FOOD SAFETY:

Microorganisms:

virus: smallest, grow & multiply by living in cells
Fungi (single celled yeasts/molds) grow on moisture, spoils jams/cheeses
Parasites: worms etc.)
Bacteria: causes 70% of food born illness. They take in food, give off waste.

- **1 bacteria can produce 280 trillion in 24 hr**
- **Rags & utensils are biggest spreaders**
- **3 shapes: spirilla, cocci, bacilli**
- **multiply by splitting (binary)**
- **Needs: protein, oxygen, warmth/temperature, neutral or slightly acidic, time**
- **1 oz bleach in a gallon of water kills**
- **60% sugar of 20% salt renders safe when added**

Temperatures:

Fridge should be 40oF (4C)
Bacteria diet at 165F (74C)
Foods should be cooked to 165F (74C)
Diseases causing microbes grow fastest at temperatures near body temperature of 98.6F (37C)
Danger zone is 40F (4c) to 140F (60c)
Holding hot food hot for service is 165F (74c) will kill most pathogens (Staph is not destroyed by cooking).
Cooking Food to kill bacteria (spores may survive) is 212F (100c)
FREEZING does not kill microbes, but they remain inactive. Temp. must be 0F (-18c)
Freezing breaks down protein in foods and bacteria grow more easily on these proteins so keep food in cooler to thaw.
Foods should be thawed at 40F (4c) in the fridge.
Microwave cooked meat - heat until internal temperature is additional 25F (14c) higher than conventional ovens. Allow to stand covered 2 min after cooking to equilibrate.
Store DRY FOODS at 10-21c
Shelves should be at least 6" (15cm) off floor for each cleansing and preventing moisture on foods from the floor and floor drain.

WASHING:

Glasses: 3-4 seconds 120F (50c) to 140F (60c) with detergent, cold water rinse.

Manual: Wash: 113F (45c)

Rinse: same
Sanitization: 2 min 170F (77c) with:

- **Chlorine: 100 ppm 2 min at 113F (45c)**
- **Iodine: 25 ppm 2 min at 113F (45c)**

Quats: 200 ppm 2 min at 113F (45c) - non corrosive, effective

Mechanical:

HOT temp. machine:
Wash: 140F (60c)
Rinse: 180F (82c) 10 sec.
Sanitize 82c

LOW temp. machine:
Wash: 120F (48c)
Rinse: same
Sanitize: with

- **Chlorine: 100ppm**
- **Iodine: 12.5 ppm**
- **Quats: 220ppm (don't double, it can be toxic)**

INCUBATION PERIOD FOR:

T=toxin (bacteria produces) I=Infection

T. Bacillus cereus (rice) 1-6 hr or 6-24 hr
vomiting, nausea, abdom. pain

T. Campylobacter (chick/meat) 1-10 days
diarrhea, pain, fever, nausea, vomiting

T. Clostridium Botulinum (home canning) 12-36 hr
blurred/double vision, trouble swallowing, dry mouth

T. Clostridium Perfringens 6-24 hr
nausea, diarrhea, abdominal pain

I. E Coli 057:H7 (undercooked animal) 12-60 hr
abdominal pain, diarrhea, chills, fever, headache

I. Salmonella (poultry, eggs, meat, parrots, birds) 6-72 hr
abdominal pain, diarrhea, chills, fever, headache

I . Shigella (moist foods, potato/meat salads) 12-7 days
diarrhea, fever, vomiting, abdominal pain

T. Staphylococcus (meats, cream, cuts), violent 30 min - 7 hr
nausea, vomit, headache, dizzy, cramps

I. Hep A Virus (polluted raw seafood, water) 15-50 days
fever, nausea, abdominal pain, jaundice

I. Norwalk virus (meat, salad, dressings) 10-50 hr
nausea, vomiting, diarrhea, abdom.
(also person to person) pain, fever

I. Tapeworm 3-4 wk
nervous, insomnia, weight loss, abdom. discomfort

I. Trichinosis (pork) 5-45 days
muscle sore/pain, swollen eyelids, sweats, chills

Enterics need to run their course.
Medicine just prolongs it.