

SAFE FOODS

BETTER SAFE THAN SICK

Food can be bad for you: food illness

- Every year: 76 million Americans-
sick: contaminants/bacteria
- 325,000 → hospital
- 5000: die
- Unborn fetus- death → pregnant
woman eats contaminated food

Symptoms: Food Poisoning

- Upset stomach
- Diarrhea
- Fever
- Vomiting
- Abdominal cramps
- Even: paralysis & meningitis

How to protect yourself, family, friends

- At supermarket



Uncooked, raw food:
bacteria/contaminants in/on it

**Safety starts as soon as you
pick up food**

2010 Dietary Guidelines for Food Safety

- **CLEAN**
- **SEPARATE**
- **COOK**
- **CHILL**

Shopping Cart

- Separate:
 - Raw
 - Cooked
 - Ready-to-eat food



FIGURE 17.15 Meat carries labels offering safe handling guidelines. (Dennis Drenner)

Prevents: Cross- contamination

Common Sense Points

- Check expiration dates
- Don't leave perishable foods- hot car
- Bring food home quickly
- Store food: cabinet, refrigerator, freezer
- Don't leave perishable foods: counter top/table

In Fridge: keep it “cool & clean”

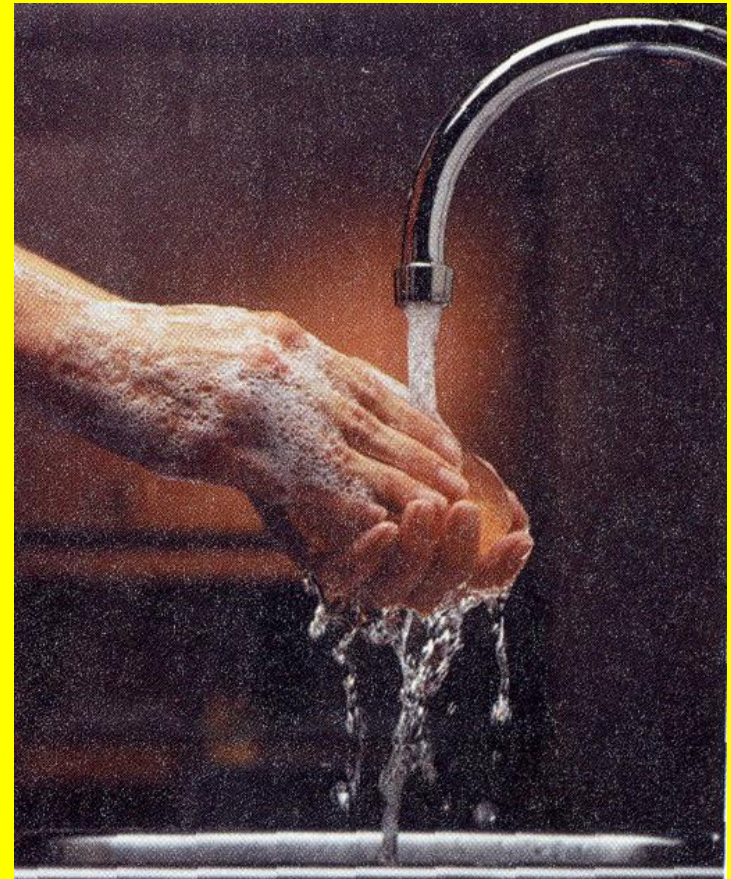
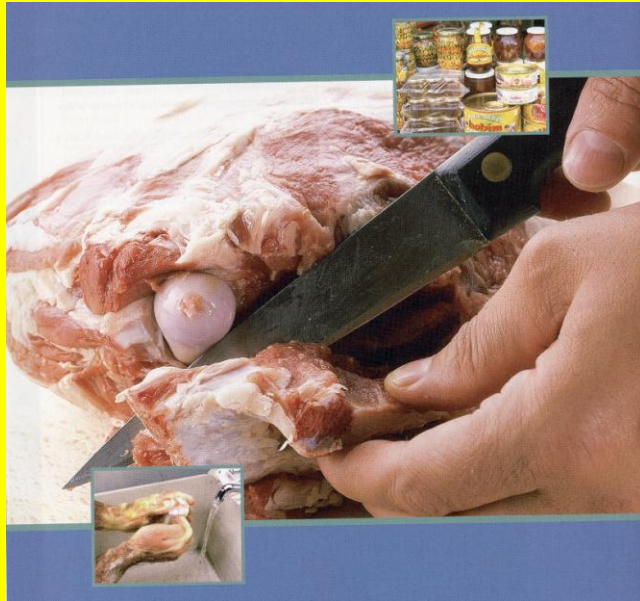
Common Sense Points

- Keep refrigerator below 40 F: cold slows bacteria
- Keep freezer: 0 F
- Clean fridge shelves
- Wipe up food/liquid spills
- Stop food juices (meats/fruits/veggies) from **dripping** (cross-contamination)

•Preparing Foods

Common Sense Points

- Clean all surfaces
- Clean knives, forks, spoons
- **Wash hands** 20 secs- soap & H₂O
- Dry hands- clean cloth/disposable towel
- Keep separate: raw, cooked, ready-to-eat foods



Washing dishes, utensils, and cutting boards with hot soapy water reduces the chances for food contamination.

•Preparing Foods

Common Sense Points

- Just before cooking: peel away/discard outer veggie leaves
- Wash fruits/veggies → dry → clean paper towel (bacteria grow on fruits/veggies)

•Thawing frozen foods

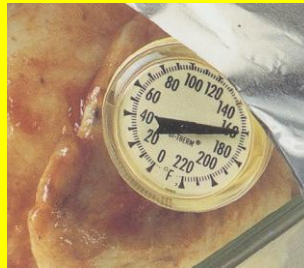
1. On plate → fridge
2. In cold H₂O (airtight bag)
3. On plate → microwave

Not on counter top/table at room temperature

- **Be smart- cook smart**

- Cook foods → temps → kill bacteria

- Best way: **food thermometer:**
inside temperatures



Food

Roasts/steaks

Poultry

Cook to

145 F

180 F

•Be smart- cook smart



Food

Ground meat

Leftovers

Sauces/soups/
gravies

Egg dishes

Cook to

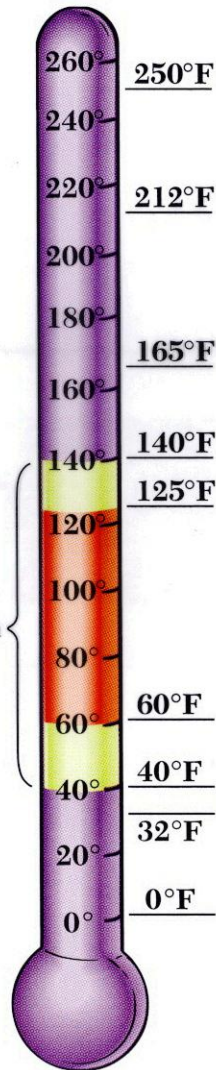
160 F

165 F

160 F

160 F

Danger Zone Temperatures in this zone allow rapid bacterial growth and production of bacterial toxins.



Canning temperature for low-acid foods in pressure cooker

Range of cooking temperatures to kill most bacteria.
The amount of time needed decreases as the temperature increases.

165°F Minimum temperature for reheating foods.

Warming temperatures control growth but allow survival of some bacteria.

140°F

125°F

Some growth may occur: Many bacteria survive.

60°F

Some bacterial growth may occur in this zone.

40°F

Cold temperatures allow slow growth for a few cold-tolerant organisms but stops the growth of most.

32°F

0°F

Freezing temperatures prevent bacterial growth but some bacteria are able to survive.

• **Be smart- cook smart**

- Cook fish → OK: flakes with fork
- Don't eat pink ground beef
- Don't eat runny eggs
- Cook hot dogs/sausages thoroughly

•Leftovers

- Bacteria grow: **uncovered** food on countertop/table
- Immediately: store food in fridge/freezer- wrap properly
- After 3-4 days? “When in doubt, throw it out”

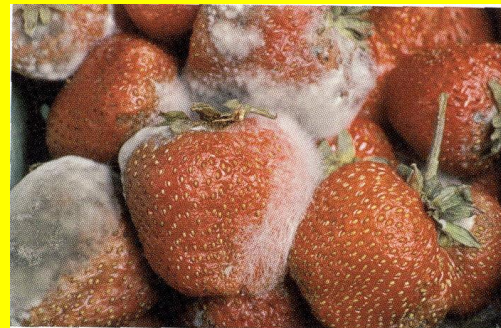
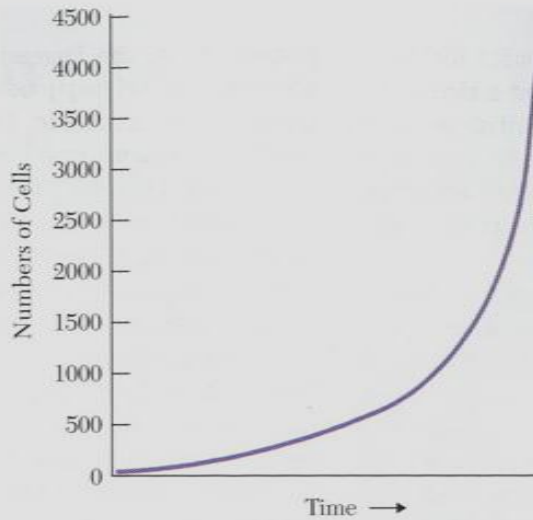


Figure 14.3 Molds rarely cause human illness, in part because they look so unappealing that we throw the food away.

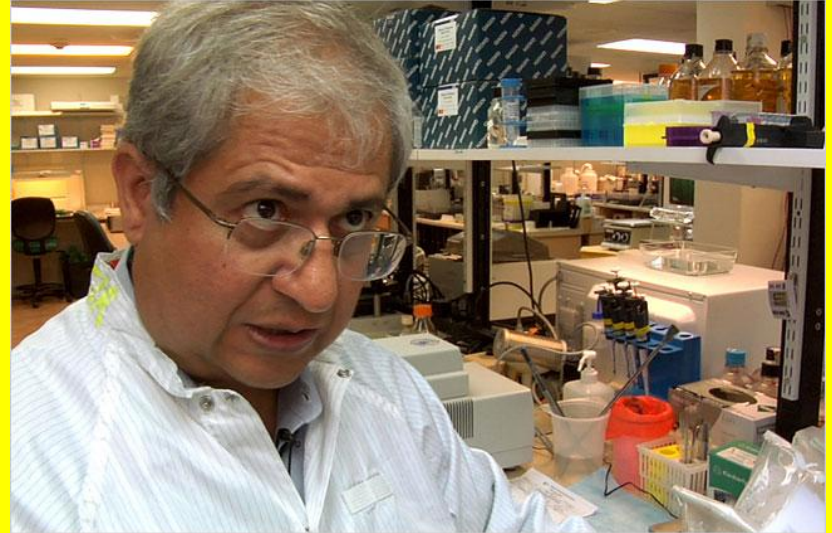
Germs are everywhere!

FIGURE 17.7 The size of a population of bacterial cells doubles each time the cells divide, resulting in an exponential growth curve. If 10 bacterial cells contaminate an egg salad sandwich during preparation and it sits in a warm car for 4 hours, during which the cells divide every 20 minutes, there will be 40,960 bacterial cells in the sandwich by the time you return to eat it. (©Snowflake Studios/StockFood America)



Dr. Samadpour, Microbiologist

“In a warm kitchen,
E. Coli doubles
Every **45** minutes”



Only few bacteria cells



ILLNESS

Special Populations at risk

1. Pregnant women & fetuses
2. Growing children
3. Older adults
4. People- weak immune systems

Pregnant Women & young children

Mercury damage nervous system



fetus child

A diagram illustrating the impact of mercury on the nervous system. The text 'Mercury damage nervous system' is at the top. Below it, the words 'fetus' and 'child' are positioned. Two green arrows originate from the word 'nervous system' and point downwards towards 'fetus' and 'child' respectively, indicating that mercury damage to the nervous system affects both.

Don't eat fish high in mercury:

Shark

Swordfish

King Mackerel

Tilefish

[www: cfsan.fda.gov/seafood1.html](http://www.cfsan.fda.gov/seafood1.html)

- What not to eat: common sense
- Raw, unpasteurized milk/milk products
- Raw/partially cooked eggs/egg dishes
- Raw/undercooked meat, chicken, fish, shellfish
- Unpasteurized juices, raw sprouts

Raw fish & parasites



FIGURE 14.7

The incidence of parasitic infections has increased with the popularity of raw fish, such as this sushi. (Glenn Beanland/Lonely

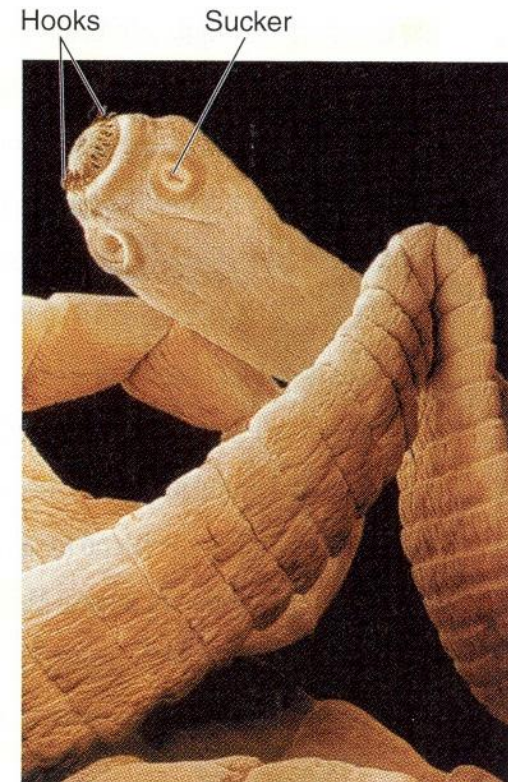
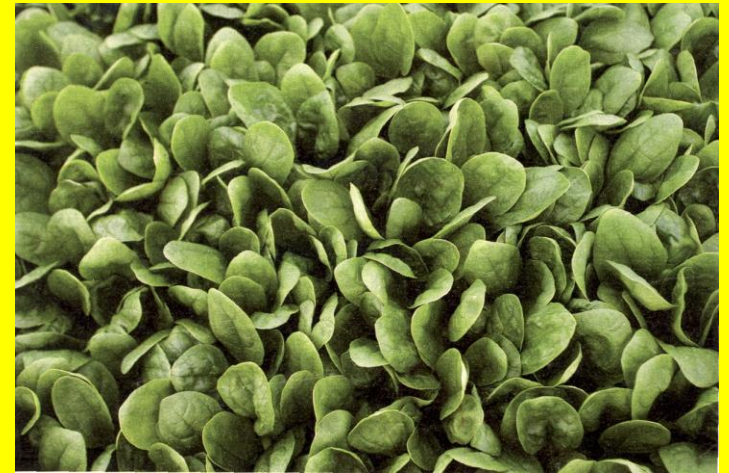


Figure 14.2 Tapeworms have long, worm-like bodies and hooks and suckers, which help them to attach to human tissues.

EAT YOUR SPINACH?



September 15, 2006 NY Times

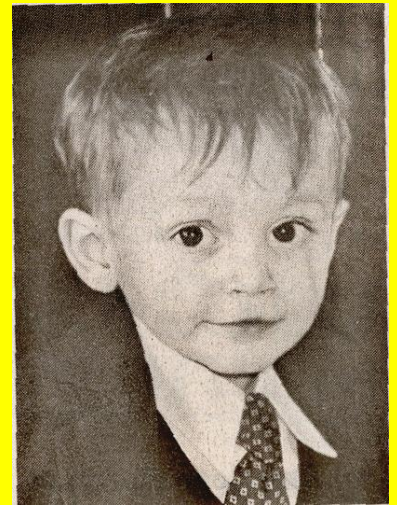
FDA warns: not to eat bag spinach

- 200 people sick
- 3 people die
- 20 states



Idaho: Kyle Allgood's mom-health
conscious: Kyle (2 years old)

- Made smoothie from vegetable (spinach), fruit + juice to get children to eat veggies
- 3 days later: Kyle : flu-like symptoms, diarrhea, kidney failure, cardiac arrest. Died: 9/20/06

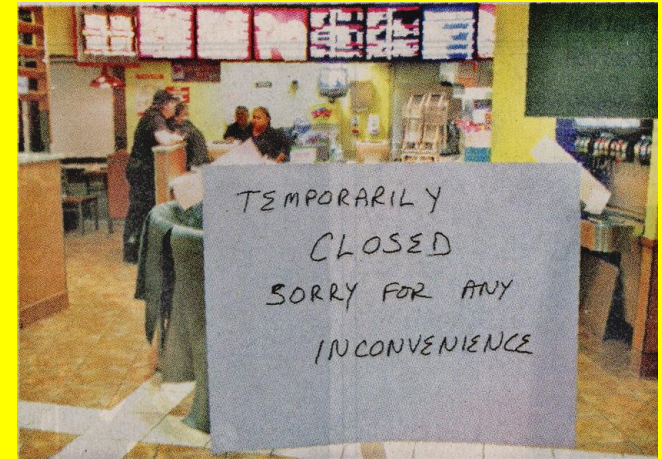


Taco Bell closes 9 restaurants:

- Food poisoning: New Jersey, Long Island, Pennsylvania



Left
Holding
the
Bag



Ed Betz/Associated Press
A Taco Bell restaurant in Deer Park, in Suffolk County, was one of eight on Long Island to be closed at the request of officials.

What caused food poisoning?

E. Coli : bacteria found in intestines of you, cows, other animals- normally harmless



In cow's intestine: E. Coli evolved
into deadly strain: 0157:H7

- Toxins: kill intestine blood vessels, abdominal cramps, kidney blood vessel damage, kidney failure
- Washing food won't kill E. Coli, cooking may kill it
- Deadly: swallow **10** bacteria: infected

How did E. Coli get from cows to spinach?

- Dairy/beef cows → manure

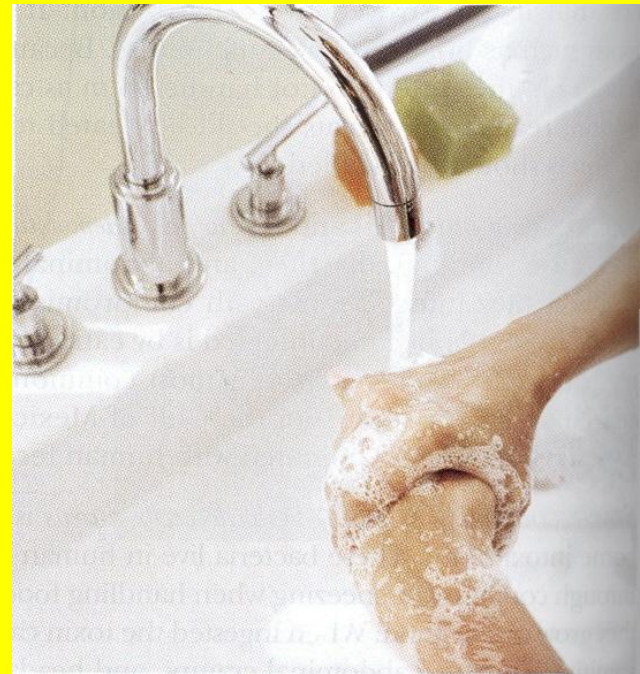
irrigation/ground H₂O

Polluted → crops in field

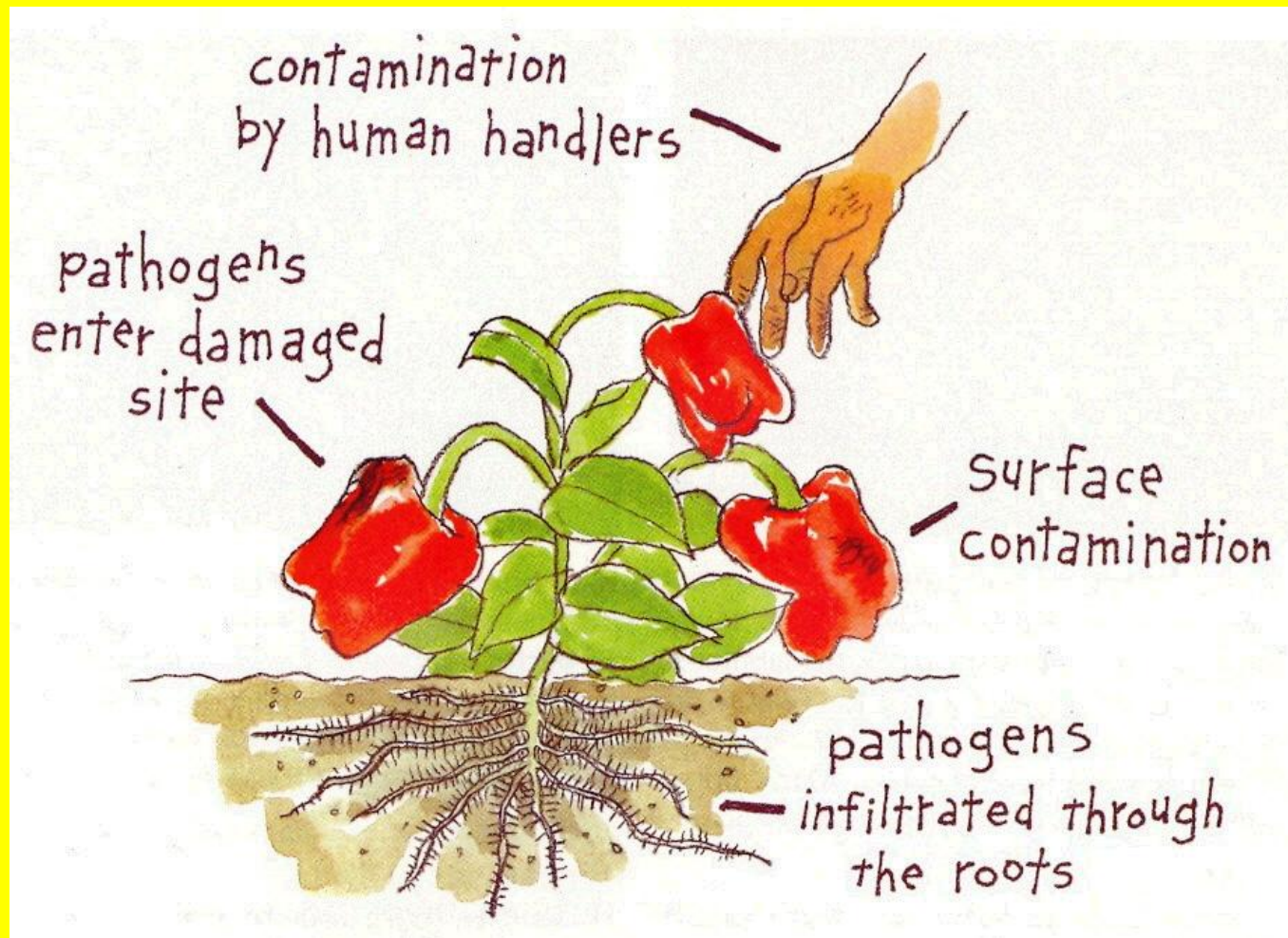
Even 1/2 mile away from cows

Other possibilities

- **Feces** from wild animals → crops
- **Flooding**: ground water contamination
- **Unclean hands-**
workers



Summary: possible sources of fruit/vegetable contamination



1993: E. Coli outbreak

- Undercooked hamburgers: Jack in the Box restaurants
- 4 children died
- USDA (poultry/meat/egg production) expanded testing/inspection
- FDA: oversees produce & seafood



BAD BEEF: Summer 2007

- Topps meat factory- New Jersey
- Supplier **Walmart**
- ↓ testing ↓ safety
- ↑ pressure- workers
more patties
- Hamburgers: **E. coli**
- 40 people sick
- Topps- out of business
- 2d largest recall in history



NY Times Oct. 2009

“The burger that
shattered her life”

“Eating ground beef is
still a gamble”

Stephanie Smith, 22

Dance Instructor,
Minnesota



- Fall 2007: Ate mom's grilled hamburger from **Sam's Club** (**Wal-Mart**)
- Stomach aches
- Cramping
- Bloody diarrhea
- Unconscious, Coma: 9 weeks
- Awoke: damaged nervous system
- **Paralyzed**: won't ever walk again



Hamburger she ate
from food giant: Cargill
“American Chef’s Selection
Angus Beef Patties”
Ingredients: beef trimmings
(half fat/half meat),
Slaughterhouse scraps,
Bread crumbs, spices
Product label says: BEEF



Source of “product”: Nebraska,
Texas, Uruguay, South Dakota

Ground up: Wisconsin

- 25% cheaper for Cargill
- Cause: Virulent form **E. Coli**
- 9400 other people sick

Cargill

Problem: Inconsistent **E. Coli**
testing: suppliers, grinders,
meat sellers

Cargill: recalled 800,000 pounds-
patties

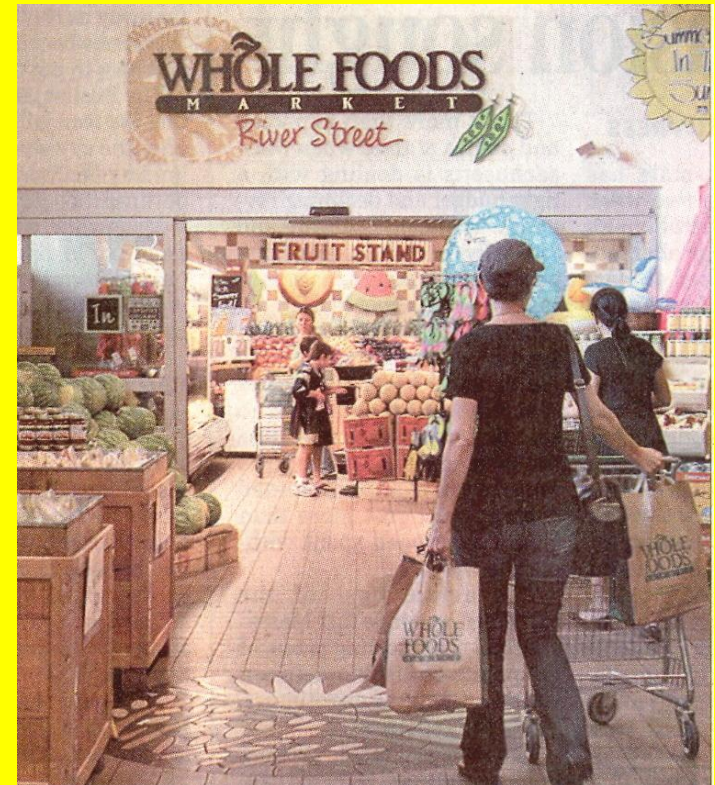
No USDA fines/sanctions, many
lawsuits

Exception:
Costco-
Big
Company-
Tests for
E. Coli
Before
Grinding



BAD BEEF: July 2008

- Nebraska Beef Ltd
- Supplier:
Whole Foods
- Beef products:
30 people sick
- **E. Coli** contamination
- 1.2 million pound recall



E. Coli infections: greatest risk- children & elderly

- Most often: undercooked ground beef or unpasteurized milk
- Also: lettuce, alfalfa sprouts, salami
- Also from: food handlers- don't wash hands after using toilet

Even peanut butter can cause problems.

- Feb. 2007: 300 people sick
- Traced to **Salmonella** in Peter Pan peanut butter
- Pulled from shelves
- Symptoms: diarrhea, fever, dehydration, abdomen pain, vomiting
- Salmonella: feces of birds/other animals
- Origin in Peter Pan ?



Peter Pan peanut butter and another brand were linked to a salmonella outbreak that sickened people in 39 states, including Massachusetts.

Local stores pull Peter Pan brand after recall

Peanut Product recall

2009

8 deaths, 500 sick

Salmonella

Contamination

Georgia Peanut

Company



Christopher Meunier

“screaming pain”

Frozen Food
Companies
shifting blame
to consumer



Inadequate
Microwaving



Zoe Warren:
Age 1: ate pot pie
Hospital for weekend
High fever, racing pulse

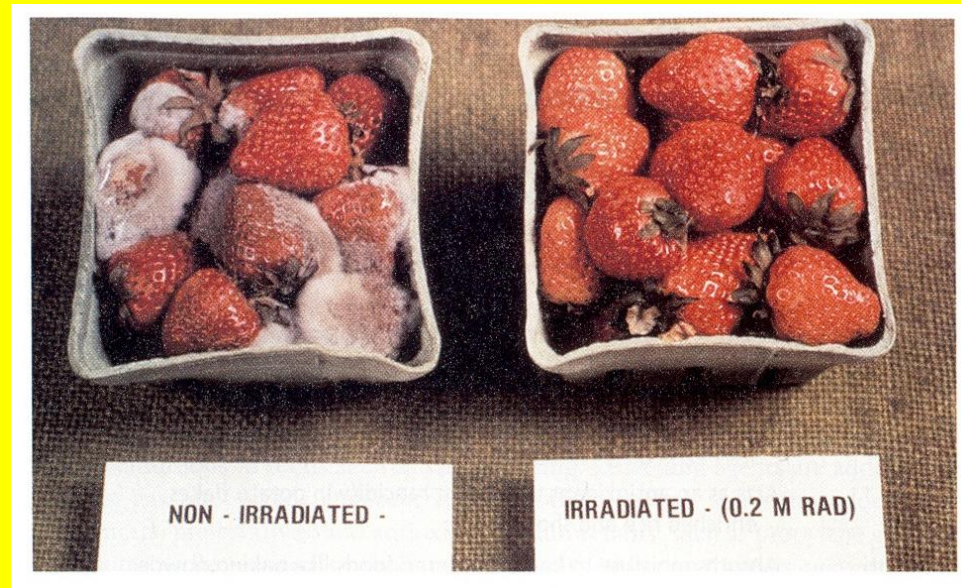
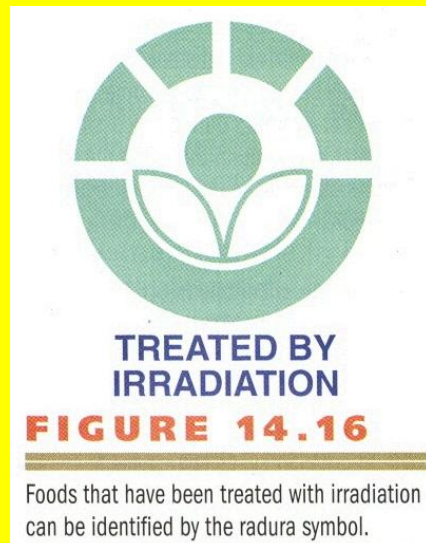
“Did your microwave nuke the bacteria”

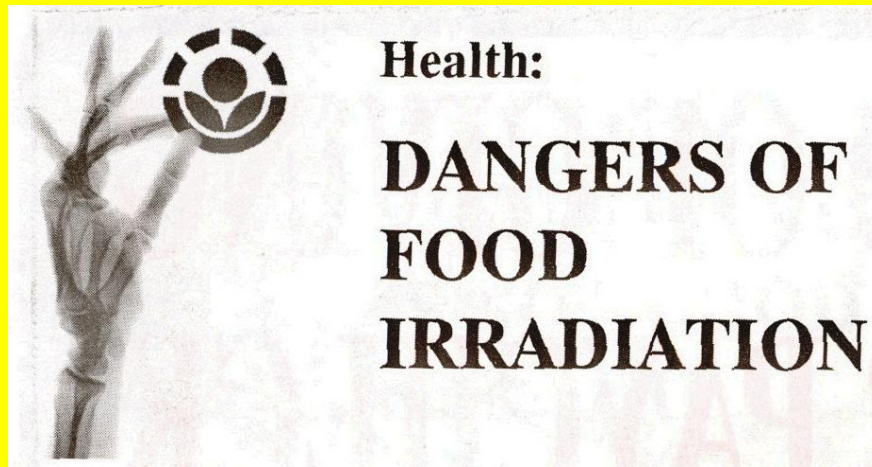
- 2007: 5000 people sick from Conagra Foods “**Banquet**” turkey pot pies
- Congra sells 100 million pot pies/year
- **Swanson & Hungry Man** can’t guarantee safety- frozen foods
- Problems: microwave wattage, time
- General Mills: **Use ovens instead**
- USDA: **Use food thermometers**

What to do?



- More irradiation of food? Several foods now irradiated- no harmful effects





FDA 2008 regulation: OK to irradiate
spinach & iceberg lettuce to kill
E. Coli

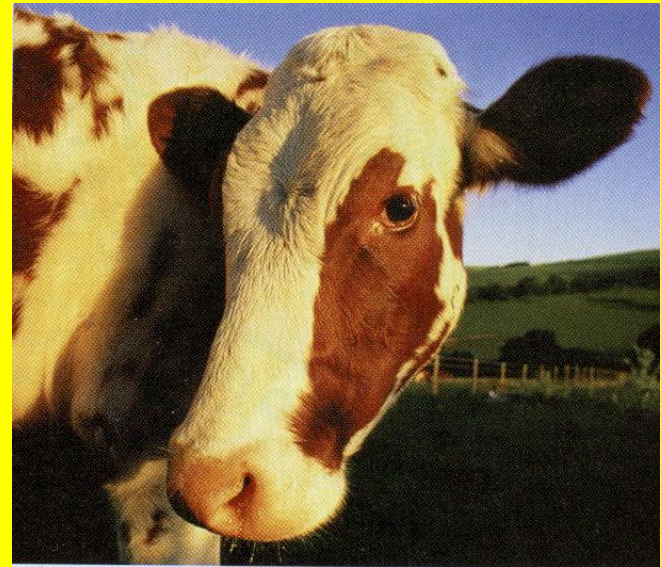
Concern: Irradiation may destroy good
phytochemicals, vitamins in plant
food

What to do?

- Blame FDA? Regulates produce & seafood; USDA oversees meats
- Food safety program- not strong enough, budget cuts, not enough inspectors
- Suggestion: create one food safety agency?

What to do?

- Vaccinate all infants against E. Coli? One idea or
- Canadian company: cow vaccine: reduces by 70% animals shedding E. Coli in manure



What to do? Detection

- **SensorfreshQ-**
Draper Labs-
Cambridge;
available **Sharper Image**
- Measures bacteria-meat
(spoiled)

A measure of freshness

High-tech scanner could keep Thanksgiving from being spoiled

By Hiawatha Bray
GLOBE STAFF

Just in time for Thanksgiving, a Lexington company is marketing the perfect gift for the paranoid chef who has everything: a pocket-sized device that detects spoiled meat.

Food Quality Sensor International Inc. of Lexington (FQSI) makes the SensorfreshQ, a hand-held scanner that can detect high bacteria levels on meat and poultry. The \$90 device, which went on sale recently at specialty retailer **The Sharper Image**, uses sensor technology developed at Draper Laboratory in Cambridge to identify spoiled meat, even if it still looks and smells fresh.

Most of Massachusetts' top technology firms make products for business and government — massive data storage arrays from EMC Corp., guided missiles from Raytheon Co., or cell-phone chips from Analog Devices Inc. There are a few exceptions, like Bose Corp. and iRobot Corp. Now FQSI hopes join their ranks by selling millions of its SensorfreshQs.

"There are all kinds of ways that foods can spoil . . . and this device is a handy way to detect that spoilage," said FQSI president Marco Bonne, a food industry veteran who served as president of Prince Foods in the 1980s.

As bacteria feast on the protein in meat, they generate tiny amounts of chemicals called biogenic amines. These chemicals mix with the surrounding air, but people can't smell them. Megan

SCANNER, Page C5

The SensorfreshQ measures bacteria levels on meat and can determine whether it is fresh or spoiled.



SARAH BREZINSKY GILBERT/
FOR THE BOSTON GLOBE

Is cat & dog food safe for your pet?

- April 2007: recall 60 million packages- pet food
- 14,000 sick pets; 16 deaths

What's really in there?



Recall prompts shift to more natural and organic pet foods

By Bruce Mohl
GLOBE STAFF

The massive recall of tainted pet food in the United States is sparking a broader debate about the quality of the food Americans are feeding their pets.

Pet food stores say the recalls, which have been linked to contaminated wheat gluten from China, have prompted many consumers to shift to more expensive natural, organic, and holistic pet foods that contain recognizable meats, fruits, and vegetables.

Connie Kastelnik of West Roxbury said she initially was relieved to learn that the Hill's Pet Nutrition Inc. food she buys for her dog, Dillon, was not on the recall list. When Hill's recalled a dry cat food, however, she and her husband decided to start investigating more natural alternatives.

"When something like this happens, it destroys your trust in the industry," Kastelnik said. "You don't know if tomorrow there will be something else."

Rebecca Remillard, a veterinarian-nutritionist at the Angell Animal Medical Center in Jamaica Plain, said the shift to natural and organic products is understandable but not necessary nutritionally.

She said there is no difference nutritionally between a \$1.19 can of Wellness Turkey Formula cat food containing turkey, chicken, sweet potatoes, carrots, cranberries, and zucchini and a 45-cent can of Friskies Special Diet Turkey & Giblets Dinner containing just turkey, with meat and poultry "byproducts."

According to the labels on the two cans, both meet the nutritional levels established by AAFCO, the Association of American Feed Control Officers.

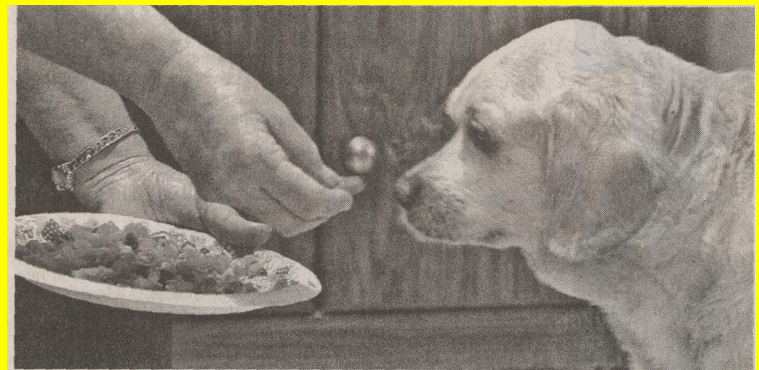
Remillard said the Wellness product, manufacturer

PET FOOD, Page C5



WELLNESS
Made by Old Mother Hubbard,
Chelmsford
Size 5.5 ounces
Price \$1.19
Animal ingredients No
Sample ingredients Turkey, chicken
liver, sweet potatoes, cranberries,
blueberries, zucchini, garlic, squash

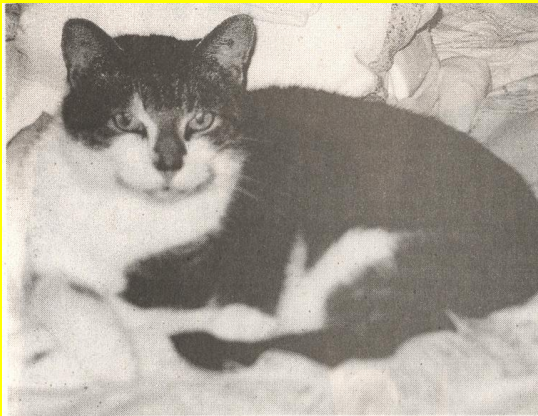
FRISKIES SPECIAL DIET
Made by Nestle Purina Petcare
Co., St. Louis
Size 5.5 ounces
Price 45 cents
Animal ingredients Yes, meat
and poultry
Sample ingredients Turkey,
poultry giblets, brewers rice,
titanium dioxide color



Karen Tam/Associated Press

Try It By F.D.A. rules, products not allowed in animal feed can go into pet food.

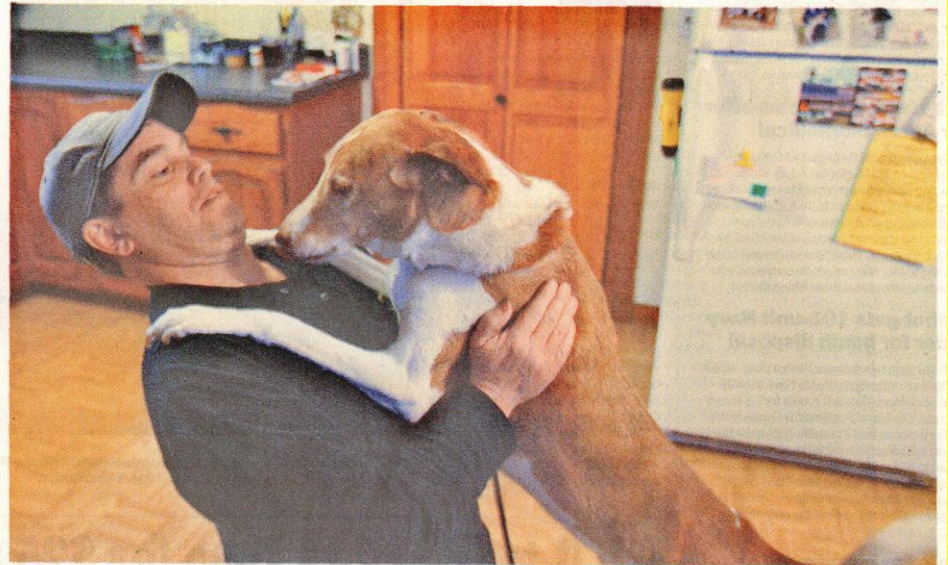
Glen Daly's cat & dog: Freetown, MA



A photo of Glen Daly's cat, Chance. Daly attributes Chance's death to illness caused by contaminated food.

Chance died-
kidney failure

Suspect gluten went to plants that make products for people, FDA says



Glen Daly plays with his dog, Teddy, at his Freetown, Mass., home. Daly's cat, Chance, suffered from kidney failure and was euthanized.

Was human food tainted too?

Teddy: OK

- Traced to fake ingredient:
melamine → chemical company-
China
- **Melamine**: scrap product made
from coal (in plastics, fertilizers)
- Mixed with wheat gluten → US pet
food



April 2007: USDA quarantined or killed 6000 hogs in US

- Melamine-laced pet foods/rice protein sent to hog farms by mistake
- Concern: food safety & globalization



China (2008): 4 infants dead, 50,000 sick from baby milk formula /milk powder containing melamine



Contaminated candy:
U.S. & Europe



Are plastic food/bottle containers safe?

2008 study: high levels of **bisphenol A (BPA)** in urine, 2X risk of diabetes or heart disease



Recommendations: don't microwave or clean plastic containers in dishwasher

Bisphenol A (BPA)

- Chemical in Sippy cups, pacifiers, baby bottles
- Linked to **Developmental Problems-** children



BPA

- Used in hard plastic, reusable bottles
- Also found in canned soups, infant formula
- Children ingest small amounts



BPA

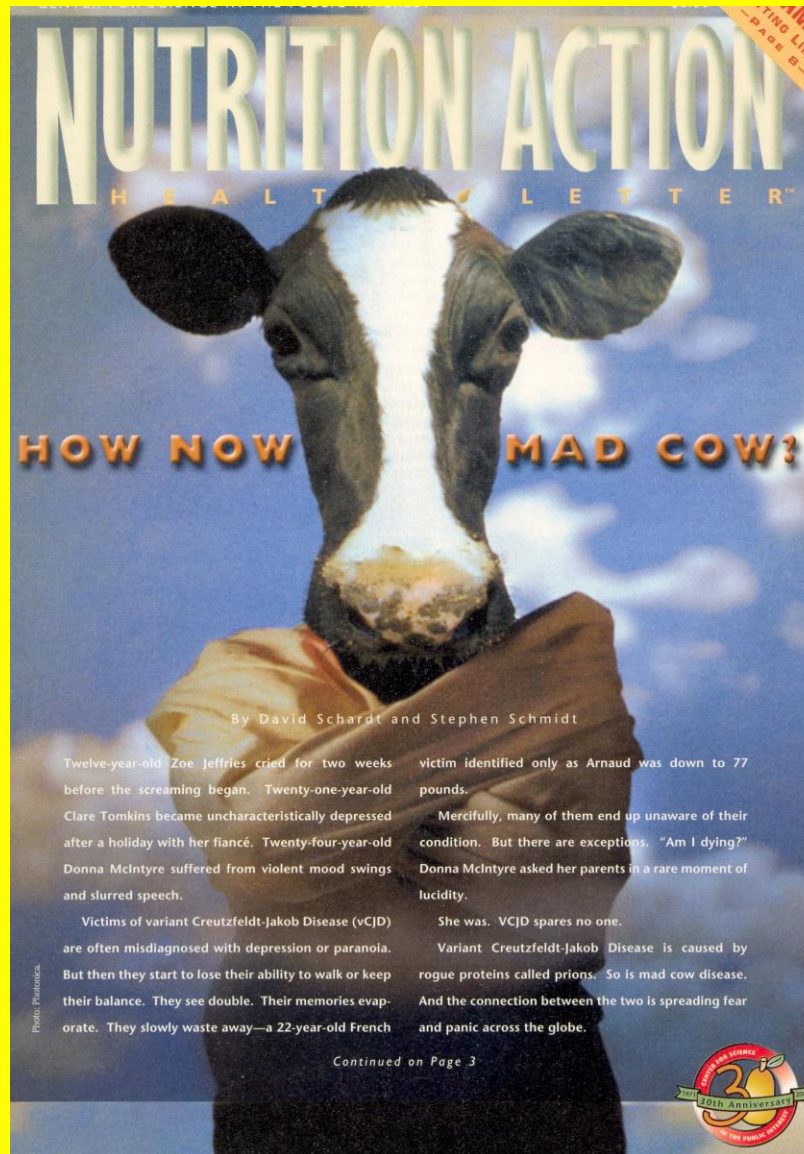
- 2009 Harvard study: BPA **leaches** from **bottles** → **body**
- Warning: pregnant/breastfeeding moms: avoid BPA food/drink containers; or **storing** breast milk/baby formulas in them
- Lining canned foods- may contain BPA
- ↑ Risk mental problems- fetus/baby

How to find BPA

- Code at bottom: **7 and "PC"**
- Better: eat fresh/frozen fruits/veggies
- Use glass/stainless steel bottles
- California:
BPA Free
Water
bottles



Mad Cow?



NUTRITION ACTION
HEALTH LETTER™

HOW NOW MAD COW?

By David Schardt and Stephen Schmidt

Twelve-year-old Zoe Jeffries cried for two weeks before the screaming began. Twenty-one-year-old Clare Tomkins became uncharacteristically depressed after a holiday with her fiancé. Twenty-four-year-old Donna McIntyre suffered from violent mood swings and slurred speech.

Victims of variant Creutzfeldt-Jakob Disease (vCJD) are often misdiagnosed with depression or paranoia. But then they start to lose their ability to walk or keep their balance. They see double. Their memories evaporate. They slowly waste away—a 22-year-old French

victim identified only as Arnaud was down to 77 pounds.

Mercifully, many of them end up unaware of their condition. But there are exceptions. “Am I dying?” Donna McIntyre asked her parents in a rare moment of lucidity.

She was. vCJD spares no one.

Variant Creutzfeldt-Jakob Disease is caused by rogue proteins called prions. So is mad cow disease. And the connection between the two is spreading fear and panic across the globe.

Continued on Page 3

Photo: Photofest

AMERICAN DIETETIC ASSOCIATION
—PAGE 8—

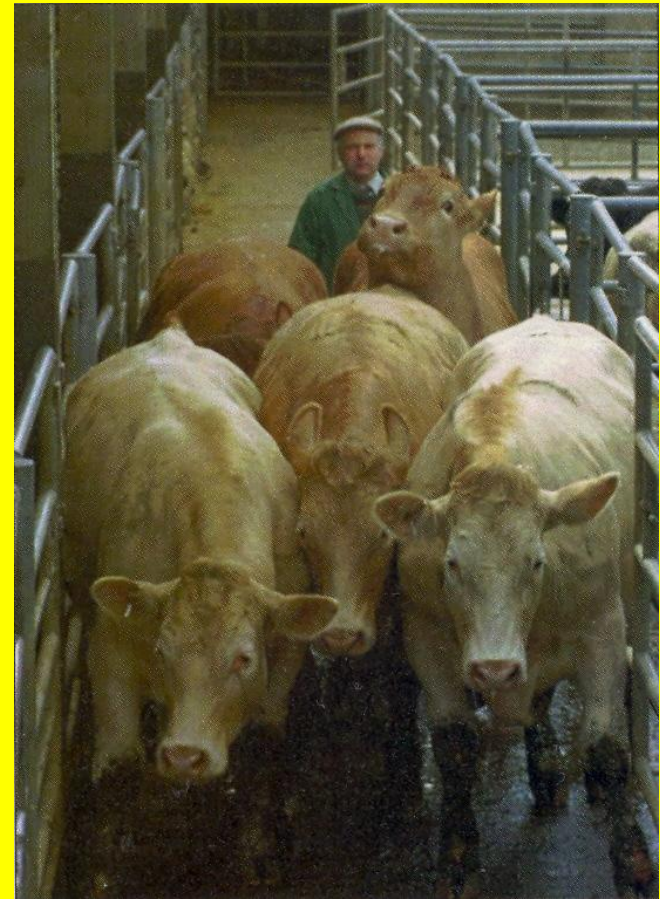
30th Anniversary
OF THE PUBLIC HEALTH SERVICE

How do you get Mad Cow Disease?

- Great Britain: 1st diagnosed 1986
- 180,000 cows infected
- 146 people infected
- USA: 1st case 2 days before Christmas 2003



US Cows
Quarantined

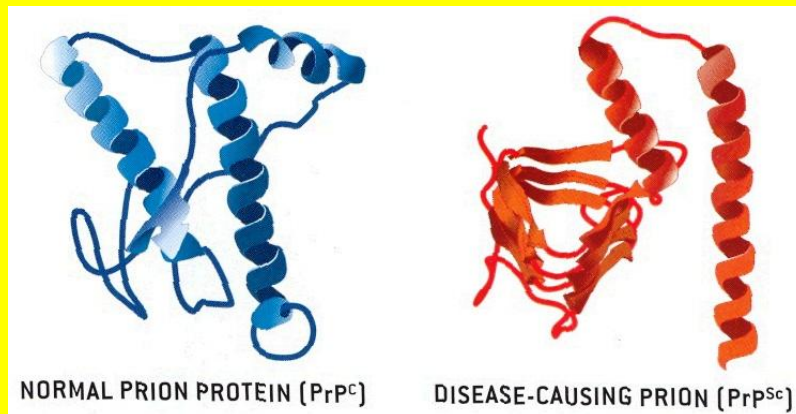
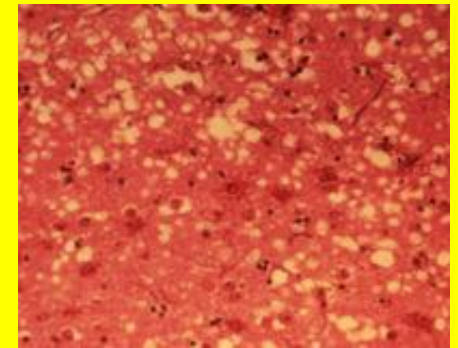


British Infected
Cows Destroyed

Mad Cow Disease

- Cows: weight loss, changes-temperament
- Weeks/months → death
- Human form: Creutzfeldt-Jakob Disease (CJD)
- Mood swings, numbness, 14 mos. dementia → coma → death: **incurable**

- Mad Cow Disease & CJD caused by infectious protein: **prion**
- Forms clumps in brain
- Brain looks like **sponge**
- Prions: not really “alive”
- Can't kill by cooking



Cow → Human infection?

- Older cow **slaughter** methods:
brain/spinal cord mixed → meat
- Infected meat → eat by humans
Creutzfeldt-Jakob Disease ←



What's being done to protect you?

1. Ban slaughter method that mixes nervous tissue with meat
2. USDA restrictions: import of cows/beef from Europe
3. More testing of cows slaughtered in US

BUT.... 2007 Hidden video- Humane Society

“Downer Cows”: too sick to walk at California meat packing company

Workers: electric prods, power hoses, forklifts to move cows



Result: **February 2008** largest US meat recall- **143** million pounds of beef

- But most company's beef already sold/eaten (stores/school lunches)
- **May 2008**: FDA proposes ban on use Downer Cows for food
- Previously allowed: veterinarian's OK

US beef → South Korea

- \$800 million/year
- 2003: 1 case Mad Cow in US
- South Korea: ban on US beef
- 2008: South Korean government lifts ban
- 100,000 people protest

Beef protests: South Korea



Globalization of our food supply





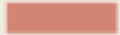













Concern: food safety- FDA underfunded, understaffed



Food stopped at the border: Salmonella, pesticides, filth

Food Refused at the Border

An analysis of food imports denied by the F.D.A. in the last year reveals the variety and extent of violations.

Countries with the most F.D.A. refusals <i>July '06 to June '07</i>	Number of refused food shipments <i>July '06 to June '07</i>	Most frequent food violation and counts <i>July '06 to June '07</i>	Total value of food imports <i>2006</i>
India	1,763 	Salmonella (mostly on spices, seeds, shrimp) 256 	\$1.2 billion
Mexico	1,480 	Filth (candy, chilis, juice, seafood, cheese) 385 	9.8
China	1,368 	Filth (produce, seafood, bean curd, noodles) 287 	3.8
Dominican Republic	828 	Pesticide (produce) 789 	0.3
Denmark	543 	Problems with nutrition label (candy) 85 	0.4
Vietnam	533 	Salmonella (seafood, black pepper) 118 	1.1
Japan	508 	Missing documentation (drinks, soups, beans) 143 	0.5
Italy	482 	Missing documentation (beans, jarred foods) 138 	2.9
Indonesia	460 	Filth (seafood, crackers, candy) 122 	1.5

Sources: Food and Drug Administration; U.S. International Trade Commission

The New York Times

Physicians Committee for Responsible Medicine



“Salmonella are intestinal bacteria, and
tomatoes have no intestines”

Dr. Neal Barnard

Salmonella outbreak: July 2008

- 1300 Americans sick
- Tomatoes incorrectly blamed
- Actual cause: Mexican jalapeno and Serrano peppers
- Contaminated irrigation water: from chicken or cow feces?

How did Typhoid Mary get her name?

- Mary Mallon
- Immigrant from Europe- cook (1868)
- **“Healthy carrier”** of **Salmonella**
(bacteria)



Working as a cook, Mary Mallon, also known as Typhoid Mary, caused over 50 outbreaks of typhoid.

- “Healthy carrier” of Salmonella- no symptoms
- Salmonella → Typhoid Fever (104 F), headaches, diarrhea
- From food/H2O in contact: **feces** of infected person
- Mary: cook for different families: Long Island, Manhattan, Ithaca
- May have infected 1400 people; 3 deaths
- Hence name: “**Typhoid Mary**”