



## Bryan: Preeminent Food Safety Champion

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Most of us have experienced nausea, vomiting and/or diarrhea after eating contaminated food.

Today's outbreaks occur less often thanks to one man's hands-on contributions to uncovering the environmental factors in foodborne disease: Frank Bryan, PhD, MPH, a 50-year public health veteran. After retiring from CDC in 1985 after nearly 30 years at the agency, Bryan worked for another two decades as a food safety consultant to the food industry, universities, states, and to the WHO.

A prolific writer (see **Sidebar**) and researcher, Bryan helped define CDC's foodborne disease and environmental health training activities. He was the first to define environmental factors that lead to outbreaks. His work at CDC is being continued by NCEH's Environmental Health Services Branch and a first-of-its-kind foodborne disease prevention research program, [EHS-Net](#).

### Bryan's Work Basis of EHS-Net

"The founding work of this branch came from Dr. Bryan. Environmental factors in food safety were not a niche CDC had filled. The 'what' in foodborne illness is easy, but the 'why' is the hard question," notes Charles Otto (CAPT USPHS), senior environmental health officer, Environmental Health Services Branch, NCEH. "Dr. Bryan was 20 years ahead of the rest of us in terms of where his vision was for food safety and getting into the causes of outbreaks."

Carol Selman, MPH, senior public health advisor, Environmental Health Services Branch, NCEH, sought out Bryan's counsel at two pivotal times after joining CDC.

"Dr. Bryan was one of the first people I called back in 1999 when we were setting up the branch," she said, adding that a year later, she consulted Bryan again before establishing the EHS-Net program, focusing on understanding the contributing factors to foodborne outbreaks. The program is currently in place in nine states. This past April, the [Conference for Food Protection](#) recommended establishing a stakeholder committee to work with CDC on a National Voluntary Environmental Assessment Information System to collect environmental factors to foodborne outbreaks based on the EHS-Net model.

CDC currently has three surveillance systems that monitor outbreaks:

- [PulseNet](#) performs DNA fingerprinting to determine what organism causes someone to get sick.
- [FoodNet](#) looks at the people aspect, characterizing outbreaks by the type of person who was eating the food and by region of the country.
- EHS-Net links the agent and the people together—knowledge that can help prevent future outbreaks.



Frank Bryan is credited with helping to define CDC's foodborne disease and environmental health training activities. He was the first to define environmental factors that lead to outbreaks. Photo by Teresa Sims



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Bryan's work at CDC is being continued by the NCEH's Environmental Health Services Branch and a first-of-its-kind foodborne disease prevention research program, EHS-Net.

"He has been so influential to environmental health service programs, especially food safety and inspection programs, not just at the local state level, but at the federal level as well," Selman says.

### Looking Back Over an Impressive Career

**CDC Connects** caught up with Bryan after his recent talk at CDC's Chamblee campus to share stories from his early days in environmental health and some key career highlights.

"Much of my activity at CDC was putting on training courses on foodborne diseases and their control," says Bryan, who was first drawn more to food sanitation rather than water and sewerage environmental health while a graduate student at the University of Michigan. Bryan later earned a PhD in

bacteriology and food science from Iowa State University. His interest in this area of public health was strengthened while serving in the US Army Medical Service Corps, where Bryan worked in field sanitation activities and mess hall inspections prior to his graduate studies.

"Engineers dominated water and sewerage, so you weren't going to excel in that area as a sanitarian," Bryan recalls.

His first assignment was at the New England Field Training Center in Amherst, Massachusetts, one of several field stations set up after World War II to provide training for sanitarians. "The New England station was very unique because it was developed in cooperation with the state and the University of Massachusetts. One of our tasks was to train the school's sanitary science students in field training," he said. Eventually the number of stations decreased, and Bryan joined CDC's Environmental Health Activity in the Training Program.

One day, a sanitarian in North Carolina contacted him about a food outbreak involving roast beef at a fast food restaurant. Bryan gathered up equipment similar to that used during his time-temperature studies on turkey rolls while working as a PhD student. He went to the restaurant and did a series of hazard analyses.

"We watched the food preparation and took food temperatures from the time the food was in the refrigerator to when it was cooked, held for service, cooled down, and reheated. We took hand and stool specimens of workers, and samples of raw and cooked meat, and all equipment and utensils used during preparation. These were serotyped to trace sources. I analyzed the samples at CDC in a lab and, after repeating the process two more times, we learned the whole story. The bacterial spores in the raw meat survived cooking. There was gross time-temperature abuse in the holding of the food during the day when the meat was held in a warmer, during sandwich preparation, and over night holding in the warmer. These microorganisms multiplied, and reheating was insufficient to kill the pathogens."

The work got the attention of Georgia's health officials, who were having problems with turkey-related foodborne outbreaks in school lunch kitchens. Bryan repeated hazard analysis in cooperation with the state epidemiology staff, and then reported the findings to the Georgia school lunch program. They also published the findings, resulting in a significant decrease in turkey-associated school lunch outbreaks over the next few years. Soon, he was asked to speak at meetings, and other states requested his expertise with food preparation following outbreak investigations.

In 1961, after the Russians beat the US to space with the launch of Sputnik, US President John F. Kennedy declared the US would beat Russia to the moon. As a result, there was a big push for ensuring astronauts had a safe food supply. Working with NASA, the Pillsbury Company developed the concept of Hazard Analysis Critical Control Point system, or [HACCP](#). This process control system identifies where hazards might occur in the food production process and puts into place stringent actions to eliminate or prevent hazards. By strictly monitoring and controlling critical process steps, there is less chance for hazards to occur.

"HACCP was introduced to the public health community in 1971 at the first Conference on Food Protection in Denver," recalls Bryan, who was involved in hazard analysis through his CDC work. He quickly concluded that HACCP was the best way to prevent foodborne illness.

Through his involvement with the International Commission on Microbiological Specifications for Foods, Bryan participated in writing the first book on the HACCP concept. "We took the concept and worked it into a more practical application," he says, adding that it took 20+ years for HACCP to be fully embraced by federal agencies.

Part of the reason he published so much during his career was to inform and teach public health personnel about foodborne disease hazards and preventive measures and to stimulate lasting policy changes.

"When I first got into the field, the FDA was mainly concerned with filth and rat feces and insect fragments in food and not about the real contributing factors to outbreaks. I thought it was crucial to publish to try to make some change in food protection policy."

According to Jack Guzewich, RS, MPH, senior environmental health scientist with FDA's Center for Food Safety and Applied Nutrition (CFSAN), Bryan's work did bring changes at FDA and elsewhere. Namely, he significantly increased expertise in field staff to help them get at underlying causes of outbreaks, rather than focusing on enforcing the code or structural requirements.

### **Emphasizing Processes Instead of Structural Code Inspections**

"His influence was to get away from just enforcing the code and structural requirements, to going towards those things that actually cause foodborne disease, which are more to do with contamination and the proliferation and survival of microorganisms. His influence was towards making the programs much more science based, and toward those things that really cause foodborne disease," says Guzewich, who also notes that Bryan contributed to FDA's investigation of foodborne diseases and use of HACCP.

"He had an impact on our Retail Food Program, where we develop the food code for regulating restaurants and supermarkets." Guzewich says that's significant because "there are more foodborne disease outbreaks due to exposure at restaurants than from any other single source. The most common place food is abused or contaminated in some way is at a restaurant or supermarket."

Guzewich first met Bryan while working at the New York State Health Department. At the end of his 27-year tenure there, he had responsibility for foodborne disease surveillance in the state, and oversaw New York's restaurant regulatory program and training of environmental health staff.

"Dr. Bryan was very influential in modernizing New York State's food regulatory program to be more HACCP-based and foodborne disease-based. He came to New York on a number of occasions and trained our staff. I was involved with him in publishing some papers and procedures manuals for investigating outbreaks," Guzewich says.



Mark Miller, a senior environmental health specialist, says everything Bryan worked on was directly applicable to local public health practitioners on the front lines.

Bryan's contributions continue to be felt today by environmental health staff like Mark Miller (CAPT USPHS), senior environmental health specialist, Environmental Health Services Branch.

"His work helped me understand what was important to look at in relation to food safety. I began to look at the process people have in preparing their food," he says, adding, "I am most impressed with his dedication to field-based practice of environmental health. Everything that he did and worked on really had direct application to people conducting food safety assessments in the communities— there was not a lot of 'pie-in-the-sky' type science; it was science that could be directly applicable to local

public health practitioners—who really do the front line work in public health.”

Selman summarized Bryan’s legacy this way: “We know that no matter what we do, the last point of safety for food is at the consumer or retail food level. That is where he has had his greatest influence—at that last link in the food safety chain. Dr. Bryan’s work in identifying contributing factors of foodborne disease has really helped us move forward in prevention.”

This ***Inside Story*** by Anne Wainscott-Sargent.

### **A Prolific Writer**

During his nearly 50-year public health career, Frank Bryan authored or co-authored more than 275 publications including the books, *Foodborne Infections and Intoxications*, *Diseases Transmitted by Foods*, *Microbiology of Foods* and *HACCP*. He also has presented papers at more than 225 professional meetings and delivered several keynote and plenary addresses. His manual on hazard analysis for developing countries was translated into all WHO official languages.

“It’s a rare food safety publication that you come across that doesn’t cite Dr. Bryan once or twice as a reference,” notes NCEH’s Charles Otto, who says Bryan offers a major lesson on the importance of publishing. “It’s one thing to find the causes of the outbreak, but you need to publish, too, for wide review of the work you have done. That’s why he is still so widely cited.”

Below are links to some of Bryan’s published work:

[Reflections on a Career in Public Health: Evolving Foodborne Pathogens, Environmental Health and Food Safety Programs.](#)

[Salmonellae Associated with Further-processed Turkey Products.](#)

[Essential Safety Requirements For Street-Vended Foods.](#)