Communicable Disease Control in NC

Laws and Principles

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Epidemiology Section

Credits: J.N. MacCormack (Laws), Kristina Simeonsson (Principles)
Who We Are....

NC DHHS

Division of Public Health

Epidemiology Section

State Lab. of Public Health
Office of Public Health Preparedness & Response
Communicable Disease Branch
Occupational/Environmental Epidemiology Branch

Office of the Chief Medical Examiner
Forms of Law

• **Statutes** - enacted by Legislature (General Assembly).

• **Rules** - adopted by agencies of Executive Branch of government.

• **Ordinances** - adopted by local county or municipal government.
General Aspects of NC Laws

• All forms of law are enforceable, although statutes are generally considered to carry more weight than rules and ordinances

• Rules and ordinances derive their authority from the General Statutes

• Statutes derive their authority from the NC Constitution

• Rules “flesh out” statutes

• Rules should not repeat what is already stated in a statute
Communicable Disease Laws

• Most, but not all, communicable disease statutes are in Article 6 of Chapter 130A of the NC General Statutes.
Reporting of Communicable Diseases

- Rule **10A NCAC 41A .0101**
  - lists reportable diseases, conditions, and reportable positive laboratory tests
  - Note foodborne diseases
  - Reporting time frame: Within 7 days, within 24 hours, or immediately
  - CD report card – and Electronic Reporting
Disease Surveillance Systems - NC

- CASE REPORTS: NC-EDSS -- North Carolina Electronic Disease Surveillance System -- since 2008

- Syndromic Surveillance: NC-DETECT, for early event detection and monitoring (Hospital Emergency Depts., Poison Center calls, Ambulance runs/EMS)

- Urgent secure communication: NC-HAN (Health Alert Network, www.nchan.org)
Who Reports?

- **Physicians** (GS 130A-135)
- **School principals & DCC operators** (GS 130A-136)
- **Medical facilities** *may report* (GS 130A-137)
- **Operators of restaurants & other food or drink establishments** (GS 130A-138):
  - Outbreak or suspected outbreak.
  - Infected food handler.
  - Must call LHD within 24 hours.
  - Not required to send CD report card.
- **Laboratories** (Report direct to DPH rather than LHD; *may report electronically*)
Remember....

• A disease does NOT have to be reportable to be investigable!
Investigation: Role of Local HD

• The Local Health Department must:
  – Immediately investigate all reports of Com. Disease
  – Determine authenticity of the report
  – Determine identity of all persons for whom control measures are required
  – Collect and submit lab specimens
  – Determine which control measures have been given
Investigation

• Access to medical records and information
• Physician/medical facility/laboratory must permit local or state health director to examine and copy records pertaining to
  – diagnosis, treatment, or prevention of a CD
  – a known or suspected outbreak
Control Measures

- *Control of Communicable Diseases Manual*, (APHA publication), except for a few diseases & conditions covered in NCAC
- May be superceded by CDC publications
- When not specified, see the *guiding principles* in rule 10A NCAC 41A .0201(b).
Confidentiality

• In general, records that identify a patient specifically are not public records and are to be treated confidentially
Confidentiality (continued)

• Exceptions:
  – When necessary for control of a disease representing a significant public health hazard [GS 130A-143(4) and rule .0211]
  – When information is collected by a person other than a physician or nurse, it may not be protectable
  – Others as specified in GS 130A-143
Special Rules

• 10A NCAC 41A .0301-0302: Turtles may not be sold as pets

• 10A NCAC 41A .0303: Records of bird sales by retail stores must be kept for 6 months
Principles of Communicable Disease

Credits: K. Simeonsson, MD, MSPH
“Communicable Disease”

An illness due to a specific infectious agent that arises through transmission of that agent or its products from an infected person, animal or inanimate source, to a susceptible host, through an intermediate plant or animal host, vector, or the inanimate environment.

(Adapted fr. Dictionary of Epidemiology, Last, 2001)
Epidemiologic Triad

Agent

Environment  Host  Community
## Types of Agents

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<thead>
<tr>
<th>Biologic</th>
<th>Chemical</th>
<th>Physical</th>
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</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>Poison</td>
<td>Trauma</td>
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<tr>
<td>Virus</td>
<td>Alcohol</td>
<td>Radiation</td>
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<tr>
<td>Parasite</td>
<td>Smoke</td>
<td>Fire</td>
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<tr>
<td>Protozoa</td>
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<tr>
<td>Fungi</td>
<td></td>
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<tr>
<td>Prion (?)</td>
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Agent Factors

- **Infectivity**
  - Ability of a pathogen to establish infection

- **Pathogenicity**
  - Ability to cause disease

- **Virulence**
  - Severity of illness in those infected
Host Factors

- Age
- Behavior
- Immunologic status
- Genetic susceptibility
- Nutritional status
Environmental Factors

- **Physical**
  - climate, season, geology

- **Biologic**
  - insect vectors

- **Socioeconomic**
  - crowding
  - sanitation
Community Factors

- Population
- Infrastructure
- Culture
- Medical facilities
- Public health infrastructure
- Political will
How Does Infection Occur?

Agent

Environment

Host
Chain of Infection

- Agent
- Reservoir
- Portal of exit
- Transmission
- Portal of entry
- Establishment of infection (disease?) in new host
Chain of Infection

Agent — Reservoir — Host
Reservoir

*The Habitat* in which an infectious agent normally lives, grows, and multiplies

**Human Reservoir**
- Respiratory infections
e.g., tuberculosis, pertussis
- Sexually-transmitted infections
e.g., gonorrhea, Chlamydia infection
Animal Reservoirs: Zoonotic infections
Example: Rabies
Other reservoirs

- Water
  - *Legionella*

- Soil
  - *Clostridium* species
    (botulism, tetanus)
  - *Histoplasma capsulatum*
Portals

Portals of Exit
- Body fluids
- Skin
- Shower head

Portals of Entry
- GI tract
- Respiratory tract
- Skin
- Mucous membrane
- Percutaneous (blood)
Modes of Transmission

• **Direct**
  - direct contact
  - droplet spread

• **Indirect**
  - Vector
  - common vehicle
  - airborne
Direct Transmission:
Direct Contact
Direct Transmission: Droplet
Indirect Exposure: Common vehicle?
Indirect Exposure: Common Vehicle

- Inanimate object that facilitates transmission of an infectious agent
  - Food
  - Water
  - Medical equipment
  - Toys
  - Kitchen equipment
Indirect Exposure: Common Vehicle
Indirect Exposure: Vector

A living animal (arthropod) capable of transmitting infectious agent from one host to another

– biological transmission
– mechanical transmission
Natural History of Disease

- Susceptible stage
- Exposure
- Incubation period
- Onset of symptoms
- Clinical disease
- Recovery or death
- Immunity
  - temporary versus permanent
Incubation Period

- Minutes  Heavy metals
- Hours    Staphylococcal toxin
- Days     Shigella, Salmonella
- Weeks    Hepatitis
- Months   Rabies, tuberculosis
- Years    Leprosy
Spectrum of Disease

Clinical features
• Subclinical
• Mild
• Moderate
• Severe / Fatal

Epidemiological features
• Asymptomatic Carrier
• Chronic Carrier
Varying Degrees of Clinical Severity

- **Rabies**
- **Measles**
- **TB**

0% 20% 40% 60% 80% 100%

- Inapparent
- Mild
- Moderate
- Severe
- Fatal

Mausner & Kramer, 1985
Levels of Disease Incidence

- Individual infection
- Endemic levels
- Epidemic levels
- Pandemic levels
Causes of Epidemics

• Change in virulence of agent
• Change in environment
• Change in host susceptibility
• Change in modes of transmission
Approaches to Prevention

Agent

Environment

Host
Prevention:
Agent

- Control measures aimed at destroying the agent in its reservoir
- Examples:
  - chlorination
  - surgical scrubbing
Prevention:
Host

• Modify hosts to make them less vulnerable to disease / infection

• Examples:
  – vaccination
  – prophylaxis
  – improving nutritional status
Prevention: Environment

• Control measures are adapted to the type of transmission involved

• Examples:
  – spraying of insecticide to eliminate mosquito vectors
  – draining cooling towers when not in use
Prevention: Community

• Support your local public health department!
• Examples:
  – Collaborative investigations: restaurant inspection and co-worker interviews when a *Salmonella* case who works there is identified
Conclusion

• Infectious disease results from interactions between agent, host, and the environment

• Epidemiologic triad provides the conceptual framework
  – disease in individuals
  – disease in communities
  – prevention and control measures
If only investigations were this easy...

How to reach us

Communicable Disease Branch (24/7):

(919) 733-3419