DOUBLE TROUBLE:
METHANOL OUTBREAK IN THE WAKE OF THE COVID-19 PANDEMIC IN IRAN

- A CROSS-SECTIONAL ASSESSMENT -
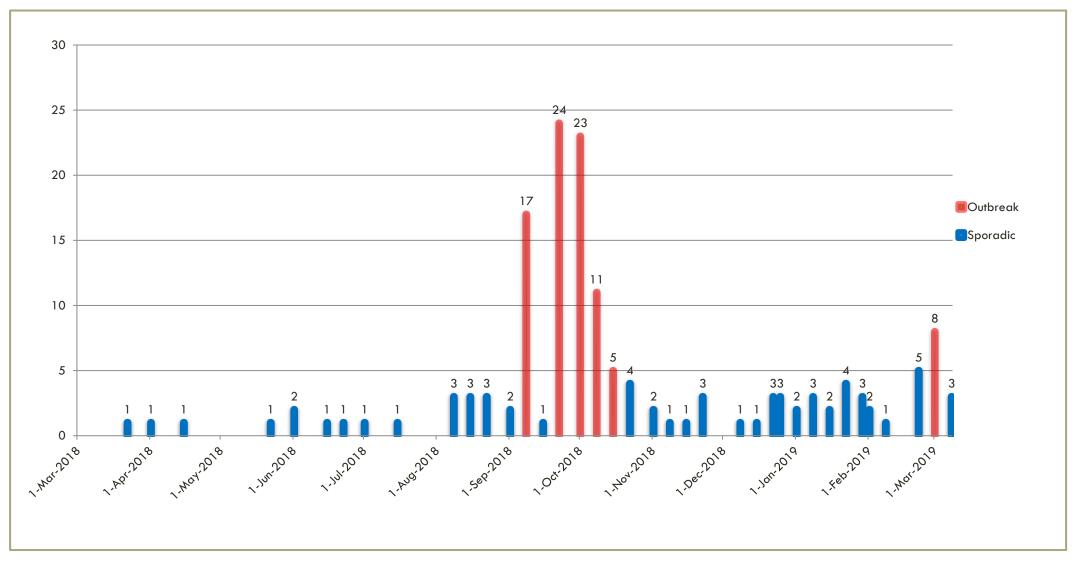
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BACKGROUND: METHANOL POISONINGS

- Methanol = toxic alcohols

- Toxicity is not immediate: Several hours' time lag between ingestion and first symptoms of poisoning

- Alcoholic beverages that contain methanol do not have distinct alarming characteristics

- Limited time for treatment: impaired vision and blindness in non-fatal cases, high mortality rate

- Poisoning cases:
  - Mostly sporadic events
  - But: When people drink methanol-contained alcohol socially (e.g. weddings, holidays): Ability to cause a local outbreak

PRE COVID-19: METHANOL POISONING ADMISSIONS AT LOGHMAN-HAKIM HOSPITAL (TEHRAN)

One-year timeline (2018-19): outbreaks (red) vs. sporadic events (blue)

MESSAGING, COVID-19, AND ALCOHOL USE:

WHO warning, April 2020:

"Under no circumstances should you drink any type of alcoholic product as a means to preventing or treating COVID-19 infection"

MEANWHILE IN IRAN…
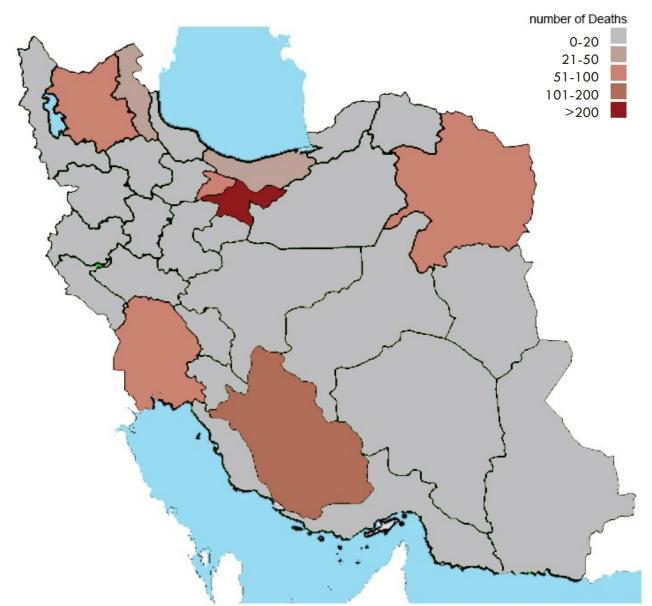
- Epicenter of COVID-19 in the Middle East: 655k infected cases and 36,985 deaths to date

- Co-occurrence of a large methanol outbreak from late February 2020:
  - Triggered by false claims on social media that consumption of disinfectants and alcohols could prevent and treat COVID-19 infection.
  - Rise in alcohol demand made bootleggers decolorate industrial alcohols containing pyridine (to deter from consumption) using bleach, before selling to customers for drinking

AIM

To assess the scope of the Iranian methanol outbreak during COVID-19, in terms of hospitalization and mortality data

- National databases of the Iranian Ministry of Health (MOH)

- Legal Medicine Organization (LMO)

- Analysis period: February 23rd (date of first documented COVID-19 case in Iran) until May 2nd, 2020

METHANOL MORTALITY BY PROVINCE: LMO DATA, 23.02.-02.05.2020

number of Deaths

0-20
21-50
51-100
101-200
>200

METHANOL POISONING CASES AND FATALITIES IN IRAN (23.02.-02.05.2020)

Province	Poisoning cases: hospital admissions (source: MOH)	Methanol deaths*	
		In hospital (source: MOH)	Total registered (source: LMO)
Tehran	1177	87	205
Khuzestan	1079	93	88
Fars	812	99	139
Razavi Khorasan	581	67	78
East Azerbaijan	483	50	75
Alborz	248	43	52
Ardebil	223	22	31
Isfahan	207	6	19
Kerman	139	0	2
Kermanshah	132	2	2
Mazandaran	100	10	28
Yazd	96	12	10
Markazi	87	4	4
Kurdestan	79	0	9
The other provinces	433	39	58
Total	**5876**	**534** (9.1% fatality rate)	**800**

*Brain-dead cases considered dead
MOH Ministry of Health, *LMO* Legal Medicine Organization (data is available through https://bit.ly/2WUBfZo)

DISCUSSION

- In the first three months of COVID-19, Iran faced the largest ever methanol outbreak reported in the literature.

- Hospital admission rates (5,876 patients) five times higher than the second-largest methanol outbreak in history (Libya, March 2013: 1,066 patients)

- But: 33% discrepancy in fatality rates (i.e. (800-534)/800*100) between MOH and LMO data. Possible reasons:
  - Out-of-hospital deaths
  - Difficulties in hospital-based diagnosis of methanol poisoning
  - Limited diagnostic equipment
  - Lack of physician knowledge of methanol toxicity

DISCUSSION (CONT'D)

- In methanol poisoning, the efficacy of medical treatment is markedly reduced in delayed presentations

- During situations like the pandemic where health care institutions may seem like a dangerous area, patients may be afraid to be hospitalized or even see a doctor

- "active case finding" by treating physicians and the public health sector

- A simple assay to detect methanol content of alcohols to avoid unsafe drinking

- Non-fatal vision-impaired or blindness in adolescents and adults

- In-depth knowledge of methanol poisonings is required to build a proper preparedness system for diagnosis, treatment and prevention.

NEXT STEPS

- Now full access to LMO and MOH datasets → data linkage study

- **Key questions:**
  - How many fatal cases went undetected in hospital? (These cases likely received inadequate treatment due to false diagnosis)
  - Review treatment process: time from ingestion to diagnosis and to treatment
  - **Subset of cases:** Prospective self-report data available on motivation for alcohol use (recreational use vs. fear of COVID-19)
    - Data collected by residents and fellows in training at Loghman Hakim Hospital
    - Analyze data to develop health education messaging

CONCLUSIONS

✓ COVID-19 misinformation is a threat to human lives

✓ Time is sensitive during outbreak emergencies!

✓ Need for evidence-based messaging campaigns to reduce transmission of COVID-19 and concurrent health issues, incl. methanol outbreaks

During this coronavirus pandemic, 'fake news' is putting lives at risk: UNESCO

Critical Care

Check for updates

Double trouble: methanol outbreak in the wake of the COVID-19 pandemic in Iran—a cross-sectional assessment

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Iran has been the epicenter of COVID-19 in the Middle East, with a total of 120,198 infected cases and 8556 deaths as of June 10 [1]. The pandemic has been complicated by the co-occurrence of a large methanol outbreak in Iran, seemingly triggered by false claims that consumption of disinfectants and alcohols could prevent and treat COVID-19 infection. According to local news, the ensuing rise in ethanol demand made bootleggers decolorate industrial alcohols containing pyridine (to deter from consumption) using bleach, before selling them as regular ethanol to Iranians.

case fatality rate of approximately 9% (534/5876). LMO registered 800 deaths from methanol poisoning during the same period (see Table 1 and Fig. 1), comprising both in-hospital and community-based fatalities. This 33% discrepancy in deaths between MOH and LMO data (i.e., (800−534)/800 × 100) may have several explanations. For instance, LMO data also includes out-of-hospital deaths and is likely more accurate. Moreover, a hospital-based diagnosis of methanol poisoning is difficult and complicated by the lack of diagnostic equipment or physician knowledge. Therefore, methanol poisoning may

ACKNOWLEDGMENTS