

Commentary

The Rise of Synthetic Drugs: New Challenges for Global Drug Control

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ABSTRACT

The rapid expansion of synthetic drugs poses new challenges to drug control and public health systems, reshaping patterns of drug use and drug-related harms worldwide. Low-cost production, rapid chemical modification, and sophisticated distribution networks have fueled this growth, giving rise to an increasingly complex drug market. Its regional manifestations vary — from the opioid-involved overdose crisis in the United States and the increasingly diverse synthetic drug markets in Europe to the growing misuse of narcotic and psychotropic medications in China. Yet traditional drug control systems still face critical gaps in surveillance, regulation, and treatment. Closing them will require stronger surveillance systems, new overdose-prevention technologies, closer collaboration with healthcare institutions, and expanded international cooperation through early warning systems.

Over the past decade, the global burden of drug use has risen substantially, as the rapid expansion of synthetic drugs poses new challenges to global drug control and reshapes patterns of drug use and associated harms worldwide (1–2). According to the United Nations Office on Drugs and Crime (UNODC), an estimated 316 million people (about 6% of the global population aged 15–64 years) used drugs at least once in 2023, up from 246 million (5.2%) in 2013 (1). Novel synthetic drugs are driving this increase disproportionately, compounding overdose deaths, mental disorders, injuries, and other drug-related harms (3–4). Highly potent opioids such as fentanyl and nitazenes, in particular, have contributed to unprecedented numbers of overdose deaths (1–2). In 2021, drug use accounted for an estimated 27.7 million disability-adjusted life years (DALYs) globally — nearly double the burden of two

decades earlier — and opioid use disorders alone were responsible for a striking 11.2 million DALYs (1). Unlike traditional plant-derived drugs, synthetic drugs are not constrained by geographic or climatic conditions: they can be manufactured cheaply, modified chemically with ease, and distributed through sophisticated digital networks. Together, these emerging substances pose profound challenges to global drug control and public health systems.

Although the consequences of rising synthetic drug use are evident across regions, their manifestations differ. In the United States, illicitly manufactured fentanyl and synthetic stimulants have recently driven an overdose-death crisis that increasingly involves toxic polydrug combinations and adulterants such as xylazine (4). Overdose deaths involving synthetic opioids other than methadone surged from 3,105 in 2013 to a record 73,838 in 2022, underscoring the exceptional lethality of these substances (5). In Europe, synthetic drug markets have grown more diverse and dynamic, and domestic production of synthetic stimulants has expanded substantially. By the end of 2023, the European Union Drugs Agency (EUDA) was monitoring 950 new psychoactive substances, and in 2022 EU member states seized a record 30.7 tonnes, predominantly synthetic cathinones (2,6). In China, the number of registered drug users has fallen steadily, from 896,000 at the end of 2023 to 747,000 by the end of 2024; even so, concerns are mounting over the non-medical use of narcotic and psychotropic medications and of unscheduled psychoactive substances such as nitrous oxide, particularly among young adults (7–8). In the fourth quarter of 2023, for example, roughly 29,000 cases of etomidate misuse were recorded, including more than 21,000 newly identified users (7). Together, these regional patterns illustrate the growing dominance and diversification of synthetic drugs and their rising toll of drug-related harms worldwide.

These regional patterns point to a broader misalignment between an increasingly dynamic synthetic drug market and the global drug control

systems meant to govern it, exposing critical gaps in surveillance, regulation, and treatment. First, current surveillance and diagnostic systems often cannot identify emerging synthetic substances quickly enough. Many novel synthetic opioids and adulterants escape routine toxicological screening, delaying the recognition of new threats and the response to overdose outbreaks (2–3). Second, illicit manufacturers continually evade controls by exploiting rapid chemical innovation and regulatory gaps across jurisdictions, leaving traditional reactive scheduling systems unable to keep pace (2–3). The growth of digital distribution networks compounds the problem, obscuring supply chains and accelerating market adaptation (2). Finally, access to evidence-based treatment remains severely inadequate: despite the rising burden of drug use disorders, only about one in twelve affected people worldwide receives treatment (1).

Meeting these challenges will require action on several fronts. Surveillance systems should be strengthened by integrating non-traditional, real-time data sources — such as social media analytics and wastewater-based epidemiology — to enable early detection of emerging substances (9–10). Collaboration with healthcare institutions should be deepened to sustain routine early warning and response mechanisms and to drive the adoption of innovative overdose-prevention technologies, such as wearable biosensors with automated naloxone delivery, which can reduce overdose mortality and related harms, including the transmission of drug-related infectious diseases (1,9–10). Finally, international cooperation should be reinforced through early warning systems and research networks that enable the rapid sharing of toxicological data, emerging drug trends, and effective prevention and control strategies for newly identified substances (2).

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