Tracking Drug Overdose in Latin America: The Epidemiological Potential of Prehospital and Emergency Department Data

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See also Diaz-Moreno and Rojas, p. 1151, and Santaella-Tenorio et al., p. 1252.

Latin America has a particular relationship with the overdose crisis unfolding among its northern neighbors. Substances produced in Latin America—especially fentanyl analogs and methamphetamine produced in Mexico and cocaine produced in South America—are implicated in a drug crisis of profound magnitude occurring in the United States and Canada. Yet overdose death rates in Latin America remain quite low, at least in official statistics. According to the Global Burden of Disease Study, in 2021 the drug-related death rate in Latin America and the Caribbean was 0.52 per 100 000, compared with 1.74 globally and 21.31 in the United States.[1]

However, there are troubling signs that this may be changing as synthetic drug production ramps up globally. For instance, in Colombia, fentanyl has appeared in combination with other psychoactive drugs, leading to overdoses.[2,3] Seizures of fentanyl analogs—either illicitly manufactured or diverted pharmaceuticals—have also risen in Costa Rica, Brazil, Peru, Chile, and Argentina, where cocaine cut with carfentanil caused a 24-death outbreak in Buenos Aires in 2022.[3–5] In the midst of these emerging signs, the capacity of Latin America's monitoring systems to quickly and accurately detect a synthetic drug crisis deserves consideration.

Mortality registries are often poorly equipped to quickly detect overdose outbreaks, even in high-resource settings. Autopsy investigations rely on toxicological analysis that can be expensive and time intensive. After aggregation and dissemination, statistics are often several years out-of-date when released. Furthermore, given the expenses involved in toxicological testing, probable overdose fatalities are often not investigated as such or are recorded as "drug overdose" with no information on the specific drugs involved.

The arrival of fentanyl to Mexico exemplifies some of these challenges. Although numerous media sources, frontline harm reduction agencies, and independent research reports have documented an emerging overdose crisis on Mexico's northern border from illicitly manufactured fentanyl,[6,7] official statistics have yet to reflect this. In 2020 official sources stated that an improbably low 19 deaths occurred from opioid overdoses in Mexico.[8] Yet when the medical examiner's office in a northern border city began using point-of-care fentanyl test strips, they discovered that 23% of all deceased individuals tested positive, suggesting a massive underregistration of fentanyl-involved deaths.[8] Nevertheless, even recently published academic articles, using mortality registries, continue to reflect low death rates (e.g., 12 opioid-involved overdose deaths in 2019[9]), as most overdoses are recorded without specific drug information, and many likely go unrecorded entirely.[10]

In this context of sparse and often inaccurate official mortality data, prehospital and emergency department (ED) records offer many advantages. They reflect a valuable set of routinely collected variables, such as sociodemographic information, precise geographic markers, diagnostic and treatment codes, and information about mortality and other outcomes.[11] These data are generally available immediately, and they can be aggregated and disseminated rapidly.

The US experience with the National Emergency Medical Services (EMS) Information System (NEMSIS) is instructive. NEMSIS aggregates records from more than 90% of US ambulance activations, making summary statistics available rapidly, with an estimated 75% of clinical encounters centrally recorded within approximately one week.[11] This system proved highly valuable during the early months of the COVID-19 pandemic, when there was great interest in shifting overdose rates but no updated official data source. NEMSIS provided an early signal of

rising overdose death trends, available just a few weeks into the pandemic, which later proved to be highly correlated with subsequently released official mortality statistics.[11]

Considering the prospect of a possible synthetic drug crisis in Latin America, a linked system of data from prehospital systems and EDs offers tremendous potential. In this issue of *AJPH*, Santaella-Tenorio et al. (p. 1252) highlight such a system in Colombia, where ED records were aggregated through a mandatory reporting system (called SIVIGILA: Sistema Nacional de Vigilancia en Salud Pública/National Public Health Surveillance System) to describe all fatal and nonfatal overdoses observed in EDs between 2010 and 2021. They note a rising rate of nonfatal overdoses from tranquilizers, sedatives, antidepressants, or a combination of these, which deserve further study and policy attention.

Another key advantage of prehospital and ED data is that they allow the tracking of nonfatal drug-related outcomes such as soft tissue infections and drug-induced psychosis. The nonfatal sequalae of illicit drug use, such as those of stimulant intoxication, greatly outnumber fatal outcomes and are arguably of greater on-the-ground importance in numerous local contexts across Latin America. Although not reflected in overdose death data, these trends can be tracked rapidly via prehospital and ED records.

For optimal epidemiological utility, EMS-based overdose detection systems should do the following:

1. be centrally aggregated,
2. provide rapidly available public summary statistics,
3. show a breakdown by key dimensions relevant to health equity for each local context (e.g., race/ethnicity, indigenous identity, language group, gender),
4. use at least point-of-care toxicology testing, and
5. ensure validity with subsequently released official measures of population-level outcomes.

The SIVIGILA system performs very well on some of these dimensions even as challenges remain. As Santaella-Tenorio et al. note, toxicological testing was rarely used in the clinical encounters described, and data largely reflect patient and family self-report regarding substances implicated in overdoses. Although gold standard toxicological screening using mass spectrometry can be costly and time intensive, implementing standardized rapid toxicological testing with point-of-care urine drug screening would be a low-cost method of improving the capacity of the system to detect shifting overdose patterns. Commendably, microdata from the SIVIGILA system are publicly available, albeit with a considerable lag, with records through 2022 currently ready for download.

Using EMS records for surveillance also entails methodological challenges. During the initial implementation period, as well as any subsequent system scale-up periods when additional facilities or jurisdictions are added to the system, the number of observed overdoses is expected to rise. This is a function of greater clinical volume in the system rather than a true increase in the underlying overdose rate in the population. A frequently used workaround to deal with this issue is using overdose encounters as a rate per clinical encounter, rather than per population.[11]

An EMS-based early detection network is likely to be just one of several complementary strategies for detecting emerging drug-related harms. Existing drug alert systems—such as SATA (the Early Alert System for the Americas), which is managed by the Organization of American States—often use data from law enforcement seizures.[3] Such data should not be relied on for public health monitoring, as they often do not reflect population-level health trends and are usually not made available to community organizations, researchers, or the public in a timely fashion. Their use for public health purposes is also ethically fraught, as they are generated as part of processes that deprive people of liberty, and not explicitly for the promotion of health.

Alternatively, community-engaged drug-checking programs can empower people who use drugs to immediately assess the contents of their substances via spectroscopy or immunoassay-based strips. These results can also inform health care providers and public health authorities which substances should be routinely tested for in clinical overdose encounters. Implementing routine, comprehensive toxicological testing during fatal overdose autopsy investigations is a critical step for ensuring that official mortality statistics are accurate and, if done quickly, can also inform rapid public health response.

In the context of these distinct resources that can be used to triangulate information about emerging overdose trends, the unique strengths of ED and EMS data lie in their rapid, clinically derived nature, which allows them to be quickly aggregated and made available to the public. AJPH

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CONFLICTS OF INTEREST

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