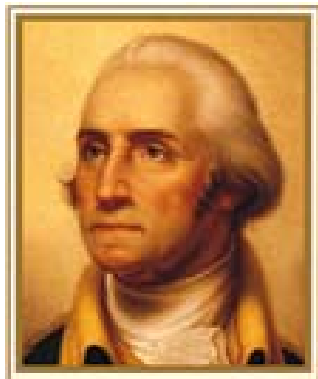


Pharmaceutical Agents in Surface and Drinking Water



THE GEORGE
WASHINGTON
UNIVERSITY
WASHINGTON DC

Briefing for MWCOG
Tee L. Guidotti
Janet Phoenix
Center for Risk Science and
Public Health
GWU SPHHS

Background

- ❑ We've known this was coming for years.
- ❑ Ecosystem effects and human health issue
- ❑ Incomplete health data
 - Typical of an emerging issue
 - Health outcome data will be hard to obtain
- ❑ Systemic approach needed:
 - Risk assessment to address uncertainty
 - Risk management to control effluent
 - Risk communication and risk perception
- ❑ Pervasive distrust of water safety in DC
 - Substantially aggravated by lead issue
 - Falls within purview of Washington Aqueduct



Health Risk Potential

- ❑ Pharmaceuticals are designed to have a biological impact, but at relatively high concentrations
- ❑ Lack tests for many effects
 - EPA has tried for endocrine disruptors – controversy
 - Meaning of some in dispute
- ❑ Pharmaceutical residues may be transformed
 - Biotransformation in surface water
 - Reactions with free chlorine
- ❑ Chemical mixtures may have unpredictable effects.
 - Theoretical concern



This is not exactly a surprise.



Health Risk - Plausible

- ❑ Ecotoxicity more likely than human toxicity
- ❑ Most likely effects are endocrine disruption
 - Hormones and cell signaling
 - Can have effects at much lower levels than other chemicals: dosage issues and relevance of indicators
- ❑ Pharmaceuticals are present in very low concentrations: ppb, ppt
 - Too low for most toxic effects
 - Allergic reactions if levels rise?
- ❑ Antibiotic-resistance?
 - Most likely where local accumulation
 - Documented for antibiotics in feed

1 ppb = 1 drop of water in an Olympic-sized swimming pool



Perception of Risk

- ❑ Perception, rather than data, drives public reactions.
- ❑ Addressing perceptions
 - We have known about this problem for years.
 - Much is due to much improved measurement technology and surveys.
 - Health effects not so easy to rule out
- ❑ Need a comprehensive message on water quality.
 - Enormously complicated by the lead issue.
 - Strategic risk communication effort

Is it a threat
to me and my
family?



Management of Risk - National

- ❑ Coordinated approach to human health effects and contaminant mixtures (FDA, EPA, CDC, USGS)
- ❑ Integration of pharmaceuticals into the CDC's Environmental Health Tracking Program
- ❑ Interagency collaboration at the local, state and national level in conducting assessments
- ❑ Control agricultural practices that release antibiotics and steroids into source water.
- ❑ Change TSCA and integrate screening with FDA
 - Require pharmaceutical companies to assess the environmental impact of new pharmaceuticals.
 - Model should be REACH. This won't happen.

Management of Risk - Local

- ❑ Pharmaceutical Take Back Programs
 - Collaboration with pharmacists
 - Proper disposal of medications
 - Public education
 - Removing barriers to take back programs.
- ❑ Invest in drinking and wastewater treatment upgrades and infrastructure.
- ❑ This is really a national issue, not a local one.
- ❑ Watershed protection and upstream management.

