

Virginia Department of Health

Smallpox: Overview for Healthcare Providers

Organism	Variola virus; genus <i>Orthopoxvirus</i> , family <i>Poxviridae</i> , subfamily <i>Chordopoxvirinae</i>
Reporting to Public Health	Suspected or confirmed cases of smallpox require immediate notification to the local health department (LHD). See www.vdh.virginia.gov/LHD/index.htm .
Infectious Dose	1 virus particle
Route of Infection	Smallpox is spread from person to person through: <ul style="list-style-type: none"> • Close contact (i.e., <6 feet) via respiratory droplets or direct contact with lesions • Indirect contact with contaminated material such as clothing or bedding (less common) • Airborne transmission via fine-particle aerosol droplet (thought to be rare)
Communicability	<ul style="list-style-type: none"> • Contagious from onset of earliest lesion (including oral enanthem) until separation of scabs (~3 weeks), with the most infectious period being the 1st week of rash as oropharyngeal lesions release virus into saliva. • For surveillance, investigation, and containment purposes, consider potentially infectious from onset of fever or rash. • Secondary attack rate is estimated to be 38–88% among susceptible household contacts.
Risk factors	Susceptibility among the unvaccinated is universal
Case-fatality Rate	<ul style="list-style-type: none"> • Historically, case-fatality rate has averaged 30% among unvaccinated populations. • There are more severe, though less common, forms with ≥95% case-fatality rate: flat-type (~5% of cases) associated with severe toxemia and flat, velvety, confluent lesions; hemorrhagic-type (~5% of cases) associated with severe toxemia and hemorrhagic rash
Incubation Period	Usually 10–14 days (range 7–19 days)
Clinical Description <i>(variola major, ordinary type)</i>	<ul style="list-style-type: none"> • Stage 1 (prodrome/preeruptive stage): Acute onset of fever, malaise, rigors, vomiting, headache, and backache lasting 2–4 days; 15% have delirium. All smallpox patients have a febrile prodrome. • Stage 2 (eruptive stage): Maculopapular rash (2–4 days after prodrome) on oral mucosa, face, forearms and palms, spreading to trunk, legs and soles → deeply-embedded firm, round papules (day 2 of rash) → vesicles (day 3–4 of rash) → pustules (day 5–12 of rash) → crusty scab (day 13–18 of rash)
Differential Diagnosis <i>(eruptive stage)</i>	<p>Chickenpox, monkeypox, generalized vaccinia, disseminated herpes zoster, disseminated herpes simplex, erythema multiforme, contact dermatitis, enteroviruses, molluscum contagiosum, secondary syphilis, atypical measles. Use CDC algorithm to determine likelihood of smallpox: http://www.bt.cdc.gov/agent/smallpox/diagnosis/pdf/spox-poster-full.pdf</p> <p><u>Differentiating Smallpox from Chickenpox:</u></p> <ul style="list-style-type: none"> • Prodrome of high fever precedes smallpox lesions. When infected with chickenpox, a mild prodrome of fever and malaise may occur before rash onset, particularly in adults. • Smallpox lesions present at same stage of development within any 1 anatomical region; chickenpox lesions appear in different stages. • Smallpox lesions tend to be concentrated on face and distal extremities (centrifugal distribution). Chickenpox lesions tend to be more concentrated on trunk (centripetal distribution).

	<ul style="list-style-type: none"> • Smallpox lesions typically occur on palms and soles. Palms and soles spared with chickenpox. • Smallpox lesions are deeply embedded in dermis. Chickenpox lesions are superficial. • Smallpox lesions evolve from macules to papules to vesicles to pustules over several days (1–2 days/stage). Chickenpox lesions evolve rapidly (< 24 hours) from macules→papules→vesicles→crusts.
Specimen Collection and Laboratory Testing[†]	<ul style="list-style-type: none"> • Alert DCLS immediately if smallpox is suspected. • Virus can be detected in vesicular or pustular fluid by various test methods. • Only PCR can definitively diagnose infection; testing only performed at CDC. All other testing methods (electron microscopy, immunohistochemistry, culture) screen for orthopoxviruses. • Do not attempt specimen collection without prior vaccination and proper personal protective equipment. • [†]If smallpox is suspected, notify LHD immediately to discuss the case and laboratory testing. Specimens should be sent to DCLS for testing <u>after</u> LHD has been consulted and laboratory testing has been approved by LHD/Division of Consolidated Laboratory Services (DCLS). For notifying LHD, see http://www.vdh.virginia.gov/LHD/index.htm. The DCLS Emergency Duty Officer can be reached 24/7 at (804) 335-4617.
Treatment	<ul style="list-style-type: none"> • There are no proven treatments for smallpox; medical care is generally supportive. • Antibiotics for secondary skin infections • Cidofovir (an antiviral) has shown promising results in lab studies; its effectiveness for treating clinical smallpox is unknown. • Vaccinia human immunoglobulin (VIG), available only through the CDC, is licensed to treat certain postvaccinia-vaccination adverse effects and it has no role in treatment of smallpox.
Postexposure Prophylaxis	For exposed persons, vaccine administered 3–4 days post exposure can prevent or attenuate disease
Vaccine	<ul style="list-style-type: none"> • Smallpox vaccine is made from live vaccinia virus; it does not contain variola virus that causes smallpox. The only smallpox vaccine licensed and used in the U.S. is ACAM2000[®] which provides high-level immunity for 3–5 years and then wanes. • Vaccine is primarily for people who work with smallpox or related viruses in laboratories, certain health care providers, and smallpox response team members. It is not available to the general public; however, a CDC stockpile has enough vaccine for the entire country if a bioterrorism event occurred. • Those receiving vaccine need to be carefully evaluated for contraindications (e.g., skin conditions, weakened immune systems). Post-vaccination care is essential to prevent autoinoculation or transmission to others.
Infection Control	<ul style="list-style-type: none"> • Consult with health department and hospital infection control as soon as possible • Isolate cases in negative-pressure rooms equipped with high-efficiency particulate air filtration. Keep doors closed. • Follow strict standard, airborne, and contact precautions • Vaccinate workers providing direct patient care and/or handling infected materials • Establish an isolated unit of hospital to minimize exposures, if possible • Double bag, seal and autoclave medical waste, contaminated clothing/bedding/materials • Surfaces that may be contaminated with smallpox virus can be decontaminated with disinfectants that are used for standard infection control, such as hypochlorite and quaternary ammonia