EMERGING INFECTIONS PROGRAM

VOLUME 2, ISSUE 3

FOODNET NEWS

SUMMER 2008

Trends in Incidence of Frequently Identified Non-Typhoidal *Salmonella* Serotypes, FoodNet 1996-2006

INSIDE THIS ISSUE:

In the period between 1996 and 2006, FoodNet ascertained 52,659 laboratory-confirmed cases of non-typhoidal *Salmonella* infections for an average incidence of 14.7 infections per 100,000 persons per year. To better understand the epidemiology of *Salmonella* we conducted an analysis focused on the 47,038 (89%) non-typhoidal *Salmonella* cases for which full serotype information was available.

The top five non-typhoidal *Salmonella* serotypes reported were Typhimurium, Enteritidis, Newport, Heidelberg, and Javiana. When comparing 2006 with the 1996-1998 reference period, only the incidence of *S.* Typhimurium decreased significantly (41% decrease) while significant increases were observed for serotypes Javiana (95%), Stanley (61%), Newport (44%), and Enteritidis (27%).

When age distribution was examined by serotype, the highest incidence per 100,000 population for all non-typhoidal *Salmonella* serotypes was in the 0-4 age group (Range: 0.38 for Mbandaka to 15.5 for Typhimurium). The most commonly occurring serotypes among children <5 years were *Salmonella* Javiana, *S.* Mississippi, and *S.* Poona. In contrast, most *S.* Braenderup, *S.* Enteriditis, and *S.* Heidelberg infections were among persons ≥20 years of age. The age distributions for *S.* Muenchen, *S.* Paratyphi B var. L (+) tartrate+, *S.* I 4,[5],12:i:-, *S.* Stanley, and *S.* Typhimurium infections were bimodal with peaks in persons ≤5 and 20-49 years of age.

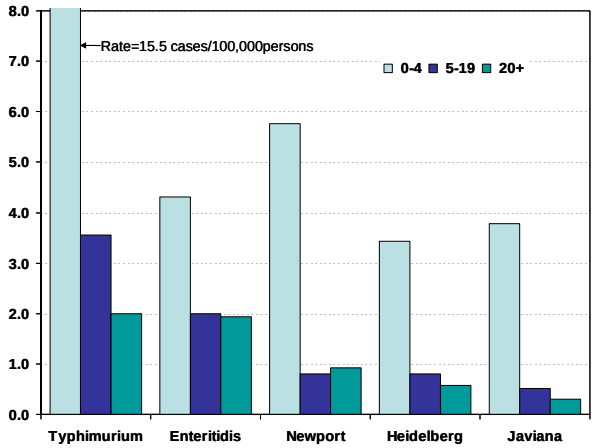
The incidence of infection for all serotyped non-typhoidal *Salmonella* in minorities was almost twice as high as that for whites, this is driven by the race/ethnicity distribution for *S.* Typhimurium and was not the case for other serotypes. There were no differences in sex by serotype.

Hospitalization was more commonly reported for infections with serotypes Poona (28%), I 4,[5]12:i:- (27%), Heidelberg (26%), Typhimurium (24%), and Mbandaka (23%). Overall, the case fatality rate was 4.7 deaths/1,000 *Salmonella* infections with the highest rate for *S.* Agona (8.2) then *S.* Typhimurium (6.5), *S.* Hadar (6.2), *S.* Poona (6.2), and *S.* I 4,[5]12:i:- (5.2).

FoodNet continues to report little change in the overall incidence of laboratory-confirmed *Salmonella* infections; however, we now know there is great variability by serotype. Understanding the epidemiology of *Salmonella* infections by serotype is imperative to guide efforts to reduce the incidence of *Salmonella* infections.

—Cherie Long, CDC FoodNet

Average annual incidence of infection with top 5 *Salmonella* serotypes, by age group, FoodNet 1996-2006



Salmonella serotypes with highest incidence, by race/ethnicity group, FoodNet 1996-2006

Black Serotype (Incidence/100,000 persons)	White Serotype (Incidence/100,000 persons)	Hispanic Serotype (Incidence/100,000 persons)	Other Serotype (Incidence/100,000 persons)
Typhimurium (4.02)	Typhimurium (2.26)	Typhimurium (3.03)	Typhimurium (2.12)
Enteritidis (2.08)	Enteritidis (1.60)	Enteritidis (1.58)	Enteritidis (1.22)
Heidelberg (1.06)	Newport (1.02)	Newport (0.79)	Heidelberg (0.93)
Newport (0.83)	Heidelberg (0.54)	Heidelberg (0.66)	Javiana (0.51)
Javiana (0.68)	Javiana (0.45)	Montevideo (0.38)	Infantis (0.48)

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WHAT IS FOODNET?

The Foodborne Diseases Active Surveillance Network (FoodNet) is the principal foodborne disease component of CDC's Emerging Infections Program. FoodNet is a collaborative project of the CDC, ten sites (CA, CO, CT, GA, MD, MN, NM, NY, OR, TN), the U. S. Department of Agriculture (USDA), and the Food and Drug Administration (FDA). The CDC FoodNet Team is in the Enteric Diseases Epidemiology Branch (EDEB), in the Division of Foodborne, Bacterial, & Mycotic Diseases (DFBMD) in the National Center for Zoonotic, Vector-Borne, & Enteric Diseases (NCZVED).

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Not the Conventional Dogma: Multistate Outbreak of Human *Salmonella* Serotype Schwarzengrund Infections Caused by Contaminated Dry Dog Food—Northeastern United States, 2006-2007

Human infections with *Salmonella* Schwarzengrund have been linked with exposure to certain brands of dry pet food produced by Manufacturer A at a single manufacturing facility, Plant A, in Pennsylvania. From 2006-2007, at least 70 persons infected with the same strain of *Salmonella* Schwarzengrund have been reported to CDC from 19 states, primarily in the Northeastern U.S. The majority of cases were from Pennsylvania. Approximately 40% of patients were one year of age or younger. A multi-state case-control study demonstrated an association between illness and purchase of dry pet foods produced by Manufacturer A. Dry dog foods produced by Manufacturer A under several brand names caused human illness. Illness related to this outbreak was not been reported in pets. However, the outbreak strain of *Salmonella* Schwarzengrund was isolated from fecal specimens from dogs that ate dry pet food in the homes of patients, from open bags of dry dog food being fed to these dogs, from Plant A environmental specimens, and from two brands of finished product produced at Plant A. Manufacturer A announced a voluntary recall of select bags of these two brands. Neither of these brands has been linked to human illness. This is the first report of human *Salmonella* infection caused by contaminated dry dog food. This outbreak demonstrates that dry dog food may be contaminated with *Salmonella* and be an under-recognized source of human infections, especially in young children. Forty-three million (37.2%) U.S. households own a dog and many feed dry dog food. Since dry pet food and other pet products, including pet treats and pet supplements, are not manufactured to be sterile it is important for pet owners to be aware of cross-contamination after feeding pets, especially in households with young children. Persons contacting dry pet food, pet treats and pet supplements should wash hands right after handling these pet products, especially before preparing food or baby bottles. Young children should not be allowed to handle dry pet food or other pet products and should be kept away from pet feeding areas.

—Casey Barton Behravesh, CDC EIS Officer '06

For more information on this outbreak please visit: http://www.cdc.gov/salmonella/schwarzengrund.html

Salmonella Outbreaks Linked to Small Turtles: A Sign of Things to Come?

In 1975, the U.S. Food and Drug Administration banned the sale and distribution of turtles less than four inches in length. The ban was meant to prevent the estimated 280,000 turtle-associated *Salmonella* infections occurring each year in the U.S. – nearly 14% of all reported *Salmonella* infections the U.S [1]. These infections occurred most frequently in infants and young children – the most vulnerable age group for severe or fatal illnesses – and were usually associated with turtles with shell length under four inches. Several reports published in the CDC MMWR since the mid-1990s have documented case reports of turtle-associated salmonellosis in the U.S. [2-6].

Two separate turtle-associated *Salmonella* outbreaks were reported in the U.S. between March 2007 and March 2008. Between October 2006 and April 2007, 20 isolates of *Salmonella* Pomona indistinguishable by PFGE were reported in the United States [5]; of 15 persons interviewed, 80% had turtle contact during the week before their illness onset. Six patients with turtle purchase information reported that they purchased at a small turtle at a flea market or pet store. One patient, a three-week-old infant, died as a result of her infection. Her family reported purchasing a 1.25-inch turtle three months earlier.

Between May 2007 and January 2008, 107 cases of *Salmonella* Paratyphi B L (+) tartrate + (var. Java) (*Salmonella* Paratyphi B var. Java) were reported in the United States [6]. Most (59%) of infections were in children ten years of age or younger; 33% of all patients were hospitalized. Of 78 patients interviewed, 47 (60%) reported exposure to turtles in the week before illness. Most (87%) of the turtles had a shell length under four inches, and 64% were purchased in a pet store, flea market, or from a street vendor. Despite longstanding scientific data documenting that turtles can harbor *Salmonella* and serve as sources of human infections, only 24% of all interviewees reported knowing about a link between *Salmonella* infection and reptile contact.

These two outbreaks likely represent only a fraction of turtle-associated *Salmonella* cases in the U.S. Studies have shown repeatedly that regulation is effective in reducing turtle-associated *Salmonella* infections [7-9]. Although education is helpful, it is important to keep small turtles from reaching households with infants and small children. The American Veterinary Medical Association has estimated that turtle ownership doubled between 1996 and 2006, and that 1% of U.S. households now own a pet turtle [10]. This may translate to increased numbers of turtle-associated *Salmonella* infections for infants and young children in the United States. Guidelines for the prevention of turtle-associated *Salmonella* are available from the CDC[5] and include keeping turtles out of homes with infants, children under five years of age, immunocompromised persons or the elderly, and thorough handwashing with soap after any contact with turtles or other reptiles.

—Julie Harris, CDC EIS Officer '07

For more information about Salmonella and turtles please visit: http://www.cdc.gov/Features/TurtlesSalmonella/

[1]Lamm SH, Taylor A, Jr., Gangarosa EJ, et al. Turtle-associated salmonellosis. I. An estimation of the magnitude of the problem in the United States, 1970-1971. American journal of epidemiology 1972;95(6):511-7.

[2]Reptile-associated salmonellosis--selected states, 1994-1995. Mmwr 1995;44(17):347-50.

[3]Reptile-associated salmonellosis--selected states, 1996-1998. Mmwr 1999;48(44):1009-13.

[4]Reptile-associated salmonellosis--selected states, 1998-2002. Mmwr 2003;52(49):1206-9.

[5]Turtle-associated salmonellosis in humans--United States, 2006-2007. Mmwr 2007;56(26):649-52.

[6]Multistate outbreak of human salmonella infections associated with exposure to turtles — United States, 2007–2008. Mmwr 2008;57(3):69-72.

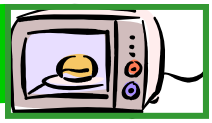
[7]Cohen ML, Potter M, Pollard R, Feldman RA. Turtle-associated salmonellosis in the United States. Effect of Public Health Action, 1970 to 1976. Jama 1980;243(12):1247-9.

[8]D'Aoust JY, Lior H. Pet turtle regulations and abatement of human salmonellosis. Canadian journal of public health 1978;69(2):107-8.

[9]de Jong B, Andersson Y, Ekdahl K. Effect of regulation and education on reptile-associated salmonellosis. Emerging infectious diseases 2005;11(3):398-403.

[10]Association AVM. U.S. Pet Ownership & Demographics Sourcebook. Schaumberg, Illinois: American Veterinary Medical Association; 2007.

Salmonella I 4, 5, 12: i– Outbreak Associated with Pot Pies



In recent years, *Salmonella* outbreaks in Australia, Canada and the United States associated with a variety of frozen, microwavable, raw, breaded chicken products including chicken nuggets, strips, and stuffed pre-browned breasts have been reported. These products fit into the popular category of prepared but not ready-to-eat (PNRTE) foods. Although PNRTE foods must be fully cooked for safe consumption, consumers often believe such products just need to be warmed.

The largest known outbreak associated with a PNRTE product occurred in 2007. The outbreak of *Salmonella* I 4,5,12:i:- was detected in June when PulseNet, the national subtyping network for foodborne disease surveillance, identified four Pennsylvania residents with recent infections indistinguishable by DNA fingerprints. Over the next several months the number of cases grew in number throughout the country. Several interviewing methods were utilized by CDC and state health departments to identify the source of infection. Ultimately, the Minnesota Department of Health suspected Brand X frozen pot pies, as a result of an iterative process of re-interviewing their patients after several had reported consuming these products.

In total, 401 outbreak strain infections were reported in the United States in 2007; due to known underreporting, this translates into an estimated 15,000 people infected. A case-control study conducted in October found a strong statistical association between illness and consumption of Brand X pot pies leading to a recall of these products. Subsequently, the outbreak strain was cultured from Brand X turkey pot pies.

Brand X pot pies are sold with a raw crust and, therefore, are considered PNRTE products. All of the ingredients of animal origin in Brand X pot pies were intended to be precooked. However, raw meat products did enter the plant that produced the pies making it possible for contamination of the final product with uncooked meat. To date, the source of contamination is unknown.

Among patients with available data, 73% (151 of 207) reported having possibly consumed a Brand X pot pie in the week before illness and 77% (102 of 133) of pot pie eaters cooked the pies in microwave ovens. The microwave instructions were confusing, requiring consumers to know the wattage category of the microwaves. Most patients questioned could not report the wattage of the microwaves used. Furthermore, most patients did not let the pot pies stand the recommended time after microwaving - a crucial step because microwaves heat foods unevenly. Letting foods stand the recommended time allows heat to distribute more evenly. Before resuming production of Brand X pot pies, the company improved instructions and modified product labeling to make it clearer that the pies need to be fully cooked.

So, what are consumers to do? They should always follow package directions. However, when given a choice, a conventional oven is the best option for cooking PNRTE foods containing ingredients of animal origin that are not fully cooked. Whether consumers choose to use a microwave or conventional oven, using a food thermometer to check the internal temperature in multiple locations is the best way to assure thorough cooking.

—Raj Mody, CDC EIS Officer '07

For more information on this outbreak please visit:: http://www.cdc.gov/salmonella/4512eyeminus_faq.html

Snack Attack: Multistate Outbreak of *Salmonella* Serotypes Wandsworth and Typhimurium Infections Associated with Consumption of a Puffed Vegetable Snack Food—United States, 2007

Salmonella infection is a major cause of acute gastroenteritis, causing an estimated 1.4 million illnesses and 400 deaths annually in the United States. Infections often occur from contaminated meat, poultry, and produce. Processed, ready-to-eat foods are less commonly implicated. *Salmonella* Wandsworth is a rare *Salmonella* serotype that had never caused an outbreak in the United States.

In May 2007, several states and CDC began investigating an increase in reported *Salmonella* Wandsworth infections. We identified *Salmonella* Wandsworth cases with the outbreak strain through PulseNet (the national molecular subtyping network for foodborne disease surveillance), used food history questionnaires and open-ended interviews to develop hypotheses, and then conducted a case-control study using age-matched friend controls. The outbreak was highly dispersed, with 69 cases occurring in 23 states between February 26 and July 4, 2007. Ninety-three percent of cases occurred in children aged 10 months to 3 years.

The case-control study showed that illness was significantly associated with eating a commercial puffed vegetable-coated ready-to-eat snack food that is a popular finger food for toddlers. Based on these results, the manufacturer ceased production and recalled this snack food. Local and state public health laboratories isolated the *Salmonella* Wandsworth outbreak strain from 11 snack food bags and a new strain of a very common serotype, *Salmonella* Typhimurium, from one bag. During inspection of the plant by the U.S. Food and Drug Administration, bags of this snack food collected from the plant, vegetable seasoning mix added after the baking and puffing steps during production of the snack food, and broccoli powder used to make the seasoning mix, all yielded the outbreak strain of *Salmonella* Wandsworth. PulseNet subsequently uncovered a hidden outbreak of 18 patients with the new *Salmonella* Typhimurium strain isolated from the snack food; most patients were children who ate the puffed vegetable-coated snack before getting sick.

Coordinated epidemiologic and laboratory efforts detected this outbreak, identified the source, and then detected the *Salmonella* Typhimurium outbreak. A nationwide recall likely prevented additional illnesses. This outbreak demonstrates that the practice of adding ingredients after the lethal-processing step during the manufacture of snack foods and can result in human illness, resulting in an ongoing threat to food safety. Measures are needed to assure that such ingredients added after the lethal-processing steps are free of pathogens.

—Anandi Sheth, CDC EIS Officer '06

For more information about this outbreak please visit: http://www.cdc.gov/salmonella/wandsworth.htm

Spotlight on Monophasic Variants of *Salmonella*

The recent pot-pie outbreak (pg. 3) brought a lot of attention to *Salmonella* serotype I 4,5,12:i:-, a monophasic variant of *Salmonella* serotype Typhimurium. Other monophasic variants are also common.

To understand monophasic variants, you first need to understand serotype designation. *Salmonella* serotype is based on subspecies, O antigen (LPS), and H (flagellin) antigens. The combination of subspecies and antigenic properties can be represented as an antigenic formula. All serotypes can be designated by formula, according to the conventions of the Kauffmann-White Scheme. When all the described antigens for a serotype within *S. enterica* subspecies I are identified, a name may also assigned to the strain (e.g. *Salmonella* serotype Typhimurium).

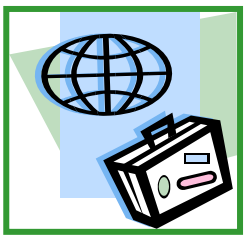
Many *Salmonella* serotypes are "diphasic"; they have two H antigens, referred to as Phase I and Phase II antigens. If only one phase of a diphasic serotype is detected, it is a monophasic variant and cannot be given a serotype name. Monophasic variants are considered "completely serotyped" and serotype is designated by antigenic formula (e.g. *Salmonella* serotype I 4,5,12:i:-).

In addition to *Salmonella* serotype I 4,5,12:i:-, *Salmonella* I 4,5,12:b:- var. L(+) tartrate + and I 13,23:b:- are also common in the US. Many serotype I 4,5,12:b:- var. L(+) tartrate + isolates in the PulseNet USA database cluster with serotype Paratyphi B var. L (+) tartrate + (var. Java), suggesting they are monophasic variants of Paratyphi B var. Java. Thus, it is important to perform tartrate testing on all I 4,5,12:b:- strains and report this result, as with Paratyphi B strains. Based on molecular characterization, *Salmonella* serovar I 13,23:b:- appears to be monophasic variant of *Salmonella* Mississippi.

Some diphasic serotypes do not switch phases easily and can confound the identification of monophasic variants; e.g., serotypes Choleraesuis (I 6,7:c:1,5) and Thompson (I 6,7:k:1,5). Depending on which phase the strain is "stuck" in, they can appear to be serotype I 6,7:-:1,5; I 6,7:c:-; or I 6,7:k:-. Many strains serotyped as I 6,7:-:1,5 in the CDC Reference Collection are *Salmonella* Choleraesuis, a serotype associated with invasive disease. It is crucial to biochemically rule-in/rule-out this serotype when these apparent monophasic variants are detected.

—Matt Mikoleit and Patty Fields, CDC *Salmonella* Reference Lab

International Travel-Related Salmonellosis: the Foodborne Active Surveillance Network (FoodNet) 2004-2006



Salmonella infections diagnosed in the U.S. can be acquired abroad. Knowing the proportion attributable to international travel helps focus efforts to characterize domestic sources and inform food safety policy.

From 2004–2006, 19,692 laboratory-confirmed cases of *Salmonella* were reported to FoodNet. Data on international travel were available for 13,276 (67%). During this period, approximately 12% of *Salmonella* cases interviewed indicated that they traveled internationally in the 7 days before illness onset. The majority of cases with a history of travel were between 20-39 years of age (median age: 31 years) while no differences by sex were observed. The highest frequency of cases occurred in July and August. The number of travel-associated cases varied widely by serotype which we expected as some serotypes are more predominant outside the U.S. Among the 15 most frequently identified *Salmonella* serotypes in the United States with travel information, S. Branderup (36%) and S. Enteriditis (26%) had the highest proportion of cases with a history of international travel while S. Heidelberg had the lowest (2%).

The likelihood that a case of salmonellosis was acquired from domestic food sources varies by serotype, season and age. Understanding which serotypes are more likely to be acquired during international travel improves our estimates of the burden of illness acquired domestically. Country-specific data on the distribution of *Salmonella* serotypes, along with information from cases on countries visited and specific food and water exposures during travel may inform more targeted prevention activities for travel-related salmonellosis.

—Liane Ong, CDC FoodNet

Don't miss the special summer handout on banishing bacteria from your BBQ! (attached to newsletter)

RECENTLY PRESENTED ABSTRACTS AT THE EPIDEMIC INTELLIGENCE SERVICE (EIS) CONFERENCE, APRIL 2008

- Barton Behravesh, C. Not the Conventional Dogma: Multistate Outbreak of Human *Salmonella* Serotype Schwarzengrund Infections caused by Contaminated Dry Dog Food—Northeastern United States, 2006-2007.
- Boore, A. The Changing Epidemiology of *Salmonella* Serotypes—United States, 1996-2006.
- Harris, J. Impact of Household Water Treatment and Hygiene Promotion on Diarrhea among Rapidly Weaned Infants of HIV-Infected Mothers—Kenya 2005-2007.
- Harris, J. Tightening Tiny Turtle Trafficking: A Multistate Outbreak of Human Salmonella Paratyhpi B (serovar Java) Infections Associated with Small Turtle Exposure—United States, 2007.
- Juliao, P. Not a Clever Retort: Multistate Outbreak of Botulism Caused by Commercially Canned Hot Dog Chili Sauce—June-August, 2007.
- Mody, R. Misadventures in Microwaving: Multistate Outbreak of Salmonella I 4, [5], 12: i– Infections Associated with Commercially Produced Frozen Pot Pies—United States, 2007.
- Olson, C. Determinants of Oral Rehydration Therapy Utilization—Asembo District, Kenya, 2007.
- Russo, E. Evaluation of Exclusion Policies During a Large Shigellosis Outbreak Associated with Child Care-Aged Children—Mississippi, 2007.
- Sharapov, U. Hot Chicks! Multistate *Salmonella* Montevideo Outbreaks Associated with Exposure to Poultry from Mail-Order Hatcheries—United States, 2007.
- Sheth, A. Snack Attack: Multistate Outbreak of *Salmonella* Serotypes Wandsworth and Typhimurium Infections Associated with Consumption of a Puffed Vegetable Snack Food—United States, 2007.
- Sodha, S. Barriers to Maintaining the Microbiologic Quality of Drinking Water, South Sulawesi, Indonesia—Bantaeng and Maros Districts, 2007.

RECENTLY PUBLISHED MANUSCRIPTS

- Crump, J. et al. Clinical Response and Outcome of Infection with *Salmonella enterica* Serotype Typhi with Decreased Susceptibility to Fluoroquinolones: a United States FoodNet Multi-Center Retrospective Cohort Study. Antimicrob. Agents Chemother. 2008 52: 1278-1284.
- Jones, T. et al. Salmonellosis Outcomes Differ Substantially by Serotype. J. Infect. Dis. Electronic publication: May 2008.
- Townes, J. et al. Reactive Arthritis Following Culture-Confirmed Infections with Bacterial Enteric Pathogens in Minnesota and Oregon: A Population-Based Study. Ann. Rheum. Dis. Electronic publication: Feb 2008.

UPCOMING CONFERENCES OF INTEREST

- International Association of Food Protection, August 3-6, 2008, Columbus, Ohio.
- American College of Epidemiology, September 14-16, 2008, Tucson, Arizona.
- Interscience Conference on Antimicrobial Agents and Chemotherapy/Infectious Disease Society of America, October 25-28, 2008, Washington, D.C.
- American Public Health Association, October 25-29, 2008, San Diego, California.
- American Society of Tropical Medicine and Hygiene, December 7-11, 2008, New Orleans, Louisiana.

ADDITIONAL RESOURCES

NEW DISTANCE LEARNING ON OUTBREAK INVESTIGATION The Centers for Disease Control and Prevention (CDC) announces the release of a new computer-based case study, "Salmonella in the Caribbean." Based on a real-life outbreak investigation, this self-instructional, interactive exercise teaches public health practitioners skills in outbreak investigation and allows them to apply and practice those skills.

"Salmonella in the Caribbean" is the fourth and final case study in the Foodborne Disease Outbreak Investigation Case Study Series. The other case studies are "Botulism in Argentina" (released 2002), "E. coli O157:H7 Infection in Michigan" (released 2004), and "Gastroenteritis at a University in Texas" (released 2005). The four case studies comprise a curriculum, and together, cover a wide range of outbreak investigation topics. The new case study, "Salmonella in the Caribbean," also focuses on the role of surveillance in identifying and characterizing public health problems, developing hypotheses about the problems, and monitoring the effectiveness of control measures.

The Foodborne Disease Outbreak Investigation series was created for students with knowledge of basic epidemiologic and public health concepts. Each case study was developed in collaboration with the original investigators and experts from CDC, the Council of State and Territorial Epidemiologists, the U.S. Department of Agriculture, and the U.S. Food and Drug Administration

All four case studies can be downloaded at no cost from CDC's Epidemiologic Case Studies website at <http://www.cdc.gov/epicasestudies/>. They also can be purchased from the Public Health Foundation at 1-877-252-1200 or <http://bookstore.phf.org>. Additionally, students can receive continuing education credits (e.g., CEUs, CMEs, CNEs, CHES, AAVSB-RACE) for completing selected case studies and have fun while they do it!

—Jeanette Stehr-Green and Nancy Gathany, CDC

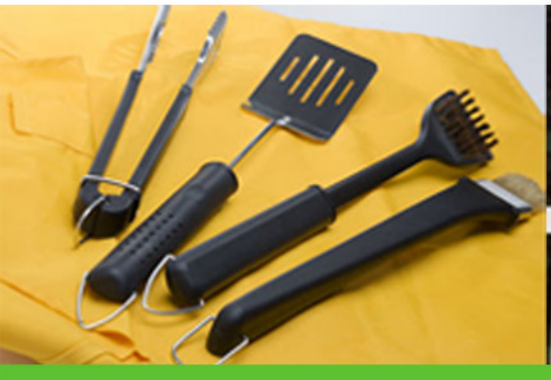
Banish Bacteria From Your BBQ

Summertime is here and that means grilled burgers, ribs, and other great-tasting foods. Make your summertime even more enjoyable by taking a few moments to learn about what you can do to reduce your risk of getting sick from these summertime goodies.

You can get a foodborne illness any time of the year when you eat a contaminated food item. However, *Salmonella* infections and other foodborne illnesses peak in the summer. So, pay special attention to the Rules of Food Safety during your summertime fun.

Why is it that more cases of foodborne illness occur during the summer? Bacteria need temperatures between 40 °F and 140 °F and moisture to grow. Since summer weather is both hot and humid, conditions are ideal for this growth. Also, safety precautions that are available in the kitchen - refrigeration, running water, etc. - are not usually readily available outdoors.

So, what can you do to help reduce your risk of foodborne illness during summer and all-year long? Do not eat raw or undercooked meat, including hamburgers, poultry, or seafood drink raw milk, or eat products made from raw milk. Rinse fresh fruits and vegetables under running tap water. And, always follow the Rules of Food Safety.



Rules of Food Safety

CLEAN your hands with soap and warm water before handling food and clean surfaces before preparing foods on them. Use an alcohol-based hand sanitizer at the BBQ site.

SEPARATE uncooked foods from ready-to-eat foods.

COOK foods to the proper temperature when grilling. Make sure to use a food thermometor. Color is not an indicator of doneness.

CHILL foods promptly after serving and when taking from one place to another. Keep your refrigerator at 40 °F or below. Keep hot foods hot and cold foods cold.

For more information on foodborne illness and food safety, you can call 1-800-CDC-INFO, email cdcinfo@cdc.gov, or visit www.cdc.gov. You may also call the USDA Meat and Poultry Hotline at 1-888-MPHotline or 1-888-674-6854 or visit their automated website, Ask Karen at www.askkaren.gov.