

Towards a new epidemiological worldview

After reading the excellent article titled *Infant mortality in the Matanza-Riachuelo River Basin. Comparison with the Autonomous City of Buenos Aires (CABA), the province of Buenos Aires, and Argentina (2010-2017)* [Mortalidad infantil en la Cuenca Matanza Riachuelo. Comparación con la Ciudad Autónoma de Buenos Aires (CABA), la provincia de Buenos Aires y la Argentina (de 2010 a 2017)], by Juliana Finkelstein et al.,¹ I would like to comment on several aspects.

First of all, I would like to make a linear analysis of what is clearly stated in the article: the social and health reality of the population living in the Matanza-Riachuelo River Basin is a reflection of an alarming reality that deserves attention. Also, the infant population in particular claims for a groundbreaking perspective and innovative actions aimed at dealing with these problems.

Second of all, I would like to comment on a series of concepts that can be read between the lines and that are greatly relevant on their own, also in the current epidemiological context. Although every aspect is interrelated, I would like to establish a four-level analysis: infant mortality, health determination, social and epidemiological polarization, and lastly, a reflection on a new understanding of epidemiology.

What do we mean by infant mortality rate? The first answer is a very simple one: an age-specific mortality rate. However, we cannot forget that this indicator is probably one of the best mirrors of the social and health reality of a specific region. Unlike other rates, infant mortality is traversed by all levels of health determination: biological, social, and environmental. Any action attempting to change it through specific actions may achieve a partial success, but unless there is an overall approach that considers all these levels of health determination, the infant mortality rate will not decrease in a sensitive and sustained manner.

In relation to health determination, the article describes a population cluster that shares adverse environmental and social conditions but has a more unfavorable progression than another cluster with better conditions. This might seem obvious, but it should be considered in a much broader sense than population group studies restricted to a limited geographic unit. Also, a strong point of this article is that it demonstrated

that children from the Matanza-Riachuelo riverbank on the CABA side probably have more in common with their peers in the province of Buenos Aires than with those living in other communes in their city. This compels us to understand phenomena beyond the traditional limits that may bias any analysis. Population dynamics and territorial dynamics work at very different rhythms.² In general, when referring to social determination, and especially when considering environmental health determination,³ we should broaden the perspective and think about regions that, many times, encompass different provinces or even countries.

Social, financial, and environmental exposure inequalities have a direct effect on infant mortality, as well as on the different morbidities, especially those related to the first stage of the health transition.⁴ In societies with a high level of socioeconomic inequality, this leads to a process called epidemiological polarization.⁵ The result is not only directly established on health-disease indicators, but also creates a bio-psycho-social, nutritional, and environmental setting, among others, that is so dissimilar that leaves noticeable traces not only on children's growth but also on their neurodevelopment and capability of social inclusion.⁶ The result is that children who are born and survive in destitution with an inadequate nutrition, exposed to chemical or physical agents from urban and industrial waste, and with an inadequate health system coverage will have fewer opportunities to develop favorably than their peers born, many times, just a few miles from these highly vulnerable centers. Needless to say, there is no room for equal opportunities in this context and the consequence of this is the perpetuation of differences in social and health statuses.

The circumstances described here, in addition to a new social and health epidemiological awareness due to the COVID-19 pandemic, represent an opportunity for the proposal of a new epidemiology understanding. The now excessive reductionism of our profession leads us to believe that specialists only work in the field of their specialization; therefore, the resulting questionable approach that epidemiologists only deal with epidemiology. We should all apply an epidemiological thinking, even to the simplest of our daily activities, because the

extension of the borders of knowledge now allows us to more frequently establish a relation between our lifestyle and exposure to certain agents, with never-before-seen related clinical manifestations. An extraordinary example of this is Barker's hypothesis,⁷ which relates perinatal factors to adult-life pathologies, as well as the concept of developmental origins of health and disease (DOHaD),⁸ which explains that epigenetic factors are influenced by the environment and leave their mark on several generations.

In this regard, many favorable changes are occurring, but we should also bring ourselves to cross certain borders. First of all, it appears appropriate to overcome the health dialectics torn between the federal and the centralized approaches. Thus, although a decentralized management of many health care aspects may seem useful, a new epidemiological thinking that considers cohorts beyond the geographic restrictions of district or even national divisions, would allow us to contemplate more realistic scenarios. Such duality, in a world where mobility and communications are now global, becomes a hindrance for the epidemiological measures required in our present reality. Uncoordinated policies among the different districts decrease the chance of success when dealing with new health care challenges. This does not mean that autonomy should be given up, but that health should be considered in a global manner, with actions agreed upon by the different authorities to establish more effective common responses. It is not possible to face the population dynamics brought about by a globalized world based on fixed concepts or individual or local solutions. In this setting, a structural element stands out: information.

Nowadays, resources are available but are not being used to their fullest health care potential: the Internet, Big Data,⁹ artificial intelligence applied to epidemiology, integrated health system networks,¹⁰ universal medical records, etc., should be a priority in the agenda for a modern and effective epidemiological surveillance, not only at the level of infectious diseases, but also in relation to recognizing daily life factors that have a direct or indirect effect on our health. The path towards an epidemiological worldview calls

for learning from past experiences, adapting to currently available tools, and developing a future that appears challenging, but that may predict indispensable social and health improvements.

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<http://dx.doi.org/10.5546/aap.2020.eng.300>

To cite: Justich Zabala PR. Towards a new epidemiological worldview. *Arch Argent Pediatr* 2020;118(5):300-301.

REFERENCES

1. Finkelstein JZ, Codebó Ramalho Luz MO, Feiock LE, Della Rosa G, García S. Mortalidad infantil en la Cuenca Matanza Riachuelo. Comparación con la Ciudad de Buenos Aires, la provincia de Buenos Aires y la Argentina (de 2010 a 2017). *Arch Argent Pediatr*. 2020; 118(x):000-000.
2. Moro J. Heterogeneidad y fragmentación del subsector público de salud en el Gran Buenos Aires. In: Ariovich A, Chiara M, Di Virgilio MM, Jiménez C, Moro J. Salud, política y territorio en el Gran Buenos Aires. Los Polvorines: Universidad Nacional de General Sarmiento, 2012. Page 45.
3. Organización Panamericana de la Salud. Determinantes ambientales y sociales de la salud. Washington, DC: OPS; 2010.
4. Hernández-Girón C, Orozco-Núñez E, Arredondo-López A. Modelos conceptuales y paradigmas en salud pública. *Rev Salud Pública*. 2012; 14(2):315-24.
5. Jarillo-Soto E, López-Arellano O. Salud Pública: Objeto de Conocimiento, Prácticas y Formación. *Rev Salud Pública*. 2007; 9(1):140-54.
6. Cafiero P, Nápoli S, Dartiguelongue JB. Fisiología del neurodesarrollo. In: Dartiguelongue JB. Fisiología pediátrica aplicada a la clínica. CABA: Journal; 2020. Pages 1-37.
7. Barrera Reyes R, Fernández Carrocera LA. Programación metabólica fetal. *Perinatol Reprod Hum*. 2015; 29(3):99-105.
8. Gil SM, Cabana J. Concepto DOHaD. In: Sociedad Argentina de Pediatría. *PRONAP*. 2019; 3(1):19-20.
9. Manrai AK, Patel CJ, Ioannidis JP. In the Era of Precision Medicine and Big Data, Who is normal? *JAMA*. 2018; 319(19):1981-2.
10. Organización Panamericana de la Salud. Redes Integradas de Servicios de Salud: Conceptos, Opciones de Política y Hoja de Ruta para su Implementación en las Américas. Washington D.C.: OPS; 2010. Serie: La Renovación de la Atención Primaria de Salud en las Américas No. 4. [Accessed on: June 11th, 2020]. Available at: https://www.paho.org/uru/index.php?option=com_docman&view=download&alias=145-redes-integradas-de-servicios-de-salud-aps-n4&category_slug=publicaciones-sistemas-y-servicios-de-salud&Itemid=307