# *Forensic Learning Series*

# Sexually Transmitted Infection and Disease Assessment

## for Health Care Providers and First Responders

*Forensic Learning Series*

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# Sexually Transmitted Infection and Disease Assessment

## for Health Care Providers and First Responders

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# Foreword

The effective detection and management of sexually transmitted infections (STIs) is integral to health and overall well-being in our patient populations. Of concern are patients who have experienced sexual assault as they are at particular risk and require STI evaluation immediately following the assault, as well as during the recommended follow-up examination. The Centers for Disease Control and Prevention states, "Examinations of survivors of sexual assault should be conducted by an experienced clinician in a way that minimizes further trauma to the survivor."[1]

It is important that caregivers are competent and confident when caring for this vulnerable and complex patient population. *Sexually Transmitted Infection and Disease Assessment for Health Care Providers and First Responders* provides health care providers information in a succinct and comprehensive format which not only increases the reader's essential knowledge, but allows learners to synthesize, apply, and review essential information in practical case history exercises. The integration and practical application of this knowledge within the scenarios allows learners to synthesize key information to transform their practice at a self-directed pace. Authored by internationally recognized experts, readers are presented with case histories and corresponding exercises in STI evaluation, which are ideal for self-directed study or group instruction and will benefit novice and advanced practitioners alike.

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1. *2015 sexually transmitted diseases treatment guidelines: sexual assault and abuse and STDs. Centers for Disease Control and Prevention Web site. https://www.cdc.gov/std/tg2015/sexual-assault.htm. Updated June 4, 2015. Accessed September 21, 2019.*

## Our Mission

To become the world leader in publishing and information services on child abuse, maltreatment, diseases, and domestic violence. We seek to heighten awareness of these issues and provide relevant information to professionals and consumers.

# Foreword

In 2018, the Centers for Disease Control and Prevention reported 2 457 118 combined cases of sexually transmitted infections (STIs) in the United States.[1] Because many cases of common STIs such as syphilis, gonorrhea, *Chlamydia*, human papillomavirus, and herpes simplex are not identified or reported, the number of STIs may be considerably higher. *Sexually Transmitted Infection and Disease Assessment for Health Care Providers and First Responders* was written with the intent of creating an evidence-based, self-directed teaching tool and reference for providers across all disciplines who deal with patients of all ages at risk for STIs. The text, in both handbook and ebook format, provides clear and concise information with drawings and full-color photographs that are useful for the veteran forensic or nonforensic clinician as well as for the clinician just entering practice.

This all-new handbook is written by content experts in forensic nursing, advanced emergency nursing practice, and advanced outpatient nursing practice. A review of male and female anatomy, with drawings and full-color photographs, details normal anatomy as well as variants of normal anatomy. An overview of STIs is provided with photographs. Each chapter provides a section on Disease and Mimics which assists in the differential diagnosis of the suspected STI. Epidemiology and focused diagnostic methods are described along with the use of checklists and concise algorithms that provide a clear pathway to diagnosis. Critical thinking is reinforced through pediatric and adult/geriatric case studies that teach and refine diagnostic skills in STI identification, treatment protocols, and follow-up based on the current evidence-based recommendations. Importantly, the reader is reminded frequently that any child diagnosed with an STI should be referred to child protective services for investigation of potential sexual abuse. With increasing international travel, the risk of STIs increases.[2] This text reinforces the need for greater STI awareness and screening for all who are at risk for STIs.

*Sexually Transmitted Infection and Disease Assessment for Health Care Providers and First Responders* is a resource that all practitioners caring for patients at risk for STIs will want in their pocket.

**William E. Somerall, Jr, MD, MAEd**
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1. *DC fact sheet: reported STDs in the United States, 2018. Centers for Disease Control and Prevention Web site. https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/std-trends-508.pdf. Accessed November 13, 2019.*
2. *Memish ZA, Osoba AO. International travel and sexually transmitted diseases.* Travel Med Infect Dis. *2006;4(2):86-93.*

# Preface

Understanding sexually transmitted infections (STIs) is a large part of medical forensic practices, whether it is registered nurses trained to recognize disease and refer the patient to experts, or advanced nurse practitioners and physicians charged with diagnosis and treatment. *Sexually Transmitted Infection and Disease Assessment* provides the latest information on STIs for medical practitioners at every level. Each chapter covers a different STI and includes information for a rapid check of presenting symptoms, current testing procedures, and treatment options according to the latest recommendations with updates from the Centers for Disease Control and Prevention. In addition, the book has patient education recommendations, as well as sexual health practices recommendations.

The case study review section helps the provider maintain skills with an assessment for differential diagnosis of the most commonly seen STIs and offers an opportunity for students to test their knowledge. Both the experienced and novice provider will benefit from the chance to review and refine their skills.

The authors want to thank the support of their employers and colleagues, and everyone who contributed to the important information included in this book. We believe health care providers will find this assessment to be an invaluable addition to their library and will keep this book on their desk, becoming their favorite frequent reference.

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## Reviews

*As a forensic nurse or first responder, we are the source that patients count on for answers. For this reason, we need powerful resources that are easy to use.* Sexually Transmitted Infection and Disease Assessment for Health Care Providers and First Responders *delivers this in a big way—providing essential and plentiful detail in a naturally intuitive structure. This is the rare combination of breadth, depth, and simplicity. Breadth: covering both common and rare STIs and STDs; depth: providing definitions, pictures, and case examples; and simplicity: each chapter makes sense and provides the information you need, where you expect to find it.*

*Whether you are an experienced practitioner or new to the field, this text provides evidence-based and current best practices including identification, modes of transmission, symptoms, and treatments of STIs or STDs. This book supports case reviews or serves as a quick reference during patient care. The user-friendly format delivers the information you need quickly and concisely. The value of a simple to use, accurate, and in-depth handbook like this cannot be overstated for the first responder. I recommend having this book readily available in all patient care scenarios.*

Sarah Pederson,
BSN, RN, SANE-A, SANE-P
Atlanta, Georgia

*The* Sexually Transmitted Infection and Disease Assessment *is a very detailed explanation of sexually transmitted infections. It not only discusses prevalence, epidemiology, assessment, and treatment, but it provides great case studies and provides the reader with the ability to self-evaluate their understanding of the diseases. The tables give you quick references to immunization schedules and illustrations assist the provider in identifying diseases. This is the type of treatise that is so beneficial to front line providers to assist them in medical diagnosis and treatment. This is a "must purchase" for nurses who are pursuing degrees as advanced practice providers.*

Barbra A. Bachmeier,
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Sexually Transmitted Infection and Disease Assessment *is an exceptional guide, which offers health care professionals the opportunity to engage in a self-directed or group learning experience in the evaluation for sexually transmitted infections. The thoughtful range and breadth with which each chapter is written provides a comprehensive and detailed understanding of sexually transmitted infections. It affords readers the opportunity to assess case histories and identify treatment options with photographs for reference, demonstrating basic concepts as well as difficult issues. The evaluation exercises included enhance and strengthen abilities in sexually transmitted infection identification, treatment, and follow-up care. This book is an invaluable resource and clearly articulates the highest standards of care for professionals providing sexual health assessments and care to this population.*

Sinead Maher, MSc, RM, RNP, RGN
CNS Sexual Assault Forensic Examiner
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Sexually Transmitted Infection and Disease Assessment *provides health care professionals with the tools necessary to deliver appropriate care for patients who may have been exposed to, or are exhibiting symptoms of, STIs. It is an exceptional resource for any health care provider, from physicians to forensic nurses, who interact with patients across the lifespan. Novice and experienced providers will find this resource to be an invaluable addition to their medical library.*

*Beginning with clear and accurate definitions, diagrams, and labeled images, this text guides the learner through several STIs. Individualized case studies allow the learner to test their own knowledge of anatomical structures and work through case presentations from presentation to treatment. Each case study builds on the previous one and serves to provide a well-rounded description of many STIs. I highly recommend* Sexually Transmitted Infection and Disease Assessment *for any health care professional who wishes to expand their knowledge-base.*

Laurie Charles, MSN, RN,
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Sexually Transmitted Infection and Disease Assessment *presents a complex and challenging health care topic for the various levels of health care professionals. This workbook promotes a practical, self-directed approach to an ever-challenging problem in today's society. The most common sexually transmitted infections are discussed through a variety of applicable learning activities. To refine and reinforce the content, anatomical reviews, case studies, special populations, treatment plans, and full color photographs are incorporated to enhance the reader's knowledge. A collaborative, trauma-informed approach provides an approach to prevention, assessment, identification, and treatment.*

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## Reviews

*The* Sexually Transmitted Infection and Disease Assessment *is a practical, clinically focused workbook designed to improve the diagnostic skills of health professionals at every level. This expertly authored text examines disease processes, contextual relevance, and clinical management for each topic using clear, concise delivery augmented by photographic exemplars and thoroughly supported with case studies. Whether used for reference or self-study, the authors' wealth of knowledge cultivated over many decades of patient care experience and curated in this well-organized volume will benefit novice first responders and experienced health care providers alike.*

Chelsea Hayman, BSN, RN, CEN
Doctor of Nursing Practice Student
The University of Alabama at Birmingham

*This comprehensive guide on sexually transmitted infections (STIs) is a must-have for all medical professionals and frontline health care workers. This guide is insightful and practical in the layout of the pathophysiology and treatment of STIs which allows information to be incorporated in forensic practice. The use of detailed case studies and laboratory information increase the learner's knowledge about STIs. All health care workers need to access this guide to enhance their knowledge about infections to better manage the care of their patients. The authors use an excellent approach to capture the attention of its audience and brings to light a much-needed topic in the health care arena.*

Beverly N. Brown, MSN, APRN, FNP-C Student
The University of Alabama at Birmingham

*The* Sexually Transmitted Infection and Disease Assessment *is a beneficial educational exercise for clinicians providing care in a multitude of settings. The succinct and relevant review of pathophysiology, diagnostics, and management of STIs is enriched by case histories and application activities for the learner. The competency gained through completion of the educational exercises will empower care providers to address patient needs according to best practice guidelines.*

Jessica Griffith Sparks, RN-BSN
Candidate for Doctor of Nursing Practice
The University of Alabama at Birmingham

*This assessment is an excellent resource for forensic medical professionals to review sexually transmitted infections and diseases. The case studies and photographs allow the medical professional to understand the diagnosis and treatment plan. It is a great addition to any medical professionals' library.*

Elizabeth McCord,
MSN, FNP-C, SANE-A
Operations Manager
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Pearl, Mississippi

*This comprehensive workbook serves as an insightful guide for students and teachers everywhere. The authors' vast knowledge is clearly visible and allows for this book to serve as a valuable resource. The special attention to detail in laboratory testing, treatments, and special considerations is key in diagnosis and treatment. The case studies provide a unique and realistic perspective into clinical practice and allow for updated information to be readily and easily available. This workbook is useful to all health care workers as a tool for educating others, as well as for self-education to be the best health care provider possible and promote patient safety.*

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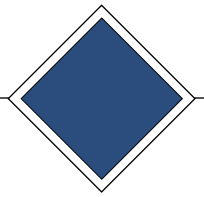
# Contents in Brief



# Contents in Detail

# Sexually Transmitted Infection and Disease Assessment

## for Health Care Providers and First Responders

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Section I

# Definitions and Anatomical Review

## Objectives

***After reviewing the figures presented in this section, the student will be able to:***

*1. Correctly identify oral, genital, and anal anatomy.*

*2. Accurately define structures of the oral, genital, and anal anatomy.*

## Instructions

Anatomical diagrams and photographs have been provided to assist the student with correctly identifying anatomical landmarks. These diagrams and photos should be used when documenting normal anatomy, injuries, and any other variant conditions or findings throughout the *Sexually Transmitted Infection and Disease Assessment.*

## STI Definitions

— ***Abstinence:*** Not having sexual intercourse.

— ***Acquired immunodeficiency syndrome (AIDS):*** A disease of the human immune system caused by the human immunodeficiency virus (HIV). HIV/AIDS represents the entire range of diseases caused by the HIV virus from early infection to late stage symptoms.

— ***Anal intercourse:*** Sexual contact in which the penis enters the anus.

— ***Antibiotic:*** A medication that either kills or inhibits the growth of a bacteria.

— ***Antiviral:*** A medication that either kills or inhibits the growth of a virus.

— ***Atrophic:*** A thinning of tissue modified by the location. In epidermal atrophy, the epidermis becomes transparent with a loss of skin texture and cigarette paper–like wrinkling. In dermal atrophy, there is a loss of connective tissue and the lesion is depressed.

— ***Bacterial vaginosis (BV):*** A polymicrobial clinical syndrome resulting from replacement of the normal hydrogen peroxide producing *Lactobacillus* sp. in the vagina with high concentrations of anaerobic bacteria. A common symptom of BV is abnormal homogeneous, off-white, fishy-smelling vaginal discharge.

— ***Cervical motion tenderness (CMT):*** A sign found on pelvic examination suggestive of pelvic pathology; when movement of the cervix during the bimanual examination elicits pain.

— ***Cervix:*** The lower, cylindrical end of the uterus that forms a narrow canal connecting the upper (uterus) and lower (vagina) parts of a woman's reproductive tract.

— ***Chlamydia:*** The most common reported sexually transmitted bacterial infection in the United States, caused by the bacteria *Chlamydia trachomatis*. Often, no symptoms are present, especially in women. Untreated *Chlamydia* can cause sterility and pelvic inflammatory disease (PID) and increase the chances for life-threatening tubal pregnancies. *Chlamydia* is treated with antibiotics and can be prevented by avoiding sexual intercourse or by using protection (eg, a latex or polyurethane condom) with every sexual act and encounter.

— ***Condom (male):*** A device that covers the penis, worn during sex to prevent sexually transmitted infections (STIs) and pregnancy. Condoms can be made of animal skin, latex, or polyurethane, but only latex and polyurethane condoms protect against diseases.

— ***Condom (female):*** A device worn internally that lines the vagina during sexual intercourse as a barrier contraceptive to prevent exposure to ejaculated sperm and STIs. The female condom is a thin, soft, loose-fitting sheath with a flexible ring at each end made out of polyurethane or synthetic nitrile.

— ***Confidential:*** Private information that identifies a person and, by law, is required to be kept in a secured location with access restricted only to authorized personnel. For example, a confidential HIV test would be one where a person's file would be kept in a locked area where only authorized medical personnel (physician, nurse practitioner, or counselor) would have access.

— ***Cryotherapy:*** Freezing with liquid nitrogen or cryoprobe; one of the recommended provider-administered treatments for external genital warts.

— ***Dark field:*** A simple and reliable microscopic test for the direct detection of *Treponema pallidum*, the bacteria that causes syphilis. Exudates and fluids from genital lesions are examined as a wet mount using dark-field microscopy. Dark-field microscopy is most suitable when the lesions are located in the genital region, are moist, and the examination can be done immediately after specimen collection. Testing nongenital lesions, especially oral lesions, can result in false positives because of the presence of nonpathogenic spirochetes and is not recommended.

— ***Dental dam:*** A thin, rectangular sheet, usually latex rubber, used as a barrier to prevent the transmission of STIs during oral sex.

— ***Disease intervention specialist (DIS):*** A public health worker who investigates cases and contacts of reportable STIs. The DIS locates and counsels people with STIs and HIV to identify exposed individuals and ensure testing and treatment. A DIS provides recommendations to physicians and health departments on the testing and treatment of patients and facilitates rapid referrals to service and follow-up.

— ***Dyspareunia:*** Painful sexual intercourse.

— ***Dysuria:*** Difficult or painful urination.

— ***Enzyme-linked immunosorbent assay (ELISA):*** A screening test used to detect HIV infection by looking for antibodies to the virus in a patient's serum. If antibodies to HIV are present (positive), it is followed by confirmatory testing according to guidelines from the Centers for Disease Control and Prevention (CDC).

— ***Ectopic pregnancy:*** Also referred to as ***tubal pregnancy;*** a pregnancy in which the fertilized egg that grows into a fetus attaches itself to the fallopian tube instead of the walls of the uterus. Ectopic pregnancy can be life threatening. Rates of ectopic pregnancy increase significantly in women who have PID, an effect of untreated bacterial STIs such as *Chlamydia* and gonorrhea.

— ***Edematous:*** A condition marked by an excessive accumulation of watery fluid in cells and tissues.

— ***Expedited partner therapy (EPT):*** The clinical practice of treating the sex partners of patients diagnosed with *Chlamydia* or gonorrhea by providing prescriptions or medications to the patient to take to his or her partner without the health care provider first examining the partners. Although legality varies by state, the clinical practice is allowed by the majority of the United States. In these cases, the health care provider does not examine the partner but is required to provide treatment through state law.

— ***Fallopian tubes:*** Tubes on each side of the uterus through which an egg moves from the ovaries to the uterus.

— ***Fluorescent treponemal antibody (FTA) test:*** A blood serum test for syphilis that detects the presence or absence of specific antibodies directed against the organism *Treponema pallidum*. The FTA is a "treponemal test" used in the diagnosis of syphilis infection and detects the majority of, but not all, cases of infection. False negatives can occur in early syphilis infection, and false positives are relatively uncommon. The FTA should be used in conjunction with the rapid plasma reagin to properly diagnose syphilis infection.

— ***Genital warts:*** A viral infection caused by the nononcogenic or low-risk types of human papillomavirus (HPV), usually types 6 and 11. Genital warts are diagnosed by visual inspection and most commonly occur in the genital or anal areas of the body. They typically appear cauliflower-shaped and can be flesh-colored, pink, or hyperpigmented. Because genital warts are caused by a virus, there is no real cure—the warts themselves can be treated, but the virus still lives inside a person's body. HPV is passed through direct skin-to-skin contact, even if no symptoms are present.

— ***Gonorrhea:*** The second most commonly reported bacterial STI in the United States, caused by the bacteria *Neisseria gonorrhoeae*. Many people who are infected show no signs of the disease, particularly women. When symptoms are present, they usually appear 2 to 5 days after sexual contact with an infected partner. Gonorrhea can cause PID if left untreated. Gonorrhea is treated with antibiotics and can be prevented by avoiding sexual contact with infected individuals or by using protection (eg, a latex or polyurethane condom) with every sexual contact.

— ***Gynecologist:*** A physician or nurse practitioner who specializes in women's reproductive health.

— ***Hepatitis A:*** An acute viral infection of the liver caused by the hepatitis A virus (HAV). Hepatitis A is often asymptomatic and generally self-limiting. Symptoms may include nausea, vomiting, diarrhea, jaundice (yellowish discoloration of the skin), fever, and abdominal pain. Incubation period is 2 to 6 weeks. It rarely results in chronic infection, chronic liver disease, or acute liver failure. Transmission is primarily by the fecal-oral route via food or water contaminated with feces. The hepatitis A vaccine is available for the prevention of hepatitis A.

— ***Hepatitis B:*** An infectious illness of the liver caused by the hepatitis B virus (HBV). Acute illness causes liver inflammation, vomiting, jaundice, and, rarely, death. Chronic hepatitis B may eventually cause cirrhosis and liver cancer. It is transmitted by exposure to infectious blood or body fluids such as semen and vaginal fluid. There is no specific treatment for the acute infection. Treatment is recommended for some with chronic infection to suppress the virus and may include antiviral medications (eg, entecavir [Baraclude], tenofovir [Viread], lamivudine [Epivir], adefovir [Hepsera], telbivudine [Tyzeka]) which fight the virus, slowing down its ability to damage the liver. It is preventable with the hepatitis B vaccine series.

— ***Hepatitis C:*** An infectious disease affecting primarily the liver caused by the hepatitis C virus (HCV). Infection is often asymptomatic, but chronic infection can lead to scarring of the liver and ultimately to cirrhosis. Those with cirrhosis may go on to develop liver failure or liver cancer. Transmission occurs through blood-to-blood contact associated with intravenous drug use, poorly sterilized medical equipment, transfusions, and rarely through sexual transmission. Chronic infection can be treated with medication, and cure rates range from 50% to 80%. HCV is the leading reason for liver transplantation. No vaccine against hepatitis C is available.

— ***Human immunodeficiency virus (HIV):*** A retrovirus, causing AIDS. It is the best-known lentivirus (***lenti*** is Latin for "slow"), which is a genus of retroviruses that causes chronic and deadly disease, characterized by long incubation periods in humans. There is slow progressive failure of the immune system, which allows life-threatening opportunistic infections and cancers to thrive. HIV is transmitted via blood, semen, vaginal fluid, pre-ejaculate, and breast milk. The virus infects vital cells in the human immune system such as helper T cells, macrophages, and dendritic cells, leading to a loss of cell-mediated immunity. As a result, the body becomes progressively susceptible to opportunistic infections. HIV is highly treatable, but there is no cure or vaccine for prevention.

— ***Human papillomavirus (HPV):*** A DNA virus from the papillomavirus family that establishes infection in keratinocytes of the skin and mucous membranes. Most HPV infections are subclinical and will cause no physical symptoms; however, some subclinical infections may become clinical and cause benign papillomas (warts) or squamous cell papillomas (cancers). Approximately 30 to 40 types of HPV are typically transmitted through sexual contact and infect the anogenital region. HPV types 6 and 11 are commonly associated with genital warts and rarely progress to cancer. High-risk HPV types 16 and 18 are associated with progression to precancerous lesions and invasive cancer. The HPV vaccine prevents HPV types 16 and 18, the 2 types that cause 80% of cervical cancer. The vaccine is routinely recommended for girls and boys ages 11 or 12, although it can be given as early as age 9. It is ideal for girls and boys to receive the vaccine before they have sexual contact and are exposed to HPV.

— ***Herpes simplex virus (HSV):*** A chronic, lifelong viral infection spread when an infected person is producing and shedding the virus in an infected area of the skin. Two types of HSV have been identified, HSV-1 and HSV-2. Most cases of genital herpes are caused by HSV-2 and oral lesions are typically caused by HSV-1, but both types can be found in the genital and oral areas. A large majority of individuals with HSV are asymptomatic and unaware of their exposure. The infection is manageable and treatable with antiviral therapy, but there is no vaccine for prevention.

— ***Injection drug use:*** A term used to describe a method of injecting drugs using a needle.

— ***Long-acting bicillin (LAB):*** Also known as benzathine penicillin. The antibiotic recommended for the treatment of syphilis because of its prolonged, low-concentration, antibacterial action over 2 to 4 weeks after a single intramuscular dose.

— ***Loop electrosurgical excision procedure (LEEP):*** A procedure using a fine wire-loop diathermy for biopsy or excision for treatment of cervical intraepithelial neoplasia.

— ***Lymphogranuloma venereum (LGV):*** An STI caused by certain subtypes of *Chlamydia trachomatis*, specifically serovars L1, L2, L2a, and L3. LGV is primarily an infection of lymphatics and lymph nodes. Although there have been sporadic outbreaks among men who have sex with men in the United States, it is endemic in parts of Africa, India, Southeast Asia, South America, and the Caribbean. Incidence and hence, prevalence, is unknown as LGV has been nonreportable since 2003.

— ***Macerated:*** Softened or broken-down skin resulting from prolonged exposure to wetness that leads to whitening and thickening of the keratin, sometimes with redness, oozing, and scaling.

— ***Macule:*** A circumscribed flat discoloration (eg, a freckle, a small vitiligo spot).

— ***Men who have sex with men (MSM):*** A term used to describe a male person who has sex with men. The CDC now recommends *gay, bisexual,* and *other men who have sex with men* be collectively referred to as MSM.

— ***Men who have sex with women (MSW):*** A term used to describe a male person who has sex with women.

— ***Mucoid:*** An adjective used to describe secretions that are slippery and rich in glycoproteins and water.

— ***Mucopurulent cervicitis (MPC):*** Inflammation of the cervix characterized by purulent or mucopurulent endocervical exudate visible in the endocervical canal or on an endocervical swab specimen.

— ***Mycoplasma genitalium (Mgen):*** An emerging STI. The bacterium is sexually transmitted and can cause inflammation of the urinary and genital tracts in men and women. Mgen, like other STIs, can cause inflammation of delicate genital tissue. Although nucleic acid amplification tests detect the organism, they are not readily available at this writing.

— ***Nodule:*** A circumscribed, elevated solid lesion. A large nodule is a tumor (ie, wart, hemangioma).

— ***Nongonococcal urethritis (NGU):*** An inflammation of the urethra not caused by gonorrheal infection; characterized by urethral discharge, painful urination, or itching at the end of the urethra.

— ***Nucleic acid amplification test (NAAT):*** A molecular technique used to detect a virus or bacterium by detecting the genetic material of an infecting organism. NAATs are able to detect the presence of infection earlier after exposure than antigen or antibody tests; however, NAATs are not used for test of cure within 3 months as the detection of noninfective residual DNA may yield false positives long after treatment.

— ***OLDCARTS:*** Acronym (Onset, Location, Duration, Character, Aggravating/relieving, Radiation, Timing, Severity) used when subjective history is provided to ensure complete assessment.

— ***Oral sex (oral intercourse, oral copulation):*** Sex in which the mouth comes in contact with the genital or anal areas (penis, vagina, or anus).

— ***Ovaries:*** The pair of female reproductive glands in which the ova, or eggs, are formed. The ovaries are located in the lower abdomen, 1 on each side of the uterus.

— ***Papanicolaou test (Pap smear):*** A method of cervical screening used to detect potentially precancerous and cancerous cells in the endocervical canal. A speculum is used to open the vaginal canal and allow the collection of cells from the outer opening of the cervix and the endocervix. Cells are then examined for abnormalities.

— ***Papule:*** A small superficial bump that is elevated and less than 1 cm (ie, papular dermatitis).

— ***Partner notification:*** A process in which a person with an infection, such as an STI, lets his or her sexual partner(s) know about the infection so that testing and treatment can be sought. DISs in the health departments can assist with the notification process.

— ***Patch:*** A large macule equal to or greater than 1 cm across, commonly involving some type of subtle skin surface changes, such as scaling or wrinkling, though the lesion itself is not palpable.

— ***Patient-delivered partner therapy (PDPT):*** A form of EPT in which providers supply infected patients with treatment packets to deliver to their partners without requiring the partners to come into the clinic for a medical examination or testing.

— ***Pelvic inflammatory disease (PID):*** An inflammatory disorder of the upper female genital tract, including any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis. The infection (usually caused by sexually transmitted organisms) spreads from the vagina to the upper parts of a woman's reproductive tract in the pelvic cavity. It can be difficult to diagnose because of the wide variety of symptoms and signs, which can be mild and subtle in many women. If left untreated, PID can cause infertility and in severe cases may even spread to the liver and kidneys, causing dangerous internal bleeding, liver and lung failure, and death.

— ***Pelvis:*** The lower part of the abdomen between the hip bones. Organs in a female's pelvis include the uterus, vagina, ovaries, fallopian tubes, bladder, and rectum.

— ***People who inject drugs (PWID):*** Refers to those who currently inject drugs or have a history of injection drug use.

— ***Plaque:*** A broad papule, or confluence of papules, equal to or greater than 1 cm; an elevated, plateau-like lesion greater in its diameter than in its depth (ie, psoriasis).

— ***Polycystic ovarian syndrome/disease (PCOS/PCOD):*** A condition in which a woman's ovaries or adrenal glands produce more male hormones than normal, possibly resulting in the development of cysts (fluid-filled sacs) on the ovaries. Women who are obese are more likely to have PCOS. Women with PCOS are at increased risk of developing diabetes and heart disease.

— ***Postexposure prophylaxis (PEP):*** A preventative medical treatment started immediately after a high-risk exposure to a pathogen such as HIV to prevent infection and development of the disease. To be effective, PEP for HIV must be taken within 72 hours of exposure; it consists of 2 to 3 antiretroviral medications taken for 28 days.

— ***Pre-exposure prophylaxis (PrEP):*** A preventative medical treatment used before exposure to a disease-causing agent to prevent rather than treat or cure a disease. PrEP most commonly refers to an HIV-prevention strategy that uses antiretroviral medications to protect high-risk HIV-negative people from acquiring HIV.

— ***Pruritus:*** Sensation that causes the desire or reflex to scratch; itchiness.

— ***Pubic lice:*** The crab louse *(Pthirus pubis)*, also known as the pubic louse. A tiny insect that is an obligate ectoparasite of humans. They are typically found in the pubic hair but may also live on other areas of coarse hair, including the eyelashes. They cannot jump, and they feed exclusively on blood. They are spread through sexual contact as well as through sharing of infested bed sheets, clothing, or towels. Females lay 3 eggs a day, and the eggs take 6 to 8 days to hatch. Itching is the main symptom of pubic lice. Skin may be irritated, and a rash may develop from extensive scratching and digging. Pubic lice can be treated with a medicated shampoo.

— ***Purulent:*** Producing or containing pus.

— ***Pustule:*** A small circumscribed elevation on the skin containing pus.

— ***Rapid plasma reagin (RPR):*** A macroscopic serological test that looks for nonspecific antibodies in the blood of a patient that may be infected with *Treponema pallidum*, the bacteria that causes syphilis. The test does not look for antibodies against the actual organism but rather for antibodies against substances released by cells when they are damaged by *T. pallidum*. The RPR is used to screen for syphilis and a RPR level (also called a ***titer***) can be used to track the progress of the disease over time and the patient's response to therapy. Because it is a nonspecific test, false positives can be seen as a result of a variety of different circumstances and conditions. The RPR is the test of choice by most laboratories across the United States and has largely replaced the Venereal Disease Research Laboratory, a similar nontreponemal syphilis test. There has been an increase in the adoption of automated treponemal tests by laboratories as the initial screening test for *T. pallidum*, followed by a

nontreponemal test. While this algorithm is timelier and more cost-effective, it does have a 14% to 40% false-positive rate, with a second treponemal test often being used to help determine what clinical action should be taken.

— ***Reporting:*** The process of notifying the federal, state, regional, or local authorities of a new case of a reportable disease. Individual states have reporting laws on which diseases are required to be reported and who is required to submit the report (laboratory, clinic, or both).

— ***Scabies:*** A contagious skin infection caused by the mite *Sarcoptes scabiei*. The mite is tiny and not directly visible. The parasite burrows under the host's skin, causing intense itching. The mite may be transmitted by direct skin-to-skin contact and from infested bed sheets, towels, or clothes. Extensive scratching can also cause a rash. Like pubic lice, scabies can be cured with a medicated shampoo.

— ***Semen:*** The fluid from a man's penis that contains sperm.

— ***Sensitivity:*** A statistical measurement of the performance of a test that measures the proportion of actual positives that are correctly identified. The ability of a test to be positive in the presence of disease (also known as the ***true positive rate***).

— ***Sexually transmitted infection (STI):*** An infection that is passed during oral, anal, or genital/vaginal sexual contact. STIs include *Chlamydia*, gonorrhea, syphilis, genital herpes, HIV, genital warts, and trichomoniasis.

— ***SOAP:*** Acronym (Subjective history, Objective findings, Assessment, Plan of care) used when diagnosising STIs.

— ***Specificity:*** A statistical measurement of the performance of a test that identifies the proportion of negatives that are correctly identified. The ability of a test to be negative in the absence of disease (also known as the ***true negative rate***).

— ***Spermatozoa (sperm):*** The male reproductive cells. In mammals, they develop in the testicles and are released from the penis. Sperm cannot divide and have a limited life span of 3 to 5 days within the female genital tract. A sperm joins an ovum (female egg cell) during fertilization to form a zygote and contributes half of the nuclear genetic information. In mammals, the sex of the offspring is determined by the sperm cell.

— ***Spermicide:*** An agent that kills spermatozoa. Spermicide can be found in some condoms. Frequent use of spermicides containing nonoxynol-9 has been associated with disruption of the genital epithelium and is therefore not recommended for STI or HIV prevention.

— ***Squamous:*** Related to or covered with scales.

— ***Sterility:*** The inability to get pregnant, or to get someone pregnant; often caused by the effects of untreated bacterial infections such as *Chlamydia* or gonorrhea.

— ***Symptom:*** Any noticeable change in the body or its functions that indicates disease or infection; a physical sign that disease is present.

— ***Syphilis:*** A bacterial infection caused by the spirochete *Treponema pallidum*. The primary route of transmission is through sexual contact, but it may also be transmitted from mother to fetus during pregnancy or at birth, resulting in congenital syphilis. Signs and symptoms vary depending on which of the 4 stages it presents (primary, secondary, latent, and tertiary). Diagnosis is usually made using blood tests and an enzyme immunoassay test. This blood test checks for syphilis antibodies. Other tests include fluorescent treponemal antibody absorption test, *Treponema pallidum* particle agglutination assay, dark-field microscopy, and microhemagglutination assay. Syphilis can be effectively treated with antibiotics, specifically the preferred intramuscular penicillin G.

— ***Transmission:*** The spread of disease from 1 person to another.

— ***Trichomoniasis:*** Also referred to as "trich," it is an infection of the urogenital tract caused by the single-celled protozoan *Trichomonas vaginalis*. The most common sites of infection in women are the urethra and the vagina. Symptoms in women can include vaginal discharge, "fishy" odor, burning, and itching. Men rarely experience symptoms but can carry, and therefore transmit, the parasite through intercourse. It can be effectively treated with oral antibiotics.

— ***Ulcer:*** An open lesion on the surface of the skin or a mucosal surface caused by superficial loss of tissue, usually with inflammation.

— ***Urethra:*** The tube in the penis that carries both urine and semen.

— ***Urethritis:*** Inflammation (swelling) of the urethra. The most common symptom is painful or difficult urination. Urethral discharge is also commonly present. STIs (eg, gonorrhea, *Chlamydia*, *Mycoplasma genitalium* infection) often cause urethritis in men.

— ***Urinalysis:*** A laboratory test in which urine is examined microscopically for normal and abnormal elements to assist in diagnosing infections of the urinary tract.

— ***Uterus:*** The small, hollow, pear-shaped organ in a woman's pelvis. The organ in which the fetus develops during gestation; also called the ***womb***.

— ***Vaginal intercourse:*** Sexual contact in which the penis is inserted inside the vagina.

— ***Vaginal fluid:*** The natural liquids produced inside a woman's vagina. In an infected person, STIs can be passed when vaginal fluids come in contact with the genital area of a woman's sex partner.

— ***Vaginitis:*** Inflammation (swelling) of the vagina associated with symptoms of vaginal discharge, itching, pain, and irritation or infection of the vulva. The 3 main causes of vaginitis are BV, vulvovaginal candidiasis (VVC or ***yeast***), and trichomoniasis.

— ***Venereal disease research laboratory (VDRL):*** A microscopic serological test that looks for nonspecific antibodies in the blood of a patient that may be infected with *Treponema pallidum*, the bacteria that causes syphilis. The test does not look for antibodies against the actual organism but rather antibodies against substances released by cells when they are damaged by *T. pallidum*. The VDRL is used to screen for syphilis, and a VDRL level (also called a ***titer***) can be used to track the progress of the disease over time and the patient's response to therapy. Because it is a nonspecific test, false positives can be seen as a result of a variety of different circumstances and conditions. The VDRL has largely been replaced by the RPR as the nontreponemal syphilis test of choice by most laboratories in the United States.

— ***Vesicle:*** A small, fluid-filled bubble, usually superficial, and less than 0.5 cm.

— ***Vulvovaginal candidiasis (VVC):*** A vaginal infection typically caused by excessive growth of *Candida albicans*, a fungal species normally present in the vagina in small numbers and usually harmless. VVC is occasionally caused by other *Candida* species. Symptoms include pruritus, vaginal soreness, dyspareunia, external dysuria, and abnormal vaginal discharge. Treatment is an antifungal medication, either topical or oral. An estimated 75% of women will have at least 1 episode of VVC in their lifetime.

— ***Western blot:*** A confirmatory test used to detect specific anti-HIV antibodies in a human serum sample using a gel electrophoresis technique. The Western blot has been the traditional confirmatory test for HIV after 2 positive ELISA tests.

— ***Wet prep:*** A microscopic laboratory procedure used for the diagnosis of vaginal infections, primarily yeast, trichomoniasis, and BV. A sample of vaginal discharge is put in a saline suspension and viewed under the microscope. Reported abnormal findings should include whether the test is positive or negative for clue cells (must be 20%), yeast pseudohyphae, motile trichomonads, and increased white blood cells.

— ***Zygote:*** A single cell with a complete set of chromosomes that normally develops into an embryo.

## Additional Definitions

The student may find reviewing the following definitions useful in completing the activities within this book. Terminology for indicators of direction when documenting findings during a medical forensic examination include ***anterior, posterior, inferior, superior, medial, lateral, proximal,*** and ***distal.***

— ***Abrasions:*** Superficial injuries representing the removal of the outermost layers of the skin; usually caused by lateral rubbing, sliding, or compressive forces.

— ***Anterior:*** Situated toward the front of the body.

— ***Avulsion:*** A forceful separation or detachment that may occur traumatically or surgically; tearing away of a body part or structure.

— ***Bruises (contusions):*** Injuries that lie below the intact epidermis and result from extravascular collection of blood that has leaked from ruptured capillaries or blood vessels after sufficient force has been applied to distort the soft tissues and tear 1 or more vessels.

— ***Cut:*** An opening in the skin that occurs when a sharp object comes into contact with skin or tissue with enough pressure to divide it; cuts have even, regular edges.

— ***Drug-facilitated sexual assault (DFSA):*** Term for all types of sexual assault when drugs, alcohol, or other intoxicants are deliberately given to the victim by the perpetrator.

— ***Distal:*** Farther away; situated away from the center of the body or from the point of attachment.

— ***Inferior:*** Low; situated lower in position.

— ***Lacerations:*** Injuries that occur when the continuity of the skin is broken and disrupted by blunt force such as tearing, ripping, crushing, overstretching, pulling apart, over bending, or shearing of tissue.

— ***Lateral:*** Situated toward the one side.

— ***Incapacitated rape:*** Self-induced intoxication creating vulnerability and lack of legal consent before rape.

— ***Medial:*** Middle; situated in the middle or inside.

— ***Petechiae:*** Multiple hemorrhagic spots; pinpoint to pinhead in size.

— ***Posterior:*** Behind; situated toward the back of the body.

— ***Proximal:*** Near; situated nearer to the center of the body or the point of attachment.

— ***Superior:*** Above; situated above another structure.

# Oral Cavity

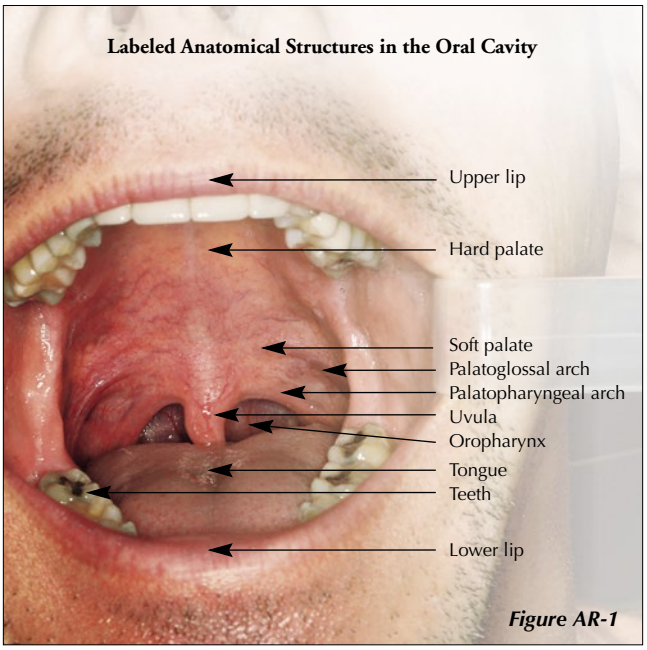


***Figure AR-1***

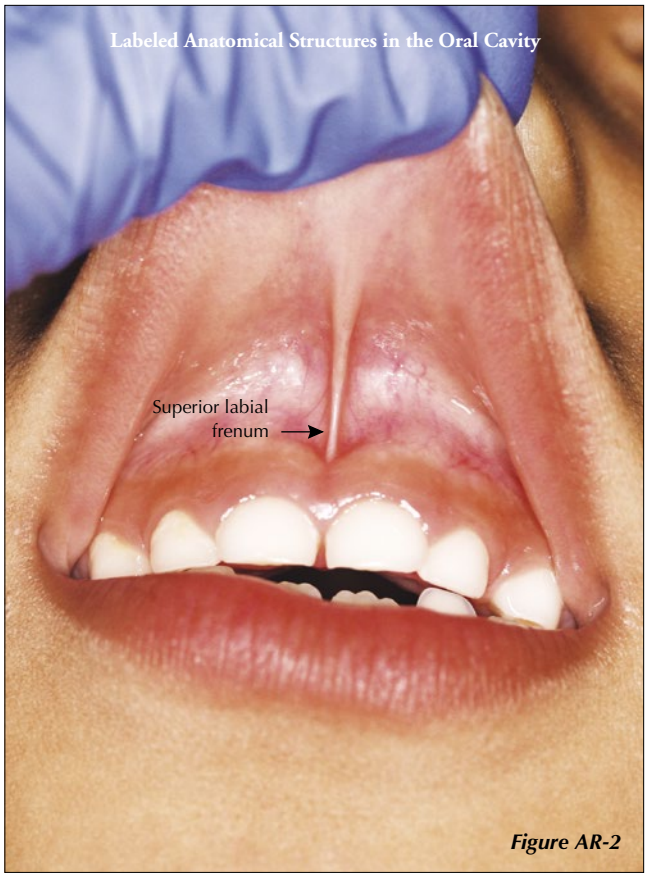


***Figure AR-2***

## Definitions

— ***Fordyce spots:*** Enlarged ectopic sebaceous glands in the mucosa of the mouth and genitals, appearing as small yellow spots.

— ***Frenum*** (original term: frenulum): A small fold of mucous membrane that limits the movements of an organ or anatomical structure (eg, lingual frenum, maxillary labial frenum, mandibular labial frenum).

— ***Gingiva:*** The soft tissue overlying the crowns of unerupted teeth and encircling the necks of those that have erupted. Wisdom teeth are the last set of molars to erupt, usually at age 18 to 25 years.

— ***Hard palate:*** The anterior part of the palate, covered above by the mucous membrane of the nose and below by the mucoperiosteum of the roof of the mouth.

— ***Lips:*** The soft external structures that form the boundaries of the mouth; the opening to the oral cavity.

— ***Oropharynx:*** The area of the pharynx between the soft palate and the upper aspect of the epiglottis; area of the throat in the back of the mouth.

— ***Palatine raphe:*** A ridge or line along the median line of the palate that sometimes turns into a slight groove at its posterior end.

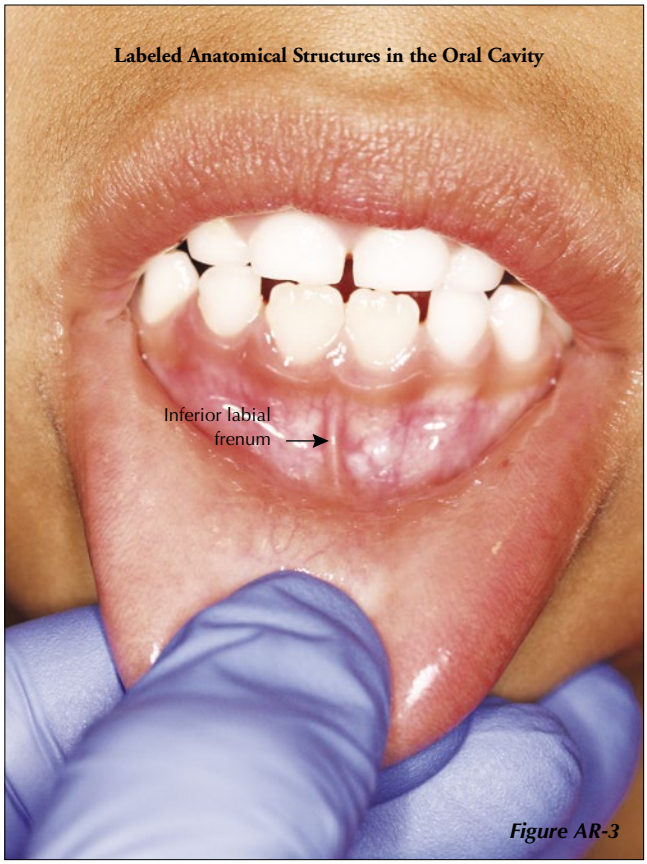


***Figure AR-3***

**Labeled Anatomical Structures in the Oral Cavity**

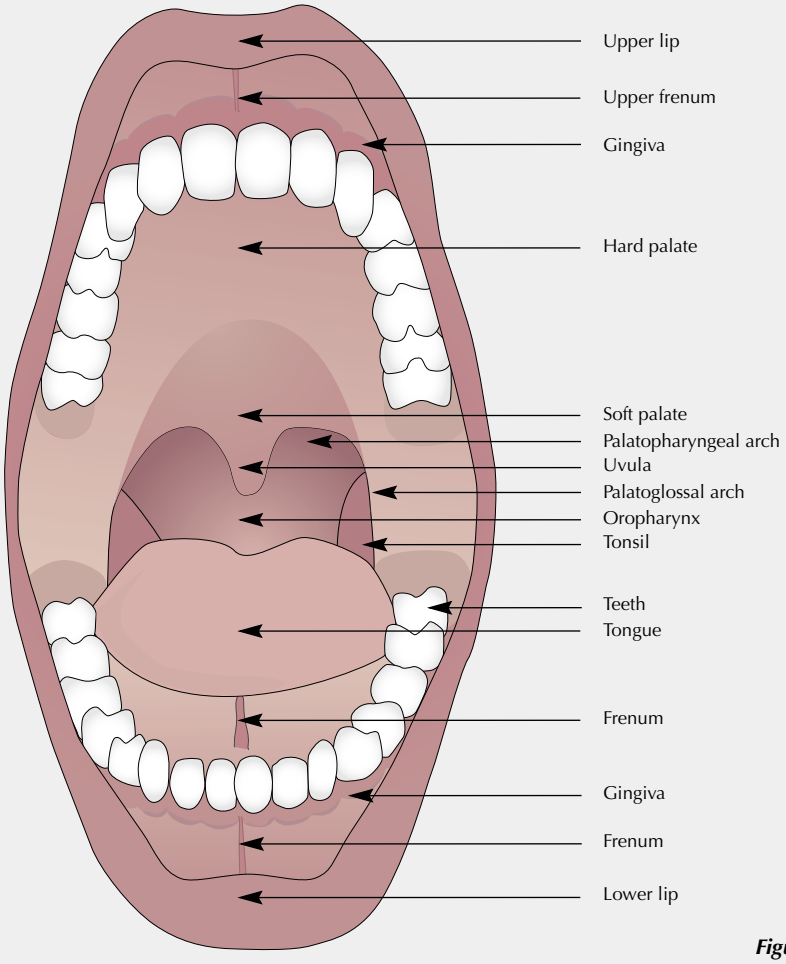


***Figure AR-4***

— ***Palatoglossal arch:*** The anterior of the 2 folds of mucous membrane on either side of the oropharynx, enclosing the palatoglossal muscle.

— ***Palatopharyngeal arch:*** The posterior of the 2 folds of mucous membrane on either side of the oropharynx, enclosing the palatopharyngeal muscle.

— ***Soft palate:*** A movable fold consisting of muscular fibers enclosed in mucous membrane. The soft palate is suspended from the rear of the hard palate and separates the nasal cavity from the oral cavity during swallowing or sucking.

— ***Teeth:*** The hardest bone in the body. Deciduous teeth are commonly called baby teeth or primary teeth; the first set usually consists of 20 teeth. For most, there are a total of 32 permanent, or adult, teeth.

— ***Tongue:*** A mobile mass of muscular tissue that is covered with mucous membrane; occupies much of the cavity of the mouth; forms part of its floor; is the organ of taste; and assists in chewing, swallowing, and speech.

— ***Tonsil:*** A small oral mass of lymphoid tissue, especially either of 2 such masses embedded in the lateral walls of the opening between the mouth and the pharynx. Also called faucial tonsil or palatine tonsil.

— ***Uvula:*** A small, soft structure hanging from the free edge of the soft palate in the midline above the root of the tongue. The uvula is composed of muscle, connective tissue, and mucous membrane.

Chapter 3

# Lymphogranuloma Venereum

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## Disease and Mimics

— Lymphogranuloma venereum (LGV) is an ulcerative disease of the genital area caused by the gram-negative bacteria *Chlamydia trachomatis*.

— LGV primarily affects the lymphatic system. LGV is caused by L1, L2, and L3 serovars of *C. trachomatis* and most recently $L_2$b (***LGV biovar***).[1]

— The most common clinical manifestation of LGV among heterosexuals is tender inguinal or femoral lymphadenopathy that is typically unilateral.

— A self-limited ulcer or papule sometimes occurs at the site of inoculation, but by the time patients seek care, lesions have often disappeared.[2]

— Rectal exposure in women or in men who have sex with men (MSM) can result in proctocolitis mimicking inflammatory bowel disease. Clinical findings may include mucoid or hemorrhagic rectal discharge, anal pain, constipation, fever, or tenesmus. Rectal LGV can be asymptomatic.[2]

— If it is not treated early, LGV proctocolitis can lead to chronic colorectal fistulas and strictures.[2]

— LGV is common in the tropical and subtropical regions around the world but is rare in the United States.[3]

## Epidemiology

LGV most likely affects both sexes equally, although it is more commonly reported in men because early symptom manifestations of LGV are more apparent in men. Men typically present with the acute form of the disease, whereas women often present when they develop complications from later stages of the disease. LGV may appear at any age, but the highest incidence is between ages 15 and 40 years (sexually active population). Most cases in Europe and North America have been identified among white MSM patients presenting with proctitis who are also often positive for human immunodeficiency virus (HIV).[4] Since 2003, there has been a series of LGV outbreaks reported across Europe.[5,6] This is a major public health concern because enhanced shedding of HIV during clinical proctitis could increase the risk of HIV transmission to uninfected men.[7] Before the outbreaks in MSM, LGV was primarily endemic in heterosexuals in areas of East and West Africa, India, parts of Southeast Asia, and the Caribbean, where it is manifested as the classic form of the disease with genital ulcers and lymphadenopathy (without proctitis).

Complications usually occur when the disease is left untreated and include necrosis and rupture of the lymph nodes, anogenital fibrosis and strictures, and anal fistula. Elephantiasis of the genital organs can also occur in some cases. Systemic complications like pneumonia and hepatitis also have been reported.[8]

Diagnosis is based on clinical suspicion, epidemiologic information, and the exclusion of other causes for proctocolitis, inguinal lymphadenopathy, or genital or rectal ulcers. Genital lesions, rectal specimens, and lymph node specimens can be tested for *C. trachomatis* by culture, direct immunofluorescence, or nucleic acid detection. MSM presenting with proctocolitis should be tested for *Chlamydia*.[2]

LGV infection has 3 phases. The first phase (primary stage) starts with a painless papule or ulcer at the site of inoculation. The second phase (secondary stage) of the infection is the invasion of regional lymph nodes, which can result in an inguinal or rectal syndrome. The third phase of LGV infection (tertiary stage) is the irreversible destruction of lymph tissue.[8]

Unlike other serovars of *C. trachomatis*, which cause mucosal infections by infecting columnar epithelial cells, the serovars L1, L2, and L3 cause systemic disease by infecting monocytes and macrophages and then invading submucosal sites and regional lymph nodes.[8]

***Primary:*** Although often unnoticed by patients, about 3 to 30 days after inoculation localized inflammation manifests at the site of exposure (often genital or rectal, but it can be oropharyngeal).[9] Classically, this lesion is a transient papule that is about 1 to 6 mm in size, but it can be a pustule or ulcer. The lesions resolve or heal spontaneously after a few days.[2] Direct rectal inoculation, as in the outbreaks of LGV among MSM, can result in proctitis with symptoms of rectal pain, anorectal bleeding, mucoid or hemopurulent rectal discharge, tenesmus, and constipation.[9]

***Secondary:*** About 2 to 6 weeks after the primary lesion appears, regional tissue invasion occurs and can be accompanied by constitutional symptoms (eg, fever, chills, malaise, myalgia, arthralgia).[10] Advancing systemic complications such as pneumonia and hepatitis have been reported.[2] Although symptoms depend on the site of inoculation, some individuals might be asymptomatic during this stage.[11] With penile, urethral, or vulvar inoculation, the main presentation is an inguinal syndrome.[9] In such cases, LGV induces often unilateral, painful, firm, inguinal or femoral lymphadenopathy known as ***buboes***. These lymph nodes can suppurate, ulcerate, and possibly lead to purulent discharge through cutaneous fistulas.[11] Concurrent inguinal and femoral lymphadenopathy can create the ***groove sign***, which is present in 10% to 20% of cases.[12,13] Cervical lymphadenopathy can occur with the onset of the oral syndrome of LGV.[2] Rectal inoculation results in proctitis and lower abdominal or low-back pain as a result of involvement of the pelvic and retroperitoneal lymph nodes.[12] In these cases lymphadenopathy is not evident on physical examination but can often be identified through imaging (eg, computed tomography, magnetic resonance imaging).[9]

***Tertiary:*** If untreated, LGV can lead to irreversible tissue destruction and scarring.[10] In particular, the chronic lymphangitis and subsequent lymphatic obstruction caused by LGV can lead to regional lymphedema and genital elephantiasis. In severe cases, necrosis and rupture of the lymph nodes have been reported.[14] In cases of rectal involvement, perirectal abscesses, anal fistulas, and strictures are possible.[8]

## Treatment Guidelines

Currently there is no vaccination against LGV. The treatment of choice (supported by more than 50 years of clinical experience) is doxycycline. The Centers for Disease Control and Prevention's (CDC's) Sexually Transmitted Disease (STD) Treatment Guidelines recommend doxycycline 100 mg orally twice daily for 21 days and an alternative regimen of erythromycin 500 mg orally 4 times a day for 21 days. Although clinical data are lacking, azithromycin 1 g orally once weekly for 3 weeks is probably effective based on its chlamydial antimicrobial activity.[2] Fluoroquinolone-based treatments also might be effective, but the optimal duration of treatment has not been evaluated.[2] Doxycycline is not recommended for use in pregnant women. Pregnant and lactating women should be treated with erythromycin. Azithromycin may prove useful for treatment of LGV in pregnancy, but no published data are available regarding its safety and efficacy.[2] Patients should abstain from sex until treatment is complete and symptoms have resolved. Sexual partners of a probable or confirmed LGV case should be tested for *Chlamydia* infection and presumptively treated with doxycycline 100 mg orally twice daily for 7 days.[2] Patients should be monitored until symptoms and signs of the disease have resolved, which may occur within 3 to 6 weeks. Tests of cure should be performed approximately 3 to 4 weeks after effective treatment is completed. All guidelines also recommend ongoing follow-up until signs and symptoms are resolved.[8] **Table 3-1** outlines possible treatment regimens for LGV.

**Table 3-1. Lymphogranuloma Venereum Treatment Regimens[4]**

| Drug | Regimen | Mechanism/Possible Side Effects | Comments |
|---|---|---|---|
| Doxycycline | 100 mg PO twice daily for 21 days | — Inhibits protein synthesis by binding to 30S ribosomal subunits of susceptible bacteria<br>— Dyspepsia; nausea; diarrhea; photosensitivity; darkening of skin, nails, eyes, teeth, gums, or scars; esophageal ulceration; Fanconi syndrome (nephrotoxicity); steatosis (hepatotoxicity); headache and vision problems (secondary intracranial hypertension–pseudotumor cerebri) | — First choice; recommended by CDC<br>— Contraindicated in pregnancy and breastfeeding<br>— Antacids that contain aluminum, calcium, or magnesium or any product that contains iron, such as vitamin or mineral supplements, should not be taken |
| Erythromycin | 500 mg PO 4 times daily for 21 days | — Inhibits bacterial growth by blocking dissociation of peptidyl transfer RNA from ribosomes<br>— Diarrhea, stomach pain, nausea, vomiting | Second choice; recommended by CDC |
| Azithromycin | 1 g PO stat, then 1 g PO weekly for 3 weeks | — Inhibits bacterial protein synthesis by binding to the 50S ribosomal subunit of the bacterial 70S ribosome<br>— The same as for erythromycin | Should be considered as second choice, but evidence is lacking to recommend this drug |
| Tetracycline | 500 mg PO 4 times daily for 21 days | — The same as for doxycycline<br>— The same side effects listed for doxycycline | The same as for doxycycline |
| Minocycline | 300 mg loading dose, followed by 200 mg PO twice daily for 21 days | — The same as for doxycycline<br>— Vertigo, dizziness, ataxia, tinnitus, and the side effects listed for doxycycline | The same as for doxycycline |
| Moxifloxacin | 400 mg PO once daily for 21 days | — Blocks DNA gyrase enzyme (responsible for production and repair of bacterial DNA), leading to bacteria death<br>— Nausea, dizziness, diarrhea, QT prolongation, and photosensitivity | — Administration should be separated from aluminum- and magnesium-containing antacids, sucralfate, and multivitamins because they can lower absorption of moxifloxacin and reduce its effectiveness<br>— Should be used with caution with warfarin (increases risk for bleeding) and sotalol (abnormal heart rhythm) |

*For more information on treatment, see the CDC's sexually transmitted diseases guidelines at https://www.cdc.gov/std/tg2015/lgv.htm.*[2]
*Modified from Ceovic R, Gulin SJ. Lymphogranuloma venereum: diagnostic and treatment challenges. Infect Drug Resist. 2015;8:39-47.*

## Diagnosis

Evaluation should involve a thorough history, including a sexual history. Diagnosis is based on clinical suspicion, epidemiological information, and the exclusion of other causes for proctocolitis, inguinal lymphadenopathy, or genital or rectal ulcers.[2-4] Genital lesions, rectal specimens, and lymph node specimens (ie, lesion swab, bubo aspirate) can be tested for *C. trachomatis* by culture, direct immunofluorescence, or nucleic acid detection. Nucleic acid amplification tests (NAATs) for *C. trachomatis* perform well on rectal specimens but are not approved by the Food and Drug Administration for this purpose.[2] However, MSM presenting with proctocolitis should be tested for *Chlamydia*, and NAAT performed on rectal specimens is the preferred approach to testing.[2-4] Sex partners from within the last 60 days of a patient with probable or confirmed LGV should be tested for *Chlamydia* and empirically treated with doxycycline 100 mg orally twice daily for 7 days.[2] Patients should have an appropriate sexually transmitted infection (STI) evaluation per the CDC's STD Treatment Guidelines for HIV, syphilis, herpes simplex virus, gonorrhea, or chancroid, and treatment or linkage to care should be provided as needed. As required by state law, these cases should be reported to the health department.[2]

## Special Considerations

***HIV infection:*** Persons with both LGV and HIV infection should receive the same regimens as those who are HIV negative. Prolonged therapy might be required, and there may be a delay in the resolution of symptoms.[2]

Recently there have been outbreaks of LGV among HIV-positive MSM. Symptoms include proctocolitis, inguinal lymphadenopathy, and penile lesions.[15]

***Pregnancy:*** Pregnant and lactating women should be treated with erythromycin. Doxycycline should be avoided in the second and third trimester of pregnancy because of risk for discoloration of teeth and bones; however, it is compatible with breastfeeding.[2]

## Case Studies

### Adult Case Study 3-1

A 31-year-old man presents to an outpatient STI testing clinic. He reports a 2-week history of a painful, red, swollen ulcer on his penis. He denies fever, chills, night sweats, rashes, genital lesions, dysuria, urethral discharge, testicular pain, proctitis, rectal discharge, tenesmus, and diarrhea. He reports previous unprotected receptive and penetrative oral and anal sexual contacts with male partners.

#### Examination

Examination reveals a 3 cm, tender, erythematous, penile lesion free of discharge and ulceration. There is no visible groove sign (ie, inflammation of the inguinal nodes above and femoral nodes below the inguinal ligament). The genitourinary examination is otherwise unremarkable, as is the examination of his cervical lymph nodes and oropharynx.

#### Laboratory Testing

Specimens are collected to test for gonorrhea and *Chlamydia*, including first-void urine for NAAT and pharyngeal and rectal swabs for culture. LGV genotyping is requested for all specimens that have positive test results for *Chlamydia*. Samples for serological testing for syphilis, HIV, and *Chlamydia* serovar L are also sent.

#### Treatment

Based on a presumptive clinical diagnosis of LGV, the patient is prescribed 100 mg doxycycline orally twice daily for 21 days. Follow-up in 2 to 3 weeks is requested. The subsequent follow-up shows complete resolution of symptoms. Serological testing for *Chlamydia* serovar L has positive results, with a titer of 1:512

by microimmunofluorescence. The HIV test results are negative. All other results are negative and, because titer *Chlamydia* is not detected in the urine, pharyngeal, and rectal specimens, the laboratory does not perform LGV genotyping. No public health reporting or follow-up occurs. The patient is encouraged to refrain from sexual activity until 7 days after he has completed his treatment and to inform all sexual partners from the previous 60 days to present for testing and empiric treatment.

### Child Case Study 3-2

AC is a 13-year-old boy who is brought to the emergency department by his mother and maternal grandmother with concerns of abdominal pain, constipation, and bleeding from the rectum. The child has been away at camp for the last 2 weeks. The child seems withdrawn and avoids eye contact.

#### Examination

The child is observed guarding his abdomen. The abdomen is hard without rebound tenderness. Visual inspection of the genital and perianal areas for genital discharge, odor, bleeding, irritation, warts, and ulcerative lesions is completed. The child has some anorectal bleeding with a small pustule approximately 4 mm in circumference.

#### Laboratory Testing

Culture is completed for *Neisseria gonorrhoeae* from specimens collected from the pharynx and anus. Culture for *C. trachomatis* is completed from specimens collected from the anus. Only standard culture systems for the isolation of *C. trachomatis* should be used. The isolation of *C. trachomatis* is confirmed by microscopic identification of inclusions by staining with fluorescein-conjugated monoclonal antibody specific for *C. trachomatis*. Isolates are preserved for additional testing. Nonculture tests for *Chlamydia* are not specific enough for use in cases of possible child abuse or assault. Serological testing for HIV infection is also considered.

#### Treatment

Treatment based on height, weight, and age is recommended. Doxycycline is generally avoided in children younger than 8 years because of the possibility of teeth staining. This child is 13 years old and currently weighs 125 lb. Current guidelines recommend ceftriaxone 250 mg intramuscularly in a single dose with azithromycin 1 g orally in a single dose plus metronidazole 2 g orally in a single dose. Follow-up in 2 to 3 weeks with AC's primary care physician to confirm the resolving of symptoms is recommended. A report to the local authorities about possible sexual abuse is made. A serum sample is collected for evaluation of HIV, hepatitis B, and syphilis infections. The HIV test results are negative. All other results are negative, and *Chlamydia* is not detected in the urine, pharyngeal, and rectal specimens.

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Chapter 11

# Hepatitis A

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## Disease and Mimics

— Hepatitis A is one of the most prevalent forms of viral hepatitis and the most common cause of foodborne infection in the world.[1]

— Hepatitis A is an extremely contagious disease caused by the hepatitis A virus (HAV) and can lead to liver infection and inflammation.

— Diagnosis is made through detection of anti-HAV–specific immunoglobulin (IgG and IgM) antibodies.

— Since the availability of the hepatitis A vaccine in 1995, the rate of HAV in the United States has decreased more than 95%.[2] However, several HAV outbreaks have been recorded in the United States within the past 3 to 4 years as a result of person-to-person transmission and contaminated foods.[1,3,4]

— HAV is endemic in areas of Asia (except Japan), Africa, South and Central America, the Middle East, and the Western Pacific.

— HAV is transmitted through the fecal-oral route or exposure to contaminated food or water.

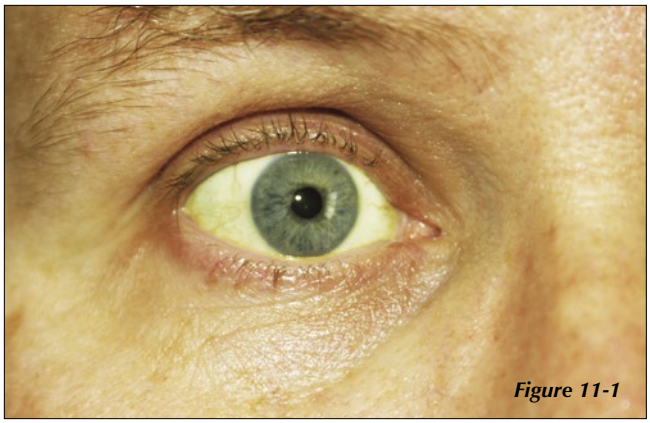
— The incubation period for HAV ranges between 15 to 50 days, with an average of 28 days.[2,5] HAV is replicated in the liver and passes into feces through the biliary system, typically 10 to 12 days after exposure.[5]

— The clinical presentation of HAV in adults is symptomatic, whereas the majority of children may be, and often are, asymptomatic.[2] Symptoms may present 2 to 6 weeks after exposure and include fever, nausea, vomiting, diarrhea, anorexia, abdominal pain, dark urine, jaundice, fatigue, and joint pain.[2] Symptoms typically last less than 2 months.[2,4,5]

## Epidemiology

In 2016 there were an estimated 4000 new hepatitis A infections in the United States, with 70 cases identifying HAV as the cause of death.[2] The group with the highest prevalence of HAV was non-Hispanic white men between the ages 55 and 64 years.[2] Worldwide there were 7134 deaths from HAV, which accounted for 0.5% of the total mortality as a result of viral hepatitis.[1] As of May 2019, 34 countries either used or are planning on introducing the HAV vaccine as a routine immunization for at-risk children.[1]

The transmission of HAV may occur through several different mechanisms. Fecal-oral person-to-person transmission is common between infected children and adults, in homeless populations, as a result of high-risk behaviors such as injection drug use and men having sex with men (MSM), and because of travel to countries where HAV is common.[2,3,5] Improper food handling and preparation (eg, food not cooked to 185°F for 1 minute) is a common source.[2,5] In the United States, waterborne outbreaks are unlikely because of the chlorination of water.[2]



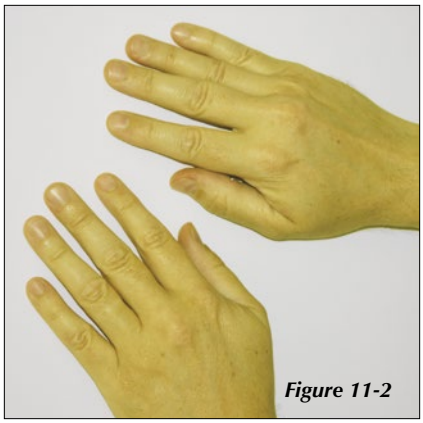




***Figure 11-1.*** *Conjunctival icterus.*

***Figure 11-2.*** *Jaundice.*

Those infected with HAV have a wide range of signs and symptoms. Signs and symptoms are more often seen in adults than children. Approximately 70% of children younger than age 6 years will be asymptomatic.[2] Acute symptoms may be mild to severe and consist of fever, nausea, vomiting, diarrhea, abdominal discomfort, hepatomegaly, loss of appetite, dark urine, jaundice, scleral icterus, fatigue, joint pain, and clay-colored bowel movements (**Figures 11-1** and **11-2**).[2,5] Acutely symptomatic children and adolescents may complain of fatigue, anorexia, nausea, fever, right upper quadrant pain, myalgia, and arthralgias.[2] Jaundice occurs in more than 70% of adolescents and adults.[1,5] HAV can lead to extrahepatic complications such as glomerulonephritis, arthritis, myocarditis, aplastic anemia, optic neuritis, and thrombocytopenia.[5] Hepatitis A is rarely fatal and does not cause chronic liver disease; however, it may cause fulminant hepatitis or debilitating symptoms.[1] In rare cases, patients will suffer severe acute liver damage; however, liver transplantation is an option.[5] Symptoms typically last less than 2 months, but 10% to 15% of symptomatic patients may relapse or experience prolonged symptoms for up to 6 months.[2]

Identifying hepatitis A based on clinical presentation is difficult to differentiate from other types of acute viral hepatitis. Diagnosis is made through detection of anti-HAV–specific immunoglobulin antibodies (IgG and IgM).[1,2] Before the onset of symptoms (5 to 10 days) IgM becomes positive, and it may be detectable for up to 1 year.[5] A positive IgG is typically identified in the initial recovery phase or may indicate previous exposure or HAV immunization.[5] Additional tests to detect HAV RNA, such as reverse transcriptase polymerase chain reaction, may be used for diagnosis.[1,5]

## Treatment Guidelines

There is no specific treatment for HAV. HAV is a self-limiting disease, and therapy is aimed at supportive measures, such as replacement of fluids lost from vomiting and diarrhea.[1,2] Avoid medications with hepatic metabolism, such as acetaminophen, and alcohol to prevent further liver damage. Hospitalization may be necessary as a result of dehydration or symptoms of acute liver failure.[2]

HAV treatment is aimed at prevention through good hand hygiene, sanitation practices, food and water precautions, and vaccination.[2,5,6] Active vaccination consists of either a 2-dose series of hepatitis A vaccine or a 3-dose series of hepatitis A and hepatitis B vaccine, which provides lifelong immunity (**Table 11-1**).[2,5] Almost 100% of patients vaccinated with the hepatitis A vaccine develop protective levels of antibodies within 1 month after only 1 dose.[1,2]

### Vaccination Recommendations

— Children older than 12 months and children adopted from HAV-endemic countries[1,2,3]

— Individuals at risk for infection (eg, homeless populations, inmates in jails and drug treatment facilities)[1,2,3,5,7]

— MSM[1,2,3,5,7]

— Illicit injection and noninjection drug users[3,5,7]

— Individuals traveling to HAV-endemic areas, such as Asia, Africa, South and Central America, the Middle East, and the Western Pacific[1,2,3,5]

— Immunocompromised individuals and those with chronic liver disease and clotting disorders[2,3,5]

— Individuals who work with HAV-infected animals[2,3,5]

— Individuals diagnosed with hepatitis B or C[8]

Immune globulin IM (IGIM; GamaSTAN S/D) is approved by the US Food and Drug Administration for hepatitis A prophylaxis and provides immediate, passive short-term protection both before and after exposure (**Table 11-2**).[2,5]

**Table 11-1. Hepatitis A Vaccination Recommendations**

| Vaccine | Age | Schedule (months) * | No. of Doses | Volume (mL) | Dose (U) | Description |
|---|---|---|---|---|---|---|
| HAVRIX† | 12 months to 18 years | 0, 6-12 | 2 | 0.5 | 720 | Hepatitis A inactivated vaccine; approved for ages ≥ 1 year |
| | ≥19 years | 0, 6-12 | 2 | 1 | 1440 | |
| VAQTA‡ | 12 months to 18 years | 0, 6-18 | 2 | 0.5 | 25 | Hepatitis A inactivated vaccine; approved for ages ≥ 1 year |
| | ≥19 years | 0, 6-18 | 2 | 1 | 50 | |
| TWINRIX§ | ≥18 years | 0, 1, 6 | 3 | 1 | 720 | Hepatitis A (inactivated) & B (recombinant); ages ≥18 years |

*For more information on treatment, see the CDC's sexually transmitted disease guidelines at https://www.cdc.gov/hepatitis/hav/havfaq.htm.*
**0 months represents timing of the initial dose; subsequent numbers represent months after the initial dose.*
*†Hepatitis A vaccine, inactivated, GlaxoSmithKline.*
*‡Hepatitis A vaccine, inactivated, Merck & Co., Inc.*
*§Combined hepatitis A and hepatitis B vaccine, inactivated, GlaxoSmithKline.*
*mL, Milliliters; U, Enzyme-linked immunosorbent assay (ELISA) units*
*Data from CDC.*[9]

**Table 11-2. Immune Globulin IM (GamaSTAN S/D) (Grifols Therapeutics, Inc.)**

| Indication | Dose |
|---|---|
| **Preexposure Prophylaxis** | |
| Up to 1 month of travel | 0.1 mL/kg |
| Up to 2 months of travel | 0.2 mL/kg |
| 2 months of travel or longer | 0.2 mL/kg (repeat every 2 months) |
| **Postexposure Prophylaxis** | 0.1 mL/kg |

*Data from CDC.*[9]

## Special Considerations

— Patients with a history of severe allergic reaction or hypersensitivity to alum or the preservative 2-phenoxyethanol in HAVRIX should not receive the hepatitis A vaccine.[2]

— ***Children and adolescents:*** Children and adolescents are generally asymptomatic and may serve as a source of infection.[2] Children younger than 6 years of age can shed HAV for up to 10 weeks longer than adults.[5] Therefore, the HAV vaccine is part of the immunization schedule for children in the United States. However, vaccination is not recommended for children younger than 12 months.[2,5]

— ***Household members caring for a child from an endemic area:*** It is recommended that caregivers be vaccinated at least 2 weeks before exposure to the child.[6]

— ***Pregnancy:*** No identified transmission from mother to fetus has been discovered.[2,5] However, HAV infection during pregnancy has been associated with premature rupture of membranes, preterm labor, and placental abruption.[2] Therefore, it is recommended that pregnant women who are at risk receive the hepatitis A vaccine.[2]

— ***Individuals with blood disorders:*** Although rare, patients with blood clotting disorders such as hemophilia could potentially acquire HAV through the administration of blood products such as solvent/detergent–treated factor VIII and IX concentrates.[2]

— ***Animal handlers:*** Outbreaks have been reported in individuals who work with nonhuman primates infected with HAV as a result of contact with animal saliva.[2,5]

— ***International travel:*** Those traveling internationally to highly or intermediately endemic areas such as Asia (except Japan), Africa, South and Central America, the Middle East, and the Western Pacific are encouraged to get the hepatitis A vaccination or immune globulin.[1,2] Travelers should receive education on hygiene (hand washing), sanitation, food, and water precautions.[2]

— ***Postexposure prophylaxis:*** Within 2 weeks of exposure to HAV, patients who have not previously received the hepatitis A vaccine should be administered immune globulin (0.02 mL/kg) or a single dose of monovalent hepatitis A vaccine (HAVRIX or VAQTA).[2] It is recommended that immune globulin be used for children younger than 12 months of age, patients with chronic liver disease, older persons, or those with severe cases of hepatitis A. Additionally, a dose of the vaccine should be given at the same time as the immune globulin, followed by a scheduled second vaccine dose.[2]

— ***Immunocompromised, HIV, and chronic liver disease:*** Antibody response is directly related to $CD4^+$ levels in patients with human immunodeficiency virus (HIV).[2] Patients with advanced HIV and chronic liver disease have lower antibody concentrations and lower efficacy after vaccination for hepatitis.[2] It is recommended that patients who are immunocompromised, have acquired immunodeficiency syndrome, are on hemodialysis, or have chronic liver disease receive the hepatitis A vaccine.

## Case Studies

### Adult Case Study 11-1

PM is a 20-year-old man who recently arrived home from his first year of college. He had previously been in good health, was taking no medications, and had not traveled outside of the United States. Ten days after arriving home, he began to complain of unusual fatigue, generalized malaise, minimal appetite, nausea, and was unable to eat without vomiting. He goes to his primary care provider after 2 days of feeling ill. He denies sexual activity, drug use, or getting tattoos. He does report partying heavily with friends the night after he returned home.

#### Examination

PM's temperature is 100.6°F (38.6°C), pulse 100 beats per minute, and blood pressure 110/58 mm Hg. He is well developed and well nourished, with skin that is pink, warm, and dry. The abdomen is soft without tenderness or hepatomegaly.

#### Laboratory Testing

Complete blood cell count and metabolic panel are within normal limits. Anti-HAV IgM is positive. Anti-HAV IgG and hepatitis B panel are negative.

#### Treatment

Instructions for supportive care are given, with no restrictions on activity or diet. PM is instructed to return if the nausea and vomiting continue. The patient receives a combined hepatitis A and B vaccine.

### Child Case Study 11-2

BK is a 5-year-old child from Central America, brought to the United States by her mother. Two weeks after arriving in the country, she became fatigued while playing and had a significant decrease in appetite. After 2 days, her mother became concerned when the child began vomiting and complaining of generalized pain in her extremities, so she took the child to the emergency department of the nearest hospital.

#### Examination

The child appears to be of normal growth and development for her age. Her abdomen is soft, yet she complains of right upper quadrant tenderness and mild pruritus, and she exhibits mild scleral icterus and intermittent vomiting. The liver edge is palpated well below the right costal margin, and there is no splenomegaly present. BK has a low-grade fever of 99.9°F (37.7°C) axillary, pulse 110 beats per minute, and blood pressure 90/64 mm Hg.

#### Laboratory Testing

Anti-hepatitis A surface antigen, anti-HBc, anti-HCV, and IgM anti-HEV tests are completed. Results are positive for anti-HAV IgM. A complete blood cell count, metabolic panel, and coagulation profile are within normal limits. Stool is guaiac negative, and urinalysis is negative for bilirubin.

#### Treatment

BK is hospitalized for 3 days and receives intravenous hydration and an antiemetic. She is released after a successful course of treatment. The child's mother receives a hepatitis A vaccine, as do the other family members she will be staying with.

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# Appendix 11-1. Hepatitis A, B, and C: Learn the Differences

**Appendix 11-1. Hepatitis A, B, and C: Learn the Differences**

| | Hepatitis A - Caused by the Hepatitis A Virus (HAV) | Hepatitis B - Caused by the Hepatitis B Virus (HBV) | Hepatitis C - Caused by the Hepatitis C Virus (HCV) |
|---|---|---|---|
| **How is it spread?** | HAV is found in the feces of people with hepatitis A and is usually spread by close personal contact (including sex or living in the same household). It can also be spread by eating food or drinking water contaminated with HAV. | HBV is found in blood and certain body fluids. The virus is spread when blood or body fluid from an infected person enters the body of a person who is not immune. HBV is spread through having unprotected sex with an infected person, sharing needles or "works" when shooting drugs, exposure to needlesticks or sharps on the job, or from an infected mother to her baby during birth. Exposure to infected blood in ANY situation can be a risk for transmission. | HCV is found in blood and certain body fluids. The virus is spread when blood or body fluid from an HCV-infected person enters another person's body. HCV is spread through sharing needles or "works" when shooting drugs, through exposure to needlesticks or sharps on the job, or sometimes from an infected mother to her baby during birth. It is possible to transmit HCV during sex, but it is not common. |
| **Who should be vaccinated?** | — People who wish to be protected from HAV infection<br>— All children at age 1 year (12–23 months)<br>— Men who have sex with men<br>— Users of street drugs (injecting and non-injecting)<br>— People who travel or work in any area of the world except the United States, Canada, Western Europe, Japan, New Zealand, and Australia<br>— People who will have close personal contact with an international adoptee from a country where HAV infection is common during the first 60 days following the adoptee's arrival in the United States<br>— People with chronic liver disease, including HCV<br>— People working with HAV in a laboratory<br>— People with clotting factor disorders (eg, hemophilia) | — All infants, children, and teens ages 0 through 18 years<br>— Any adult who wants to be protected from HBV infection<br>— Sexually active people who are not in long-term, mutually monogamous relationships<br>— Men who have sex with men<br>— People seeking evaluation or treatment for a sexually transmitted disease<br>— Health care or public safety workers who might be exposed to blood or body fluids<br>— Residents and staff of facilities for developmentally disabled people<br>— Adults younger than 60 years of age with diabetes<br>— Dialysis and pre-dialysis patients<br>— People infected with HIV<br>— People in close personal contact (ie, household or sexual) with someone who has chronic HBV infection<br>— Current or recent injection-drug users<br>— Travelers to regions of the world where hepatitis B is common (Asia, Africa, the Amazon Basin in South America, the Pacific Islands, Eastern Europe, or the Middle East)<br>— People with chronic liver disease | **Who should be tested?**<br>There is no vaccine to prevent HCV. Testing for HCV is recommended for the following groups of people.<br>— People born during 1945–1965<br>— Injecting drug users<br>— Recipients of clotting factors made before 1987<br>— Hemodialysis patients<br>— Recipients of blood or solid organ transplants before 1992<br>— Infants born to HCV-infected mothers<br>— People with undiagnosed abnormal liver test results<br>— People with HIV infection<br>Although HCV is not commonly spread through sex, individuals having sex with multiple partners or with an infected steady partner may be at increased risk of HCV infection. |

*(continued)*

**Appendix 11-1. Hepatitis A, B, and C: Learn the Differences *(continued)***

| | Hepatitis A - Caused by the Hepatitis A Virus (HAV) | Hepatitis B - Caused by the Hepatitis B Virus (HBV) | Hepatitis C - Caused by the Hepatitis C Virus (HCV) |
|---|---|---|---|
| **Symptoms** | Viral hepatitis symptoms are similar no matter which type of hepatitis you have. If symptoms occur, you might experience any or all of the following: jaundice (yellowing of the skin and whites of the eyes), fever, loss of appetite, fatigue, dark urine, joint pain, abdominal pain, diarrhea, nausea, and vomiting. Very rarely, a recently acquired case of viral hepatitis can cause liver failure and death. Sometimes in these instances, a liver transplant (if a liver is available) can save a life. Note: For all types of viral hepatitis, symptoms are less common in children than in adults, and for people of any age with HCV infection, they are less likely to experience symptoms. | | |
| | **Incubation period:** 15 to 50 days, average 28 days | **Incubation period:** 60 to 150 days, average 90 days | **Incubation period:** 14 to 180 days, average 45 days |
| **Chronic infection** | There is no chronic infection. Once you have had HAV infection, you cannot get it again. About 15 out of 100 people infected with HAV will have prolonged illness or relapsing symptoms over a 6–9 month period. | Chronic infection occurs in up to 90% of infants infected at birth; in about 30% of children infected at ages 1–5 years; and less than 5% of people infected after age 5 years. In the United States, about 2 000 people die each year from hepatitis B. Death from chronic liver disease occurs in 15%–25% of chronically infected people. People who have chronic HBV infection have a much higher risk of liver failure and liver cancer. | Chronic infection occurs in 75%–85% of newly infected people and 70% of chronically infected people go on to develop chronic liver disease. In the United States, about 20 000 people die each year from HCV. People who have chronic HCV infection have a much higher risk of liver failure and liver cancer. Chronic HCV-related liver disease is the leading cause for liver transplant. |
| **What treatment helps?** | — There is no treatment for HAV other than supportive care.<br>— Avoid alcohol. It can worsen liver disease. | — People with chronic HBV infection should have a medical evaluation for liver disease every 6–12 months. Several antiviral medications are currently licensed for the treatment of individuals with chronic HBV. These drugs are effective in preventing serious liver problems in up to 40% of patients, but the drugs do not get rid of the virus. Liver transplant is the last resort, but livers are not always available.<br>— Avoid alcohol. It can worsen liver disease.<br>— There is no medication to treat recently acquired HBV infection. | — People with chronic HCV infection should have a medical evaluation for liver disease every 6–12 months. There are drugs licensed for the treatment of individuals with chronic HCV infection. Combination therapy is currently the treatment of choice and can eliminate the virus in approximately 40–50% of patients with genotype 1 (the most common genotype in the United States).<br>— Get vaccinated against hepatitis A and B.<br>— Avoid alcohol. It can worsen liver disease.<br>— There is no medication for the treatment of recently acquired HCV infection. |

*(continued)*

**Appendix 11-1. Hepatitis A, B, and C: Learn the Differences *(continued)***

| | Hepatitis A - Caused by the Hepatitis A Virus (HAV) | Hepatitis B - Caused by the Hepatitis B Virus (HBV) | Hepatitis C - Caused by the Hepatitis C Virus (HCV) |
|---|---|---|---|
| **How is it prevented?** | — Get vaccinated! Safe and effective vaccines to prevent HAV infection have been available in the United States since 1995.<br>— Always wash your hands with soap and water after using the toilet, changing a diaper, and before preparing or eating food.<br>— For a recent exposure to someone with HAV or if traveling soon (leaving in less than 2 weeks) to an area of the world where hepatitis A is common, see your health care provider about your need for hepatitis A vaccine or a dose of immune globulin (IG). | — Get vaccinated! Hepatitis B vaccination is the best protection. Two or 3 shots are given over a period of 1 to 6 months, depending on brand.<br>— Whenever a woman is pregnant, she should be tested for hepatitis B (HBsAg blood test); infants born to HBV-infected mothers should be given HBIG (hepatitis B immune globulin) and vaccine within 12 hours of birth.<br>— Tell your sex partner(s) to get vaccinated too, and always follow "safer sex" practices (eg, using condoms). | — There is no vaccine to prevent HCV infection.<br>— HCV can be spread by sex, but this is not common. If you are not in a mutually monogamous relationship, use latex condoms correctly and every time to prevent the spread of sexually transmitted diseases. (The efficacy of latex condoms in preventing HCV infection is unknown, but their proper use may reduce transmission.) In addition to getting hepatitis A vaccine, you should also get hepatitis B vaccine. |

*Adapted from Immunization Action Coalition, Saint Paul, MN. www.immunize.org/catg.d/p4075.pdf. Updated October 2018. Accessed November 26, 2019.*


# Answer Key

## Note to Students

Community standards and agency protocols for evidence collection, prophylactic treatment, patient referrals, and follow-up vary across the United States and internationally. It is the student's responsibility to know his or her community standards, agency protocols, and the rationale surrounding any variations where national or international standards or recommendations exist.

When documenting findings in the medical forensic record, documentation should include approximate length, width, shape, and color of injuries. This level of documentation is not possible when reviewing photodocumentation as presented in these case studies. Limitations to assessment of injury via photodocumentation are related to several variables, including scale, angle, lighting, equipment settings, picture quality, and provider technique (eg, separation, traction).

The case studies in this book are brief summaries of complex patient encounters. The figures provided with each case study represent a sample of the photodocumentation collected during the medical forensic examination. Please note the detail and extent of evidence collection, prophylactic treatment, patient referrals, and recommended follow-up are based on these brief summaries, not on the additional details that would be available during an actual patient encounter. Also, the authors purposefully created the answer key for a broad audience to reflect the diversity and scope of practice of individuals completing this book. In doing so, it is recognized that the answer key may often reflect those roles that have a more limited scope of practice (eg, registered nurse [RN] versus advanced practice registered nurse [APRN] or doctor of medicine).

## Case Study 1

### Activity 1-1. Identifying Missing Subjective Information

Radiation, Severity, Aggravating/relieving factors

### Activity 1-2. Anatomical Identification

A. Cervix

B. Cervical os

C. Squamocolumnar junction

### Activity 1-3. Physical Examination Findings

The cervix is erythematous with punctate hemorrhages resembling a "strawberry cervix." Otherwise, the examination is normal.

### Activity 1-4. Clinical Laboratory Improvement Amendments (CLIA) Laboratory Examination

— The RN orders the office urine dipstick, which shows moderate increase in leukocytes, as well as trace blood. No other abnormalities are seen in dipstick results.

— Implement the protocol for testing.

### Activity 1-5. Clinical Laboratory Testing

— Nucleic acid amplification testing (NAAT) for *Trichomonas* on a vaginal swab or urine sample is the preferred method. If this is not possible, an immediate wet mount of the sample could suffice as a backup option if CLIA-provider approved.

— APTIMA *T. vaginalis* assay, if available, using a sample of urine, vaginal swab, or endocervical swab.

— Wet mount.

— Culture.

— Consider testing for other sexually transmitted infections (STIs), including human immunodeficiency virus (HIV) and syphilis.

### Activity 1-6. Forensic Evidence Collection

This case does not warrant a medical forensic evaluation with evidence collection.

### Activity 1-7. Nursing Plan of Care Procedure

Nursing diagnosis:

— Damage to tissue integrity: Mucosal lesion in the cornea, the integument, or subcutaneous tissues.

— Violation of the integrity of the oral mucosa: Out of the tissue layers of the oral cavity.

— Violation of the integrity of the skin: Skin lesion; break in the integument, the largest multifunctional organ of the body.

— Acute pain: Itching, distress, or malaise experienced and reported by the person.

— Chronic pain: Pain lasting for more than 6 months.

Plan of care:

— Adherence to quality, psychomotor activities in testing

— Patient-centered collaborative activities

— Trauma-informed collaboration and support with implementation of plan of care

### Activity 1-8. Advanced Practice Provider (APP) and Physician Differential Diagnosis

— The differential diagnosis includes bacterial vaginosis (BV), group B *Streptococcus* infection, trichomoniasis, cancer, iatrogenic injury, scarring, and recent semen deposit.

— The infection is trichomoniasis.

### Activity 1-9. Treatment

— Metronidazole 2 g orally (PO) once ***OR***

— Tinidazole 2 g PO once ***OR***

— Metronidazole 500 mg PO twice a day for 7 to 14 days, depending on compliance and chronicity

### Activity 1-10. Reporting

— Trichomoniasis is not a reportable disease.

— *Note: Children exposed to well (bathing) water or lake water (swimming) may have an infection from normal activities. Call local public health epidemiologist for further investigation of the community's water quality.*

### Activity 1-11. Follow-Up Recommendations in Plan of Care

— Avoid alcohol for 24 hours after treatment with metronidazole and 72 hours after treatment with tinidazole.

— Avoid sexual intercourse until the treatment of the patient and all partners is completed and the patient is no longer exhibiting symptoms.

— Immediately discontinue douching permanently, because douching increases the risk for STIs.

— Additionally, all sexual partners should be seen at the clinic for examination and treatment. Condom use is recommended and is essential in preventing STIs.

— Follow-up recommendations: Patient follow-up should include retesting 3 months after completion of treatment for a test of cure. Avoid NAAT testing because DNA remains for months, even if the organism is dead, particularly in the nonestrogenized genital environment of children and elders.

## Case Study 2

### Activity 2-1. Identifying Missing Subjective Information

Aggravating/relieving, Radiation, Timing, Severity

### Activity 2-2. Anatomical Identification

Arrow A: Clitoral Hood

Arrow B: Labia Major

Arrow C: Labia Minor

Arrow D: Uretha

Arrow E: Hymen

Arrow F: Posterior Forchette

### Activity 2-3. Physical Examination Findings

The examination reveals multiple red lesions ( approximately 8 to 12) with white centers covering labia majora, labia minora, urethra, and vestibule. Kissing lesions present adjacent to urethra majora adjacent to urethra, and vaginal orifice at 3 o'clock. One cluster coalesced on labia majora at mons. Discharge is clear, caking in slight glossy film.

Arrow A: Blisters/vesicles

Arrow B: Ulcers on mucous membrane

Arrow C: Ulcers on skin

### Activity 2-4. Clinical Laboratory Improvement Amendments (CLIA) Laboratory Examination

— The RN ordered the office urine dipstick, and child was unable to void because of pain.

— Implement the protocol for testing.

— Laboratory testing:

  — NAAT Results: Laboratory loses NAAT, never logged into custody. Not reported to provider.

  — Culture Results: Scraping of lesions completed for culture, which was sent to another laboratory.

  — Positive for herpes simplex virus 2 (HSV-2).

### Activity 2-5. Clinical Laboratory Testing

— Urine NAAT for *Chlamydia* and gonorrhea

— Urine analysis (UA)

— Epstein-Barr virus and cytomegalovirus

— NAAT culture, rectal and oral

### Activity 2-6. Forensic Evidence Collection

This case does warrant a medical forensic evaluation, but evidence collection may not be possible because of levels of pain. Alternate items worn before symptoms may be collected for analysis (eg, undergarments).

### Activity 2-7. Nursing Plan of Care Procedure

Nursing Diagnosis:

— Damage to tissue integrity: Mucosal lesion on urethra or surrounding integument or subcutaneous tissues

— Violation of the integrity of the genital mucosa: Out of the tissue layers of the anogenital areas

— Violation of the integrity of the skin: Skin lesion; break in the integument, the largest multifunctional organ of the body

— Acute pain: Distress or malaise experienced and reported by the person

— Chronic pain: Pain severity associated with neuralgia

Plan of care:

— Adherence to quality evidence-based interventions to manage disease and pain syndromes

— Patient-centered collaborative activities (eg, knowledge and treatment of disease), including diminished spread

— Trauma-informed collaboration and support with implementation of plan of care

— Identification of source, reporting to authorities

### Activity 2-8. APP and Physician Differential Diagnosis

— Herpes simplex virus (HSV), self-injury, vesicular eczema, tinea cruris, Epstein-Barr virus and cytomegalovirus, impetigo or cellulitis.

— The infection is HSV-2.

### Activity 2-9. Treatment

Medical treatment:

— Discharged home with acyclovir (75 mg/kg per day orally divided 5 times each day, for a maximum 1000/day for 7 days, to be started immediately) and told to return in 72 to 96 hours for reevaluation.

Follow-up plan of care:

— Follow-up instructions include scheduling the next visit anytime symptoms worsen or in 72 to 96 hours.

— No further testing ordered.

— Transmission may occur from routine touch of an infected person, where auto-transfer occurs with children sucking on their fingers and transferring the virus to the genitals in their sleep. There is no definitive test that determines the source, other than a prodromal disease from others with description of symptoms.

— The link between anogenital herpes and sexual abuse requires an understanding of viral transmission and typing to properly interpret its significance, including that asymptomatic adults spread the virus without outbreak of symptoms.

— Anogenital herpes in children require primary care providers to have an understanding of the appearance and mode of transmission of anogenital herpes, as well as techniques for diagnosis.