# Survey Summary Statistics for Occurrence, continued

- ICR
  - 64 of 350 plants (18%) had means of at least 0.075/L
  - 196 plants (56%) had all-zeros
- Supplemental Survey
  - 12 of 87 plants (**14%**) had means of at least 0.075/L
  - 18 plants (**21%**) had all-zeros



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- *Cryptosporidium* Occurrence
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  - ***Round 1 Data (next 7 slides)***
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# Caveats

- October 2011 dataset is not final
  - Schedule 4 monitoring is still ongoing
- The Data Collection and Tracking System (DCTS) data don't include all "grandfathered" data used by some systems.
- Sources include some that are not filtered.
- Some records are missing info (schedule, source type, etc.)
- Schedule 4 systems are not representative of all small systems, due to use of *E. coli* trigger.



# *Cryptosporidium* Occurrence Summary Statistics

## Numbers of Systems, Facilities (Intakes), and Records

<b>Schedule</b>	<b>Systems</b>	<b>Facilities</b>	<b>Records</b>
1	229	365	9,854
2	175	237	6,195
3	756	838	21,814
4	189	197	4,234
NA*	27	33	813
Total	1,376	1,670	42,910

\* NA = Not Available. Schedule information was missing.



## *Cryptosporidium* Summary Statistics Numbers of Sample Assays (Records)

<b>Schedule</b>	<b>Records</b>	<b>Field</b>	<b>Matrix Spikes</b>
1	9,854	9,128	726
2	6,195	5,725	470
3	21,814	20,160	1,654
4	4,234	3,907	327
NA*	813	756	57
Total	42,910	39,676	3,234

\* NA = Not Available. Schedule information was missing.



## *Cryptosporidium* Field Summary Statistics

Schedule	Mean	% NonDetect
1	0.0117	93.9% (8,573 of 9,128)
2	0.0148	93.4% (5,347 of 5,725)
3	0.0166	93.2% (18,799 of 20,160)
4	0.0247	88.7% (3,464 of 3,907)
NA*	0.0201	90.7% (686 of 756)
All	<b>0.0161</b>	<b>92.9%</b> (36,869 of 39,676)

\*NA = Not Available. Schedule information was missing.

For comparison, Supplemental Survey mean was **0.053/L** and **86%** were nondetects.



## Field Statistics by Facility

- Each “Facility” has a single drinking water source. (Some “systems” have multiple facilities.)
- 77 facilities each have fewer than 6 assays and are not included in the summary statistics that follow. (213 field records)
- 917 facilities have exactly 24 assays and use rolling annual average to determine bin.
- 113 facilities have 48 or more assays and use the average (mean).
- Statistics that follow use the mean for all facilities. This is expected to understate the numbers required to take action.



## Cryptosporidium Summary Statistics by FACILITY\*

<b>Schedule</b> NA = not available	<b>Number</b> <b>Facilities</b>	<b>No. With All-</b> <b>Nondetects (%)</b>	<b>No. at or Above</b> <b>0.075 (%)</b>
1	331	185 (56%)	11 (3.3%)
2	221	111 (50%)	7(3.2%)
3	820	422 (51%)	37 (4.5%)
4	192	87 (45%)	19 (9.9%)
NA**	29	14 (48%)	1 (3%)
All	1,593	819 (51%)	75 (4.7%)

\* Includes only facilities having at least 6 field measurements.

\*\* NA = not available. Schedule was not specified.



## Cryptosporidium Summary Statistics by Water Type\*

<b>Water Type** NA = not available</b>	<b>Number of Facilities</b>	<b>No. with All- Nondetects (%)</b>	<b>No. At or Above 0.075 (%)</b>
Res/Lake (LR)	709	451(64%)	9 (1%)
River/Stream (FS)	615	204 (33%)	58 (9%)
Both (LR & FS)	56	26 (46%)	3 (5%)
GWUDI-FS	69	53 (77%)	0
GWUDI-LR	34	26 (76%)	2 (6%)
NA**	110	59 (54%)	3 (3%)
All	1,593	819 ( <b>51%</b> )	75 ( <b>4.7%</b> )

\*GWUDI = ground water under direct influence

\*\*NA = not available. Water Type was not specified.



## Outline

- Round 1 *Cryptosporidium* Occurrence
  - LT2 estimates
  - Round 1 data
  - ***Summary (next slide)***



# Summary

- Compared with LT2 Estimates, overall occurrence is considerably less than expected:
  - More nondetects (**93%** vs. **86%**) → Fewer detects (**7%** vs. **14%**)
  - More plants with all-nondetects (**51%** vs. **21%**)
  - Lower overall average concentration (**0.016** vs. **0.053**)
  - Smaller % of source waters with mean concentrations of at least 0.075/L (**4.7%** vs. **14%**)
- Occurrence for Schedule 4 is significantly greater than for Schedules 1-3, suggesting that indicator screening is working.

**Blue = DCTS**     **Red = Historical (survey statistics)**