

RESEARCH SUMMARY

October 9, 2020

Smith, G., Vijaykrishna, D., Bahl, J. *et al.* Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic. *Nature* 459, 1122–1125 (2009).

<https://doi.org/10.1038/nature08182>

Abstract

In March and early April 2009, a new swine-origin influenza A (H1N1) virus (S-OIV) emerged in Mexico and the United States. During the first few weeks of surveillance, the virus spread worldwide to 30 countries (as of May 11) by human-to-human transmission, causing the World Health Organization to raise its pandemic alert to level 5 of 6[....] Here we use evolutionary analysis to estimate the timescale of the origins and the early development of the S-OIV epidemic. We show that it was derived from several viruses circulating in swine, and that the initial transmission to humans occurred several months before recognition of the outbreak[....] Our results highlight the need for systematic surveillance of influenza in swine, and provide evidence that the mixing of new genetic elements in swine can result in the emergence of viruses with pandemic potential in humans.

Dawood, F.S., et al. (2012). Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: a modelling study. *The Lancet*, vol. 12, no. 9, pp. 687-695

[https://doi.org/10.1016/S1473-3099\(12\)70121-4](https://doi.org/10.1016/S1473-3099(12)70121-4)

Abstract

18 500 laboratory-confirmed deaths caused by the 2009 pandemic influenza A H1N1 were reported worldwide for the period April, 2009, to August, 2010. This number is likely to be only a fraction of the true number of the deaths associated with 2009 pandemic influenza A H1N1. We aimed to estimate the global number of deaths during the first 12 months of virus circulation in each country.

Notes

1. The Toronto Vegetarian Association (TVA) had no involvement with these studies, financially or otherwise, and has no conflicts-of-interest. The TVA is not responsible for the accuracy of these studies.
2. This summary is intended for educational purposes only. Interpretations are made to the best of our ability. Always refer solely to the original studies when citing the claims of these studies.

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TVA Summary

The first study is in the form of a letter published in the prestigious journal, *Nature*, in 2009. The lead authors are with the University of Hong Kong. The authors performed an evolutionary analysis (by comparing DNA) of various strains of influenza virus endemic in pigs, swine-origin influenza viruses (S-OIV), to determine the origin of pandemic H1N1/09 virus – the 2009 “swine flu” virus. The research showed that the, “movement of live pigs between Eurasia and North America seems to have facilitated the mixing of diverse swine influenza viruses, leading to the multiple reassortment events associated with the genesis of the S-OIV strain.” In other words, the pandemic H1N1/09 virus was a result of different swine flu influenza viruses mixing in Eurasian and North American pig herds.

The letter further states that, “all three pandemics of the twentieth century seem to have been generated by a series of multiple reassortment events in swine or humans[.]” The three pandemics referenced are the 1918 H1N1 virus (“Spanish flu”), the 1957 H2N2 virus (“Asian flu”), and the 1968 H3N2 virus (“Hong Kong flu”).

The second study, from 2012, was published in the prestigious medical journal, *The Lancet*. The leading authors are with the United States Centers for Disease Control and Prevention (CDC). The study aimed to estimate the global number of human deaths that resulted from the 2009 swine flu pandemic. The authors constructed a model to calculate the number of respiratory and cardiovascular related deaths based on known mortality rates from the virus, excess death rates among various ages in different countries, the different risk factors of dying from influenza in various countries, and other factors. The study estimated that, “globally there were 201[,]200 respiratory deaths ... with an additional 83[,]300 cardiovascular deaths ... associated with 2009 pandemic influenza A H1N1.”

The two studies together show that approximately 284,500 human lives were lost as a result of the 2009 swine flu, itself a result of modern animal agriculture practices.

Adding human deaths from the 1918 H1N1 virus, 1957 H2N2 virus, and 1968 H3N2 virus, to those from the pandemic H1N1/09 virus, gives us a death toll of over 52.3 million people related to animal agriculture from those four pandemics.^{1,2,3}

These figures show us what danger animal agriculture can, and has, posed to human lives.

Ryan Cannon
Volunteer, TVA

*The author has a B.Sc. in Mathematics & Engineering from Queen’s University in Kingston, Ontario and is an avid reader of scientific literature. He has been a vegetarian since 1996 and a vegan since 2015. He is dedicated to spreading scientific knowledge to promote and support the veg*n lifestyle.*

¹ Centers for Disease Control and Prevention. 1918 Pandemic (H1N1 Virus). Retrieved from <https://www.cdc.gov/flu/pandemic-resources/1918-pandemic-h1n1.html>

² Centers for Disease Control and Prevention. 1957-1958 Pandemic (H2N2 Virus). Retrieved from <https://www.cdc.gov/flu/pandemic-resources/1957-1958-pandemic.html>

³ Centers for Disease Control and Prevention. 1968 Pandemic (H3N2 Virus). Retrieved from <https://www.cdc.gov/flu/pandemic-resources/1968-pandemic.html>