

# Prenatal exposure to Hong Kong flu associated with reduced intelligence in adulthood

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The Hong Kong flu pandemic was responsible for more than 700,000 deaths worldwide in the late 1960s, with major disease outbreaks in Europe in the winter of 1969-1970. A number of studies have been conducted to determine if prenatal exposure to the influenza virus may result in mental disorders that affect a small portion of the population, but no studies have explored the possible effects of prenatal exposure on the mean intelligence in the general population. A new study found that early prenatal exposure to the Hong Kong flu may have interfered with fetal cerebral development and caused reduced intelligence in adulthood. The study is published in *Annals of Neurology*.

The study involved records of more than 180,000 men born between 1967 and 1973 who served in the military. Military service is compulsory for young men in Norway, who are evaluated medically and psychologically before they enter the service. The [intelligence](#) test data used in the study consisted of a composite score from arithmetic, word similarity and figures tests similar to those commonly used in intelligence tests.

The results showed that the mean intelligence score increased in every birth year from 1967 to 1973, except for a downturn in 1970. The intelligence scores of men born in July through October of that year, six to nine months after the main outbreak of the Hong Kong flu in Norway, were lower than the mean values for those born in the same months

during the preceding and following years. The mean intelligence score of men born during these months was also lower than the mean score of men born in any other month in 1970, and this trend was not seen in the other years. As the [flu outbreak](#) occurred during the winter months, this suggests that exposure during the first three to four months of pregnancy seems to have had the strongest impact on intelligence scores.

"This is the first report of a possible association between prenatal exposure to an influenza virus epidemic and the mean level of intelligence in the general population," says Dr. Willy Eriksen of the Norwegian Institute of Public Health, co-author of the study. The authors note that other types of maternal infections during pregnancy such as rubella, varicella, cytomegalovirus and toxoplasmosis may cause central nervous system abnormalities and cognitive delay in offspring. In these cases, more severe damage to the fetal brain also tends to occur during the first trimester.

There are several possible explanations for the results shown in the study. It may be that exposure to the influenza virus interfered with the cerebral development of the fetus, as has been shown in laboratory animals. Also, some [influenza virus](#) strains, including the Hong Kong flu virus, can cross the placental barrier, so it is possible that some fetuses suffered a cerebral infection. It may also be that a maternal infection during pregnancy has an effect on the fetal brain through maternal immune response or high body temperature, or through medication used to treat infections.

The authors suggest that that if 20 percent of the men born between July and October 1970 were exposed to the flu virus, and assuming they were all affected neurologically, prenatal exposure to such a virulent virus may reduce intelligence scores by three to seven points on a standard IQ scale.

"If cerebral complications occurred in only a small group of those who were exposed, however, the effects on the intelligence of the susceptible individuals may have been considerably larger," says Eriksen.

More information: This study is published in *Annals of Neurology*.

Source: Wiley ([news](#) : [web](#))

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