

In the last five years, at least five countries in the Americas Region have reported cases and deaths related to methanol poisoning; more recently, Brazil reported 16 confirmed cases of methanol poisoning following the consumption of adulterated alcoholic beverages. The Pan American Health Organization / World Health Organization (PAHO/WHO) urges Member States to strengthen toxicological and epidemiological surveillance, ensure timely clinical management of cases, reinforce prevention and risk communication actions aimed at the population, and coordinate with the competent authorities to investigate and control the circulation of contaminated beverages.

Background and summary of the situation

The consumption of unregistered alcohol—that is, alcohol produced, distributed, or sold outside the legal market—constitutes a significant health risk in the Americas Region. As of 2021, approximately 13.8% of the alcohol consumed in the region is not accounted for by official systems, which include informal beverages, homemade products, substitute alcohols (adulterated with windscreen wash, rinses, antifreeze, fuel alcohol) or illicit imports. These forms of alcohol are usually less regulated and may contain dangerous contaminants, such as methanol or heavy metals, which increase the risk of blindness, neurological damage, or death, even at relatively low doses (1).

Methanol (also called methyl alcohol) is a type of alcohol that is generally used as a fuel additive and in the manufacture of basic chemicals such as solvents, antifreeze fluids, and windscreen wash. It is very difficult to differentiate methanol from ethanol by its smell or taste. However, methanol is much more toxic than ethanol because the human body is less efficient at metabolizing methanol than ethanol and generates toxic metabolites. After ingestion, liver enzymes transform the methanol by-products into formic acid and affect several organs, producing tissue hypoxia and lactic acidosis. Poisoning symptoms can occur with small volumes of methanol (e.g., 2-8 ounces) than ethanol because the body is more efficient at breaking down and removing ethanol from the body (2).

The consumption of adulterated or informally produced alcohol represents an additional danger to that associated with excessive ethanol consumption. Outbreaks of poisoning affect confidence in local products and perceived safety in tourist destinations (3).

Between 2020 and 2025, multiple outbreaks of methanol poisoning associated with the consumption of adulterated alcoholic beverages have been recorded in Latin America. For example, in 2020, Mexico reported an outbreak in the state of Jalisco with 81 confirmed cases, nine hospitalized, and 27 deaths, mainly adult males living in rural areas (4). That same

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year, the Dominican Republic reported a similar event due to the consumption of adulterated alcoholic beverages, with 322 confirmed cases and 199 deaths (5). In 2022, Peru reported a sustained increase in cases with 372 notifications nationwide and 156 deaths, affecting six regions of the country (6). More recently, in 2025, Colombia reported 89 cases of methanol poisoning, with an outbreak concentrated in the city of Barranquilla and additional cases in other departments (7).

Over the past five years, Brazil has reported an average of 23 cases per year. Between August and 5 October 2025, 225 suspected cases of methanol poisoning have been reported, of which 16 were confirmed (two in Paraná and 14 in São Paulo). Suspected cases were registered in 13 federal units: Federal District (n= 1), Goiás (n= 2), Mato Grosso do Sul (n= 5), Mato Grosso (n= 1), Pernambuco (n= 10), Paraná (n= 4), Rondônia (n= 1), São Paulo (n= 192), Piauí (n= 2), Rio Grande do Sul (n= 2), Rio de Janeiro (n= 1), Paraíba (n= 1), and Ceará (n= 3). There were 15 deaths reported, including two confirmed deaths in the state of São Paulo and 13 that remain under investigation (8).

The Brazil Ministry of Health has activated a national situation room to coordinate the response to this event, reinforcing immediate notification and surveillance through the National Center for Strategic Information in Health Surveillance (CIEVS per its acronym in Portuguese) and distributed pharmaceutical ethanol reserves to hospitals. In addition, efforts to acquire the antidote fomepizol, set up reference laboratories for diagnosis, and articulated intersectoral actions with justice, agriculture, and security to control and remove adulterated beverages from the market have been initiated (9).

Guidance for national authorities

Given the risk of methanol poisoning associated with the consumption of adulterated alcoholic beverages, PAHO/WHO urges Member States to adopt measures for surveillance, market controls for unrecorded alcohol, and preparation of services for the timely attention of these events.

PAHO/WHO reminds Member States that, in addition to immediate prevention, control, and clinical care actions, the fact sheet "Alcohol Series - Unrecorded Alcohol in the Americas" is available from: <https://www.paho.org/en/documents/alcohol-series-unrecorded-alcohol-americas> (1) and the regional guidelines on surveillance, public policies and control of unregistered alcohol in the "Regional Status Report on Alcohol and Health in the Americas 2020," available from: <https://iris.paho.org/handle/10665.2/52705> (3). Below is a summary of guidance related to surveillance and clinical suspicion of cases, adequacy of health care services, laboratory confirmation, case management, and risk communication.

Surveillance and clinical suspicion of cases

Epidemiological surveillance of cases of methanol poisoning should be strengthened through the implementation of registration systems in health services. To this end, standardized data collection sheets should be used for clinical and epidemiological follow-up of cases that include key variables such as demographic data, probable source of poisoning, time of evolution, clinical manifestations (including visual and neurological manifestations), laboratory results and case evolution, as well as the association with other cases for the

configuration of the outbreak. In this way, the characterization of the event and the implementation of preventive and control measures will be facilitated (10, 11).

A high clinical suspicion allows cases to be identified in the early stages, in people who present compatible symptoms between 2 and 48 hours after the consumption of alcoholic beverages of informal origin, in bulk or without health registration, although high intakes may have manifestations within a few minutes. Initial signs may include nausea, vomiting, headache, and dizziness. Subsequently, visual disturbances (blurred vision, photopsia, scotomas) may manifest and may progress to blindness. In advanced stages, neurological involvement (confusion, lethargy, seizures) and multiorgan failure are observed, frequently associated with metabolic acidosis with increased anionic and osmolar gaps. It is also essential to train health care personnel in the early recognition of clinical signs of methanol poisoning and in the appropriate management of cases, with emphasis on the prevention of serious sequelae such as blindness (10, 11).

Adequacy of health-care services

Given the risk of cases emerging and increasing, the aim is to adapt services to ensure a timely response at all levels of care. This includes, the organization of clinical triage for poisoning by toxic alcohols, flows and references to health units with advanced handling capacity, and operational coordination with poison centers and situation rooms. Ensure availability of diagnostic and therapeutic supplies: blood gases, electrolytes, osmolarity, anionic/osmolar gap calculation, and access to antidotes (fomepizole as the first line where available or therapeutic ethanol), bicarbonate, folinic acid/folate, and hemodialysis support when indicated. In the event that any of the above are not available, certified alcoholic beverages with an alcohol content of between 35 and 40% can be supplied in a supervised manner, as a preventive measure to avoid damage from methyl alcohol (10, 11).

Laboratory confirmation

Arterial gases, electrolytes, osmolarity, and renal function tests are recommended in all suspected cases. The presence of metabolic acidosis with anion gap $>10\text{--}12$ mOsm/kg H_2O guides the diagnosis. Confirmation is obtained by determining serum levels of methanol, formaldehyde or formic acid in blood or urine, considering that concentrations greater than 20 mg/dL are toxic and greater than 40 mg/dL can be lethal. However, low or undetectable levels do not rule out poisoning if the clinical picture is compatible. As a characteristic finding, imaging studies (CT or brain MRI) may show bilateral putamen infarction and/or cerebral edema (10, 11).

Case Management

Management of suspected cases of methanol poisoning should begin with patient stabilization and appropriate life support. It is recommended to immediately perform arterial gases, electrolytes, plasma osmolarity, anion gap calculation, renal function assessment, and, when possible, determination of serum methanol and/or ethylene glycol levels (10).

Treatment includes inhibition of alcohol dehydrogenase by the antidote fomepizole (first-line, if available) or intravenous or oral ethanol according to national protocols. The following doses are suggested (10):

- Fomepizol: loading dose 15 mg/kg IV, followed by 10 mg/kg every 12 hours for four doses, and then 15 mg/kg every 12 hours as long as the criteria for intoxication persist; In hemodialysis patients, administer 10 mg/kg every 4 hours during the procedure.
- Ethanol (alternative): maintain target serum concentration close to 100 mg/dL; 10% IV solution, loading dose of approximately 8 mL/kg in 30–60 minutes, and maintenance of 1–2 mL/kg/h (double during haemodialysis); orally (40–50%), loading of 2 mL/kg, and maintenance of 0.2–0.4 mL/kg/h.

Metabolic acidosis should be corrected with bicarbonate and folinic acid or folic acid should be administered to promote the metabolization of formate. Haemodialysis is indicated for refractory acidosis, visual impairment, renal failure or high concentrations of methanol. All actions must be coordinated with the Toxicological Information Center and notified to the epidemiological surveillance system (10).

Any patient with suspected methanol poisoning should keep their eyes covered and avoid ocular exposure to light, given the risk of retinal injury, until the condition or the end of treatment is ruled out.

Risk Communication and Community Engagement

Implement rapid and segmented risk communication, emphasizing avoiding the purchase/consumption of beverages of unknown origin or underestimated prices, privileging formal businesses, and reporting adverse events associated with consumption. Include messages about warning signs and consultation routes, referral to poison control centers and emergency services (1).

References

1. Pan American Health Organization. Regional Status Report on Alcohol and Health in the Americas 2020. Washington, D.C.: PAHO; 2020. Available from: <https://iris.paho.org/handle/10665.2/52705>.
2. United States National Institute of Health. National Library of Medicine. National Center for Biotechnology Information. Bookshelf – Methanol Toxicity. Bethesda: NIH; 2025 [cited 6 October 2025]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482121/>.
3. Pan American Health Organization. Alcohol Series - Unrecorded alcohol in the Americas. Washington, D.C.: PAHO; 2021. Available from: <https://www.paho.org/en/documents/alcohol-series-unrecorded-alcohol-americas>.
4. Jalisco Gobierno del Estado. Comisión para la Protección Contra Riesgos Sanitarios del Estado de Jalisco. SSJ reporta 45 pacientes dados de alta tras intoxicación por metanol. Guadalajara: SSJ; 2020. Available from: <https://coprisjal.jalisco.gob.mx/prensa/noticias/ssj-reporta-45-pacientes-dados-de-alta-tras-intox>.
5. Dominican Republic, Ministerio de Salud Pública, Dirección General de Epidemiología, Sistema Nacional de Vigilancia Epidemiológica. Boletín Epidemiológico Semanal, Semana Epidemiológica (SE) No. 21. Santo Domingo: MSP; 2020. Available from: <https://repositorio.msp.gob.do/bitstream/handle/123456789/1904/BS212020.pdf>.
6. Ministerio de Salud de Perú. Dirección General de Epidemiología. Boletín Epidemiológico Semana 51 – 2022. Lima: MINSA; 2022. Available from: <https://www.dge.gob.pe/portal/docs/tools/teleconferencia/2022/SE512022/03.pdf>.
7. Instituto Nacional de Salud de Colombia. En lo corrido del año se han registrado 89 casos de intoxicaciones por metanol en Colombia. Bogotá: INS; 2025. Available from: <https://www.ins.gov.co/Noticias/Paginas/En-lo-corrido-del-ano-se-han-registrado-89-casos-de-intoxicaciones-por-metanol.aspx>.
8. Ministério da Saúde de Brasil. Ministério da Saúde confirma 225 registros de intoxicação por metanol após ingestão de bebida alcoólica. Brasília, DF: MS; 2025. Available from: <https://www.gov.br/saude/pt-br/assuntos/noticias/2025/outubro/ministerio-da-saude-confirma-225-registros-de-intoxicacao-por-metanol-apos-ingestao-de-bebida-alcoolica>.
9. Ministério da Saúde de Brasil. Ministro da Saúde anuncia ações estratégicas para tratar intoxicação por metanol. Brasília, DF: MS; 2025. Available from: <https://www.gov.br/saude/pt-br/assuntos/noticias/2025/outubro/ministro-da-saude-anuncia-acoes-estrategicas-para-tratar-intoxicacao-por-metanol>.
10. Ministerio de Salud de Colombia. Instituto Nacional de Salud. Intoxicación por metanol.; 2025. Available from: https://www.minsalud.gov.co/comunicadosprensa/documents/intoxicacion_por_metanol.pdf.
11. Veras-Estévez BA, Chapman HJ. Methanol Toxicity Outbreaks in the Americas: Strengthening National Prevention and Response Measures. MEDICC Rev. 2022; 16; 24(2):43-44. Available from: <https://pubmed.ncbi.nlm.nih.gov/35648062/>.