

FRI eNews provides updates on research and events at FRI and UW-Madison and other current food safety news.

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Highly pathogenic avian influenza (HPAI) H5N1 clade 2.3.4.4b genotype B3.13 in cows and milk continues to be an important topic in the news.

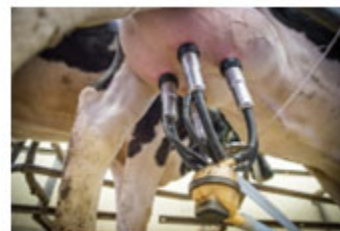
What is the current status of the outbreak in dairy herds?

- As of June 26, 129 herds (up from 67 on May 28) in 12 states (up from nine on May 28, now including **Minnesota, Iowa, and Wyoming**) have had confirmed cases of HPAI.
- No cases in cows have been reported in Canada or Mexico as of June 24.



What has been learned about HPAI infections in cows?

- USDA published a detailed, data-rich report on the **clinical effects of H5N1 virus on cows** based on a survey of affected dairy farms.
 - The most common clinical observations were **abnormal lactation, decreased feed consumption, and thickened or clotted milk**.
 - **Less than 10% of cattle in affected herds exhibited clinical symptoms**.
 - Animal movement is known to be a risk for disease transmission.
 - Other animals at the farms, including cats and poultry, have become sick or have died.
 - **Contaminated transportation vehicles and shared equipment or personnel** are known risks for disease transmission.
 - Preliminary data suggests that **cows are shedding 14 to 16 days before clinical signs are noticed** on the farm (per Keith Poulsen, director of the Wisconsin Veterinary Diagnostic Laboratory and FRI affiliate member).
- Interim results from a **German study in dairy cows** demonstrated that an **H5N1 virus isolated from a wild bird in Germany could multiply very well in the udder**. Infected cows showed clear signs of disease similar to U.S. infected cows.



What about HPAI in dairy workers and humans?

- **No new cases of H5N1 in U.S. dairy workers** (beyond the three mild cases discussed in the June eNews) have been officially reported.
 - There are additional reports of flu-like symptoms in dairy workers on farms with infected cattle, but these cases lack documentation.
 - The state of Michigan is working with CDC to assess whether **asymptomatic infections** have been occurring in people working with infected cattle.
- CDC announced in June that it has developed strategic priorities focused on understanding and preventing infection and illness in people exposed to H5N1 illnesses as well as preparing for and mitigating the possibility of an HPAI pandemic.
- **Vaccines against H5N1 are in development:**
 - A clade 2.3.4.4b hemagglutinin glycoprotein-expressing mRNA-lipid nanoparticle vaccine demonstrated strong protective immune responses in mice and ferrets against H5N1 clade 2.3.4.4b viral challenge.
 - An intranasal parainfluenza virus 5-based vaccine confers complete protections against H5N1 clade



other H5N1 influenza viruses.

- The EU, U.S., and Canada are in the process of acquiring H5N1 influenza vaccines that are “well-matched to the H5 of the currently circulating H5N1 strain” to help protect farm and dairy workers. Finland is expected to be the first country offering the vaccine to workers exposed to animals, perhaps as early as next week.

Does pasteurization of milk destroy the virus? Yes.

- A new study from NIAID and other researchers confirms earlier work (conducted by UW-Madison researchers and others and reported in the June eNews) that pasteurization of milk at 63°C for 30 minutes (the “holding method” or vat/batch pasteurization method) results in H5N1 viral inactivation below levels of detection, while the more commonly used “high-temperature short-time method” (72°C for at least 15 seconds) decreases viable virus levels by ~4 log but may leave very low levels of viable virus present. **Both studies were conducted at laboratory scale**, which might not exactly reflect what would happen at scale (see last bullet point below).
- Another study conducted in China tested the thermal stability of other H5N1 clade 2.3.4.4b viruses and other influenza subtype viruses (H1, H3, H7, H9, and H10) spiked into raw milk and concluded that “the standard pasteurization methods used by dairy companies are effective in inactivating all tested subtypes of influenza virus in raw milk.”
- Most recently and compellingly, USDA and FDA released a preprint of a study in which **commercial milk processing was simulated at scale and demonstrated that the high-temperature short-time method (72°C for 15 seconds) was able to “completely inactivate” virus inoculated into homogenized raw whole milk in each of nine repeated experiments.**



What else has happened in the last month?

- FDA announced plans for additional work to understand characteristics of **inactivation methods for H5N1 in dairy products, including milk and raw milk cheeses. A second round of retail milk sampling is also underway.**
- CDC released new **wastewater testing results**. During the first two weeks of June, 328 of 727 sites reported data for influenza A virus, and **3 (<1%) sites from 1 state (Illinois) were at a high level** compared to levels before March 2024). It is important to note, however, that the testing does not determine whether the virus is H5N1 specifically or the source (human, bird, or animal product such as milk).
- USDA transferred \$824 in emergency funding to the Animal and Plant Health Inspection Service (APHIS) to facilitate APHIS and state and local partners in quickly identifying HPAI in poultry and livestock.
- Numerous states, including Wisconsin, are **implementing testing requirements for the movement of lactating dairy cattle for fairs or exhibitions.**
- USDA also announced a Voluntary H5N1 Dairy Herd Status pilot program. Dairy producers from states enrolled in the first phase of this program (Kansas, Nebraska, New Mexico, and Texas) who enroll their herds and test negative for H5N1 for three consecutive weeks using on-farm bulk tank milk samples will be able to move animals without



monitoring and testing. About 20 farms are currently participating in the program.

- Wisconsin Department of Health Services has issued an [HPAI prevention guide](#) for workers in meat and dairy processing.

Highly Pathogenic Avian Influenza (HPAI) prevention for workers in meat and dairy processing



- The state of Michigan is [offering](#) dairy farms funding, **up to \$28,000 per farm**, to participate in real-time research studies.

Other U.S outbreaks and food safety warnings have been in the news, including the following:

- The ongoing outbreak [associated with](#) the rare ***Salmonella Africana* serovar** reported last month appears to be linked to **cucumbers** and may be related to the ***Salmonella Braenderun*** outbreak that started around the same time, in the same geographic areas, and in similar demographics. At least 196 people (including 68 requiring hospitalization) and 185 individuals have been associated with the *S. Africana* and *S. Braenderun* outbreaks, respectively. At least one cucumber sample collected from a retail location in Pennsylvania tested positive for *Salmonella*, with the serovar still being determined. Cucumbers from that producer have been recalled.



- **Diamond Shruumz-brand products (microdosing chocolate bars, infused cones, and micro- and macro-dose gummies)** [have been linked](#) to a variety of severe symptoms including **seizures, central nervous system depression (loss of consciousness, confusion, sleepiness), agitation, abnormal heart rates, hyper/hypotension, nausea, and vomiting**. At least 39 people have been sickened, with 23 requiring hospitalization. The Diamond Shruumz products [contain](#) a “proprietary blend of nootropic and functional mushrooms” and describes the products as **“trippy” or “hallucinogenic;”** however, the company website confirms that the products do not contain psilocybin, cannabinoids, or compounds from the hallucinogenic *Amanita muscaria* mushroom. However, FDA and state partners have identified four compounds in the products that are **known psychoactive drugs found in mushrooms or are bioactive compounds found in kava**. All flavors of Diamond Shruumz-brand products bars, cones, and gummies [have now been recalled](#).



In **Virginia**, 25 probable or confirmed cases of **Shiga toxin-producing *E. coli*** have [occurred](#) in individuals who were in the **Lake Anna area** over Memorial Day weekend. Most of those sickened were children under the age of 18. At least 12 of the cases were caused by STEC O157, with one case identified as STEC non-O157. Seven individuals developed **hemolytic uremic syndrome**, but no deaths have occurred. The Virginia Department of Health believes

the STEC infections were due to **exposure to lake water**, although they have been unable

Recent news stories on **botulism** cases around the world include the following:

A botulism outbreak in Clovis, Calif., [has been linked](#) to family events on June 21–22 during which **food was prepared by family members**. At least eight individuals have been sickened, with up to 30 people possibly exposed. The food that caused the outbreak has not yet been announced.

- In **Russia**, at least 139 people [have sought medical care](#) due to symptoms of botulism that appears to be linked to **ready-to-eat salads from a popular food delivery service**. Most cases are located in Moscow with additional cases in Nizhny Novgorod and Kazan. Sixty-four individuals were in serious condition, with at least 30 in intensive care.
- A 61-year-old man in Australia [became ill](#) after drinking **commercially produced almond milk** in 2023. **The product had not been labeled with instructions to keep refrigerated**.
- In the U.S., [a massive voluntary recall](#) of 296 **canned coffee products** made by Snapchill and sold in various brand names was triggered when FDA notified the Green Bay, Wis. company that **it had not filed the appropriate low acid canned food process notification for their product with FDA**. No illnesses have been reported, and no toxin identified in products to date. The Canada Food Inspection Agency [has also issued](#) a recall for Snapchill products distributed in Canada.



FRI News

FRI research will be well represented at the 2024 IAFP Annual Meeting, as shown in the table below ([also on our website](#)).



Symposium (S6)	Food Safety of Cheese Brines: Management and Prevention Strategies	Timothy Stubbs, Chad Galer, and Kathy Glass	Monday, July 15 8:30 a.m. to 10 a.m.	101A
Presentation	Use of Hydrogen Peroxide as a Continuous <i>Listeria</i> Controls Intervention	Kathy Glass	Monday, July 15 9:00 a.m.	101A
Technical Session (T4-08)	Utilizing 16S Sequencing with Viability Differentiation to Identify Potential Sources of Spoilage Contamination During RTE Meat Manufacturing	Jessica Brown and Steve Ricke	Monday, July 15 4 p.m. to 4:15 p.m.	101B
Marketplace (MP-03)	Parameters that Determine the Risk of Pathogen Growth and Survival in Natural Cheeses (>39 to 50% Moisture) Made from Pasteurized Milk: Literature Review and Analysis	Wendy Bedale , Rob Shumaker , and Erin Headley	Tuesday, July 16 1:30 p.m.	204
Marketplace (MP-09)	Cheese Milk Thermization App	Kathy Glass and Sarah Engstrom	Tuesday, July 16 1:30 p.m.	204
Symposium	"Cure" What Ails You: Nitrite Alternatives in Meat Systems	Heather Hunt , Kathy Glass , Joyjit Sah	Tuesday, July 16 1:30 p.m.	203BC
Presentation	Efficacy of Nitrite and Nitrite Alternatives to Inactivate or Inhibit the Growth of Bacteria	Kathleen Glass	Tuesday, July 16 1:30 p.m.	203BC
Presentation	Plant Pathology and Bacterial Persistence – An Intricate Interplay	Jeri Barak	Tuesday, July 16 2:30 p.m.	101A
Poster (P2-50)	Sodium Lactate Prevents Growth of Proteolytic and Non-Proteolytic <i>Clostridium botulinum</i> in Uncured Turkey Products More Effectively Than Sodium Diacetate or Propionate	Stevie Ward , Kristin Schill , and Kathleen Glass	Tuesday, July 16 8:30 a.m. to 6:15 p.m.	Convention Center
Poster (P2-110)	Synergistic Effect of Natural Flavor and Vinegar for Shelf-Life Extension of Fresh Poultry	Surabhi Wason , Matthew McCusker , Jasmine Kataria , Robert Weyker , Paul Ludtke , Kaylee Rumbaugh , Joyjit Saha , and Saurabh Kumar	Tuesday, July 16 8:30 a.m. to 6:15 p.m.	Convention Center
Poster (P2-285)	Thermal Inactivation of Salmonella in Plant-based Process Cheese as a Function of pH and Water Activity	Calvin Slaughter , Harneel Kaur , Kristin Schill and Kathleen Glass	Tuesday, July 16 8:30 a.m. to 6:15 p.m.	Convention Center
Poster (P3-80)	Shelf-Life Extension of Poultry Leg Quarters Treated with a Short-Duration Dip (15-s) of Sodium Acid Sulfate	Dana Dittoe , Cynthia Austin , Elena Olson , Christina Oval , and Steven Ricke	Wednesday, July 17 8:30 a.m. to 3 p.m.	Convention Center

Listen to FRI associate director **Kathy Glass** discuss **her long and storied career in food safety** in [this podcast](#) with Food Safety Magazine.



FRI is sad to report that a former FRI member and long-time friend and supporter of FRI, **William H. Sperber**, has passed away. A **globally recognized expert food microbiologist**, Dr. Sperber received his PhD from the University of Wisconsin-Madison in 1968 and was one of the early pioneers of



his food safety work [here](#). He was an inspiration to all of us and will be missed.

Congratulations to FRI executive committee member **Laura Knoll** on receiving the Kellett Mid-Career Research Award. This award recognizes and supports a select group of **outstanding mid-career faculty** at the University of Wisconsin-Madison.



This year's FRI **Summer Scholars** recently visited a **PepsiCo Frito Lay plant** as well as **Hormel Foods**. Everyone had fun and asked a lot of questions! Learn more about the FRI Undergraduate Research Program in Food Safety on our [website](#).

Former FRI graduate student **Kirty Wahawan**, along with former FRI director **Chuck Czuprynski**, FRI affiliate member **Garrett Suen**, and UW-Madison colleagues, published a [new report](#) that sheds light on **why wood boards used for cheese ripening may sometimes (but not always) be resistant to *L. monocytogenes* contamination**.

Previous work suggested that the **native microflora** of the wood cheese boards was essential for *L. monocytogenes* inhibition. In this new study, funded in part by FRI, the growth of *L. monocytogenes* in broth was strongly inhibited by microbial communities obtained from five cheese boards from different cheese facilities. **Both a *Leuconostoc mesenteroides* isolate and *Staphylococcus equorum* isolate from these cheese board microbial communities were also able to inhibit the *L. monocytogenes* growth in broth.** Future work (some of which FRI affiliate member **Tu Anh Huynh** is conducting) should provide insight into the mechanism of the inhibition by these and other organisms.



Learn about the amazing career of **food microbiology pioneer and FRI founder Gail Dack** in [this biographical article](#) just published in Food Protection Trends by former FRI director **Chuck Czuprynski** and FRI science writer **Wendy Bedale**.



Government & Regulatory News



The **Office of Inspector General** (which provides oversight of the U.S. Department of Health and Human Services, which includes FDA) released [findings from its audit](#) of FDA responses related to the finding of ***Cronobacter sakazii* at an Abbott manufacturing facility in Sturgis, Mich.** Briefly, the report concluded that FDA lacked policies and procedures to identify and respond promptly to risks to the **infant formula supply chain**.

FDA [is making it clear to retailers](#) that they must **promptly remove recalled products from their shelves** or they could



levels in hundreds of U.S. children linked to consumption of **contaminated apple cinnamon fruit puree pouches**. FDA has put the distributor of the cinnamon used in the contaminated products on multiple **import alerts** and will also conduct **increased and more targeted import screening**.



FDA proposed an exemption for **Grade “A” cottage cheese** that appears on the Interstate Milk Shippers List from the requirements of the **Food Traceability Rule**. FDA’s Food Traceability Rule (which has a compliance date of Jan. 20, 2026) requires additional recordkeeping activities for foods, including soft cheeses, that are included on the **Food Traceability List**. FDA is proposing the exemption for Grade “A” cottage cheese because **such products must already comply with requirements in the Pasteurized Milk Ordinance** that control pathogens during pasteurization and

prevent contamination during post-pasteurization processing. The exemption applies to cottage cheese formulated with potassium sorbate or other approved antimicrobial and to those that are hot-filled.

You can read former **FDA Deputy Commissioner for Food Policy and Response Frank Yiannis’s insights** for why the Food Traceability Rule is needed to improve food safety (including the lead- and chromium-contaminated apple cinnamon pouches discussed above as an example) and how retail giant **Kroger is requiring all foods (not just those on the Food Traceability List) entering its stores to have specific standardized food traceability information** in place.



FDA plans to release **new resources to help industry comply with the Food Traceability Rule**, including a downloadable template for tracking, minor edits to the Food Traceability List (not yet posted online), and a supply chain example. They also announced that they will be collaborating with the Food Safety Preventive Controls Alliance (FSPCA) to develop **training for the food industry on the Food Traceability Rule, which should be available in mid-2025**.

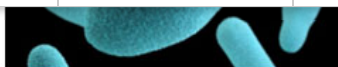
FSIS will hold a webinar titled “Using Whole Genome Sequencing to Support FSIS Food Safety and Public Health Mission.” The webinar is open to both internal and external stakeholders and will be held on Monday, July 8, from 1 to 2 p.m. ET.

Current Literature

The quest for **new plant-derived alternatives to animal-based proteins** continues; however, **potential food safety risks of these plant protein products are not well understood** (as evidenced recently in the U.S. by the serious toxicities associated with tara flour protein used in Daily Harvest’s French Lentil + Leek Crumbles). A new review article discusses **endogenous and exogenous hazards** that can be associated from plant-based protein alternatives, including chemical hazards, biotoxins, nanoparticles, and microbiological hazards.



A recent review article discusses the molecular mechanisms



with relevance to food safety and quality such as *Clostridium* and *Bacillus* species) exhibit and highlighting how this knowledge may help identify **new ways to inactivate**

spores.

Potential health benefits associated with ingestion of live dietary microorganisms (in fermented foods or as probiotics) by healthy individuals are explored in a recent systematic review. The study found that microbial doses of at least **2 x 10⁹ CFU/day were associated with non-negative reported outcomes**. Gaps in the literature, challenges to confounding variables, and ways to improve the quality of clinical research into dietary microbes are discussed.

UW-Madison and Wisconsin News



USDA and the University of Wisconsin-Madison celebrated the ground-breaking of a new dairy research facility. The facility, which has been in the planning stages for a decade, should be completed in 2027, will include 18 buildings that will house robotic milking systems, chambers for measuring greenhouse gas emissions, an advanced animal nutrition unit, and other state-of-the-art laboratories. (Photo from CALS Flickr, Michael P. King)

Save the date for the 38th annual Kenneth B. Raper Symposium (Sept. 3 in the Microbial Sciences Bldg. on the UW-Madison campus), which highlights microbiology research at UW-Madison and nearby institutions.

Save the Date
38th Annual Kenneth B. Raper Symposium

September 3, 2024
Microbial Sciences Building
1550 Linden Dr
Madison, WI 53706



The Kenneth B. Raper Symposium highlights microbiology at UW-Madison and nearby institutions, and is well-attended by scientists across campus, the city, and the state. The symposium is sponsored in full by the Department of Bacteriology through generous donations from the Kenneth B. Raper family. No registration fees will be collected. We hope to see you there!

 Department of Bacteriology
UNIVERSITY OF WISCONSIN-MADISON



The **2024 Wisconsin Science Festival**,

to be held Oct. 14–20, will focus on **agriculture** this year.

You can **find out how you can share your science** at the festival by going to [this website](#).

Upcoming training opportunities on the UW-Madison campus include the following:

- Candy School (July 22–Aug. 2, waitlisted); hosted by the department of food science
- Food Safety and Meat Microbiology School (August 13–15), hosted by FRI and the Meat Science & Animal Biologics Discovery (MSABD) program; **registration is now open**
- World of Cheese from Pasture to Plate (Aug. 27–30); hosted by the Center for Dairy Research
- Wisconsin Meat Processing School (Sept. 17–19); hosted by MSABD
- New Technologies Short Course: Thermal Processing (October 22–24); hosted by MSABD



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