

Emerging Contaminants: Maine's Experience

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Chemicals Play an Important Role in our Economy

- “Each day, a total of 43 billion pounds of chemical substances are produced or imported in the U.S. for commercial and industrial uses...An additional 1,000 new chemicals are introduced into commerce each year.” Green Chemistry Cornerstone to a Sustainable California 2008



Balance is needed to prevent harm from the limited subset of chemicals that are problematic especially for vulnerable populations



Emerging Contaminants

- Chemicals that do not break down and bioaccumulate
 - May be discovered to be toxic after they are widespread
 - May be discovered to have chronic effects at lower levels after they are widespread



Persistence

Bioaccumulation

- Pollution is not solved by dilution when the chemical stays in the environment in a toxic form for long periods of time and bioaccumulates up the food chain
- Fish bioaccumulate mercury 100,000 to 1 million times greater than the water they spawn, grow and live in



Toxics and Children

- Some chemicals impact narrow windows of growth and development for unborn or young children in very small amounts



Lead

- 1965- Blood lead levels over 60 were thought to be toxic
- 2005- No safe blood lead level in children has been identified



Mercury in the Environment

- Maine -1980's-92 studies of high mercury levels in Maine eagles, snow, peat moss and fish provide indicators that preceded Maine's decision to issue the 1st northeast statewide mercury fish consumption advisory for lakes in 1994
- 1997-Fish consumption advisories expanded to all Maine fresh waters



Mercury in People

- Maine -10-20% of Maine women of childbearing age have blood mercury levels high enough to provide an insufficient margin of safety for protecting a fetus from mercury related effects on development
- U.S - Estimated 600,000 children born each year in the U.S. are potentially at risk for nervous system effects due to methlymercury exposure in the womb K.R.Mahaffey EPA 2004



Flame Retardants in the Environment

- PBDE Flame Retardants
 - Found in Maine fish DEP water monitoring/SWAT 2004
 - Maine birds-Deca PBDE found in 8 species
 - Aquatic & terrestrial habitats
 - Fish eaters and invertebrate eaters (insects, crustaceans)
Wing Goodale 2008
 - “Found in fish in remote mountain lakes, Arctic mammals
 - Levels in sediment have increased by several orders of magnitude since the 1970’s.” D Rice Maine CDC 2007



Flame Retardants in People

- U.S.- levels of PBDE flame retardants in humans in the U.S. highest in the world
- Levels of PBDE flame retardants in humans have increased exponentially since 1970's D. Rice Maine CDC 2007



Fate and Transport Difficult to Predict DDT Residuals in the Environment

- Organochlorine pesticides such as DDT, most of which are no longer in use, are still detected in 94% of fish tissue samples and 80% of bed sediment in urban streams and in 57% of the fish tissue samples and 24% of bed sediments in streams in non-agricultural areas with *no* development USGS

Ecological Receptors Difficult to Predict Toxics in Maine Birds

- Mercury, flame retardants, industrial repellants, banned transformer coolants and banned pesticides found in the eggs of all 23 Maine bird species surveyed in a 2007 statewide study W. Goodale Biodiversity Institute 2008

Concern for Vulnerable Populations - Fish Advisories

- U.S.-by end of 2007 all 50 states had issued statewide or water body specific fish consumption advisories for mercury.
- There are fish advisories in the U.S. for 44 different chemical contaminants. Five bioaccumulative contaminants Hg, PCBs, chlordane, dioxins and DDT were involved in 88% of fish advisories as of 2006.

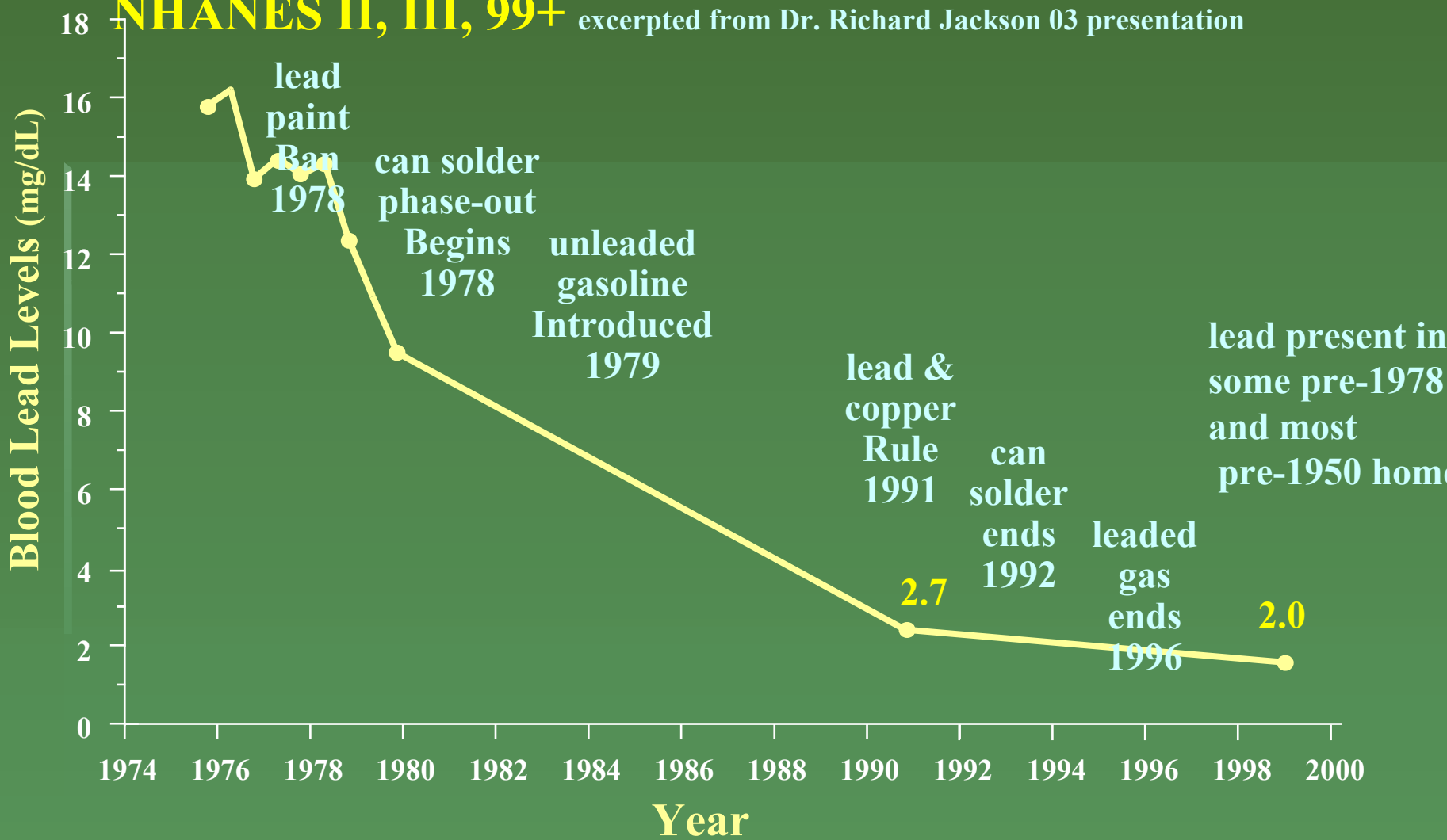
Lead

- Blood Lead levels have decreased dramatically with bans & phaseouts on lead in paint, gasoline, tin can and plumbing solder but concerns remain



Blood Lead Levels in the U.S. Population 1976–1999

NHANES II, III, 99+ excerpted from Dr. Richard Jackson 03 presentation



Maine DEP Product Bans

- 38 MRSA §1601 After Jan. 1979, Aerosol spray which contains a saturated chlorofluorocarbon compound not containing hydrogen
- 38 MRSA §1602 After Sept. 1981, Chemical solvent containing halogenated hydrocarbon compounds as septic tank cleaners or degreasers
- 38 MRSA §1603 After Jan. 1989, Extruded polystyrene foam sheets and foam board using any fully halogenated chlorofluorocarbons found by USEPA to be ozone depleting
- 38 MRSA §1608 After Jan. 1, 1992, Ozone depleting products including
 - CFC cleaning sprays for noncommercial or nonindustrial usage in cleaning electronic and photographic equipment
 - Hand-held halon fire extinguishers for residential use
 - Party streamers and noisemakers in aerosol containers that contain CFC
- 38 MRSA §1609 Effective Jan. 1 2006, Product containing 0.1% of the "penta" or "octa" mixtures of polybrominated diphenyl ethers
 - Effective Jan. 1, 2008 The following products that have plastic fibers containing the "deca" mixture of polybrominated diphenyl ethers
 - Mattress or mattress pad
 - Upholstered furniture intended for use in the home or residential occupancy
- Effective Jan. 1, 2010 a television or computer that has a plastic housing containing the "deca" mixture of polybrominated diphenyl ethers.
- 38 MRSA §1661-C
 - Effective Jan. 1, 2002 Mercury fever thermometer.
 - Effective Jan. 1, 2002 Mercury manometer (used in milking machines on dairy farms).
 - Effective Jan. 1, 2002 Bulk elemental or chemical mercury or mercury compounds for primary or secondary school classrooms.
 - After Jan. 1 2006 Mercury-added thermostat.
 - Effective Jul. 1 2006 mercury added products including barometer, esophageal dilator, bougie tube or gastrointestinal tube, flow meter, hydrometer, hygrometer or psychrometer, manometer, pyrometer, sphygmomanometer, thermometer (a mixture of consumer and other uses).
 - Effective Jul. 1, 2006 a mercury switch or relay individually or as a product component (a mixture of consumer and other uses).
 - Effective Jun. 30, 2011 Mercury-added button cell battery.
- 38 MRSA §1665-A
 - Effective Jan. 1, 2003 a Motor vehicle if it contains a mercury switch.
- 38 MRSA §1681 Beginning April 1, 2004, arsenic-treated wood or wood products for residential use (not included as permitted uses in a notice of cancellation order issued by USEPA)

1st in the Nation Product Bans--Mercury

- Maine enacted 1st in the nation laws effective in 2006 banning the sale of
 - Mercury switches and relays
 - Mercury measuring devices including fever thermometers and barometers
- These banned products collectively account for over 70% of the historical use of mercury in products

Chemical Policy Reform

- **2006 EU RoHS directive** Restriction of 6 Hazardous Substances lead, Hg, Cadmium, Hexvalent Chromium, PBB's,Deca in electronics; includes many consumer products; becoming the de factor world standard. 46 additional substances under consideration
- **2007 EU REACH regulation** Registration, Evaluation & Authorization of Chemicals. Will impact U.S. importers to EU. Shift to precautionary chemicals policy; Shift to d manufacturer responsibility for environmental and health information, Increased information available to the public including supply chain information. Listing of substances of very high concern (2009) expected to reduce their global availability in the supply chain.
- **2008 State Laws: Washington, Maine, Connecticut, California**
- **2008 US Consumer Product Safety Reform** – lowers lead thresholds in toys and new thresholds for 6 Phthalates including 3 that are precautionary bans pending outcome of testing. The precautionary Phthalates ban is considered a new direction in US chemicals policy.
- **2009 Congressional hearings on US TSCA**



Toxic Chemicals in Children's Product

- Signed into Maine law April 2008
- Overwhelming support from Governor Baldacci and both legislative bodies
- Outcome of Governor's Task Force to Promote Safer Chemicals in Consumer Products
- Some commonalities with Washington State statute signed into law also in April 2008



Chemicals of High Concern

- ID and publish list of *chemicals of high concern* by Jan 2010
- ID based on hazards
 - Carcinogen, reproductive or developmental toxicant, endocrine disruptor;
 - Persistent, bioaccumulative, toxic
 - Very persistent, very bioaccumulative
- To be included must be ID'd by authoritative governmental entity on the basis of credible scientific evidence



Priority Chemicals

- Designate at least 2 *priority chemicals* by Jan 2010
- If the Commissioner & Maine CDC find:
 - Through biomonitoring in human tissue or fluids;
 - Through sampling and analysis in the home environment;
 - Through monitoring in fish wildlife or natural environment;
 - Present in consumer products used or present in the home
 - ID'd as high production volume chemical by EPA or
 - Sale or use banned elsewhere in the US;

Priority Chemicals

- Commissioner shall seek recommendations on *priority chemicals* protocol from a stakeholder group
- Designation as a *priority chemical* triggers mandatory disclosure of chemical info by mfg/distributor at discretion of MDEP
- MDEP may assess a fee to cover cost of managing collected info

Sales Prohibition

- The Board may adopt rules prohibiting the manufacture, sale or distribution in State of a children's product containing a priority chemical where:
 - Distribution directly or indirectly exposes children and vulnerable populations
 - One or more safer alternatives available at comparable cost

Interstate Clearinghouse States Working Together

- Maine authorized in statute to participate in an interstate clearinghouse to promote safer chemicals in consumer products
- Conn 08 statute authorizes participation in an interstate clearinghouse
- Washington State has a similar chemicals policy statute signed into law in April 2008. Maine and Washington are sharing information. Some of the work to date by Washington State is expected to save Maine staff research time on our task to identify Chemicals of High Concern. Valuable Me/Wash chemical info sharing was already in place from our mutual and successful efforts to ban the brominated flame retardant deca.
- Existing chemicals lists from California and Washington State can be used as authoritative credible government sources to build Maine's list of Chemicals of High Concern

