

ADVANTAGES AND DISADVANTAGES

Table 1 below summarizes the main advantages and disadvantages, according to surveyed coroners and chief medical examiners, of using toxicological analysis data collected on deceased persons before formal determination of the cause of death.

Tableau 1 Main advantages and disadvantages of using toxicological analysis data collected on deceased persons before formal determination of the cause of death

Advantages	Disadvantages
<ul style="list-style-type: none"> ■ Provides data and trends quickly ■ Enables a quick response to worrisome or urgent situations ■ Enables preventive action ■ Provides an overall picture of exposure to chemicals regardless of the cause of death ■ Detects emerging substances or combinations of substances 	<ul style="list-style-type: none"> ■ Hard to interpret toxicological data without other investigative information ■ Hard to establish a causal link between the death and the substances detected ■ Difficulty in interpreting the results may lead to inappropriate corrective measures ■ Detected substances may have no relation to the cause of death ■ Number of toxicological analyses conducted is limited ■ Toxicological analyses are expensive ■ Quality of the results of the analyses depends on sampling

SUBSTANCES AND CIRCUMSTANCES OF DEATH TO INCLUDE IN TOXICOVIGILANCE ACTIVITIES

Respondents were also asked to suggest substances and circumstances of death, alone or in combination, that should be covered by toxicovigilance activities using toxicological analysis data from ongoing investigations of coroners and medical examiners. Since the toxicological analyses requested by coroners and medical examiners generally target medications and drugs, the substances or combinations of substances mentioned by the respondents were mainly from these two categories. None of the respondents suggested other substance combinations or circumstances of death.

Suggested substances:

- Alcohol
- Antidepressants
- Benzodiazepines
- Synthetic cannabinoids
- Synthetic cathinone derivatives (“bath salts”)
- Carbon monoxide
- Emerging substances
- Emerging street drugs
- Emerging synthetic substances

Suggested substance combinations

- Combinations of stimulants, depressants, or disruptors (combination of benzodiazepines, methamphetamine, and cocaine)
- Alcohol in combination with other substances

Toxicovigilance activities in Canada

This section presents details on ongoing toxicovigilance activities in Canada on which surveyed coroners agreed to provide information. At the time this summary was written, only Nova Scotia submitted information on its toxicovigilance activities.

NOVA SCOTIA

Where who & since when

At the office of the Nova Scotia Medical Examiner Service (NSMES), an epidemiologist is responsible for toxicovigilance of opioids in the province. The toxicovigilance program started in mid-2016 and is still operating today.

Substances covered

The epidemiologist is mainly concerned with opioids, but she also keeps an eye out for new substances and cases of combined poisoning by opioids and benzodiazepines, which are detected in 50% of opioid poisoning cases.

Case definition

The following case definitions are used by NSMES:

- Confirmed death by acute drug poisoning:
 - Death occurred in Nova Scotia and cause of death determined as an acute poisoning caused by drug³
- Probable cause of death was acute drug poisoning:
 - Death occurred in Nova Scotia AND
 - Positive toxicological results for the specified drug AND
 - Cause of death undetermined
- Suspected case (monitored by NSMES, but not reported except in the case of a significant increase):
 - Death occurred in Nova Scotia AND
 - Cause of death undetermined AND

- The circumstances of death are classified as “drug-related” (this variable reflects the investigator’s initial impression of the cause of death)
- Illegal fentanyl suspected in a death by acute drug poisoning (the definition includes only fentanyl and not analogues reported separately):
 - The toxicological results include fentanyl AND
 - The investigation into the person’s history or the situation indicates that illegal fentanyl powder or tablets were used AND
 - There was no trace of a fentanyl patch at the site or of the administration of fentanyl at the hospital during care prior to death
- Specific opioids (new opioids added as they are detected):
 - Hydromorphone, methadone, oxycodone, oxymorphone, hydrocodone, fentanyl, heroin, morphine, codeine, tramadol, meperidine, buprenorphine, tapentadol, pentazocine, furanylfentanyl, U-47700, despropionyl fentanyl
- Combinations of nonpharmaceutical opioids:
 - Heroin, furanylfentanyl, despropionylfentanyl, illegal fentanyl suspected, U-47700
- Combinations of benzodiazepines:
 - “Zepam” or “zolam” or “benzo” are tested for as a cause of death
- Other drugs:
 - Cocaine, MDMA/methamphetamine/ecstasy, new stimulants as they are detected

Indicators and calculation methods

Several indicators are used for opioid toxicovigilance and surveillance, including:

- Monthly death rates by acute poisoning (not including alcohol) per 100,000 inhabitants

³ Formal cause of death established by the medical examiner following the investigation.

- Proportion of deaths by suicide due to opioids compared to other causes of death
- Number of cases of acute poisoning (not including alcohol) over 12 months and the number of cases per 100,000 inhabitants over the preceding 12 months, compared to other provinces and territories
- Proportion of cases of acute poisoning involving opioids over the preceding 12 months
- Number of confirmed and probable cases over the preceding 12 months per 100,000 inhabitants for Nova Scotia's four health regions
- "Heatmaps" of confirmed cases of opioid poisoning by geographical distribution
- Number of cases per year of the five main opioids involved in deaths by opioid poisoning
- Number of cases per year of nonpharmaceutical opioid poisoning (individually and collectively) involved in opioid poisonings
- Number of cases of death per year involving nonpharmaceutical drugs or medications
- Description of deaths due to nonpharmaceutical opioids in 2016 and 2017 by age group, gender, and geographical distribution (by health region)

The epidemiologist responsible for these toxicovigilance activities reports that the indicators are interpreted based on call data from the IWK Regional Poison Centre and police seizures.

Conclusion

Most of the coroners and chief medical examiners surveyed considered toxicological analysis data from ongoing investigations useful for toxicovigilance purposes. However, the technical and financial constraints that affect the choice of toxicological analyses conducted following a death may limit the ability of toxicovigilance activities to detect certain cases or phenomena involving pesticides or industrial or household chemicals. The respondents also cautioned against interpreting the cause of death too quickly based on toxicological results in the absence of all investigative data because this could lead to useless or inappropriate preventive or corrective measures. Despite these disadvantages, coroners and chief medical examiners surveyed recognized that this type of program helps detect emerging substances and develop preventive measures more quickly.

Survey of Coroners and Medical Examiners on Toxicovigilance

AUTHOR

Julien Vachon, M.Sc.
Direction de la santé environnementale et de la toxicologie

COORDINATION

Pierre-André Dubé, B.Pharm., Pharm.D., M.Sc., C.Clin. Tox.
Direction de la santé environnementale et de la toxicologie

EDITING AND LAYOUT

Julie Douville, Administrative Officer
Direction de la santé environnementale et de la toxicologie

PUBLISHED BY

Unité des communications et de la documentation

The French version of this document is also available: [Enquête auprès des coroners et des médecins légistes en chef concernant la vigie des intoxications aux agents chimiques](#)

This document is available in its entirety in electronic format (PDF) on the Institut national de santé publique du Québec website at <http://www.inspq.qc.ca>.

Reproduction for private study or research purposes is authorized under Section 29 of the Copyright Act. Any other use must be authorized by the Government of Québec, which holds exclusive intellectual property rights for this document. Authorization may be obtained by submitting a request to the central clearing house of Service de la gestion des droits d'auteur at Les Publications du Québec, using the online form at <http://www.droitauteur.gouv.qc.ca/autorisation.php>, or emailing droit.auteur@cspq.gouv.qc.ca.

Information in this document may be cited provided the source is mentioned.

Legal deposit – 1st quarter 2019
Bibliothèque et Archives nationales du Québec
ISBN: 978-2-550-81480-1 (French PDF)
ISBN: 978-2-550-83426-7 (PDF)

© Gouvernement du Québec (2019)

Publication N°: 2505