Key Communications Points -- 4/19/99

Today's Announcement

The Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services, announced today the availability of an updated Toxicological Profile for Mercury. This document replaces the profile released in 1994. Today's updated profile is a final revision of the draft that was released for public comment in the fall (October) of 1997.

ATSDR's Toxicological Profiles

In CERCLA, the Superfund Law (42 USC 9604), ATSDR is directed by Congress to produce toxicological profiles for hazardous substances found at National Priorities List (NPL) sites (abandoned waste sites ranked highest priority in the Superfund program). Each toxicological profile examines, summarizes, and interprets available toxicologic information and epidemiologic evaluations on a given hazardous substance.

Each profile is reviewed by ATSDR staff, as well as staff members of the Centers for Disease Control and Prevention (CDC) and other government agencies, prior to its release. In addition, each profile is peer-reviewed by a nongovernment panel and then made available to the public for review and comment. However, final responsibility for the contents and views expressed in the toxicological profile resides with ATSDR.

Concern about Mercury

Mercury is a heavy metal that can cause neurotoxicity in humans, especially developing fetuses. Excessive exposure can result in delay of walking and talking in children, as well as other impacts on nervous system function and development. Mercury is of particular concern because it persists in the environment. Mercury emissions to the atmosphere can reach waterways as a result of rainfall and runoff. Mercury then can enter the "food web" and build up as methylmercury in the tissues of predatory fish that feed on contaminated smaller fish.

Advice to People about Eating Fish

Today's release of the ATSDR Toxicological Profile for Mercury does not affect FDA's advice to consumers about fish consumption. Fish and shellfish are excellent foods, and eating fish has many health benefits. The levels of methylmercury encountered in commercial fish are generally low. Therefore FDA advises consumers that it is safe to eat fish and other seafood from grocery stores and restaurants. (Particular questions on the safety of commercial seafood should be directed to the FDA Washington Press Office at 202-205-4144. FDA's website address is: *www.fda.gov*.

Specifically, FDA states that no consumption advice is necessary for the top 10 seafood species, which make up 80% of the seafood market: canned tuna, shrimp, pollock, salmon, cod, catfish,

clams, flatfish, crabs, scallops. The methylmercury concentration in these species is generally less than 0.2 ppm, much lower than the action level of 1 part per million (ppm). Further, few people eat more than the suggested weekly limit of fish (2.2 pounds).

However, FDA continues its recommendation that pregnant women and women who may become pregnant limit their consumption of shark and swordfish to no more than one meal per month. This advice is given because methylmercury levels are relatively high in these species (about 1 ppm methylmercury). Nursing mothers who follow this advice will not expose their infants to increased health risks from methylmercury.

For the general population (other than pregnant women and women who may become pregnant), FDA advises limiting the regular consumption of shark and swordfish to about 7 ounces per week (about one serving).

The greatest exposure of humans to methylmercury is for those subsistence fishers, recreational fishers, and others who regularly eat non-commercial fish from mercury-polluted waters. Of this group, pregnant women and women who may become pregnant, in particular, should pay careful attention to the state advisories that warn people against eating fish caught in mercury-polluted waters. Approximately forty states have issued mercury-related fish advisories for non-commercial fishing. ATSDR and EPA recommend that States and Tribal Nations not modify or eliminate existing fish advisories based on the Toxicological Profile released today. (Specific questions on fish advisories should be directed to your state health department or tribal authority).

Minimal Risk Levels (MRLs)

MRL stands for Minimal Risk Level. It is an estimate of the level of human exposure to a chemical that does not entail appreciable risk of adverse non-cancer health effects. MRLs typically are calculated for individual chemicals for particular modes of exposure (e.g., ingestion, inhalation, or skin contact) and for particular durations.

MRLs are health guidance values established by ATSDR. They are intended for use by public health officials as screening tools when determining whether further evaluation of potential human exposure at hazardous waste sites is warranted. They are not intended for use in determining clean-up levels or for other regulatory purposes.

Each MRL is calculated using precautionary assumptions with a view toward ensuring a substantial margin between the MRL and the exposure level where appreciable toxicity might be expected. The MRL, therefore, is not a "bright line" indicating the boundary between no risk and risk. Levels immediately above the MRL also are highly likely to be safe; but, as a general rule, the further above the MRL, the greater the risk of adverse health effects.

When calculated for exposure via ingestion, the MRL usually is expressed as micrograms (of the chemical) per kilogram of body weight (of the person) per day. An MRL for ingestion is conceptually equivalent to the Reference Dose (RfD) of the U.S. Environmental Protection Agency, the Acceptable Daily Intake (ADI) of the U.S. Food and Drug Administration, and the Tolerable Daily Intake (TDI) of the World Health Organization.

How Other Agencies Define their Health Guidance Values

EPA, FDA and the World Health Organization have defined their health guidance levels as follows:

A. EPA's Reference Dose (RfD)

A Reference Dose (RfD) is a daily ingestion level anticipated to be without adverse effect to persons, including sensitive populations, over a lifetime. An RfD may be considered the midpoint in an estimated range of about an order of magnitude (a factor of ten). This range reflects the uncertainty and variability in the estimate. At the RfD or below, exposures are expected to be safe. The Agency does not represent the RfD as a "bright line" which differentiates between safety and risk. While the level at which risk begins following exposures above the RfD is uncertain, risk increases as exposure increases above this level. The RfD is usually expressed as micrograms (of the substance) per kilogram of body weight (of the person) per day.

B. FDA's Acceptable Daily Intake (ADI) and Action Level

Acceptable Daily Intake (ADI) - health guidance level
The Acceptable Daily Intake (ADI) is the amount of a substance that can be consumed daily over a long period of time without appreciable risk. It is usually expressed in terms of milligrams or micrograms of residue per kilogram of body weight of the consumer per day.

Action Level - regulatory level
FDA, which is responsible for assuring the safety of the commercial food supply, uses an ADI as the basis for judging whether risks from the commercial food supply are not likely to be appreciable. Based on the results of a long term dietary survey, data on levels of the contaminant in food, and the ADI, FDA establishes an Action Level (which defines the maximum allowable concentration of the contaminant in commercial food) as a means to limit consumer exposure to levels without appreciable risk.

C. World Health Organization's (WHO) Tolerable Daily Intake (TDI)

The Tolerable Daily Intake (TDI) is an estimate of the amount of a substance in food or drinking water, expressed on a body weight basis (mg/kg or μg/kg of body weight), that can be ingested daily over a lifetime without appreciable health risk.

Differences Among Agency Health Guidance Levels

Though not identical, the methylmercury exposure values used by the three US agencies and WHO are remarkably close. The small differences exist primarily because the most important scientific studies on people exposed to methylmercury lead to somewhat different indications about the levels at which methylmercury causes appreciable health risks, as indicated below. At this time, the agencies are at different stages of reviewing the most recent mercury studies and do

not interpret the studies in exactly the same way. As a result, the agencies have chosen somewhat different values for the daily dose unlikely to cause toxicity in people. Nevertheless, EPA, ATSDR, FDA, and WHO all share the view that methylmercury has the potential to damage the human nervous system, particularly in the developing fetus, and are dedicated to protecting the public from mercury risks.

In November, 1998, several recent methylmercury studies were peer reviewed by 25 outside experts at a scientific workshop sponsored by eight federal agencies and attended by 150 people from 11 states. In particular, two studies of populations who frequently consume seafood were reviewed, one of a population in the Faroe Islands in the North Atlantic and one of a population in the Seychelles Islands in the Indian Ocean. Expert panelists at the workshop judged both studies to be credible and to provide valuable insights into the potential health effects of methylmercury.

The Methylmercury Workshop was very useful in resolving and narrowing approaches to the assessment of mercury health effects. All the Federal Agencies agree that both the Faroes and Seychelles studies need to be considered in deriving a methylmercury health guidance value. However, a number of issues are still subject to alternative interpretations.

The Faroe Islands study found subtle neurological effects in children exposed in the womb to levels of methylmercury similar to those observed in the Seychelles study, which did not find such effects. However, differences between the studies could account for their different outcomes. Those differences that seem most important are as follows:

> The population in the Faroes was exposed to other potentially neurotoxic substances - polychlorinated biphenyls (PCBs) - along with mercury; and the exposure to the mixture of contaminants was episodic, with some spikes of high intake, in contrast to the generally steady mercury exposure of the Seychelles population.
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> Different tests were used in the two studies to assess neurological functioning.
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> The subtle neurodevelopmental effects reported for the Faroes children were observed at an age that the Seychelles cohort had not yet reached at the time the data were gathered.
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> A variety of differences exist in the study designs and study populations.

In addition, little information exists on other dietary factors that might modify the outcome of the studies.

Faced with such considerations, members of the scientific community have expressed a spectrum of views. This is hardly surprising. Until further reports from these two studies and the results of additional related research become available, experts almost certainly will continue to differ regarding the most appropriate approach to evaluation of the Seychelles and Faroes studies - including the relative weight that each should receive and the selection of appropriate uncertainty

factors.

ATSDR's new MRL for methylmercury (0.3 μg/kg/day) is based on its interpretation of recent epidemiological data examining the health risks to the developing fetus associated with maternal exposure to low levels of methylmercury in populations dependent on consumption of seafood. The MRL is based primarily on the results of the studies in the Seychelles Islands and modified to account for consideration of results from the Faroe Islands study.

EPA's current RfD for methylmercury (0.1μg/kg/day) was revised in 1995 and is designed to be protective of the developing fetus. The RfD is based on a previous data set from a poisoning incident in Iraq. In the fall of 1998, Congress asked EPA to seek the advice of the National Academy of Sciences' (NAS) with regard to EPA's current RfD. EPA does not plan to conduct a formal reassessment of the newer health studies--including the data on child development from the Faeroes and Seychelles studies--until the NAS completes its review of the health risk data related to mercury. The NAS report is scheduled to be completed by May, 2000.

EPA will issue interim guidance to its programs and regional offices encouraging them to continue to use 0.1 μg/kg/day as the RfD for methylmercury until the Agency has had the opportunity to review the work of the NAS. EPA interim guidance is based on the following: 1)the RfD of 0.1 μg/kg/day is a safe level for methylmercury exposure; 2) ATSDR's new MRL falls within the range of uncertainty of the RfD, and 3) EPA's preliminary review of the data from the Faroes and Seychelles studies supported the use of EPA's current RfD.

FDA's current ADI of 0.4 μg/kg/day was developed in the early 1970's based on studies of poisoning events in Japan and Iraq. The ADI is intended to be protective of the US population, including sensitive subpopulations. FDA has begun a full policy review of the Seychelles and Faroes studies to determine whether to change or modify its current approach for methylmercury residues in commercial seafood.

In summary, there are differences among health guidance values that can be attributed to the status of the review and/or judgments about the relative importance and meaning of various uncertainties and study results. At the same time, an MRL of 0.3 μg/kg/day is within the order of magnitude uncertainty surrounding the RfD. Given that the various health guidance values were derived using different data sets, and appreciating the extent of uncertainties characteristic of any risk assessment, the MRL is remarkably close to both the RfD and the ADI.

Relevance of Methylmercury MRL to State Fish Advisories

MRLs are not designed or intended for use in developing fish advisories. ATSDR and EPA recommend that States and Tribal Nations not modify or eliminate existing fish advisories based on the new methylmercury MRL. In issuing new fish advisories, States and Tribes should use EPA's "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories."

As stated in the Toxicological Profile, the purpose of ATSDR's MRLs is to assist public health officials in the identification of chemicals/elements of potential health concern at hazardous waste sites. The MRL is derived for a specific substance and does not include effects attributable

to interaction with other chemicals or environmental substances. In particular, ATSDR recognizes that health officials might choose a value below the MRL in particular circumstances. Examples include situations where other substances are present that are known or suspected of causing neurodevelopmental effects (e.g., PCBs) or where individuals are occasionally exposed to large amounts of methylmercury as a consequence of eating fish from mercury contaminated waters. Such exposure may occur in circumstances where States or Tribes have issued or are considering the issuance of fish advisories.

Relevance of the MRL to Consumption of Commercial Seafood

ATSDR's new MRL is consistent with FDA's views about the safety of the commercial seafood supply. According to FDA, it is safe to eat fish and other seafood from grocery stores and restaurants. *See fourth point on "Advice to People About Eating Fish."*