

# Fever and Rash...what's in a number??

Dr. Earl Rubin

Division Director, Pediatric Infectious Diseases

Medical Microbiologist

Montreal Children's Hospital

McGill University Health Centre



# Disclosure

- Although I have sat on Advisory boards, and given talks for different pharmaceutical companies, there is no relationship to this lecture
- All pictures were downloaded from the internet, either from Up to Date, the AAP redbook, or a Medscape tutorial





***I know this one!***



***I really have no idea!***



***F-you,  
how do you expect me to know that...  
It's all Fake anyway!***

# Fever and Rash is common symptom constellation...A systematic approach

- Age of the patient
- Season
- Travel history
- Geographic location
- Exposure to ill contacts, animals, ticks, insects..
- Medications
- Immunization history

# Age of the Patient, and what's in a number??

What commonly presents in the Pediatric age range

- 1<sup>st</sup> Disease
- 2<sup>nd</sup> Disease
- 3<sup>rd</sup> Disease
- 4<sup>th</sup> Disease
- 5<sup>th</sup> Disease
- 6<sup>th</sup> Disease



*Who's on first?? What do you do with someone who has this??*

Controlled...Panic!

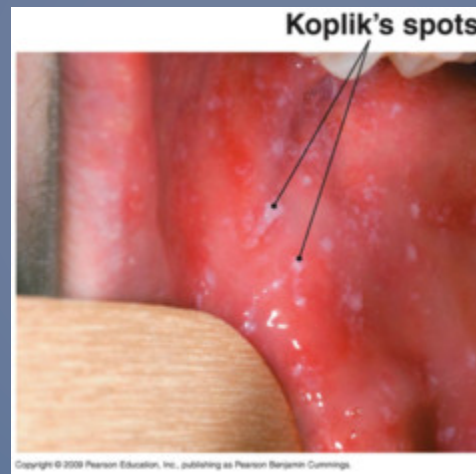
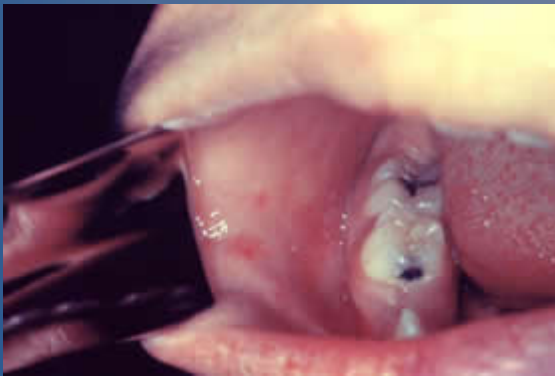


# What do you think this is??

- 1. German Measles
- 2. Fifth disease
- 3. Red Measles
- 4. Parvovirus
- 5. Rubella



Must have coryza  
And conjunctivitis  
And a cough



**Koplik's spots** (blue-white spots with a red halo) appear on the buccal mucous membrane opposite the premolar teeth 24 to 48 hours before the exanthem and remain for 2 to 4 days.





# What are things to remember about a Measles and Measles Rash?

- Fever, cough, coryza and conjunctivitis PRECEEDs the rash!
- Koplick spots are during the prodromal phase!
- Rash Starts on the forehead and neck and spreads downward
- Involves the palms and soles 50% of the time

# Measles

- Transmitted primarily by droplets BUT is also airborne!!
- Most highly communicable of infectious diseases, with an attack rate of >90% if exposed and non immune
- Vaccine failure is about 7% if one dose of vaccine after 12 months
- Maternal Ab interferes with live virus vaccines and are present <12 months from maternal vaccine, and up to 15 months if mother had measles!
- Incubation period 7-21 days
- Contagious from 4 days before to 4 days after the rash

# Measles: Diagnosis etc..

- Serology: IgM
  - To do if rash >3 days and less than 28 days
- PCR
  - Nasopharyngeal specimen
  - Urine
- Don't just send to the hospital
  - Ensure they are wearing a mask
  - Advise area where you are sending them, to isolate in a negative pressure room
  - Call Public Health 514-528-2400
- No specific treatment, but WHO recommends Vitamin A

Cet appel à la vigilance est destiné  
aux médecins et infirmières des urgences, des cliniques médicales, des équipes de prévention et contrôle des  
infections, aux pédiatres, aux pédiatres-infectiologues et aux microbiologistes-infectiologues des établissements  
de santé

## Rougeole : cas confirmé à Montréal

Le 24 avril 2018, un cas confirmé et 3 cas probables de rougeole ont été identifiés par la Direction régionale de santé publique du Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Île-de-Montréal. Les cas sont âgés entre 8 et 26 ans. Certains d'entre eux auraient voyagé de la Roumanie à Montréal par avion le 2 avril 2018 et auraient utilisé les services d'un centre hébergement et un organisme d'aide pour demandeurs d'asile durant leur période de contagiosité. L'identification des contacts est en cours. Il est possible que d'autres personnes, non adéquatement vaccinées, manifestent des signes et symptômes compatibles avec la rougeole au cours des prochaines semaines. Il est à noter que l'incubation de la maladie est de 7 à 14 jours entre le moment du contact et le début des symptômes (exceptionnellement 21 jours). La période de contagiosité débute 4 jours avant et se poursuit jusqu'à 4 jours après l'apparition de l'éruption cutanée.

### RECOMMANDATIONS :

1. Être vigilant lors de la prise de rendez-vous, à l'accueil et au triage

- Identifier si un patient présente fièvre, toux et éruption cutanée maculopapulaire généralisée.

2. Appliquer les mesures de prévention et contrôle des infections

- Faire porter un masque chirurgical au patient;
- Isoler le patient en salle d'examen fermée ou à pression négative;
- Porter un masque, si vous êtes un professionnel soignant;
- Établir, au besoin, la liste des personnes dans la salle d'attente.

3. Demander les tests de laboratoire appropriés en fonction de la date de l'évaluation médicale

isolement du virus	<ul style="list-style-type: none"><li>• ≤ 4 jours après le début de l'éruption : PCR et culture de la rougeole à partir d'un écouvillon nasopharyngé pour confirmation et génotypage</li><li>• ≤ 7 jours après le début de l'éruption : PCR et culture de la rougeole à partir d'un échantillon OU d'urine</li></ul>
ET	
Sérologie	<ul style="list-style-type: none"><li>• ≥ 3 jours et &lt; 28 jours après le début de l'éruption : sérologie IgM</li><li>• ≤ 7 jours après le début de l'éruption : IgG 1<sup>er</sup> sérum, puis 2<sup>e</sup> sérum 1 à 3 semaines après le 1<sup>er</sup> prélèvement</li></ul>

Profiter de chaque occasion  
pour mettre à jour le statut  
vaccinal de toute personne.

L'efficacité du vaccin contre la  
rougeole est de 85 à 95 % après la  
1<sup>re</sup> dose et de plus de 95 % après  
la 2<sup>e</sup> dose.

4. Déclarer rapidement tout cas de rougeole

- À la Direction régionale de santé publique de Montréal du CIUSSS du Centre-Sud-de-l'Île-de-Montréal, en joignant le professionnel de garde au 514 528-2400.
- Au service de prévention et de contrôle des infections de votre établissement

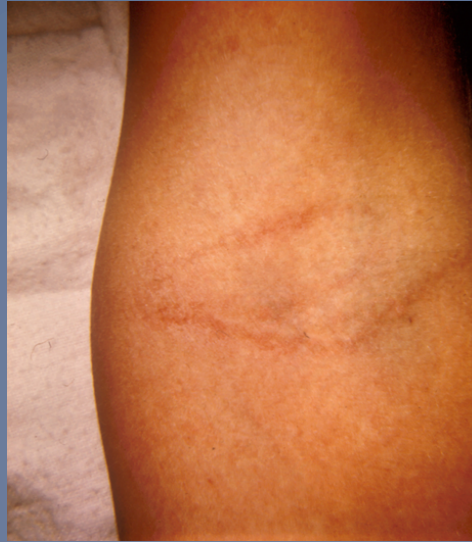
5. Identifier les personnes à risque de complications et administrer la prophylaxie appropriée

- Certaines personnes à risque doivent recevoir des immunoglobulines (Ig) si la première exposition remonte à moins de 7 jours. Voir l'annexe ci-jointe ainsi que le chapitre 11 du Protocole d'immunisation du Québec (PIQ) : <http://publications.msss.gouv.qc.ca/acrobat/f/documentation/piq/chap11-1.pdf>
- Vacciner les personnes âgées de 6 mois et plus, considérées comme non protégées, dans les 72 heures qui suivent le premier contact avec un cas de rougeole. Voir le chapitre 10.2 du PIQ : <http://publications.msss.gouv.qc.ca/acrobat/f/documentation/piq/chap10-2-1.pdf>

Pour plus de renseignements, consulter :

- Annexe ci-jointe : Aide au diagnostic, confirmation par laboratoire, identification des personnes à risque de complications.
- La fiche technique pour la gestion des cas et contacts : <http://publications.msss.gouv.qc.ca/msss/fichiers/2017/17-271-06W.pdf>

# What's on 2<sup>nd</sup>?? Second disease



# What illness is this?

- 1. Roseola
- 2. Slapped cheek disease
- 3. Scarlet fever
- 4. Staphylococcal Scaled Skin Syndrome
- 5. Varicella

# What's on 2<sup>nd</sup>?? Second disease

## Scarlet Fever



# Red and white strawberry tongue



During the first days of infection, the tongue is coated heavily with a white membrane through which swollen, red papillae protrude (classic appearance of white strawberry tongue).

By day 4 or 5, the white membrane sloughs off, revealing a shiny red tongue with swollen papillae (red strawberry tongue).





# Scarlet Fever

- Most often in association with pharyngitis and, rarely, with pyoderma or an infected wound.
- Scarlet fever usually is a mild disease in the modern era and involves a characteristic confluent erythematous sandpaper-like rash that is caused by one or more of several erythrogenic exotoxins produced by group A streptococci.
- Best to test, but sometimes classic that no throat swab necessary

*I don't know who is on Third.....hey I have never seen this guy!*



Boy, this looks like the guy on 1<sup>st</sup>, but he is a lot less intense!

# What do you think 3<sup>rd</sup> disease is?

- 1. Red Measles
- 2. Chickenpox
- 3. Pityriasis rosea
- 4. Rubella
- 5. Erythema infectiosum

*I don't know is on Third.....hey I have never seen this guy!*

## Rubella or German Measles



Boy, this looks like the guy on 1<sup>st</sup>, but he is a lot less intense!

# Rubella

- Clinical disease is usually mild, or asymptomatic!
- Lymphadenopathy, mostly posterior auricular and suboccipital often precede the rash, but lasts 5-8 days
- Rash starts on the face, generalizes within 24 hours and lasts only 2-3 days
- Transient polyarthrititis (mostly in adolescents and adults)
- Contagious from a few days before to 7 days after the rash
- Incubation period is long, 14-21 days
- Mostly now in non vaccinated immigrants
- Major concern is Congenital Rubella Syndrome
- Forchheimer's spots: pinpoint red macules/petechiae over soft palate and uvula BEFORE or WITH the ONSET the rash

# Forschheimer Spots



*There is nobody on 4<sup>th</sup> base, because there is no 4<sup>th</sup> base! And there is no such thing as 4<sup>th</sup> disease!!*

**TRUE** or FALSE?



# Filatow-Duke's Disease, or Maybe SSSS

- Many thought a misdiagnosis of Scarlet fever or Rubella
- Term dropped from most text books in the 1960's
- Good for medical trivia game!
- Some believe 4<sup>th</sup> disease is actually Staph Scalded Skin Syndrome
- SSSS
  - Starts small and can cover most of the body in 1-2 days
  - Red, well demarcated and tender, and then forms bullae and large blisters, that break and then desquamate
  - Rubbing displaces epidermis from dermis (Nikolsky sign)





*What do you think this is?*



© AAP



© AAP

# What is this rash??

- 1. Parvovirus
- 2. Erythema Infectiosum
- 3. 5<sup>th</sup> disease
- 4. Varicella

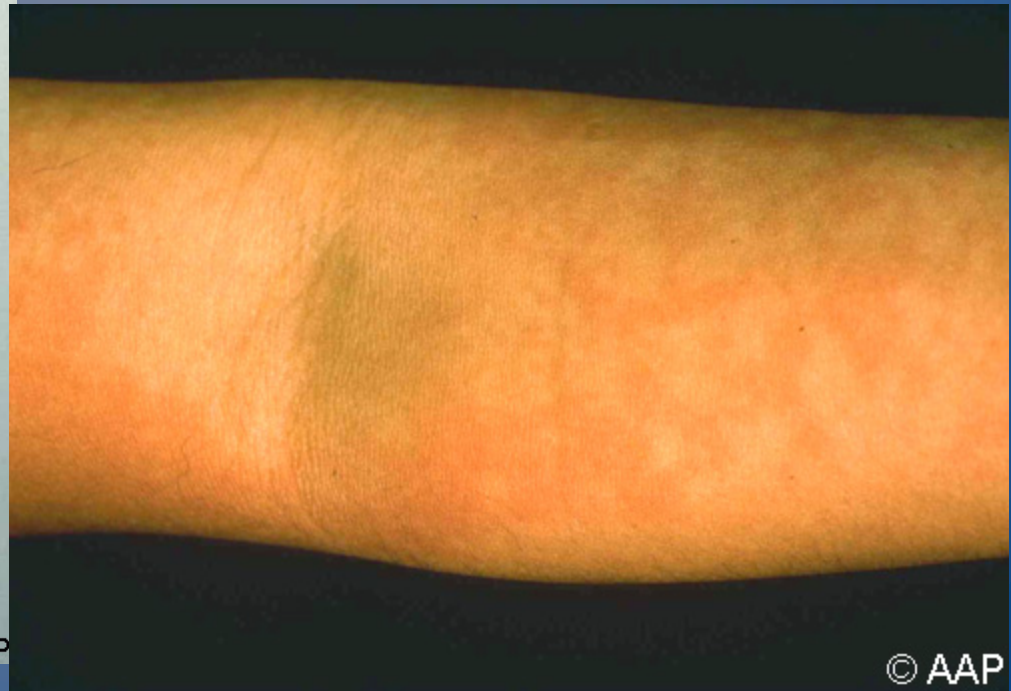


*What do you think this is?*

Parvovirus or Erythema  
Infectiosum, or 5<sup>th</sup> Disease



© AAP



© AAP

# 5<sup>th</sup> Disease

- Slapped cheek, with circumoral pallor
- Symmetric, macular, lace-like, often pruritic rash on trunk moving out to arms, buttocks and thighs
- Rash fluctuates especially with temperature/exposure
- Rash can last weeks or even months
- Preceding rash is non specific illness (1 week before rash)
  - Fever, malaise, myalgia headache
- More so in adults, but arthralgia or frank arthritis, especially the knees, but also fingers but almost any joints.

## Clinical Manifestations of Human Parvovirus B19 Infection

Conditions	Usual Hosts
Erythema infectiosum (fifth disease, EI)	Immunocompetent children
Polyarthropathy syndrome	Immunocompetent adults (more common in women)
Chronic anemia/pure red cell aplasia	Immunocompromised hosts
Transient aplastic crisis	People with hemolytic anemia (ie, sickle cell anemia)
Hydrops fetalis/congenital anemia	Fetus (first 20 weeks of pregnancy)
Petechial, papular-purpuric gloves-and-socks syndrome (PPGSS)	Immunocompetent children and young adults



Should you exclude a child with 5<sup>th</sup> disease from school or daycare? And if so, for how long?



# Possible choices:

- 1. Exclude child until the rash has resolved
- 2. Exclude the child for 5 days
- 3. No need to exclude the child
- 4. Exclude the child until there is no more fever, no more rash, and a minimum of 7 days has elapsed



*Should you exclude a child with 5<sup>th</sup> disease from school or daycare? And if so, for how long?*

Children can attend, because they are no longer contagious once the rash appears!



# This child had fever and was miserable for 4 days, now better, but has this!

- 1. Roseola
- 2. Exanthem Subitum
- 3. Rose rash of infants
- 4. 3-day fever rash
- 6<sup>th</sup> Disease



*This child had fever and was miserable for 4 days, now better, but has this!*



Roseola



# Roseola, or 6<sup>th</sup> disease, or Exanthem Subitum, or “Sudden rash”, or Rose Rash of infants, or 3-day fever rash

- Caused by Human Herpes Virus 6B (or HHV-7)
- Sudden onset of high fevers for 3-4 days (but up to 7 days) with minor other symptoms
- Seizures (10%-15% of cases) or overall irritability may appear before the rash
  - Can also have bulging fontanelle, encephalopathy, status epilepticus
- Rash begins as fever goes down
  - Numerous pale pink, almond shaped macules on trunk and neck that become confluent, and fade in hours to a 3 days.
  - Rash spares the face

*What do you think this is, why...i.e what is the classic finding...and why doesn't it have a number??*



# What is this eruption??

- 1. Varicella
- 2. Molluscum Contagiosum
- 3. Disseminated Herpes simplex



*What do you think this is, why...i.e what is the classic finding...and why doesn't it have a number??*

**Varicella; every stage...and umbilication!**



*What is the difference between these two clinical presentations?*

## Breakthrough vs. Primary





# *The following are characteristics of breakthrough varicella*

- A. Most cases mild, no fever, Most cases have <50 lesions, vs. wild type that has 300-500
- B. Due to primary vaccine failure (no protective response to vaccine) and secondary failure (eventual waning of immunity)
- C. Primary failure occurs in <1% if received 2 doses of vaccine vs. 15% if a single dose
- D. Breakthrough cases can still transmit disease
- E. All of the above



# Age of the Patient, and what's in a number??

## What commonly presents in the Pediatric age range

- **1<sup>st</sup> Disease**
  - Measles, (Rubeola, Red Measles, hard measles, 14-day measles)
- **2<sup>nd</sup> Disease**
  - Scarlet Fever(Scarlatina)
- **3<sup>rd</sup> Disease**
  - Rubella (German Measles, 3-day measles)
- **4<sup>th</sup> Disease**
  - ?Filatow-Dukes's Disease (some say this does not exist), Staphyoccal Scaled Skin syndrome, Ritter's Disease
- **5<sup>th</sup> Disease**
  - Erythema Infectiosum (Parvovirus B19)
- **6<sup>th</sup> Disease**
  - Roseola (Exanthem subitum, Sudden rash, rose rash of infants, 3-day fever)

Of the picture slides to follow,  
these are all vesiculopustular  
lesions in newborns. Which  
one do you absolutely **NEED TO**  
know



# Miliaria Rubra



# Miliaria Rubra

- common, transient cutaneous disorder caused by blockage within the eccrine sweat duct. It is also known as "sweat rash," "prickly heat," or "heat rash."
- Miliaria rubra is very common. It has been reported in 4 percent of neonates [1] and in up to 30 percent of people of all ages

# Erythema Toxicum



# Erythema toxicum neonatorum

- 20 percent of neonates in the first 72 hours of life [1-4]. It occurs more frequently in neonates with higher birthweight and greater gestational age
- ETN presents with multiple erythematous macules and papules (1 to 3 mm in diameter) that rapidly progress to pustules on an erythematous base
- may be present at birth but typically appear within 24 to 48 hours. The rash usually resolves in five to seven days

# Neonatal cephalic pustulosis (neonatal acne)





# “Neonatal acne”

- common eruption that occurs in approximately 20 percent of infants
- not caused by stimulation of sebaceous glands by maternal and endogenous androgens, the eruption is no longer referred to as "neonatal acne“
- The mean age at onset is three weeks.
- Inflammatory papules and pustules,
- characteristic distribution limited to the face (especially the cheeks) and sometimes the scalp

***What do you think this neonate has?***



# What does this neonate have?



- Erythema Toxicum
- Shingles
- HSV
- Neonatal acne

*What do you think about this neonate?*

**HSV**

*This is absolutely  
something you **DO NOT**  
want to miss!!*

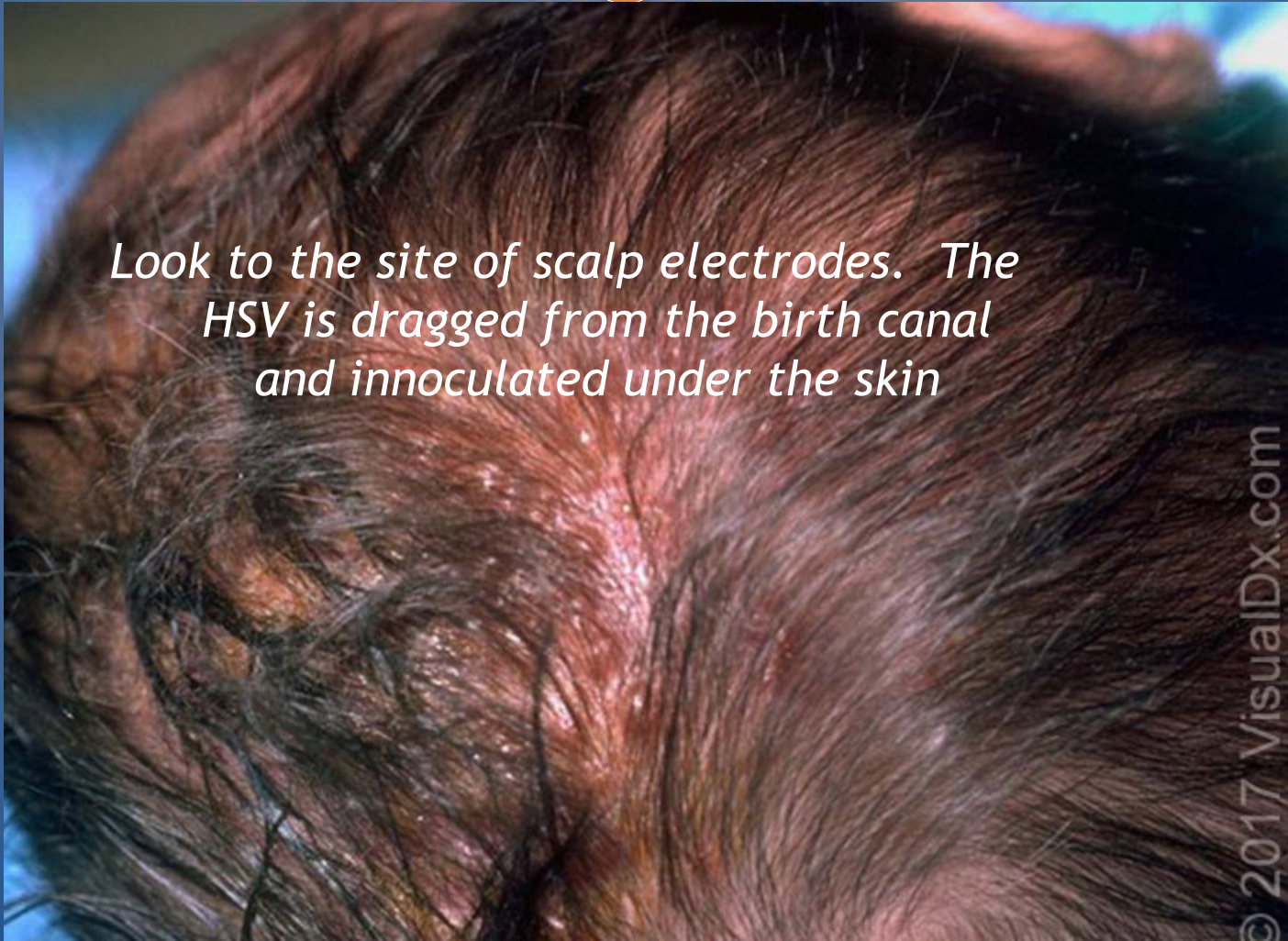
© 2017 VisualDx.com



# *What about this?*

## *HSV...again...*

*Look to the site of scalp electrodes. The HSV is dragged from the birth canal and innoculated under the skin*



Let's try some "spot" diagnosis  
(no pun intended)



*“I didn’t even realize that I have something!”*



**“I didn’t even realize that I have something!”**

- 1. Tinea corporis
- 2. Nummular eczema





*“I didn’t even realize that I have something!”*

## Tinea



# Signs and symptoms of ringworm may include:

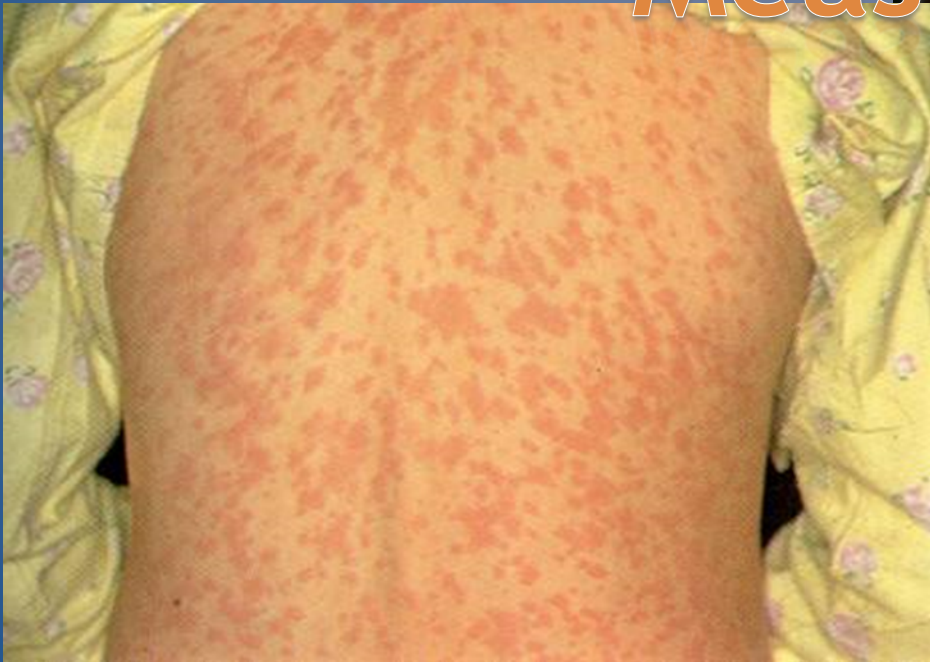
- A scaly ring-shaped area, typically on the buttocks, trunk, arms and legs
- May itch
- A clear or scaly area inside the ring, perhaps with a scattering of red bumps
- Slightly raised, expanding rings
- A round, flat patch of itchy skin
- Overlapping rings

# Nummular Eczema

- Dry skin all over the body.
- Tiny red spots that turn into large rashes across the skin. Some patches may be larger than 4 inches. These may also be round.
- Patches on the skin that vary in color: While many are red, they can also be brown, pink, or yellow.
- Mild to severe itchiness: In some cases, nummular eczema might keep you up at night scratching.
- Burning sensations in the affected patches.

*What do you think this may be??*

Measles



*These don't "bug" me either!*



# *What is this?*

- Herpes Simplex
- Varicella Zoster
- Folliculitis
- Molluscum Contagiosum



*These don't "bug" me either!*

# Molluscum Contagiosum

Firm, umbilicated lesions



*What other body areas do you want  
to examine?*

*Post pharynx for herpangina and  
palms, but look everywhere!*

*Enterovirus, classically Coxsackie virus,  
causing Hand, foot and mouth  
disease*





*Saw my doc 3 weeks ago, who said it was viral. It's still there. Doesn't really bother me, except a little itchy. What do I have and when will it go away?*



# What do I have and when will it go away?



- Measles, and not soon enough
- German Measles, and in 5 days
- Pityriasis Rosea, and can take couple of months to go away
- 5<sup>th</sup> disease, and I am no longer infectious so it doesn't matter when it will go away

*Saw my doc 3 weeks ago, who said it was viral. It's still there. Doesn't really bother me, except a little itchy. What do I have and when will it go away?*

## *Pityriasis Rosea*



*Can take 2-3 months to go away.*

*Can give something to control the itch*

*Although thought to be viral, low likelihood of transmission to others*

*I go to a sleep away camp, and I am now  
the 4<sup>th</sup> person in my bunk with this!*



# What do I have?

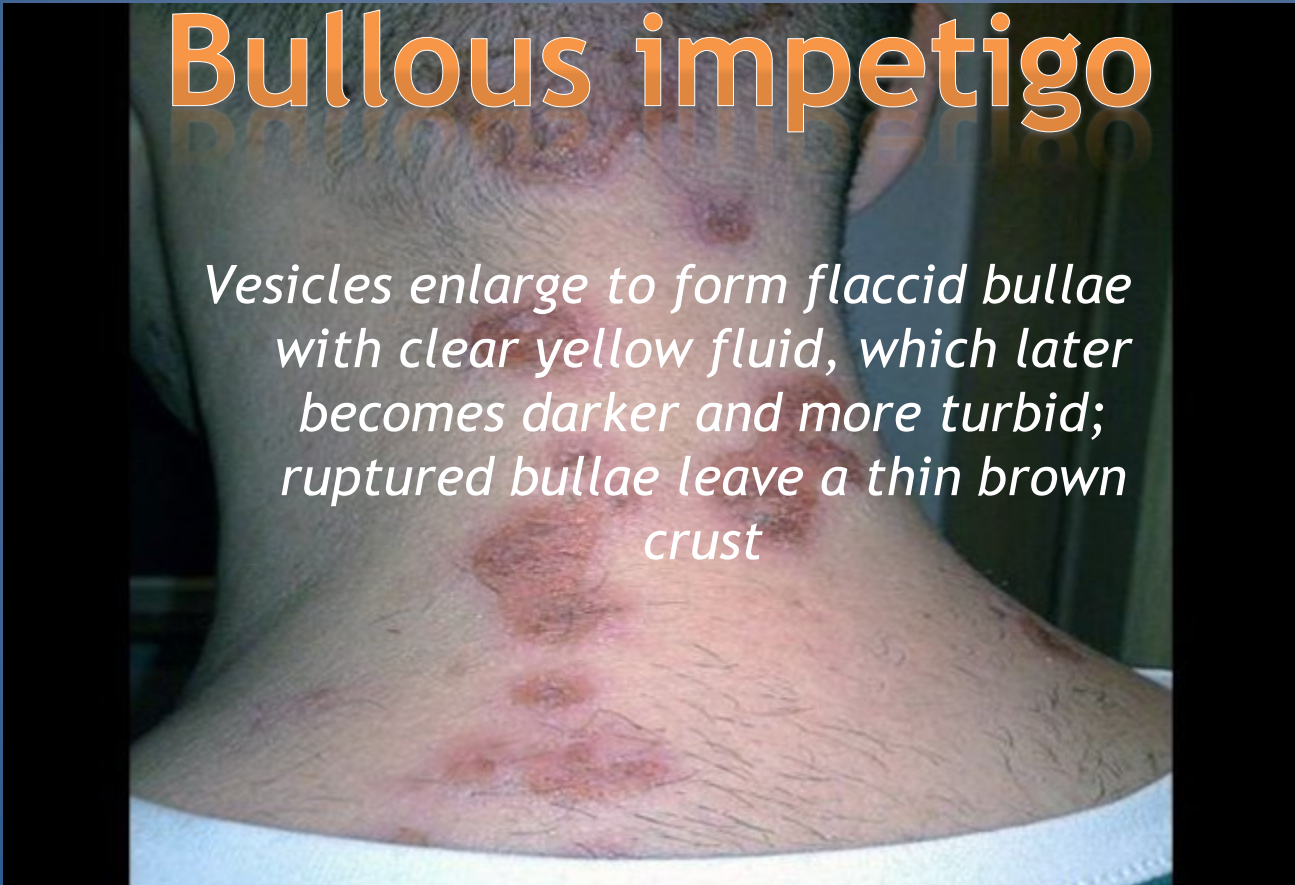
- Bed bugs
- Scabies
- Bullous impetigo
- Herpes from the hickey he got from his girlfriend



*I go to a sleep away camp, and I am now  
the 4<sup>th</sup> person in my bunk with this!*

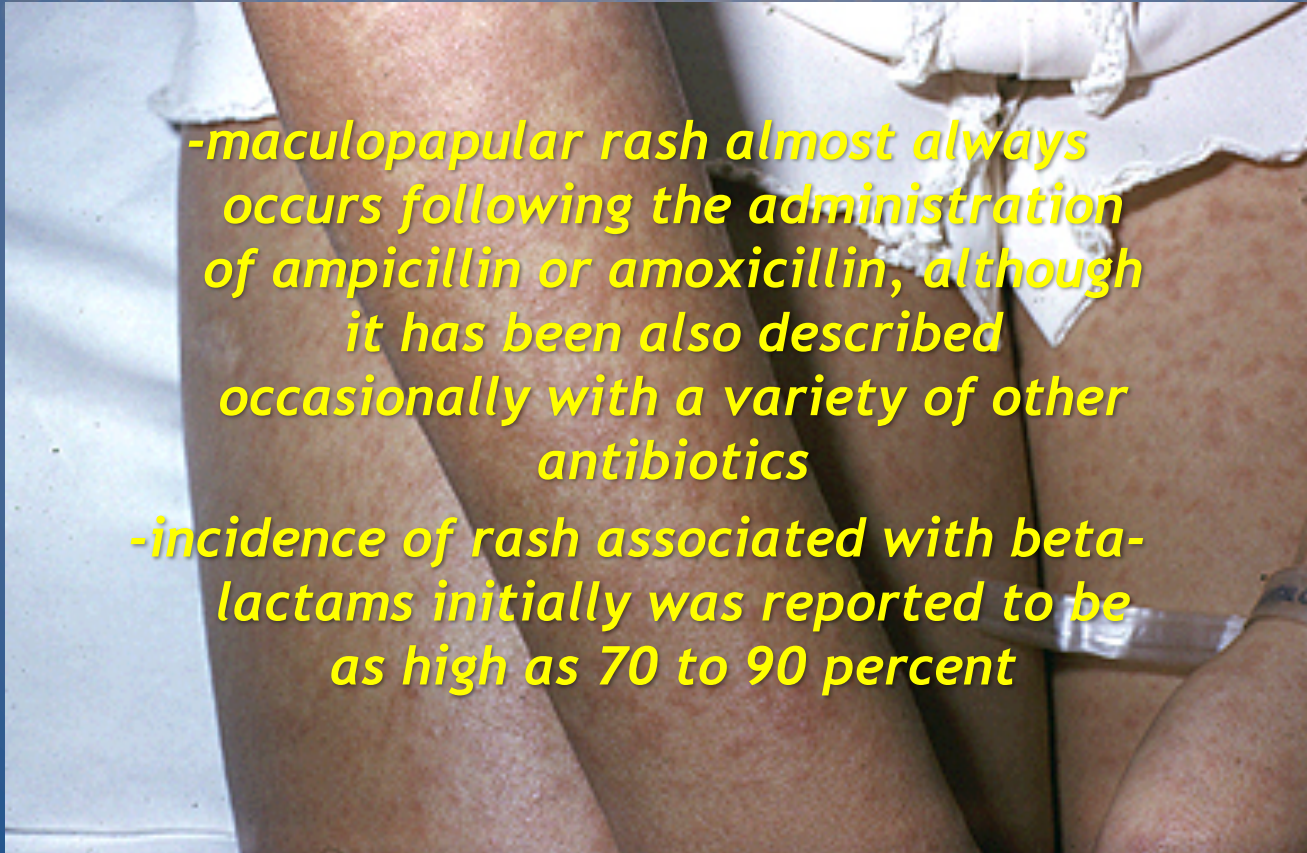
## Bullous impetigo

*Vesicles enlarge to form flaccid bullae  
with clear yellow fluid, which later  
becomes darker and more turbid;  
ruptured bullae leave a thin brown  
crust*



*Had a the worst sore throat ever, and my doctor took one look and gave me Amoxil to treat my strep throat. I feel miserable and exhausted*

## Rash with Amoxil and EBV



*-maculopapular rash almost always occurs following the administration of ampicillin or amoxicillin, although it has been also described occasionally with a variety of other antibiotics*

*-incidence of rash associated with beta-lactams initially was reported to be as high as 70 to 90 percent*

*Had a sore throat, fever, tender nodes  
and my doc was convinced this was Grp.*

*A strep, but the tests were negative*

## **Arcanobacterium Hemolyticum**





*What is associated with a brick red maculopapular rash beginning in the head and neck and spreads centrifugally?*

- A. Rubeola
- B. Varicella
- C. Rubella
- D. Erythema infectiosum
- E. Exanthem subitum



*I have fever and a sore throat too!*

# Scarlet fever



*I have been peeling like this for a couple of weeks, what do you think and what do you want to ask?*

## Peeling after Scarlet fever



*Circumoral pallor is associated  
with what rashes?*

Scarlet fever, 5<sup>th</sup> disease



*What is this picture showing you,  
and what disease does this child  
have?*

## Scarlet fever



**Another finding is dark, hyperpigmented areas on the skin, especially in skin creases. These areas are called Pastia's lines or Pastia's sign.**



**THANK YOU.  
BELIEVE ME, LIKE ME, YOU'RE  
FANTASTIC. SO GREAT.  
VERY, VERY AWESOME.**

