

Viral Infections among the Huron: An Ecological Approach

by

Sam Migliore

McMaster University

ABSTRACT

The introduction of viral diseases such as smallpox, during the European contact period, had a profound demographic effect on Amerindian groups. Given what we know today about the natural histories of smallpox and other viral infections (i.e., mode of transmission, incubation period, etc.), I examine a number of sociocultural factors that may have contributed to the spread and/or severity of these diseases among the Huron during the 1634-1640 period.

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RESUME

L'introduction des maladies virales telle que la petite vérole pendant la période de contact avec les Européens a eu un effet démographique énorme sur les groupes amérindiens. En tenant compte de ce que nous savons aujourd'hui sur l'histoire naturelle de la petite vérole et d'autres infections virales (c'est-à-dire mode de transmission, période d'incubation, etc), j'examine un nombre de facteurs socioculturels qui pourraient avoir contribué à la propagation et/ou à la gravité de ces maladies chez les hurons pendant la période 1634-1640.

INTRODUCTION

Infectious diseases have played an important role in the process of on-going human evolution. They have acted as agents of selection, eliminating certain genotypes while favoring others. Due to the New World's relative isolation, however, native American populations did not come into contact with many Old World diseases. For this reason, Amerindians did not have the opportunity to develop genetic or acquired immunity to these maladies. This explains why the introduction of diseases such as smallpox, simple measles, influenza, etc., during the European contact period, had such a profound demographic effect on most, if not all, Amerindian groups (see, Ashburn 1947; Cook 1971 & 1973; Crosby 1976; Dobyns 1966 & 1976; Duffy 1951; Ewers 1973; Joralemon 1982; Larocque 1982; Stearn and Stearn 1945).

As in the case of other Amerindian groups, scholars agree that the Huron of southern Ontario experienced a sharp decrease in population as a result of contact with Old World diseases (see, Larocque 1982; Schlesier 1976; Trigger 1976 and 1981). Taking this as a point of departure, I will examine the interaction between biological and sociocultural factors (see, Alland 1970: 52-85) among the Huron during the epidemics of 1634-1640. More specifically, I will examine the extent to which Huron customs and practices may have contributed to either the spread of these diseases or to their severity within the population.

NATURAL HISTORY OF VIRAL INFECTIONS

According to Burnet and White (1972:53), a virus is merely a strand of either RNA and DNA coated by a protein layer; "it has no metabolism and is wholly dependent for its reproduction on mechanisms provided by its host cells". These highly contagious parasites often enter the host through the respiratory tract, by means of infected droplets and/or dust particles. Once infected, the victim usually undergoes an asymptomatic incubation period. The length of this incubation period depends on the particular ailment the victim is suffering from: smallpox, for example, has an incubation period of 12 days (Tudor and Strati 1977:34); simple measles has a 10 to 11 day incubation period (Downie, 1967:202); and influenza symptoms usually appear within 24 to 48 hours after effective exposure. Immediately following this asymptomatic period each disease produces a characteristic set of symptoms.

Symptomatology

Smallpox symptoms (see Tudor and Strati 1977:34-40) include: fever and chills, muscular pains, headaches, vomiting, and in some cases diarrhoea. The severity of the disease may also cause hallucinations and/or delirium. Skin eruptions first appear on the third day, and then quickly pass through various stages until scabs are formed. Approximately 21 days after the onset of symptoms, if the victim survives, the scabs disappear leaving deep pock marks. In severe cases, the eruptions may develop into the fatal haemorrhagic form of smallpox which occurs in conjunction with bleeding from the nose, gums, and other areas. It is important for the reader to remember, however, that there are a number of varieties of

smallpox (Koplan and Foster 1979), and that the haemorrhagic form is the most lethal but least common.

The initial symptoms of measles resemble those of the common cold; they also include, however, high fever and koplik's spots (Downie 1967). The skin rash characteristic of measles usually appears 3 to 5 days later. As in the case of smallpox, there is also a haemorrhagic form of measles.

According to Stuart-Harris (1967:146), influenza is characterized by "a 3-day fever with headache, weakness, muscular pains and dry cough". In severe cases, however, symptoms may include fever, cough, sore and swollen throat, and nosebleed (McBryde 1940:297).

Although the symptoms of these diseases may in themselves be very severe, suprainfection with bacteria can further aggravate the condition (Burnet and White 1972:121; Tudor & Strati 1977:55). An individual is susceptible to secondary bacterial infection, because the activity of the virus often damages the lining of the respiratory tract. If untreated this secondary infection may lead to death.

Transmission

All three diseases are communicated, directly or indirectly, from host to host. The period of communicability, however, varies. In the case of influenza, virus infected droplets are released from the mouth and nose of afflicted individuals throughout both the incubation period, and the course of the disease (Burnet and White 1972:125). For measles, the period of communicability usually begins one or two days before the first symptoms appear, and ends several (5-6) days after the rash erupts (Top 1964:432). Finally, smallpox can be communicated, by means of infected droplets, during the last day or two of the incubation period, and throughout the febrile stage. In addition, the smallpox virus can be liberated from skin lesions.

Indirect sources of infection include: contaminated articles, clothing, and dust particles. These sources of infection are particularly important in the case of smallpox, because the virus is resistant to common disinfectants, heat, drying, and cold (Tudor and Strati 1977:31).

Immunity

Human specific parasites depend on people for their development; therefore it is in their best interest not to kill the host. This suggests that the parasites will become less pathogenic through time, as they become better adapted to the host. In order to survive, people must also adapt, or adjust to these parasites. This mutual adaptation process is brought about by selective pressures on both parasite and host populations (Alland 1970). Theoretically, therefore, we may expect to find a degree of genetic immunity among populations living in areas where the disease has been endemic for many generations.

At the moment, we do not know of any genetic factors that may confer immunity to viral infections such as smallpox, measles, and influenza. An individual, however, may acquire either a temporary passive (congenital

immunity and/or acquisition of antibodies from mother's milk) or active (the development of antibodies as a result of direct contact with the virus) resistance to these viral infections.

Both smallpox and measles often confer lifelong, active immunity to individuals who survive the symptoms. In contrast, contact with the influenza virus usually confers resistance to the disease for only a couple of years. Antibodies developed against one influenza strain, however, may not confer resistance to other strains.

Although active immunity to smallpox is usually lifelong, a process known as "contact fever" may develop. Anyone re-infected by the virus, for example, may experience a minor and "brief period of fever, headache, and perhaps influenzalike aches and pains" (Deutschmann 1967:7).

VIRAL INFECTIONS AMONG THE HURON

Prior to the 1634-1640 epidemics, Trigger (1976:31-32) estimates that approximately 18,000 Huron inhabited the area between Georgian Bay and Lake Simcoe in southern Ontario. According to Wright (1977:184), this figure is much too low; he suggests that recent archaeological settlement pattern data tends to support the 30,000 to 40,000 estimates made by contemporary writers such as Samuel de Champlain (Biggar 1929:vol.3, p.122), Sagard (Wrong 1939:92), and Le Jeune (Thwaites 1897:vol.8,p.115). At any rate, if we accept Trigger's estimate as the minimum size of the Huron population, and accept his suggestion that there were 9,000 survivors at the end of the epidemic period, then the Huron population was reduced by at least fifty per cent by 1640. This reduction occurred primarily as a result of contact with Old World diseases -- i.e., influenza, measles, and smallpox (Schlesier 1976; Trigger 1976 and 1981). The smallpox epidemic of 1639-1640, in all likelihood, produced the greatest loss of life (see, Trigger 1976:588-589).

Although direct evidence is not available I also believe Old World diseases, as Schlesier and Trigger suggest, were responsible for the epidemics. I base this conclusion on the following factors: (1) the French and Huron displayed differential susceptibility to these maladies; (2) when both groups were affected, the Huron experienced much more pronounced effects; and, (3) the Huron were not familiar with these diseases. In order to illustrate these points, I will quote two historical sources. Le Jeune's relation of 1637 (Thwaites 1897: vol.12,p.261), for example, states:

... I have observed that this contagion or Epidemic which slaughters so many Hurons, has not been communicated to the French at the 3 Rivers, although they have had negotiations and intercourse with these people.

In his relation of 1653, Bressani (Thwaites 1897:vol.39,pp.125-131) describes the following events taking place in Huronia during the small-pox epidemic of 1639-1640.

... it was a common opinion that we were the authors of a kind of pestilence which was not usual in the country, and almost utterly ruined it. They founded their suspicion ... on the ground that although, at the beginning, almost all of ours had been attacked by the disease at the same time, -- without a physician, or medicine, or convenience of provisions ... -- they had in a few days convalesced, and recovered perfect health; whereas the Barbarians, with all their remedies ... nearly all died

Since the Huron were much more susceptible and suffered a high death rate, I suggest that smallpox and the other viral diseases were not indigenous to the area. The French, on the other hand, did not experience the same effects because they possessed a degree of acquired immunity to many Old World diseases.

INTRODUCTION OF VIRAL INFECTIONS

The Huron maintained friendly trade relations with both Iroquoian and Algonkian-speaking peoples. They traded with the Tionnontate, Neutrals, and Susquehannok to the south to obtain luxury goods and tobacco, and exchanged corn and other commodities to Algonkian groups in return for dried fish and furs (Trigger 1976:62-63). European trade goods began to arrive in Huronia, by way of Algonkian traders, during the late sixteenth and early seventeenth centuries.

According to Trigger (1976:247) direct contact between French and Huron was established in 1609. By 1616, they concluded a formal alliance that enabled Huron traders to travel east each year to obtain European goods. In order to maintain friendly relations with the French, the Huron allowed the Recollets, and later the Jesuits, to reside in Huronia.

Although the Huron maintained friendly relations with certain Iroquoian-speaking peoples, their relations with the Iroquois of what is now New York State, were characterized by reciprocal raiding. The main objective of these raids was to capture an opponent, return home, and subject him to torture (Trigger 1976:68-73).

Huron trade and warfare enabled individuals to come in direct contact with outsiders. This contact facilitated the spread of disease from host to host and eventually community to community. The relatively long, symptomless, incubation period -- i.e., 12 days for smallpox -- ensured that victims of disease would be able to either reach Huronia before symptoms appeared or immediately after. Since the smallpox virus is resistant to heat, cold, and drying, it could reach Huronia by way of contaminated clothing and trade goods.

As far as we know, the Huron were afflicted by four major epidemics¹: (1) the 1634-35 influenza or measles epidemic; (2) the influenza attacks of 1636-37; (3) an unidentified epidemic (possibly one of the so-called "childhood" diseases) in 1637; and, (4) the smallpox epidemic of 1639-40 (see Trigger, 1976:498-602). Three of these epidemics occurred imme-

diately after the Huron returned from trading expeditions to Quebec. The following excerpt from Lalemant's relation of 1640 (see Thwaites 1897: vol.19,p.89), concerning events that transpired in October 1639, clearly illustrates this point:

It was upon the return from the journey which the Huron made to Kebec, that it started in the country, -- our Hurons, while again on their way up here, having thoughtlessly mingled with the Algonquins, whom they met on the route, most of whom were infected with smallpox. The first Huron who introduced it came ashore at the foot of our house ... whence being carried to his own village ... he died straightway after then the evil spread from house to house, from village to village, and finally became scattered throughout the country.

According to Trigger (1976:528), the unidentified epidemic of 1637 spread northward from the Susquehannok. Huron trade relations, therefore, facilitated the spread of viral diseases to Huronia.

LIFE WITHIN HURONIA

The preceding excerpt from Lalemant's relation indicates that viral diseases quickly spread throughout Huronia, once they were introduced into the area. In this section, I will outline a number of factors that may have made this possible:

Residence patterns. The Huron lived in multi-family long-houses that were about 90 to 100 feet long and 25 to 30 feet wide (Trigger 1976:43). These lodgings usually housed six families or 36 people (Heidenreich 1971:123; Trigger 1976:439-40, no.26). In some cases, however, 80 or more people resided in one longhouse (Tooker 1967:40). Since viral infections are communicated directly from host to host, and these dwellings brought together a relvely large number of people within an enclosed area, I suggest that Huron residence patterns facilitated the transmission of disease.

Within each longhouse, the families shared the use of four or five main hearths. Although smoke could escape from a hole(s) in the roof of the house, the dwelling was often filled with smoke and fire (Heidenreich 1971:122; Tooker 1967:41). I believe conditions in the longhouse may have complicated the health problems in two ways. First, smoke can irritate the respiratory tract and thereby increase the likelihood that an individual will succumb to a viral attack. Second, high temperatures within the dwellings themselves act as complicating factors for individuals experiencing a febrile state.

Political activities, feasting, and inter-village travel.

Both Tooker (1967:48-49) and Trigger (1976:56-57) point out that the village council, made up of elders and headmen from the various clan segments, met daily. When there was no business to discuss, they simply

met to socialize. One of their duties was to organize many of the feasts that took place in late autumn and winter, after people returned to the village from their seasonal activities -- including trading expeditions. Invitations to these feasts were often extended to individuals who lived in other villages, and on certain occasions entire villages were invited. According to Trigger (1976:85), "it was regarded as an insult for anyone invited to attend a feast to refuse to do so without good reason". Once the guests arrived, everyone gathered in the host's longhouse for festive activities or in a special longhouse constructed for large gatherings; these activities included: a communal meal, dancing, singing, and other forms of entertainment. In order to demonstrate their friendship for others, the Huron would present their guests "with a lighted pipe after having smoked it themselves" (Tooker 1967:57).

As mentioned previously, viral infections are communicable during at least a portion of the asymptomatic period. For this reason, an afflicted individual could attend large gatherings such as council meetings or feasts, and unwittingly transmit the disease to others. The "passing of the pipe" ritual would facilitate this process. Since the Huron population inhabited 18 to 25 villages within a narrow strip of land measuring "35 miles east to west and 20 miles north to south" (Trigger 1976:30), newly infected individuals could travel back to their own villages before they developed symptoms. Festive activities, therefore, may have been one of the factors that enabled Old World diseases to spread throughout Huronia. The Jesuit practice of visiting and attempting to baptize the sick and dying probably acted as an additional contributing factor.

MEDICAL BELIEFS AND PRACTICES

The Huron medical system operated at both a physical and a supernatural level. They recognized, for example, three etiological categories: (1) natural causes; (2) soul desires; and, (3) witchcraft. Ailments people attributed to natural causes were treated with natural remedies -- i.e., herbal remedies made from a plant called Oscar or Ooxrat root (Wrong 1939:195-196). Men also used sweat baths, followed by a plunge in cold water, to either prevent illness or promote health (Tooker 1967:86). If these methods did not produce the desired effects, the Huron attempted to re-interpret the cause of the problem.

From a Huron point of view, everyone possessed a soul capable of having specific desires (i.e., particular items; dances; feasts; etc.). If an individual's soul desires were not fulfilled, he or she was likely to become ill or suffer misfortune. For this reason, members of the community were expected to do everything in their power to help satisfy these desires (Tooker 1967:86-91).

Finally, the Huron believed that witches were capable of injuring others by injecting foreign substances into their victim's body (Tooker 1967:117-118). In order to cure these ailments, it was necessary to consult a shaman. Once he removed the substance, the shaman often recommended that a feast or game be performed to ensure the efficacy of the treatment.

Huron medical practices probably satisfied, at least to a certain extent, local needs; however, they were not adequate to prevent or cure newly introduced contagious diseases. A Huron quoted in Le Jeune's relation of 1638 (Thwaites 1897: vol.15,p.43), states:

I have seen maladies in the country before, but never have I seen anything like this we already count a Year since we began to be afflicted, and we see as yet no probability of soon beholding the end of our misery. What has caused us the most uneasiness ... is that we cannot at all understand this disease, and that we have not yet been able to discover its origin.

Instead of providing relief, certain practices may have actually complicated the problem. For example:

- (1) The Huron did not practise quarantine measures. According to Lalemant (see Thwaites 1897:vol.19,p.89), the Huron "no matter what plague or contagion they may have -- live in the midst of their sick ... as if they were in perfect health". In fact, the feasts and games that were arranged to help the sick recover brought more people into contact with the virus. Le Jeune's account of Tonnerauanount's (a shaman) attempt to restore health among the Huron illustrates this point:

... the whole country was sick; and he had prescribed a remedy, namely, a game of crosse, for its recovery. This order had been published throughout all the villages, the Captains had set about having it executed, and the young people had not spared their arms; but in vain. The disease did not cease to spread (Thwaites 1897:vol.13,p.131).

- (2) The chilling effects of washing with cold water immediately following a sweat bath would produce a traumatic physical shock for anyone suffering from smallpox. Heagerty (1928:63-64) points out that this custom had fatal results not only among the Huron, but also among other native American populations.

In summary, it can be said that the Huron were not familiar with the newly introduced diseases; their medicines were not adequate to prevent or cure these diseases²; and, certain customs directly or indirectly affected the death rate.

CONCLUSION

Scholars agree that Old World diseases had a profound demographic effect on the Huron, because the Huron did not have immunity to these maladies. Although I too believe this to be true, I suggest that it is necessary to examine the interaction between biological and sociocultural factors in order to fully understand what happened during the epidemics of 1634-40. In this paper, I have isolated a number of customs and practices that may have either facilitated the spread of disease or contributed to

its severity within the population. I believe these factors acted as positive feedback mechanisms to complicate the initial problem.

The interaction between biological and sociocultural factors is always a two way phenomenon. What I have done in this paper is to examine one half of the interactive process. More specifically, it would also be interesting to examine how biological factors, in turn, affected Huron custom and practices. For example: (a) to what extent did the effects of viral infections disrupt seasonal activities, including ritual activities; (b) did the high death rate among elderly people disrupt political activities and/or lead to a loss of traditional knowledge and skills; and, (c) can we say that witchcraft accusations directed toward the French (as well as other Huron) increased as the effects of viral infections became more pronounced. To a certain extent these, or related, issues have already been discussed by Martin (1978) and Trigger (1981). The conflicting views they arrive at however, indicates that additional research is needed in this area.

NOTES

1. Although we do not have information concerning the outbreak of viral infections in Huronia prior to 1634, there is always the possibility that these diseases preceded the French to Huronia. Jackes (1983) analysis of osteological evidence from a Neutral Indian cemetery, for example, indicates that smallpox may have become a problem in southern Ontario before the 1639-40 epidemic, and possibly before 1634.
2. French preventive and/or therapeutic measures were probably not much better.

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