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Food Facts For You!

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CDC Report: Health Risks Associated with Raising Chickens; New Endpoint Temperature for Cooking Poultry; Toxin-Producing *E. coli* O157 in Livestock at Agricultural Fairs; Backgrounder: Heat Processing of Home-Canned Foods; What's On Your Mind? (safety of slow-cooker liners; an allergic reaction to out-dated pancake mix)

CDC Report: Health Risks Associated with Raising Chickens

On April 2, 2006 the Center for Disease Control released a report on the health risks associated with raising chickens; reprinted below. See also: http://communitydispatch.com/artman/publish/article_4440.shtml

Many families raise a small number of chickens, particularly in rural areas. In recent years, however, raising chickens has become a popular hobby for people who live in urban areas as well. Information that promotes raising chickens touts the birds as being good pets, stress relievers, and easy to keep. Most people though, choose to keep flocks because they believe the meat and eggs they grow will be safer and less expensive than store purchased products. Whether they are pets or a source of food, there are some issues that need to be considered before deciding to raise chickens. In addition to the fact that many urban areas will not allow chickens to be raised within city/town limits, keeping chickens poses a potential health risk.

Chickens, turkeys, ducks, and other poultry frequently carry bacteria that can cause illness to you and your family. Baby chicks may be especially prone to shed these germs and cause human illness. Young birds are often shipped several times before they reach a permanent home. Shipment and adapting to new locations causes stress on birds and makes them more likely to shed bacteria in their droppings. While anyone can become ill from exposure to these germs, the risk of infection is especially high for children, the elderly, and persons with weakened immune systems; for example, people receiving chemotherapy or who are HIV-infected.

One of the most important bacteria you need to be aware of is *Salmonella*. Birds infected with *Salmonella* do not usually appear sick. *Salmonella* lives in the intestine of infected chickens, and can be shed in large numbers in the droppings. Once shed, bacteria can spread across the chicken's body as the bird cleans itself and throughout the environment as the chicken walks around. Therefore, it is especially important to carefully wash hands with soap and water after handling young birds or anything that has come in contact with them. If you ingest *Salmonella*, you may become ill. People accidentally ingest *Salmonella* in many ways, including eating after handling chickens or by touching their hand to their mouth while working with the birds. Typical symptoms of *Salmonella* infection are nausea, vomiting, diarrhea, and abdominal pain. These symptoms generally develop within one to three days of exposure and may last

for up to a week. Individuals with weaker immune systems commonly have more severe infections.

There have been several outbreaks of human *Salmonella* infections resulting from handling baby chicks. Many of the outbreaks involved young children and most occurred in the spring around Easter. Some outbreaks have been associated with keeping chicks in the classroom. If you still want to raise chickens, here are some ways to reduce the risk to yourself and your family:

1. Keep baby chicks and adult chickens away from persons with weaker immune systems, including the elderly, pregnant women, diabetics, patients receiving chemotherapy, and people who are infected with HIV.
2. Do not keep chickens if a household has children less than five years of age.
3. Make sure that any interaction between chicks or chickens and small children is supervised and that children wash their hands afterwards. Children less than five years of age tend to put their hands and other potentially contaminated objects into their mouths.
4. Supervise hand washing for small children to make sure that it is adequate.
5. Always wash your hands with soap and water after touching chickens or anything in their environment. If soap and water are not available, use an alcohol based hand sanitizer. Bacteria on your hands can be easily transferred to objects and other people in your home.
6. Do not eat or drink around your chickens.
7. Keep chickens away from food preparation areas AND limit access of chickens to gardens and other food-harvest areas.
8. Do not wash items from chicken coops like water and food dishes in the kitchen sink.
9. Do not allow chickens to roam freely around the house.
10. Frequently clean the area where chickens are kept.

For more information: http://www.cdc.gov/healthypets/pdf/intown_flocks.pdf

New Endpoint Temperature for Cooking Poultry

[summary and additional information related to an April 2006 press release]

The USDA Food Safety and Inspection Service (FSIS) has announced a new recommendation for cooking raw poultry. The new recommendation advises consumers that cooking raw poultry to a single temperature of 165°F will ensure microbiological safety of cooked poultry. The temperature of 165°F will destroy *Salmonella*, the most heat resistant pathogen of public health concern in raw poultry.

Previously, consumers were urged to cook whole chicken or turkey, thighs, or wings to 180°F; poultry breasts or roasts to 170°F; and ground poultry meat to 165°F. The new recommendation, based on recommendations by the National Advisory Committee on Microbiological Criteria for Foods (NACMCF), sets a single minimum temperature for poultry at which consumers can be confident that pathogens and viruses will be destroyed.

Consumers may still wish to cook poultry to higher temperatures (180°F for whole chicken or turkey or whole muscle thigh meat, or 170°F for whole muscle breast meat) in order to remove the pink appearance and rubbery texture in poultry that is cooked only to 165°F. However, cooking to 165°F will ensure safety, and meat that is not over-cooked can be juicier and more tender.

The one exception that the National Advisory Council noted applies to chicken or turkey that is frozen at the beginning of the cooking process. In this case, a longer cooking time is needed to bring the product to a safe internal temperature. In addition, parts of the product may thaw at different rates, making it important to determine temperature accurately and in several different spots. Consumers are also warned that microwave-cooking of raw, frozen poultry is not advisable.

Questions that you have asked about this new guideline:

Would the new cooking temperature also destroy bird flu (avian influenza)? Yes, the new internal temperature for poultry of 165°F will destroy the avian influenza virus, along with other pathogens of importance in poultry, such as *Campylobacter jejuni*.

Will UWEX and WNEP teaching materials be changed to reflect this new temperature? Efforts will be made over the upcoming weeks and months to edit our teaching materials to reflect this new cooking recommendation. Some already-published curricula which can not be easily edited will continue to reflect the higher cooking temperatures. Since these higher temperatures will also ensure safety and may, in some circumstances, better reflect consumer preference, having the higher temperatures reflected in our outreach materials should not pose a problem for consumers.

Toxin-Producing *E. coli* O157 in Livestock at Agricultural Fairs

[Livestock shows at county and state fairs are important for exhibitors and visitors alike. Researchers from the USDA (Clay Center, Nebraska), Ohio State, and Louisiana State University published an article in the May 2006 edition of *Emerging Infectious Diseases* outlining the prevalence of toxin-producing *E. coli* O157 in agricultural fair livestock. This research has implications for food safety and transmission of harmful pathogens from animals to humans. The article is summarized below.]

Each year approximately 3,500 state and county fairs in the United States attract more than 125 million visitors. Livestock exhibits, which are popular and common at these fairs, provide an opportunity for both direct and indirect human contact with animals that may carry human pathogens. One pathogen that animals may carry is *E. coli* O157:H7 (shiga-toxigenic *Escherichia coli* O157:H7 or STEC O157). Since 1999, at least seven outbreaks of *E. coli* O157:H7 illness in humans have been associated with visits to agricultural fairs in the United States, resulting in thousands of illnesses. Outbreaks at fairs in the United States have been associated with contact with ruminants, contaminated water, and contact with animal environments.

To estimate livestock STEC O157:H7 prevalence at U.S. fairs, researchers collected 2,919 fecal specimens at 29 small or local county fairs in 2 midwestern states, and at 3 large state fairs in 2 midwestern states and 1 southern state in 2002, for a total of 32 fairs sampled. County fair fecal sampling targeted 25 cattle and 25 swine. State fair sampling targeted 60 to 70 each for market and breeding beef, market and breeding swine, and dairy cattle. Other livestock fecal samples (sheep, goats, poultry, etc) were collected as available. To maximize the likely number of source farms, researchers obtained 1 fecal specimen per cow or 1 fecal specimen per pen for animals displayed in small groups (swine, sheep, goats and poultry) with a common owner. Flies were live-trapped with pheromone-baited traps or live-netted at 21 fairs generating 154 fly pools (63 stable fly, 54 house fly, and 37 blow fly). Flies were unavailable for sampling at 11 fairs primarily due to inclement weather.

STEC O157:H7 was isolated from livestock at 31 (96.9%) of 32 fairs, and from 187 of 2,919 fecal samples (6.4%). STEC O157:H7 was most prevalent in cattle feces (11.4% of 1,407 beef and dairy cattle). STEC O157:H7 was less prevalent in feces from swine (1.2% of 1,102 swine), sheep and goats (3.6% of 364 sheep and goats), and from fly pools (5.2% of 154 fly pools). The fair-level STEC O157:H7 prevalence by species (i.e. number of fairs with STEC O157:H7 present in the species/number of fairs with the species present) was beef cattle, 30/32 (93.8%); dairy cattle, 4/5 (80%); swine, 11/32 (34.4%); sheep, 6/12 (50.0%); goats, 1/5 (20.0%); other livestock, 0/8 (0%); and pest flies, 4/21 (19.0%). STEC O157:H7-positive fly pools originated from beef barns (6 pools), a swine barn, and an outdoor manure pile. Cattle, swine, and flies at some fairs shared indistinguishable STEC O157:H7 isolate subtypes, indicating that cross contamination occurs in the barn environment.

In a follow-up study, environmental samples were collected at 20 fairgrounds in the summer of 2003 (19 county fairgrounds in 2 states and 1 state fairground from among the original 32 fairs visited). The 19 county fair grounds had had no, or very limited, livestock on the premises since the fair the previous year (10 to 11 months previous). Samples were collected from cattle/swine/show arena areas; at ground level or from above-ground surfaces. A total of 689 environmental samples were taken, and STEC O157:H7 was isolated from 4 samples (0.6%). The positive samples originated from 2 of the 20 county fairgrounds and the one state fairground sampled (15% of sampled fairgrounds). All four STEC O157:H7-positive samples were from beef barn environments: 2 dirt samples, 1 house fly pool, and 1 above-ground surface swab.

The researchers noted that, in contrast to commercial husbandry practices, animals raised for show competition are typically reared individually or in small groups. And the emphasis on animal and environmental hygiene at fairs (thorough washing and cleaning of animals daily for several weeks before and during fairs; maintaining clean stalls or pens) was predicted to result in a lower STEC O157 prevalence in fair animals compared to commercially reared livestock. This, however, was not the case. The fecal prevalence of 13% in beef cattle at U.S. fairs in this study was comparable to the STEC O157:H7 fecal prevalence of 13% in summer feedlot cattle. The STEC O157:H7 fecal prevalence in swine at fairs in this study, 1.2%, was similar to the STEC O157 prevalence of 2.0% reported in swine at slaughter.

Overall, the researchers noted that fair livestock O157:H7 prevalence was high and thus of prime importance for agriculture and public health officials, fair managers, and fair visitors to consider. The presence of residual contamination in the environment was postulated to be both an animal biosecurity and a zoonotic risk as a potential source of infection to arriving animals or visiting persons at future fair events.

Citation: Keen JE, Wittum TE, Dunn JR, Bono JL, Durso LM. Shiga-toxigenic *Escherichia coli* O157 in agricultural fair livestock, United States. *Emerg Infect Dis* [serial on the Internet]. 2006 May [cited 24 April 2006]. Available from <http://www.cdc.gov/ncidod/EID/vol12no05/05-0984.htm>

Note: In response to an outbreak of illness associated with E.coli O157:H7 at petting zoos in 2000, the Center for Disease Control issued the following guidelines for visitors coming into contact with farm animals. The information provides some basic information that may be appropriate for animal-human contact at fairs as well.

Reducing the Risk for Transmission of Enteric Pathogens at Petting Zoos, Open Farms, Animal Exhibits, and Other Venues Where the Public Has Contact With Farm Animals

- **Information should be provided.** Persons providing public access to farm animals should inform visitors about the risk for transmission of enteric pathogens from farm animals to humans, and strategies for prevention of such transmission. This should include public information and training of facility staff. Visitors should be made aware that certain farm animals pose greater risk for transmitting enteric infections to humans than others. Such animals include calves and other young ruminant animals, young poultry, and ill animals. When possible, information should be provided before the visit.
- **Venues should be designed to minimize risk.** Farm animal contact is not appropriate at food service establishments and infant care settings, and special care should be taken with school-aged children. At venues where farm animal contact is desired, layout should provide a separate area where humans and animals interact and an area where animals are not allowed. Food and beverages should be prepared, served, and consumed only in animal-free areas. Animal petting should occur only in the interaction area to facilitate close supervision and coaching of visitors. Clear separation methods such as double barriers should be present to prevent contact with animals and their environment other than in the interaction area.
- **Handwashing facilities should be adequate.** Handwashing stations should be available to both the animal-free area and the interaction area. Running water, soap, and disposable towels should be available so that visitors can wash their hands immediately after contact with the animals. Handwashing facilities should be accessible, sufficient for the maximum anticipated attendance, and configured for use by children and adults. Children aged <5 years should wash their hands with adult supervision. Staff training and posted signs should emphasize the need to wash hands after touching animals or their environment, before eating, and on leaving the interaction area. Communal basins do not constitute adequate handwashing facilities. Where running water is not available, hand sanitizers may be better than using nothing. However, CDC makes no recommendations about the use of hand sanitizers because of a lack of independently verified studies of efficacy in this setting.
- **Hand-mouth activities** (e.g., eating and drinking, smoking, and carrying toys and pacifiers) **should not be permitted in interaction areas.**
- **Persons at high risk for serious infections should observe heightened precaution.** Farm animals should be handled by everyone as if the animals are colonized with human enteric pathogens. However, children aged <5 years, the elderly, pregnant women, and immunocompromised persons (e.g., those with HIV/AIDS) are at higher risk for serious infections. Such persons should weigh the risks for contact with farm animals. If allowed to have contact, children aged <5 years should be supervised closely by adults, with precautions strictly enforced.
- **Raw milk should not be served.**

See <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5015a5.htm>

Backgrounder: Heat Processing of Home-Canned Foods

Home canning can be a way for consumers to preserve the goodness of their gardens all year round, and to provide special treats for their families. The following information from the National Center for Home Food Preservation (University of Georgia) provides a general guide to some of the 'hows' and 'whys' of home canning.

Why do individual home-canned foods have different heat processing times?

There are several factors that affect the way in which heat is distributed through the food in a jar during a home-canning process. It is this variation in heat penetration that determines the position of the “cold spot” (the slowest heating area) of the jar, which can be different for different jar sizes and shapes as well as different foods. The heating rate at the cold spot determines how long the process time needs to be. In the case of low-acid foods, this is to ensure that the food receives the heat necessary to kill *Clostridium botulinum* spores. Left alive inside a sealed jar of low-acid food at room temperature, the spores become bacterial cells that multiply and produce the toxin that causes botulism poisoning.

The time and temperature combinations at which *C. botulinum*, its spores and other bacteria are killed are established under certain conditions. However, the substrate (food) in which these bacteria are found is an important variable factor in the rate of destruction. The food factors that will influence the amount of heating needed to kill bacteria include: the consistency of the food; the pH (acidity); and, the presence of nutrients that are “protective” for bacteria (e.g., high protein and sugar levels). Other influences on the amount of heat delivered to the food in the jar are: the shape and size of the jar; the size, shape and texture of food pieces; the solid to liquid ratio; the temperature of the food at the beginning of the process; and, the temperature inside the canner. For example, heat penetration through a mass of liquid (faster) will be very different from heat penetration through puréed or mashed food (slower). This is apparent during stove-top cooking too, where different foods heat up differently based on their composition and consistency.

If the food is thick, puréed, or mashed; if there are large pieces of food in the jar; or, if the food is packed in too tightly, heat penetration can be slower than in more liquid or loosely packed foods. If a specific heat process is not calculated for each food and style of pack, the heating may not be adequate, and the food will be underprocessed.

How is the processing time for a food determined experimentally?

Heat penetration experiments, which are necessary for all low-acid foods and some acid foods, are carried out in a properly equipped laboratory. The food prepared by specific procedures is filled into jars and thermocouples (temperature measuring devices) are inserted through the lid, jar or can into the food in the jar. These are connected by wires to a monitor, and the temperature at the end of each thermocouple is recorded throughout the time the canner comes up to processing temperature, during a process at that temperature (e.g., boiling water or 240°F under pressure), and during at least some of the cooling period.

Determining the process time is a two-step procedure. The first step is to put thermocouples in several areas of the jar to determine the “cold spot” (slowest-heating location) of the jar. Once that spot is located, more data is collected at the cold spot to have enough information to calculate the process time for this food under these specific conditions – i.e., in a particular jar type in this canner. The process time is the time needed to achieve a certain level of “lethality”, or killing of a number of target pathogens

or spoilage organisms for that food. In the case of low-acid foods, the processing time needs to ensure that the minimum temperature and time combination to destroy spores of *C. botulinum* is reached, so that the food will be safe when stored on the shelf. In the case of acid foods, the target microorganisms will be those likely to make someone sick or spoil the food.

This process has to be done separately with each food, as well as any variation that alters pH, consistency, texture, distribution of solids and liquids, or other factors that result in a “new” product”. Experimentally determining safe processing times for home-canned foods is thus a lengthy, expensive and time-consuming process, which explains why there are fewer home-canned processes available than many people would like. In short, there is no easy formula to work out processing times without experimentation and analysis that take into account how each food product heats in a particular canning situation.

Why do some foods have both hot and raw pack processing times, while others have one or the other?

The offering of hot and/or raw packs is usually based on quality issues with the finished product. However, USDA process recommendations have been developed over time by different laboratories and researchers. Sometimes it has been the choice of the researchers who developed the process recommendation to only use one method. Individual food characteristics can also lead to the need for specific preparation procedures. For example, in a hot pack process for a starchy food like potatoes, the food is precooked in water that is then discarded (some of the starch is drawn out into the water) and replaced by fresh boiling water when filling jars. If a raw pack process was chosen for the same product, the starch that now cooks out in the jar may later gelatinize and/or cause excessive cloudiness in the finished “raw pack”. This amount of starch in the jar also causes safety concerns during the canning processing, and makes it hard to detect any post-processing spoilage in the stored jar. As another example, many pickled products are hot packs because the pre-heating starts to acidify the food before it goes in the jar and results in a safer product.

Why are hot and raw pack processing times sometimes the same?

Hot pack and raw pack variations, if they are offered in USDA recommendations, have each been researched separately. This includes collecting heat penetration data and calculating an independent process time for each. So the process time is determined by the actual heating characteristics of the pack. Depending on preparation procedures and the type of process, the final result may be the same. Other times, it might be different. The temperature of the process (boiling water or pressure) and the length of the process needed can influence the differences between hot and rack pack rates of heating. Another consideration is that USDA home-canning processes are rounded off to the next higher 5-minute interval. If the hot and raw pack process times vary by less than 5 minutes, but in the same interval, the recommended process time will be the same. For example, if the hot pack is calculated as 11 minutes and the raw pack requires 14 minutes, they will both get rounded off to, and published as, a 15-minute process time.

Why should I not make up a processing time for a food that I wish to can?

Under-processed low-acid foods run the risk of allowing survival of *Clostridium botulinum* and its spores, and consumption of these foods can lead to botulism, an often fatal disease, and one that involves expensive health-care costs and health complications for those that do survive. Again, there is no formula for converting a process time for one

low-acid food to that for another food or jar size. Too many characteristics of the particular food and processing procedures can influence the rate of heating. If you are experimenting with untested recipes for pickled products or other acidified foods such as salsas and there is not enough acid to treat them as a boiling-water canned food, you may also end up with the same risk of botulism by under-processing. Even if you have an acid food and do not process it long enough, food spoilage can result.

Why should I not purée or mash foods before canning them?

Packing food into a jar may seem easier or less wasteful of jar space with mashed or puréed food, but this style of pack greatly increases the product density and will have a very different heat penetration pattern than pieces of food in a liquid cover. Current USDA home-canning recommendations do not include mashed or puréed vegetables because there have not been the resources to do the amount of experimentation needed (e.g., to cover all variations in density that may result when a consumer mashes or purées food). So far, methods of preparation that are likely to result in more uniform results of heating patterns have been offered. The USDA process times are only intended for use with the preparation procedures that accompany them. Consumers put themselves at great risk for botulism if they choose to purée or mash vegetables and use the same processing time for a pack that is intended to be pieces of food in liquid.

Why should I not make additions/deletions of my own to the canning recipe? I want the canned food to taste exactly like one of my own recipes.

We all would like the convenience of great-tasting “one jar meals”. But, any additions or deletions made to an approved canning recipe would need a new process time calculated for it. It is not safe to change the recipe and use the same process time. One-dish meals often include thickening ingredients or are cooked down to a thicker consistency than expected for the process time for an individual ingredient. These situations are likely to result in hazardous foods. You may add your special ingredients after you open up the jar, when reheating or assembling the dish. Also keep in mind that after canning and storage, your special recipe may no longer taste exactly the same as when it is made fresh. Sometimes special recipes are best enjoyed as freshly made dishes.

What should I do if I desire to preserve one of my own recipes that does not have a matching canning process?

Choose the closest approved procedures for canning and follow them instead. After canning, when you are reading to consume/reheat the food, add your special ingredients to adjust the recipe to your taste. Alternately, you may make up & freeze your recipe with all the fixings.

Keep in mind that several products that we desire to have ‘home-canned’ are not available commercially, either. The commercial food manufacturing industry puts a lot of time and expense into research for their own safely canned products (they do not have a ‘blanket processing’ method or formula for adjustments, without collecting heat penetration data, either). Also, just because a canned food is made commercially and found on a store shelf does not mean a home canning process is available for the same or similar item. The heating characteristics under home preparation methods and canning procedures would have to be studied to come up with a home-canning process. The commercial canning industry also has more resources and methods at its disposal for controlling the consistency and maturity of raw ingredients going into a canned food.

There will be more variability to take into account when researching a home-canning process to cover all the potential variables.

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What's On Your Mind?

Slow Cooker Liners! Mary Fran Lepeska asked about the new slow-cooker liners that Reynolds® is selling for crock pots (slow cookers). Because many of us are aware of the concerns relative to plastics and heat, this seemed like a great question to ask: **Are slow-cooker liners safe to use?** The answer appears to be: Yes! Reynolds® Slow Cooker Liners are made of heat resistant nylon – they are food-grade and will not leach contaminants into food. According to Reynolds®, “the liners help avoid all that soaking and scrubbing that is associated with slow cooking. Simply place the liner in the slow cooker bowl, add ingredients, and cook as you normally would. After cooking, remove meal from the lined-slow cooker, allow to cool, and simply toss the liner. It's that easy!” Thanks, Mary Fran for asking.

Allergic reaction to out-dated pancake mix? Wilma Johnson wrote to ask about a *Dear Abby* column which appeared on April 14, 2006 in the Eau Claire Leader Telegram: “*Pancakes made from old mix cause severe reaction*” Wilma noted that the column relates an incident in which a 14 year-old boy ate pancakes prepared from out-dated mix. The pancakes tasted funny, but the boy ate them anyway and suffered an anaphylactic reaction with breathing difficulties and lips turning blue.

I queried a food safety listserv to gather information on this, and the consensus was that the allergic reaction was most likely linked to mold in the mix. The preservatives in the mix may have deteriorated on extended storage, allowing mold to grow in the mix. One food safety expert noted: ‘some folks are highly allergic to molds.’ Generally, pancake mix, flour and other dry foods will not support mold growth since there is insufficient water present. However, of the three primary classes of microorganisms: bacteria, yeast and mold, mold requires the least available water to grow. If the flour/dry eggs or milk in the mix picked up moisture during storage, it might be possible to support mold growth.

A documented case of anaphylaxis related to outdated pancake mix has been published, and the abstract is reprinted below:

Am J Forensic Med Pathol. 2001 Sep;22(3):292-5. An unusual case of anaphylaxis. Mold in pancake mix. Bennett AT, Collins KA. Office of the Chief Medical Examiner Department of Pathology and Laboratory Medicine, Forensic Section Medical University of South Carolina, Charleston, USA.

Anaphylactic reactions involve contact with an antigen that evokes an immune reaction that is harmful. This type of reaction is a rapidly developing immunologic reaction termed a type I hypersensitivity reaction. The antigen complexes with an IgE antibody that is bound to mast cells and basophils in a previously sensitized individual. Upon re-exposure, vasoactive and spasmogenic substances are released that act on vessels and smooth muscle. The reaction can be local or systemic and may be fatal. The authors report the death of a 19-year-old white male who had a history of “multiple allergies,” including pets, molds, and penicillin. One morning, he and his friends made pancakes with a packaged mix that had been opened and in the cabinet for approximately 2 years. The

friends stopped eating the pancakes because they said that they tasted like "rubbing alcohol." The decedent continued to eat the pancakes and suddenly became short of breath. He was taken to a nearby clinic, where he became unresponsive and died. At autopsy, laryngeal edema and hyperinflated lungs with mucous plugging were identified. Microscopically, edema and numerous degranulating mast cells were identified in the larynx. The smaller airways contained mucus, and findings of chronic asthma were noted. Serum tryptase was elevated at 14.0 ng/ml. The pancake mix was analyzed and found to contain a total mold count of 700/g of mix as follows: Penicillium, Fusarium, Mucor, and Aspergillus. Witness statements indicate that the decedent ate two pancakes; thus he consumed an approximate mold count of 21,000. The decedent had a history of allergies to molds and penicillin, and thus was allergic to the molds in the pancake mix.

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