FEDERAL BUREAU OF PRISONS
CLINICAL PRACTICE GUIDELINES
MANAGEMENT OF VARICELLA ZOSTER VIRUS INFECTIONS
October 2002

PURPOSE

The Federal Bureau of Prisons Clinical Practice Guidelines for the Management of Varicella Zoster Virus (VZV) Infections provide recommendations for the medical management of federal inmates with varicella (chicken pox) and herpes zoster (shingles).

REFERENCES

Prevention of varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP), *MMWR*, 1999;48(RR-6), Centers for Disease Control and Prevention.

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(Management of VZV Infections)

DEFINITIONS

Herpes zoster, commonly called shingles, is a primarily dermatologic disease, caused by the reactivation of latent (dormant) varicella zoster virus.

Varicella, commonly called chicken pox, is a highly contagious systemic disease, usually of childhood, caused by an acute infection with varicella zoster virus.

Varicella zoster virus (VZV) is a Herpes family virus that causes chicken pox and shingles.

PROCEDURES

Clinical information covered under "Procedures" is outlined as follows:

1. INTRODUCTION

- **Varicella (chicken pox)**: Varicella or chickenpox is a highly contagious systemic disease caused by varicella zoster virus (VZV) that normally results in lifelong immunity. Persons with a prior history of varicella, who are re-exposed to wild-type VZV, develop an asymptomatic reinfection that boosts VZV antibody titers, but rarely causes a second bout of chicken pox. VZV infection is readily transmitted from person to person by the following routes:

- direct contact, droplet, or aerosol from vesicular fluid or skin lesions; or

- secretions from the respiratory tract.

The average incubation period for varicella is 14 - 16 days, but can range from 10 - 21 days. The period of contagiousness of infected persons begins 1 - 2 days before the onset of rash and ends with the crusting of the lesions, usually 4 - 5 days after the onset of rash. Immunocompromised persons may be contagious for a longer time, presumably because their immune response is depressed, which allows viral replication to persist.

Chickenpox normally presents with mild constitutional symptoms and the sudden onset of a maculopapular rash that rapidly evolves to a vesicular exanthem. The rash classically spreads in

successive crops, resulting in lesions in various stages of evolution, including papules, superficial vesicles ("dew drops"), pustules, and crusted lesions. A greater concentration of lesions are on the trunk with the fewest lesions on the distal extremities, not involving the palms or soles.

SMALL POX DIFFERENTIAL: In contrast to varicella, the rash of variola (smallpox) usually consists of more deep-seated lesions that are simultaneously in the same stage, evolving from macules to papules to pustules over several days, with each stage lasting 1-2 days. Lesions occur preferentially on the face and distal extremities and may be found on the palms and soles.

Atypical and subclinical cases of varicella without a rash are rare, but do occur. Most cases of chickenpox are self-limited without serious sequelae, particularly in children. Life-threatening complications, such as encephalitis, pneumonia, and hepatitis, occur more commonly in newly infected adults and immunocompromised persons.

Primary infection with VZV during pregnancy may result in viral transmission to the fetus or newborn. Intrauterine transmission of VZV can result in congenital varicella syndrome, neonatal varicella, or herpes zoster during infancy. Congenital varicella syndrome is most commonly associated with primary VZV maternal infection during the first trimester of pregnancy and is characterized by low birth weight, limb deformities, and ocular problems in the newborn. Maternal infection with VZV 5 days before to 2 days after delivery is associated with severe, potentially fatal perinatal chickenpox in the newborn infant.

- **Herpes zoster (shingles)**: VZV infection persists dormant in dorsal-root ganglia following primary infection (varicella). Reactivation of VZV infection results in herpes zoster (shingles). Shingles occurs sporadically in otherwise healthy individuals, but more commonly affects the elderly, and immunocompromised persons, particularly those with lymphoproliferative cancers, organ transplantations, and infection with human immunodeficiency virus (HIV).

Herpes zoster commonly presents as a severe, painful, unilateral dermatomal rash. Malaise, headache, and a severe neuropathic type pain may precede the rash and may be misdiagnosed by the evaluating clinician until the dermatomal rash becomes apparent. The rash is initially papular, then vesicular, and eventually crusts in 10-15 days. Cranial nerve involvement, if present, results in nerve specific signs. (**NOTE:** eyelid and nose lesions indicate potentially sight-threatening keratitis). Severe

sequelae are more common with concurrent immunosuppression and may include disseminated dermatologic disease, meningo-encephalitis, cerebral angiitis presenting as stroke, visceral disease, and acute retinal necrosis. Once the shingles rash has resolved, post-herpetic neuralgia may persist chronically, particularly in the elderly.

2. SCREENING

A positive or negative history of varicella and herpes zoster should be ascertained by inmate interview and documented in the medical record for all inmates entering BOP custody.

3. DIAGNOSIS

Inmates presenting with unilateral dermatomal pain or a vesicular rash should be evaluated for possible VZV infections. The diagnosis of VZV infection can be made by any one or more of the following:

- **Physical examination** of a typical VZV rash:

  - Varicella: lesions that are simultaneously in all stages of development from vesicles on a red base to umbilicated pustules to crusted lesions.

  - Herpes zoster: the unilateral, dermatomal distribution of a painful vesicular rash.

- **Direct immunofluorescence assay** (rapid and inexpensive).

- **Culture** of vesicle for VZV. (Note: VZV is labile and may not be recovered.)

- **Antibody assay** for acute and convalescent paired sera. (Optional if antigen- or culture-positive.)

- **Patient history** of exposure to VZV or herpes zoster in past 3 weeks in a susceptible contact. (Requires patient follow-up to confirm diagnosis or provide prophylaxis.)

4. TREATMENT

Drug treatment options for VZV infections are outlined in **Appendix 1, Antiviral Therapy for VZV Infections.**

- **Varicella/chicken pox**: Treatment for varicella should be considered if the inmate is diagnosed within 24 hours of the rash

or soon thereafter. Antiviral therapy with **acyclovir 800 mg, administered orally 4 times per day for 5 days**, may result in fewer skin lesions and fewer constitutional symptoms if initiated at the onset of the rash. Pruritus should be treated with topical, and if necessary, systemic antihistamines to minimize scratching and potentially serious secondary bacterial infections. Consultation with a physician expert is recommended for inmates with complicated primary VZV infections, such as varicella pneumonia, varicella during pregnancy, and varicella in an immunocompromised host. Intravenous acyclovir and hospitalization may be indicated for complicated varicella infections.

- **Herpes zoster/shingles**: **Acyclovir, 800 mg, orally administered every 4 hours (5 times daily) for 7 to 10 days**, decreases viral shedding, accelerates healing of skin lesions, reduces acute pain, and decreases the risk of post-herpetic neuralgia in some persons. Famciclovir and valacyclovir, although more simply dosed, offer no major therapeutic advantages over acyclovir, and therefore should only be selectively considered. Antiviral therapy must be administered within 48 hours of the rash to be maximally effective.

The concurrent administration of a tapering course of prednisone to reduce post-herpetic neuralgia is of uncertain, but potential benefit; and therefore should be considered on a case by case basis. Steroids should not be prescribed for inmates who have absolute or relative contraindications, e.g., diabetes mellitus. Topical antiviral agents are of no benefit. Patients should be advised to keep the lesions clean to prevent secondary bacterial infections. A nonocclusive, nonadherent, sterile dressing can prevent the irritation of contact with clothing. Pain may be severe and should be aggressively managed.

- **HIV infection**: All inmates presenting with herpes zoster infection should be screened for HIV infection. Orally administered acyclovir in standard doses is effective in treating herpes zoster in persons with HIV co-infection. Acyclovir therapy should be continued until all lesions have crusted due to the risk of relapse in this population. Intravenous acyclovir is recommended for disseminated herpes zoster (rash involving multiple noncontiguous dermatomes). The risk of post-herpetic neuralgia is no greater in persons with HIV infection.

- **Herpes zoster ophthalmicus**: VZV reactivation involving the first branch of the trigeminal nerve often presents with unilateral pain and lesions involving the nose,

forehead, or periocular areas. Left untreated, these patients may develop potentially sight-threatening keratitis, and other ocular complications, such as episcleritis, and iritis. Diagnosis of herpes zoster ophthalmicus warrants immediate referral to an ophthalmologist.

- Post-herpetic neuralgia: Chronic pain following a bout of herpes zoster can be protracted, incapacitating, and refractory to therapy, particularly in the elderly. Potentially effective treatments, alone or in certain combinations, include tricyclic antidepressants, gabapentin, opioids, topical capsaicin applied to healed, intact skin, and 5% lidocaine patches applied to healed intact skin. Therapy should be individualized based on the severity of pain and the risk of complications to the various treatment options.

5. PREVENTION OF TRANSMISSION

- **Varicella/chicken pox communicability**: Persons with chickenpox are contagious 1-2 days before developing a rash until skin lesions are crusted (usually for 4-5 days after the rash began). VZV is spread from person to person from respiratory secretions or from the vesicular skin lesions through direct contact, droplet, or aerosol exposures. Secondary attack rates (transmission rates to previously uninfected persons) are extraordinarily high, ranging from 70%-90%. Persons can be infected without immediate contact with an infectious person, however, for contact investigation purposes, direct contact of one hour or greater is usually considered significant.

- **Herpes zoster/shingles communicability**: Herpes zoster is less contagious than chickenpox, however, VZV can be transmitted by direct contact, droplet, or aerosol exposures to the vesicular lesions of a person with shingles. The infectiousness of herpes zoster is greatly increased when disseminated disease is present. Transmission of VZV from persons with herpes zoster may result in chickenpox in susceptible contacts.

- **Inmate containment**: Inmates with suspected or confirmed varicella or herpes zoster should be isolated from the general inmate population in accordance with BOP policy. Inmates should be transferred to a community hospital if medically indicated, or otherwise housed in the institution's negative pressure isolation room (NPIR) or a single cell with restricted contact with other inmates. The inmate can return to general population housing when skin lesions have crusted.

- **Infection control**: Any staff or inmates entering the cell of a contagious inmate with chickenpox or herpes zoster should wear masks (NIOSH-certified respirators or surgical masks) and gloves when any direct contact with the inmate is anticipated. Disposable masks and gloves should be treated as infectious waste.

- **Staff concerns**: Staff contacts who have symptoms of varicella should be referred to their physicians and medically cleared prior to returning to work. Correctional staff who are pregnant or have reason to believe they may be pregnant should be referred to their physicians, regardless of their reported history of chickenpox or shingles. Pregnant staff should have no contact with inmates with contagious chickenpox or herpes zoster.

Only those correctional staff who self-report a reliable history of chicken pox or shingles should have direct contact with inmates with varicella or herpes zoster. Susceptible health care providers should be restricted from any direct patient care. Asymptomatic staff contacts with no prior history of varicella or herpes zoster or documented immunity may continue to work but their assignments should not involve contact with unexposed susceptible staff or inmates.

- **Visitors**: Visitors to the institution, particularly women of childbearing age, should be notified about the possible risk of exposure to chicken pox, e.g., post a warning/communication in the visiting room. Inmate visitations can continue, although limitations should be considered for susceptible inmate contacts, and restrictions should be imposed for inmates with varicella.

6. MANAGEMENT OF INMATE CONTACTS

- **Identification of contacts**: A contact investigation should be initiated whenever a single case of varicella or herpes zoster is suspected or diagnosed. The investigation should focus on those inmates who were in close indoor contact with the index case. The source/index case should also be interviewed to help identify additional close contacts that may not be apparent after the routine review of the index case's housing and work assignments. Inmate contacts should be interviewed to determine if they have a history of chickenpox or shingles or current signs or symptoms of chicken pox. Those inmate contacts who self-report no previous history of chickenpox or shingles, should be considered potentially contagious 10-21 days after their exposure. Symptomatic inmate contacts should be evaluated and isolated consistent with recommendations for inmates with varicella.

- **Varicella zoster immunoglobulin (VZIG) prophylaxis**: Certain susceptible inmate contacts are candidates for post-exposure prophylaxis with VZIG in accordance with the following guidance:

- VZIG should be administered intramuscularly in accordance with the manufacturer's guidelines.

- VZIG must be given within 96 hours of exposure for it to have proven efficacy.

- VZIG is indicated for susceptible persons at high risk of complications from chickenpox, including pregnant women, and immunocompromised persons, such as those with the acquired immunodeficiency syndrome (AIDS). (**NOTE:** Varicella vaccine is contraindicated in these patient populations.)

- In pregnant women, VZIG does not prevent congenital varicella syndrome or neonatal varicella, but limits the potentially severe complications of chickenpox in the mother.

- The incubation period of chickenpox is prolonged to 28 days or greater for exposed persons treated with VZIG.

- The duration of protection provided by VZIG is uncertain. In the context of an extended varicella outbreak, where ongoing protection is necessary, VZIG should be readministered 3 weeks following the initial dose.

- **Varicella vaccine prophylaxis**: Post-exposure prophylaxis with varicella vaccine should be considered for susceptible inmate contacts, since vaccination may prevent varicella or reduce disease severity. The determination to administer varicella vaccine prophylactically should be based on epidemiological and patient-specific factors while considering the following:

- Varicella vaccine is a live vaccine and should **NOT** be administered to pregnant women or immunocompromised patients. (Screening for HIV infection and pregnancy is necessary prior to vaccine administration if clinical status is unknown.)

- The vaccine should be administered within 3 days and ordinarily no more than 5 days after varicella exposure to be maximally effective

- Varicella vaccine should be administered in accordance with the manufacturer's instructions after informing the inmate of the vaccine's benefits and risks. The varicella vaccine (VARIVAX)is administered subcutaneously to adults in a 0.5 mL

dose, repeated at the same dose 4 to 8 weeks later. **NOTE:** Varicella vaccine must be stored in a frostfree freezer with an average temperature of -15°C (5°F) or colder. The vaccine is reconstituted at room temperature with a diluent and must then be administered within 30 minutes.

- Varicella vaccine should not be administered concurrently with VZIG or other immunoglobulins.

- Vaccinated inmates may develop a rash that is potentially contagious. They should be monitored closely following vaccination and should be restricted from close contact with other inmates who are pregnant or immunocompromised.

- If vaccinated inmates develop a rash they should be isolated, as if they had wild-type varicella, until the lesions have crusted.

- Management of susceptible contacts: Inmates without a self-reported history of chickenpox should be considered potentially contagious 10-21 days after their exposure and for 28 days if VZIG is administered. These inmates should be managed in accordance with the following guidance:

- The overall management of susceptible inmate contacts should be determined on a case-by-case basis by the Clinical Director with the concurrence of the Warden, depending on multiple factors, including, the number of susceptible contacts, the degree and timing of the exposures, security concerns, and housing issues.

- Susceptible inmate contacts should ordinarily not be transferred or moved, e.g., court trips, until the incubation period has lapsed.

- Efforts should be made to minimize the contact of susceptible inmate contacts with one another and with unexposed susceptible inmates and staff. Absolute quarantine or isolation of susceptible contacts, however, is rarely indicated.

- Testing for varicella immunity (by serology) should be considered, particularly when mass inmate movement to other facilities is necessary or when secondary cases have occurred.

- If susceptible inmate contacts must be transferred for security reasons, the receiving institution should be

notified prior to the transfer so that the inmate can be segregated from at-risk inmate populations and staff.

- Incoming inmates to the institution should be interviewed to determine if they are susceptible to varicella so that they can be appropriately housed.

- Inmate contacts (i.e., close contacts to the index case 48 hours prior to lesion presentation or afterward) who have transferred to other BOP facilities should be identified in consultation with ISM staff. The Clinical Director and HSA of the receiving institutions should be notified that they have received inmate contacts of a varicella case so that these inmates can be appropriately evaluated.

7. INMATE EDUCATION

Inmates with varicella or herpes zoster can be offered the following practical advice:

- **Take medications** as prescribed by your physician.

- **Don't scratch:** Scratching can make the sores harder to heal, cause scarring and increase the risk that the sores will become infected. If itching is particularly severe, over-the-counter or prescribed antihistamines should be considered.

- **Take showers:** Cool showers every 3 to 4 hours can help relieve itching.

- **Apply lotion:** Applying calamine lotion or similar agent to the rash may help relieve the itching.

- **Rest and eat a bland diet, if necessary:** Getting plenty of rest is helpful in getting over any infection. If chickenpox sores develop in the mouth, switch to a diet of soft, bland foods. Spicy, acidic or hard crunchy foods can be irritating to mouth sores.

- **Treat a fever:** Fever can be reduced with acetaminophen (Tylenol).

8. HEALTH CARE PROVIDER SELF ASSESSMENT

A health care provider self-assessment tool is attached in **Appendix 2, Provider Self-Assessment, Management of VZV Infections.**

ATTACHMENTS

Appendix 1: Antiviral Therapy for VZV Infections

Appendix 2: Provider Self-Assessment, Management of VZV Infections: Questions and Answers

ANTIVIRAL THERAPY FOR VARICELLA ZOSTER VIRUS (VZV) INFECTIONS

	Herpes Zoster (Adults)	**Varicella (Adults)**	**Notes***
Acyclovir 200, 400, 800 mgs	800 mg po 5X day for 7 - 10 days 5 - 10 mg/kg IV q8h - 7 - 10 days	800 mg po QID X 5 days	
Famcyclovir (Famvir) 125, 250, 500 mgs	500 mg po q8h X 7 days		↓ if renal function impaired
Valcyclovir (Valtrex) 500 mgs, 1 gm	1000 mg po TID X 7 days		↓ if renal function impaired

*Antiviral therapy should be initiated within 48 hours of the onset of the rash. Continue antiviral therapy until lesions have crusted in persons with HIV infection or other potentially immunocompromised conditions. Intravenous acyclovir is required for disseminated disease or serious complications of VZV infection.

PROVIDER SELF-ASSESSMENT QUESTIONS (MANAGEMENT OF VZV INFECTIONS)

Question #1
An inmate develops a varicella rash on January 2nd, but doesn't seek medical attention until January 10th, when the lesions have all crusted and "look ugly." Which of the following potential contacts is at least risk of developing chicken pox?

A. His former cellmate who moved out on January 3rd.
B. His wife who last visited him on New Years Eve.
C. His new cellmate who moved in on January 10th.
D. The Warden who talked to the inmate for 1 hour on January 4th.

Question #2
Which of the following is false regarding varicella?

A. The lesions are often in various stages of development in contrast to the rash of small pox.
B. The lesions are highly contagious until crusted
C. The rash is usually unilateral and dermatomal.
D. Complications in adults, such as pneumonia, may be life-threatening.

Question #3
Which of the following is false regarding herpes zoster?

A. The rash is usually unilateral, not crossing the midline.
B. The rash is potentially contagious.
C. Herpes zoster may be the initial clue that the inmate also has HIV infection.
D. Herpes zoster rarely occurs in immunocompetent persons.
E. Pain may precede the rash

Question #4
An inmate presents with unilateral headache with a vesicular eruption on the tip of the nose typical of herpes zoster. Which of the following management strategies should you employ?

A. Antiviral therapy/referral to an ophthalmologist.
B. Antiviral therapy/referral to an ENT specialist.
C. Culture the lesion/begin antiviral therapy/follow clinically.
D. Observe and provide symptomatic therapy.

Question #5
Which of the following is false regarding the management of inmates with varicella?

A. Isolation of inmates with varicella from the general inmate population is warranted until lesions have crusted.
B. Topical acyclovir should be prescribed in conjunction with oral acyclovir.
C. Acyclovir is minimally effective if given 6 days after the rash has developed.
D. Pruritus should be aggressively managed.

Question #6
Which of the following is false regarding the management of susceptible inmate contacts to a case of varicella?

A. VZIG should be considered for pregnant contacts
B. Varicella vaccine should be considered for immunocompetent, nonpregnant contacts.
C. VZIG or vaccine prophylaxis must be administered soon after exposure to be effective.
D. Asymptomatic contacts exposed 4 days ago are at low risk of developing varicella.
E. Varicella vaccination may result in a low grade contagious varicella rash.

PROVIDER SELF-ASSESSMENT ANSWERS
(MANAGEMENT OF VZV INFECTIONS)

1. **Answer is C**

2. **Answer is C**

3. **Answer is D**

4. **Answer is A**

5. **Answer is B**

6. **Answer is D**