

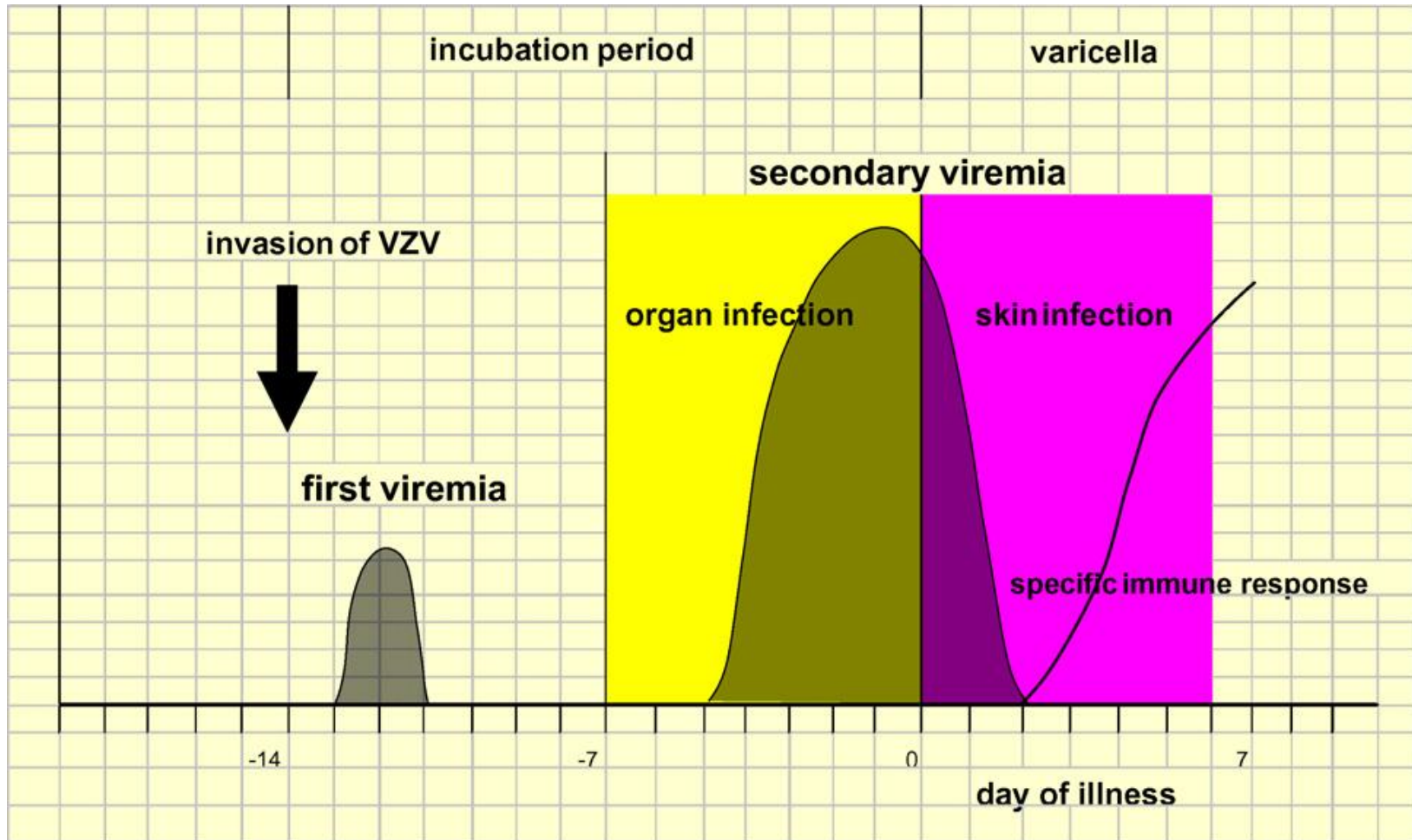
VARICELLA

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Varicella Zoster Virus (VZV): The Basics

- Herpes virus
- Exclusively human infection
- Primary infection: varicella (chickenpox)
- Neurotropic, establishing latency in cranial nerve, dorsal root and autonomic ganglia
- Reactivation can cause a wide range of disease, particularly involving the nervous system: herpes zoster, post-herpetic neuralgia, vasculopathy, myelopathy, cerebellitis, zoster sine herpete

Pathogenesis of varicella



Herpes Zoster: Epidemiology

- Overall rate in Australia: 490 cases per 100,000
- Risk factors: older age, varicella infection during the first year of life, immuno-compromise
 - Age >50yrs: 1000/100 000
 - Age >70-79 yrs: 1450/100 000
 - Age \geq 85years: 5000/100 000
 - Lifetime risk 20-30%

Varicella: Chickenpox and Herpes Zoster



Enterovirus



Molluscum contagiosum

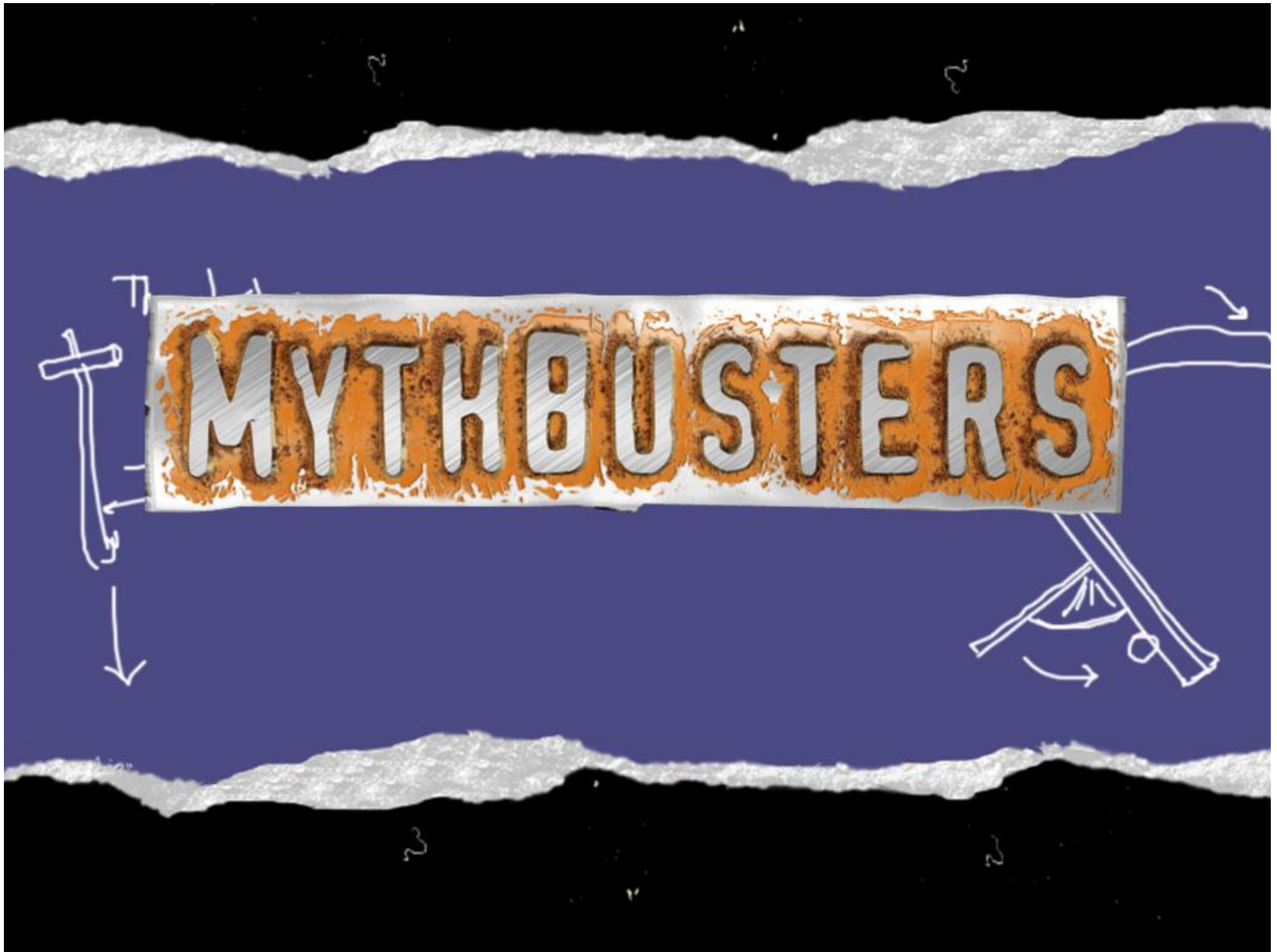


Hypersensitivity (drug) reaction



Diagnosis and treatment

- Clinical appearance of rash
- Confirm if patient requires admission or is vaccinated
 - Swab:
 - varicella PCR or culture
 - Herpes virus PCR or culture, depending on site
- Treatment (if indicated)
 - Antiviral therapy: aciclovir, famciclovir or valaciclovir
 - Corticosteroid therapy: early presentation of shingles
 - Symptomatic: Pain relief, antihistamines for itch



Myth or fact?

Chickenpox *is* the most infectious childhood viral infection.

Busted!

- So how infectious is varicella?
 - Secondary attack rate amongst susceptible household contacts in temperate regions up to 90%
 - This is NOT as infectious as measles
 - Secondary attack rate in tropical regions is significantly lower, as is immunity
 - Proposed that this is due to the anti-viral effect of UV light

Myth or fact?

Varicella causes infection in the upper airway, leading to spread by droplets into the environment.

Probably true

- It is believed that the upper airway is the source of airborne infection, HOWEVER VZV is rarely isolated from throat swabs during acute infection
- It is generally accepted that varicella is spread by airborne transmission from pharyngeal infection, as viral DNA has been detected at significant distances (>5 metres) from the bedsides of patients and on surfaces that cannot be touched, such as air conditioning filters

Myth or fact?

Herpes zoster infection is only transmitted by contact with skin lesions.

Busted!

- 1892, von Bókay
 - Observed that young children often develop varicella after exposure to an adult with HZ
- 1925, Kundratitz
 - Inoculated children who had no history of chickenpox with fluid from HZ lesions: these children developed varicella and secondary transmission occurred

Busted!

- VZV DNA can be detected in 70% **air samples** obtained from hospital rooms of patients with herpes zoster (82% patients with varicella)
- VZV DNA was found 1.2–5.5 m from patients' beds and for up to 6 days following onset of rash
- DNA was also found outside the isolation rooms housing patients

Transmissibility of Herpes Zoster in the community

- VZV infections reported in children in day-care or school between 2003-2010
- 290 infections were reported
 - 52 (18%) of infections in children were HZ
 - 9% of HZ infections resulted in transmission, causing 84 cases of varicella
- Site of HZ did not influence transmission rate (covered/uncovered)
- 30% of varicella cases were moderate severity or greater (>50 lesions)

Busted!

- Editorial by Viner et al:
 - 10% HZ cases lead to secondary varicella
 - 15% sporadic varicella lead to secondary varicella
 - HZ and varicella were equally likely to cause >2 secondary cases
 - Risk independent of anatomical localisation of HZ
- “this finding contradicts the assumption that coverage of active skin lesions with dressings or clothing reduces VZV aerosolisation, and , if substantiated through further investigations, may warrant s change in current recommendations for VZV protection”

Scenario 1: When do I put a patient with herpes zoster into airborne precautions?

- Mr TG
- PHx
 - follicular lymphoma: standard chemotherapy and autologous stem cell transplant
 - therapy related myelodysplasia, with chronic neutropaenia
 - current chemotherapy: azacitidine and birinapant
- Presented to outpatient centre with rash
- Herpes zoster diagnosed
- Commenced valaciclovir



"YOU'VE GOT THE SHINGLES"

Progress

- Admitted two days later with worsening rash, possible *Staphylococcus* superinfection
- Reviewed by ID the following day:
 - HZ over T4-T5 distribution
 - Vesicular rash over other areas of trunk, back, limbs
 - CXR clear, no respiratory symptoms
 - VZV PCR positive in blood and skin swabs
- Commenced IV acyclovir
- Additional transmission based precautions
- ?Contact ? Droplet ??Evidence

2010 National Infection Control Guidelines

DISEASE	TYPE OF INFECTION	TRANSMISSION ROUTE	PRECAUTIONS		DURATION OF PRECAUTIONS	SPECIAL REQUIREMENTS FOR HCWs				ADDITIONAL COMMENTS
			TYPE	TARGET		Non-Immune	Immunocompromised	Infected	Pregnant	
Chickenpox and shingles (Varicella-Zoster Virus)	Viral (enveloped)	Contact; airborne	C,A	All patients	Until all lesions dry and crusted over	✓	✓	✓	✓	Screen by history and serology; pre-employment Varicella vaccine. Post-exposure prophylaxis (vaccination, or ZIG in high risk cases and late pregnancy) may be indicated Susceptible healthcare workers must not attend the patient.

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Journal of Hospital Infection (1986) **8**, 305–312

Letters to the Editor

Sir,

**Use of a simple exhaust fan to control airborne transmission of
varicella zoster**

Scenario 2

- A staff member from your surgical ward rings you to notify you that he has been diagnosed with thoracic HZ
- You ask IPCU for advice:

Acute infection	Exclusion period
Herpes Zoster (Shingles)	Must not provide ANY direct patient care if lesions cannot be covered (e.g. ophthalmic zoster) If active lesions can be covered, can provide care to all patients except for pregnant women, neonates, severely immunocompromised patients, burns patients and patients with extensive eczema.

- The staff member reports that in the last hospital he was employed at he was not allowed to work during his last episode of shingles

What to do?

- Risk based approach
- Consider type of patients on ward
- Consider non clinical duties during duration of illness
- High threshold for remaining at home
- Are your other staff members safe???

Scenario 3

- Scenario 2 results in significant discussion amongst your staff
- One nurse mentions that her GP has discussed the herpes zoster vaccine with her, and recommended she have it after her next birthday
- Your hospital offers varicella vaccine free of charge for non-immune staff, and she has enquired whether the hospital would provide it for her, free of charge
- On enquiring, 25% of your staff will turn 50 in the next three years
- Should they be vaccinated?

Zostavax

- Live attenuated vaccine formulated from Oka varicella strain, with potency approximately 14 times > varicella vaccine
- Good efficacy
 - Reduces risk of HZ by 51.3% and post-herpetic neuralgia by 66.5%
 - Greatest efficacy in 60-69yo (64%)
- Protection remains significant for at least 8 yrs post vaccine
- Side effects
 - 0.1%: varicella like rash at injection site
 - 0.1%: varicella like rash not localised to injection site-usually due to wild VZV, occurred at same rate in placebo group
- Registered for use in adults ≥ 50 yrs of age, however not recommended patients under 60yo, unless they are household contacts of persons who are immunocompromised

Zostavax

- Not recommended for
 - Adults <60yo
 - Individuals with episode of HZ in past 12 months
 - People who have previously received varicella vaccine
 - People with HIV and significant immunocompromise
 - Use in caution in people anticipating future immunocompromise or less immunocompromised
- Cost: \$45-\$55

What to do?

- Evidence supports the use of the vaccine in over 60yo, data for >50yo not compelling
- Action
 - Check varicella immunisation status/serostatus for all staff on ward
 - Provide varicella vaccine to non-immune staff
 - Present information to your ADON
 - **OUTCOME:** You are invited to write a business case to provide Zostavax free of charge

In summary



**IMMUNITY, AND DON'T FORGET
ABOUT HERPES ZOSTER**