Measles

Pathophysiology

• Measles- member of the genus *Morbillivirus* of the family Paramyxoviridae
• Is an acute highly communicable virus causing systemic infection
• The primary site of infection is the respiratory epithelium of the nasopharynx

Signs & Symptoms

• Begins with Upper respiratory symptoms: cough, sneezing, red watery eyes, runny nose, & high fever (>104 degrees Fahrenheit)
• 3-7 days post exposure a macular papular will appear on the face
• Koplik spots are often seen and are considered pathognomonic for the disease.
Mode(s) of Transmission

- Airborne droplet transmission spread by direct contact with Nasalopharyngeal secretions of infected individuals.
- Can also be spread via articles that have been contaminated by these secretions
- Patients are contagious from 4 days before rash appears to 4 days after the rash appears
- Is considered one of the most highly contagious infectious diseases!
  - The virus remains in the air for 2 hours after it is expelled from the body.

Testing Options

- Measles-specific IgM antibody
- Measles RNA by real-time polymerase chain reaction (RT-PCR)
- Healthcare providers should obtain both a serum sample and a throat swab (or nasopharyngeal swab) from patients suspected to have measles.
- Urine samples may also contain virus, and when feasible to do so, collecting both respiratory and urine samples can increase the likelihood of detecting measles virus. (Cdc.gov)

Management & Treatment

- No specific antiviral therapy for measles.
- Treatment is supportive
  - Goal is to alleviate symptoms and address potential complications
- Severe measles cases among children should be treated with vitamin A.
  - The recommended age-specific daily doses are:
    - 50,000 IU for infants younger than 6 months of age
    - 100,000 IU for infants 6–11 months of age
    - 200,000 IU for children 12 months of age and older
Complications

• Diarrhea
• Bronchitis
• Pneumonia
• Otitis media
• Acute brain inflammation
• Corneal ulceration

Vaccine

• MMR (Measles, Mumps & Rubella)
  – One dose is about 93% effective if exposed to measles
  – Two doses are about 97% effective
• Widespread vaccination in the US has lead to >99% reduction in Measles
• Most cases in the US originated outside the US or were linked to a case that originated outside the US

Vaccine Schedule

• First dose between 12 & 15 months of age
• Second dose between ages 4-6
  – Can be given earlier, but must be AT LEAST 28 days after the first dose.
• College students & health care providers with no evidence of immunity need 2 doses at least 28 days apart
• Adults with no evidence of immunity should get at least one dose.
Postexposure prophylaxis

- May be partially or completely protected by IG given within 6 days of exposure, followed by live measles vaccination 5-6 months later
- Vaccination within 72 hours of exposure MAY offer some protection.
- The following should be considered candidates for PEP:
  - Household or other close contacts, children less than 1, pregnant women, individuals with immunodeficiencies

Recent Outbreaks of Mumps

- 2009-2010
  - NYC religious group with student returning from UK during a mumps outbreak
  - School aged children in Guam
- 2011-2013
  - College Campuses in Calif, Va, & MD
- 2014
  - Nat’l Hockey League
  - Ohio State
  - Fordham University, NY
Pathophysiology
RNA paramyxovirus

• Only natural host is humans, wild strains in unvaccinated populations (12 different genotypes designated A-L)
• Disease provides life long immunity
• Vaccination – 2 doses confer life long immunity in 85% of pop. Introduced in US in 1967
• In unvaccinated countries 90% seroconvert by age 15
• Incubation period 12-25 days

Mumps: Signs & Symptoms

• Prodromal symptoms are nonspecific
  – Myalgia, anorexia, malaise, headache & low-grade fever
• Acute viral illness with fever, swelling and tenderness of one or more salivary glands
  – Parotid, sometimes sublingual or submaxillary glands
• Parotitis may be unilateral or bilateral and typically lasts 7-10 days in the unvaccinated, resolves within 1-2 weeks

Unilateral Parotitis


Bilateral Parotitis
Mumps: Signs & Symptoms

- Orchitis occurs in 20-30% post-pubertal males
  - Sterility rare
  - Risk factor for testicular cancer- conflicting studies
- Respiratory symptoms occur in 40-50% of kids younger than 5
- Affects males and females equally

Mode of Transmission

- By droplet spread
- Direct contact of saliva of an infected person
  - 7 days before infection to 9 days afterward
- Double dipping of appetizers!

Testing

- Usually by clinical symptoms
- Salivary mumps IgM
- Serum mumps IgM
- Serum mumps IgG
- RT-PCR – works best if collected within 2 days of symptoms regardless of vaccination status
- A negative IgM DOES NOT RULE OUT MUMPS
  - Perform no earlier than 3 days after onset of s/s
Management & Treatment

• ISOLATION - respiratory for 5 days after onset of parotitis
• Disinfect anything contaminated with saliva or nasal secretions
• Immunize susceptible contacts to reduce the likelihood of infection
• Immune globulin is not effective and not recommended and not available
• Resolves within 1-2 weeks

Management & Treatment

• Supportive care includes fever management and analgesia relief using acetaminophen or ibuprofen
• Mumps is seen as a benign viral disease in children and adults that resolves within 1-2 weeks.
• Hydration very important with young kids - feel pretty miserable.

Complications

• Orchitis
• Treatment:
  • Bedrest
  • Fluids
  • Scrotal elevation
  • Feel better in about 4-5 days
Complications

- Aseptic meningitis – 10-15%
  - 3 x more common in males
- Treatment
  - Supportive Care with adequate analgesia/antipyretics, anti-emetics and if volume depleted IV fluids
  - Usually complete recovery, but must r/o bacterial meningitis!

Complications

- Oophoritis – only in post-pubertal females
  - Fever, with loin, abdominal and/or back pain
- Mastitis
  Treatment
  Supportive

Complications

- Mumps encephalitis – 1/100,000 cases
  - Seizures, decreased level of consciousness and focal neurological symptoms
  - Mortality is 1-5%
  - Long term morbidity is rare
- Medical Emergency
Complications

• Sensorineural hearing loss
  – High frequency loss in 4% of adult men
  – Permanent unilateral deafness 1/20,000
  – Bilateral hearing loss very rare

Complications

• Pancreatitis
  • Happen approximately in 4%
    – Kids and adults
  • Conservative management
    – Improves in 3-7 days

Complications

• Myocardial Involvement
  – May see ST segment depression
  – T wave inversion
  – Prolonged PR intervals
• Seen in about 15% of mumps cases
Differential

- Influenza A
- Coxsackie virus
- Acute HIV infection
- Acute suppurative parotitis
- Parotid duct obstruction

Pregnancy
- Increased risk of miscarriage (study from 1960) in 1st trimester –
- No increase risk of congenital abnormalities
- Vaccination not recommended in pregnancy

Contraindications to vaccination

- Severe immunosuppression
  - HIV
  - Congenital immunodeficiency
  - Immunosuppression due to high dose steroids or chemotherapy
  - Pregnancy
Postexposure Prophylaxis

• Immunize susceptible contacts if not immunized and no clinical history
• Unknown immunization status – immunize
  — No risk in immunizing those who are already immune

Vaccine- LAV

• 1st dose given as MMR vaccine at age of 12-18 months
• 2nd dose – second year of life to age at school entry
• Adverse reactions: fever and parotitis
• Rare: orchitis, sensorineural deafness and thrombocytopenia

Rubella
Pathophysiology

• Caused by rubella virus-a member of the Rubivirus genus of the family Togaviridae
• Is a mild febrile viral illness characterized by a diffuse punctate & maculopapular rash
• Difficult to distinguish from other febrile illnesses that present with rash
• Is only moderately contagious

Signs & Symptoms

• Maculopapular rash that begins on the face and spreads to the trunk & limbs
  – Preauricular, occipital, & posterior cervical lymphadenopathy precedes the occurrence of rash by ~5-10 days
  – Up to 50% of all cases have no rash
• Low grade fever (<101 degrees Fahrenheit)
• Arthralgia
• Headache
• Conjunctivitis
• Forcheimer’s sign

Mode(s) of Transmission

• Transmitted via airborne droplets from the upper respiratory tract
• May also be present in the urine, feces, and skin
• Can be transmitted to the fetus if Mom is infected during pregnancy
Testing Options

- Enzyme immunoassays (EIA) are the most commonly used and widely available diagnostic test for rubella.
- Rubella virus can be detected from nasal, throat, urine, blood, and cerebrospinal fluid specimens from persons with rubella.
- A single serologic IgG test may be used to determine the rubella immune status of persons whose history of rubella disease or vaccination is unknown.

Interpreting Test Results

Management & Treatment

- No disease-specific treatment for Rubella.
- Management is focused on symptomatic relief.
- Hospitalized patients suspected of having Rubella should be placed in droplet isolation.
- Hospitalized infants with CRS need to be placed in contact isolation.
Complications

- Congenital Rubella Syndrome (CRS)
  - At least 20% chance of fetal complications if a mother contracts early in pregnancy
- More common in adults than children
- Arthralgia or arthritis
- Encephalitis
- Thrombocytopenic purpura
- Orchitis, neuritis, & progressive panendephalitis

Vaccine

- IMPORTANT for non-immune women who may become pregnant
- Is a live attenuated virus (RA 27/3 strain)
- 95% or more effective to provide lifelong immunity

Vaccine Schedule

- First dose at 12-15 months
- Second dose between 4-6 years of age
- Doses need to be at least 28 days apart
Postexposure prophylaxis

- Not recommended
  - Neither rubella vaccine nor immune globulin (IG) is effective for post-exposure prophylaxis of rubella.

Varicella-Zoster Virus (VZV) Pathophysiology

- Human alpha-herpesvirus
- Causes chickenpox (varicella) & shingles (HZ)
- VZV lies dormant in dorsal root ganglia after primary infection
- Can reactivate at a later time due to illness, stress causing herpes zoster
- Childhood immunization as well as adult immunization important
- Distinct seasonal fluctuation – March to May

Chicken Pox Varicella-Zoster
Varicella: Signs & Symptoms in the **Unvaccinated**

- Prodrome of fever, malaise, headache & abdominal pain 1-2 before rash
- Rash involves successive crops that progress within less than 24 hours from macules to papules, to vesicles, to pustules and crusts – pt will have lesions in different stages as the crops erupt
- Usually starts on face and trunk and then spread to extremities
- May have 250-500 lesions that are pruritic
- Typically ‘crops’ are crusted 4-7 days after onset of rash

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Varicella: Signs & Symptoms in the **Vaccinated**

- **BREAKTHROUGH** Varicella – infection occurring 42 + days after vaccination
- Approx 70% of these cases very mild or undetectable
-Usu low or no fever
- Develop fewer than 50 lesions, with papules that do not generally progress to vesicles
- The other 25-30% are not mild & have clinical manifestations similar to unvaccinated
Mode of Transmission

- Transmitted person to person by direct contact, droplet aerosols from vesicular lesions and respiratory tract secretions
- Incubation period: range 10-21 days after exposure to rash
- Period of contagiousness: 1-2 days before the onset of rash until all lesions are crusted, usu 5-7 days
- Highly contagious in unvaccinated - 61-100%

Testing

- Varicella zoster virus polymerase chain reaction (PCR)
- IgG – rise is indicative of infection
- Screening adults for immunity
  - LA varicella antibody
  - Not recommended for individuals born before 1980

Management & Treatment

- Children – usually need fever management (acetaminophen) do not use NSAIDs
- Hydration is important particularly in toddlers with fever
- oatmeal baths to manage pruritus, diphenhydramine orally and topically, impeccable hygiene to prevent secondary infection
  - Skin lesions with staph or strep A- secondary infection require antibiotic treatment & close monitoring
Moderate risk of severe disease

- 13 years of age and over
- Pts with chronic skin diseases such as atopic dermatitis
- Underlying pulmonary disease
- Pts on short course or intermittent oral corticosteroids or inhaled steroids
- Pts on salicylate tx
- Start on acyclovir within the first 72 hours

High risk of severe disease

- Pts who are immunocompromised (organ transplant, chemotherapy, HIV infection)
- Neonates
- Pts using high dose systemic oral corticosteroids or immunosuppressants
- Pregnant women
- Treatment intravenous antiviral therapy STAT
- Delay in treatment can have serious consequences for these patients

Complications

- Secondary bacterial infection of skin lesions
- CNS – meningoencephalitis, cerebellar ataxia
- Pneumonia – viral or bacterial- presents 1-6 days after onset of rash w/ dyspnea, tachypnea, fever
  – Chest x-ray- nodular or interstitial changes
- Rare: Hepatitis, hemorrhagic complications, thrombocytopenia, nephritis occur less frequently
Complications

- Certain groups at increased risk for complications
  - Adults (13+)
  - Immunocompromised persons
  - Pregnant Women
  - Newborns

Fatality Rates Prior to Vaccination

<table>
<thead>
<tr>
<th>Age</th>
<th>Cases per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14</td>
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<tr>
<td>15-19</td>
<td>2.7</td>
</tr>
<tr>
<td>30-49</td>
<td>25.2</td>
</tr>
</tbody>
</table>

Vaccine

- Prior to 1997 average 103 deaths per year from varicella
- After vaccine average 8 per year
- Implemented routine 2-dose childhood varicella vaccination program in 2006
- 2-doses for all adolescents and adults without evidence of immunity
- Pre-natal screening and post-partum vaccination
Varicella Vaccination

- Varicella vaccine (Varivax)
  - Approved for 12 months & older
- Measles/Mumps/Rubella/Varicella (ProQuad)
  - Approved for 12 months through 12 years
- Herpes zoster vaccine (Zostavax)
  - Approved for 50+ years

Varicella Schedule

- Routine vaccination at 12-15 months of age
- Routine second dose at 4-6 years
- Minimum interval between doses of varicella vaccine is 3 months for children younger than 13 years of age
- Adolescents & Adults
  - 2 doses separated by at least 4 weeks
  - Do not repeat 1st dose because of extended interval btw doses

Postexposure Prophylaxis

- Varicella vaccine is recommended for use in persons without evidence of varicella immunity after exposure to varicella
  - 70-100% effective if given within 3 days of exposure (possibly up to 5 days)
  - Not effective if administered more than 5 days after exposure but will produce immunity if pt is not infected
Postexposure Prophylaxis

- VariZIG - purified human immune globulin
  - Approved March 2013, Temecula Calif
  - FFF Enterprises 800-843-7477
- Immunocompromised, neonates whose moms have s/s of varicella 5 days before and 2 days after delivery
- Preterm infants exposed in neonatal period
- Pregnant women

Contraindications/Precautions to vaccination

- Severe allergic rx to vaccine component or following a prior dose
- Immunosuppression
- Pregnancy
- Moderate or severe acute illness
- Recent blood product
- Personal or family hx of seizures of any etiology (MMRV only)

Contraindications/Precautions to vaccination

- MMRV not approved for use in persons with HIV infection
- HIV infection - May be eligible for varicella and MMR depending upon age and CD4 count
Varicella Vaccine Adverse Reactions

- Local pain erythema
- Generalized rash
- Systemic reactions are not common
- Adverse rx similar for MMRV

Tetanus

Pathophysiology

- A disease caused by an endotoxin produced by the bacterium *Clostridium tetani*
- The bacterium usually enters the body via an injury causing a break in the skin (tetanus-prone wound)
- *C. tetani* produces two exotoxins:
  - Tetanolyisin
  - Tetanospasmin
- The toxin binds in the CNS & interferes with neurotransmitter release to block inhibitor impulses
  - This leads to unopposed muscle contraction & spasm
Tetanus Prone Wounds

- Any wound sustained more than 6 hours prior to surgical intervention
- Compound fractures
- Deep penetrating wounds
- Any wound containing foreign bodies
- Wounds complicated by pyogenic infections
- Wounds with extensive tissue damage
- Any wound that is obviously contaminated

Signs & Symptoms

- Symptoms usually present with a descending pattern
  -- Begins with trismus (AKA Lockjaw)
  -- Neck stiffness
  -- Difficulty swallowing
  -- Rigidity of abdominal muscles
- Muscle spasms
- Fever
- Diaphoresis
- Elevated BP
- Episodic tachycardia

Mode(s) of Transmission

- Enters the body through a break in the skin
- Tetanus is NOT spreadable from person to person
Testing Options

• None
• Diagnosis is ENTIRELY based on clinical findings

Management & Treatment

• Determine circumstances of injury
• Post-exposure prophylaxis
• With confirmed cases of tetanus:
  – Maintain airway
  – Sedation if indicated
  – Muscle relaxants
  – intubation

Complications

• Laryngospasm
• Fractures
• Hypertension and/or abnormal heart rhythm
• Nosocomial infections
• Pulmonary embolism
• Aspiration pneumonia
• Death
Vaccine

• Was developed in the 1920’s and first widely used during WW II.
• Consists of a formaldehyde-treated toxin
• 2 types of toxoid available:
  – Absorbed (preferred)
  – Fluid

Vaccine Schedule

• In childhood, series of 4 doses given at:
  – 2 months of age
  – 4 months of age
  – 6 months of age
  – 15-18 months of age
• Between 4-6 years of age
• Between 11-12 years of age
• Every 10 years thereafter

Postexposure prophylaxis

• Important for any tetanus prone wound
• Td or Tdap every 10 years for any at risk wound if >3 prior doses of the vaccine
• Td or Tdap in 5 years if <3 prior doses of the vaccine
DIPTHERIA

Pathophysiology

• Caused by toxins produced by Corynbacterium diptheria – must distinguish type
• Greek means ‘leather hide’ – characteristic lesion
• Toxin causes tissue destruction, usu in oropharynx, causing a pseudomembrane formation and often enters the bloodstream

Signs & Symptoms

• Throat mod to severely sore, low grade fever
• Enlarged/tender cervical lymph nodes
• Bull neck or swelling of neck (croupy cough)
• Asymmetrical adherent greyish white membrane – may extend into trachea
  – Causing airway obstruction
• Nasal diphtheria range from mild to chronic
  – Serosanguinous nasal discharge & excoriations
Incubation Period

- 2-5 days, range 1-10 days
- May involve any mucous membranes
- Leather like membrane forms within 2-3 days
- Fever not high but pt appears sicker than expected - toxic

Mode of Transmission

- Humans only reservoir
- Kissing disease
  - Spread by a Mother’s kiss to her child
- Respiratory droplet
  - Coughing & sneezing
- Skin lesions (rarely)
- Inanimate objects

Testing

- Cultures from nose & throat swabs
  - Swab discolored areas, ulcerations and tonsillar crypts
- Requires selective Culture medium containing tellurite blood agar or Tindale media
- If suspicion is high begin treatment – waiting for results may result in death
Management & Treatment

- Hospitalization, close monitoring
- Call the CDC 770-488-7100
- Tx with antitoxin after obtaining from CDC
  - Antitoxin only neutralizes free toxin – so time is of the essence
  - Pt must be tested for sensitivity rx (eye or skin)
- Penicillin G IM or Erythromycin - requires a 14 day course. Pt usu receive parenteral tx until they can swallow

Management & Treatment

- Cultures will be repeated
- May require another 10 days of antibiotic tx
- All close contacts should be tested and monitored for at the very least 10 days
  - Immunization status checked and receive DTP or TD vaccine booster
  - As well as 7-10 course of erythromycin or penicillin

Management & Treatment

- Health Care providers who are in direct contact with patients should receive a Tdap booster.
- Asymptomatic carriers – may be placed in respiratory isolation or those with cutaneous colonization will require contact isolation
  - Require 10 day course of antibiotics
  - Repeat of cultures – 2 neg cultures 24 hrs apart
  - Booster of age appropriate diphtheria toxoid
Complications

- Upper airway obstruction
- Acute Respiratory failure
- Neuritis
  - Eye muscles, limbs, phrenic nerve, soft palate
- Myocarditis
- Death
  - >5 and <40 year old up to 20%

Vaccine

- Single agent is not available
- Formulations for adults (Td or Tdap) and children (DTaP or DT) or Pediatrix (Dtap-HepB-IPV or Pentacel (DTaP-IPV/Hib)
- Pediatric formulations have higher doses of diphtheria toxoid

Vaccine

- Adults(7+) – never vaccinated, need series of three properly spaced Td doses
- This schedule is 95% Effective in providing protection

<table>
<thead>
<tr>
<th>Dose</th>
<th>Interval</th>
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<tbody>
<tr>
<td>1st Dose</td>
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<tr>
<td>2nd Dose</td>
<td>4 weeks</td>
</tr>
<tr>
<td>3rd Dose</td>
<td>6-12 months</td>
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Routine DTaP Schedule

<table>
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<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Dose</td>
<td>2 months</td>
<td>--------</td>
</tr>
<tr>
<td>2nd Dose</td>
<td>4 months</td>
<td>4 weeks</td>
</tr>
<tr>
<td>3rd Dose</td>
<td>6 months</td>
<td>4 weeks</td>
</tr>
<tr>
<td>4th Dose</td>
<td>15-18 months</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Children who receive DT

- If **First Dose** given to child younger than 12 months of age – **NEED 4 DOSES**
- If **First Dose** given to child at or older than 12 months of age – **NEED 3 DOSES**
- **BOOSTERS**
  - 4-6 YEARS OF AGE – DTaP (before school)
  - 11 or 12 years of age – Tdap
  - Every 10 years Td

Postexposure prophylaxis

- Case contacts must be treated as noted earlier
Pertussis – Whooping Cough

Pathophysiology

• Caused by the bacterium *Bordetella pertussis*
  – Attaches to the cilia & produces toxins that
    paralyze the cilia & cause inflammation and
    narrowing of the airways
• Is HIGHLY contagious

Signs & Symptoms

• URI that presents with a very distinctive cough
  – Inspiratory “whooping” sound
• Onset is insidious-similar to the common cold
• Fever can occur, but is usually minimal
• Stages:
  – catarrhal-Initial phase characterized by insidious onset
    of URI with an irritating cough
  – Paroxysmal –develops over 1-2 weeks characterized
    by repeated violent coughing followed by a high-
    pitched inspiratory “whoop”
  – Convalescence
Mode(s) of Transmission

- Airborne via respiratory droplets.
- Rarely indirectly through the air or contaminated objects
- Highly contagious in the first 2 weeks at the beginning of the paroxysmal stage

Testing Options

- Culture is the Gold Standard:
- Polymerase Chain Reaction (PCR)
- Serology
- Direct fluorescent antibody test

Management & Treatment

- Primarily supportive
- Antibiotics are of some value:
  - Azithromycin, clarithromycin, erythromycin, & Trimethoprim-sulfamethoxasole
Complications in Children

- Secondary bacterial pneumonia
- Neurologic complications
- Otitis media
- Anorexia
- Dehydration
- Pneumothorax
- Epistaxis
- Subdural hematomas
- Hernias
- Rectal prolapse

Complications in Adolescents & Adults

- Sleep disturbances
- Urinary incontinence
- Pneumonia
- Rib Fracture

Vaccine

- First developed in the 1930’s
- DTP is 70%-90% effective after 4 doses
- Little to no protection after 5-10 years
- Local adverse reactions are common
Vaccine Schedule

• In childhood, series of 4 doses given at:
  – 2 months of age
  – 4 months of age
  – 6 months of age
  – 15-18 months of age
• Between 4-6 years of age
• Between 11-12 years of age
• Every 10 years thereafter

Postexposure prophylaxis

• Antibiotics should be given to all close contacts of patients with pertussis
• All close contacts <7 years of age who have not yet received the 4 dose primary series should complete the series with the minimal recommended intervals.
• Close contacts between 4-6 years of age who have not yet received their 5th dose should be vaccinated.
• Efficacy of post-exposure use of Tdap is unknown

In Summary, Imagine A World Without Vaccines
• We have forgotten the death, disability and injuries of common infectious diseases

• We focus on what we know— the problem is we have forgotten
  – One - 3 die for every 1000 cases of measles
  – 1921, 15,000 Americans died from Diphtheria
  – 1964-65 Rubella infected 12.5 million Americans, killed 2000 babies & caused 11,000 miscarriages, & thousands born deaf/neurologic disorders

Harvey S. Kaplan, MD, FAAP graduated New York Medical College in 1963

• Complications related to varicella sometimes resulted in hospitalization in the days prior to the introduction of the chickenpox vaccine in 1995. I remember a 10 year old with extensive chickenpox lesions, fever, and that the lesions were “black.” These “black pox” were due to hemorrhagic complications causing skin bleeding.

• I remember a child hospitalized with severe chickenpox with so many skin lesions that it was almost impossible to find a clear space to start an IV for fluids and antibiotics. The child had a secondary bacterial infection.

• Pediatricians still need to think about these things, but they aren’t everyday events like they were when I started my career. Now, doctors have to counsel parents who are dubious about vaccinations; I don’t remember that before. The fear of immunizations is new to me. I retired five years ago, but when I was in practice, parents did not question the fact that immunization would protect their children from potentially deadly diseases. They were correct, because vaccines are good for children.
VACCINES PROTECT US ALL!

Figure 1. Reported diphtheria cases in the Soviet Union and the Newly Independent States, 1965–96.

- Providers are important sources of vaccine information
- Be informed!
- NIP-IT.org excellent resource that provides 6 CEU's of credit
- Positive provider communication style, along with individualized and appropriate vaccine information
THE BEST PART ABOUT GETTING VACCINATED ISN’T THE LOLLIPOP

IT’S THE PART WHERE YOU DON’T GET SICK AND DIE!

References