Meningitis

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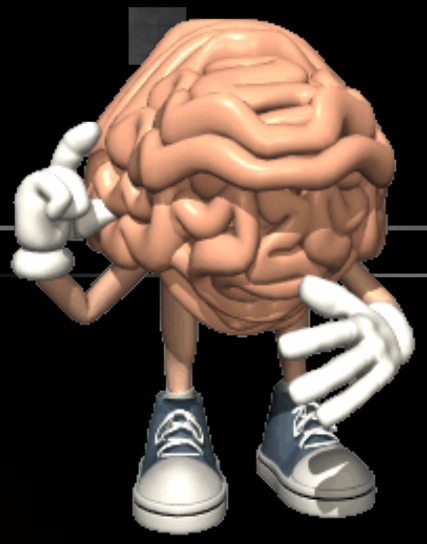
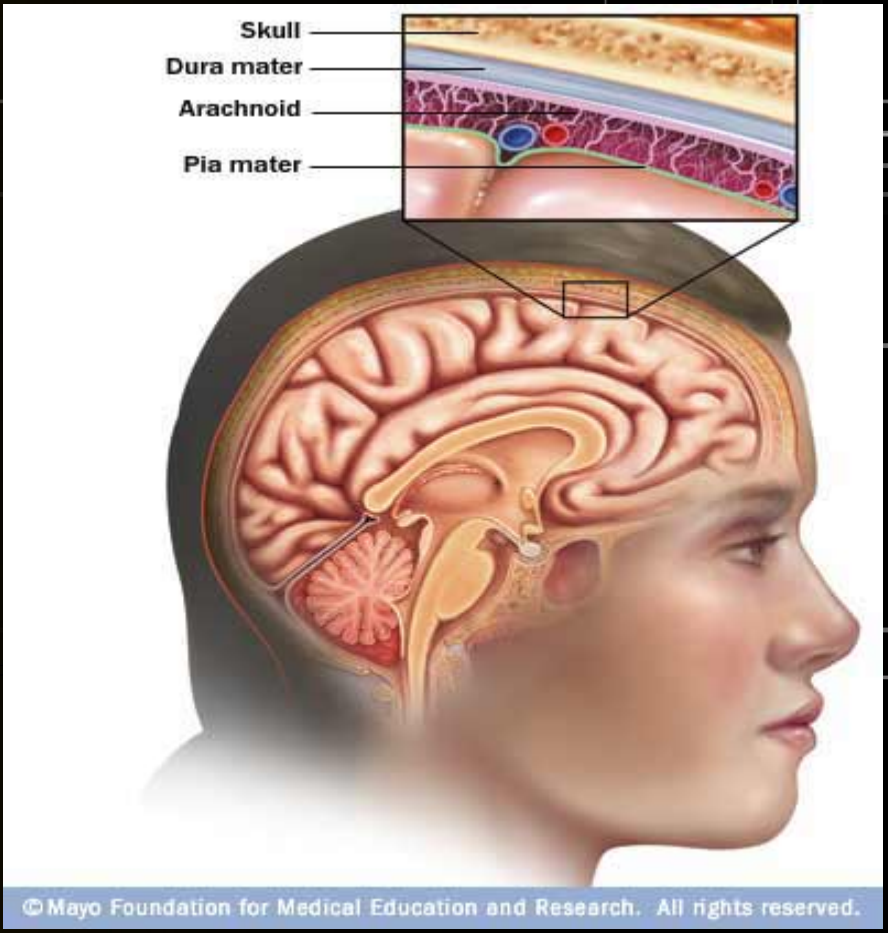
THE STUDENT WILL BE ABLE TO……

- define what meningitis is
- explain the difference between viral and bacterial meningitis
- list three signs and symptoms of meningitis
- identify how meningitis is transmitted
- recall three ways to prevent meningitis



WHAT IS MENINGITIS?

- An infection of the fluid around the spinal cord and the fluid that covers the brain



Source: Mayo Foundation

IS MENINGITIS CONTAGIOUS?

- **Some forms of bacterial meningitis are contagious. The bacteria is spread by the exchange of respiratory and throat secretions through such things as coughing kissing. None of the bacteria that causes meningitis are as contagious as the common cold or the flu. Meningitis is not spread by casual contact or by breathing the air where a person with meningitis has been.**

Source: CDC, Meningococcal Disease

MENINGITIS INFORMATION

- The first definitive description of the disease was in Switzerland in 1805 (Red Book)
- Meningitis can either be viral or bacterial
- Most common type of Meningitis is viral
- Bacterial form of meningitis is extremely dangerous, fast moving and can be fatal
- Viral meningitis has similar signs and symptoms of bacterial meningitis, but viral is not as deadly nor as debilitating as bacterial

Brad Pitt diagnosed with viral meningitis

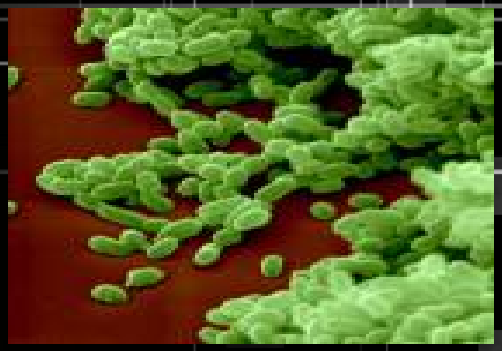
LOS ANGELES (AP) — Actor Brad Pitt has been diagnosed with a mild case of viral meningitis and was released from the hospital on Wednesday, his publicist said. Brad Pitt's publicist said the actor is at home "and doing well" after being diagnosed with viral meningitis. Pitt, 41, had checked himself into Cedars-Sinai Medical Center in Los Angeles on Monday night complaining of flu-like symptoms. He went home Wednesday afternoon, publicist Cindy Guagenti said. "The actor is at home and doing well," she said in a statement.

Most patients recover from viral meningitis in a week. Severe illness and death is uncommon, according to the Centers For Disease Control.

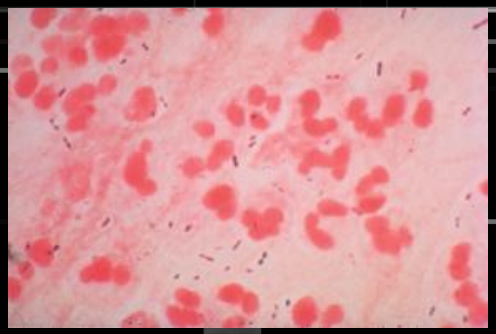
Source:2005 The Associated Press

Organisms that cause meningitis

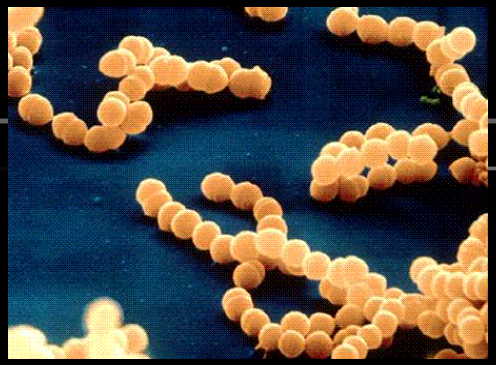
- Haemophilus influenza



- Streptococcus pneumoniae



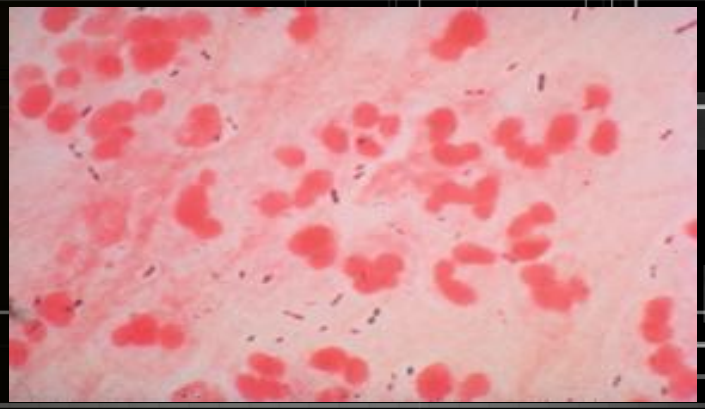
- Neisseria meningitidis



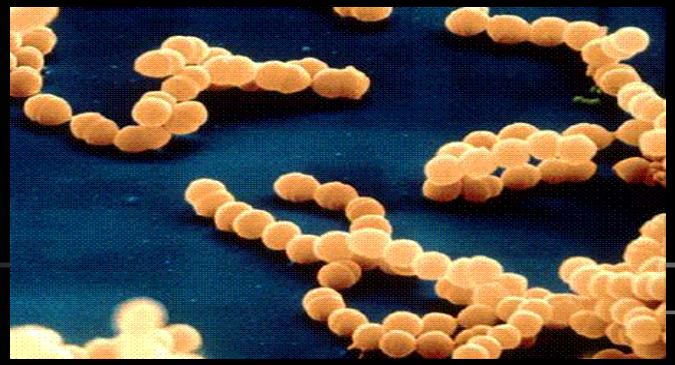
Source: www.brown.edu

Most common types of meningitis

- Streptococcus pneumoniae

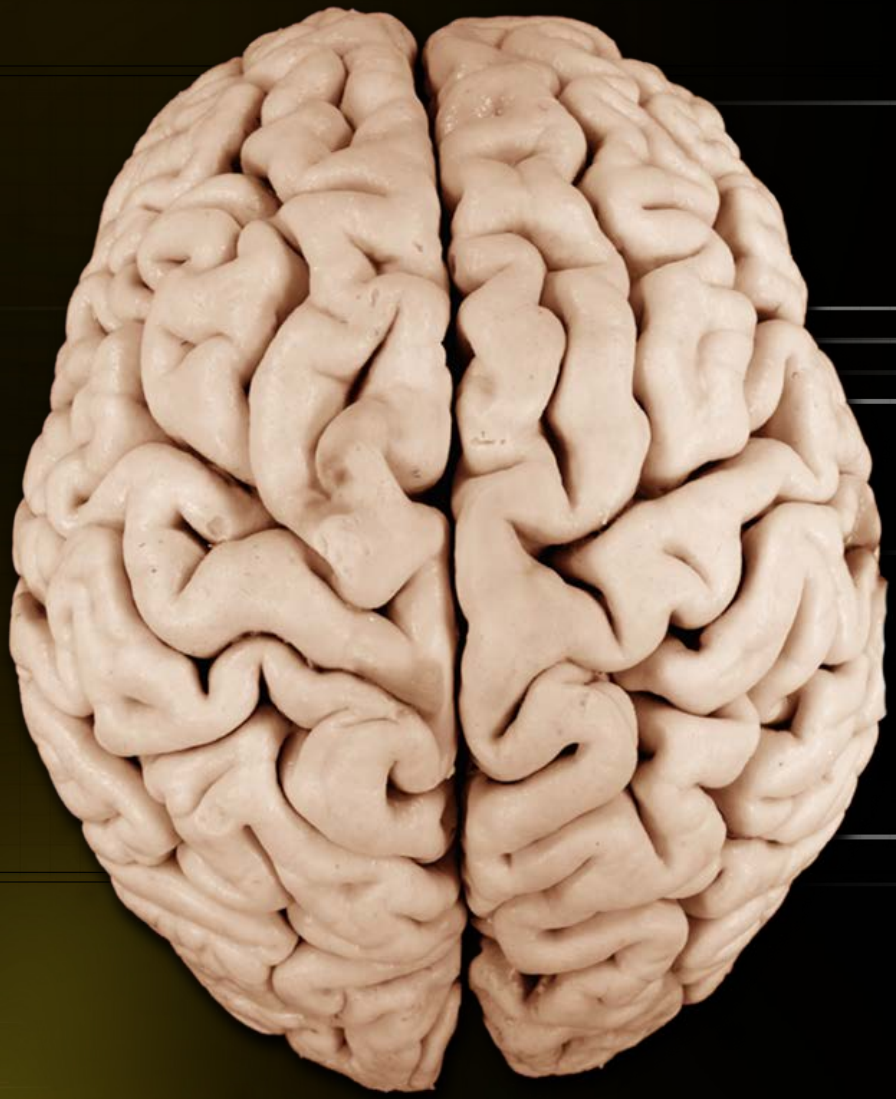


- Neisseria meningitidis



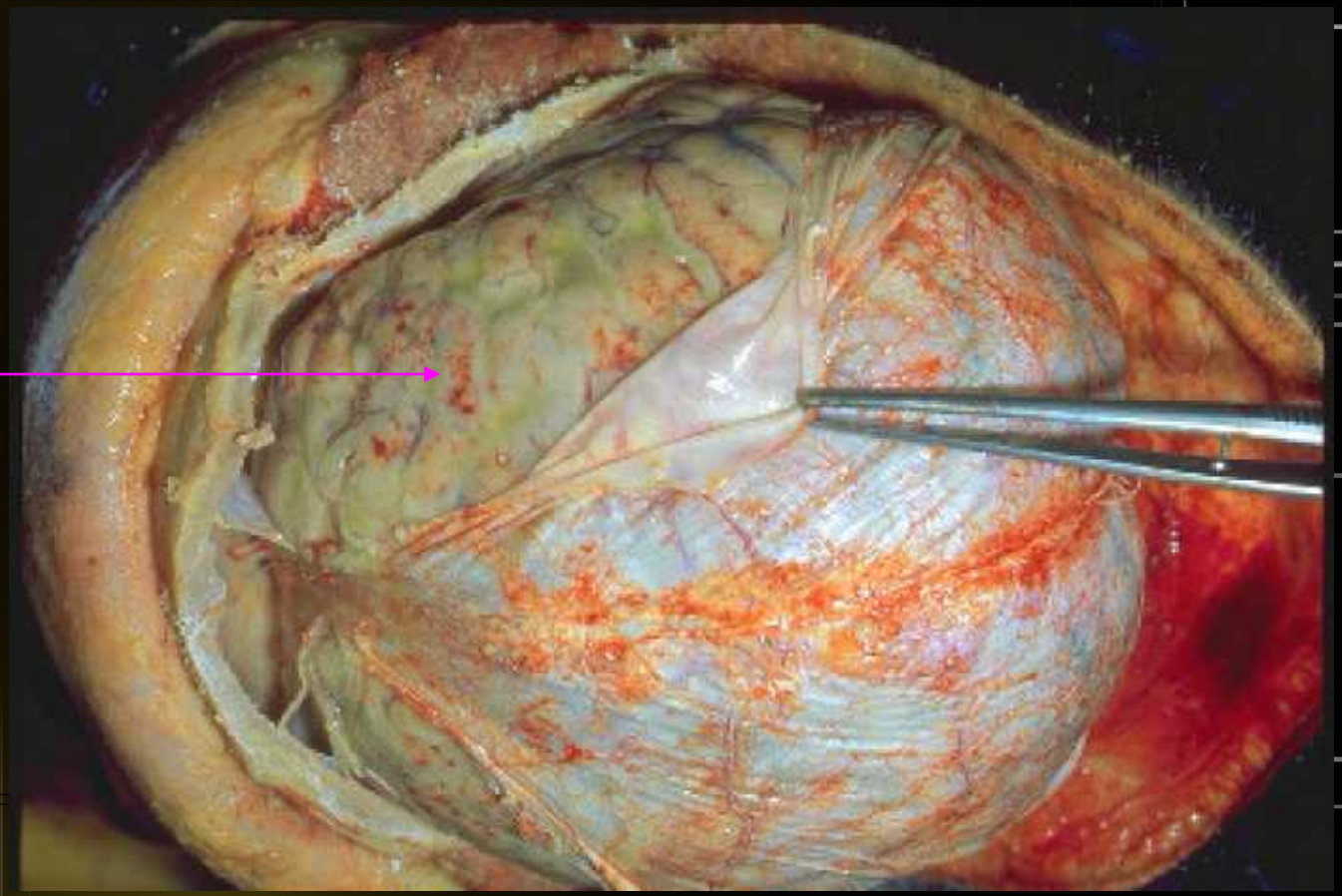
Source: www.uni-wuerzburg.de

HEALTHY BRAIN



Source:http://library.med.utah.edu/WebPath/HISTHTML/NEURANAT/NEURANCA.html

Brain Infected with Meningitis



www.immunizationed.org

MENINGITIS INFORMATION

- Approximately 2,500 to 3,000 cases of meningococcal disease are reported each year in the U.S. (CDC)
- Infants <12 months of age have the highest rates of disease
- 1 out of 10 people who develop the disease will die of bacterial Meningitis (CDC)

- 10 percent of the population are believed to carry N.meningitidis in their throat and nasal passages
- People who “carry” n.meningitidis can pass it to others
- If not treated early, bacterial meningitis can lead to death or permanent disability
- Meningitis can occur any time of the year

TRANSMISSION

- Direct contact with an infected person (kissing, sneezing & sharing items, drinking glasses and lip gloss
- Bacteria or virus attaches itself to the mucus lining of the nose and throat, where they can multiply
- When the bacteria or virus penetrates the mucus lining and enters the bloodstream, they move quickly

RISK GROUPS

- Neonates (28 days after birth)
- Infants/Children
- Adolescents
- College students
- Adults
- People who live in crowded living situations
- People who have compromised immune system
- People who are on immune-suppressant medication
- People who have no Spleen
- Certain genetic risk factors
- Military recruits
- Smokers
- Race/Low social- economic status

RISK FACTORS FOR COLLEGE STUDENTS

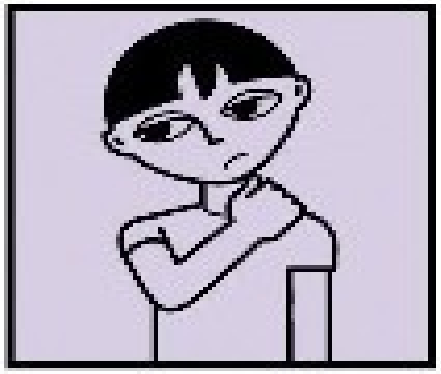
- Age 15-24 years old
- Geographic Diversity
- Stress
- Living conditions, (freshman who live in dorms are at increased risk by 7-10%)
- Smoking
- Bar patronages and alcohol consumption
- Caucasian race with a history of urinary tract infections

Source: Tina Q. Tan, M.D.
Associate Professor of Pediatrics
Feinberg School of Medicine, Northwestern University

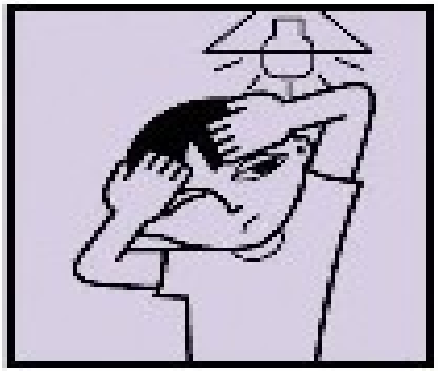
Signs and Symptoms of Viral & Bacterial Meningitis

- Irritability
- Fever
- Headache/Seizures
- Nausea/Vomiting
- Stiff neck
- Sensitivity to light
- Rash

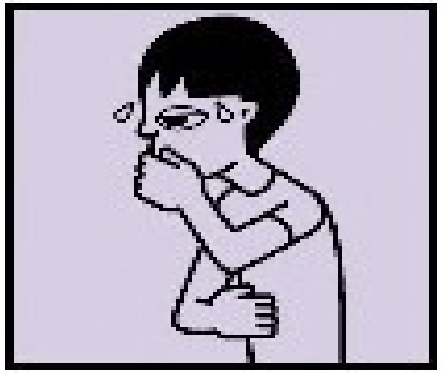
Severe headache



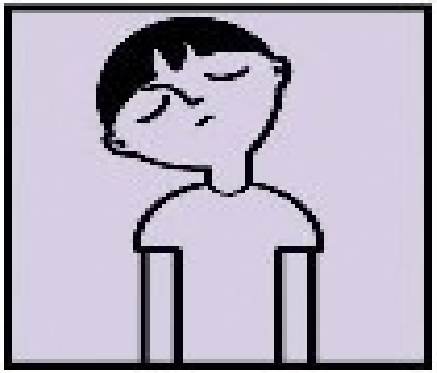
Stiff neck



Dislike of bright lights



Fever/vomiting



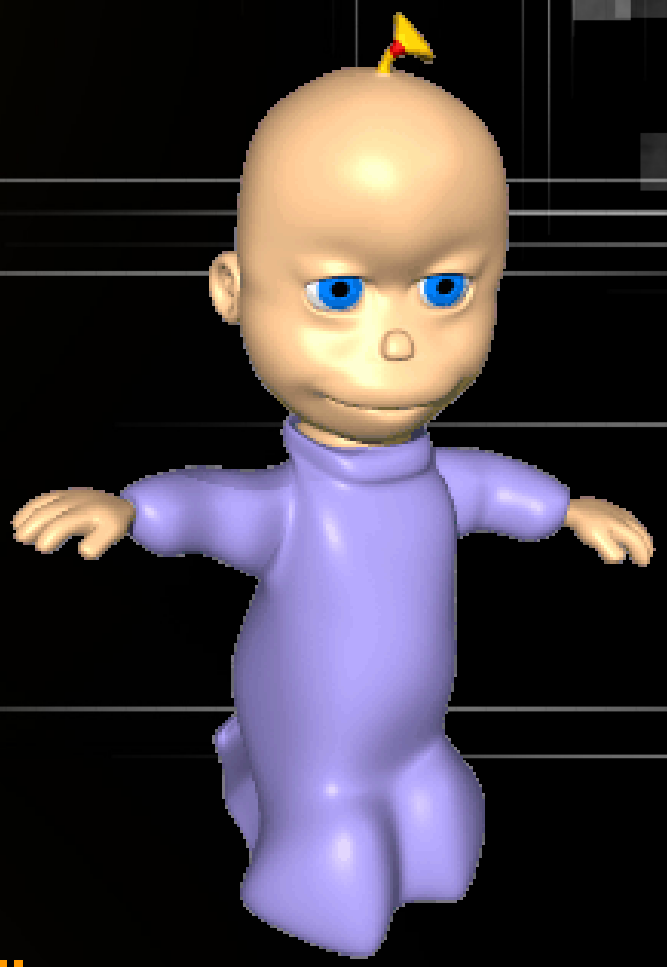
Drowsy and less responsive/ vacant

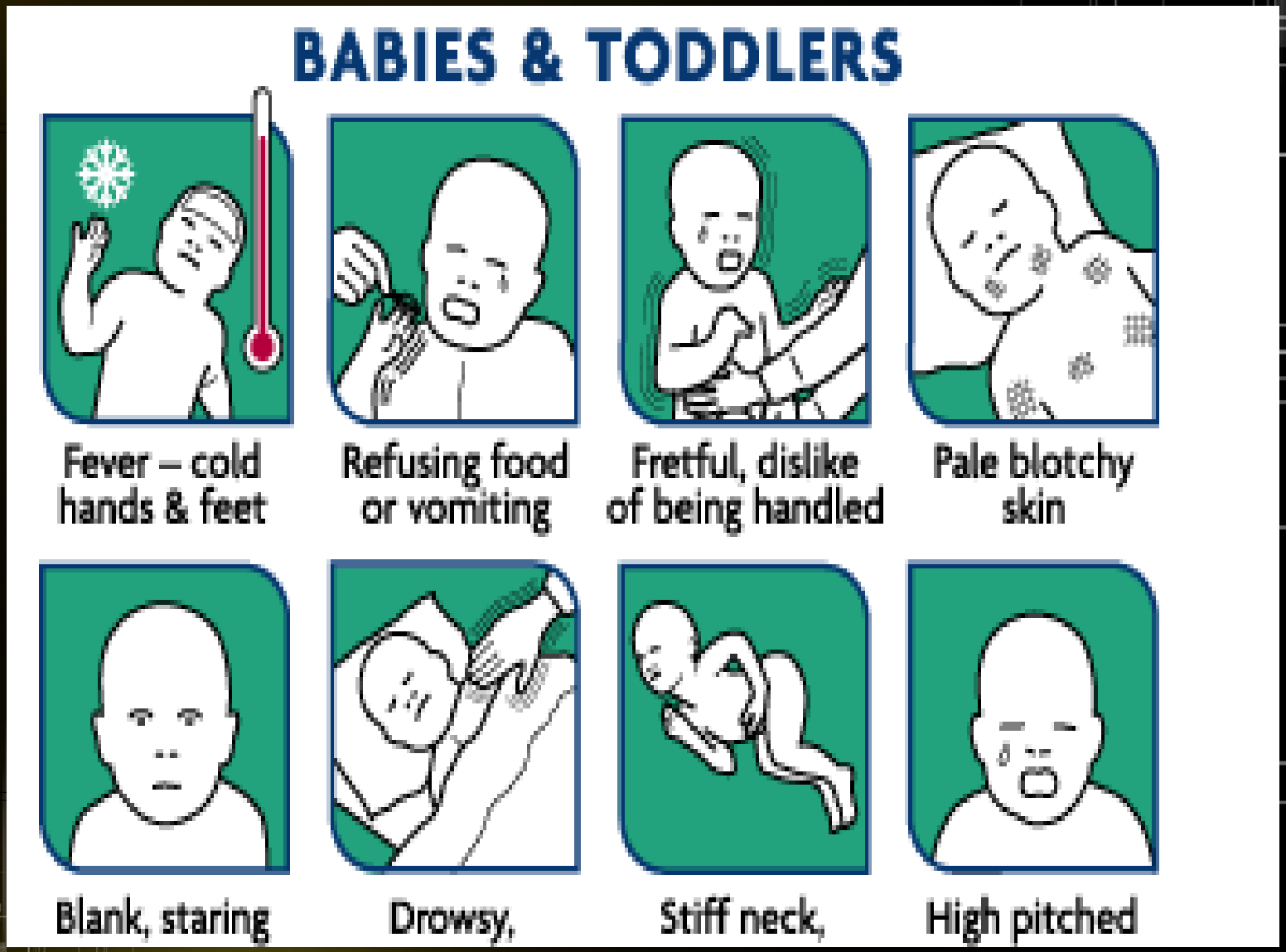
Rash (develops anywhere on body)

Source:www.students.stedwards.edu/ssamuel/

Signs and Symptoms of Viral & Bacterial Meningitis in Infants

- Irritability
- Lethargy/listlessness
- Feeding problems/weak sucking
- High pitched crying
- Vomiting
- Rash
- Diarrhea
- Respiratory distress
- Temperature problems (high or low temp.)
- Jaundice (yellow)
- A bulging fontanel (found in 1/3 of all cases)





Source: www.meningitis-trust.org.nz/about_meningitis

RASH

- A rash can occur at any age
- Can be on any part of the body
- The rash is purple in color and will NOT turn white when pressed on
- The rash means that the bacteria has moved to the bloodstream
- The person needs to be taken to the HOSPITAL WITHOUT DELAY

www.wch.sa.gov.au/services/az/divisions/labs/...

Viral Meningitis (Aseptic Meningitis)

- **Viral meningitis is common but rarely a serious infection**
- **Caused by a number of different viruses, such as:** *Herpes simplex, Varicella-zoster (chicken pox), Epstein-Barr*
- **Most common cause of viral meningitis is Enteroviruses**

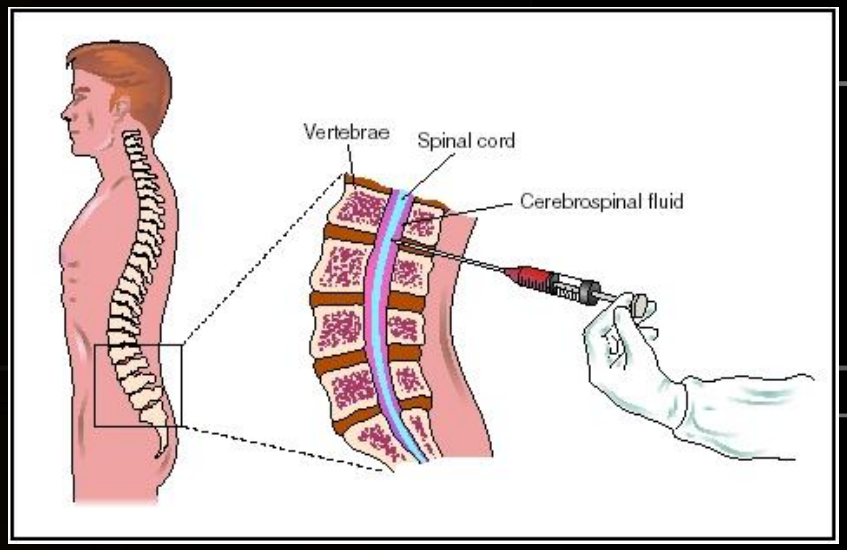
- Often occurring in the summer and fall
- Some people only have symptoms for 7-10 days while others for 3-4 months
- Viral meningitis is found in stool, which accounts for some cases in children who are not toilet trained and adults who change diapers

- Incubation time is 3-7 days from the time of infection until the development of symptoms,

- The virus can spread 3 days after infection until 10 days after the development of symptoms

DIAGNOSIS OF VIRAL MENINGITIS

- Blood cultures
- CT scan
- Lumbar puncture



Lumbar puncture

Source: health.enotes.com

Treatment for Viral Meningitis

- No specific treatment
- Rest
- Relaxation
- Fluids
- Medication for fever or headache

PREVENTION FOR VIRAL MENINGITIS

- There is no current vaccine for viral meningitis
- The BEST prevention is GOOD PERSONAL HYGIENE
- DO NOT SHARE objects that could be contaminated

HANDWASHING

Source :www.lung.ca/protect-protegez/germs-microbes_e.php

BACTERIAL MENINGITIS

- Caused by Neisseria meningitidis, Streptococcus pneumoniqe and Haemophilus influenza type b (Hib)

- Neisseria meningitidis is the leading cause of meningitis in older children and young adults in the US

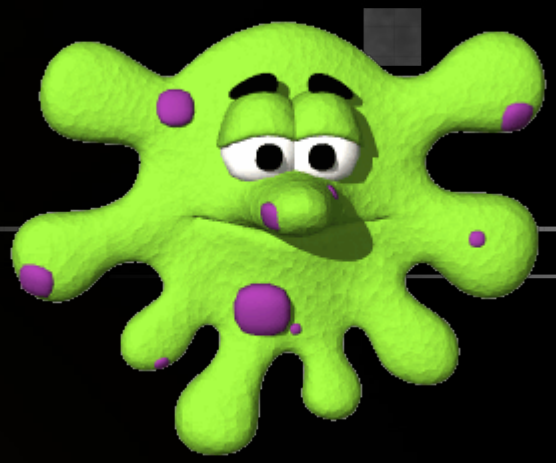
- Haemophilus influenza b was the leading cause of meningitis among children under 5 years old

- 10-20% of the survivors will have some long term problem such as:

  * Hearing Loss
  * Limb Loss
  * Mental Retardation
  * Brain Swelling

OTHER INFORMATION FOR BACTERIAL MENINGITIS

- Incubation is 3-7 days from the time of infection until the development of symptoms,
- Onset is often more sudden than viral
- The bacteria can spread 3 days after infection until 10 days after the development of symptoms



DIAGNOSIS OF BACTERIAL MENINGITIS

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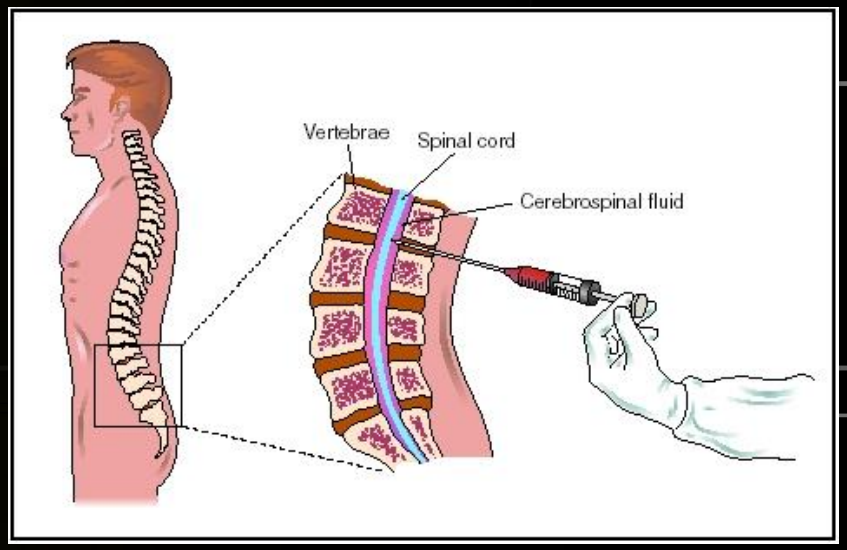


Lumbar puncture

Source: health.enotes.com

TREATMENT FOR BACTERIAL MENINGITIS

- Hospitalization
- IV antibiotics
- Supportive Care
- If not treated, person can **DIE**

CLOSE CONTACTS

- People who have had close or prolonged contact with a person who has Neisseria meningitidis or Hib
- People in the same households, day-care centers, or anyone with direct contact with a person's oral secretions could be at risk for developing meningitis
- People who qualify as a close contact of a person with N. meningitidis should receive antibiotics to prevent them from developing the disease
- Antibiotics for contact of a person with Hib are no longer recommended if all contacts 4 years of age or younger are fully vaccinated against Hib

PREVENTION FOR MENINGITIS

- Vaccination

  - ✖ Haemophilus Influenza Type b (Hib)
  - ✖ Pneumococcal Conjugate
  - ✖ Meniningococcal conjugate (MCV4)

- GOOD PERSONAL HYGIENE

- DO NOT share objects that could be contaminated

IMMUNIZATION SCHEDULE

FIGURE 1. Recommended immunization schedule for persons aged 0–6 years — United States, 2007

Vaccine ▼ / Age ▶	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B[1]	HepB	HepB		See footnote 1	HepB				HepB Series		
Rotavirus[2]			Rota	Rota	Rota						
Diphtheria, Tetanus, Pertussis[3]			DTaP	DTaP	DTaP		DTaP				DTaP
Haemophilus influenzae type b[4]			Hib	Hib	*Hib*[4]	Hib		Hib			
Pneumococcal[5]			PCV	PCV	PCV	PCV				PCV / PPV	
Inactivated Poliovirus			IPV	IPV	IPV						IPV
Influenza[6]					Influenza (Yearly)						
Measles, Mumps, Rubella[7]						MMR					MMR
Varicella[8]						Varicella					Varicella
Hepatitis A[9]						HepA (2 doses)				HepA Series	
Meningococcal[10]										MPSV4	

Range of recommended ages

Catch-up immunization

Certain high-risk groups

= Meningitis vaccine

Source: MMWR January5, 2007

FIGURE 2. Recommended immunization schedule for persons aged 7–18 years — United States, 2007

Vaccine ▼ / Age ▶	7–10 years	11–12 YEARS	13–14 years	15 years	16–18 years
Tetanus, Diphtheria, Pertussis[1]	See footnote 1	Tdap	Tdap		
Human Papillomavirus[2]	See footnote 2	HPV (3 doses)	HPV Series		
Meningococcal[3]	MPSV4	MCV4	MCV4	MCV4[3]	MCV4
Pneumococcal[4]	PPV				
Influenza[5]	Influenza (Yearly)				
Hepatitis A[6]	HepA Series				
Hepatitis B[7]	HepB Series				
Inactivated Poliovirus[8]	IPV Series				
Measles, Mumps, Rubella[9]	MMR Series				
Varicella[10]	Varicella Series				

Range of recommended ages

Catch-up immunization

Certain high-risk groups

= Meningitis vaccine

Source: MMWR January5, 2007

VACCINE INFORMATION STATEMENT

Haemophilus Influenzae Type b (Hib) Vaccine

WHAT YOU NEED TO KNOW

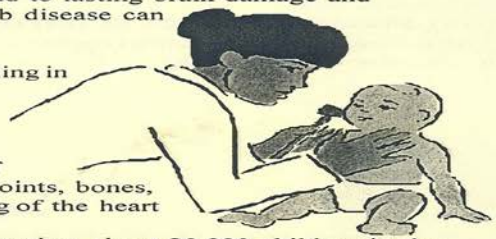
1 What is Hib disease?

***Haemophilus influenzae* type b (Hib) disease is a serious disease caused by a bacteria.** It usually strikes children under 5 years old.

Your child can get Hib disease by being around other children or adults who may have the bacteria and not know it. The germs spread from person to person. If the germs stay in the child's nose and throat, the child probably will not get sick. But sometimes the germs spread into the lungs or the bloodstream, and then Hib can cause serious problems.

Before Hib vaccine, Hib disease was the leading cause of bacterial meningitis among children under 5 years old in the United States. Meningitis is an infection of the brain and spinal cord coverings, which can lead to lasting brain damage and deafness. Hib disease can also cause:

- pneumonia
- severe swelling in the throat, making it hard to breathe
- infections of the blood, joints, bones, and covering of the heart
- death



Before Hib vaccine, about 20,000 children in the United States under 5 years old got severe Hib disease each year and nearly 1,000 people died.

Hib vaccine can prevent Hib disease.
Many more children would get Hib disease if we stopped vaccinating.

2 Who should get Hib vaccine and when?

Children should get Hib vaccine at:

- ✓ 2 months of age
- ✓ 4 months of age
- ✓ 6 months of age*
- ✓ 12-15 months of age

* Depending on what brand of Hib vaccine is used, your child might not need the dose at 6 months of age. Your doctor or nurse will tell you if this dose is needed.

If you miss a dose or get behind schedule, get the next dose as soon as you can. There is no need to start over.

Hib vaccine may be given at the same time as other vaccines.

Older Children and Adults
Children over 5 years old usually do not need Hib vaccine. But some older children or adults with special health conditions should get it. These conditions include sickle cell disease, HIV/AIDS, removal of the spleen, bone marrow transplant, or cancer treatment with drugs. Ask your doctor or nurse for details.

3 Some people should not get Hib vaccine or should wait

- People who have ever had a life-threatening allergic reaction to a previous dose of Hib vaccine should not get another dose.
- Children less than 6 weeks of age should not get Hib vaccine.
- People who are moderately or severely ill at the time the shot is scheduled should usually wait until they recover before getting Hib vaccine.

Ask your doctor or nurse for more information.

Source: CDC, National immunization Program

VACCINE INFORMATION STATEMENT

PNEUMOCOCCAL CONJUGATE VACCINE

WHAT YOU NEED TO KNOW

1 Why get vaccinated?

Infection with *Streptococcus pneumoniae* bacteria can cause serious illness and death. Invasive pneumococcal disease is responsible for about 200 deaths each year among children under 5 years old. It is the leading cause of bacterial meningitis in the United States. (Meningitis is an infection of the covering of the brain).

Pneumococcal infection causes severe disease in children under five years old. Before a vaccine was available, each year pneumococcal infection caused:

- over 700 cases of meningitis,
- 13,000 blood infections, and
- about 5 million ear infections.

It can also lead to other health problems, including:

- pneumonia,
- deafness,
- brain damage.

Children under 2 years old are at highest risk for serious disease.

Pneumococcus bacteria are spread from person to person through close contact.

Pneumococcal infections can be hard to treat because the bacteria have become resistant to some of the drugs that have been used to treat them. This makes **prevention** of pneumococcal infections even more important.

Pneumococcal conjugate vaccine can help prevent serious pneumococcal disease, such as meningitis and blood infections. It can also prevent some ear infections. But ear infections have many causes, and pneumococcal vaccine is effective against only some of them.

2 Pneumococcal conjugate vaccine

Pneumococcal conjugate vaccine is approved for infants and toddlers. Children who are vaccinated when they are infants will be protected when they are at greatest risk for serious disease.

Some older children and adults may get a different vaccine called pneumococcal polysaccharide vaccine. There is a separate Vaccine Information Statement for people getting this vaccine.

3 Who should get the vaccine and when?

- **Children Under 2 Years of Age**

  The routine schedule for pneumococcal conjugate vaccine is 4 doses, one dose at each of these ages:

  ✓ **2 months** ✓ **6 months**
  ✓ **4 months** ✓ **12-15 months**

  Children who weren't vaccinated at these ages can still get the vaccine. The number of doses needed depends on the child's age. Ask your health care provider for details.

- **Children Between 2 and 5 Years of Age**

  Pneumococcal conjugate vaccine is also recommended for children between 2 and 5 years old who have not already gotten the vaccine and are at high risk of serious pneumococcal disease. This includes children who:

  - have sickle cell disease,
  - have a damaged spleen or no spleen,
  - have HIV/AIDS,
  - have other diseases that affect the immune system, such as diabetes, cancer, or liver disease, or who
  - take medications that affect the immune system, such as chemotherapy or steroids, or
  - have chronic heart or lung disease.

  The vaccine should be considered for all other children under 5 years, especially those at higher risk of serious pneumococcal disease. This includes children who:

  - are under 3 years of age,
  - are of Alaska Native, American Indian or African American descent, or
  - attend group day care.

  The number of doses needed depends on the child's age. Ask your health care provider for more details.

Pneumococcal conjugate vaccine may be given at the same time as other vaccines.

Source: CDC, National immunization Program

VACCINE INFORMATION STATEMENT

MENINGOCOCCAL VACCINES

WHAT YOU NEED TO KNOW

1 What is meningococcal disease?

Meningococcal disease is a serious illness, caused by a bacteria. It is a leading cause of bacterial meningitis in children 2-18 years old in the United States.

Meningitis is an infection of fluid surrounding the brain and the spinal cord. Meningococcal disease also causes blood infections.

About 2,600 people get meningococcal disease each year in the U.S. 10-15% of these people die, in spite of treatment with antibiotics. Of those who live, another 11-19% lose their arms or legs, become deaf, have problems with their nervous systems, become mentally retarded, or suffer seizures or strokes.

Anyone can get meningococcal disease. But it is most common in infants less than one year of age and people with certain medical conditions, such as lack of a spleen. College freshmen who live in dormitories have an increased risk of getting meningococcal disease.

Meningococcal infections can be treated with drugs such as penicillin. Still, about 1 out of every ten people who get the disease dies from it, and many others are affected for life. This is why *preventing* the disease through use of meningococcal vaccine is important for people at highest risk.

2 Meningococcal vaccine

Two meningococcal vaccines are available in the U.S.:

- **Meningococcal polysaccharide vaccine (MPSV4)** has been available since the 1970s.
- **Meningococcal conjugate vaccine (MCV4)** was licensed in 2005.

Both vaccines can prevent 4 types of meningococcal disease, including 2 of the 3 types most common in the United States and a type that causes epidemics in Africa. Meningococcal vaccines cannot prevent all types of the disease. But they do protect many people who might become sick if they didn't get the vaccine.

Both vaccines work well, and protect about 90% of those who get it. MCV4 is expected to give better, longer-lasting protection.

MCV4 should also be better at preventing the disease from spreading from person to person.

3 Who should get meningococcal vaccine and when?

MCV4 is recommended for all children at their routine preadolescent visit (11-12 years of age). For those who have never gotten MCV4 previously, a dose is recommended at high school entry.

Other adolescents who want to decrease their risk of meningococcal disease can also get the vaccine.

Meningococcal vaccine is also recommended for other people at increased risk for meningococcal disease:

- College freshmen living in dormitories.
- Microbiologists who are routinely exposed to meningococcal bacteria.
- U.S. military recruits.
- Anyone traveling to, or living in, a part of the world where meningococcal disease is common, such as parts of Africa.
- Anyone who has a damaged spleen, or whose spleen has been removed.
- Anyone who has terminal complement component deficiency (an immune system disorder).
- People who might have been exposed to meningitis during an outbreak.

MCV4 is the preferred vaccine for people 11-55 years of age in these risk groups, but MPSV4 can be used if MCV4 is not available. MPSV4 should be used for children 2-10 years old, and adults over 55, who are at risk.

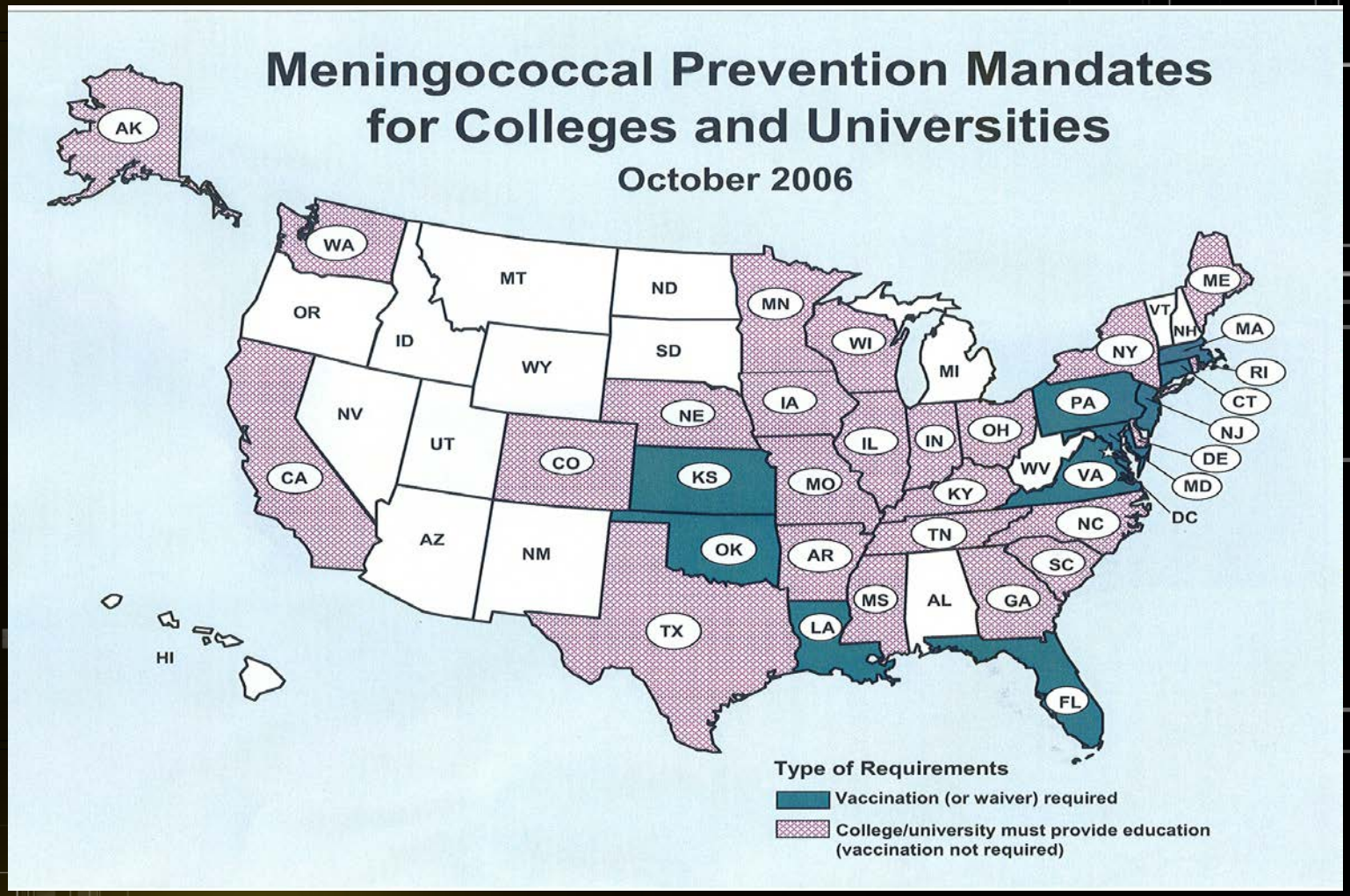
Source: CDC, National immunization Program

American College Health Association

"The American College Health Association supports the meningococcal vaccination recommendation issued by the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC). This recommendation states that all incoming college freshman living in dormitories (or residence halls) receive the conjugate meningococcal vaccine that is approved by the U.S. Food and Drug Administration."

Source: American College Health Association

LEGISLATION AND COLLEGE STUDETNS



Source; Immunization Action Coalitation

- McKenzie Hartwig attended high school in Pinedale, Wyoming and graduated in 2001. McKenzie was a beautiful, vivacious 18-year old, who was named Wyoming All State in Volleyball, Basketball and Track in 2001. She played the flute and piccolo; could speak two languages, loved to travel, and was an honor student. She was a freshman at the University of South Dakota on a volleyball scholarship with business and foreign language classes.

  In August, 2001, while attending a volleyball tournament in North Dakota with her college teammates, she suddenly became ill and died that same evening.

McKenzie died of a vaccine-preventable disease!

Source: **The McKenzie Meningitis Foundation**

RESOURCES.....

- American College Health Association
  www.acha.org/
- Center for Disease Control and Prevention
  www.cdc.gov
- Indiana State Department of Health
  www.in.gov/isdh/
- Immunization Action coalition
  www.immunize.org/
- Meningitis Foundation of America
  www.musa.org/