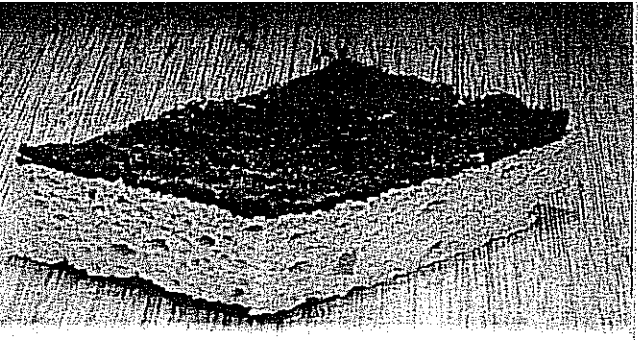
Safe at Home

How to keep your kitchen from making you sick



Earlier this year, NSF International—a non-profit agency that sets safety standards for water filters and other equipment in Canada and the United States—asked 22 families in the Ann Arbor, Michigan, area to swab 30 everyday items and sites around their homes, including their wallet or purse, iPod, toilet seat, cell phone, pet's bowl, and different spots in the kitchen.

NSF was looking for coliform bacteria (a sign of fecal contamination), *Staphylococcus* bacteria (which, like coliform, can cause diarrhea and vomiting), and yeast and mould (which can trigger allergic reactions). The agency hit pay dirt most often in the kitchen. Although the researchers didn't survey homes in Canada, NSF says that the findings would probably be similar here.

We'll never live in a germ-free environment, and odds are you won't get food poisoning from what's in your kitchen. But if there are vulnerable people in your household—or you just want to clean up your act—it's important to know what researchers have learned.

Welcome to Germ Central. It's easy for bacteria and other bugs to find their way around the kitchen as they travel from soiled hands and raw foods to countertops, sponges, and sinks. Once there, they can contaminate hands and food, sometimes for up to a week.

Sponges & Dish Cloths

"Sponges are usually the dirtiest thing in the kitchen and difficult to keep clean," says microbiologist Manan Sharma of the United States Department of Agriculture's Food Safety Laboratory in Beltsville, Maryland.

That was true in the recent NSF International survey of homes, where 77 per cent of the sponges and dish cloths contained coliform bacteria, 86 per cent had yeast and mould, and 18 per cent had *Staph* bacteria.[1]

Why are sponges so dirty? "They come into contact with food residues that can build up in them and that provide nutrients for bacteria and other micro-organisms to grow," explains Sharma. What's more, sponges are often wet and are left in damp areas in or near the sink, which are ideal conditions for germs to multiply.

"They also have many nooks and crannies, which can be great places for germs to multiply," notes NSF microbiologist Rob Donofrio, who adds that "sponges are typically not properly—or regularly—sanitized before their next use."

That's why sponges "are not a safe method" for wiping surfaces that come into contact with food, says Andrew Russell of HACCP Canada, a company that helps retail food establishments set up food-safety programs.

"A safe kitchen is a dry kitchen where there are no wet sponges and no wet towels for bacteria to grow overnight," adds O. Peter Snyder, whose Hospitality Institute of Technology and Management in St. Paul, Minnesota, provides training for the U.S. food and restaurant industries in sound food-safety practices.

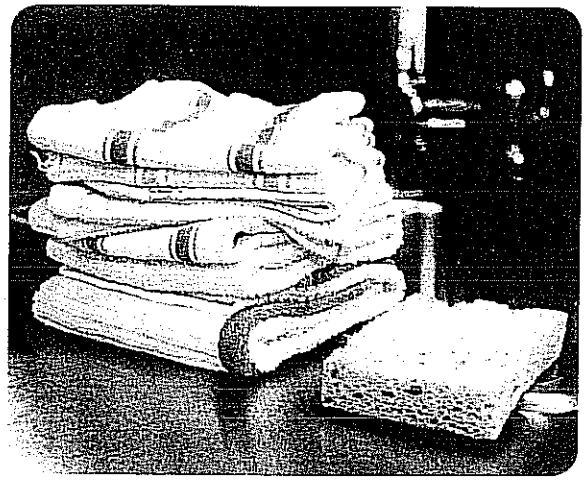
What to do: "Just rinsing and squeezing out a sponge under running water is not going to do a whole lot," says Sharma. "But microwaving your wet sponge for one minute gets rid of a significant portion of the bacteria."

After Sharma and colleagues at the U.S. Department of Agriculture soaked sponges for two days in a slurry of ground beef and soy broth, microwaving at full power for one minute was the most effective way of killing the bacteria in the sponges.[2]

Running them through the dishwasher killed almost as many bugs. Soaking them in 10 per cent bleach (about twice as concentrated as household bleach) for three minutes or in lemon juice or water for one minute wasn't much better than doing nothing.

Don't try to microwave sponges that have metal in them, cautions Sharma. "And make sure the sponge is wet so it won't catch fire."

If you don't want to go through all that to keep your sponges clean, keep a supply of clean dish cloths handy. Start out each morning with a fresh, dry one and at the end of the day toss the used cloth into the laundry hamper.



If you don't microwave your sponges or run them through the dishwasher every day, use dish cloths on your kitchen surfaces. Start with a fresh one each morning and toss it into the hamper each night.

Countertops

In the NSF survey, 32 per cent of kitchen countertops were contaminated with coliform bacteria and 18 per cent had yeast and mould.

A major source of contamination: our fingers.

"We use our hands, in particular the fingers, for so many things that we tend to forget where they've been and where they're going," says Michigan State University food-safety expert Ewen Todd. "We just tend to use them automatically."

Then there's wiping countertops with dirty sponges and dish cloths.

Even after a wet sponge has been squeezed out, it still holds two and

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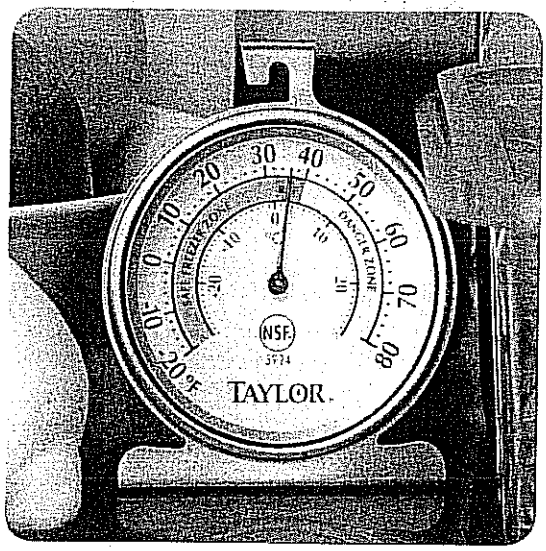

There's only one way to know if your refrigerator or freezer is cold enough: use a thermometer.

Photo: Jorge Bach.

a half times its weight in water. When you use the sponge to wipe off a countertop, some of that water—and from 20 to 40 per cent of the microbes in it—can be left behind.[3] And the non-porous surface of a countertop is ideal for spreading micro-organisms to anything that touches it, including fingers, utensils, and food.

"The risk of cross-contamination in the kitchen is fairly high," says Todd. "The danger is that we transmit micro-organisms to vegetables or fruit or any other ready-to-eat food that is not going to undergo further preparation like cooking, which would kill them."

What to do: "Cleaning your kitchen surfaces with soap and water is enough for most normal healthy people," says Joseph Frank of the University of Georgia's Center for Food Safety.

Using soap or detergent and water physically removes germs and dirt from surfaces and rinses them away. While that doesn't kill them, it does lower their numbers and, therefore, the risk of spreading infection.

For most purposes, that's enough. It's not necessary to bring out the big guns—chemical disinfectants—to kill the germs.

"It's more important to keep things clean than it is to have things disinfected, because cleaning removes 99 per cent of the micro-organisms, and disinfectants don't work unless the surface is cleaned first anyway," says Frank.

And disinfectants—products like Pine-Sol, Lysol, and Clorox—don't kill viruses, parasites, or even all disease-causing bacteria, adds O. Peter Snyder.

"The only way to take care of viruses and parasites is to wash them off with soap and water," he notes.

"But if you have people in your household who have a greater risk of getting sick, such as the immunocompromised, the very elderly, and perhaps small children, I would definitely consider using a disinfectant on countertops and the sink."

If you do, make sure you know how to use it.

"You should always clean the surface first with soap and water," says Frank. "If the surface has dirt, especially grease, the disinfectant won't work."

And many disinfectants don't kill bacteria immediately, like bleach does. "They have to remain in contact with the surface for 30 seconds, a minute, sometimes several minutes or more," notes Frank. For Lysol Disinfectant All-Purpose Cleaner or the liquid in Clorox Disinfecting Wipes, for example, it's 10 minutes.

"And if the surface is going to come into contact with food," adds Frank, "it must be rinsed with clean water afterwards, since these disinfectants haven't been approved as safe in food."

That's not the case with a simple, effective disinfectant you can easily make at home. "Use a bleach solution to sanitize," says Health Canada. Its formula: mix 5 mL (1 teaspoon) of household bleach with 750 mL (3 cups) of water in a labelled spray bottle.

Flood the countertop with the solution, allow it to sit for a few minutes, then pat with clean, dry paper towels or allow to air dry. You don't need to rinse the countertop because the bleach solution breaks down into salt and water. What you don't use will keep for a week if it's tightly covered.

Other homemade disinfectants like vinegar and baking soda are too weak to be effective, says William Rutala of the University of North Carolina. In his studies, vinegar had little effect on the common food bug *Staphylococcus aureus*, while baking soda was no match for *E. coli*.[4]

Sinks

"Sink drains are really dirty places," according to the University of Georgia's Joseph Frank. Food particles get trapped in the drain and disposal, creating a perfect environment for bacterial growth.

"You'll find *Listeria* in a good many drains, and probably *Salmonella* too, especially if people use the sink for rinsing off raw meat or poultry," says Frank.

In the NSF survey, 45 per cent of kitchen sinks were contaminated with coliform bacteria and 27 per cent with yeast and mould.

What to do: "If you have people at a higher risk of infection in your household, I would sanitize the drain periodically with a bleach solution," says Frank. (You can use the same homemade solution that works on your countertops: a teaspoon of unscented bleach in 3 cups of water.)

"And I wouldn't fill up the sink with water to rinse off your vegetables or lettuce because there's a good chance of pathogens' being there from the drain," adds Frank. "Do that in a separate clean bowl."

Cutting Boards

Which is safer: a wooden or a plastic cutting board? "Either one is fine and either one can give you problems," says Frank.

"It's more a matter of the integrity of the board's surface," he explains. "New wood and plastic boards all work fine and are easy to clean. It's after you've been using them for a while and they start getting cuts and gashes that it can become difficult to get all of the food residues out of them."

Worn and knife-scarred plastic boards are "impossible to clean and disinfect manually, especially when food residues such as chicken fat are present," wrote Dean Cliver of the University of California at Davis on the University's Web site.[5] (Cliver, a leading authority on keeping cutting boards clean, died last May.)

Wooden boards, on the other hand, have a certain degree of built-in protection, Cliver found. Whether new or used, they absorb bacteria from food into their interior, where the bugs gradually die, he wrote.

Special cutting boards that have antimicrobial compounds incorporated into them are a waste of money, notes Frank.

"They kill only the pathogens that are in direct contact with the board, but most of the time pathogens are in grease or food and are not contacting the board."

If you don't clean it, an antimicrobial board is not going to help you, says Frank. "And if you do clean it, then you don't need it because your cutting board is already clean."

What to do: Clean your cutting boards with soap and water. You can also run plastic or solid wooden boards through

the dishwasher. Small wooden boards can be disinfected in the microwave, Cliver found, though "care must be used to prevent overheating."

If the surface of any of your cutting boards—wood or plastic—is so rough that you can still see food remnants after you've cleaned it, "buy a new cutting board," says Frank. "They're not that expensive."

Refrigerators

Cold temperatures keep most bacteria in a state of suspended animation, so they don't multiply. To do that, though, your refrigerator needs to stay at 4°C (40°F) or below.

Using a refrigerator thermometer is the only way to know for certain how cold your fridge is. (That's especially important after a power outage, because it eliminates the guesswork about how warm your food was.)

Just one in nine U.S. households use a refrigerator thermometer, according to a recent survey.[6] (There's no reason to think that the proportion is any different in Canada.) And when the investigators gave thermometers to 2,037 survey participants, more than a quarter of them discovered that the inside of their refrigerator was warmer than 4°C.

What to do: Put a thermometer that's designed for refrigerators in the middle of a middle shelf. Leave it there for five to eight hours. If the temperature is above 3°C to 4°C (38°F to 40°F), lower the temperature setting and check again after another five to eight hours.

Just keep in mind that some food-borne pathogens can grow at 4°C or below.

One is *Yersinia enterocolitica*, a bacterium that is sometimes found in raw or undercooked pork. It causes about 100,000 illnesses and 30 deaths a year in the United States. In Canada, "the number of cases is unknown," according to the Web site of Alberta Health and Wellness, which adds that *Yersinia* infections are "an uncommon source of diarrhea and abdominal pain in Canada."

A more serious threat is *Listeria monocytogenes*, which is often found in cold cuts, hot dogs, and soft cheeses.

Although *Listeria* infections are relatively rare in Canada, according to Health Canada, they're more likely to end in

Washing 101

"Over and over again, studies have shown that handwashing is one of the most effective ways to prevent the spread of many cases of infection and illness, including food-borne illness," says Michael Beach of the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia.

But that's only if you wash your hands properly. According to Health Canada, here's what that means:

■ Wash for at least 15 seconds. That means wetting your hands and scrubbing with soap long enough to hum the "Happy Birthday" song. Rinse under running water using a rubbing motion, then dry your hands with a paper towel or clean cloth towel.

"Wetting your hands under running water only gets rid of the loose surface contamination," explains food-safety expert Ewen Todd of Michigan State University.

But rubbing your hands together with soap or detergent removes surface skin cells along with bacteria and viruses, which are carried away by rinsing. And drying your hands with a towel removes additional germs by friction and by wicking away moisture that contains more bugs.

■ Don't worry about the temperature. "The water doesn't need to be hot," says Todd. "Clearly, you want a temperature that's comfortable, but whether the water is hot, lukewarm, or cold is less important than the length of time of scrubbing and the degree of friction created." In fact, washing your hands with water that's at 4°C (40°F) removes the same amount of germs as washing with water that's at 49°C (120°F).[1]

■ Use a nail brush. Don't forget to clean underneath your fingernails, where pathogens may be hiding. In studies at the Center for Food Safety at the University of Georgia, people who used nail brushes had the most success at cleaning hands with dirty fingernails. People with the longest nails had the least success.

■ Don't use antibacterial soap or detergent. Dawn, Life, and several other brands of antibacterial dish detergent contain triclosan, which can kill bacteria. So do hand soaps like Dial, Life, and Baléa. But it's more a marketing tool than anything else, especially for use in the home.

For one thing, studies that demonstrate the effectiveness of antibacterial soaps typically test them by having people scrub for 60 to 90 seconds or longer. That's far more than most people would scrub for in their homes.

"And these products work by gradually building up an antibacterial surface on your hands after using them repeatedly over a period of time," says Todd. "Using antibacterial soap just once or twice a day is not often enough to do that."

Only one good published study has compared soaps with and without triclosan at a concentration similar to what's in popular soaps. After volunteers washed for 30 seconds at a time (think two verses of "Happy Birthday"), six times a day for five days, bacterial counts on the hands of the triclosan-soap users were no lower than counts on the hands of the ordinary-soap users.[2]

What's more, people in households that use triclosan-containing products are no less likely to get sick than people in households that don't use them.[3]

Health Canada has another reason why consumers shouldn't use soaps with triclosan: "Anti-bacterial soaps are not recommended because they destroy good bacteria as well as bad and can add to the problem of antibiotic resistance."

And the U.S. Food and Drug Administration is considering a ban on triclosan because it may affect the body's regulation of hormones. (Exposure to high doses suppresses thyroid hormone levels and increases the impact of estrogen in laboratory rats.[4])

[1] *Dairy Food Environ. Sanitation 21*: 997, 2001.
[2] *Am. J. Infect. Control 17*: 83, 1989.
[3] *Clin. Infect. Dis. 45 (Suppl 2)*: S137, 2007.
[4] *Toxicol. Sci. 117*: 45, 2010.

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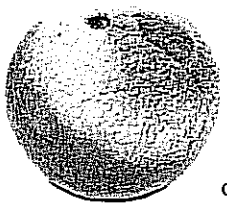
Keeping Food Safe

Using your eyes or nose to decide whether to eat a questionable refrigerated food won't tell you if the food is safe.

"Eyeballing and sniffing just detects the presence of spoilage micro-organisms, not necessarily food pathogens," says food-safety expert O. Peter Snyder of the Hospitality Institute of Technology and Management. "Most of the organisms in food that can make you sick do not create slime, stink, and smell."

The "sell by," "best before," and "use by" dates on packages of perishable foods aren't much help either. Those are just clues to how long the taste or peak quality of a food is expected to last. They don't tell you whether the food is safe.

Here are a few things you can do:



■ **Avoid mouldy foods.** Since moulds can cause allergic reactions and respiratory problems, it's not a good idea to sniff food with visible mould. Health Canada recommends avoiding mouldy foods in part because "the conditions that allow the growth of mould could also allow the growth of harmful bacteria that cause food-poisoning."

Small spots of mould on porous foods like bread or on soft foods with high moisture content like yogurt, soft cheeses, and luncheon meats could mean they're also contaminated below the surface. But it's difficult for moulds to penetrate dense foods like hard cheeses or firm fruits or vegetables like carrots and bell peppers, so it's safe to trim off any mouldy spots and eat the rest. Foods like hard salami and cheeses like Brie and Stilton are supposed to have surface mould.

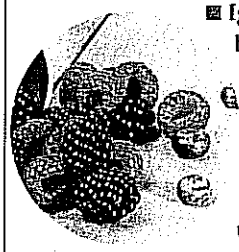
■ **Follow food recalls.** Last year, the Canadian Food Inspection Agency (CFIA) issued 129 Class I recalls for food products. A Class I recall means that there is a "high risk that eating or drinking that product will lead to serious health problems or death."

Despite an average of about 10 Class I recalls a month, only half of Canadians surveyed recently said they had heard anything about food recalls during the previous six months.[1] Aside from paying attention to the news, the easiest way to keep up with foods that have been recalled is to visit the government Web site inspection.gc.ca/english/corpaffr/recarapp/recaltoce.shtml.

■ **Know what to do when the power goes out.** Keep the freezer and refrigerator doors closed as much as possible to keep the cold air in. Unopened, a refrigerator will keep food cold for about four hours, while a freezer will keep food frozen for two days if full and one day if half full.

Meat, poultry, and seafood can be refrozen if they still contain ice crystals or they (or the freezer) haven't risen above 4°C (40°F). Refrigerated perishable foods like milk, meat, leftovers, and deli foods should be discarded after four hours without power.

■ **Prevent cross-contamination.** Keep raw meat, poultry, seafood, and eggs separate from other foods. Keep a separate cutting board and utensils for them. Try to prepare your vegetables and salad before you take the raw meat, poultry, seafood, or eggs out of the refrigerator.



■ **Ignore the five-second rule.** Some people believe that if you pick up food just a few seconds after it has fallen on the floor, it somehow won't become contaminated with germs. "That's a myth," says microbiologist Paul Dawson of Clemson University in South Carolina. "Food picks up bacteria immediately on contact."

To show that, Dawson and his students applied *Salmonella* bacteria to three different surfaces—tile, wood flooring, and carpet—and then dropped bread and bologna on them. "Whether the food was in touch with the surfaces for just a few seconds or a few minutes, it picked up enough bacteria to make you sick," says Dawson.[2]

■ **Know where to get help.** There's a wealth of useful information at foodsafety.gc.ca, which is a partnership of Health Canada, the Canadian Food Inspection Agency, and the Public Health Agency of Canada. For practical advice on how to store foods, try stilltasty.com, a site run by a Canadian mother-daughter team that draws on U.S. government and industry sources.

[1] epe.lac-bac.gc.ca/100/200/301/pwgsc-tpsgc/por-ef/canadian_food_inspection_agency/2011/048-10/report.pdf.
[2] *J. Appl. Microbiol. 102*: 945, 2007.

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death than any other bacterial food poisoning. In high-risk individuals like pregnant women and the elderly, 20 to 30 per cent of food-borne *Listeria* infections may be fatal.

To protect yourself from *Listeria*, don't store ready-to-eat refrigerated foods like hot dogs and luncheon meats in the refrigerator "for longer than 4 days and preferably only 2-3 days," says Health Canada. The longer you store them, the more chance *Listeria* has to grow.

And clean the inside of your refrigerator regularly with soap and water to remove spills and leakages of food where *Listeria* can grow. "The more often it is cleaned, the less chance that *Listeria* will be transferred from contaminated food and surfaces to non-contaminated foods," Health Canada explains.

If you're pregnant or have a weakened immune system, don't eat wieners or luncheon meats unless they've been reheated until steaming hot. And keep in mind that freshly sliced cold cuts from the deli are five times more likely to cause a *Listeria* infection than lunch meats from sealed packages.[7]

Freezers

Foods kept frozen continuously at -18°C (0°F) or colder are safe to eat indefinitely, although the taste will eventually deteriorate and they may develop unappetizing, leathery spots known as freezer burn.

What to do: To measure your freezer's temperature, place a freezer thermometer between frozen food packages. Wait five to eight hours. If the temperature is greater than -18°C to -17°C (0°F to 2°F), lower the freezer temperature and check again after another five to eight hours.

Microwave Ovens

Microwave ovens cook food by bombarding it with short-wavelength radio waves. The microwaves cause the molecules of water, fat, and sugar in the food to vibrate, which creates heat.

"The challenge of cooking in a microwave oven is that food doesn't cook evenly, so cold spots can develop where harmful bacteria can survive," says the Hospitality Institute of Technology and Management's O. Peter Snyder. "Food two inches apart can be eight degrees centigrade different in temperature," he