

## MEDICAL INNOVATION: MUMPS VACCINE (PHARMACEUTICAL: BIOLOGICALS)

**Physician: Dr. Maurice Hilleman**  
**Industry: Merck**

### Situation

***A contagious disease striking several hundred thousand children annually***

Mumps is a contagious disease that mainly strikes children, resulting in a high fever, aches, tiredness and swelling of the salivary glands in the neck. The mumps virus is spread through contact with the saliva of an infected person, and it can also be transmitted through airborne droplets from the nose and mouth.

Mumps is rarely fatal, but it can cause complications in older children and teenagers, principally swelling of the testicles that can lead to sterility. There is no known treatment for mumps, and, prior to the development of a vaccine in the 1960s, the disease struck several hundred thousand children a year in the United States alone.

### Physician-Industry Collaboration

***A researcher develops a vaccine from his own daughter***

The discovery of a vaccine for mumps is one of the most recognized accounts of twentieth century pharmacology. Maurice Hilleman, a researcher with Merck and Company in Philadelphia with a long record of successful vaccine research and development, was about to leave on an international scientific trip when his five-year old daughter, Jeryl Lynn, complained to him of a sore and severely swollen throat. He immediately recognized her fever and other symptoms as the beginning of an onset of mumps.

Hilleman put his daughter to bed and prepared her for several days of rest, and then promptly went to his lab past midnight and gathered some Petri dishes and swabs and brought them home. He proceeded to culture his daughter's throat and froze the specimens before leaving on his trip.

Upon his return, Hilleman discovered that he had a perfectly isolated specimen of the mumps virus, and he set about the task of developing a vaccine using a standard methodology -- by attenuating (weakening) the virus through combining it with chicken cells. He was eventually able to develop a strain of the virus that was strong enough to develop an immune response in children, but weak enough that it wouldn't cause development of the disease. Hilleman named this vaccine the "Jeryl Lynn" strain, and it is still in use today.

Shortly after he developed the experimental "Jeryl Lynn" vaccine, Hilleman volunteered to have it tested on his younger daughter Kirsten, and a [photograph](#) was published widely, showing young Kirsten crying upon receiving the vaccine, at the same time as she is being comforted by her sister Jeryl Lynn who was the original source of the vaccine. Hilleman recounted the episode in a [video interview](#) years later: "Here was a baby being protected by a virus from her sister, and this [was] unique in the history of medicine...It was a big human interest story."

### Innovation Benefits

## ***A 99% drop in cases of mumps each year***

Hilleman's mumps vaccine was approved for use in 1967, and it has become one of the most widely used vaccines in the world, with over 500 million doses distributed worldwide, according to the World Health Organization (WHO). It is now combined with measles and rubella vaccines in one omnibus treatment known as measles, mumps and rubella vaccine (MMR), frequently given twice to children to maximize its effectiveness.

Although outbreaks of mumps still occur from time to time in the United States, the Centers for Disease Control and Prevention (CDC) estimates that only a few hundred cases of mumps occur in the United States each year, or roughly 1% of the annual number of infections before the Jeryl Lynn vaccine was developed.

### **Patient Benefits**

#### ***'I never thought I'd get mumps at 23'***

The mumps vaccine was not widely administered in the United Kingdom before 1988. The BBC describes a typical case involving a young man who failed to get the vaccine as a child:

Iain Laurie, 23, from London, first noticed something might be wrong when the saliva glands either side of his face began to swell. "I went to work and was feeling a bit iffy, but by the end of the day I felt pretty horrific," recalls Iain.

The next morning the doctor confirmed Iain's suspicion that he had caught mumps from his brother, Colin, aged 20. Iain said: "My brother had caught it three weeks before at University. But he hadn't felt that ill, so I thought I would still hang around with him and didn't worry about it."

"I felt really bad, like when you have got flu - tired and aching. Eating and swallowing was really difficult and for some reason, everything seemed to taste of salt. It was horrible.

Iain said he followed his GP's advice and stayed in bed, drinking plenty of fluids and taking pain killers when needed. Unfortunately, Iain developed one of the complications of mumps, swelling of the testicles called orchitis. "It was painful as hell. That was the worst."

Rarely, this can lead to infertility. But, thankfully, Iain made a full recovery after more bed rest.

Iain said: "I had all the other things as a child, like measles and chicken pox, but I never had mumps, and never knew any other children with mumps.

"I fell in the wrong age group and missed out on MMR. I wish I had been vaccinated. It was the sickest I have ever been. I couldn't work for three weeks and lost a bit of money. I would sooner have been vaccinated and never had it."

