

DIOXINS: FDA Strategy for Monitoring, Method Development, and Reducing Human Exposure

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GOALS:

- 1) Expand FDA's monitoring program for determining dioxins in the U.S. food and animal feed supply
- 2) Effectively manage the risks to humans from dioxins and identify opportunities to reduce human exposure

BACKGROUND

Environmental Contamination

Dioxins, a collective term for a group of environmental contaminants that includes certain dioxin, furan, and dioxin-like PCB (polychlorinated biphenyl) congeners, are found throughout the world. Dioxins and furans are released into the air from combustion processes, such as commercial or municipal waste incineration and from burning fuels, such as wood, coal or oil. Burning of household trash and forest fires can also result in the release of dioxins and furans into the environment. Accidental or intentional release of transformer fluids has resulted in the presence of PCBs in the environment.

Over the past decade, the Environmental Protection Agency (EPA) and industry have worked together to dramatically reduce emissions from numerous combustion processes, resulting in a significant decline in levels of dioxins and furans in the United States. Similarly, PCB levels in the U.S. have also declined substantially since the 1970's when the use of PCBs in electrical transformer fluids was discontinued.

Because dioxins break down very slowly, dioxins released in the past from both man-made and natural sources still exist in the environment and cannot be quickly reduced. EPA is continuing to look for ways to reduce dioxin levels entering the environment and the resulting human exposure from them.

Potential Human Health Risk

Scientists and health experts are concerned about dioxins because exposure may result in a variety of adverse health effects. Studies have suggested that high dioxin levels to which some industrial workers were exposed in the past lead to reproductive and developmental problems, increased heart diseases, increased diabetes, and increased cancer. In 1999, the International Agency for Research on Cancer (IARC) classified one of the dioxin congeners (TCDD or 2,3,7,8-tetrachlorodibenzo-p-dioxin) as a human carcinogen. In its draft dioxin reassessment, new assessments of worker populations exposed to TCDD have led EPA to suggest that TCDD may be a more potent carcinogen than had been previously thought.

Need for an Expanded Monitoring Program

Dioxins are found in most food-producing animals and animal feeds are suspected to be the primary route of exposure. Because dioxins tend to accumulate in the fat of food-producing animals, consumption of animal-derived foods (e.g., meat, poultry, eggs, fish, and dairy products) is considered to be the major route of human exposure. However, it should be noted that dioxins levels in food producing animals are well below those that would lead to exposures observed in industrial workers mentioned above.

The Food and Drug Administration (FDA) has been concerned about dioxins and has been monitoring specific foods with the goal of identifying ways to reduce dietary exposure. For example, since 1995, FDA has been monitoring dioxin levels in finfish, shellfish, and dairy products. In 1999, FDA initiated dioxin analysis of foods collected under its Total Diet Study (TDS) survey. TDS is FDA's annual survey of market baskets representing 265 core foods (ready-to-eat) in the U.S. food supply to assess levels of various pesticide residues, contaminants, and nutrients in foods and to estimate intakes of these substances in representative diets of specific age-sex groups in the U.S.

Because dioxin analysis is costly and time consuming, available data on background levels in most foods and feeds are limited. In fact, for many foods and most feeds, there are no data. Consequently it is difficult to determine where and how dioxin levels in foods and feeds can be further reduced. FDA is expanding its monitoring program to obtain more comprehensive data on background levels as well as to identify opportunities to reduce human exposure to dioxins.

Measures of Success for Broader Monitoring Program

Because dioxins are so widespread in the environment it is not possible to eliminate them entirely from food and feed. Our immediate goals are to obtain profiles of background levels in a wide variety of foods and feeds through a broader monitoring program and to identify opportunities to reduce human exposure to dioxins. Measures of success for achieving these goals will include:

1. Identifying foods and feeds with unusually high levels of dioxins. Currently, it is difficult to determine unusually high levels in foods and feeds because we have limited information on background levels.
2. Finding opportunities to reduce human exposure to dioxins through, for example--
 - Trace-back investigations of unusually high levels in foods and feeds to determine if the source of contamination can be reduced or eliminated.
 - Analysis of unusually high levels in food or feed to determine if they pose a health hazard and warrant taking enforcement actions (e.g., seizure of domestic products or refusal of entry for imports).
3. Improving assessments of human exposure to dioxins. This will enhance our ability to identify and protect susceptible populations. Exposure assessments can be improved by providing better information about--
 - Exposure trends over time
 - Dioxin levels in foods that provide a significant portion of the total human exposure to dioxins
 - Exposure variations based on geographic region
 - Exposure variations based on type of diet.

EXPAND AND OPTIMIZE DIOXIN MONITORING PROGRAM

FDA plans to expand and improve the effectiveness of the monitoring program by:

- Increasing sampling and analysis of human foods and animal feeds that contribute most significantly to human dietary exposure to dioxins,
- Expanding the capability of FDA field staff to collect and analyze increased numbers of food and feed samples for dioxins,

- Performing trace-back investigations of unusually high levels in food and feeds to determine if the source of contamination can be reduced or eliminated, and
- Enhancing research into new or modified methods for dioxin analysis so that less time consuming and less expensive methods become available to the public.

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