EPA's New Beach Water Quality Criteria

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BACKGROUND

- **EPA adopted new beach water quality criteria November 26, 2012**
- **You asked for a briefing about the biggest changes contained in the new criteria**
  - These are federal recommendations
  - California must determine which parts to adopt
- **I gave a similar briefing to the California Beach Water Quality Workgroup**
  - I will also share their thoughts on what California should adopt

MAJOR CHANGES

- **New beach management thresholds**
  - There are now three values instead of two
  - The conceptual approach to thresholds has changed
  - Increased consistency between freshwater and saltwater criteria
- **Allows use of rapid QPCR-based methods**
- **Allows use of predictive models for health warnings**
- **Allows use of quantitative microbial risk assessment (QMRA) for developing site-specific objectives**
- **Opens the door to use of alternative indicators**

THREE THRESHOLDS

- **Geometric mean (35 cfu/100 ml)**
  - Same value as we are presently using
  - The allowable number of illnesses (on which it is based) changes, but that is in the weeds
- **Statistical threshold value (130 cfu/100ml)**
  - A new concept
- **Beach action value (70 cfu/100 ml)**
  - A new concept
- **Eliminates the single sample maximum criteria (104 cfu/100 ml)**

BEACH ACTION VALUE

- **EPA differentiates water quality criteria from beach health warnings**
  - Water quality criteria are intended for discharge permit requirements and for determination of impaired water bodies
- **The Beach Action Value is not regulatory**
  - Provides single sample guidance for when beach health warnings should be issued
  - EPA refers to it as “a conservative, precautionary tool for making beach notification decisions”
- **It is lower than the value we have been using for that purpose**
  - 70 vs. 104
  - Would lead to about 20% more beach advisories, if adopted

STATISTICAL THRESHOLD VALUE

- **A new regulatory value**
  - Intended to supplement the geometric mean with a frequency of exceedance component
- **Value not to be exceeded by more than 10 percent of the samples taken in a month**
  - Does not explicitly provide for a seasonal adjustment
- **It replaces the single sample maximum and would result in fewer 303(d) listings**
  - Some Regional Boards presently use no more than 4% of samples above 104
  - This would be no more than 10% of samples above 130

RISK LEVEL

- **New criteria identifies two possible risk levels**
  - 32 illnesses per thousand or 36 illnesses per thousand

	Illness Rate: 36 per 1,000		**OR**	**Illness Rate: 32 per 1,000**	
Indicator	GM	STV		GM	STV
Enterococci – marine and fresh	35	130		30	110
OR					
E. coli – fresh	126	410		100	320

- **Provides no guidance on which of these States should adopt**
  - 36 illnesses per thousand equivalent to present allowable illness rate

BWQWG REACTION

- **There were aspects they liked**
  - Consistency between fresh and salt water
  - Separation of warnings from criteria
  - An opportunity to eliminate *E. coli* and fecal coliform measurements
- **But mostly they weren't favorable to switching**
  - Changes would create confusion
  - The underlying science was based on non-representative beaches
- **Were also concerned that it would add to inconsistency across States**
  - Only some States would adopt new standards
  - They didn't understand the different risk levels, which they felt would add to inconsistency

USE OF RAPID METHODS

- **EPA is allowing use of QPCR, with caveats**
  - "not currently suggested for NPDES permitting or effluent-related monitoring purposes because this method may not reflect the efficacy of WWTP disinfection"
  - "EPA has limited experience with its performance across a broad range of environmental conditions"

- **The methods we have been using in California are slightly different than the EPA method**
  - Recommended thresholds also differ from what we have been using
  - Technology is evolving rapidly and their method is already dated
  - EPA has opened the door to use of alternative methods, but hasn't laid out clear rules for method substitution

- **EPA has not yet issued implementation guidance**
  - Due out later this year

BAV THRESHOLDS FOR QPCR

- **EPA is recommending a BAV threshold of 1000 cell equivalents when using QPCR**
  - We have used 104 in our pilot testing
  - Makes a huge difference in the number of warnings that would be issued
- **CA has flexibility in assigning this threshold, but the process for doing that is unclear**
  - "EPA encourages a site-specific analysis of the method's performance prior to use"

	Enterolert <104	Enterolert >=104
EPA1600 <104	86.3	5.1
EPA1600 >=104	2.5	6.1

	qPCR <104	qPCR >=104
EPA1600 <104	85.6	5.8
EPA1600 >=104	5.8	2.9

	qPCR <1000	qPCR >=1000
EPA1600 <104	90.6	0.7
EPA1600 >=104	8.3	0.4

SOME IMPLEMENTATION ISSUES

- **Standard reference material**
  - What type will be used?
  - Where will you obtain it from?
- **Training**
  - Who is going to provide training?
  - How many locations will training be held?
- **No mention of financial assistance or incentives for adoption of new methods**
  - Have already eliminated traditional beach monitoring support funds
  - Sequestration won’t help
- **QA and laboratory certification**

BWQWG REACTION

- **Everyone liked the concept of rapid methods**
  - Particularly when it could be applied to a subset of beaches most in need of rapid methods
- **Most expressed concern that EPA needs to provide implementation guidance and start-up funds**
- **Also concerned it would add inconsistency to monitoring systems**
  - Methods are still evolving
  - The process for establishing site-specific thresholds for new methods is vague

STATISTICAL MODELS

- **EPA has opened the door to use of models for health warnings**
  - Some States are already doing it
  - The new criteria provides approval and guidance
- **Recognizes several categories of predictive models**
  - Statistical regression models
  - Rainfall-based notifications
  - Decision trees
  - Deterministic models
- **Mostly technical guidance about how to do it well, rather than a recommendation or criteria**

BWQWG REACTION

- **Interesting, but not compelling**
- **Noted that we are already using models for health warnings**
  - Imperial Beach: Based on flow from Tijuana River
  - Rain-related warnings
- **Stanford/Heal the Bay currently doing a project to investigate whether models work at California beaches**
  - Group wants to hear results from that project before opining on likelihood of expanded use of models

QUANTITATIVE MICROBIAL RISK ASSESSMENT (QMRA)

- **One of the biggest complaints about previous criteria is that they are applied equally, regardless of fecal source**
- **States are presently permitted to conduct epidemiological studies to derive site-specific objectives**
- **EPA will now allow QMRA for site-specific objectives**
  - Less expensive, but scientifically less mature than epidemiology
  - EPA is presently developing QMRA guidance

HOW DOES QMRA WORK?

- **Identify fecal sources**
  - Sanitary survey
  - Source ID methods
  - Stop if there is more than ~15% human contribution
- **Quantify pathogen loads from each source**
  - Eight pathogens account for >97% of non-foodborne illness in the US
- **Model illness potential based on known health risk from each of those pathogens**

Norovirus	*Giardia lamblia*
Rotavirus	*Campylobacter* spp.
Adenovirus	*Salmonella enterica*
Cryptosporidium spp.	*E. coli* O57:H7

BWQWG REACTION

- **This topic engendered the most discussion**
- **People were generally favorable**
  - Recognize that some beaches have non-human sources
- **But they were also cautious**
  - Were concerned about relaxing standards based on inadequate evidence
- **EPA has not yet produced guidance**
  - EPA is enthusiastic to partner with us on case studies

ALTERNATIVE INDICATORS

- **“EPA anticipates that scientific advancements will provide new technologies for enumerating fecal pathogens or FIB”**
  - “As new or alternative indicator and/or enumeration method combinations are developed, states may want to consider using them to develop alternative criteria”
- **Opens the door to both new methods and new indicators**
- **“If a state adopts WQS using alternative indicator/method combinations, EPA will review those standards to determine whether such standards are scientifically defensible and protective of the primary contact recreation use”**
  - “A robust relationship need not be established between EPA’s recommendation and alternative indicators for the whole range of indicator densities”
  - “It is important that a consistent and predictable relationship exist between the enumeration methods and an established indicator/health relationship in the range of the recommended criteria”

BWQWG REACTION

- **No reaction, as they didn’t see adoption of new indicators as likely to happen in the foreseeable future**
  - They were glad to see flexibility for adopting new enterococcus measurement methods as they evolve

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