



Michigan Society  
for Medical Research

# BioFocus

A Newsletter Exploring Science & Biomedical Research Issues For School Educators

Vol. 1, Issue 19, Winter 2009

## Our Mission

The Michigan Society for Medical Research (MISMR) is a nonprofit educational organization that supports biomedical research and testing and the judicious use of animals in research, education and testing in the interests of human and animal welfare. Established in 1981, MISMR is made up of the state's leading research universities, teaching hospitals, pharmaceutical companies, voluntary health organizations and hundreds of scientists, educators and students who understand and support the importance of animal research and testing in advancing health care and treatment.

## MISMR Educational Projects & Activities

### ANNUAL ESSAY CONTEST

Every year MISMR sponsors an essay contest open to all Michigan high school students. Students from well over 500 schools in the state have annually participated in the contest to address the benefits of biomedical research. Prizes are awarded.

### SPEAKERS BUREAU

MISMR volunteers visit K–12 schools and civic community groups through out Michigan each year to educate the public about biomedical research and to dispel commonly held myths.

### ANNUAL SYMPOSIUM

MISMR's popular annual meetings have often proved to be "standing room only", typically attracting local and national educators and researchers with interactive training workshops and presentations promoting biomedical research.

### WE WANT TO HEAR FROM YOU!

We want to include your stories, comments or questions relating to animals in your classroom in upcoming editions of *BioFocus*. Please email stories to: [mismr@umich.edu](mailto:mismr@umich.edu)

## BioFocus

*BioFocus* is published by the Michigan Society for Medical Research. Please send your questions, comments, and suggestions to:

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## Thinking About Vaccination?

Diseases preventable by immunization with vaccines are breaking out in many parts of the country, including Michigan. The following are a few headlines culled from the news media near the end of 2008.

### Whooping cough cases reported

"Two children may have exposed 130 people to whooping cough..."

— *Carmel Valley Leader*, Carmel, CA, August 14, 2008

### Whooping cough outbreak concerns county health officials

— *Goldsboro News Argus*, Wayne County, NC, August 19, 2008

### VA workers ill in whooping cough outbreak

— *Pittsburgh Tribute-Review*, Pittsburgh, PA, August 30, 2008

### Number of whooping cough cases continues to rise

— WHAS Channel 11 ABC, Louisville, KY, October 27, 2008

### "48 cases of whooping cough reported in recent days..."

— WOWT Channel 6, Omaha, NE, October 31, 2008

### N. Illinois county has whooping cough outbreak

"Winnebago County has had 38 cases of whooping cough since the end of October..."

— AP, Rockford, IL, November 9, 2008

### Minnesota officials expect whooping cough outbreak

— *Pioneer Press*, St. Paul, MN, November 14, 2008

## Michigan

In August 2008, the Michigan Department of Community Health (MDCH) announced increases in the incidence of both whooping cough (pertussis), and mumps, and that there have been more cases of measles in the country than at any time in the last ten years. A recent outbreak (2006) of pertussis in Kalamazoo produced at least 175 confirmed cases. Most occurred in pre-teens and teens, but several were infants, who may be unable to survive prolonged bouts of violent coughing. (The "whoop" is the sound made as the patient gasps for breath after an episode of coughing.)

Pertussis and mumps are among 14 infectious diseases that can be prevented through school vaccination programs, so why are they re-appearing now? There are two big reasons. First, because vaccination has been so successful that today's parents are unaware of how devastating (and fatal) these diseases can be, and assume that they are no longer a problem.

Second, some parents hold religious objections to medical treatment of any sort, while others believe that vaccinations actually harm their children. Rumors persist that autism — a severely disabling mental condition that begins in childhood — is caused by vaccinations.

Though many well-constructed scientific studies have demonstrated otherwise, the belief still flourishes among some groups. As a result, a growing minority of parents are opting out of school immunization programs, leaving their children as both potential victims and carriers of disease. This endangers everyone who comes into contact with them, especially those most at-risk: unvaccinated infants and the elderly whose immunization lessens over time.

As recently as 1994, Michigan had the lowest percentage of immunized people in the U.S. — only 61%. Today that number has risen to 80%, but the nationwide goal is 90% and many states have already achieved it. Recent increasing rates of infectious disease suggest that rather than moving toward the goal, Michigan and other parts of the U.S. may be backsliding as more parents refuse to vaccinate their children.

## United States

The U.S. nearly conquered whooping cough and other childhood diseases with the discovery of vaccines in the 1940s, 50s and 60s, but large reservoirs of infection remain in other parts of the world. Russia experienced a recent epidemic of diphtheria, which until vaccination in the U.S. in the 1930s and 40s infected as many as 150,000, killing 10,000 annually. It can be worse. In New England between 1735 and 1740, the disease killed an estimated 80% of the children under 10.

Another pathogen, *Haemophilus influenzae*, though a bacterial infection easily prevented by vaccination, can cause a potentially fatal brain infection called meningitis. Until recently, cases had become rare. However, in 2007, Michigan reported 31 cases, 13 of which were children under the age of 5.

Polio (short for poliomyelitis) is a paralyzing viral disease. President Franklin Roosevelt was a victim of polio and spent much of his adult life in a wheel chair, though he tried to

*Continued on back...*

How do we, or should we, compromise between individual rights and public health?

**Vaccination...** *Continued from front*

hide his disability from the public. At the peak of the U.S. epidemic in 1952, more than 21,000 cases of paralytic polio were reported. With chest muscles paralyzed, people were kept alive by the iron lung, a device that mechanically expanded their lungs, allowing them to breathe but trapping them inside the machine.

In 1955, Jonas Salk produced the inactive polio vaccine, and a massive vaccination program quickly brought polio under control in the U.S. The World Health Organization has spent years trying to eradicate polio worldwide, but it's still alive and well in Afghanistan, Pakistan and India, and there is an outbreak now (in 2008) spreading through West Africa. Less than 30 years ago, polio imported from the Netherlands broke out among unvaccinated Amish in the Midwest.

**The History of Vaccination and How It Works**

For centuries, people have noticed that some diseases don't reinfect people who have previously had them and survived, suggesting that the body develops a degree of immunity after an infection. Smallpox was the first disease that people attempted to prevent by vaccination. A plague that killed millions (up to 60% of those infected) as it periodically swept through the world — smallpox is known from India and Egypt as long as 3400 years ago.

2200 year-old Chinese drawings show the first attempts to immunize against smallpox by variolation, or deliberate infection with small amounts of the live smallpox ("variola") virus. The problem was that sometimes the live virus, rather than producing immunity, was fatal.

It wasn't until 1796 that Edward Jenner, a British doctor, stumbled upon a safer means of stimulating immunity against smallpox by vaccinating (from the Latin word for cow: "vacca") people with the milder cowpox virus. Thanks to Jenner's discoveries, smallpox was gone from the U.S within 50 years.

**What would happen if using animals in research to prevent fatal or debilitating diseases in people, as well as in livestock, pets, and other creatures, were made illegal?**

From that beginning, vaccines for many diseases have been developed with animal partners. Animals may carry weaker versions of a human disease, or may actually weaken human viruses, producing "attenuated" forms safe for human use. Further research shows that some dead viruses, and even parts of bacterial cells, produce immune responses in the human body.

Doctor Jenner conducted his experiments with cowpox and smallpox on human subjects, which is unethical and illegal today. Using animals — instead — to study and create vaccines has vastly improved both human and animal health, and is essential in the fight against HIV, and to confront emerging diseases. Though there are high professional standards and many laws regarding the humane treatment of study animals, some political groups oppose any use of animals in biomedical research. This raises issues both moral and practical.

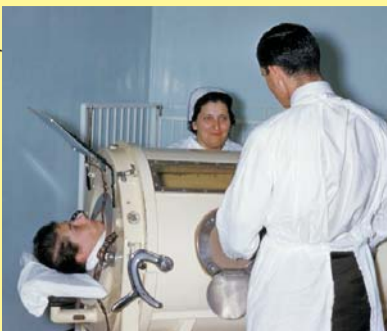
The very first infectious disease treated with vaccination, smallpox, has become medical science's greatest success story. After an intensive effort over many years, the World Health Organization declared that smallpox had been completely eradicated from the planet on December 9, 1979. Immunization against smallpox hasn't been available since. But it *hasn't* been completely eradicated. Both the United States and Russia hold large repositories of the smallpox virus for research purposes, and for potential use as a biological weapon. The disease can kill in less than 3 days after infection.

**Should the U.S. government resume its vaccination program to protect the public against possible biological attacks using the smallpox virus?**

**Conclusion**

The discovery of vaccination and immunization is one of medicine's greatest achievements, but even after all that's been accomplished — the virtual elimination of serious infectious childhood diseases from this country and the extension of the average human lifespan — scientists encounter new problems, and new political questions are raised. Solving those problems and answering those questions requires sharp, critical thinking, because the answers will determine the quality of life for millions of people now and far into the future.

Wikipedia



Polio patient inside iron lung (1960).

Wikipedia



Child with small pox.

**INFORMATIVE WEBSITES**

**The United States Centers for Disease Control (CDC)**  
[www.cdc.gov](http://www.cdc.gov)

Based in Atlanta, Georgia, CDC is one of the world's best sources of research on infectious diseases. They monitor diseases worldwide, tracking their movements, working on prevention and developing cures.

**World Health Organization (WHO)**  
[www.who.int/en/](http://www.who.int/en/)

WHO studies and combats diseases worldwide, and is another vast source of information, particularly concerning worldwide public health campaigns, the relationship between poverty and disease, and tropical diseases of the Third World.

[www.mismr.org](http://www.mismr.org)



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