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Alcohol and drug presence in traffic crash fatalities before and after the COVID-19 pandemic: Evaluation of the fatality analysis reporting system (FARS) and linked medical examiner-vital records data in Clackamas, Multnomah, and Washington County, Oregon, 2019–2021

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ABSTRACT

Traffic fatalities, with and from increased risky behaviors (reduced seat belt use, increased impairment from licit and illicit substances), have been increasing, especially during the COVID-19 pandemic. Death certificates are a major source of epidemiologic data in the United States, but have known underreporting of drug and alcohol presence. The Fatality Analysis Reporting System (FARS) is one major source of data on fatal crashes with intoxication. This study links FARS data for three counties in Oregon (2019–2021) with local medical examiner and death certificate data (FARS source data) and compares their concordance with blood alcohol concentration and toxicology for three major drug classes by year. For drivers only, our study finds good concordance between FARS and its source data in 2019 but poor concordance in 2020. This discordance may impact future analysis of impaired crash deaths, and we list some suggestions for amelioration.

1. Introduction

Traffic crashes are a leading cause of death in the U.S. In 2021, the number of people killed in traffic crashes increased 10 % over 2020, from 39,007 to 42,939 deaths, and the fatality rate per 100,000 vehicle miles traveled increased by 2.2 % [1]. In 2019, the U.S. had the highest population based traffic crash death rate among 29 high-income countries [2]. During the height of the COVID-19 pandemic in 2020, more people died in the U.S. from traffic crashes than in any year since 2007, even with a decrease in number of miles driven during that time [3]. The National Highway Traffic Safety Administration (NHTSA) reported an increase in speeding, not using seat belts, and use of alcohol and drugs in 2020 compared to similar time periods in 2019 [4]. Traffic crashes have a huge societal cost; the estimated cost in 2019 for crashes in the United States was $340 billion, or more than $1035 for every person [5].

Impairment by legal and illegal substances (e.g., alcohol, marijuana, cocaine, methamphetamine) is a risk factor for traffic crashes [6,7]. Alcohol's involvement in crash deaths is well-described [8–11]. Martin et al.'s review of the literature showed that the most important variables related to impairment were the level (concentration) of alcohol as well as the complexity of the driving task [8]. The role of drugs in fatal crashes is more difficult to quantify [7,12]. Although studies exist describing impairment and road crashes due to substances, there is not scientific consensus on standard values (such as a cut-off of 0.08 g/dL for alcohol), due to factors such as tolerance, drug interaction, and a lack of a relationship between impairment and blood concentration of drugs [7,10,12]. For example, some drugs stay detectable for weeks after use (i.e., cannabis), so a positive test does not necessarily indicate impairment at the time of the crash [13].

Information gleaned from death certificates is imperative to describe the epidemiology of deaths, as well as to guide policy and resource allocation at the federal, state, and local level [9,14,15]. Each death certificate contains demographic information on the decedent, as well as information about the manner and cause of death. The cause of death information on the death certificate consists of two parts. The first part (Part I) of the cause of death is the "chain of events" leading directly to death with the immediate cause on "Line a." The purpose of the second part (Part II) of the cause of death is to list "other significant conditions

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contributing to death but not resulting from the underlying cause given in Part I" [16,17].

Research suggests that death certificates fail to capture the true extent of alcohol and drug involvement in motor vehicle crashes [9,18]. Castle et al. demonstrated that the underreporting of alcohol involvement in traffic crashes between 1999 and 2009 was substantial; the estimate of underreporting was 84 %, meaning that only one of every six traffic crash deaths due to alcohol impairment was reported [9]. There are several potential reasons for this underreporting. Not all states have the same requirements for blood alcohol testing of drivers killed in traffic crashes; some only test based on certain criteria such as probable cause that the motorist was driving under the influence of alcohol or drugs; some states only test if the data will be used solely for statistical purposes [19]. Often, death certificates must be issued soon after death – before blood alcohol concentration (BAC) testing or drug toxicology testing is completed [9]. In this case, the medical examiner or coroner must file a supplemental report or amend the pending death certificate to include alcohol and/or drugs as a contributing cause. In some cases, even when the BAC exceeds the legal limit, or when licit or illicit substances are detected, coroners or medical examiners may not be certain that alcohol and/or drugs contributed to the death and will choose not to report it [9,20]. In short, variations in state law and guidelines for medical examiners and coroners result in inconsistent reporting practices. Despite this, the National Center for Health Statistics (NCHS) recommends that if "alcohol and/or other substances" are believed to have contributed to death, then that information should be listed as a contributing cause (pg. 12) [15]. Of drivers who have previously crashed and survived, the driver BAC of >50 mg/dL [>0.05 g/dL] was the most significant and independent predictor of a recurring crash [21].

The Fatality Analysis Reporting System (FARS), maintained by the NHTSA, is a national census in the United States that covers motor vehicle crashes occurring on public roads, where at least one death occurs within 30 days of the crash. FARS has data on blood alcohol tests of persons who died in traffic crashes, as well as other toxicology testing data, and in many ways is considered the definitive source for information on fatal crashes on U.S. roads and highways [6,22]. Important health measures, such as the Council of State and Territorial Epidemiologists (CSTE) alcohol related crash deaths indicator, and the Healthy People 2030 objective to reduce the proportion of motor vehicle crash deaths that involve a drunk driver, utilize FARS [23,24]. However, FARS has limitations in the recording of drug information, such as a lack of quantitative level reporting (i.e., presence or absence only). Because FARS gathers information from multiple sources, including medical examiner (ME) reports, but not death certificates, comparing FARS to primary source data such as ME reports could be useful to more accurately describe the prevalence of drugs and alcohol among persons killed in motor vehicle crashes [6,25].

Given the wide-ranging effects of the COVID-19 pandemic not only on driving behavior (e.g., increased use of alcohol and drugs while driving [26]), but on data collection systems [27,28], it is critical to validate the data underlying national crash statistics. Further, quantifying and describing traffic deaths is important as deaths rise; understanding the role of alcohol and drug presence can inform local prevention efforts. Medical examiners routinely test blood and bodily fluids as part of their death investigation process (in Oregon as defined by Oregon Revised Statute 146) [29], and in a perfect system, these results would be used as the sole source for the FARS alcohol/drug information. Therefore, examining both systems can enhance our understanding of reporting of drug and alcohol test results in traffic crash fatalities.

In this study, we describe limited characteristics of all persons dying in fatal traffic crashes in the Portland, OR, metro area between 2019 and 2021 as determined by FARS, and, for drivers, compare toxicology in FARS to ME toxicology results. We describe 2019 as "pre-pandemic" and 2021 as "post-pandemic" to highlight the fact that much of 2020 was affected by stay at home orders. We then compare agreement between the two systems for each year. We further determine if the final death certificates for drivers have drugs or alcohol listed as contributing causes of death.

2. Methods

2.1. Data sources

The data sources used in this analysis are described in the following sections (see also Fig. 1).

2.2. Data source 1: fatality analysis reporting system (FARS)

FARS data are managed by NHTSA and are collected in all 50 states plus the District of Columbia and Puerto Rico through cooperative agreements (in Oregon, the Oregon Department of Transportation or ODOT is the managing agency). We downloaded 2019, 2020, and 2021 final files FARS data directly from NHTSA as SAS files. We merged data from the crash, person, and drug files by unique identifier (STATE_NO), person identifier (PERSON_NO, and vehicle number (VEH_NO). We limited records to fatal injuries (INJ_SEV = 4) occurring in Clackamas, Multnomah, and Washington County, Oregon. FARS does not include deaths that happened more than 30 days after the crash event, or occurred on private property.

2.3. Data source 2: medical examiner (ME) reports

Oregon Revised Statute 146.090 requires investigation of any apparently accidental deaths or deaths resulting from injury [29]. Oregon has a semi-centralized ME system, where the State Medical Examiner maintains statutory authority, but counties perform their own death investigations [30]. We obtained the ME data for this study from MDILog (Occupational Research & Assessment Inc., Big Rapids, Michigan), the case management software used by all County and State ME staff to record information relating to death investigation. By using date of crash, date of death (if different from crash date), age, sex, and location of crash information from FARS, we manually matched each record to a subsequent ME case, resulting in a matched FARS-ME dataset. Toxicology results are not routinely input electronically into the ME database, so results (saved as documents) were input manually into a spreadsheet and later merged into the final file by the MDILog ID number without other identifying details.

2.4. Data source 3: vital records (death certificates)

Each ME record contains a death certificate number, which we used to match the FARS-ME data to the vital records data. We used the following ICD-10 codes to identify cases as having any multiple cause of death code related to alcohol and drugs (adapted from Ref. [25]).

- T51 (toxic effects of alcohol);
- X45 (poisoning by and exposure to alcohol-accidental intent);
- X65 (poisoning by and exposure to alcohol-intentional intent);
- Y15 (poisoning by and exposure to alcohol-undetermined intent);
- T36-50 (acute poisoning by drugs).

Although this is a somewhat narrow definition of alcohol and drug involvement (i.e., limited to acute intoxication and does not include mental or behavioral disorders due to substance abuse), it is in alignment with the NCHS coding of injury, where deaths from injuries receive a code for the nature of the injury as well as the cause of the injury (e.g., the substances involved) [31].

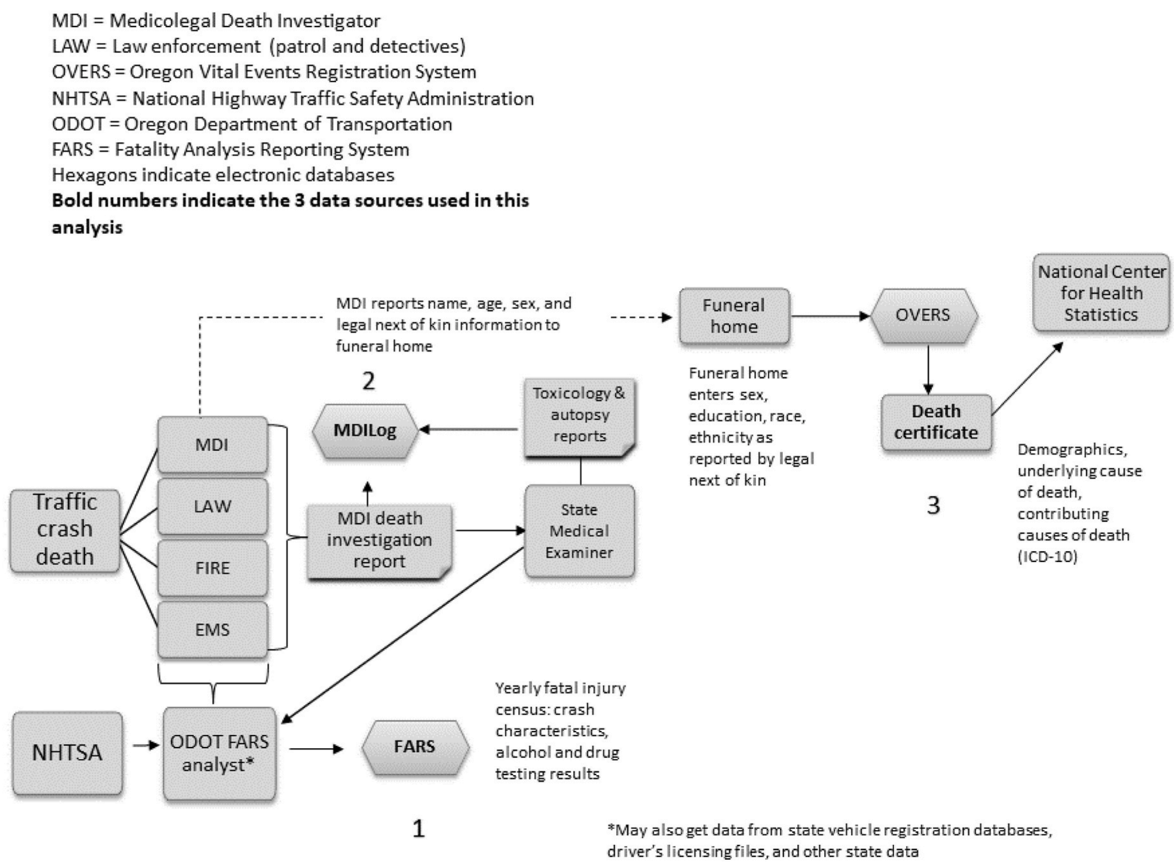

Fig. 1. Data sources.

2.5. Data definitions

2.5.1. Blood alcohol concentration (BAC)

Oregon Revised Statute 146.113 requires a blood sample be drawn to test for alcohol and if requested, controlled substances if the deceased is over the age of 13 [32]. A county death investigator under the order and authority of the State Medical Examiner usually collects this sample. The results of the toxicology testing are input from a separate system into MDILog, typically as a PDF document. This toxicology information is eventually reported to FARS via the cooperative agreement mentioned previously. We used the ME alcohol result as a numeric value measured in grams per deciliter (g/dL), where not detected was recorded as zero (0), and a value that exceeded the testing linearity (i.e., $\geq$0.40 g/dL) as 0.40 g/dL. If alcohol testing was not performed, the value was set to missing (although rare, testing may not occur if pre or post mortem samples are not available).

In Oregon, legal impairment by intoxicants is defined for alcohol as a minimum concentration of 0.08 percent or more by weight [this is equivalent to 0.08 g/dL) [33].

2.5.2. Positive drug tests

We coded the substances in the Clackamas, Multnomah, and Washington County Medical Examiner reports to correspond with the equivalent substance in the FARS coding manual [34]. The groups of substances tested were narcotics (e.g., fentanyl, heroin), stimulants (e.g., methamphetamine, cocaine), and depressants (e.g., benzodiazepines). We defined a positive drug result as any non-zero value. Results could be from either urine, vitreous or blood specimen types.

2.6. Statistical analysis

We describe limited crash characteristics (county of occurrence, person type, lighting type, and weather conditions) by year using FARS. Year refers to the year the death occurred. Deaths do not always occur on the same day (and, rarely, the same year) as the crash. FARS requires a death occur within 30 days of the crash to be included in its yearly count, so cases not meeting these criteria were not included in the analysis. To compare percent agreement between alcohol and drug testing results between FARS and ME reports, we calculated a Kappa statistic and report this as percent agreement. Data for this section were limited to only drivers because it is unclear how to interpret positive values of alcohol and drugs for non-drivers (e.g., passengers, pedestrians). We conducted all analyses with SAS 9.4 (SAS Institute, Cary, North Carolina).

This analysis was considered public health practice, and review by an institutional review board was not sought.

3. Results

3.1. Data source 1: fatality analysis reporting system (FARS)

More than half of fatal crashes in the Portland, OR metro area occurred in Multnomah County (N = 230, 56 %) (Table 1). Decedents were most frequently reported as drivers (N = 229, 56 %), followed by pedestrians (n = 111, 27 %), passengers (N = 51, 12 %) and bicyclists/persons on personal conveyance devices (N = 18, 4 %). More than half of total crashes occurred in the dark (N = 212, 52 %) and nearly half occurred under clear conditions (N = 176, 43 %). However, for both lighting and weather, the proportion of cases with no information reported was much higher in 2020 compared to 2019 and 2021.

3.2. Data source 2: medical examiner (ME) data with toxicology results

All FARS records were matched with a corresponding medical

Table 1
Select characteristics, FARS data, 2019–2021.

County	2019	2020	2021	TOTAL
	N (%)	N (%)	N (%)	N (%)
Clackamas	33 (26)	36 (25)	35 (26)	104 (25)
Multnomah	65 (50)	85 (59)	80 (59)	230 (56)
Washington	31 (24)	23 (16)	21 (15)	75 (18)
Person Type				
Driver of a motor vehicle	64 (50)	83 (58)	82 (60)	229 (56)
Passenger of a motor vehicle	22 (17)	18 (13)	11 (8)	51 (12)
Pedestrian	36 (28)	36 (25)	39 (29)	111 (27)
Bicyclist or person on a personal conveyance device	7 (5)	7 (5)	4 (3)	18 (4)
Lighting	N (%)	N (%)	N (%)	N (%)
Light	55 (43)	40 (28)	53 (39)	148 (36)
Dark	63 (49)	78 (54)	71 (52)	212 (52)
Dawn/dusk	5 (4)	4 (3)	6 (4)	15 (4)
Unknown/not reported	6 (5)	22 (15)	6 (4)	34 (8)
Weather				
Clear	61 (47)	41 (28)	74 (54)	176 (43)
Cloudy	27 (21)	22 (15)	30 (22)	79 (19)
Rain	14 (11)	28 (19)	16 (12)	58 (14)
Other/Unknown/not reported	27 (21)	53 (37)	16 (12)	96 (24)
TOTAL	**129 (32)**	**144 (35)**	**136 (33)**	**409 (100)**

examiner record by manually reviewing crash date, crash location, sex, and age of decedent. For 229 drivers, we obtained alcohol and drug testing results. Seventy-seven decedents had any positive alcohol result (Table 2), and 102 had any positive drug (stimulant, narcotic, or depressant (Table 3).

3.3. Data source 3: vital records (death certificates)

The FARS-ME data described above was joined to the death certificate vital records data using the medical examiner record number. We retained the underlying and multiple cause of death codes only using this data source. Four death certificates had alcohol as a contributing cause of death (Table 2), and 4 had a positive drug (Table 3). Since more than one drug could be listed on any one death certificate, 4 is the deduplicated total for the sum shown in Table 3.

3.4. Kappa analysis

Table 2 presents the results of the Kappa analysis for blood alcohol testing in drivers (N = 229), while Fig. 2 displays the frequency distribution of positive BAC. In 2019, there was perfect agreement between the FARS dataset and the ME reports. The mean alcohol concentration for drivers using ME reports was 0.199 g/dL, or nearly two and half times the legal limit for impaired driving in Oregon. In 2020, the concordance between datasets was low (38 %), with 12 positive FARS reports and 35 positive ME reports. The mean concentration of alcohol in 2020 was 0.169 g/dL, or two times the legal limit. In 2021, the concordance between the data sets increased to 88 %. The mean concentration of alcohol in 2021 was 0.151 g/dL, or slightly less than twice the legal limit. Four death certificates had a contributing cause code indicating alcohol in the three-year time-period. The mean alcohol level for those four death certificates was 0.263 g/dL, vs. 0.165 g/dL for the remaining deaths where the death certificate had no alcohol contributing factors listed (data not shown). Out of the 229 driver death certificates evaluated for this study, 77 had a positive alcohol concentration (any non-zero level), and 68 had concentrations greater or equal to 0.08 g/dL (Fig. 2). Among drivers with a positive alcohol result, the most frequently reported concentration was 0.2 g/dL, or around two and a half times greater than the legal limit in Oregon (Fig. 2).

Table 3
Agreement between FARS and ME for select drug categories (limited to drivers, N = 229).

	Percent agreement	FARS Positive	ME Positive	# death certificates with any drug as contributing cause
2019				
Stimulants	95 %	13	14	1
Depressants	100 %	1	1	1
Narcotics	84 %	7	6	1
2020				
Stimulants	37 %	6	21	2
Depressants	23 %	1	7	2
Narcotics	25 %	2	12	2
2021				
Stimulants	80 %	17	23	1
Depressants	100 %	7	7	1
Narcotics	89 %	9	11	1

Table 3 presents the results of the Kappa analysis for select drug categories in drivers (N = 229). Percent agreement in 2019 was high in all three categories, ranging from 84 % for narcotics to 95 % for stimulants and 100 % for depressants. Out of 229 death certificates, one had any drug code as a contributing cause of death (the same certificate had 3 drug types). In 2020, as with alcohol, system concordance was much lower, ranging from 23 % for depressants to 37 % for stimulants and 25 % for narcotics. Two of 229 death certificates had any drug as a contributing cause (the same certificates had all 3 types). In 2021, concordance was closer to pre-COVID-19 levels (80 % for stimulants, 89 % for narcotics, and 100 % for depressants), and one death certificate had any drug as a contributing cause (again, the same certificate had 3 drug types).

4. Discussion

The COVID-19 pandemic affected many facets of society, including motor vehicle fatalities. Although there was a reduction in overall traffic volume in early 2020, due to stay at home orders and routine telework, the U.S. saw an increase in traffic crash fatalities during this time [3]. Other factors posited for influencing this increase in fatal crashes include an increase in risky behaviors, changing gas prices, and a reduction in law enforcement [35,36]. FARS is the sole national source of publicly accessible data on fatal crashes and thus it is critical that the information is accurate and reliable. This cross-sectional study showed that concordance between FARS and ME in 2019 and 2021 was good (between 80 % and 100 % agreement in one alcohol and three drug categories), but poor in 2020 (between 23 % and 38 % agreement). The non-pandemic year concordance values agree with other studies that showed good to moderate concordance between FARS and source data [6,25]. However, results for both alcohol and drug testing indicate at least some misalignment between source data and FARS, even in the

Table 2
Agreement between FARS and ME for alcohol (limited to person type = driver, N = 229).

	Percent agreement	FARS Positive (any alcohol concentration)	ME Positive (any alcohol concentration)	Mean BAC (g/dL) from ME reports	# death certificates with alcohol listed as contributing cause
2019	100 %	18	18	0.199	1
2020	38 %	12	35	0.169	3
2021	88 %	20	24	0.151	0

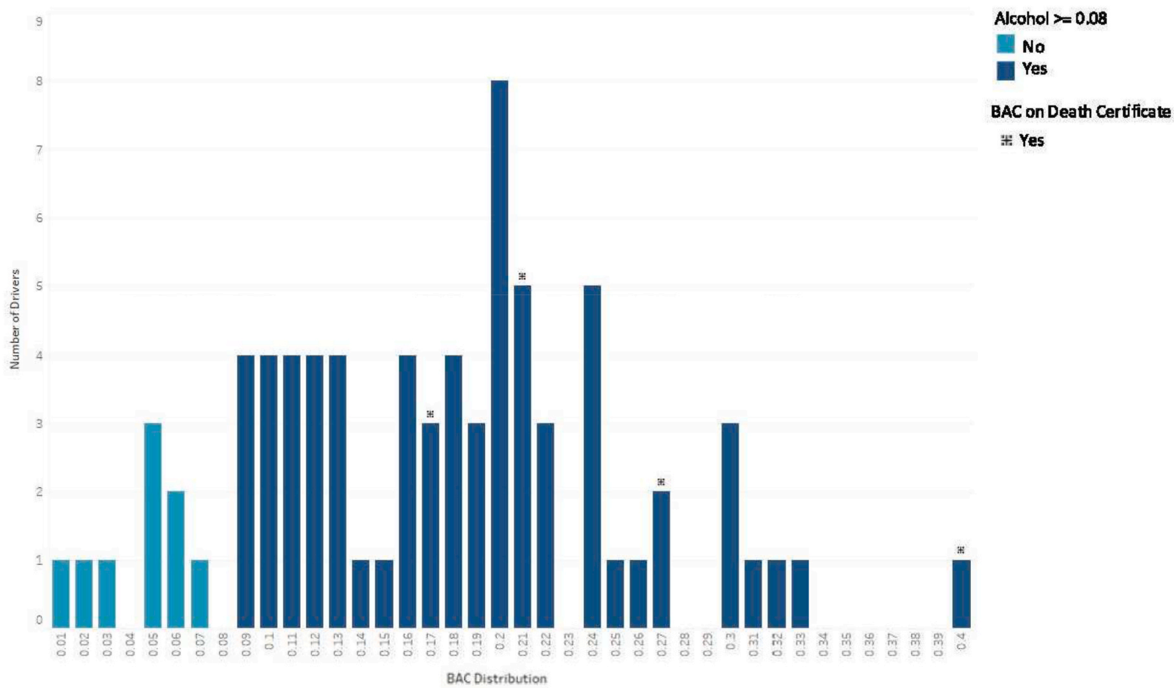

Fig. 2. Distribution of BACs for drivers involved in fatal traffic crashes in Clackamas, Multnomah, and Washington County, OR, 2019–2021.

absence of the COVID-19 pandemic. The magnitude of misalignment may vary by jurisdiction as well as time, and warrants additional consideration by epidemiologists and researchers.

Castle et al. demonstrated that states with mandatory blood alcohol testing laws, like Oregon, had overall testing rates higher than states without testing laws, but that testing rates were not correlated with reporting alcohol involvement on death certificates [9]. Whether alcohol or drugs are listed on Part II of a death certificate is up to the certifying pathologist. We reported that of the 229 death certificates we evaluated for this study, 77 had a positive alcohol concentration and 68 had concentrations greater than or equal to 0.08 g/dL. There were four alcohol mentions listed on Part II of four death certificates, and the same certifying pathologist completed all four. The mean BAC for these 77 records was more than twice the legal definition of impairment in Oregon (0.170 g/dL; range 0.011 g/dL to 0.40 g/dL) (data not shown).

Previous researchers have proposed several reasons for the divergence between positive BAC and listing alcohol as contributory on the death certificate. These reasons can be grouped into two main themes [9,20]: 1) Uncertainty whether a high BAC contributed to the death. With each decedent having their own health conditions, legal and illegal substance use, and array of driving behaviors, it is challenging to say with legal certainty that a high BAC forensically contributed to the death. 2) A delay in receiving the results of toxicology tests when a final death certificate could be filed quickly if including alcohol was not necessary.

Both issues could potentially be addressed in ways that could be minimally onerous to the already overworked and underfunded ME system. For theme one, we suggest that if the BAC is above the legal limit of 0.08 g/dL that alcohol be automatically listed as a contributing cause on Part II of the death certificate. This is similar to the definition of a fatal alcohol-impaired crash in FARS, which is driver with a BAC of 0.01 g/dL or above [3].

Implementing this process would mean that a death certificate pending toxicology could be initially issued by a County ME if the underlying cause is already listed by the State ME (e.g., in the case of traffic crashes, the Part 1 cause of death is often blunt force trauma). The County ME, with oversight or standing orders from the State ME, could amend Part II with the final alcohol result if the concentration is over the legal limit. The proposed process for death certificate amendment after alcohol test results are returned is already the standard process for agencies who perform forensic toxicology testing for suspected drug-related deaths, except all work is performed by the State Medical Examiner. Shifting the burden to the County ME could minimize the work required by the State ME.

For substances other than alcohol, there is not a clear-cut solution, since there is not one specified cut off level for impairment (impairment being affected by other factors such as metabolism, chronic use, sex, and health status, etc.), and the distinction between presence and impairment is unclear [37]. A meta-analysis by Elvik et al. showed that use of drugs is associated with a "modest" increased odds of being in a traffic crash [7]. Since Oregon impairment laws indicate that the detection of any "intoxicant" is against statute ["… the influence of any combination of intoxicating liquor, cannabis, psilocybin, a controlled substance and an inhalant"], there could be argument to amend Part II of the death certificate with any illegal drug level detected. Practically, we think that making drug level data available electronically is a more feasible and cost-effective solution (both in FARS as well as the death investigation database).

Related to theme two, data modernization standards affect the ability to identify ME records with positive alcohol or drug results. When toxicology testing results are finalized, there is often no interoperability between systems, so results are instead uploaded as documents. The MDILog database has the capability for inputting toxicology results in searchable fields, but this is a manual process. It took many hours of epidemiologists' time for this analysis to manually open each document and transcribe the results to a spreadsheet. To reproduce this analysis would be difficult in the future if this process does not change. At a minimum, we would recommend a trained staff person who could help enter results into the database under proper oversight until such time that the data systems can communicate with each other and send results automatically.

During our study, we noticed that one fatality from 2019 that had both alcohol and drugs listed as contributing causes on the death certificate had negative (zero) results in both FARS and ME data. We notified the original investigator and pathologist, and subsequently found out that the alcohol as a contributing cause was listed in error. The original pathologist amended the death certificate, and our study results reflect the new, updated information. We note that this is a highly unusual occurrence; as we previously discussed, it is typically underreporting that is a problem for alcohol and drug testing results and death certificates.

We note some limitations to our study. Our County MEs function within a semi-State-based ME system and those jurisdictions who function in different systems (e.g., coroner based) may experience different results. Further limitations include the lack of quantitative toxicology within FARS, though the authors had access to the forensic toxicology results from the ME. Without direct access to quantitative toxicological testing, this study would not be reproducible. Finally, we limited our sample size for the toxicology analysis to drivers only, because it is unclear how positive alcohol or drug results in other road users (passengers, pedestrians, bicyclists) should be interpreted. Although not in the scope of our study, we emphasize protecting all road users by implementing safe systems approaches [38]. Such approaches note that humans are imperfect and make mistakes, but that any death or serious injury is unacceptable. Reducing risk requires that all parts of the transportation system are strengthened (e.g., roadways designed to protect all users, reduction in speed limits, more vehicles with features that help prevent crashes).

5. Conclusions

Public health interventions rely on complete, accurate, and timely data in order to identify trends, protect vulnerable subgroups, and create interventions to limit and eliminate harm. These interventions often require the use of multiple data systems, each of which has strengths and limitations. FARS is and continues to be an important data source. The utilization of FARS for common health indicators (such as the HP 2030 drunk driving measure), however, might be precisely because alcohol is known to be underreported on death certificates. Further, the analysis of crash data using FARS is complex, and the delay in obtaining recent data is about 2 years [13]. In addition, our analysis showed that FARS data in 2020 was not reflective of true available toxicology data. Death certificates, on the other hand, remain one of the most widely utilized sources for epidemiologic research. Analysis can be performed at the local level (using access to one's own vital records data) or using online public query tools, such as CDC WONDER [39]. The time lag in death data is now typically shorter, with some preliminary information available months after death. Therefore, omitting alcohol intoxication as a contributory factor on a death certificate would continue to underrepresent the impact that alcohol has on traffic related deaths. If the authors were hypothetically able to add alcohol to Part II of death certificates to all deaths where the driver BAC is at least 0.08 g/dL, this would increase the number of alcohol related driver deaths in the tri county area from 4 to 68 in the time period of our study. We therefore recommend consideration of the following actions.

1) Train staff to enter drug and alcohol results into the electronic database so that results can be obtained and analyzed more easily.
2) Ensure interoperability between the death investigation databases and the toxicology testing databases so that manual entry is not required.
3) Create a process to amend death certificates for drivers who have died from the crash itself but who had an alcohol concentration of at least 0.08 g/dL. Put this information into the Part II section of the death certificate.
4) Provide the necessary support to ME's offices to list drug names on death certificates when considered contributory. Make this a universal practice.

Data availability

Due to the use of confidential identifying information, data are not available upon request. FARS data is freely available online.

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Human participant compliance statement

This analysis was considered public health practice, and review by an Institutional Review Board was not sought.

CRediT authorship contribution statement

Jaime K. Walters: Writing – review & editing, Writing – original draft, Supervision, Resources, Methodology, Formal analysis, Data curation, Conceptualization. **Kimberly K. Repp:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Molly C. Mew:** Writing – review & editing, Writing – original draft, Validation, Formal analysis, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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