This is a transcript of an Interagency Food Safety Analytics Collaboration (IFSAC) Webinar presented on June, 18, 2013 by Dana Cole, DVM, PhD. The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Title: Improving the Categories Used to Classify Foods Implicated in Outbreaks

Closed Captioning Transcript -
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>> -- Dr. Cole.

>> Thank you Michael. Thank you for joining us this afternoon as I take this opportunity to provide an update on one of IFSAC's highest priority projects outlined in our strategic plan: Improving the categories used to classify foods implicated in outbreaks.

>> One of the needs first identified by the Interagency Food Safety Analytic Collaboration was to improve the way that foods implicated in foodborne disease outbreaks are classified. IFSAC prioritized this effort because of the need to improve the use of data from outbreak surveillance for regulatory decision-making. Our goals for this project were to: Increase the accuracy and utility of food commodities used to generate foodborne illness source attribution estimates used by federal agencies. Specifically, we worked to provide more specific assignments of food vehicles to food commodities so that we could align with FDA and FSIS' regulatory classifications of food and better reflect the production practices and postharvest handling systems used to process different types of food; and finally, to provide more botanically correct categories of produce commodities.

>> Before I describe the new food categorization scheme, I am going to provide a short background to food categorization and summarize the process that the IFSAC project team used to improve the scheme.

>> CDC has used a food categorization scheme to categorize foods implicated in foodborne disease outbreaks since 2009. This was initially described in a publication by John Painter and colleagues in the journal Foodborne Pathogens and Disease. The publication defined the hierarchy of 17 mutually exclusive "terminal" food commodities highlighted in orange here derived from 8 food commodity groups in grey and described the method for categorizing the foods implicated in outbreaks to each food commodity.

Use of this food categorization scheme has become an important part of source attribution because over 2000 individual foods have been implicated in foodborne disease outbreaks since

electronic outbreak surveillance began in 1998, and use of this classification scheme provides a meaningful way to estimate the contribution of various types of foods to human foodborne illness.

>> It is important to understand why the information obtained from foodborne outbreak surveillance is so important to food safety decision-making. First, CDC's Foodborne Disease Outbreak Surveillance System (or FDOSS) is the only national human surveillance system in the United States that directly links foodborne illnesses to their food sources. Standard data collection systems have been used by FDOSS to collect information on foodborne outbreaks investigated by local, state, and territorial health departments for several decades, so this surveillance system provides important insights into the types of foods and agents contributing to foodborne illness over time. The information reported to FDOSS on the foods and settings that contribute to foodborne disease outbreaks provide the foundation to estimating the proportion of foodborne diseases in the United States attributable to different sources (known as source attribution).

>> To understand how the food categorization scheme is used, I will illustrate what foods are categorized to a commodity. First any implicated food with a single ingredient, such as a steak, is assigned to a commodity. Likewise, any implicated food with multiple ingredients that all belong to the same commodity, such as a milk shake, is assigned to a commodity. All outbreak reports that implicate single ingredient or multiple ingredient foods categorized to a single commodity are assigned to that commodity.

In some outbreak reports, a multiple ingredient food is implicated, but during the outbreak investigation a single ingredient is identified as the contaminated ingredient causing illness. For example, the outbreak report may indicate that chile rellenos were the source of outbreak illnesses, but additional details in the report reveal that undercooked egg in the breading of the chile relleno was the contaminated ingredient. Similarly, mung bean sprouts may be reported to be the contaminated ingredient in an outbreak associated with vegetarian sandwiches. Outbreaks such as these with information about single, contaminated ingredients are assigned to the food commodity of the contaminated ingredient implicated in the outbreak report.

>> So why is it important to public health and food safety to classify foods implicated in outbreaks?

Public health and food industry professionals can use source attribution data to target prevention efforts toward specific agents and commodities that cause the most foodborne disease outbreaks.

In addition, Food safety regulators use source attribution data to inform food safety decision-making. For example, FSIS uses the outbreak source attribution data for FSIS-regulated

products (meat, poultry, and processed egg products) to set illness reduction goals to achieve Healthy People 2020 pathogen-specific objectives. And FDA uses outbreak source attribution data to help determine the "Most Significant Contaminants" in their regulated foods (which is a requirement of the Food Safety Modernization Act).

>> To develop the new food categorization scheme, the IFSAC project team reviewed input that was provided during the 2010 FDA Metrics public meetings, the 2012 IFSAC public meeting, and other interactions between federal agencies and their stakeholders. It was important to build on the strengths of the current food categorization scheme developed by Painter et al., so the project team used this scheme as the framework for improving the food categorization scheme.

Within each regulatory agency in IFSAC, project team members consulted subject matter experts to identify the appropriate food commodities, to discuss proposed revisions to the food categorization scheme, and to provide expertise regarding the specific foods to be assigned to each food commodity to make sure that the new categorization scheme is useful to regulatory agency needs.

>> I will now walk through the new food categorization scheme and provide a couple of examples of how the assignment of outbreaks using the new food categorization scheme compares with the current Painter scheme.

>> In this slide we illustrate the original Painter food groups and commodities in blue boxes and the new, proposed food commodities in green boxes. The new food categorization scheme includes 32 new food commodities.

>> Like the Painter scheme, the new food categorization scheme subdivides food commodity "groups" shown in the blue boxes into terminal, mutually-exclusive food commodities that are based on animal species and botanical plant categories. The new food categorization scheme has 40 terminal food commodities shown here in the tan boxes compared with 17 terminal food commodities used in the Painter scheme. We have also further divided these terminal food commodities into processing sub-categories, and I will provide examples of these in a minute.

>> Although the new scheme better captures the food categories that are most useful to the regulatory agencies, some of these commodity categories may not be intuitive to most people, including many of us at CDC,. Consequently, the project team developed a food glossary to accompany the new food categorization scheme to help illustrate the specific foods in each food commodity. I have shown an example here highlighting some foods in their small fruit category and also the solenacous, seeded vegetable category.

>> An important improvement to the food categorization scheme was to include processing sub-categories so that important information regarding the food products within each commodity contributing to foodborne disease could be used in source attribution studies.

In this diagram, I provide examples of the processing sub-categories for the dairy and egg commodities. For example, the dairy commodity has sub-categories describing solid or semi-solid dairy food products, like cheeses and yogurt and fluid milk food products, and further distinguishes between pasteurized and unpasteurized food products. Likewise, shell eggs are separated from egg products, and additional processing information for each of these is also included.

>> Here is another example of processing sub-categories used to describe food products in the seeded vegetable, herbs, and vegetable row crop categories. As you know, food commodities in the seeded vegetable group may be consumed in a variety of ways, such as sun-dried tomatoes, frozen corn, or canned pumpkin. A variety of herbs such as basil or mint are consumed fresh, or they may be dried and used as spices or may be used in teas. Likewise vegetable row crop food commodities may be fresh-cut and bagged, frozen or distributed as a raw agricultural product with little to no processing after harvest. The new scheme provides similar processing categories for fruit commodities and meat commodities.

>> In this slide you can see how outbreaks assigned to the beef commodity using the painter categorization scheme can now be sub-divided using the new processing sub-categories.

In this example, 437 foodborne outbreaks are assigned to the beef commodity. With the new food categorization scheme, additional information on 248 of these beef commodity outbreaks is used to assign these outbreaks to more specific processing sub-categories. Each food category box presented here is mutually-exclusive. In other words, only those outbreaks with implicated foods or ingredients that can be assigned to beef and also contain additional processing information are assigned to sub-categories in this graphic. The outbreaks assigned to the beef commodity are missing food processing information that would enable us to assign these to a more specific category.

This example highlights the fact that many outbreak reports contain limited processing information, so not all foods assigned to food commodities can be assigned to processing sub-categories. In the future, CDC will develop tools in the national outbreak reporting system to help capture this information, when it is known by the outbreak investigators.

>> Here is another example demonstrating how the new food categorization scheme is used to provide more specific information about the food products contributing to outbreaks within a food commodity. In this example, details about the implicated food or contaminated ingredient

included in the outbreak report were used to assign 86 of the outbreaks associated with foods in the dairy commodity to more specific processing sub-categories.

This example also highlights another important component of this IFSAC project…the project team is reviewing all reported foods and contaminated ingredients in the FDOSS database and updating the rules used to assign foods and ingredients to each food commodity. Using the new rules, cream filling is no longer categorized to the dairy commodity.

>> As I mentioned before, the food categorization scheme is very important to source attribution work that is vital to the food regulatory agencies. Consequently, the project team used many of the food product definitions used by FDA and FSIS to inform the choice of food commodities used to classify foods and ingredients implicated in foodborne disease outbreaks.

We also examined the food categorization schemes used by others to summarize the food commodities associated with foodborne illness in the United States. Two examples are the manuscript published by Batz and colleagues in the Journal of Food Protection in 2012 where the food sources associated with the top 14 pathogens in the US, and the recent white paper published by the Center for Science in the Public Interest describing the food sources of outbreak illnesses in the US reported over the past decade. Our new food categorization scheme is compatible with many of the commodities used in both of these publications.

>> There are still a couple of steps ahead for the project team to finalize our project deliverables.

>> First, the project team needs to finalize the rules used to categorize the more than 2000 foods and ingredients reported since 1998 to the new food categorization scheme. As before, multi-ingredient foods will be categorized to a food group or commodity when all ingredients belong to that category. Foods with multiple ingredients that don't fit in a single food group or commodity such as those containing ingredients from both the plant and land animal groups, or those containing ingredients from both aquatic and land animal groups will be categorized as "multiple commodity" foods.

In addition, information regarding the processing sub-categories for each food product needs to be included when assigning foods and ingredients to the new food categorization scheme. Secondly, the project team has developed a new method for pulling information from outbreak reports that will improve the accuracy of assigning outbreaks to the new food categorization scheme.

Specifically, the new method uses information provided in free text fields and in other report fields to better describe the type of food and its processing. We are currently evaluating the utility of the new method and we plan to finalize it over the next few months.

>> Once we have categorized and validated all foods and ingredients implicated in foodborne disease outbreaks, we will post the complete food categorization scheme with the food glossary online with our Foodborne Outbreak Online Database (or FOOD). And finally, we plan to update the electronic National Outbreak Reporting System, or NORS, to include the new food categories. This will be helpful to the public health departments that investigate and report foodborne disease outbreaks.

>> I would like to acknowledge the IFSAC project team that leads the effort to improve the food categorization scheme and the methods used to assign the foods implicated in outbreaks to food commodities as well as the IFSAC steering committee. I would also like to recognize the work of the IFSAC Communications Team to make this webinar and many other IFSAC communications possible, as well as the IFSAC Technical Workgroup for their input at critical points in the project.