

30 Years of Food Safety: Reflecting on Progress, Envisioning the Road Ahead

Susan T. Mayne, Ph.D.

Former Director (1/2015 - 5/2023)

Center for Food Safety & Applied Nutrition
Food & Drug Administration

NOTHING TO DISCLOSE

30 Years of Food Safety

- Microbial food safety
- Chemical food safety
- Allergens in foods

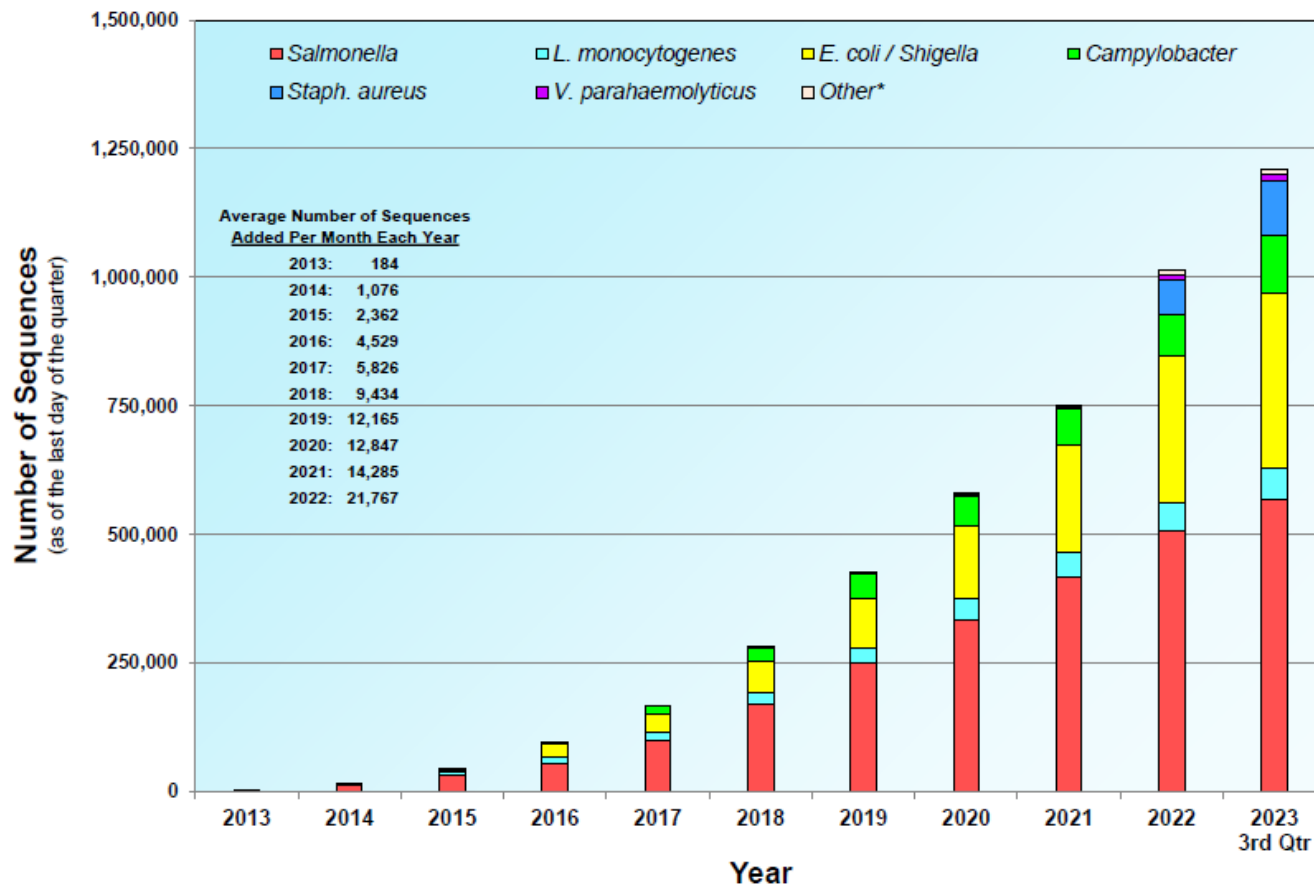
Unifying theme:

Empowered by data, moving from
reaction to prevention

Microbial Food Safety

- Technology (WGS) has produced unprecedented ability to detect and solve outbreaks, and identify root causes of pathogen contamination (e.g., resident pathogen vs. sporadic contamination)
- Pathogens from food, food facilities, & agricultural environments
- GenomeTrakr Network: 184 sequences/mo in 2013 vs. >20,000 sequences/mo in 2022.
- Ability to DETECT outbreaks vs. ability to PREVENT

Total Number of Sequences in the GenomeTrakr Database



First sequences uploaded in February 2013

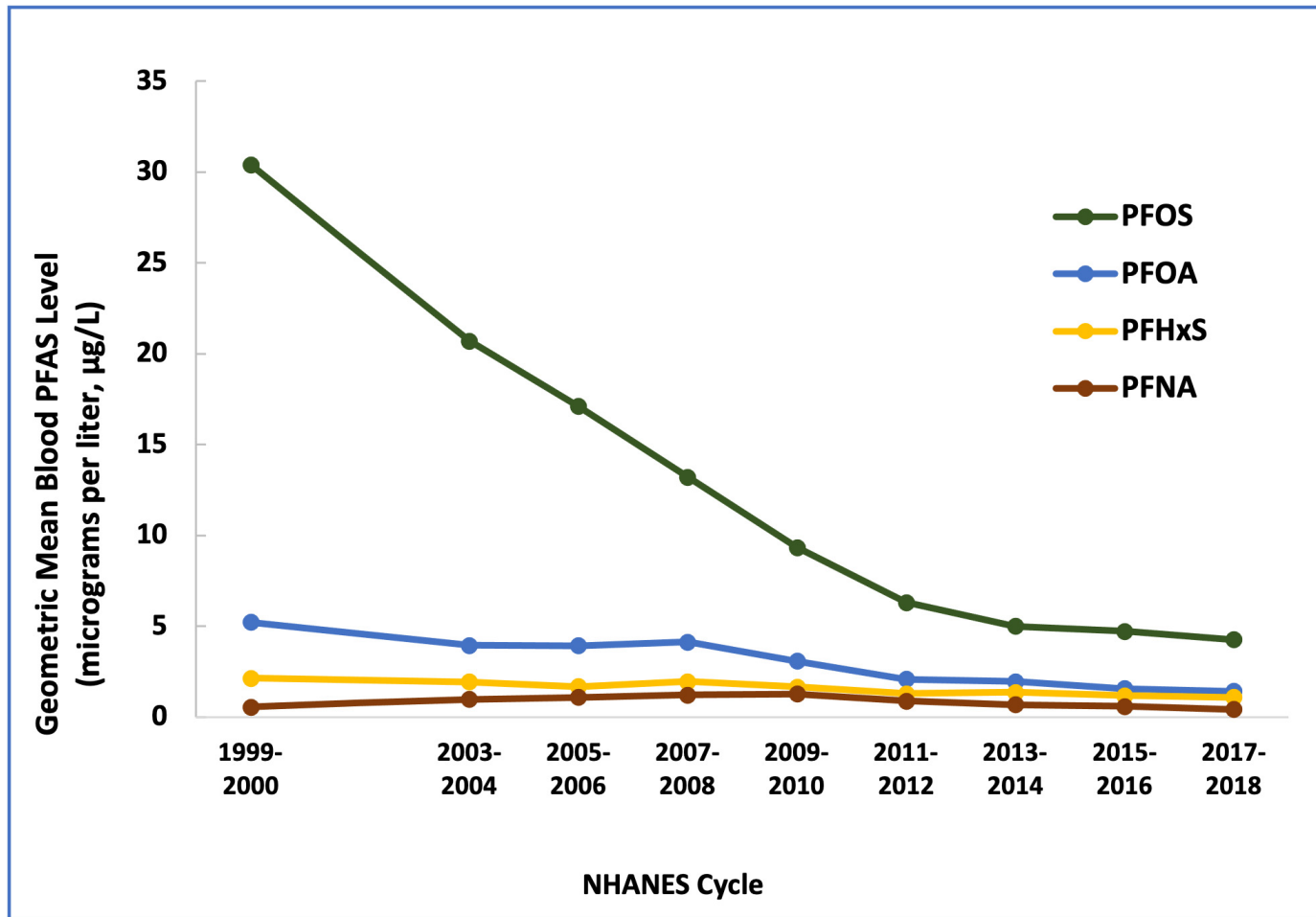
* Other pathogens: *Cronobacter*, *V. vulnificus*, *C. botulinum*, *C. perfringens*, and *Bacillus cereus* group

<https://www.fda.gov/food/science-research-food/whole-genome-sequencing-wgs-program>

Allergens and Chemicals

- Landmark labeling: FALCPA (Food Allergen and Labeling Consumer Protection Act) – 2004, FASTER (Food Allergen Safety, Treatment, Education, and Research) Act added sesame effective January 2023.
- Chemicals: regulatory and industry efforts to reduce exposure to chemicals of concern
 - Toxic elements: e.g., average daily lead in diet of 1-3 yr olds declined by 97% since 1980
 - Process-induced contaminants: e.g., Decline in mean acrylamide intake (FDA data, 2019)
 - Other environmental contaminants that were the targets of regulatory action such as dioxins, PCBs, PFOS/PFOA have declined substantially over past decades

Blood Levels of the Most Common PFAS in People in the United States Over Time



Source: ATSDR/CDC

FDA FOOD SAFETY MODERNIZATION ACT



Hazard Analysis, Preventive Controls

Food Safety Going Forward (1)...

- Genome sequencing/technology: viruses and parasites
- Global expansion of WGS data
- Allergen thresholds, new priority allergens/criteria and harmonization
- Chemicals: transparency around domestic risk considerations, greater harmonization globally
- Avoiding chemical “whack-a-mole” (e.g., PFAS)

Food Safety Going Forward (2)...

- Preventive controls: produce, needed \$ research on pathogen prevalence and mitigation strategies in key areas (cronobacter, E. coli in flour)
- Traceability/supply chains/recall effectiveness
- Regulatory prioritization based on risk
 - Data driven, new data sources and new technologies to interrogate data such as AI/ML
- Global regulatory partnerships (systems or commodities)
- Surveillance and metrics

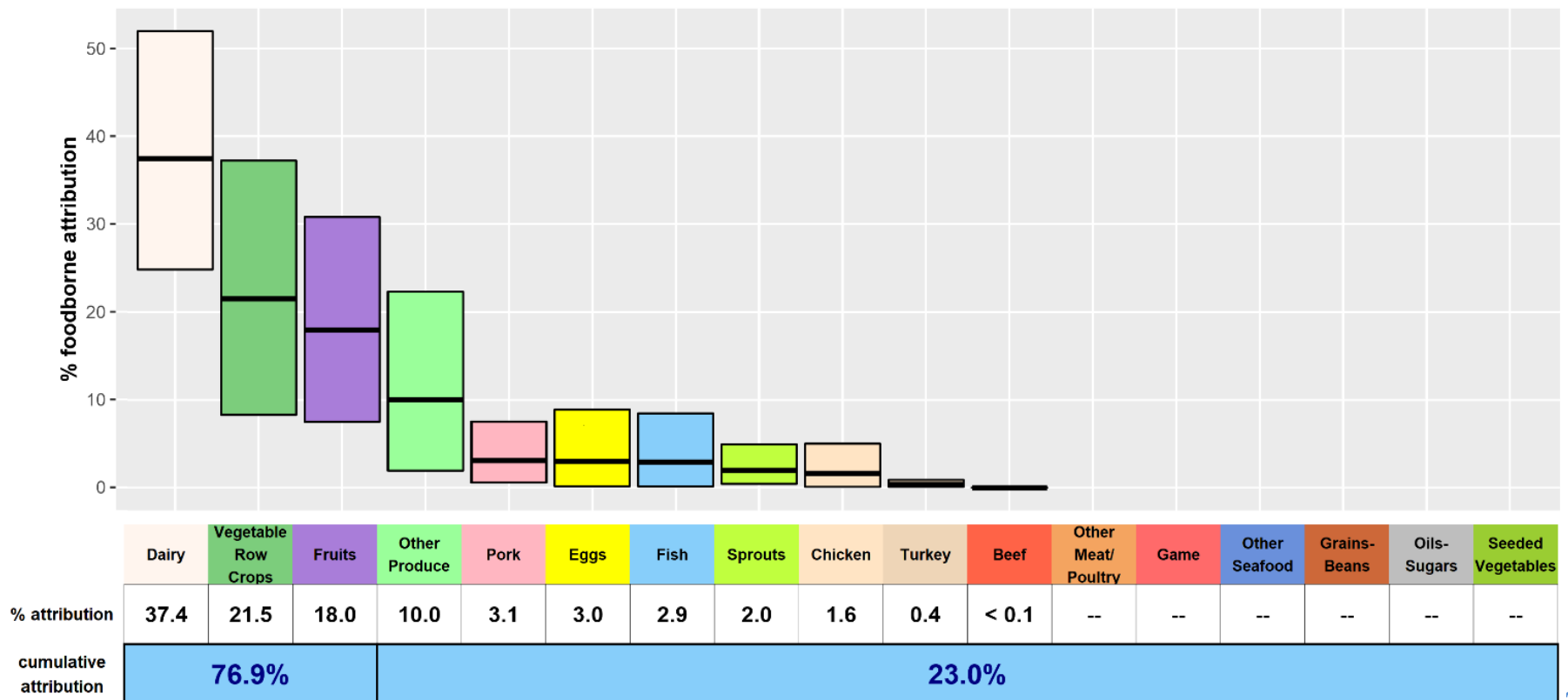
Food Safety Going Forward (3)...

- Anticipating and responding to climate change and challenges to food systems (e.g., COVID-19)
- Supporting innovation/new approaches to foods/food ingredients while assuring safety
 - Cell-cultured foods
 - Controlled environment agriculture
 - Innovations in food delivery models
- Consumer education needs to evolve along with evolution in consumer food behaviors

Food Safety Impacts Nutrition...

Estimated percentage of foodborne *Listeria monocytogenes* illnesses (with 90% credibility intervals) for 2021, attributed to each of 17 food categories, based on outbreak data from 1998 through 2021,* United States. SOURCE: IFSAC 2023

Listeria



Summary – Future of Food Safety

- Partnerships across regulators/industry/consumers
- Data driven, technology-enabled, evolving
- Global partnerships and increased harmonization of food safety approaches to risk/hazard identification
- Consumer education – countering misinformation, building knowledge and TRUST
- Synergy with nutrition