

**Foodborne
Focus**

by Joseph Kays

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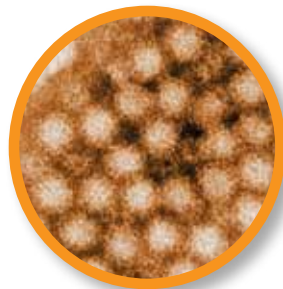
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Cantaloupe





Listeria



Norovirus



Salmonella

Report identifies riskiest combinations of foods and disease-causing microorganisms

Growing up, Colette Dziadul learned to “cook your meat well, wash your apples, and never leave anything with mayonnaise in it out in the sun.”

So when her 3-year-old daughter Dana loaded up a plate with fresh cantaloupe at an Easter morning buffet 10 years ago, the safety of the fruit never crossed her mind.

Two weeks of high fever, stomach cramps and diarrhea later, doctors figured out that Dana had contracted a life-threatening case of food poisoning from *Salmonella* that has resulted in lifelong health issues. Detective work by federal and state public health officials ultimately determined the cantaloupe was the culprit.

For Pam Berger, it was turkey cold cuts she got from her local deli in Brooklyn, N.Y., that changed her life and the life of her then-unborn daughter Louisa.

Berger contracted Listeriosis from that sandwich and passed it along to Louisa, who was born premature, weighing slightly

more than two pounds. The infant developed water on the brain and spent months in a neonatal intensive care unit.

Dana, Pam and Louisa are just a few of the 100,000 Americans hospitalized annually with a foodborne illness. An estimated 3,000 people die from these illnesses every year.

Cases like these illustrate the immense physical and social costs of foodborne illnesses, says Michael Batz, director of food safety programs at the University of Florida’s Emerging Pathogens Institute and co-author of a new report on the riskiest combinations of foods and disease-causing microorganisms.

But until now, regulators and public health officials had no way of determining which pathogens, and pathogen-food combinations, they should focus on.

So Batz and study co-authors Glenn Morris, director of the Emerging Pathogens Institute, and Sandra Hoffmann of the U.S. Department of Agriculture, created a new tool for ranking foodborne illnesses.

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—Michael Batz



Ray Carson

The Foodborne Illness Risk Ranking Model — or FIRRM — measures such factors as hospitalization, doctor visits, lost wages and quality of life. By applying the formula to more than 10 years of data on foodborne illnesses and surveying nearly 50 public health experts, the researchers were able, for the first time, to identify the worst culprits.

The report concludes that 90 percent of the annual \$14 billion health burden can be attributed to just five pathogens — *Campylobacter*, *Salmonella*, *Listeria monocytogenes*, *Toxoplasma gondii*, and norovirus. Even more important for the purpose of prevention, the analysis identified the foods most commonly contaminated by these pathogens. The researchers discovered that the top 10 pathogen-food combinations were responsible for more than \$8 billion in medical costs, lost wages and significant loss of quality of life.

“We hear about outbreaks all of the time associated with various products and it lends a perception that there’s just contamination lurking in every corner,” Batz says. “But what we find is that ... a relatively small number of these hazards account for a significantly large portion of the overall burden.”

The report, which was supported by a grant from the Robert Wood Johnson Foundation, includes the following key findings and recommendations for food safety officials:



Poultry contaminated with *Campylobacter* bacteria topped the list, sickening more than 600,000 Americans at a cost of \$1.3 billion per year. *Salmonella* in poultry also ranks in the Top 10, with \$700 million due to costs of illness. Infections with these microorganisms can cause acute

illness such as vomiting but also can lead to hospitalization or death. *Campylobacter* infection can also cause paralysis and other neuromuscular problems.



Salmonella is the leading disease-causing bug overall, causing more than \$3 billion in disease burden annually. In addition to poultry, *Salmonella*-contaminated produce, eggs and multi-ingredient foods all rank in the Top 10. The report recommends that the FDA and

USDA develop a joint *Salmonella* initiative that coordinates efforts in a number of foods.

| PATHOGEN-FOOD COMBINATIONS | COMBINED RANK | QALY LOSS | COST | ILLNESSES | HOSPITALIZATIONS | DEATHS |
|-----------------------------------|---------------|---------------|---------------|------------------|------------------|------------|
| <i>Campylobacter</i> – Poultry | 1 | 9,541 | \$1.3B | 608,231 | 6,091 | 55 |
| <i>Toxoplasma</i> – Pork | 2 | 4,495 | 1.2B | 35,537 | 1,815 | 134 |
| <i>Listeria</i> – Deli Meats | 3 | 3,948 | 1.1B | 651 | 595 | 104 |
| <i>Salmonella</i> – Poultry | 4 | 3,610 | \$712M | 221,045 | 4,159 | 81 |
| <i>Listeria</i> – Dairy products | 5 | 2,632 | \$724M | 434 | 397 | 70 |
| <i>Salmonella</i> – Complex foods | 6 | 3,195 | \$630M | 195,655 | 3,682 | 72 |
| Norovirus – Complex foods | 6 | 2,294 | \$914M | 2,494,222 | 6,696 | 68 |
| <i>Salmonella</i> – Produce | 8 | 2,781 | \$548M | 170,264 | 3,204 | 63 |
| <i>Toxoplasma</i> – Beef | 8 | 2,541 | \$689M | 20,086 | 1,026 | 76 |
| <i>Salmonella</i> – Eggs | 10 | 1,878 | \$370M | 115,003 | 2,164 | 42 |
| TOTAL | | 36,915 | \$8.2B | 3,861,128 | 29,829 | 765 |

These Top 10 pathogen-food combinations cause the greatest burden to the public health, says a new report by researchers at the University of Florida’s Emerging Pathogen Institute. The researchers ranked the combinations by calculating short- and long-term costs due to foodborne illness, as well as loss of quality adjusted life years (QALYs), a standardized measure used in public health to assess pain, suffering and other impacts to quality of life.

Four combinations in the Top 10 —



Listeria in deli meats and soft cheeses, and *Toxoplasma* in pork and beef — pose serious risks to pregnant women and developing fetuses, causing stillbirth or infants born with irreversible mental and physical disabilities. The report recommends that agencies strengthen prevention programs for these pathogens and improve education efforts aimed at pregnant women.



Norovirus is the most common foodborne pathogen and is largely associated with multi-ingredient items that can become contaminated, often by service-industry workers who handle food. The researchers recommend strengthening state and local food safety programs through increased

funding, training and adoption by states of the most recent FDA Food Code.



The report lists **E. coli O157:H7** as the sixth pathogen in overall burden, with the majority due to contaminated beef and produce. The report recommends federal agencies continue to target *E. coli* O157:H7, due to the particularly devastating injuries it causes in small children, including kidney failure, lifetime health complications and death.

EXPERTS SAY THE FDA AND USDA OFTEN WORK IN A PIECEMEAL FASHION, REACTING TO THE OUTBREAK OF THE DAY RATHER THAN TAKING STEPS TO PREVENT SAFETY PROBLEMS. THEY ARE URGING THE FDA AND USDA TO ADOPT A MORE UNIFIED, PREVENTATIVE AND RISK-BASED APPROACH TO THE MOST PRESSING FOOD SAFETY PROBLEMS.



Morris says that a ranked list of the most costly foodborne illnesses will be a vital tool as the FDA implements the Food Safety Modernization Act signed into law by President Obama in January 2011.

“U.S. food safety regulators have often reacted to the crisis of the day rather than act in a coordinated fashion to prevent the next outbreak,” Morris says. “Virtually every major study on the growing problem of food safety has recommended that regulators shift to a risk-based, preventive way of doing business — one that could potentially identify a risky combination of a newly emerged strain and a popular food.”

Morris and Batz say that the global food production network presents safety challenges unheard of in the past.

“Food that used to come from the backyard or the orchard behind the house is now produced and shipped from thousands of miles away,” Morris says.

“Food can be contaminated anywhere from the farm to the fork,” Batz adds. “That could be somewhere halfway across the world or in the kitchen of a neighborhood restaurant.”

But while there’s little consumers can do about the early links in the food chain, Morris says there’s a lot they can do when the food arrives in their kitchens.

“While some food safety risks are outside of our control as consumers,” he says, “effective food safety practices — such as making sure you wash your hands frequently and using separate cutting boards and knives for meat and produce — can help to keep your family safe from foodborne illness.”

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Related website:
<http://www.epi.ufl.edu/?q=RankingTheRisks>



Scan the QR code with your smartphone to see video about this research.



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FINDING:

A substantial amount of foodborne disease may be caused by improper food handling, storage and preparation in restaurants, cafeterias, deli counters and other professional kitchens.

RECOMMENDATION:

State and local efforts are a critical part of the national food safety system and should be strengthened by:

- Fully funding state and local inspection activities
- Increasing adoption of the most recent FDA Food Code by states
- Improving education and training of food workers and government inspectors