

# PUBLIC HEALTH RESPONSE TO METHANOL MASS POISONING IN THE CZECH REPUBLIC IN 2012: A CASE STUDY

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## SUMMARY

**Objectives:** The study focuses on the 2012 methanol outbreak in the Czech Republic. The main goal of the present study was to apply analytical and descriptive tools to selected qualitative and quantitative processes related to the 2012 methanol outbreak in the Czech Republic. The secondary goal was to study and evaluate in detail their potential for creating integrated conceptual national policies aimed at eliminating the risk of methanol poisoning in the future.

**Methods:** The presented qualitative analysis focused on the content of documents published by Czech public authorities – the Ministry of Health, the Ministry of the Interior, the Czech Agriculture and Food Inspection Authority, and the Regional Public Health Authorities – as well as the content of the relevant legal regulations. Moreover, statistical data concerning the number of hospitalisations and deaths due to the methanol intoxication were used to provide a background to a detailed description of the relevant facts.

**Results:** In procedural terms, most of the analysed measures focused on a strongly restrictive regulation of sales, regular information channels designed to protect consumers on the national as well as international level, and elimination of further health and economic risks stemming from the dangerous alcoholic products that had already entered distribution networks. The health, social and economic consequences of such activities are quantified at a highly aggregated level. The analysed institutional ties are evaluated also in the context of international documents: the European Action Plan to Reduce Harmful Use of Alcohol 2012–2020 and the Global Strategy to Reduce Harmful Use of Alcohol, and their current potential for steering public policies is assessed.

**Conclusion:** The analysis and evaluation of procedural activities carried out after the methanol outbreak have laid the foundations for a multi-dimensional study that can contribute to integrated national policy concepts aimed at preventing these and similar negative health, societal and economic consequences. Six years after the methanol outbreak, national and regional health policies have reflected no findings concerning the experience of patients whose health was impaired due to methanol, and the economic cost of the event has not been calculated. The quality of life of these patients has greatly decreased due to permanent or partial incapacity and serious upheavals of their and their families' economic and social conditions. This opens the question of researching and evaluating multiple aspects of health, social and economic impacts of harmful use of alcohol and setting up processes to mitigate these impacts.

**Key words:** poisoning, methanol, public health

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## INTRODUCTION

Historically speaking, methanol poisoning has occurred repeatedly, when first cases were recorded as early as at the turn of the 19th and 20th century following the discovery of methanol purification. The 20th century then brought significant findings that allowed determination of the real causes of methanol poisoning, followed by a development of interventional methods. The toxicity of methanol was confirmed in 1923 after a mass poisoning of workers in Hamburg in 1922 (1). Focal points of

methanol poisoning regularly occur all over the world on a varying scale and intensities. Between 1998 and 2012, a total of 58 poisoning outbreaks were recorded globally with at least 2,767 people dying\* (2).

Alcohol consumption in the Czech Republic is high, according to the latest evidence of WHO (3) it was about 14.4 litres of pure alcohol per capita in 2016 (23.2 for males and 6.1 for females). The 15+ aged population prevalence of alcohol use disorders and alcohol dependency is 6.0% and 2.8%, respectively for both sexes, while males are much more affected than females. Some cross-

\*Not including the 2012 methanol outbreak in the Czech Republic.

sectional surveys indicate even a higher rate of alcohol dependency (4). The accessibility of treatment (5) and alcohol associated disability (4) represent related sensitive substantive issues.

The most serious case of methanol poisoning outbreak in the Czech Republic happened in 2012 when the number of poisoned persons reached levels that were significant from the European and even the global points of view. This happened due to criminal activities of a total of 16 individuals who distributed a mixture of ethyl alcohol and methanol both to other resellers and end users, and created the impression of regular (recorded) alcohol production and retail, however, we must consider this alcohol for unrecorded. Alcohol and methanol poisoning cases have continued to appear in the Czech Republic until today, as well as they were recorded before 2012, mostly due to home-distilled alcohol (Table 1); however, the 2012 outbreak was not related to home distillation. The consumption of unrecorded alcohol in the Czech Republic was evaluated by the WHO using tree-year averages; their estimations range between 1.2 litres in 2010 and 1.5 in 2016 (3). A considerable part of the people affected by the methanol poisoning were not aware of the fact that the alcohol was unrecorded, just because they bought it in bottles in regular shops or other points of sale, drank it on the occasion of family celebrations or visiting friends, or got it as a gift (6).

The studies that mentioned methanol outbreak are mostly descriptive and many are based on the concept of specific causalities. To do this, this paper presents a case study of the Czech Government response to the 2012 methanol outbreak.

The Czech alcohol control policy stems from WHO documents as well as from the European Action Plan to Reduce Harmful Use of Alcohol and from the Global Strategy to Reduce Harmful Use of Alcohol. The alcohol control policy aggregates four different dimensions of regulatory character. The basic regulatory framework focuses not only on processes aimed at reducing demand for alcohol, restricting access to alcohol or setting the conditions for the sale of alcohol, but it also aspires to directly influence

consumer's decision-making (e.g. through regulation of advertisement). These measures have been specified in strategies and action plans of EU countries and constitute the core of national alcohol control policies in the EU.

The main goal of the present study was to apply analytical and descriptive tools to selected qualitative and quantitative processes related to the 2012 methanol outbreak in the Czech Republic. The secondary goal was to study and evaluate in detail their potential for creating integrated conceptual national policies aimed at eliminating the risk of methanol poisoning in the future and strengthening institutional ties with an explicit link to the consequences of such poisoning cases. The analysed institutional ties were evaluated in the context of international documents, the European Action Plan to Reduce Harmful Use of Alcohol 2012–2020, and the Global Strategy to Reduce Harmful Use of Alcohol, and their potential for establishing domestic public policies was assessed.

## Overview of Studies on Methanol Outbreak Impacts Globally and in the Czech Republic

Generally, mass poisoning of methanol happens sporadically, and it typically occurs in developing countries or in countries with high taxes on alcohol (8, 9). Zyoud et al. (10) found 912 articles on methanol poisoning between 1902–2012 in the Scopus database (11, 12). In the European region of WHO the cases have been reported also from Estonia (13), Norway (14), Turkey (15), and the Russian Federation (16). Table 2 provides an overview of published studies latest available reviews.

Looking at the content of the studies and reports, we found that they tend to describe the focal points of poisoning outbreaks and, in some cases, the distribution lines and causal links between the manufacture of the toxic substance and its fatal health consequences. There is another important part of this procedural line. Despite the fact that the outbreaks took place on different continents, there is one thing that all cases had in common – they were triggered with financial gain in mind. The actors of many methanol scandals planned to profit from their actions regardless of the illegality of their activity and/or distribution of thousands of litres of toxic alcohol. In terms of the effects, the studies reported figures on the number of fatalities, hospitalisations and in some cases on the mapping of changes to patients' quality of life in the aftermath of life-long disabilities due to methanol poisoning. The above studies are rather heterogeneous, which is due to specific objectives of the research teams as well as the differences in national public health policies in different countries, the extent of interventions, etc. Nevertheless, the studies offer valuable information for an evaluation of deeper causal relations and impact on creation of national prevention concepts.

According to the results of our literature search, the papers highlighted the clinical point of the poisonings. In these papers, the public health perspective is contained in detection of cases and their proper diagnosing, in the investigation, as well as in locating sources of intoxication.

## Studies in the Czech Republic

Papers on the 2012 methanol outbreak in the Czech Republic published so far addressed general epidemiology, treatment

**Table 1.** Number of hospitalisations and deaths due to methanol intoxication in 2002–2016 in the Czech Republic

Year	Number of hospitalized	Number of deaths
2002	11	0
2003	8	2
2004	12	0
2005	9	3
2006	8	1
2007	2	1
2008	7	1
2009	3	3
2010	11	3
2011	10	3
2012	97	36
2013	15	9
2014	11	7
2015	4	2
2016	3	1

Source: Mravčík et al. (7)

**Table 2. Country cases of methanol poisoning in the European region of WHO**

Methanol poisoning			
Outbreak year	Country	Number of people affected	Source
2001	Estonia	111 confirmed cases	Paasma et al. (13)
2002–2004	Norway	53	Hovda et al. (14)
2009–2013	Poland	49 (peak – 15 in 2013)	Krakowiak et al. (11)
1993–2002	Turkey	113	Kalkan et al. (15)
2016	Russian Federation	88 (deaths)	Jargin et al. (16)
Approach to the patients – recommendations and consensus statements reviews			
Source		Year	
Roberts et al. (12)		2015	
Hassanian-Moghaddam et al. (9)		2019	

and outcomes (17–20). A more recent paper (21) focused on cost-effectiveness of hospital treatment and outcomes of acute methanol poisoning during the Czech mass poisoning outbreak. The public health aspects of the methanol outbreak from the point of view of the regional public health authority were described by Šebáková et al. (22, 23). Very recently, Zakharov et al. (19) published a book summarizing the clinical aspect of the 2012–2013 mass methanol poisoning, and also the evidence previously published in individual research papers. The awareness of the risk due to poisoned alcohol among public was studied by Běláčková et al. (24).

### Methodological Framework and Data Base

This paper presents a case study of the Government (Ministry of Health and Ministry of Finance) response to the 2012 methanol outbreak, which may be understood as a public health event. The authors performed a qualitative content analysis of documents published by public authorities – the Ministry of Health of the Czech Republic, the Ministry of the Interior of the Czech Republic, the Czech Agriculture and Food Inspection Authority, the Regional Public Health Authorities – as well as the content of the relevant legal regulations. The basic approach to the content analysis corresponds to that used for example by Plichtová (25). The first step is defining and identifying suitable documents for the content analysis, their classification and description. In the next step, basic units are defined and a system of categories is created. The next step involved metacoding using a hierarchical sorting method. As a part of the analysis methods of Miles and Huberman (26) were also used.

First step in our analysis was similar. We identified, classified and described documents published by the above-mentioned public authorities and related to methanol outbreak. The analysis was carried out with two aims that correspond to two analytical procedures. The first aim was to describe public health responses in relation to the methanol outbreak. We identified the date of each event and described the related measures. Using this timeline, we analysed the sequences of measures implemented and their possible impact on the number of new cases and deaths.

Second, since the aim of this study was to examine and evaluate the potential of selected measures and processes related to the methanol outbreak for the creation of integrated conceptual

national policies, the identified measures were coded with codes based on an indication of the relevant area of alcohol control according to the European Action Plan to Reduce Harmful Use of Alcohol, as well as with the relevant dimension of the Global Strategy. The first set of codes related to the European Action Plan to Reduce Harmful Use of Alcohol are: regulation of sale, information flows, legislation support, risk prevention, consumer protection (subcodes: international level, distribution networks regulation), international institutional platform, measure to limit the supply of alcohol, measure to limit the demand for alcohol, measure concerning the ban to sale alcohol and spirits by shots, ban on export, creation of institutional links. The second set of codes related to Global Strategy to Reduce Harmful Use of Alcohol are the same as five main objectives (27):

**A** – raised global awareness of the magnitude and nature of the health, social and economic problems caused by harmful use of alcohol, and increased commitment by governments to act to address the harmful use of alcohol;

**B** – strengthened knowledge base on the magnitude and determinants of alcohol related harm and on effective interventions to reduce and prevent such harm;

**C** – increased technical support to, and enhanced capacity of, Member States for preventing the harmful use of alcohol and managing alcohol-use disorders and associated health conditions;

**D** – strengthened partnerships and better coordination among stakeholders and increased mobilization of resources required for appropriate and concerted action to prevent the harmful use of alcohol;

**E** – improved systems for monitoring and surveillance at different levels, and more effective dissemination and application of information for advocacy, policy development and evaluation purposes (Table 4).

### Ethical Considerations

The research design was approved by the ethical committee no. AZV No 16 – 27075A. Due to the fact that entire court judgments, all names, and the exact locations where the poisoning occurred were made public, these pieces of information are generally known. Detailed information relating to all aspects of the outbreak were also published in several thousands of media communications since 2012.

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## Mass Methanol Outbreak in Public Health Context

This chapter describes the public health responses and measures made by authorities in relation to the methanol outbreak. It is important to highlight that the outbreak response was, in line with the legal framework of the Czech Republic, directed by central state administration, while also the regional public health authorities are established and directly controlled by the Ministry of Health of the Czech Republic, and similarly the Police and the custom services are directed by the Ministry of Interior. Table 3 provides a chronological overview of medical, protective and/or legislative actions related to the mass methanol intoxication. Next to that, the table provides six main measures that were identified in the Czech context. Furthermore, the authors analysed the sequences of implemented measures and their possible impact on the number of new cases and deaths. The chronology of the outbreak was as follows:

The first patient with methanol intoxication was hospitalised in the Moravian-Silesian Region on 3 September 2012; another 6 intoxicated patients were admitted to a local hospital on 6 September 2012, and the Regional Public Health Authority of the Moravian-Silesian Region was alerted on the same day at 2:45 p.m. The first death directly attributable to methanol was recorded on 5 September. The main task of the Regional Public Health Authority was to evaluate the risk connected with methanol poisoning and to suggest next steps in public health protection, especially in the context of Section 85 of the Public Health Protection Act, which allows extraordinary measures to be taken in emergency situations.

The Czech methanol outbreak was unusual due to its unprecedented scale and the number of fatalities (Table 1). In the European context it can be compared for example with the methanol outbreak in Estonia. At the time of the methanol outbreak in the Czech Republic, methanol-related problems were recorded also in other countries including Slovakia, Poland and Russia. Considering the distribution of toxic alcohol and the growing number of deaths, some countries decided to adopt special measures banning the sale of beverages with the alcohol content more than 20% manufactured in the Czech Republic in order to protect their national population from tragic consequences. These measures were implemented regardless of any proven causal links to the methanol scandal. However, they were primarily motivated by security considerations and applied to alcohol manufactured in the Czech Republic in a precisely defined timeframe.

By 28 September 2012, the number of affected patients increased to 48, and this number had been increasing, when the last case was recorded on 5 April 2013. Methanol intoxication cases in the Moravian-Silesian Region made up more than a half of the total number of patients in this outbreak.

After extraordinary legislative measures were adopted with the aim of mitigating the risk of methanol occurrence, sale and use, the Regional Public Health Authority of the Moravian-Silesian Region deployed 170 field specialists working in more than 50 mobile units, covering thus the entire territory of the region. The mobile units operated non-stop including nights and weekends. The Regional Public Health Authority in Ostrava offered free of charge testing of alcohol for local citizens. In the Moravian-Silesian Region alone, 2,076 individuals had approximately 6,000 bottles of alcohol tested. This led to 1,293 samples selected for lab tests. Approximately one third of these

samples failed due to the content of methanol or isopropanol above the limit (23).

The overview of medical, protective and/or legislative actions shows also the chronological order of initiation of information processes related to the detection and identification of outbreak focal points and indistinct distribution and consumption networks. As mentioned earlier, free alcohol testing played an important role. A total of 170 field specialists were deployed in more than 50 mobile units. Despite thousands of alcohol samples tested, the mortality of users did not stop completely.

## Procedures and Measures Applied by State and Public Authorities

The measures adopted by state authorities and other relevant institutions in the context of the 2012 national methanol outbreak are summarised in Table 4. Since the aim of this study was to examine and evaluate the potential of selected measures and processes related to the methanol outbreak for the creation of integrated conceptual national policies, Table 4 completes each measure with an indication of the relevant area of alcohol control according to the European Action Plan to Reduce Harmful Use of Alcohol, as well as with the relevant dimension of the Global Strategy.

When analysing individual items from Table 4, we can see that, in procedural terms, the majority of listed measures was focused on a strongly restrictive regulation of sale, regular information flows aimed at protecting consumers on national as well as on international level (four extraordinary measures, reporting to the Rapid Alert System of Food and Feed, etc.), and on elimination of other health and economic risks connected to the volume of distributed dangerous alcohol to various distribution networks (in terms of the five Global Strategy dimensions, most measures can be classified as D or E). The health, societal and economic impacts of the respective activities have been quantified only in a highly aggregated manner.

## DISCUSSION

Taking into account the activities of the public health system, state authorities and other institutions (law enforcement authorities) described above as well as their quick response, the situation cannot be considered a public health error, although it is certainly possible to retrospectively criticise the success rate and efficiency of individual measures. The public health aspect is just one of several perspectives to view the methanol outbreak. Important perspectives are also those of the work done by the Police of the Czech Republic and the Czech court system, but this is beyond the scope of this paper.

Our analysis and evaluation of procedural activities carried out after the methanol outbreak laid the ground for multidimensional studies that could serve as a basis for integrated conceptual national policies aimed at preventing these and similar negative health, societal and economic events in the society.

In its recommendations, the European Action Plan to Reduce Harmful Use of Alcohol 2012–2020 calls for an integration of policies focused at alcohol harmful use into general economic and social policies, and for a coherent and joint effort shared by various state authorities and sectors. In cases like this methanol outbreak,

**Table 3. Timeline of the methanol outbreak in the context of measures adopted**

Date (MM/DD/YYYY)	Events	Measures (if applicable)
09/03/2012	3 patients hospitalised, 2 died at home	
09/04/2012	1 patient hospitalised	
09/05/2012	First death in the Havířov Hospital	
09/06/2012	1 patient hospitalised, 1 died at home, the Regional Public Health Authority in Ostrava alerted	Appeal to the public not to drink unlabelled alcohol, especially if sold by individual shots, information from the Regional Public Health Authority in Ostrava
09/07/2012	Systematic inspections of catering services launched	
09/10/2012	The Toxicology Information Centre asked international partners for information whether they had also recorded poisoning cases – a negative response	
09/10/2012	Information submitted to Rapid Alert System of Food and Feed	
09/11/2012	The Police President instituted the “Methyl” special investigation team	
09/12/2012	The Minister of Health instituted a crisis team	
09/12/2012	First extraordinary measure of the Ministry of Health	Ban on the sale of alcohol by shots and the sale of spirits with more than 30% alcohol content
09/12/2012	Police conducts inspections in partnership with the Regional Public Health Centre, CS and other authorities	
09/14/2012	Second extraordinary measure of the Ministry of Health	Ban on the sale of alcohol by shots and the sale of spirits with more than 20% alcohol content
09/16/2012	Poland bans import and sale of Czech alcohol	
09/18/2012	Slovakia bans import and sale of Czech alcohol	
09/18/2012	Restrictions, or rather ban on alcohol advertisement broadcasting	
09/19/2012	Decree of the Ministry of Finance No. 310/2012 Coll.	
09/20/2012	Third extraordinary measure of the Ministry of Health	Ban on the sale of alcohol by shots and the sale of spirits with more than 20% alcohol content, export ban
09/24/2012	Press conference held by the Police President announcing the detention of two main organizers	Later condemned to life sentences as an extraordinary punishment
09/27/2012	Fourth extraordinary measure of the Ministry of Health	
12/07/2012	Started free testing of alcohol stock held by households	6,983 samples tested, 841 failed, 40 potentially lethal
12/25/2012	3 people died from methanol poisoning in Poland	
01/27/2013	16-year-old girl died from methanol poisoning	
02/19/2013	The University of Chemistry and Technology in Prague provided the Ostrava Police with a Raman spectrometer	
08/08/2013	Spirits mandatory labelling act amendment passed	
10/31/2013	Extraordinary measures of the Ministry of Health invalidated	
02/28/2014	The last death directly linked to methanol	
05/21/2014	Regional Court in Zlín (sentences not coming into effect, first line of investigation)	
02/04/2015	High Court in Olomouc – final sentences	
03/30/2018	Supreme Court of the Czech Republic – appellate review (review denied and final sentences confirmed)	
04/05/2018	Request for renewed hearing denied	

a quantification of economic and non-economic consequences for the national healthcare and social system is inevitable. It is crucial for the development of new policies not only on the national but also on the international level.

Let us remark at this point that six years after the completion of the processes responding to the methanol outbreak, no results

quantifying any burden concerning the life and experience of patients whose health was seriously impaired due to methanol poisoning mirrored in the national and/or regional health policies, and the economic costs of such burdens even have not been calculated. The quality of life of these patients has been greatly affected due to a permanent or partial disability and serious upheavals in



**Table 4.** Summary of measures taken by state authorities and other competent institutions in the context of the methanol outbreak

	Date and relevant timeframe	Instigator, coordinator, actor, institution...	Process created, activity carried out
1	11 September 2012	Police President instituted the "Methyl" special investigation team <b>C, D, E</b>	The main goal: coordination of police activities based on available information, expert opinions and analyses, collection and analysis of information on poisoning cases, suspicious production and distribution of alcohol from the entire national territory. Detection and investigation of threats to public health due to food and other products (28).
2	12 September 2012 (6 days after the first case was reported to the Regional Public Health Centre)	The Government instituted a crisis team for the methanol outbreak <b>A, C, D, E</b> <div>Sale regulation</div> <div>Information flows</div> <div>Legislation support</div>	The Ministry of Health issued their first extraordinary measure aimed at tightening the alcohol sale regulation (29). The main task of the crisis team: defining the size and type of shops and other facilities that would be banned from selling spirits; regular information for the Government. The Government made the following decisions: <ul style="list-style-type: none"> <li>• institute a temporary crisis team;</li> <li>• hold crisis team meetings as necessary to regularly evaluate the immediate methanol poisoning situation including efficiency of adopted measures;</li> <li>• immediately inform the Government about crisis team's findings and adopted measures;</li> <li>• work with crisis team's members on drafting bills to the legislature aimed at reducing the risk of similar situations repeating in the future.</li> </ul>
3	September 2012 – March 2013	The Ministry of the Interior creates the Situation Information Centre <b>A, B, D</b> <div>Risk prevention</div> <div>Consumer protection</div>	The main goal: serve as a key integration point for communication with individual members of the inter-ministry workgroup. The Police and the Ministry of the Interior gained a full authority to inform the public not limited by anything (anybody), above all to prevent methanol-related risks (30).
4	12 September – 31 December 2012	The Regional Public Health Authority of the Moravian-Silesian Region established a dedicated phone hotline <b>B, D</b> <div>Consumer protection</div> <div>Risk prevention</div> <div>Information flows</div>	A non-stop information line was served by professional healthcare staff capable of answering common questions about methanol poisoning typical symptoms, and of giving information about free alcohol tests. The Regional Public Health Authority's website provided information about the current situation development in the region, results of inspections, as well as information about methanol-related risks (23).
5	13 September 2012	Daily coordination meetings chaired by the Director of the Regional Public Health Authority of the Moravian-Silesian Region, attended by: the Police, the Customs Authority, the Regional Fire Department, the Czech Agriculture and Food Inspection Authority, and the Regional Government (22). <b>D</b>	<div> <div> <div></div> <div>Creation of institutional links (necessary for initiation and setting of integration, cooperation, information and regulation crisis mechanisms)</div> <div></div> </div> </div>
6	12 September 2012	The responses and other related measures of the Ministry of Health, <b>C, D, E</b> <div>Creation of institutional links (guaranteed by the Ministry of Health)</div> <div>Sale regulation</div> <div></div>	As the responsible administrative authority, the Ministry of Health issued an Extraordinary Measure in response to the growing number of methanol poisoning cases (29). The measure banned the sale of alcohol by shots and spirit-type beverages with more than 30% alcohol content in food stands, food trucks and other mobile and/or temporary sales points until further notice. The measure became effective as of the moment of its announcement on nation-wide TV channels and radio stations. The measure was also posted on the Ministry of Health official notice board, as well as on the notice boards of regional public health authorities. Violation of this measure would be considered an administrative offence under Section 92(2) of the Public Health Protection Act, and could result in a fine of up to CZK 3,000,000 (EUR 120,000) <sup>1</sup>

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<sup>1</sup>Pursuant to Section 80(1g) and Section 95 of the Act No. 258/2000 Coll., on public health protection and changes to certain related laws, effective until 31 October 2012. The extraordinary measure was effective only on the territory of the Czech Republic.

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7	12 September 2012	Control inspections ordered by the Police President were carried out in collaboration with public health authorities, local community authorities, the Czech Agriculture and Food Inspection Authority, and other authorities entitled to carry out control inspections. <b>D, E</b> <b>Sale regulation</b> <b>Consumer protection</b>	Numerous inspections targeting bars, restaurants, food stands and food trucks focused on the application of the ban on sale of alcohol by shots and sale of spirits with more than 30% alcohol content (31).
8	10 September 2012	The first report on methanol detection on the territory of the Czech Republic sent to the Rapid Alert System of Food and Feed. <b>D, E</b> <b>International institutional platform</b> <b>Information flows</b>	As an EU member, the Czech Republic is involved in the rapid alert system. In this case, the Rapid Alert System of Food and Feed (RASFF) is relevant. The first report on methanol detection on the territory of the Czech Republic was uploaded to the system on Monday 10 September 2012.
9	14 September 2012 17 September 2012	Health Safety Committee <b>D, E</b> <b>International institutional platform</b> <b>Information flows</b>	A special audio conference was held to share current information about the methanol outbreak.
10	19 September 2012 21 September 2012	European Commission's Standing Committee on Plants, Animals, Food and Feed – Section: "Biological safety of the food chain" (SCFCAH) (32). <b>D, E</b> <b>International institutional platform</b> <b>Information flows</b>	Providing latest information about the methanol outbreak.
11	September 14 2012	Ministry of Health <b>B, E</b> <b>Risk prevention</b> <b>Measure to limit the supply of alcohol</b> <b>Measure to limit the demand for alcohol</b>	Another extraordinary measure was issued (33) substantially extending the ban to include food companies, catering services and banning the offering, sale and other forms of marketing of spirits with 20% and more of ethanol content, including "tuzemák" (potato brown rum) and consumer spirits. The measure took effect as of its announcement <sup>2</sup> .
12	15 September 2012	Ministry of Health <b>B, E</b> <b>Measure concerning the ban to sale alcohol and spirits by shots, ban on export</b>	The third extraordinary measure was adopted (34), substantially regulating the domestic market and exports, banning the sale of alcohol by shots and the sale and export of spirits with more than 20% ethanol content.

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<sup>2</sup>Act No. 258/2000 Coll., on public health protection and changes to certain related laws, effective until 29 July 2013.

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13	18 September 2012	<p>Extraordinary measure discussed at the 17th meeting of the Radio and TV Broadcasting Council</p> <p><b>A, B</b></p> <p>Risk prevention</p> <p>Measure to limit the supply of alcohol</p> <p>Measure to limit the demand for alcohol</p>	<p>The meeting discussed a legal analysis of lawfulness of broadcasting advertisement for spirits. The Council adopted a conclusion that, for the duration of the extraordinary measure, broadcasting of advertisements for spirits explicitly listed in the measure would be in breach of the Advertising Regulation Act. Under Section 2(1a) of the Advertising Act, any advertisement for goods, services, activities or values, the sale, provision and/or distribution of which is prohibited by legal regulations, is banned. Since the sale of the specified spirits became illegal under the extraordinary measures, limiting or banning any advertisement of these products is in line with law. Thus, spirits explicitly listed in the extraordinary measure cannot be promoted in TV and radio broadcasting or through on-demand audio-visual services for the duration of the measure effectiveness (35).</p>
14	16 September 2012	<p><b>C, E</b></p> <p>Consumer protection (international level)</p>	<p>The Republic of Poland banned any import, distribution, sale and/or use of alcohol with 20% ethanol content or more. As of 17 September 2012, 23 persons were charged for violations of this ban; one third of which were methanol dealers and two thirds were sellers (36).</p>
15	18 September 2012	<p><b>C, E</b></p> <p>Consumer protection (international level)</p>	<p>The Slovak Public Health Authority issued a temporary ban on any distribution, sale and/or use of spirits with 20% or more of ethanol content manufactured in the Czech Republic. The measure took effect on 18 September 2012 at 5:00 p.m.</p>
16	20 September 2012	<p><b>D, E</b></p> <p>Consumer protection (international level)</p>	<p>The Ministry of Health issued the measure MZDR 32764/2012 (37) prohibiting food companies including catering services from offering for sale, selling and/or other forms of offering spirits with 20% and more of ethanol content, including "tuzemák" (potato brown rum) and consumer spirits. Simultaneously, the measure prohibited any distribution and/or export of spirits with 20% and more of ethanol content, including "tuzemák" and consumer spirits outside of the Czech Republic territory. This very strict measure was motivated by concerns that unless exports are regulated by the national authority, similar measures might be adopted by the European Union, lifting of which would then be more complicated and time demanding.</p>
17	27 September 2012	<p>Extraordinary measure issued by the Ministry on 27 September 2012 (38).</p> <p><b>D, E</b></p> <p>Consumer protection (distribution networks regulation)</p> <p>Risk prevention</p>	<p>Food companies including catering services were banned from offering, selling and other forms of marketing to end consumers of spirits with 20% and more of ethanol content, including "tuzemák" (potato brown rum) and consumer spirits produced after 31 December 2011, unless the goods had been accompanied by the proof of origin during all phases of distribution as per the Government Decree 317/2012 Coll., which introduced documentation of alcohol origin for certain types of spirits, distilled products and some other types of alcohol. Furthermore, food companies were prohibited from exporting and distributing outside of the Czech Republic spirits with 20% and more of ethanol content, including "tuzemák" and consumer spirits produced after 31 December 2011, unless the goods had been accompanied by a proof of origin during all phases of distribution as per the above Government Decree. Food companies including catering services were ordered to destroy in accordance with the Waste Act spirits with 20% and more of ethanol content, including "tuzemák" and consumer spirits in consumer packaging the seal of which was broken or damaged prior to the effect of this had been announced, with the exception of spirits with 20% and more of ethanol content, including "tuzemák" and consumer spirits that were certified to be law-compliant by an accredited laboratory, and to do so within 60 days of the measure's announcement. This extraordinary measure was lifted on 31 October 2013.</p> <p>The extraordinary measure referred to the Government Decree No. 317/2012 Coll., of 27 September 2012, which introduced documentation of alcohol origin for certain types of spirits, distilled products and certain types of alcohol.</p>

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18	24 September 2012	Announcement of results of the investigation A, B	The Police President announced that all significant suspects involved in the distribution of methanol had been identified, and that criminal proceedings had been open. As of this date, 10 tonnes of methanol had been seized (39) <sup>3</sup> .
Quantification of the impact on the healthcare, economic and social systems in the Czech Republic <sup>4</sup>			

A, B, C, D, E – five main objectives (27).

their (and their families) economic conditions and social lives. This opens up the question of researching and evaluating various aspects of the health, societal and economic impacts of harmful use of alcohol, and setting up processes to mitigate these impacts.

The response to the methanol outbreak can be also related to the recommendations of the European Action Plan to Reduce Harmful Use of Alcohol 2012–2020 in terms of formulation and/or reformulation of national policies in this area. Each country should consider carefully which of the recommended measures best fit their needs. Negative experience with the methanol outbreak and its fatal consequences should definitely inspire a strong review of institutional relations, uncover synergies of related activities, and involve more actors into these processes. In this respect, there is an opportunity to create and implement efficient alcohol policies focused on individuals, communities, local healthcare and social facilities, NGOs, the alcohol industry, as well as the Government.

Healthcare data registers could play an important role in these processes. Existing healthcare registers should expand their current databases and improve the quality of statistical data to be used to evaluate the health state of the Czech population in the context of alcohol consumption. Namely data on sources of unrecorded consumption, regional and sessional patterns, preferences of alcohol type as well as patterns among different population groups. A high-quality database shall allow the definition of particular indicators necessary for various monitoring systems focused on examining and evaluating population health as impacted by harmful alcohol use. Stronger cooperation between various sectors and ministries is legitimately expected in this respect. For example, in order to improve the efficiency of prevention programmes within school education, teachers should be provided with up-to-date materials for the prevention of alcohol misuse in the form of new information, recommendations, methodologies, etc. The negative experience and tragic outcomes of the methanol scandal can serve as an exemplary case of a human failure and criminal phenomena in the society.

The public health response to the 2012 outbreak, namely the activities of the Public Health Institutes and other public bodies like the Police or the Customs, may be considered as successful and adequate. Some improvement is possible in preparation of detailed guidelines for medical facilities, public health and public administration bodies, police and other relevant bodies. Specific strategies are also desirable to cover long-term changes in the quality of life of the affected people and survivors including long-term social health care, social services and community support.

The public health prevention measures may cover the specific consumption patterns related to the preferences for spirits and home-made alcohol, as well as an improvement in alcohol related health literacy.

## CONCLUSIONS

The public health dimension of methanol outbreaks has not been well discussed in available literature. In terms of the readiness of the healthcare systems for such threats, however, it is crucial to understand the response of public health authorities as well as the measures that these authorities tend to adopt. Statistics show that isolated cases of alcohol and methanol poisoning happen in the Czech Republic every year. However, the 2012 methanol outbreak was entirely unprecedented. Indeed, it was one of the biggest public health events on the territory of the Czech Republic at least since the end of WWII. The Regional Public Health Authority of the Moravian-Silesian Region deployed 170 specialists working in the field in more than 50 mobile units, thus covering the entire territory of the region. Further professionals were deployed in the other regions of the Czech Republic. The outbreak provided valuable information and experience for the further development of public health interventions as well as cooperation and coordination of public health actors in similar outbreaks in the future.

All measures adopted in the relevant timeframe and analysed in this study strongly focused on regulation, protection and prevention with the aim of stopping further consumption of contaminated alcohol distributed through unclear distribution and consumer channels and networks. We can see a huge potential of mapping and assessing such activities for a transformation of procedural and result-focused activities to public health policy support tools on all levels.

The international documents cited in this paper recommend that each country should formulate or review its national health policies in order to reflect the current health situation in the context of health determinants such as harmful use of alcohol, as well as the demographic structure of the population, global processes related to demographic aging, large regional disparities, and discrepancies in terms of the health status of the Czech population, the level of primary and social alcohol prevention, etc. For public health policies, it is crucial to make available and accessible high-quality relevant data on the health burden related to harmful alcohol use and integrate them into the set of monitoring

<sup>3</sup>Act No. 40/1995 Coll., on advertising regulation and changes and amendments to Act No. 468/1991 Coll., on the operation of TV and radio broadcasting, as amended.

<sup>4</sup>Pursuant to Act No. 185/2001 Coll., on waste and changes to certain other laws, as of December 31, 2012; classified as hazardous waste 16 03 05\* in the Waste Catalogue.

and evaluation indicators used in the national health policy. These indicators play an important role also in the process of developing and setting international benchmarking indicators needed to build and strengthen partnerships aimed at better coordination among relevant institutions and mobilisation of resources in order to eliminate harmful consequences of alcohol use.

An important issue is also a continuous development of monitoring systems on the regional as well as national and international levels with the aim of efficiently disseminate information for policies in this area. Last but not least, research should be also focused on phenomena such as the spread of western life-styles among young people, the unfavourable influence of the Internet and social networks, the changing status of families, etc. All these issues together open up opportunities to create horizontal and vertical structures in conceptual health policies that need to be constantly reviewed and that should not be created only as a formal exercise for the sake of strategic government documents in the field of health. They should, above all, initiate new institutional relations and detect any anomaly in health-related behaviours in the population in all its age groups. Stronger institutional ties and a creation of new separate local policies (reflecting current health and social needs of all regions including migration and economic conditions) as well as complex national policies will support preventive efforts in the country, and improve readiness to cope with unpredictable health and economic burdens such as the 2012 methanol outbreak.

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#### Conflict of Interests

None declared

#### REFERENCES

1. Tephly, TR. The toxicity of methanol. *Life Sci.* 1991;48(11):1031-41.
2. Zhang G, Crews K, Wiseman H, Bates N, Hovda KE, Archer JR, et al. Application to include fomepizole on the WHO model list of essential medicines [Internet]. Geneva: WHO; 2012 [cited 13 June 2018]. Available from: [https://www.who.int/selection\\_medicines/committees/expert/19/applications/Fomepizole\\_4\\_2\\_AC\\_Ad.pdf](https://www.who.int/selection_medicines/committees/expert/19/applications/Fomepizole_4_2_AC_Ad.pdf)
3. World Health Organization. WHO Global status report on alcohol and health 2018. Geneva: WHO; 2018
4. Formánek T, Kagström A, Cermakova P, Csémy L, Mladá K, Winkler P. Prevalence of mental disorders and associated disability: result from the cross-sectional CZEch mental health Study (CZEMS). *Eur Psychiatry.* 2019;60:1-6.
5. Kagstrom A, Alexova A, Tuskova E, Csajbók Z, Schomerus G, Formanek T, et al. The treatment gap for mental disorders and associated factors in the Czech Republic. *Eur Psychiatry.* 2019;59:37-43.
6. Barták M. Evaluation of qualitative interviews with survivors of methanol poisoning. (In print).
7. Mravčík V, Chomynová P, Grohmannová K, Janíková B, Tion Leštinová Z, Rous Z, et al. Annual report on drug situation 2016 – Czech Republic. Praha: Office of the Government of the Czech Republic; 2017.
8. Hassanian-Moghaddam H, Nikfarjam A, Mirafzal A, Saberinia A, Nasehi AA, Masoumi AH, et al. Methanol mass poisoning in Iran: role of case finding in outbreak management. *J Public Health (Oxf).* 2014;37(2):354-9.
9. Hassanian-Moghaddam H, Zamani N, Roberts DM, Brent J, McMartin K, Aaron C, et al. Consensus statements on the approach to patients in a methanol poisoning outbreak. *Clin Toxicol (Phila).* 2019;1-8. doi: 10.1080/15563650.2019.1636992
10. Zyoud SH, Al-Jabi SW, Sweileh WM, Awang R, Waring WS. Bibliometric profile of the global scientific research on methanol poisoning (1902-2012). *J Occup Med Toxicol.* 2015 May 3;10:17. doi: 10.1186/s12995-015-0062-9.
11. Krakowiak A, Piekarska-Wijatkowska A, Kobza-Sindlewska K, Rogaczewska A, Politański P, Hydzik P, et al. Poisoning deaths in Poland: types and frequencies reported in Łódź, Kraków, Sosnowiec, Gdańsk, Wrocław and Poznań during 2009-2013. *Int J Occup Med Environ Health.* 2017;30(6):897-908.
12. Roberts DM, Yates C, Megarbane B, Winchester JF, McLaren R, Gosselin S, et al. Recommendations for the role of extracorporeal treatments in the management of acute methanol poisoning: a systematic review and consensus statement. *Crit Care Med.* 2015;43(2):461-72.
13. Paasma R, Hovda KE, Tikkerberi A, Jacobsen D. Methanol mass poisoning in Estonia: outbreak in 154 patients. *Clin Toxicol (Phila).* 2007;45(2):152-7.
14. Hovda KE, Hunderi OH, Tafjord AB, Dunlop O, Rudberg N, Jacobsen D. Methanol outbreak in Norway 2002-2004: epidemiology, clinical features and prognostic signs. *J Intern Med.* 2005;258(2):181-90.
15. Kalkan S, Cevik AA, Cavdar C, Aygoren O, Akgun A, Ergun N, et al. Acute methanol poisonings reported to the Drug and Poison Information Center in Izmir, Turkey. *Vet Hum Toxicol.* 2003;45(6):334-7.
16. Jargin SV. Alcohol consumption in Russia: Distorted vision. *Health Edu Care.* 2018;3(2). doi: 10.15761/HEC.1000133
17. Zakharov S, Navratil T, Pelcova D. Fomepizole in the treatment of acute methanol poisonings: experience from the Czech mass methanol outbreak 2012-2013. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.* 2014;158(4):641-9.
18. Zakharov S, Pelcova D, Navratil T, Belacek J, Komarc M, Eddleston M, et al. Fomepizole versus ethanol in the treatment of acute methanol poisoning: comparison of clinical effectiveness in a mass poisoning outbreak. *Clin Toxicol (Phila).* 2015;53(8):797-806.
19. Zakharov S, Pelcova D, Urban P, Navratil T, Diblík P, Kuthan P, et al. Czech mass methanol outbreak 2012: epidemiology, challenges and clinical features. *Clin Toxicol.* 2014;52(10):1013-24.
20. Zakharov S, Pelcova D, Urban P, Navratil T, Nurieva O, Kotikova K, et al. Use of out-of-hospital ethanol administration to improve outcome in mass methanol outbreaks. *Ann Emerg Med.* 2016;68(1):52-61.
21. Rulisek J, Balik M, Polak F, Waldauf P, Pelcova D, Belohlavek J, et al. Cost-effectiveness of hospital treatment and outcomes of acute methanol poisoning during the Czech Republic mass poisoning outbreak. *J Crit Care.* 2017;39:190-8.
22. Šebáková H, Letošník R. The role of the public health protection authorities and other departments in the methanol case in the area of the Moravian-Silesian Region: meeting of secretaries of communities on 31 January 2014 [Internet]. Ostrava: Regional Public Health Authority of the Moravian Silesian Region; 2014 [cited 13 June 2018]. Available from: [http://www.khsova.cz/docs/01\\_aktuality/files/metanol\\_20140131.pdf](http://www.khsova.cz/docs/01_aktuality/files/metanol_20140131.pdf)
23. Šebáková H, Letošník R, Michálková L. Role of the Regional Public Health Authority of the Moravian-Silesian Region in the Methanol Case. *Hygiena.* 2013;58(3):134-7.
24. Belackova V, Janikova B, Vacek J, Fidesova, Miovsky M. "It can't happen to me". Alcohol drinkers on the 2012 outbreak of methanol poisonings and the subsequent prohibition in the Czech Republic. *Nordisk Alkohol Nark.* 2017;34(5):385-99.
25. Plichtová J. Content analysis and possibilities of its using in psychology. *Cesk Psychol.* 1996;40(4):304-14.
26. Miles MB, Huberman AM. Qualitative data analysis: an expanded sourcebook. Thousand Oaks: SAGE Publications; 1994.
27. World Health Organization. WHO global strategy to reduce the harmful use of alcohol. Geneva: WHO; 2010.
28. Zatloukalová Š. Establishment of the special team Methyl [Internet]. Police of the Czech Republic; 2012 [cited 13 June 2018]. Available from: <http://www.policie.cz/clanek/zpravodajstvi-zpravodajstvi-2012-zrizeni-specialniho-tymu-metyl.aspx>
29. Ministry of Health of the Czech Republic. Extraordinary measure related to the growing number of methanol poisoning as of 12 September 2012; ref. MZDR 32037/2012. Prague: Ministry of Health of the Czech Republic; 2012.

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30. Ministry of the Interior of the Czech Republic. Methanol – information of the Ministry of the Interior about measures taken following the epidemic of deaths from methanol in autumn 2012. Prague: Ministry of the Interior of the Czech Republic; 2013.
  31. Zatloukalová Š. Extraordinary measures of the Police of the Czech Republic [Internet]. Police of the Czech Republic; 2012 [cited 13 June 2018]. Available from: <http://www.policie.cz/clanek/mimoradne-opatreni-policie-cr.aspx>
  32. Ministry of Health of the Czech Republic. International collaboration in the case of methanol. Attachment to ref. 32605/2012. Prague: Ministry of Health of the Czech Republic; 2012.
  33. Ministry of Health of the Czech Republic. Extraordinary measure related to the growing number of methanol poisoning as of 14 September 2012; ref. MZDR 32317/2012. Prague: Ministry of Health of the Czech Republic; 2012.
  34. Ministry of Health of the Czech Republic. Information to the Extraordinary measure of the Ministry of Health of the Czech Republic ref. MZDR 32317/2012 related to the growing number of methanol poisoning as of 15 September 2012. Prague: Ministry of Health of the Czech Republic; 2012.
  35. RRTV. Press release – legal status of the Council for Radio and Television Broadcasting to broadcasting advertisement of alcohol as of 18 September 2012. Prague: Council for Radio and Television Broadcasting; 2012.
  36. Hulan T. Summary information on the case „Methyl“ [Internet]. Police of the Czech Republic; 2012 [cited 13 June 2018]. Available from: <http://www.policie.cz/clanek/souhrnne-informace-ke-kauze-metyl.aspx>
  37. Ministry of Health of the Czech Republic. Extraordinary measure related to methanol poisoning as of 20 September 2012; ref. MZDR 32764/2012. Prague: Ministry of Health of the Czech Republic; 2012.
  38. Ministry of Health of the Czech Republic. Extraordinary measure related to methanol poisoning as of 27 September 2012; ref. MZDR 33888/2012. Prague: Ministry of Health of the Czech Republic; 2012.
  39. Hulan T, Zatloukalová Š. „METHYL“ – information up to now [Internet]. Police of the Czech Republic; 2012 [cited 13 June 2018]. Available from: <http://www.policie.cz/clanek/metyl-dosavadni-informace.aspx>.
  40. Act No. 258 of July 14, 2000, on protection of public health. Sbirka zákonů ČR. 2000 Aug 11;Pt 74:3622-62. (In Czech.)
  41. Act No. 40 of February 9, 1995, on advertising regulation and on amendments to Act No. 468/1991 Coll., on the operation of radio and television broadcasting as amended. Sbirka zákonů ČR. 1995 Mar 14;Pt 8:467-9.

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