



Kentucky Occupational Motor Vehicle Injury Surveillance Program

Background

In 2021, occupational motor vehicle crashes (OMVCs) were the leading cause of occupation-related fatalities in the U.S. (33%) and in Kentucky (38%) (Bureau of Labor Statistics, 2022, 2023). To track OMV-related injuries in Kentucky, the Kentucky Occupational Safety and Health Surveillance (KOSHS) fundamental program developed two state-specific, population-based, OMV-related occupational health indicators (OHIs): OHI #26 (occupational motor vehicle collisions first reports of injury claims filed with workers' claims by injury year) and OHI #27 (fatal and nonfatal occupational motor vehicle collision injuries) (Bunn et al., 2023).

These OHIs are developed using the Workers' Compensation (WC) and Collision Reporting and Analysis System for Highways (CRASH) data sources, respectively. Because these OHIs are based on sole-source data elements, injury risk associated with OMV crashes is assumed to be underestimated, especially for certain occupations and industries (such as farm workers, sales representatives, gig drivers [e.g., Uber or Lyft drivers], and highway incident managers) that may be difficult to capture through these two surveillance sources. Heavy vehicles such as buses, semi-trucks, and dump trucks infer occupation relatedness as these vehicle types are used less commonly for personal use. Conversely, when the units involved in occupation-related crashes are smaller passenger vehicles and pickup trucks, those crashes are more difficult to identify as OMVs given that the vehicle types are commonly used for personal use.

Considering these limitations, a critical shortcoming of OMV surveillance is the inability to identify OMV crashes involving light and medium vehicles (e.g., vans, passenger cars, small delivery trucks) through the existing crash data sources and methods. To provide a more complete picture of the magnitude of the occupational health problem, the Occupational Motor Vehicle Injury Surveillance (OMVIS) system was developed in Kentucky using existing data from available sources. OMVIS employs machine learning using crash record narratives to identify ambiguous occupation-related crashes involving light and medium vehicles and uses probabilistic linkage of crashes to other databases to define additional work-related crashes.

Beginning in 2020, many changes in usual traffic patterns such as decreased overall vehicle miles traveled, a higher number of deliveries, and an increase in the frequency of the use of services that are typically provided with small and light vehicles (Bureau of Transportation Statistics, 2021) occurred in response to the COVID-19 pandemic. Therefore, the Kentucky crash dataset from 2019 was used to avoid bias and to establish pre-pandemic OMVC numbers that can later be compared to pandemic and post-pandemic numbers.





Results

The crash narrative data mining component of OMVIS consists of a targeted, machine learning approach using a Python script model to efficiently identify OMVCs. A 5-year database is used to examine trends. For each year, crashes involving heavy vehicles and buses as well as all vehicles that can be identified as a work vehicle (e.g., taxis, emergency vehicles, publicly owned vehicles, military vehicles, etc.) are removed. The results from this analysis are summarized in Table 1. The data show a consistent pattern of identified OMV crashes that increased in 2020 and remained constant in the following years. The team speculates this increase in OMV crashes in light and medium vehicles could be due to increased home deliveries during the early phases of the COVID-19 pandemic. The data also indicate that the magnitude of OMV crashes is greater than previously considered when only heavy vehicles were reported as OMV crashes. In this case, the total for the five-year period is 94,853 crashes, representing approximately 14% of the total crashes.

Table 1. OMV Crashes in Kentucky, 2019–2023

Year	Vehicle Type			Total Crashes
	Heavy	Special	Small/Medium	
2019	13,610	2,197	4,750	157,111
2020	10,401	1,848	4,181	119,947
2021	12,283	1,879	4,510	131,732
2022	12,847	1,875	4,261	130,303
2023	13,118	1,950	4,659	139,022
Total	62,259	9,749	22,361	678,115

OMVIS also utilizes a probabilistic linkage for identifying additional crashes that can be considered as OMV through an examination of WC, outpatient and inpatient hospital (OPH and IPH), and emergency medical services (EMS) records. The same five-year crash database was utilized as input to this linkage. To ensure that each record is uniquely identified in OMVIS, an analysis is performed to filter and exclude those records that are already identified in the narrative data mining effort. Table 2 shows the results of this process in identifying additional crash records that were not captured in the data in Table 1.

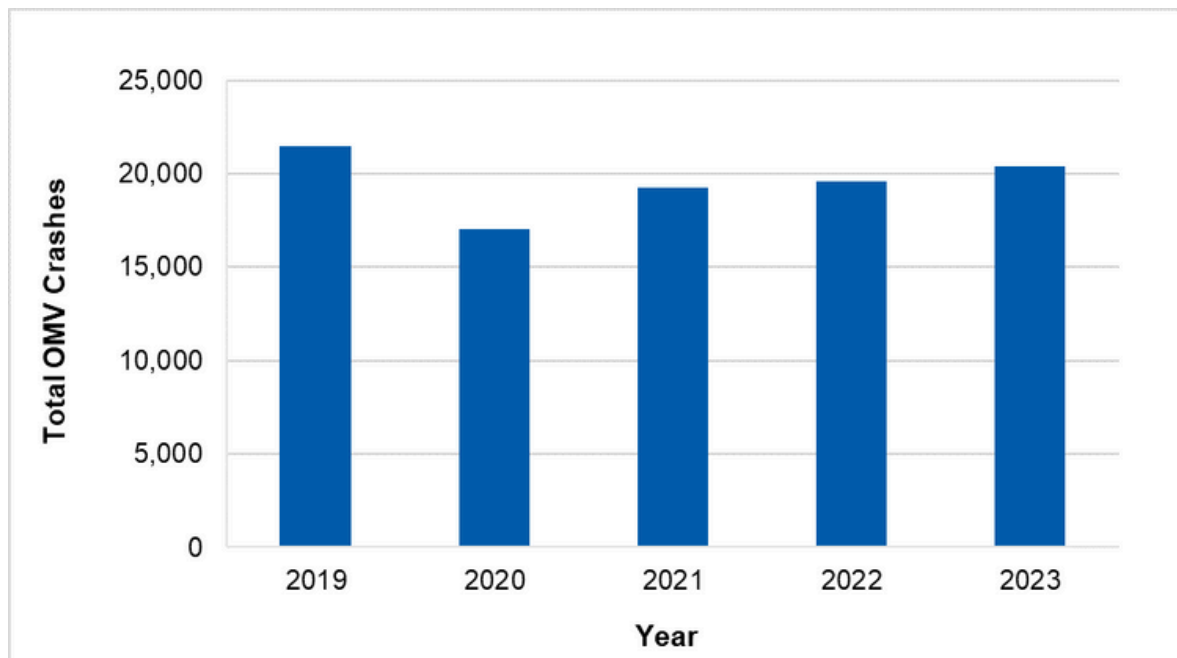


Table 2. New OMV Crashes in Kentucky through Probabilistic Linkage, 2019–2023

Year	Database				Total
	WC	IPH	OPH	EMS	
2019	298	21	403	113	835
2020	197	17	297	37	548
2021	172	12	278	39	501
2022	181	18	281	49	529
2023	185	12	304	50	551
Total	1,033	80	1,563	288	2,964

OMVIS’ analysis indicates that the overall number of OMV crashes in Kentucky is higher than previously reported. These crashes are illustrated in Figure 1.

Figure 1. Total OMV Crashes in Kentucky, 2019–2023



A review of OMVIS crashes shows that of the 3,648 fatal crashes in Kentucky during the 5-year period, 697 (19.1%) are identified as OMV. Most of these involved heavy vehicles. Table 3 presents the number of crashes identified by each of the OMVIS databases. The fatal crashes from the non-CRASH database are new crashes that were not captured in the CRASH database as OMV fatal crashes.

Table 3. Fatal OMV Crashes in Kentucky, 2019–2023

Year	Database							Total
	CRASH			WC	IPH	OPH	EMS	
	Heavy	Special	Small/Medium					
2019	104	15	5	9	2	10	3	148
2020	101	15	11	7	3	9	2	148
2021	112	16	13	5	0	6	0	152
2022	90	13	12	8	2	4	1	130
2023	103	13	17	6	0	4	0	143
Total	510	72	58	35	7	33	6	721



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