2017. Excavations of tombs identified in the Cathedral of Panama Viejo. Photo by Javier Rivera-Sandoval © Javier Rivera-Sandoval

Bioarcheology and ecology of infectious diseases in Panama and Cartagena in the colonial period

The encounter between Europe and America has given rise to many debates about how the process evolved and on why the conquest was so successful. Factors have been pointed out such as the use of more efficient technology for weapons and transport, the transformation of labour systems and, perhaps the most impactful for Indigenous populations, the introduction of new diseases. However, the process also posted significant challenges and difficulties for both Europeans and Africans, who trying to adapt to new environments and social realities.

In this context, the founding of new settlements became a priority for the peninsular government, as it was a strategy for controlling both territory and people. The establishment of cities such as Panama (1519) on the Pacific and Cartagena de Indias (1535) in the Caribbean enabled the interconnection of several American territories with one another and with Europe. The arrival of people from different latitudes and the growth of the port/cities promoted the circulation of goods, but also the spread of numerous infectious diseases.

From a biocultural approach, the spread of diseases depends on how human populations interact with their environment and cultural context. In other words, disease results from the interaction of biological, environmental, and cultural factors, many of which are not always evident in bio-archaeological evidence, as only chronic infectious diseases last long enough to affect bones and teeth.

To study infections in past populations, skeletal analysis alone is not enough; it must be complemented by an understanding of the archaeological context in which the remains were found. However, certain problems arise which limit the reconstruction of how these diseases affected people in the past. For example, the absence of soft

tissue, the difficulty of diagnosing from fragmented bones, the non-specific nature of skeletal response that resemble lesions from various causes, and the variability in biological responses both among individuals within a population and within an individual across their life cycle.

Nevertheless, bioarcheology and paleopathology have enabled a precise register of damage resulting from infectious diseases. This includes the systematization of recording methods, the implementing of differential diagnosis, and the development of interpretative models from a bicultural perspective. Likewise, we have strived to explain the aetiology, means of transmission, and the types of response created against specific pathogens.

Recent excavations at the Cathedral of Panamá Viejo (1519-1671) and the Convento de San Francisco in Cartagena de Indias (1550-1900) recovered several individuals inhumed there during the colonial period. Of these, 175 individuals from Panama and 160 from Cartagena were analysed for skeletal lesions compatible with infectious diseases, particularly those known as *periosteal new-bone formation*, periostitis or periostosis and, in more severe cases, osteitis and osteomyelitis, which can also affect the medullary cavity.

The analyses revealed a similar prevalence for this type of lesions in both populations, Panama with 26.3% and Cartagena with 26.7%. However, while both sites show that more men were affected than women, the difference was more pronounced in Panama (21.8% in women and 46% in men) compared to Cartagena (40.5% and 48.3% respectively). Similarly, the frequency of lesions in both groups tends to increase with age, with individuals aged 35-55 showing more lesions, which suggests a connection with a cumulative process due to age.

Nevertheless, this pattern does not mean that this sector of the population was more ill, on the contrary, it reflects those individuals who survived long enough for the disease to produce a skeletal a response. More vulnerable individuals, such as children (0–12 years old), who often died shortly after infection, may not have lived long enough to manifest visible bone lesions. No such damage was observed in children in either population. This is associated with what is known in bioarcheology and paleopathology as «the osteological paradox».

On the other hand, no significant differences were found when comparing the bio-geographical origins of the individuals, that irrespective of being Indigenous, African, European, or mestizo (mixed ancestry), everyone was susceptible to infection. This may be linked to environmental factors, as both Panama and Cartagena de Indias were characterized by warm humid climates, as documented in historical sources. These conditions, combined with limited access to clean drinking water and hygiene and sanitation problems. This situation carried the risk of developing parasitic diseases, which would also have affected the nutritional state of people, weakening their immunological system, and making them more vulnerable to infectious diseases.

In this respect, there were several complaints from the inhabitants of both cities, pointing out the inconvenience of having settlements there and the rise in deaths from endemic diseases. However, relocation was inconvenient for the political, economic and defensive interests of the colonial authorities, as both ports were key hubs for inter-oceanic trade. Adapting the environmental conditions in which these cities were founded brought important challenges which affected the living conditions of their inhabitants. This would explain the increase in infectious diseases.

Javier Rivera-Sandoval, associate professor at the Department of History and Social Science at the Universidad del Norte in Barranquilla (Colombia), is a bioarcheologist. His research interests focus on topics such as funerary practices and the living conditions of pre-hispanic and historical peoples.

Further reading:

Martín JG, Aceituno FJ, Rivera-Sandoval J, Knipper C, Hernández I, AramB. 2021. Dietary continuity and change at Panama Viejo from an interdisciplinary perspective, C. 600-1671. *Journal of Anthropological Archaeology*, 64, 101363.

Rivera-Sandoval J, Castro-Méndez SA, Acevedo-Ruíz A, Meisel-Roca A. 2026. Height and health in Cartagena de Indias. Skeletal evidence from the 16th to the 19th Century. En *Health, Nutrition and Inequality in Latin America An Anthropometric History*, Routledge(en prensa).

Rivera-Sandoval, J. 2025. Bioarchaeology of infectious diseases in the Cathedral of Panama Viejo (1519-1671 A.D.). *Revista Prospectiva,* 3: 56-74.https://revistas.umss.edu.bo/index.php/prospectiva

Therrien M. 2022. Arqueología urbana de Cartagena, o 25 hallazgos para contar su historia. En *Ensayos sobre la historia de Cartagena de Indias*: 43-88. Universidad Tecnológica de Bolívar.