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Red Book Update: Addressing the Top 5 Nationally Notifiable Infectious Diseases

Larry K. Pickering, MD, FAAP, FIDSA
April 16, 2016
Los Angeles, CA
I have no financial interest or other relationship with manufacturer(s) of product(s) or provider(s) of service(s) that will be discussed in this presentation.
Objectives

• Highlight the structure of and updates to the 2015 Red Book
• Review the top 5 nationally notifiable diseases in the United States and how they are addressed in the Red Book
• Discuss the impact of these diseases on clinical practice and public health
• Summarize the Red Book approach to therapy and prevention of these conditions
Vaccine Advances Since 1938

• Of 18 infectious diseases and organisms described in the 1938 Red Book, 12 now can be prevented by immunization
• 16 vaccines now are recommended for use in children and adolescents to prevent infectious diseases
• Two vaccines also prevent cancer (HBV and HPV) in vaccine recipients
• Smallpox has been eradicated
Red Book 2015: Major Sections

- Active and passive immunization
- Care of children in special circumstances
- Summary of infectious diseases
- Antimicrobial agents and related therapy
- Antimicrobial prophylaxis
- Eight appendices
First Use of an Antibiotic in America

- Sulfonamide compound first used in Germany in 1933 heralding the antibiotic era
- Sulfonamide first used in the U.S. two years later in a 10 year old child
- Katherine Woglom, was in her eighth week of illness due to Hib (epiglottitis ➔ meningitis ➔ eventual death)
- Antibiotic given by her primary physician Dr. Alexander Ashley Weech at Babies Hospital (Columbia) in NYC
Antibiotic(s) in 1938 in the Red Book
Sulfanilamide

- Only antimicrobial agent included in the 1938 Red Book®
- Indicated for use in three conditions
  - Erysipelas
  - Epidemic meningitis
  - Pneumococcal pneumonia (type III)
- Antiviral, antiparasitic and antifungal agents were not available
- 105 pages of antimicrobial therapy in 2015 Red Book compared to 8 total pages in 1938
Notice to Readers: Final 2014 Reports of Nationally Notifiable Infectious Diseases

Weekly
September 18, 2015 / 64(36);1019-1033

The tables listed in this report on pages 1020–1033 summarize finalized data, as of June 30, 2015, from the National Notifiable Diseases Surveillance System (NNDSS) for 2014. These data will be published in more detail in the Summary of Notifiable Diseases, United States, 2014 (1). Because no cases were reported in the United States during 2014, the following diseases do not appear in these early release tables: anthrax; dengue hemorrhagic fever; eastern equine encephalitis, nonneuroinvasive; poliomyelitis, paralytic; poliovirus infection, nonparalytic; severe acute respiratory syndrome-associated coronavirus disease (SARS-CoV); smallpox; vancomycin-resistant Staphylococcus aureus (VRSA); western equine encephalitis virus disease, neuroinvasive and nonneuroinvasive; and yellow fever.

Policies for reporting NNDSS data to CDC can vary by disease or reporting jurisdiction, depending on case status classification (i.e., confirmed, probable, or suspected). The publication criteria used for the 2014 finalized tables are listed in the "Print Criteria" column of the NNDSS event code list, available at http://www.cdc.gov/nndss/document/nndss_event_code_list_2014.pdf.

In addition, only cases from reporting jurisdictions where the nationally notifiable disease is reportable are published. The NNDSS website is updated annually to include the latest national surveillance case definitions approved by the Council of State and Territorial Epidemiologists (CSTE) for classifying and enumerating cases of nationally notifiable infectious diseases.

Population estimates are from the National Center for Health Statistics postcensal estimates of resident population of the United States for July 1, 2013–July 1, 2014, by year, county, single-year of age (0–≥85 years), bridged race (white, black or African American, American Indian or Alaska Native, Asian, or Pacific Islander), Hispanic origin (not Hispanic or Latino, Hispanic or Latino), and sex (Vintage 2014), prepared under a collaborative arrangement with the U.S. Census Bureau. Population estimates for states as of June 25, 2015 are available at http://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2014. Population estimates for territories are 2014 estimates from the U.S. Census Bureau (2).

References


Nationally Notifiable Infectious Diseases

- CDC in collaboration with Council of State and Territorial Epidemiologists collects and compiles data from state health departments and territories. Data reported since 1980.
- Health care providers (clinicians, hospitals and laboratories) are required by law to report diseases, conditions, or outbreaks.
- A disease may be added as a new pathogen emerges or deleted as its incidence declines.
- Provisional and final data are published in MMWR. Data are provided in tabular and graphic form.
- Red Book 2015, Appendix 4
What was the most common Nationally Notifiable Infectious Disease in the United States in 2014 and in 2015?

A. Campylobacter  
B. Chlamydia trachomatis  
C. Gonorrhea  
D. Lyme Disease  
E. Salmonella  
F. Syphilis
Number 6: Lyme Disease

- Follows tick exposure
- Caused by spirochete *Borrelia burgdorferi*
- Three stages of clinical disease: early localized, early disseminated, and late disease. Early see erythema migrans.
- Diagnosis requires a 2-step approach for serologic detection (EIA or IFA followed by Western blot)
Reported Cases of Lyme Disease—United States, 2012

One dot is placed randomly within the county of residence for each confirmed case. Though Lyme disease cases have been reported in nearly every state, cases are reported based on the county of residence, not necessarily the county of infection.

Concerns Regarding a New Culture Method for *Borrelia burgdorferi* Not Approved for the Diagnosis of Lyme Disease

Christina Nelson, MD\(^1\), Sally Hojvat, PhD\(^2\), Barbara Johnson, PhD\(^1\), Jeannine Petersen, PhD\(^1\), Marty Schriefer, PhD\(^1\), C. Ben Beard, PhD\(^1\), Lyle Petersen, MD\(^1\), Paul Mead, MD\(^1\) (Author affiliations at end of text)

In 2005, CDC and the Food and Drug Administration (FDA) issued a warning regarding the use of Lyme disease tests whose accuracy and clinical usefulness have not been adequately established \(^1\). Often these are laboratory-developed tests (also known as “home brew” tests) that are manufactured and used within a single laboratory and have not been cleared or approved by FDA. Recently, CDC has received inquiries regarding a laboratory-developed test that uses a novel culture method to identify *Borrelia burgdorferi*, the spirochete that causes Lyme disease. Patient specimens reportedly are incubated using a two-step pre-enrichment process, followed by immunostaining with or without polymerase chain reaction (PCR) analysis. Specimens that test positive by immunostaining or PCR are deemed “culture positive” \(^2\). Published methods and results for this laboratory-developed test have been reviewed by CDC. The review raised serious concerns about false-positive results caused by laboratory contamination and the potential for misdiagnosis \(^3\).

CDC recommends that laboratory tests cleared or approved by FDA be used to aid in the routine diagnosis of Lyme disease. A complete searchable list of such tests is available online \(^4\).

When evaluating testing options, providers and their patients might be confused by the distinction between Clinical Laboratory Improvement Amendments (CLIA) certification of laboratories and FDA clearance of tests. When laboratory testing is indicated, CDC recommends two-tier serologic testing for the diagnosis of Lyme disease. Two-tier testing consists of an FDA-cleared enzyme immunoassay (EIA) that, if positive or equivocal, is followed by an FDA-cleared immunoblot test, commonly known as a “Western blot” test. Results are considered positive only when both the EIA and Western blot are positive \(^5\). Culture and PCR of clinical specimens are recommended only in certain rare circumstances \(^6\).

CDC encourages researchers to work with FDA to develop new or improved tests for the diagnosis of Lyme disease. As with any diagnostic test, it is critical that new tests for Lyme disease have adequate analytical and clinical validation to avoid misdiagnosis and improper treatment of patients.

\(^1\)Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; \(^2\)Division of Microbiology Devices, Office of In Vitro Diagnostics and Radiological Health, Center for Devices and Radiological Health, FDA (Corresponding author: Christina Nelson, wje1@cdc.gov, 970-225-4259)

**References**

Tick Transmitted Pathogens

Potential Coinfections with Lyme

- *Babesia microti*
- *Anaplasma phagocytophilum*
- Deer type virus (type of Powassan)
- *Borrelia miyamotoi*
- *Ehrlichia species Wisconsin*
- *Borellia burdorferi* (Lyme) and *hermsii* (relapsing fever)
- *Coxiella burnetii* (Q fever)
- *Rickettsia species* (spotter fevers)
- *Francisella tularensis* (tularemia)
- Colorado tick fever

Red Book 2015, pages 210-213
Number 5: Campylobacter
Documented Outbreaks Associated with Unpasteurized Milk, US (1993-2006)
Diseases Associated with Raw Milk

Before milk pasteurized in 1920s
- Tuberculosis
- Diphtheria
- Severe streptococcal infections
- Typhoid fever

Current diseases
- Campylobacter 55%
- Salmonella 22%
- STEC 14%
- Listeria/Brucella/Shigella each 3%
Myths About Raw Milk

• Raw milk is healthier and more nutritious than pasteurized milk
• Drinking raw milk can prevent or cure diseases such as asthma, allergies, heart disease, or cancer
• Milk is safe as long as it is labeled “organic”
• Milk and raw milk products like soft cheeses and yogurts are safe if they come from healthy animals
• If animals are raised in sanitary conditions on humane farms, this ensures that their milk is safe
• Drinking raw milk may not be safe, but no harm will come from eating products (cheeses, yogurts) made from raw milk
Campylobacter jejuni Infections Associated with Raw Milk Consumption — Utah, 2014

Kenneth R. Davis, MPH; Angela C. Dunn, MD; Cindy Burnett, MPH; Laine McCullough; Melissa Dimond, MPH; Jenni Wagner, MS; Lori Smith; Amy Carter; Sarah Willardson, MPH; Allyn K. Nakashima, MD

In May 2014, the Utah Public Health Laboratory (UPHL) notified the Utah Department of Health (UDOH) of specimens from three patients infected with Campylobacter jejuni yielding indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. All three patients had consumed raw (unpasteurized and illness onset on May 10, and both were hospitalized. Patient A died 1 week later of multisystem organ failure, related, in part, to gastroenteritis and underlying medical conditions. Patient C’s symptoms began on May 11. All three patients reported raw milk consumption from dairy A in Weber County, in
### TABLE. Demographic and clinical characteristics for 99 patients with *Campylobacter jejuni* infection associated with consumption of raw milk from a dairy — Utah, May–November 2014

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
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<tr>
<td><strong>Sex (n = 97)</strong></td>
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<tr>
<td>Male</td>
<td>57 (59)</td>
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<tr>
<td>Female</td>
<td>40 (41)</td>
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<tr>
<td><strong>Hispanic ethnicity (n = 98)</strong></td>
<td></td>
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<tr>
<td>Non-Hispanic</td>
<td>67 (68)</td>
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<tr>
<td>Hispanic</td>
<td>31 (32)</td>
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<tr>
<td><strong>Age group (yrs) (n = 99)</strong></td>
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<tr>
<td>0–5</td>
<td>11 (11)</td>
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<tr>
<td>6–18</td>
<td>29 (29)</td>
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<tr>
<td>≥19</td>
<td>48 (48)</td>
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<tr>
<td>Unknown</td>
<td>11 (11)</td>
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<tr>
<td><em><em>Signs and symptoms (n = 84</em>)</em>*</td>
<td></td>
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<tr>
<td>Abdominal pain</td>
<td>65 (77)</td>
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<tr>
<td>Fever</td>
<td>53 (63)</td>
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<tr>
<td>Nausea</td>
<td>41 (49)</td>
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<tr>
<td>Vomiting</td>
<td>36 (43)</td>
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<tr>
<td>Bloody diarrhea†</td>
<td>35 (42)</td>
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<tr>
<td><strong>Outcome (N = 99)</strong></td>
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<tr>
<td>Hospitalized</td>
<td>10 (10)</td>
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<tr>
<td>Died</td>
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POLICY STATEMENT

Consumption of Raw or Unpasteurized Milk and Milk Products by Pregnant Women and Children

abstract

Sales of raw or unpasteurized milk and milk products are still legal in at least 30 states in the United States. Raw milk and milk products from cows, goats, and sheep continue to be a source of bacterial infections attributable to a number of virulent pathogens, including *Listeria monocytogenes*, *Campylobacter jejuni*, *Salmonella* species, *Brucella* species, and *Escherichia coli* O157. These infections can occur in both healthy and immunocompromised individuals, including older adults, infants, young children, and pregnant women and their unborn fetuses, in whom life-threatening infections and fetal miscarriage can occur. Efforts to limit the sale of raw milk products have met with opposition from those who are proponents of the purported health benefits of consuming raw milk products, which contain natural or unprocessed factors not inactivated by pasteurization. However,
Salmonella Strains

Non-typhi

- asymptomatic carriage
- gastroenteritis
- systemic illness
- animal reservoir

Typhi

- enteric fever
- bacteremia
- dissemination
- human reservoir

U.S. cases in 2013:

- 43,560
- 380

WORLDWIDE:

- = 21.6 million

References:

MMWR 2013; 62:669-683
Lancet 2005;366: 749
Outbreak of *Salmonella* Newport Infections Linked to Cucumbers — United States, 2014

Kristina M. Angelo, DO¹,², Alvina Chu, MHS³, Madhu Anand, MPH⁴, Thai-An Nguyen, MPH², Lyndsay Bottichio, MPH², Matthew Wise, PhD², Ian Williams, PhD², Sharon Scelman, MS, MBA³, Rebecca Bell, PhD⁵, Marianne Fatica, PhD⁵, Susan Lance, DVM, PhD³, Deanna Baldwin⁶, Kyle Shannon³, Hannah Lee, MPH³, Eija Trees, PhD², Errol Strain, PhD⁵, Laura Gieraltowski, PhD² (Author affiliations at end of text)

In August 2014, PulseNet, the national molecular subtyping network for foodborne disease surveillance, detected a multistate cluster of *Salmonella enterica* serotype Newport infections with an indistinguishable pulse-field gel electrophoresis (PFGE) pattern (XbaI PFGE pattern JJPX01.0061).* Outbreaks of illnesses associated with this PFGE pattern have previously been linked to consumption of tomatoes harvested from Virginia's Eastern Shore in the Delmarva region and have not been linked to cucumbers or other produce items (1). To identify the contaminated food and find the source of the contamination, CDC, state and local health and agriculture departments and laboratories, and the Food and Drug Administration (FDA) conducted epidemiologic, traceback, and laboratory investigations. A total of 275 patients in 29 states and the District of Columbia were identified, with illness onsets occurring during May 20–September 30, 2014. Whole genome sequencing (WGS), a highly discriminating subtyping method, was used to further characterize PFGE pattern JJPX01.0061 isolates. Epidemiologic, microbiologic, and product traceback evidence suggests that cucumbers were a source of *Salmonella* Newport infections in this outbreak. The epidemiologic link to a novel outbreak vehicle suggests an environmental source for the outbreak. Patients who reported eating at the same restaurant, attending the same event, or shopping at the same grocery store in the week before becoming ill.

A total of 275 cases were reported from 29 states and the District of Columbia (Figure 1). An additional 18 suspected cases not meeting the case definition were excluded from the analysis because they were found to be temporal outliers and unlikely to be related. Illness onset dates ranged from May 25 to September 29, 2014 (Figure 2). Median age of patients was 42 years (range = <1–90 years); 66% (174 of 265) were female. Thirty-four percent (48 of 141) were hospitalized; one death was reported in an elderly man with bacteremia. A total of 101 patients were interviewed using the supplemental questionnaire about exposures in the week before illness onset. This questionnaire focused on leafy greens and tomatoes and contained smaller sections on fruit, vegetables, and seafood common to the Delmarva region. Many patients were unreachable and did not receive the supplemental questionnaire. Sixty-two percent (49 of 79) of respondents reported eating cucumbers in the week before becoming ill. Patients were significantly more likely to report consuming cucumbers compared with other vegetables. Cucumbers were used to make salad dishes, salsas, and sauces.
Sporadic *Salmonella* Infections

- 1.4 million nontyphoidal human *Salmonella* infections occur annually in the U.S.
- 15,000 hospitalizations
- 400 deaths
- Reptile associated salmonellosis represents 6% of salmonellosis and 11% in people < 21 years of age
- Reptile or amphibian associated Salmonellosis: 74,000 per year

Multistate Outbreak of Human *Salmonella* Poona Infections Associated with Pet Turtle Exposure — United States, 2014

Colin Basler, DVM¹, ²; Lyndsay Bortchichio, MPH²; Jeffrey Higa, MPH³; Belinda Prado, MPH⁴; Michael Wong³; Stacey Bosch, DVM²

(Author affiliations at end of text)

In May 2014, a cluster of human *Salmonella* Poona infections was identified through PulseNet, the national molecular subtyping network for foodborne disease surveillance. Historically, this rare serotype has been identified in multiple *Salmonella* outbreaks associated with pet turtle exposure and has posed a particular risk to small children (1,2). Although the sale and distribution of small turtles (those with carapace [upper shell] lengths <4 inches [<10.2 cm]) is prohibited by federal law, they are still available for legal purchase online for “bona-fide” scientific, educational, or exhibition purposes, other than use as pets (3). In addition, small turtles are still available for illegal purchase through transient street vendors, at flea markets, and at fairs.

During April 26–September 22, 2014, a total of 40 persons infected with *Salmonella* Poona pulse-field gel electrophoresis home. Turtles had been obtained from several types of locations, including a carnival and a fair. The transient nature of turtle vendors hampered the traceback investigation. No other common food or animals were identified during the course of the investigation.

This outbreak demonstrates that turtles remain a source for human *Salmonella* infections, especially for young children. Because 40% of ill persons were infants aged ≤1 year and were unlikely to directly handle pet turtles, the potential role of indirect transmission in turtle-associated salmonellosis outbreaks should be considered. Turtles in the home could lead to environmental contamination with *Salmonella* bacteria and result in human illness. Educational campaigns directed toward parents of young children, in conjunction with the federal turtle ban, might help to prevent future turtle-associated salmonellosis outbreaks.

¹Epidemic Intelligence Service, CDC; ²Division of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; ³California Department of Public Health; ⁴City of Long Beach Department of Health and Human Services, Long Beach, California.

Corresponding author: Colin Basler, cbasler@cdc.gov, 404-639-2214.
Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — February–October 2014

Colin Basler, DVM¹,², Tony M. Forshey, DVM³, Kimberly Machesky, MPH⁴, C. Matthew Erdman, DVM, PhD⁵, Thomas M. Gomez, DVM⁵, Denise L. Brinson, DVM⁵, Thai-An Nguyen, MPH², Casey Barton Behravesh, DVM, DrPH², Stacey Bosch, DVM²

(Author affiliations at end of text)

In early 2014, five clusters of human *Salmonella* infections were identified through PulseNet, the national molecular subtyping network for foodborne disease surveillance. Many ill persons in each of these clusters reported contact with live poultry, primarily chicks and ducklings, from a single mail-order hatchery; therefore, the clusters were merged into a single investigation. During February 3–October 14, 2014, a total of 363 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Newport, and Hadar were reported from 43 states and Puerto Rico, making it the largest live poultry-associated salmonellosis outbreak reported in the United States.

Among the ill persons, 35% (122 of 353) were aged ≤10 years, and 33% (76 of 233) were hospitalized; no deaths were reported. Among those interviewed, 76% (174 of 230) reported live poultry contact in the week before illness onset. Among the ill persons who provided supplemental information on live poultry exposure, 80% (94 of 118) reported chick exposure and 26% (31 of 118) reported duckling exposure.

The U.S. Department of Agriculture’s National Poultry Improvement Plan, a collaboration between industry and state and federal agencies, provides guidance on management and sanitation practices for mail-order hatcheries, including a Best Management Practices Handbook.* Comprehensive *Salmonella* prevention and control programs are needed at all hatcheries and associated breeder farms to prevent outbreaks.

The possibility of environmental contamination of the home by live poultry, suggested by the 27% of respondents who reported no direct contact with their poultry, illustrates a need for additional educational information advising customers on how to reduce the risk for *Salmonella* transmission from live poultry (3) to humans through environmental contamination. Educational information regarding zoonotic *Salmonella* outbreaks, including outbreaks associated with live poultry, is available from CDC (4). A comprehensive approach to illness prevention involving human and animal health officials and practitioners, industry, and backyard poultry flock owners is needed to prevent future outbreaks.

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*Available at [http://www.poultryimprovement.org/default.cfm](http://www.poultryimprovement.org/default.cfm).

¹Epidemic Intelligence Service, CDC; ²Division of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; ³Ohio Department of Agriculture; ⁴Ohio Department of Health; ⁵US Department of Agriculture (Corresponding author: Colin Basler, cbasler@cdc.gov, 404-639-2214)
Mail-Order Hatcheries in the United States

- ≈ 20 core mail-order hatcheries
- >50,000 chicks sold annually
- Hatcheries may distribute nationwide
- Distribute through U.S. postal service directly to customers or to agricultural feed stores
- One box may contain multiple species (cross-contamination)
<table>
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<tr>
<th>Organism</th>
<th>Choice</th>
<th>Alternate</th>
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<tr>
<td>Salmonella</td>
<td>Ceftriaxone or Fluoroquinolone</td>
<td>Ampicillin</td>
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<tr>
<td></td>
<td></td>
<td>TMP/SMX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chloramphenicol</td>
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<tr>
<td></td>
<td></td>
<td>Azithromycin (Typhi)</td>
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</tbody>
</table>

www.cdc.gov/narms
SYPHILIS, PRIMARY AND SECONDARY. Incidence* — United States and U.S. territories, 2012

* Per 100,000 population.

In 2012, the primary and secondary syphilis rate in the United States and territories (Guam, Puerto Rico, and Virgin Islands) was 5.1 cases per 100,000 population.
Clinical Manifestations of Congenital Syphilis

- Death--hydrops fetalis--asymptomstic
- Hepatosplenomegaly
- Snuffles
- Lymphadenopathy
- Mucocutaneous lesions
- Pneumonia
- Osteocondritis
- Pseudoparalysis
- Edema
- Rash
- Hemolytic anemia, thrombocytopenia
Clinical Pearls

• 322 cases of congenital syphilis reported in 2012 (348 in 2013 and 458 in 2014)
• Rates of congenital syphilis higher among infants born to black and Hispanic women
• See algorithm in syphilis chapter of 2015 Red Book for evaluation and treatment of infants born to mothers with reactive serologic tests for syphilis
Gonorrhea in the Americas

- Sexually transmitted infection is caused by the bacterium *Neisseria gonorrhoeae*
  - Can lead to pelvic inflammatory disease
  - Can result in adverse reproductive health complications
  - Facilitates HIV transmission

- Second most commonly reported nationally- notifiable disease
  - 338,815 cases reported in 2014
  - Vast majority of infections are asymptomatic

Red Book 2015, pages 356-367
GONORRHEA. Incidence* — United States and U.S. territories, 2012

* Per 100,000 population.

In 2012, the gonorrhea rate in the U.S. and territories (Guam, Puerto Rico, and Virgin Islands) was 106.3 cases per 100,000 population, an increase from the rate in 2011.
Recommendations for the Laboratory-Based Detection of Chlamydia trachomatis and Neisseria gonorrhoeae — 2014

Prepared by
John R. Papp, PhD1
Julius Schachter, PhD2
Charlotte A. Gaydos, DrPH3
Barbara Van Der Pol, PhD4

1Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC
2University of California at San Francisco, San Francisco, California
3Johns Hopkins University, Baltimore, Maryland
4University of Alabama at Birmingham, School of Medicine, Birmingham, Alabama

Summary

This report updates CDC’s 2002 recommendations regarding screening tests to detect Chlamydia trachomatis and Neisseria gonorrhoeae infections (CDC. Screening tests to detect Chlamydia trachomatis and Neisseria gonorrhoeae infections—2002. MMWR 2002;51[No. RR-15]) and provides new recommendations regarding optimal specimen types, the use of tests to detect rectal and oropharyngeal C. trachomatis and N. gonorrhoeae infections, and circumstances when supplemental testing is indicated. The recommendations in this report are intended for use by clinical laboratory directors, laboratory staff, clinicians, and disease control personnel who must choose among the multiple available tests, establish standard operating procedures for collecting and processing specimens, interpret test results for laboratory reporting, and counsel and treat patients.

The performance of nucleic acid amplification tests (NAATs) with respect to overall sensitivity, specificity, and ease of specimen transport is better than that of any of the other tests available for the diagnosis of chlamydial and gonococcal infections. Laboratories should use NAATs to detect chlamydia and gonorrhea except in cases of child sexual assault involving boys and rectal and oropharyngeal infections in prepubescent girls and when evaluating a potential gonorrhea treatment failure, in which case culture and susceptibility testing might be required. NAATs that have been cleared by the Food and Drug Administration (FDA) for the detection of C. trachomatis and N. gonorrhoeae infections are recommended as screening or diagnostic tests because they have been evaluated in patients with and without symptoms. Maintaining the stability and culture of both Neisseria and Chlamydia
Sexually Transmitted Diseases Treatment Guidelines, 2015

Prepared by
Kimberly A. Workowski, MD1,2
Gail A. Bolan, MD1
1Division of STD Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
2Emory University, Atlanta, Georgia

Summary

These guidelines for the treatment of persons who have or are at risk for sexually transmitted diseases (STDs) were updated by CDC after consultation with a group of professionals knowledgeable in the field of STDs who met in Atlanta on April 30–May 2, 2013. The information in this report updates the Sexually Transmitted Diseases Treatment Guidelines, 2010 (MMWR Recomm Rep 2010;59 [No. RR–12]). These updated guidelines discuss 1) alternative treatment regimens for Neisseria gonorrhoeae; 2) the use of nucleic acid amplification tests for the diagnosis of trichomoniasis; 3) alternative treatment options for genital warts; 4) the role of Mycoplasma genitalium in urethritis/cervicitis and treatment-related implications; 5) updated HPV vaccine recommendations and counseling messages; 6) the management of persons who are transgender; 7) annual testing for hepatitis C in persons with HIV infection; 8) updated recommendations for diagnostic evaluation of urethritis; and 9) retesting to detect repeat infection. Physicians and other health-care providers can use these guidelines to assist in the prevention and treatment of STDs.

Introduction

The term sexually transmitted diseases (STDs) refers to a variety of clinical syndromes and infections caused by pathogens that can be acquired and transmitted through sexual activity. Physicians and other health-care providers play a critical role in preventing and treating STDs. These guidelines for the treatment of STDs are intended to assist with that effort. Although these guidelines emphasize treatment, prevention strategies and diagnostic recommendations also are discussed.

This document updates CDC’s Sexually Transmitted Diseases Treatment Guidelines, 2010 (1). These recommendations should be regarded as a source of clinical guidance rather than prescriptive. This document is based on the basis of their expertise in the clinical management of STDs. Members of the multidisciplinary workgroup included representatives from federal, state, and local health departments; public- and private-sector clinical providers; clinical and basic science researchers; and numerous professional organizations. All workgroup members disclosed potential conflicts of interest; several members of the workgroup acknowledged receiving financial support for clinical research from commercial companies. All potential conflicts of interest are listed at the end of the workgroup member section.

In 2012, CDC staff and workgroup members were charged with identifying key questions regarding treatment and clinical management that were not addressed in the 2010
Gonorrhea – Antibiotic Resistance

- Antibiotic resistance (inability of an antibiotic to cure infection)
  - Undermines treatment success
  - Heightens risk of complications
  - Facilitates passage of infection to uninfected individuals

- Gonorrhea has demonstrated the ability to progressively develop antibiotic resistance

<table>
<thead>
<tr>
<th>Sulphonamides</th>
<th>Penicillins</th>
<th>Tetracyclines</th>
<th>Fluoroquinolones</th>
<th>Cephalosporins</th>
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<td><strong>X</strong></td>
</tr>
</tbody>
</table>
Clinical Pearls for Treatment

- Recommended therapy consists of a combination of ceftriaxone plus azithromycin
- Cefixime is no longer recommended
- Treat sex partners from the preceding 60 days
- For persistent infections after treatment (treatment failure), obtain relevant clinical specimens and perform susceptibility testing
- Follow-up of case-contacts is decreasing, which is a major problem in preventing any STI
- Red Book 2015, in gonococcal chapter: tables 3.7 (uncomplicated) and 3.8 (complicated)
Chlamydia trachomatis

- Neonatal chlamydial conjunctivitis
- Pneumonia
- Genitourinary tract infection
- Lymphogranuloma venereum (LGV)
- Trachoma

- Red Book 2015, pages 288-294
Clinical Pearls

• Range of clinical manifestations involving eyes and genitourinary and respiratory tracts
• Most common STI in the U.S.
• Diagnosis is with nucleic acid amplification tests (NAAT) but they are not approved for all indications
• Treatment varies by condition but generally azithromycin/erythromycin or doxycycline/tetracycline
• Control measures depend on clinical syndrome
  - Neonatal
  - STI
  - Trachoma: SAFE (surgery, antibiotic, face washing, environment

Red Book 2015: Summaries of Infectious Diseases pages 288-29
Diseases that round out the top 10 notifiable diseases

• 6. Lyme disease
• 7. Pertussis
• 8. Shigellosis
• 9. Invasive pneumococcal
• 10. Giardiasis

Excludes HIV
Summary of Top 10 Nationally Notifiable Diseases in the United States, 2014

- Four cause gastroenteritis
- Three are sexually transmitted
- Two are vaccine-preventable
- One is caused by a tickborne spirochete
- All 10 involve children and adolescents
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