No longer a deadly encounter?

Marcelo U. Ferreira¹, Marcia C. Castro²

¹Department of Parasitology, Institute of Biomedical Sciences, University of São Paulo, São Paulo, Brazil,

²Department of Global Health and Population, Harvard T. H. Chan School of Public Health, Boston, MA, USA

A careful analysis shows that the mortality rates associated with epidemics following the contact between Amazonian indigenous communities and the external world have decreased in recent years. However, whether isolated indigenous populations can be contacted safely is still open to debate; many will argue that these populations should remain uncontacted in order to survive.

Keywords: epidemics, mortality, indigenous populations, New World

In his landmark article ‘Coexistence and Contamination’, first published in 1956, Brazilian anthropologist Darcy Ribeiro describes how new viruses and bacteria that arrived with the colonizers caused a severe depopulation of indigenous communities of the Americas, becoming major ‘conquer weapons’ at the time of the European expansion to the New World.¹ It has been estimated that Brazil had about 1000 indigenous groups with a population between 2 and 4 million people by the end of the sixteenth century,² reduced to approximately 222,000 people four centuries later.³ Recently, there have been few attempts to estimate mortality rates in ‘virgin soil epidemics’ following the first contact of native American populations with the external world.

A recent paper by anthropologist Robert Walker and colleagues has carefully analysed information for 117 epidemics recorded over 130 years, affecting 59 indigenous societies living in Greater Amazonia and causing 11,000 deaths.⁴ The authors found that measles (37%), influenza (25%) and malaria (13%), all thought to have been introduced in the Americas by the Europeans, caused most epidemics with known cause, with quite similar median mortality rates, ranging between 18 and 20%. Interestingly, mortality rates declined exponentially as a function of the calendar year when the epidemics occurred (between 1875 and 2008) and the time elapsed since the first sustained contact of the indigenous community with the external world, which ranged roughly between < 1 year and 88 years. Moreover, data from communities with sequential outbreaks allowed them to demonstrate that the inter-epidemic period (average, 7 years) varied widely but correlated positively with the time elapsed since the first contact. In other words, epidemics (regardless of their

cause) became less frequent with increasing time since contact.⁴

The authors note that these outbreaks seem to follow the type III epidemic wave described by Bartlett⁵ for measles in small and isolated populations. Type III outbreak waves spread quickly once measles is introduced in a fully susceptible population, but wane as acquired life-long immunity develops; subsequent waves occur irregularly and infrequently. The finding that most ‘virgin soil epidemics’, regardless of their cause, follow an overall pattern originally described for measles is particularly surprising, given the differences in immunity induced by each infectious agent. Measles elicits lifelong immunity against reinfection, while protection from influenza is clearly variant-dependent – past exposure to an influenza virus strain only confer protection against that or closely related strains, but ‘immune-escape’ variants continuously emerge as antigenic changes accumulate by antigenic drift and occasionally by antigenic shift. In contrast, repeated malaria infections are required for the acquisition of some level of clinical immunity, which may protect from severe disease and mortality but not necessarily from infection.

These data have important implications for defining strategies to contact safely some of the 50+ indigenous tribes that remain isolated across the Amazon Basin, many of them on the border between Brazil and Peru.⁶ Walker and colleagues argue that appropriate healthcare delivery, including vaccines and antibiotics, can minimize the adverse health consequences of peaceful contacts with isolated communities and report a few examples of carefully planned contacts with negligible mortality.⁴ Some, however, will disagree. The well-known Brazilian explorer and ethnographer Sydney Possuelo, for example, insists that isolated indigenous populations in South America should remain uncontacted in order to survive.⁷ Indeed, some indigenous communities in Latin America have chosen

Correspondence to: Marcelo U. Ferreira, Department of Parasitology, Institute of Biomedical Sciences, University of São Paulo, Av. Prof. Lineu Prestes 1374, 05508-900 São Paulo (SP), Brazil. Email: muferrei@usp.br

to remain in isolation, but the maintenance of such lifestyle can be threatened by environmental changes and exploitation of natural resources proximal to their land,⁸ which often result in unplanned and non-peaceful contacts. Under such a scenario, isolation is the best survival strategy.

Contributors

MUF and MCC contributed equally to this work both analysed and wrote the manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- 1 Ribeiro D. Convívio e Contaminação. Efeitos dissociativos da depopulação provocada por epidemias em grupos indígenas [Coexistence and contamination. Dissociative effects of depopulation caused by epidemics in indigenous groups]. *Sociologia*. 1956;18: 3–50.
- 2 Azevedo M. How many were they? How many will they be? Povos Indígenas do Brasil. São Paulo: Instituto Sócio-Ambiental; 2006.
- 3 Ribeiro D. Culturas e Línguas Indígenas do Brasil [Indigenous cultures and languages in Brazil]. *Educação e Ciências Sociais*. 1957;2:5–102.
- 4 Walher RS, Sattenspiel L, Hill KR. Mortality from contact-related epidemics among indigenous populations in Greater Amazonia. *Sci Rep*. 2015;5:14032.
- 5 Bartlett MS. Measles periodicity and community size. *J R Stat Soc A*. 1957;120:48–70.
- 6 Lawler A. Making contact. *Science*. 2015;348:1072–1079.
- 7 Angelo C. Prime directive for the last Americans. *Sci Am*. 2007;296:40–41.
- 8 Montenegro RA, Stephens C. Indigenous health in Latin America and the Caribbean. *The Lancet*. 2006;367:1859–1869.