

# The Net Benefits of Rapid Test Methods at U.S. Coastal Beaches



**Julie Hewitt**  
**US Environmental Protection Agency**

**October 9, 2012**

**Disclaimer:** The opinions expressed here are solely the author's, do not establish or affect legal rights or obligations, and do not necessarily reflect the views of the U.S. EPA; no official endorsement should be inferred.

# Outline



- The title of my talk is only accurate if you add a “?” or replace end with “at Two Great Lakes Beaches”
- Why do we care?
  - 63 million people visited US coastal beaches in 1999-2000  
National Survey on Recreation and the Environment (NSRE)
  - About 22% of the population
- A preliminary analysis from 2005
- Data challenges that a national or coastal beach estimate difficult
- What would support greater use of the qPCR test?

# 2005: The Problem of Delayed Test Results



WATER QUALITY



IDEAL SCENARIO



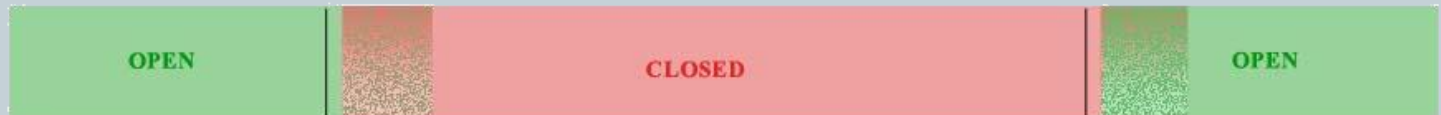
CURRENT METHOD

↑  
test



NEW METHOD

↑  
test



Opportunity for  
Health Benefits

Opportunity for  
Recreational Benefits

# 2005 Preliminary Estimate

## NEEAR Study Areas

- 2003 intercept data and follow-up re GI illness
- WQ testing using culture and qPCR methods
- Beach attendance data from beach authorities
- Rainfall data (NOAA)
- Cost-of-illness data for GI illnesses
- Economic values to avoid impaired water quality warnings
- Rough estimates of costs of test equipment



# 2005 Preliminary Estimate



- Annual health benefits from closing beach faster
  - 15 days open but should be closed
  - 819 avoided cases of GI illnesses
  - \$247 avoided costs per case
    - ✦ Cost of illness, not willingness to pay
  - Total health benefits: \$202,000

# 2005 Preliminary Estimate



- Annual recreational benefits from reopening beach faster
  - 15 days closed but should be open
  - 3,248 swimmers per day
  - \$2.28 value per swimmer of an avoided beach advisory day
    - ✦ Willingness to pay
  - Total recreational benefits: \$62,000

# 2005 Preliminary Estimate



- Annual net costs
  - Capital costs, training costs, per test costs (net of test costs for current method)
  - Total net costs: \$2,000 at 2 beaches
- Annual net benefits at these two beaches:  
**\$262,000**

# Extrapolating to US Coastal Beaches



- Detailed data collected for purposes of setting qPCR limits isn't generally available
- Need visitation data:
  - Have estimate of total swimmer days from NSRE, but would have to apportion to beaches, and days of beach season
  - NSRE tracks multiple activities at beaches, but not on a per-trip basis, which produces trade-off between underestimating and double-counting
  - NSRE doesn't collect activities of children under 16
  - More information known about monitored beaches than unmonitored beaches – in theory, states prioritize beaches for monitoring
- Closure data can vary significantly from year to year and in space
- A difference in accuracy of test methods could produce false closures, and would affect results
- qPCR costs are higher than culture method, but is this relationship dependent on limited usage?



# Encouraging Use of qPCR Method



- Relatively low break-even level of testing required.
- Some California beaches already use qPCR
  - Gather information on why it works for them
- Single sample versus geometric means
  - What is justified level of accuracy?
- Difference in accuracy: levels of false positives, false negatives?

# Greater Use of qPCR?



- Networking beaches given initial costs associated with qPCR (equipment, training, etc.)
- Use government labs which may already have necessary expertise
- Contractors could provide comprehensive package of testing services to states, municipalities
  - No barriers to entry