Uniting Theory and Practice: The Crucial Partnership between Epidemiology and Public Health in the Era of COVID-19

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Despite the common confusion between terms, Epidemiology and Public Health are not – and have never been – a single science. On the contrary, despite both being as old as time, they might be considered intertwined. Though it is not possible to review all of their achievements, much less to mention the rest of their family in such a short space, it is worth remembering that, like any living beings, both Epidemiology and Public Health have developed over time, and today encompass the theoretical and practical aspects of actions aimed at the wellbeing of any given community\(^1\). In this sense, one cannot fail to remember their recent contributions to the common good and their impact on the daily lives of each one of us, highlighting the challenges that still lie ahead.

Most notably, the importance of Epidemiology and its application to Public Health was present in our daily lives during the COVID-19 pandemic. Who doesn’t remember how restrictive and punitive these two seemed? Without much delay, we were prevented from working, socializing, and moving from one point to another without a very good explanation. Even living together became burdensome under the guilt of disobeying orders that we understood so little. But why did we obey without even understanding them?

To understand this issue, let’s go back in time. Recent history teaches us that a certain Jon Snow, less than 200 years ago, used logical deductive reasoning to stop a cholera outbreak in London\(^1\). Since then, the systematic collection of data and information, its logical application to deduce causal inferences and the possible construction of mathematical models have been the basis for various sciences and help us understand the modern world. Basically, epidemiology has applications beyond the health sector and, even though it may seem complex in principle, it is safe to say that it participates in our way of thinking from a young age\(^2\).

It makes sense, then, to obey a logical and, in some way, familiar construction in the back of our minds, even if, at first, we do not have a full understanding of its arguments – and this has proven to be frequent for at least a few centuries: if the epidemics of the 17th and 18th centuries are far from collective memory, the Spanish flu has certainly not yet been completely forgotten. Which brings us back to the 21\(^{st}\) century and the COVID-19 pandemic: with more experience, data, and mathematical models, we were able to gain great understanding of an entirely new disease in record time. The result? The death of more than 6,985,964 people in the world at the time of writing this editorial\(^6\). What happened to the faith we placed in the ability of our great sciences to save us?

In part, it can be said that a considerable number of deaths would be inevitable – as it is common to any disease, regardless of its global reach –, however, with the pandemic, the numerous flaws in our health services became evident. Let me explain: despite its historical importance, Epidemiology has been largely relegated to academia – having been used as a tool for understanding the world, but with few elements incorporated into health practices. Over time, we inadvertently separated it from its sister: Public Health. During the Pandemic, it was like having an activist shouting for obvious and necessary improvements, but who was only heard too late. It’s even worse if we think about the countless missed opportunities, denounced by the most diverse areas of this science, such as Clinical and Social Epidemiology, as well as the inferences arising from real-world evidence that ultimately served to generate more fanfare than action.

Therefore, as a celebration of these sciences, we should not remember their past victories, but rather our most recent war against a simple yet lethal virus, so that we never forget that knowledge without practicality is nothing more than uselessness. It is like this in all areas of life and, most notably, in social well-being: Epidemiology and Public Health must go together as theory and practice, as pillars for the health and development of citizens, and no longer as simple names of boring and almost unknown disciplines.

DOI: https://doi.org/10.54727/cbps.v1i2.24
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