

OUTBREAKS BY THE NUMBERS: VIRUSES
1990-2004

CAROLINE SMITH DEWAAL
FARIDA BHUIYA

CENTER FOR SCIENCE IN THE PUBLIC INTEREST
WASHINGTON, DC 20009

ABSTRACT

Viruses account for 23% (n = 1138/5000) of reported foodborne illness outbreaks with an identified food source from 1990 to 2004, according to data from the Center for Science in the Public Interest. This compares with 61% linked to pathogenic bacteria, 15% linked to chemicals, and 1% linked to parasites. Due to better data collection and improved laboratory detection, viruses have been growing as a reported cause of outbreaks. For example, in the years 1990–1997, viruses were linked to 7% of the foodborne illness outbreaks with known or suspected pathogen and identified food. Between 1998 and 2004, they constituted 30% of such outbreaks.

Norovirus alone is responsible for 88% of virus outbreaks and 20% of all foodborne illness outbreaks. Hepatitis A and unspecified viruses account for the remainder of virus outbreaks. Most virus outbreaks occur in restaurants (45%) and private homes (13%). Most virus outbreaks involve multi-ingredient foods or produce. Multi-ingredient foods, such as sandwiches and multi-ingredient salads, are involved in 31% of all virus outbreaks. Produce items, such as leafy green salads, lettuce, and fruit, are involved in 26% of virus outbreaks. The average size of a virus outbreak is 38 cases.

Virus outbreaks are underreported for many reasons. Due to the short duration of illness for common food poisoning viruses, such as Norovirus, ill patients may not visit the doctor. Furthermore, Norovirus is not a notifiable disease, so doctors have no incentive to report cases to health departments or CDC. Viruses are not always captured as part of FoodNet or PulseNet, so outbreak data with an attributed food source remains the best single source of information on the public health impact of viruses.

BACKGROUND

- Each year, 76 million people become ill and 5,000 die after eating poisoned food, according to the Centers for Disease Control and Prevention (CDC).
- Only a small proportion of foodborne illnesses are associated with reported outbreaks, and of these, less than 37% have both an identified etiology and food source.
- The CDC publishes foodborne illness outbreak line listings organized by hazard, including outbreaks with unknown etiologies and outbreaks with unknown food vehicles.
- CSPI maintains a database of only those foodborne illness outbreaks with an identified etiology and food vehicle. The outbreaks are categorized by specific food, allowing policymakers, regulators, and producers to make science-based, risk management decisions.
- Viruses, particularly Norovirus, are responsible for numerous outbreaks and illnesses annually and new, more virulent, strains of Norovirus are being discovered. We must examine the causes of these outbreaks, including the foods associated with outbreaks, to identify ways to reduce the number of foodborne illness outbreaks from viruses.

METHODS

- CSPI's data is compiled from various sources, including the CDC, state and local health departments, and scientific and medical journals.
- The database is updated regularly, and only includes those incidents of foodborne illness which meet the CDC's definition of an outbreak, occurred in the United States between 1990 and 2004, and for which there is a known or suspected etiology and an identified food vehicle.
- Outbreaks in the CSPI database are grouped according to regulatory agency, and placed within one of thirteen food categories. Each category is then subdivided into food types. The database is updated as new reports of foodborne illness are identified, and is published periodically in CSPI's *Outbreak Alert!*
- Using the *Outbreak Alert!* database, we identified outbreaks due to viruses and examined the characteristics of these outbreaks.

RESULTS

- Between 1990 and 2004, there were 1,138 outbreaks and 40,977 individual illnesses linked to viruses in the CSPI database.
- Restaurants are the most common location for virus outbreaks, as 45% of these outbreaks occur in restaurants and food establishments. Private homes, with 13% of outbreaks, are the next most common location for virus outbreaks. Other common locations for virus outbreaks with food are the workplace (8%), catered events (6%), and schools (6%).
- Virus outbreaks have an average of 36 illnesses per outbreak. Outbreaks involving produce and dairy cause larger outbreaks than other commodities; produce outbreaks have an average of 43 illnesses and dairy outbreaks have an average of 41 illnesses.
- The most common foods in virus outbreaks are multi-ingredient dishes, which cause 31% of outbreaks. Produce causes 26% of outbreaks. Seafood causes 9% and poultry causes 7% of outbreaks.

RESULTS

- Virus outbreaks account for 23% of foodborne illness outbreaks and 27% of illnesses in the database. Pathogenic bacteria are responsible for 61% of outbreaks. Chemicals and toxins cause 15% of outbreaks and parasites cause the remaining 1% of outbreaks.
- The majority of virus outbreaks are caused by Norovirus (88%). Five percent of virus outbreaks are caused by Hepatitis A. Aside from sporadic outbreaks due to Calicivirus, Rotavirus, and Sapovirus, the remaining virus outbreaks are due to unspecified viruses.
- Between 1990 and 1997, virus outbreaks were responsible for merely 7% of all foodborne illness outbreaks. The percentage of virus outbreaks tripled in later years, with viruses accounting for 30% of outbreaks between 1998 and 2004.

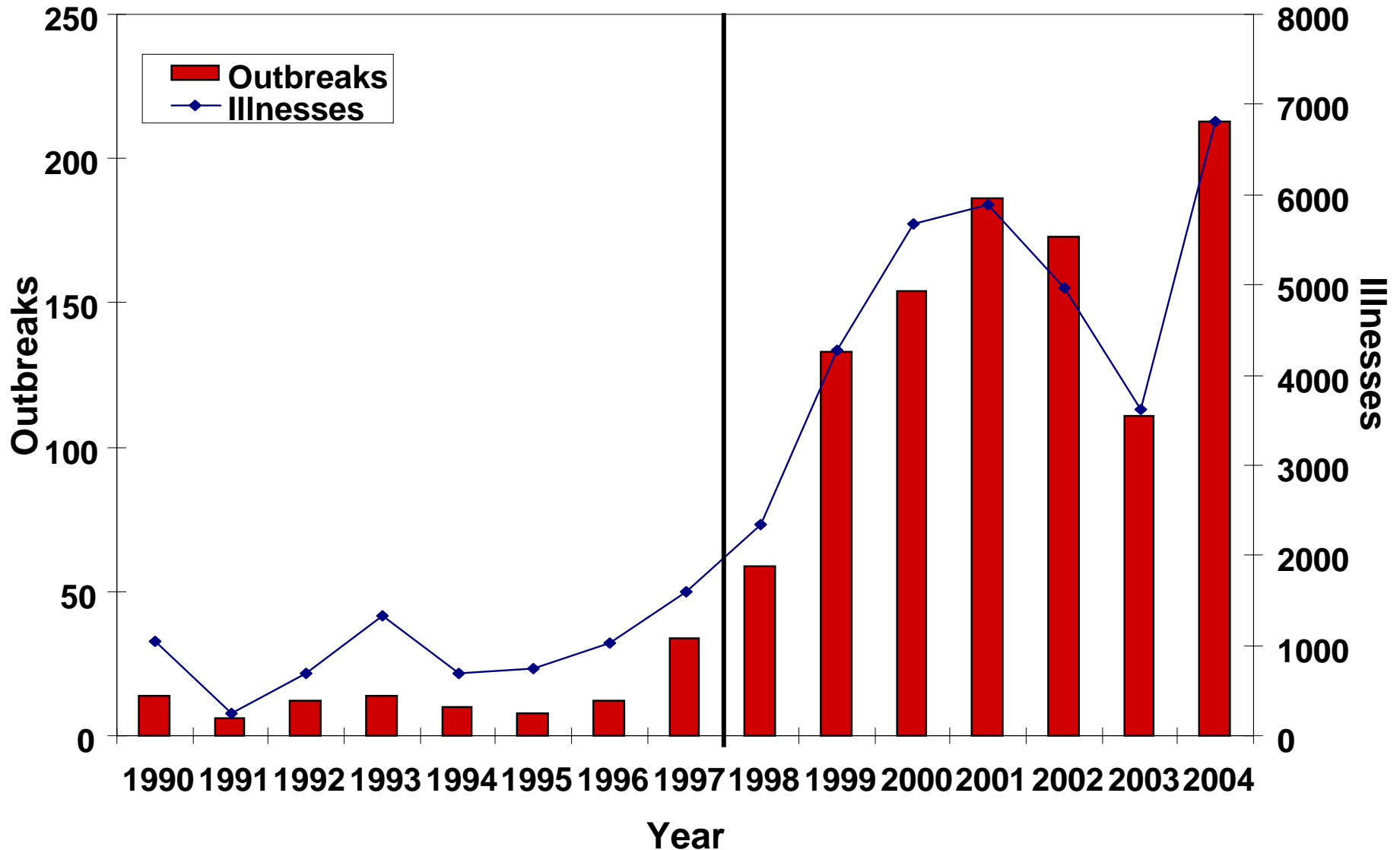
CONCLUSIONS

Viruses are responsible for nearly one-fourth of foodborne illness outbreaks in the United States. Over the years, the proportion of virus outbreaks has increased. This increase may be due to better surveillance, both from improved laboratory identification of Norovirus and better reporting of outbreaks from states.

Still, many virus illnesses and outbreaks go unreported. Due to the short duration of illness for common food poisoning viruses, such as Norovirus, ill patients may not visit the doctor. Furthermore, Norovirus is not a notifiable disease, so doctors have little incentive to report cases to health departments or CDC. Viruses are not always captured as part of FoodNet or PulseNet, so outbreak data with an attributed food source remains the best single source of information on the public health impact of viruses.

As new, more virulent, strains of Norovirus emerge, there are more frequent and larger outbreaks from Norovirus. Threats of Hepatitis A outbreaks from infected food handlers have also put the public on alert about virus-related foodborne illness. By identifying the characteristics of such outbreaks, we can identify solutions to best prevent the hazards in specific food commodities, particularly multi-ingredient foods and produce, and to reduce the contamination levels of such foods.

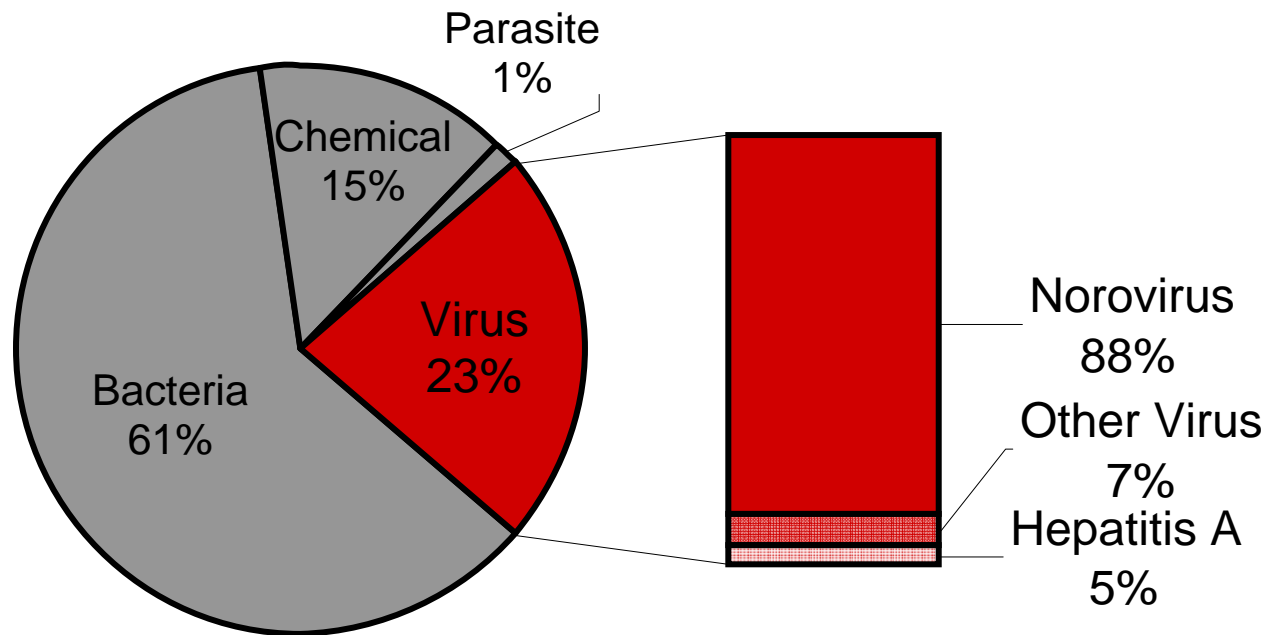
FIGURE 1. YEARLY TRENDS IN VIRUS OUTBREAKS



NB: In 1998, the Centers for Disease Control enhanced outbreak surveillance efforts. The sharp increase in outbreak numbers between 1997 and 1998 is likely due to the enhanced surveillance.

FIGURE 4. PROPORTION OF VIRUS OUTBREAKS IN ALL OUTBREAKS 1990-2004

Types of Pathogens in Foodborne Illness Outbreaks



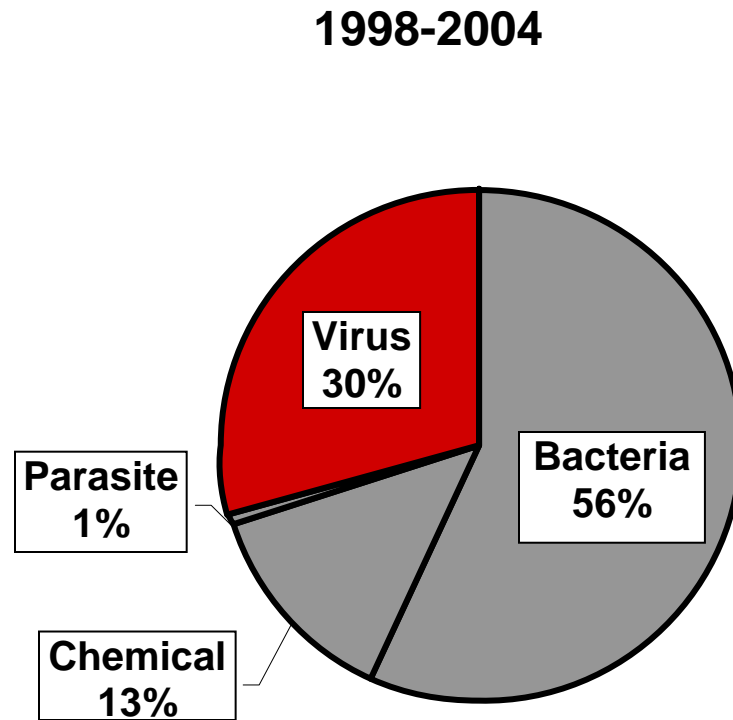
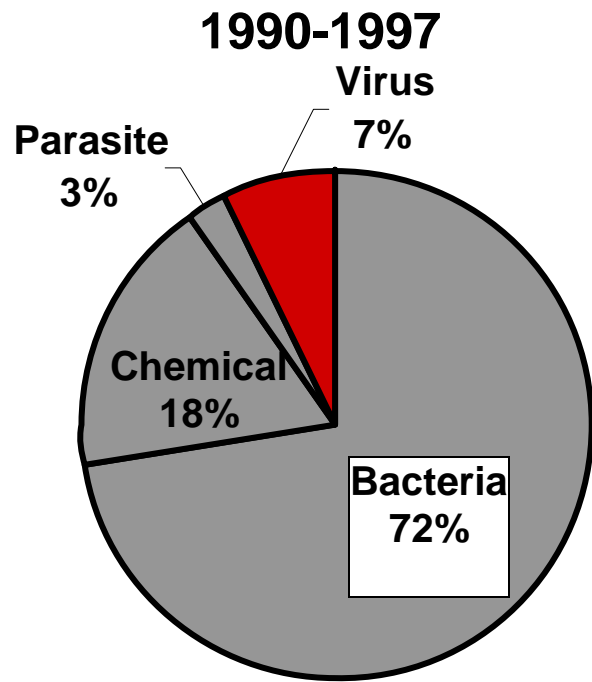


FIGURE 3. FOODS IDENTIFIED IN VIRUS OUTBREAKS 1990-2004

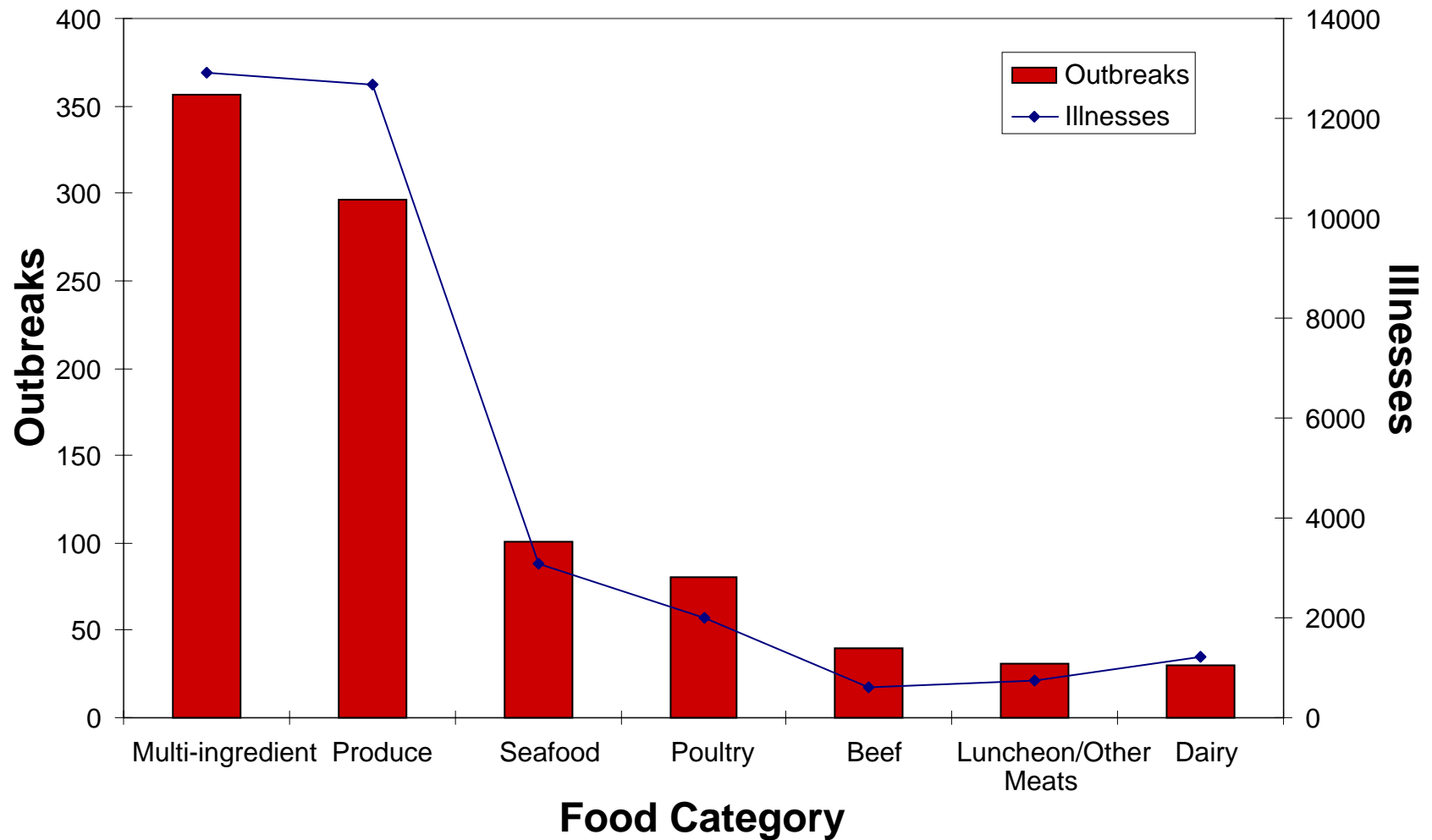


FIGURE 2. VIRUS OUTBREAK LOCATIONS 1990-2004

