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NIEHS CONTACT: Bill Grigg (301) 402-3378
grigg@niehs.nih.gov
NTP Public Liaison Office, (919) 541-0530

TCDD - Dioxin -- is Listed as "Known Human Carcinogen" in Federal Government's Ninth Report On Carcinogens

The **National Toxicology Program** announced today the publication of an **addendum** to its ***Ninth Report on Carcinogens*** that adds 2,3,7,8-tetrachlorodibenzo-p-dioxin, also known as TCDD or Dioxin, to the list of substances **"known to be human carcinogens."**

Kenneth Olden, Ph.D., Director of the **National Institute of Environmental Health Sciences** and the National Toxicology Program, which has the responsibility for preparation of this report, said that publication of this addendum follows the recent ruling by the U.S. Court of Appeals for the District of Columbia Circuit dismissing a request for an injunction to prevent the listing of TCDD as a "known human carcinogen" pending appeal of the district court's decision upholding the listing.

The change in the listing of TCDD from the "reasonably anticipated" to the "known to be a human carcinogen" category had been planned to occur in the Ninth Report, but the designation was delayed by litigation. The plaintiffs in the lawsuit claim that the **Department of Health and Human Services** and **National Toxicology Program** had improperly applied the Report on Carcinogens' listing criteria in listing TCDD as a "known human carcinogen." The Ninth Report was published last May 15 with TCDD listed as a "reasonably anticipated" human carcinogen but with a statement included indicating an addendum may be published following the Court's ruling on the litigation.

The National Toxicology Program's listing of TCDD in the " known" category is based on sufficient evidence of carcinogenicity from studies in humans, involving a combination of epidemiological and mechanistic information which indicates a causal relationship between exposure to TCDD and human cancer.

TCDD is not deliberately produced today but has been found as a contaminant in some herbicides and pesticides and is formed as an inadvertent by-product of incineration of waste. TCDD levels in Americans have declined in recent years as a result of environmental controls but is still widely detected in the environment and can be found in very small amounts in the general population. The Report on Carcinogens is a cancer health hazard identification document that discusses substances that may pose a carcinogenic hazard to human health. The report does not present quantitative assessments of carcinogenic risk, an assessment that defines the conditions under which the hazard may be unacceptable.

The listing of substances in the report, therefore, does not establish that such substances present carcinogenic risks to individuals in their daily lives. Such formal risk assessments are the purview of the appropriate Federal, State, and local health regulatory and research agencies. Both the **Environmental Protection Agency** and the **Food and Drug Administration** have quantitative assessments of dioxin's cancer risks.

The Report on Carcinogens is a Congressionally mandated listing of known and reasonably anticipated human carcinogens. Its preparation is delegated to the National Toxicology Program, which is headquartered at the National Institute of Environmental Health Sciences, by the Secretary, Department of Health and Human Services. Section 301(b)(4) of the Public Health Service Act, as amended, provides that the Secretary, **Department of Health and Human Services** shall publish a report and also states that the reports should provide available information on the nature of exposures, the estimated number of persons exposed and the extent to which the implementation of Federal regulations decreases the risk to public health from exposure to these chemicals. The revised Ninth Report that contains all addendum materials is available on the Internet from the National Toxicology Program's web page at **http://ntp-server.niehs.nih.gov/NewHomeRoc/AboutRoC.html**

NTP is headquartered at the NIEHS in **Research Triangle Park, N.C.**

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The URL for this press release is: http://www.niehs.nih.gov/oc/news/dioxadd.htm

U. S. Department of Health and Human Services
U. S. Department of Agriculture
U. S. Department of Veterans Affairs
U. S. Environmental Protection Agency
U. S. Department of Defense
U. S. Department of State
Executive Office of the President
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Questions and Answers about Dioxins

The following questions and answers provide general information about dioxins, a subject that can be complex and confusing. The materials presented here provide information about the Environmental Protection Agency's (EPA) draft risk assessment on dioxins (also called the dioxin reassessment). In addition to background information, these materials discuss possible effects of dioxin exposure in humans, include advice about consumption of food that might contain dioxins and explain the process for reviewing the report before it is finalized. The questions and answers provided here are not meant to comment on the scientific validity of the EPA report and should not be taken to indicate that the analysis or conclusions of the draft EPA dioxin report are final.

The Interagency Working Group on Dioxin (IWG) prepared the questions and answers in this document. The Dioxin IWG is composed of federal agencies that address health, food, and the environment and are working together to ensure a coordinated federal approach to dioxin related issues. These activities include research on dioxin exposure and effects, and coordinated efforts to measure dioxin levels in the environment and food and to reduce dioxin risks. The Dioxin IWG, under the auspices of the National Science and Technology Council (NSTC), provides the overall mechanism for coordinating these activities.

The Dioxin IWG consists of representatives from the following federal agencies:

Department of Health and Human Services (DHHS)
Department of Agriculture (USDA)
Department of Veterans Affairs (DVA)
Environmental Protection Agency (EPA)
Department of Defense
Department of State
Executive Office of the President

The questions and answers are presented in four sections:

1. General information about dioxins
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3. Food safety questions and answers
4. Risk assessment questions and answers

General information about dioxins

In this section, background information about dioxins is provided to help those who would like a basic understanding of what dioxins are.

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Overview of the EPA dioxin report

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This section answers questions dealing with general risk assessment issues relevant to the EPA draft

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R4. What are possible next steps for the Interagency Working Group on Dioxin?

General information about dioxins

G1. What are dioxins?

"Dioxins" refers to a group of chemical compounds that share certain chemical structures and biological characteristics. Several hundred of these compounds exist and are members of three closely related families: the chlorinated dibenzo-*p*-dioxins (CDDs), chlorinated dibenzofurans (CDFs) and certain polychlorinated biphenyls (PCBs). Sometimes the term dioxin is also used to refer to the most studied and one of the most toxic dioxins, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). CDDs and CDFs are not created intentionally, but are produced inadvertently by a number of human activities. Natural processes also produce CDDs and CDFs. PCBs are manufactured, but are no longer produced in the United States.

Dioxins are formed as a result of combustion processes such as commercial or municipal waste incineration and from burning fuels (like wood, coal or oil). The draft dioxin reassessment makes the finding that anthropogenic emissions dominate current releases in the United States, but acknowledges the need for more data on natural sources. Dioxins can also be formed when household trash is burned and as a result of natural processes such as forest fires. Chlorine bleaching of pulp and paper, certain types of chemical manufacturing and processing, and other industrial processes all can create small quantities of dioxins. Cigarette smoke also contains small amounts of dioxins.

Over the past decade, EPA and industry have worked together to dramatically reduce dioxin emissions. It is important to note that dioxin levels in the United States environment have been declining for the last 30 years due to reductions in manmade sources. However, dioxins break down so slowly that some of the dioxins from past releases will still be in the environment many years from now. Because dioxins are extremely persistent compounds, levels of dioxins still exist in the environment from both manmade and natural sources. A large part of the current exposures to dioxins in the United States is due to release of manmade dioxins that occurred in the past, even decades ago. Even if all human-generated dioxins could somehow be eliminated, low levels of naturally produced dioxins will remain, as will reservoirs. EPA is working with other parts of the government to look for ways to further reduce dioxin levels entering the environment and to reduce human exposure to them.

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G2. Why are people concerned about dioxins?

Studies have shown that exposure to dioxins at high enough doses may cause a number of adverse health effects. Because dioxins exist throughout the environment, almost every living creature, including humans, has been exposed to dioxins. The health effects associated with dioxins depend on a variety of factors including: the level of exposure, when someone was exposed, and how long

and how often. Because dioxins are so widespread, we all have some level of dioxins in our bodies.

The most common health effect in people exposed to large amounts of dioxin is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Other effects of exposure to large amounts of dioxin include skin rashes, skin discoloration, excessive body hair, and possibly mild liver damage.

One of the main health effects in question for dioxins is the risk of cancer in adults. Several studies suggest that workers exposed to high levels of dioxins at their workplace over many years have an increased risk of cancer. Animal studies have also shown an increased risk of cancer from long-term exposure to dioxins.

Finally, based on data from animal studies, there is some concern that exposure to low levels of dioxins over long periods (or high level exposures at sensitive times) might result in reproductive or developmental effects.

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G3. What happens to dioxins when they enter the environment?

When released into the air, some dioxins may be transported long distances. Because of this, dioxins are found in most places in the world. When dioxins are released into water, they tend to settle into sediments where they can be further transported or ingested by fish and other aquatic organisms. Dioxins decompose very slowly in the environment and can be deposited on plants and taken up by animals and aquatic organisms. Dioxins may be concentrated in the food chain so that animals have higher concentrations than plants, water, soil, or sediments. Within animals, dioxins tend to accumulate in fat.

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G4. How might I be exposed to dioxins?

Most of the population has low-level exposure to dioxins. Although dioxin is an environmental contaminant, most dioxin exposure occurs through the diet, with over 95% coming through dietary intake of animal fats (see also F3 and F4). Small amounts of exposure occur from breathing air containing trace amounts of dioxins on particles and in vapor form, from inadvertent ingestion of soil containing dioxins, and from absorption through the skin contacting air, soil, or water containing minute levels.

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G5. Do all dioxin compounds pose the same amount of danger?

No. Different dioxin compounds have different toxicities and dioxins are most often found in mixtures rather than as single compounds in the environment. The most toxic forms of dioxin are 2,3,7,8-TCDD and 1,2,3,7,8-PeCDD. Scientists use a shorthand method for comparing the toxicity of different types or mixtures of dioxins to the toxicity of 2,3,7,8- TCDD and 1,2,3,7,8-PeCDD. This method is called the "Toxicity Equivalence" or TEQ.

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G6. Have we made progress in reducing environmental dioxins?

Yes. Dioxin levels in the United States environment have been declining for the last 30 years due to reductions in manmade sources. In fact, as a result of the efforts of EPA, state governments and industry, known and quantifiable industrial emissions of dioxin in the United States will be reduced more than 90% from 1987 levels within the next year or so. However, dioxins break down so slowly that some of the dioxins from past releases will still be in the environment many years from now. Dioxins that remain in the environment from past releases are sometimes called "reservoir sources" of dioxins. Because of natural processes, dioxin levels in the environment will never go to zero.

Based on recent measurements in a few states, it appears that levels in our bodies are going down too. We are continuing to monitor to see if these trends continue. Because of background occurrence of dioxin in the environment, the levels will probably never go to zero.

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G7. What is meant by "natural background" and "current background" for dioxins?

In addition to manmade sources, natural processes, such as brush and forest fires, produce dioxins. The term "natural background" for dioxins refers to the dioxins that are in the environment because of these natural processes. We do not know what the natural background level of dioxins is. The term "current background" refers to the level of dioxin in the environment today. Current background is primarily made up of dioxins from manmade sources.

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G8. What are the major sources of dioxins?

The amounts of dioxin released from various sources have changed significantly over time. Historically, commercial or municipal waste incineration, manufacture and use of certain herbicides and chlorine bleaching of pulp and paper resulted in the major releases of dioxins to air and water. Government regulatory actions along with voluntary industry actions have resulted in dramatic reductions in each of these sources, and they are no longer major contributors of dioxins to the environment in the United States. While the United States has taken action to control this type of emission, these sources of dioxin still occur in the world. Currently, the uncontrolled burning of residential waste is thought to be among the largest sources of dioxins to the environment in the United States. Source characterization is an ongoing effort, and if new major sources are identified, they will be factored into future inventories.

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G9. How long has dioxin exposure existed?

Dioxins have been around for a long time. There are natural sources for dioxins like brush and forest fires and volcanic eruptions, although natural sources contribute little to the current background dioxin levels. In the 1920's, as a consequence of industrialization, dioxin levels began increasing in the global environment. Declines in environmental levels began in the 1970's when

dioxins were recognized as highly toxic chemicals and governments and industry took actions to prevent environmental pollution.

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G10. Why does the 2003 draft reassessment estimate of potential risk from dioxins differ from the 2000 draft?

The findings of the current draft are not significantly different from those of the 2000 draft. The 2003 draft differs from the 2000 SAB review draft in that it 1) reflects changes and clarifications made in response to the EPA Science Advisory Board (SAB)'s comments and 2) reflects an expansion of the quantity and quality of dioxin data, as well as refinements in how to calculate dioxin risk. The current document has an expanded analysis of background exposure, which is intended to provide a more current estimate of background exposure from diet. It also has expanded analysis of data on whether dioxin's non-cancer effects might occur at our near doses to which we are exposed, and which provides for a more robust evaluation of non-cancer effects based on body burden.

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G11. What is EPA doing to control dioxin releases into the environment?

Over the last 20 years, EPA has aggressively looked for ways to reduce and control dioxins in all environmental media in the United States. Collectively, these actions have resulted in strict controls on all of the known and quantifiable major industrial sources of dioxin releases. As a result of EPA's efforts, along with efforts by state government and private industry, known and quantifiable industrial emissions in the United States have been reduced by more than 90% from 1987 levels. For example, municipal waste combustors are estimated to have emitted collectively nearly 18 pounds of dioxin toxic equivalents in 1987, but under EPA regulations, they are now expected to emit less than 1/2 ounce per year. Similarly, medical waste incinerators emitted about 5 pounds of dioxin equivalents in 1987, but under EPA regulations they now will be limited to about 1/4 ounce annual emissions. EPA has implemented similarly strict standards for other dioxin sources. Through expanded monitoring and research collaboration with the Food and Drug Administration (FDA), the Food Safety and Inspection Service (FSIS), and the Centers for Disease Control and Prevention (CDC), EPA is also making progress in characterizing additional sources.

In response to the evolving scientific understanding of dioxin-like compounds, EPA plans to release a draft Agency-wide dioxin strategy. This draft strategy will be made available for public comment. In addition, federal agencies are already working together to coordinate federal activities related to dioxin (See also F8). Further information regarding EPA efforts to reduce dioxin emissions and develop a comprehensive strategy can be found in the fact sheets available on the Internet at cfpub.epa.gov/ncea/cfm/dioxin.cfm.

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G12. Should I (or can I) find out what my dioxin levels are?

We do not recommend dioxin testing. Tests for measuring dioxin levels in humans are not routinely available. Laboratories that offer dioxin testing generally are not certified for that testing

(as is required for clinical laboratories doing medical testing). Furthermore, their detection levels may not be low enough to detect dioxin levels that occur in the general population.

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G13. How can I reduce my personal dioxin levels?

We recognize that individuals might be concerned about their potential dioxin exposure. Dioxins have existed in our environment for a long time. We all have some levels of dioxins in our bodies. Environmental dioxin has declined significantly since 1987 and recent measurements in a few states indicate that levels in our bodies are going down as well. Unfortunately, there are no safe and effective treatments to rid dioxins now in humans. Dioxins metabolize slowly (over years), but reduction of exposure reduces dioxin levels over time. The best way to reduce your personal dioxins level (and your risk from dioxins) is to reduce exposure and intake of dioxins.

Although dioxins are an environmental contaminant, exposure most often occurs through the food by consumption of animal fats. For most people, following existing Federal Dietary Guidelines will reduce fat consumption and, consequently, reduced dioxin exposure (see also G4). The dietary guidelines provide for moderate amounts of fats, which are part of a balanced diet. Eliminating all fats is not recommended. Overall, the best strategy for lowering the risk of dioxins while maintaining the benefits of a good diet is to follow the recommendations in the Federal Dietary Guidelines to choose fish, lean meat, poultry, and low or fat free (skim) dairy products and to increase consumption of fruits, vegetables and grain products. Lean meat includes meats that are naturally lower in fat, and meat where visible fat has been trimmed. For fish and poultry you can reduce fat by removing the skin. Reducing the amount of butter or lard used in the preparation of foods and cooking methods that reduce fat (such as oven broiling) will also lower the risk of exposure to dioxin. These strategies help lower the intake of saturated fats as well as reduce the risk of exposure to dioxin. For information on the Federal Dietary Guidelines see www.health.gov/dietaryguidelines/.

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Overview of the EPA dioxin report

The U.S. Environmental Protection Agency (EPA) is in the final stages of completing a major scientific report entitled, *"Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds."* This report is commonly referred to as the EPA dioxin reassessment. We also refer to the dioxin reassessment as the EPA "dioxin report" in these questions and answers.

In April 1991, EPA announced that it would conduct a scientific reassessment of the health risks of exposure to dioxin and dioxin-like compounds. EPA decided to perform this reassessment because of significant advances in the scientific understanding of dioxin toxicity and significant new studies on its potential adverse health effects.

In 1994, EPA completed a draft of the dioxin reassessment and submitted it to the EPA's Science Advisory Board (SAB) for review. In 1995, the SAB recommended revision of two draft sections of the dioxin reassessment -- the dioxin risk characterization and the dose-response modeling chapter -- and the development of a new section on dioxin toxicity equivalence factors (TEF). Because of the complexity of the science issues related to dioxin, the SAB recommended that these three sections undergo an additional level of review by independent external peer reviewers before being brought back to the SAB

for review. The three sections are:

Part II. Chapter 8: Dose-Response Modeling for 2,3,7,8-TCDD,

Part II. Chapter 9: Toxicity Equivalence Factors (TEF) for Dioxin and Related Compounds, and

Part III. Integrated Summary and Risk Characterization for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds.

Independent external peer review, as well as public comment, was completed on each section, providing an additional level of feedback regarding the scientific credibility of the dioxin reassessment. These draft documents were revised based on peer review and public comments and submitted to the SAB for review at its November 2000 public peer review meeting.

After in depth discussions of key science and assessment issues in the draft documents, the SAB panel approved the draft report with comment saying it was confident the EPA could address the SAB comments prior to completing the reassessment and encouraged EPA to expeditiously complete and release the reassessment, taking appropriate note of the findings and recommendations of the SAB and other public comments. On May 31, 2001, EPA received the SAB's final review report, "Dioxin Reassessment - An SAB Review of the Office of Research and Development's Reassessment of Dioxin."

The EPA has modified the reassessment based on the SAB's comments and submitted the modified document to the Interagency Working Group on Dioxin for review and comment. Since there continues to be differing interpretations of the science associated with the impact on human health from environmental exposure to dioxin, the IWG recommended that the National Academy of Sciences provide an additional review to help ensure that the risk estimates contained in the draft are scientifically robust and that there is a clear delineation of all associated uncertainties.

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O1. What are the elements of the 2003 draft dioxin reassessment?

The 2003 draft dioxin reassessment consists of three parts. *Part I: Estimating Exposure to Dioxin-Like Compounds* includes three volumes that focus on sources, levels of dioxin-like compounds in environmental media, and human exposures. *Part II: Health Assessment for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* consists of two volumes that include information on critical human health end points, mode of action, pharmacokinetics, dose-response, and TEFs. Part II has nine chapters. *Part III: Integrated Summary and Risk Characterization for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* is intended as a stand-alone document. Part III summarizes the overall conclusions of the reassessment. This part describes key findings pertinent to the potential hazards and risks of dioxins, including a discussion of all important assumptions and uncertainties.

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O2. What is the status and next step regarding the dioxin reassessment?

Because the assessment is of interest to various parts of the government, EPA has consulted with the Interagency Working Group on Dioxin (IWG) on its 2003 draft dioxin reassessment. Based on that consultation, the EPA, along with other members of the IWG, has asked the National

Academy of Sciences to provide an additional review to help ensure that the risk estimates contained in the draft are scientifically robust and that there is a clear delineation of all associated uncertainties. The EPA will evaluate the draft report in light of the NAS comments and will make appropriate revisions to the draft to address those comments. The EPA then plans to prepare the reassessment for release it in final form.

The Dioxin IWG is made up of federal agencies that address health, food, and the environment. These agencies are working together to ensure a coordinated federal approach to dioxin related issues. These activities include research on dioxin exposure and effects, and coordinated efforts to measure dioxin levels in the environment and food and to reduce dioxin risks. The Dioxin IWG, under the auspices of the National Science and Technology Council (NSTC), provides the overall mechanism for coordinating these activities.

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O3. Who wrote the dioxin report?

EPA's National Center for Environmental Assessment (NCEA), a part of the Office of Research and Development of EPA, is the group heading up the dioxin reassessment. The draft dioxin reassessment was developed over many years with the participation of scientific experts in EPA, the National Institutes of Health's National Institute of Environmental Health Sciences, and other federal agencies, as well as scientific experts in the private sector and academia.

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O4. Why did it take EPA 12 years to develop the dioxin reassessment to this point?

Development of the dioxin reassessment has taken longer than expected. It took substantial time to collect, assess, and portray in the document the significant and latest evolving data on dioxin. In addition, there has been significant controversy surrounding the science of dioxin. EPA has been rigorous and thorough throughout the development of the draft reassessment to ensure that it has been responsive to both scientific peer reviews and extensive public consultation and comment. In crafting the final reassessment, EPA must respond to the substantive and complex review comments and incorporate the most recent scientific findings. This process will ultimately benefit the American public by providing a sound scientific basis for future risk management decisions.

It is important to note that while the reassessment has been underway, EPA and other federal agencies have not stopped efforts to reduce dioxin emissions to the environment. EPA initiated control programs for most known major industrial sources of dioxin including municipal waste incinerators, medical waste incinerators, hazardous waste incinerators, boilers and industrial furnaces, and chlorine bleaching pulp and paper mills. EPA continues to make significant strides in the reduction of dioxin-containing emissions through regulatory action based on available control technology and through voluntary action by involved industries. FDA and FSIS have expanded monitoring of foods for dioxins.

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O5. How can I get a copy of the most recent drafts of the dioxin reassessment?

The easiest way to obtain a copy of the draft reassessment is at:

http://cfpub.epa.gov/ncea/cfm/dioxin.cfm

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Food safety questions and answers

Exposure in the food supply stems from environmental sources. Dioxins decompose very slowly in the environment and can be deposited on plants and taken up by animals and aquatic organisms. Dioxins may be concentrated in the food chain so that animals have higher concentrations than plants, water, soil, or sediments. Within animals, dioxins tend to accumulate in fat.

We have been aware of very low levels of dioxins in foods since the 1970's and have been increasing monitoring since the late 1990's, as technology to measure has improved. Presence of dioxins in foods is not new, nor is it unique to the U.S. food supply. However, dioxins in food are at such low levels it is not practical to routinely measure them even using current testing methods. The Food and Drug Administration (FDA) and USDA's Food Safety Inspection Service (FSIS) are exploring ways to address these issues in collaboration with EPA, including broadening the existing monitoring program for dioxins in the U.S. food and feed supply. To date the FDA monitoring of dairy products and fish shows that when detectable levels are found they are generally consistent with EPA estimates for background occurrence of dioxins (See also G7). We are continuing our efforts to reduce dioxin levels even further both in the environment and therefore in foods.

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F1. Has it been determined what levels of dietary dioxin exposure cause adverse health effects in humans?

No. Known incidents of high dioxin levels in humans have resulted from accidental exposure; not typical dietary exposures. Despite a large body of research and data collection, there are numerous questions and uncertainties regarding scientific data on and analysis of dioxin risk. This fact is acknowledged by the EPA's Science Advisory Board, which nonetheless also acknowledged that these uncertainties are unlikely to be resolved in the near future. We believe the NAS review of the 2003 draft reassessment will provide additional insight into this issue.

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F2. Is the food supply safe?

The U.S. food supply is among the safest and most nutritious in the world. While the federal food and environmental agencies are concerned about dioxin, the draft report does not change the government's view of the overall safety of the food supply in this country. Maintaining the safety of the food supply is a top U.S. government priority.

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F3. Should I stop eating particular foods?

No, we do not recommend avoiding particular foods because of dioxins. The draft dioxin report from EPA indicates that following the science-based advice in the Dietary Guidelines for Americans will also likely help individuals lower their risk of exposure to dioxins. These

guidelines include the recommendations to choose meat and dairy products that are lean, low fat, or fat free and to increase consumption of fruits, vegetable, and grain products. Meat, milk, and fish are important sources of nutrients for the American public and an appropriate part of a balanced diet. Milk is a major source of calcium, vitamins A and D, and riboflavin; meat is an important source of iron, zinc and several B-vitamins; fish provides beneficial fatty acids as well as certain vitamins and minerals. Each of these foods provides high quality protein in the diet. Lean meat includes meats that are naturally lower in fat, and meat where visible fat has been trimmed. For fish and poultry you can reduce fat by removing the skin. Reducing the amount of butter or lard used in the preparation of foods and cooking methods that reduce fat (such as oven broiling) will also lower the risk of exposure to dioxin. These strategies help lower the intake of saturated fats as well as reduce the risk of exposure to dioxin. For information on the Federal Dietary Guidelines see www.health.gov/dietaryguidelines/.

You should pay attention to local fishing advisories for fish that you catch yourself (See also F6). Fishing advisories may exist that provide recommended consumption rates of particular kinds of fish from particular water bodies where local contamination has occurred. If you do not know whether a water body that you fish in is covered under a fishing advisory, call your local or state health or environmental protection department and ask for their advice. (They are listed in the blue pages of your local telephone directory.) Ask them if there are advisories on the kinds or sizes of fish that should not be eaten from the water body. You can also ask about fishing advisories at local sporting goods or bait shops where fishing licenses are sold.

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F4. Should I reduce my fat intake?

For most people, adjusting their diet to fall within the Federal Dietary Guidelines will result in multiple health benefits, including reduced dioxin exposure. The dietary guidelines provide the best scientifically based advice on what constitutes a healthy diet and provide guidance on how to plan a varied diet choosing individual foods from a number of food groups. These groups include grain products such as breads and cereals, fruits and vegetables, and meat and dairy products. The U.S. Food Guide Pyramid, based on the Dietary Guidelines, recommends 2-3 servings (3 oz. each) of protein (including lean meats) and 2-3 servings from the dairy group. Some people consume more foods high in saturated fats (meat and dairy) than is recommended in the Dietary Guidelines. For these people, there are well-known and significant health benefits of reducing saturated fat intake that go beyond the potential risks of dioxin.The Dietary Guidelines, however, do not recommend that people avoid all fats, as fats are an important part of balanced nutrition.

We need a certain amount of fat for a healthy, balanced diet. Fats supply energy and essential fatty acids, and they help the body absorb fat-soluble vitamins (A, D, E, and K). You need some fat in the food you eat. The federal Dietary Guidelines recommend that fat intake be no more than 30% of your total energy intake, with no more than 10% coming from saturated fats. For a person who consumes 2000 calories this means a total fat intake of 65 grams, including 20 grams or less of saturated fat. See the Nutrition Facts Label on food products for more information on fat content of food items. The Dietary Guidelines do not recommend that you avoid all fats, but recommend an appropriate level of lean meats and low or fat-free dairy products and recommend reducing the use of spreads or cooking fat made from animal fat. This advice regarding saturated fats is consistent with a strategy to reduce dioxin exposure.

For information on the Nutrition Facts Labels see http://www.cfsan.fda.gov/label.html.

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F5. Can I cook the dioxins out? Or wash them off?

Good food safety practices like washing food and countertops will reduce risk from bacterial infection, but they cannot reduce dioxin levels. Methods that keep fat at a minimum in the food you eat (such as trimming fat and broiling) may help to reduce dioxin exposure.

For more discussion of food safety practices, see http://www.foodsafety.gov/~fsg/fsgfaq.html.

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F6. Does the government monitor food for dioxins?

The government monitors potential dietary sources of dioxins, primarily foods that contain animal fat. The goal of this monitoring is to find any unusually high dioxin levels and then work to determine the dioxin sources for those high levels so that they can be controlled.

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F7. What kinds of foods are tested, how often, and in how many locations?

Since about 1995, dioxin monitoring has involved several hundred samples a year, primarily of fish and dairy products from grocery stores and distribution centers across the country. To date the FDA monitoring of dairy products and fish shows that when detectable levels are found they are generally consistent with EPA estimates for background occurrence of dioxins (See also G7). USDA's Food Safety Inspection Service (FSIS) recently began to monitor dioxins in domestically produced beef, pork, and poultry products. FDA and FSIS monitoring has been focused on these products because they are the foods in which there is a high potential to contain dioxins. In the past, it was more difficult to detect or monitor the low levels of dioxins in foods. Recent improvements in dioxin testing methods have allowed us to expand our monitoring efforts. We can now test more foods on a yearly basis. In addition, as a result of past monitoring, we have discovered the importance of focusing on animal feeds, and so we are beginning to monitor animal feeds that may contribute to the dioxin levels in some foods.

In 1999, FDA began monitoring annually for dioxins as part of FDA's Total Diet Study (TDS). TDS is a yearly program that determines levels of various pesticide residues, contaminants, and nutrients in foods. In addition to the TDS samples, FDA conducts additional targeted sampling of food and animal feed in an effort to gather additional information on dioxin. FDA collected approximately 500 food and 50 feed samples in 2001 and approximately 1,000 food and 50 feed samples in 2002 for dioxin analysis. FDA plans to expand the program to approximately 1,500 food and 150 feed samples in 2003. Similarly, FSIS has also recently initiated a survey of over 500 meat and poultry samples for dioxin. For more information about FDA's TDS see http://www.cfsan.fda.gov/~comm/tds-toc.html

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F8. How do levels of dioxin now found in food compare to the incidents of dioxin contamination that have been in the news in the last several years?

To date the FDA monitoring of dairy products and fish shows that when detectable levels are found they are generally consistent with EPA estimates for background occurrence of dioxins (See also G7). It is also important to note that known and quantifiable industrial emissions of dioxin in the United States have been reduced significantly since 1987. In addition, recent measurements from a few states show that dioxin levels in our bodies are also going down.

There were however, two incidents in recent years that received national and international attention. In both incidents, the dioxin levels were higher than background levels typically seen in foods tested by FDA or FSIS. In the first incident in 1997, elevated levels of dioxins were found in some farm-raised fish and poultry products. The levels in fish, poultry, and eggs during this incident were about 10 times higher than background levels. An investigation was quickly launched by FDA, FSIS, and EPA. That investigation discovered that particular clay from one mine in Mississippi used as an additive to animal feed was responsible for the higher dioxin levels. The clay, which appears to be naturally contaminated, was immediately prohibited from use in any animal feed. The government is continuing to monitor these foods and will address any situations identified. In the second incident in 1999, elevated levels of dioxins were discovered in some Belgian animal products, and the source of the dioxins was traced to animal feeds from a particular source. The U.S. government stopped the import of certain foods from a number of European countries until it could be either established that dioxin contaminated feeds were not used for the food, or that the food did not contain elevated dioxins. The levels of dioxins in this incident were a hundred or more times higher than what the current background levels are in similar foods in the United States.

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F9. What is the federal government doing to reduce dioxin levels in food?

Relevant federal agencies have taken a number of actions to reduce dioxin levels in food. EPA has taken aggressive actions to reduce and control dioxins in all environmental media by placing strict regulatory controls on all of the major industrial sources of dioxins. The known, quantifiable industrial emissions have been reduced by more the 90% from their levels in the 1980's as a result of EPA's efforts, along with efforts by state government and private industry.

In the long-term, efforts to reduce dioxin in the environment should also reduce dioxin levels in the food supply. Federal agencies have been monitoring the levels in foods and conducting an investigation whenever a particular food has dioxin levels detected over the background levels in that food. If the investigation determines a specific source of the increased dioxins, Food and Drug Administration (FDA) and the Food Safety Inspection Service (FSIS) are poised to take action to remove that source.

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F10. Given that studies have shown that dioxin is in breast milk, should I nurse my infant?

Yes. Studies consistently show that breastfed infants are healthier than formula fed infants, in spite of the dioxin in breast milk. This statement is even truer now than in the past, when the levels of dioxin in breast milk were higher than they are today.

There are overwhelming benefits of breastfeeding both for the mother and her infant. The American Academy of Pediatrics and many other professional organizations have concluded that

the benefits of breastfeeding far outweigh the potential effects of dioxin in breast milk. Breast milk is known to be the most complete form of nutrition for infants, with benefits for infant health, growth, immunity, and development. The benefits of breastfeeding for children include fewer cases and less severity of diarrhea, respiratory infections, ear infections, and meningitis, among others. Breastfeeding may also reduce the risk of sudden infant death syndrome and may lower rates of childhood cancer.

In addition to the benefits for children, breastfeeding also has benefits for mothers. Breastfeeding has been shown to reduce postpartum bleeding, promote earlier return to pre-pregnancy weight, and reduce the risk of breast cancer.

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Risk assessment questions and answers

The purpose of EPA's dioxin report is to estimate the potential harm from dioxin exposure. There are significant scientific uncertainties associated with our understanding of the adverse health effects of dioxin and the quantitative relationships between dioxin exposures and the risk of those effects. At present, scientists cannot provide highly reliable assessments of dioxin health risks. In conducting its risk assessment, EPA has tended to treat scientific uncertainties in a cautious way, to avoid understating risks to health. Assessments like this help us to compare risks for dioxins to risks posed by other contaminants and determine whether there is a need to reduce the potential risks identified for dioxins. EPA made assumptions about things like whether exposures to workers in a factory are the same as exposures from food, and whether the higher doses received by factory workers for a short time tell us what would happen at the lower doses we get from diet over a long time. Risk assessments like the EPA draft dioxin report do not predict actual health risks for an individual or to tell us how often health effects will actually occur in the population. The approach used by EPA is a commonly accepted practice by federal and state health agencies.

R1. Why did EPA provide a scientifically conservative estimate in its draft dioxin report?

The purpose of a risk assessment is to estimate the potential risk from exposure to a particular substance, in this case dioxins. The reassessment will allow for the comparison of risk among a variety of sources and pathways. EPA wanted a scientifically credible estimate of how high the possible risks from exposures to dioxins might be. The approach EPA used is the same as EPA and other federal and state agencies' use for exposure to any chemical. For example, EPA made assumptions about how mixtures of chemicals behave in the body, about how data from animal studies and limited observations in groups of humans might relate to the general population, and about whether certain individuals in the population might be particularly sensitive to the exposure. Care was taken to not underestimate potential risk. The approach used by EPA is a commonly accepted practice by federal and state health agencies.

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R2. EPA's report provides a scientifically conservative estimate, but what is the actual risk?

We do not know what the actual risk from dioxins is. The draft EPA dioxin report presents an upper bound estimate of potential risk. The actual risk for most individuals is expected to be lower and may be zero for some individuals. It is important to realize that assessments like EPA's do not predict actual health effect risk for any one person, or health effect rates in the population. EPA

used its best judgment with the available data and standard approaches in reaching its conclusions about potential risks. Despite a large body of research and data collection, there are numerous questions and uncertainties regarding scientific data on and analysis of dioxin risk. This fact is acknowledged by the EPA's Science Advisory Board, which nonetheless also acknowledged that these uncertainties were unlikely to be resolved in the near future.

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R3. In evaluating potential risks for the U.S. population, why did EPA use data from other countries?

Dioxin is found in the environment around the world. EPA wanted to use all available scientifically valid data, no matter where the work was done. The draft EPA report primarily used North American data to estimate emission sources in our region, environmental levels, dietary levels and levels of exposure to the U.S. population. In evaluating the effect of exposure on human populations or on animals, EPA evaluated studies from around the world.

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R4. What are possible next steps for the Interagency Working Group on Dioxin?

The IWG will continue to coordinate agency activities associated with dioxin. In particular, the IWG is developing an inventory of current activities and will prepare a coordinated integrated risk management strategy.

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