Using Telematics for Traffic Safety

Data Sources

Analyzing driving behavior based off of smartphone sensors

Accelerometer
Identifies phone position with axis-based motion sensing.

Gyroscope
Works with accelerometer to determine position of phone.

Magnetometer
Measures magnetic fields.

GPS
Identifies phone location with multiple satellites.

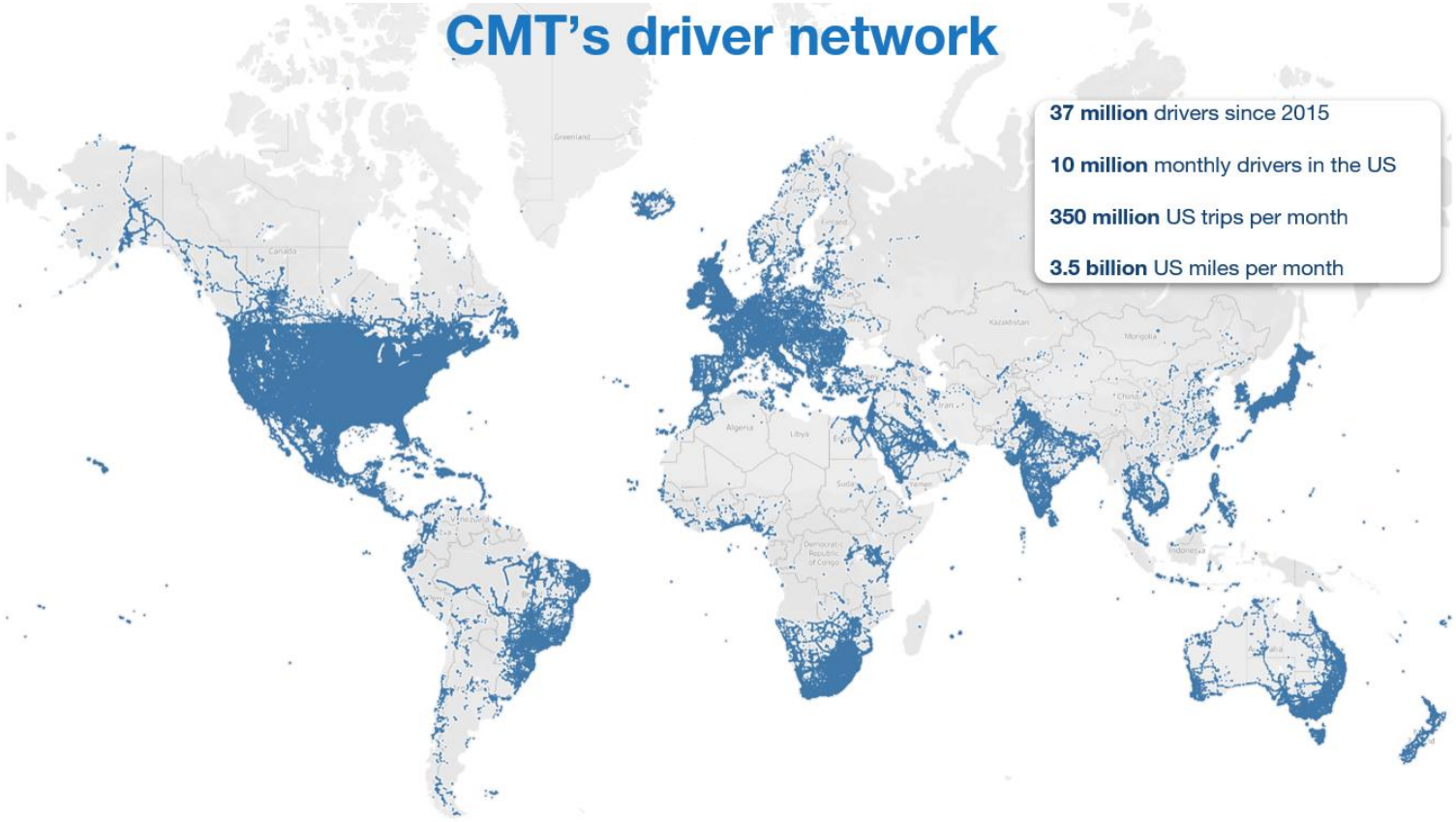
Barometer
Measures air pressure.

Proximity sensor
Determines the proximity of the phone to nearby objects.

Ambient Light
Measures the amount of light near the phone.

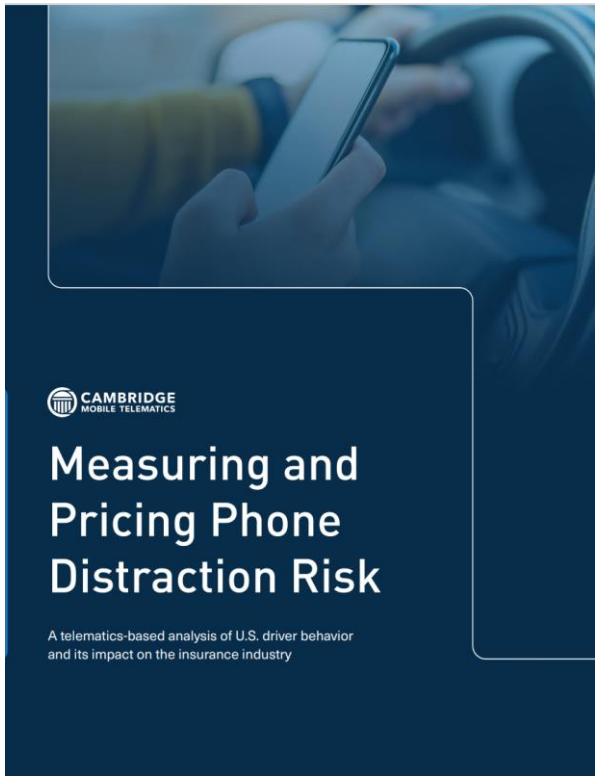
Telematics data uses **smartphone sensors** to detect hard braking, acceleration, speeding and distracted driving.

Large Data Set



CAMBRIDGE MOBILE TELEMATICS

In depth research on distracted driving for four years



2020-2024

2020-2023

US Road Risk Behaviors

	2020	2023	Change
Screen interaction time per hour	1:47	2:06	17.8%
Phone motion time per hour	1:26	1:31	5.8%
Phone motion above 50 mph	33.3%	35%	5.1%
Handheld call time per hour	0:31	0:27	-12.9%
Hands-free call time per hour	3:19	3:47	14.1%
Speeding time per hour	2:05	2:02	-2.4%
Hard braking per 100 miles	3.34	2.96	-11.4%

The utility of telematics data for estimating the prevalence of driver handheld cellphone use, 2019–2022

August 2023

Ian J. Reagan
Jessica B. Cicchino
Eric R. Teoh

Table 1

Estimates of drivers on handheld cellphone calls during daytime, 2019–2022: NOPUS percentage of drivers holding phones to ears compared with CMT percentage of trips and percentage of total trip time with handheld calls

	2019			2020			2021		
	NOPUS drivers (%)	CMT trips (%)	CMT total trip time (%)	NOPUS drivers (%)	CMT trips (%)	CMT total trip time (%)	NOPUS drivers (%)	CMT trips (%)	CMT total trip time (%)
Region									
Northeast	2.0	3.4	0.7	1.1	2.8	0.5	1.8	2.6	0.5
South	3.8	4.8	1.1	4.4	4.3	1.0	3.1	4.1	0.9
Midwest	3.3	4.2	1.0	2.0	3.5	0.8	2.9	3.3	0.7
West	1.5	3.1	0.6	1.5	2.6	0.5	1.6	2.4	0.5
Weekdays [1]	3.2	4.6	1.1	3.0	4.0	0.9	2.6	3.7	0.9
Rush hours [2]	3.2	4.5	1.1	3.0	3.9	1.0	2.6	3.7	0.9
Non-rush hours	3.1	4.6	1.0	3.0	4.1	0.9	2.6	3.8	0.8
Weekends [3]	2.0	3.4	0.6	1.6	3.0	0.6	2.2	2.9	0.5
Overall	2.9	4.1	0.9	2.6	3.5	0.8	2.5	3.3	0.7

[1] Weekdays include Monday through Friday from 7:00 a.m. to 5:59 p.m.

[2] Rush hours include 7:00 a.m.–9:29 a.m. and 3:00 p.m.–5:59 p.m.; non-rush hours include 9:30 a.m.–2:59 p.m.

[3] Weekends include Saturday and Sunday from 7:00 a.m. to 5:59 p.m. on both days.

Table 2

Estimates of drivers manipulating cellphones during daytime, 2019–2022: NOPUS percentage of drivers manipulating phones compared with CMT percentage of trips and percentage of total trip time with phone motion

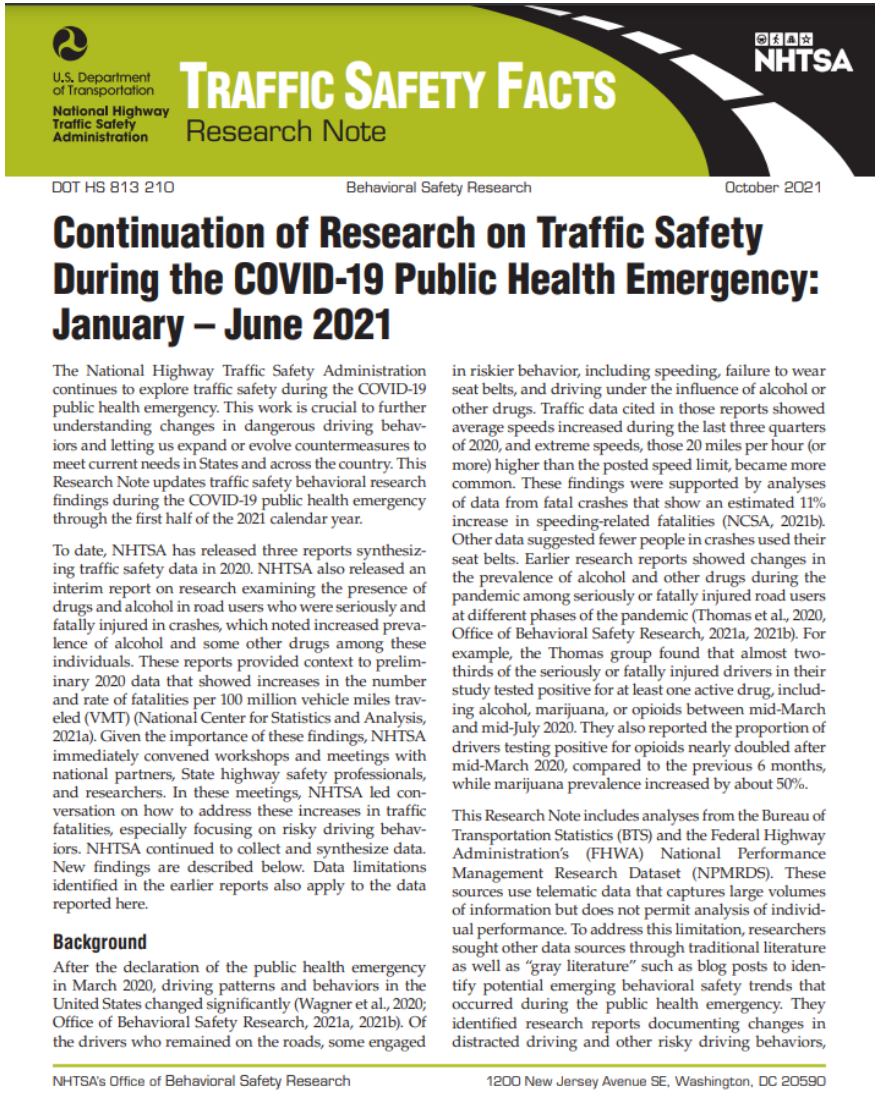
	2019			2020		
	NOPUS drivers (%)	CMT trips (%)	CMT total trip time (%)	NOPUS drivers (%)	CMT trips (%)	CMT total trip time (%)
Region						
Northeast	2.3	31.5	2.3	2.8	30.6	2.4
South	3.4	34.5	2.5	3.1	35.2	2.6
Midwest	2.4	29.3	2.0	2.4	30.0	2.1
West	3.0	31.5	2.1	2.5	31.0	2.1
Weekdays [1]	3.1	32.4	2.3	2.9	32.5	2.4
Rush hours [2]	2.9	33.4	2.2	2.8	33.1	2.3
Non-rush hour	3.3	31.4	2.3	3.1	32.0	2.4
Weekends [3]	2.3	31.0	2.1	2.3	31.3	2.2
Overall	2.9	32.2	2.2	2.8	32.5	2.4

[1] Weekdays include Monday through Friday from 7:00 a.m. to 5:59 p.m.

[2] Rush hours include 7:00 a.m.–9:29.a.m. and 3:00 p.m.–5:59 p.m.; non-rush hours include 9:30 a.m.–2:59 p.m.

[3] Weekends include Saturday and Sunday from 7:00 a.m. to 5:59 p.m. on both days.

Publication by FHWA & NHTSA



U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Research Note

NHTSA

DOT HS 813 210 | Behavioral Safety Research | October 2021

Continuation of Research on Traffic Safety During the COVID-19 Public Health Emergency: January – June 2021

The National Highway Traffic Safety Administration continues to explore traffic safety during the COVID-19 public health emergency. This work is crucial to further understanding changes in dangerous driving behaviors and letting us expand or evolve countermeasures to meet current needs in States and across the country. This Research Note updates traffic safety behavioral research findings during the COVID-19 public health emergency through the first half of the 2021 calendar year.

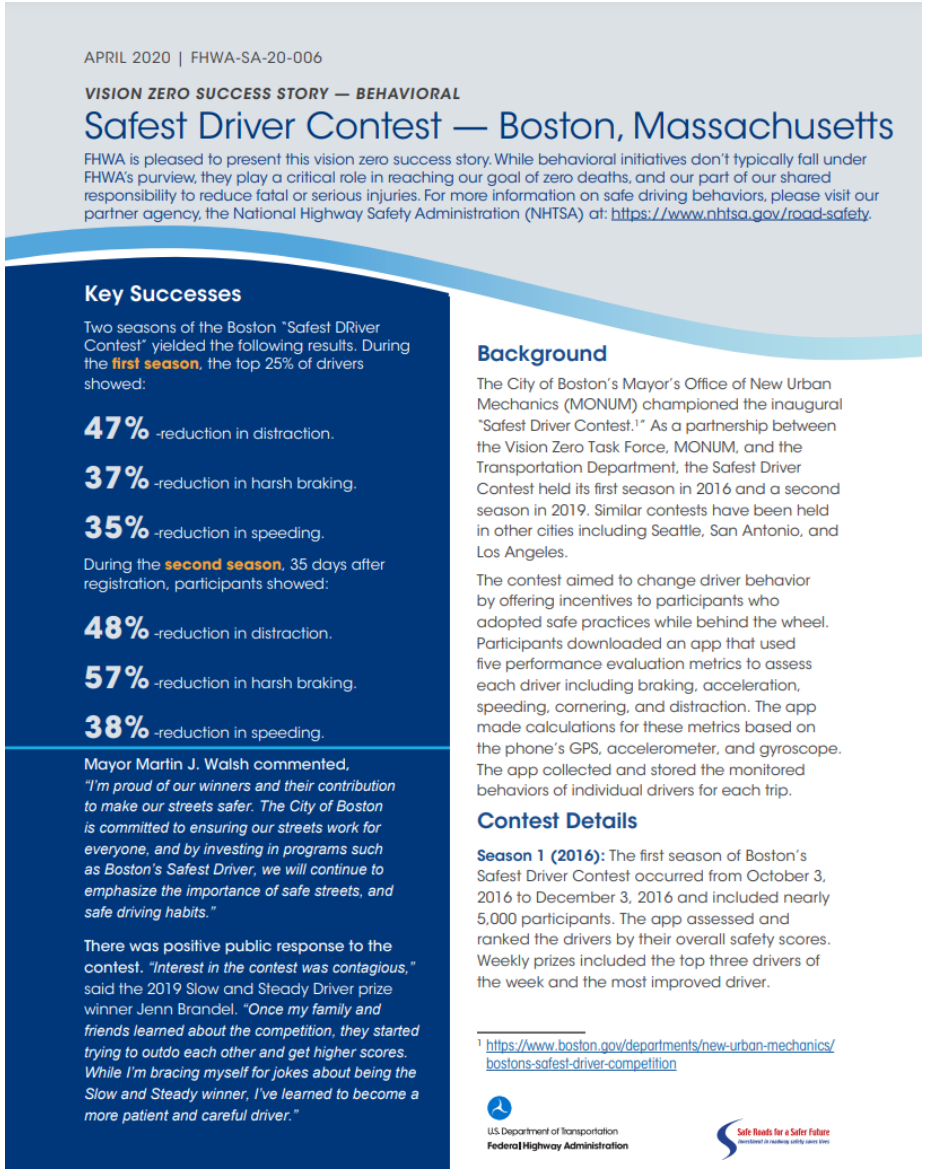
To date, NHTSA has released three reports synthesizing traffic safety data in 2020. NHTSA also released an interim report on research examining the presence of drugs and alcohol in road users who were seriously and fatally injured in crashes, which noted increased prevalence of alcohol and some other drugs among these individuals. These reports provided context to preliminary 2020 data that showed increases in the number and rate of fatalities per 100 million vehicle miles traveled (VMT) (National Center for Statistics and Analysis, 2021a). Given the importance of these findings, NHTSA immediately convened workshops and meetings with national partners, State highway safety professionals, and researchers. In these meetings, NHTSA led conversation on how to address these increases in traffic fatalities, especially focusing on risky driving behaviors. NHTSA continued to collect and synthesize data. New findings are described below. Data limitations identified in the earlier reports also apply to the data reported here.

Background

After the declaration of the public health emergency in March 2020, driving patterns and behaviors in the United States changed significantly (Wagner et al., 2020; Office of Behavioral Safety Research, 2021a, 2021b). Of the drivers who remained on the roads, some engaged in riskier behavior, including speeding, failure to wear seat belts, and driving under the influence of alcohol or other drugs. Traffic data cited in those reports showed average speeds increased during the last three quarters of 2020, and extreme speeds, those 20 miles per hour (or more) higher than the posted speed limit, became more common. These findings were supported by analyses of data from fatal crashes that show an estimated 11% increase in speeding-related fatalities (NCSA, 2021b). Other data suggested fewer people in crashes used their seat belts. Earlier research reports showed changes in the prevalence of alcohol and other drugs during the pandemic among seriously or fatally injured road users at different phases of the pandemic (Thomas et al., 2020, Office of Behavioral Safety Research, 2021a, 2021b). For example, the Thomas group found that almost two-thirds of the seriously or fatally injured drivers in their study tested positive for at least one active drug, including alcohol, marijuana, or opioids between mid-March and mid-July 2020. They also reported the proportion of drivers testing positive for opioids nearly doubled after mid-March 2020, compared to the previous 6 months, while marijuana prevalence increased by about 50%.

This Research Note includes analyses from the Bureau of Transportation Statistics (BTS) and the Federal Highway Administration's (FHWA) National Performance Management Research Dataset (NPMRDS). These sources use telematic data that captures large volumes of information but does not permit analysis of individual performance. To address this limitation, researchers sought other data sources through traditional literature as well as "gray literature" such as blog posts to identify potential emerging behavioral safety trends that occurred during the public health emergency. They identified research reports documenting changes in distracted driving and other risky driving behaviors,

NHTSA's Office of Behavioral Safety Research | 1200 New Jersey Avenue SE, Washington, DC 20590



APRIL 2020 | FHWA-SA-20-006

VISION ZERO SUCCESS STORY — BEHAVIORAL

Safest Driver Contest — Boston, Massachusetts

FHWA is pleased to present this vision zero success story. While behavioral initiatives don't typically fall under FHWA's purview, they play a critical role in reaching our goal of zero deaths, and our part of our shared responsibility to reduce fatal or serious injuries. For more information on safe driving behaviors, please visit our partner agency, the National Highway Safety Administration (NHTSA) at: https://www.nhtsa.gov/road-safety.

Key Successes

Two seasons of the Boston "Safest DRiver Contest" yielded the following results. During the **first season**, the top 25% of drivers showed:

47% -reduction in distraction.

37% -reduction in harsh braking.

35% -reduction in speeding.

During the **second season**, 35 days after registration, participants showed:

48% -reduction in distraction.

57% -reduction in harsh braking.

38% -reduction in speeding.

Mayor Martin J. Walsh commented, *"I'm proud of our winners and their contribution to make our streets safer. The City of Boston is committed to ensuring our streets work for everyone, and by investing in programs such as Boston's Safest Driver, we will continue to emphasize the importance of safe streets, and safe driving habits."*

There was positive public response to the contest. *"Interest in the contest was contagious,"* said the 2019 Slow and Steady Driver prize winner Jenn Brandel. *"Once my family and friends learned about the competition, they started trying to outdo each other and get higher scores. While I'm bracing myself for jokes about being the Slow and Steady winner, I've learned to become a more patient and careful driver."*

Background

The City of Boston's Mayor's Office of New Urban Mechanics (MONUM) championed the inaugural "Safest Driver Contest."[1] As a partnership between the Vision Zero Task Force, MONUM, and the Transportation Department, the Safest Driver Contest held its first season in 2016 and a second season in 2019. Similar contests have been held in other cities including Seattle, San Antonio, and Los Angeles.

The contest aimed to change driver behavior by offering incentives to participants who adopted safe practices while behind the wheel. Participants downloaded an app that used five performance evaluation metrics to assess each driver including braking, acceleration, speeding, cornering, and distraction. The app made calculations for these metrics based on the phone's GPS, accelerometer, and gyroscope. The app collected and stored the monitored behaviors of individual drivers for each trip.

Contest Details

Season 1 (2016): The first season of Boston's Safest Driver Contest occurred from October 3, 2016 to December 3, 2016 and included nearly 5,000 participants. The app assessed and ranked the drivers by their overall safety scores. Weekly prizes included the top three drivers of the week and the most improved driver.

[1] https://www.boston.gov/departments/new-urban-mechanics/bostons-safest-driver-competition

U.S. Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future

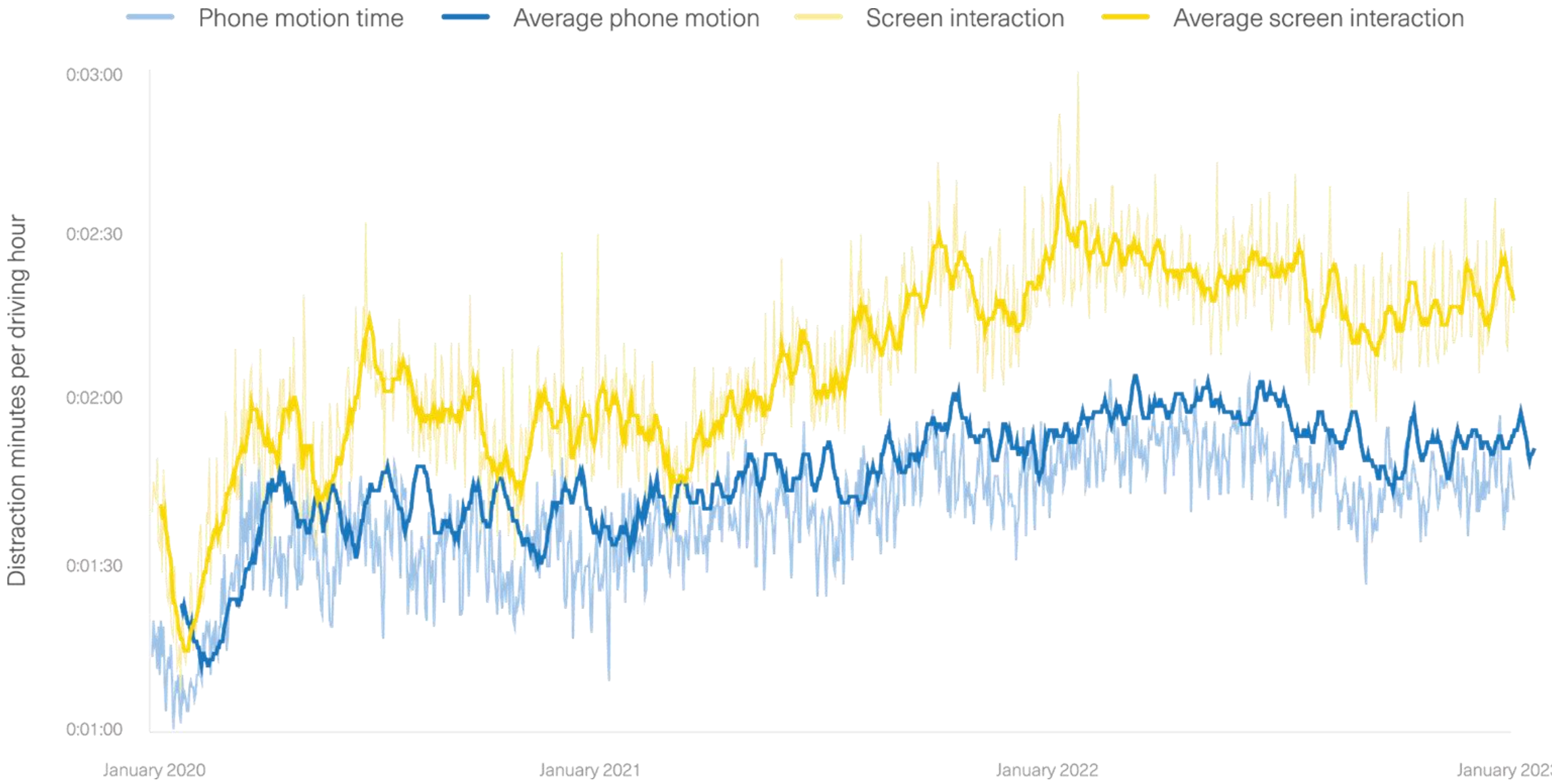
What does CMT data say?

Cell Phone Distractions Under Reported

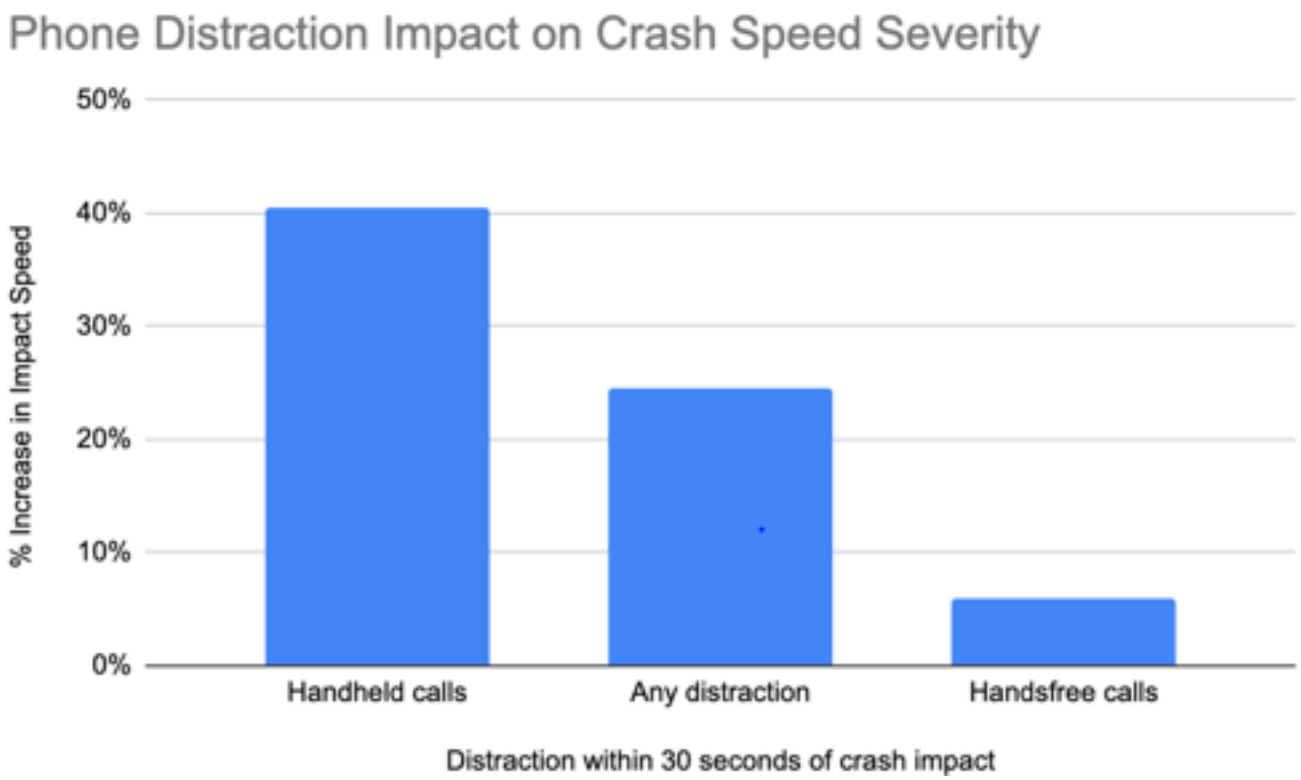
34%

OF DRIVERS WERE DISTRACTED THE MINUTE BEFORE THEY CRASHED

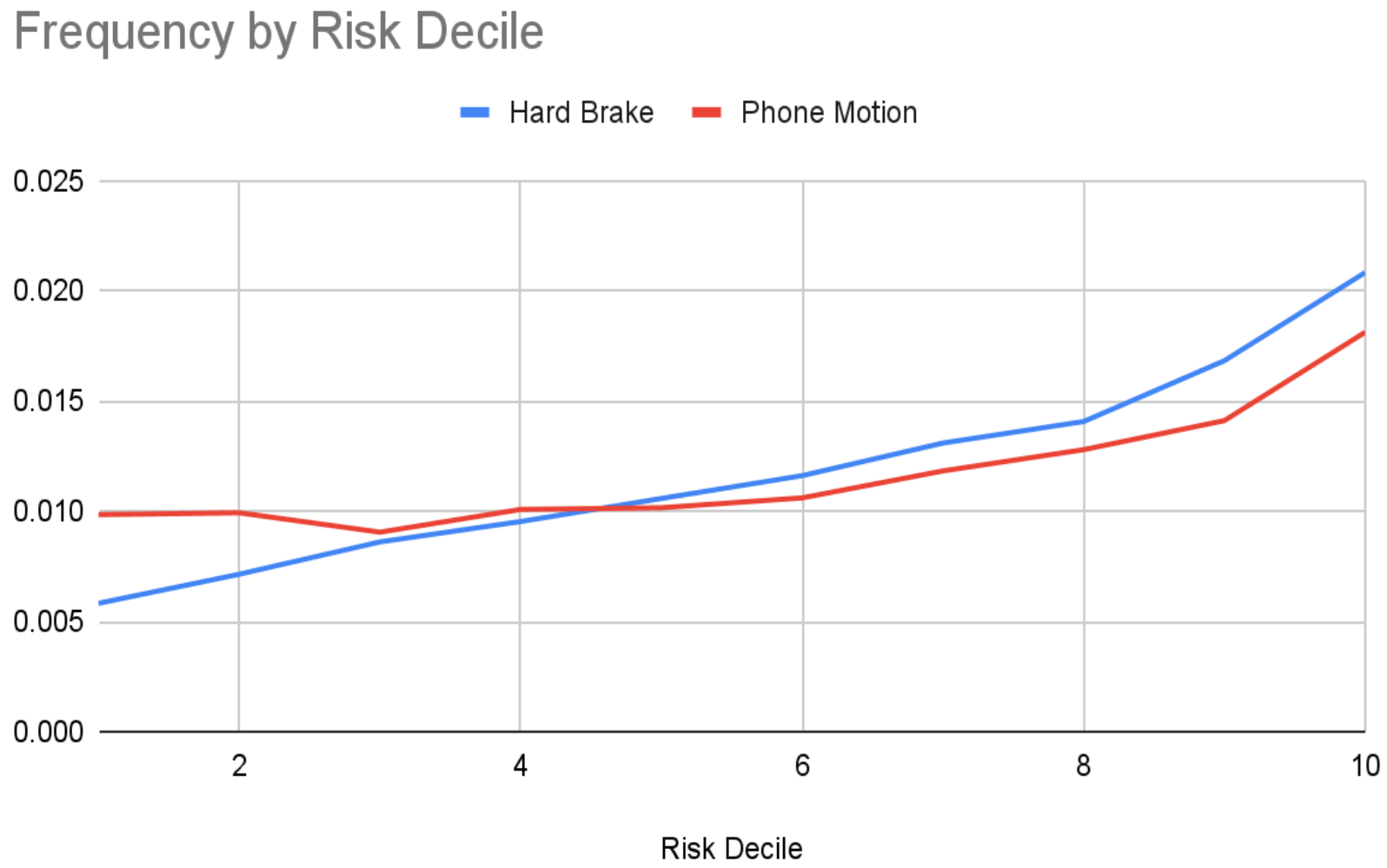
Distracted driving surged in the pandemic



Distraction Increases Speed & Severity



Smartphone based distraction is highly predictive of crashes with insurance claims



Does Legislation Work?

Impact of 2023 Hands-Free Laws

	Ohio	Alabama	Michigan	Missouri
Drivers	8.2M	4.0M	7.9M	4.2M
Law start	Apr 4, 2023	Jun 16, 2023	Jun 30, 2023	Aug 28, 2023
Phone motion reduction	-8.7%	-5.7%	-10.3%	-4.1%
Crashes prevented	3,659	926	3,118	512
Injuries prevented	2,049	519	1,747	287
Fatalities prevented	17	4	14	2
Economic damage prevented	$144,879,782	$36,667,427	$123,487,073	$20,282,530

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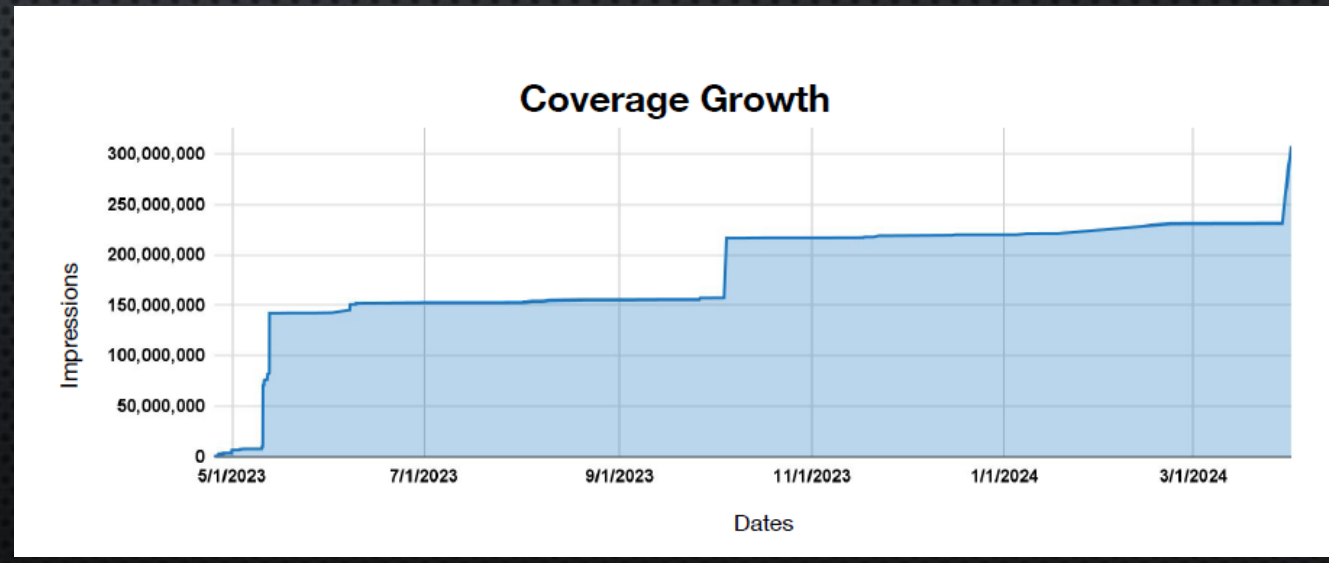
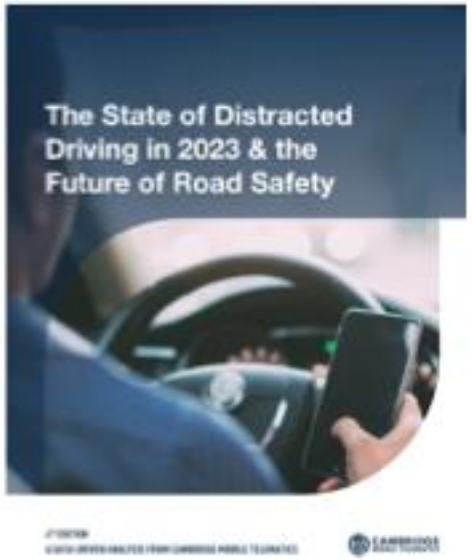
Media Coverage is Key!

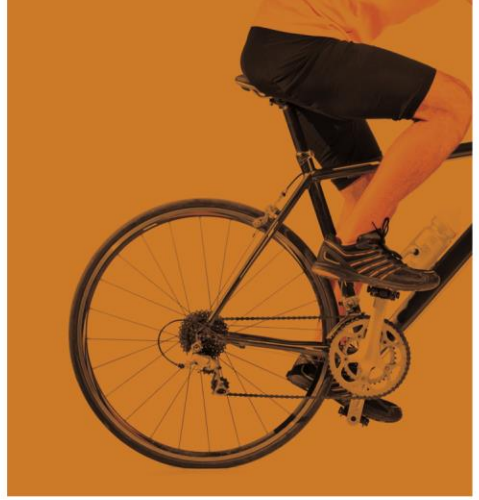
Date	Publication	Headline	Reach
5/10/2023	Yahoo! News	Drivers using phones less on Ohio roads after new law, study shows	58.8 million
5/12/2023	Yahoo! News	Report: Drivers spent over 8% less time on phones after distracted driving law	58.8 million
10/4/2023	Yahoo! News	Distracted driving warning period ends today: Here's what you need to know when ticketing begins Thursday	58 million
3/31/2024	Forbes	Distracted Driving Fell After States Implemented Hands-Free Laws	76.2 million



Contact:
Ryan McMahon
Cambridge Mobile Telematics



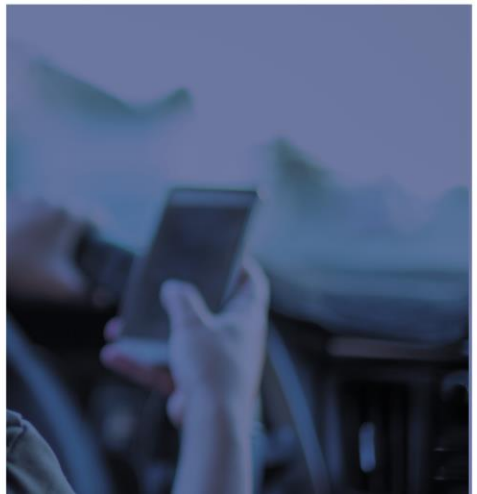
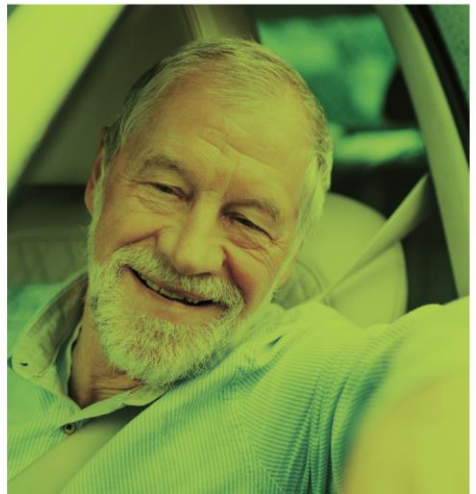


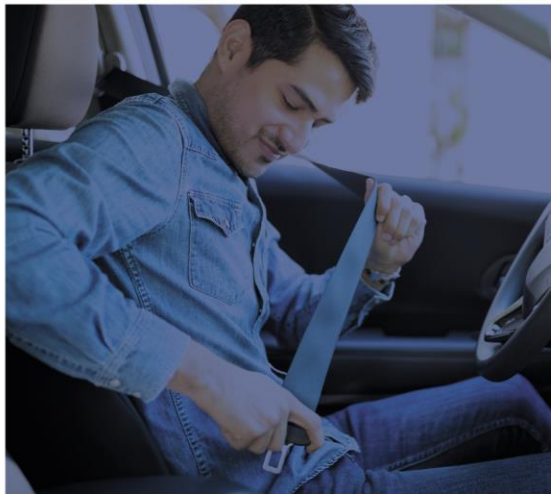


EVERY MOVE YOU MAKE
TOWARD ZERO DEATHS

Ohio's Story

August 2024



(*VERY*)

BRIEF HISTORY

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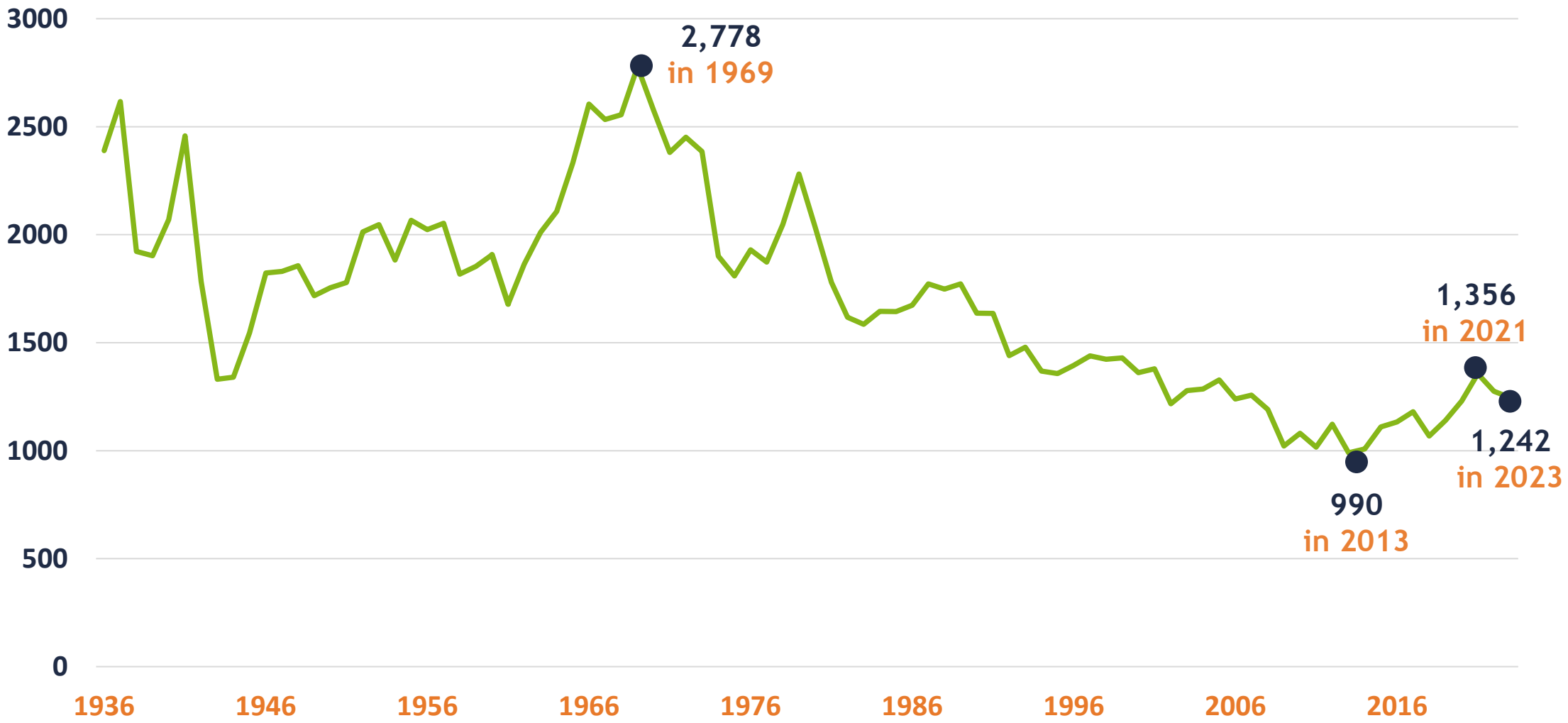
OHIO TRAFFIC DEATHS



Building the Case

- Smart phones are more dangerous than other distractions
- People underestimate the danger because the technology is addictive.
- **States with primary, hands-free laws have reduced traffic deaths.**

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Legislative Success!

Governor Mike DeWine
@GovMikeDeWine

One year ago today, I signed Ohio's enhanced distracted driving law, which makes the use of a cell phone while driving a primary offense. Learn more about the law at phonesdown.ohio.gov.

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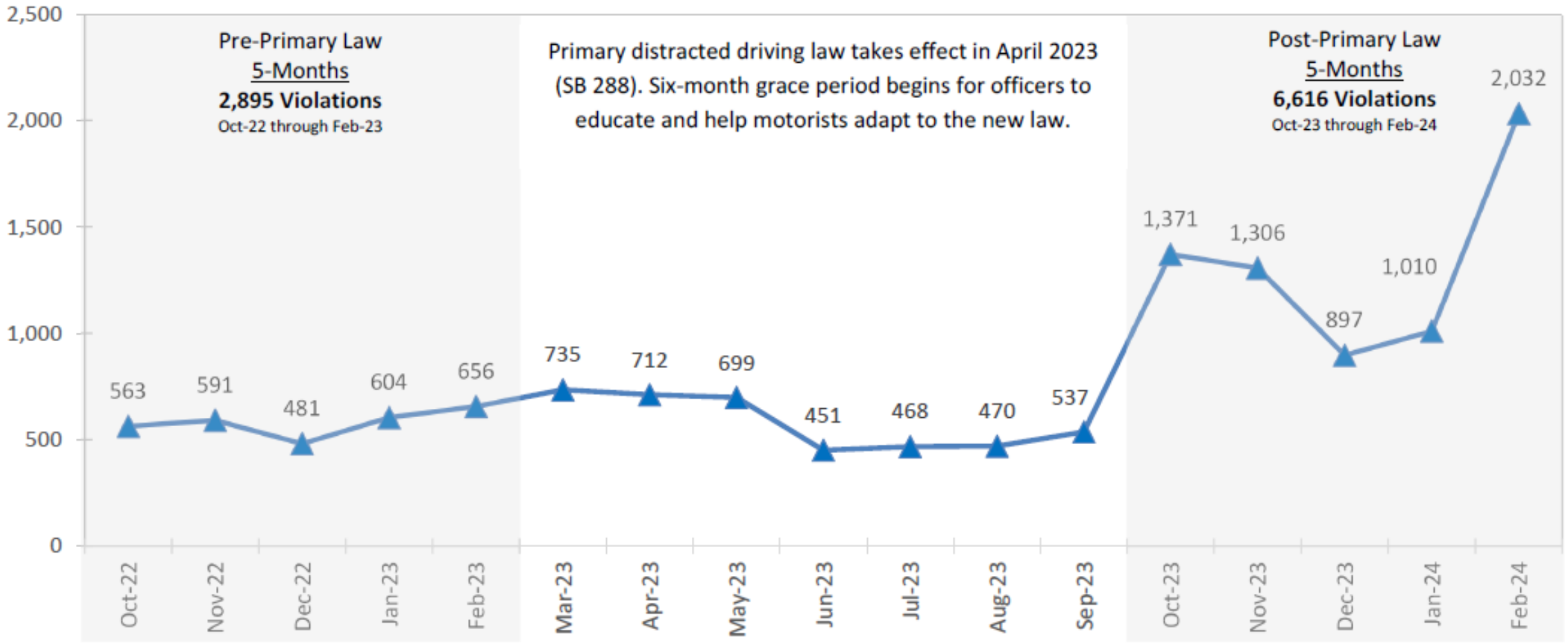
IS IT WORKING?


Traffic Deaths
dropped 2%

Ohio State Highway Patrol

Statistical Analysis Unit

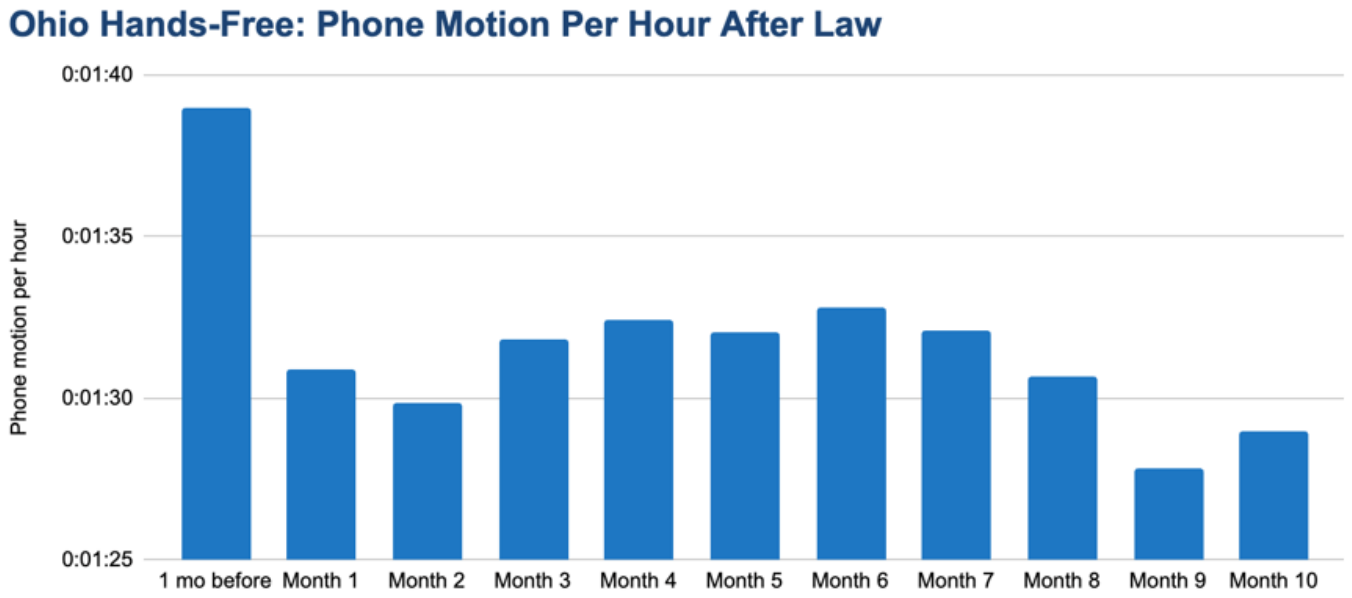
OSHP Distracted Driving Violations by Month



Source: OSHP computer-aided dispatch (CAD) system. Distracted driving violations include incidents with one of the following violations: 4511.204, 4511.205, 4511.991, or 392.82A1 (federal motor carrier).

CELL PHONE ANALYSIS

8% reduction in hand-held phone use and screen interaction.



CAMBRIDGE MOBILE TELEMATICS

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WHAT'S THE CATCH?

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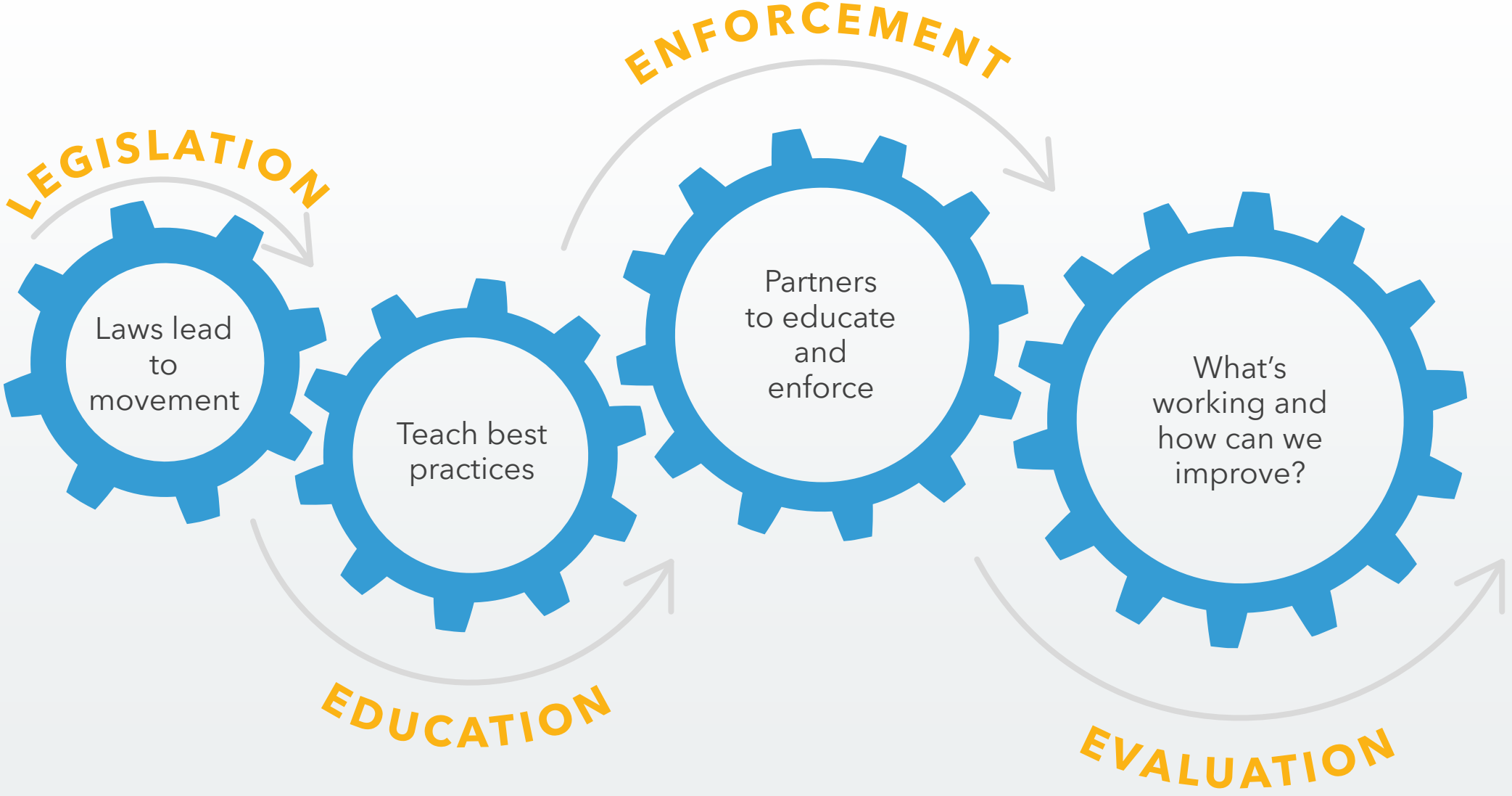
Long-Term Plan



CELL PHONE ANALYSIS

Most states see an initial decrease, then a regression in behavior.

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WHY?

Most states get a boost in awareness after the law passes – but awareness can fade over time.

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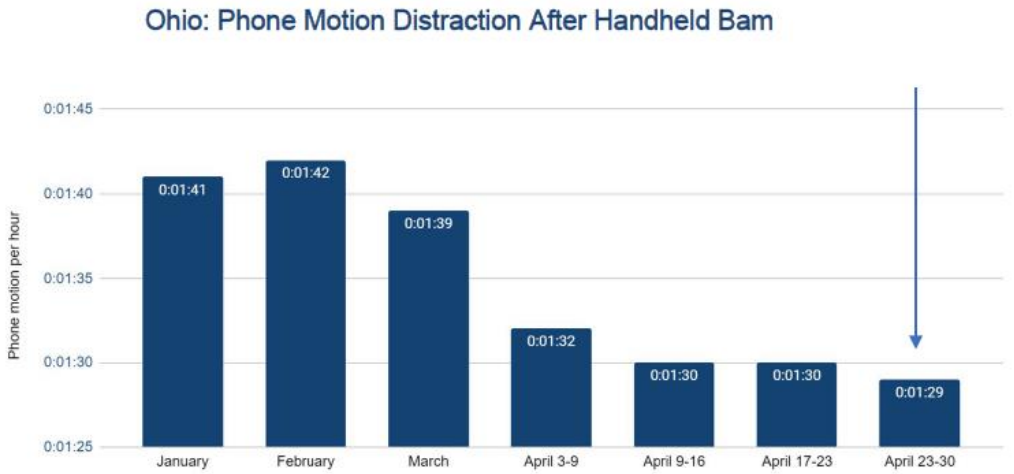
SUSTAINED MEDIA COVERAGE

Public awareness impact



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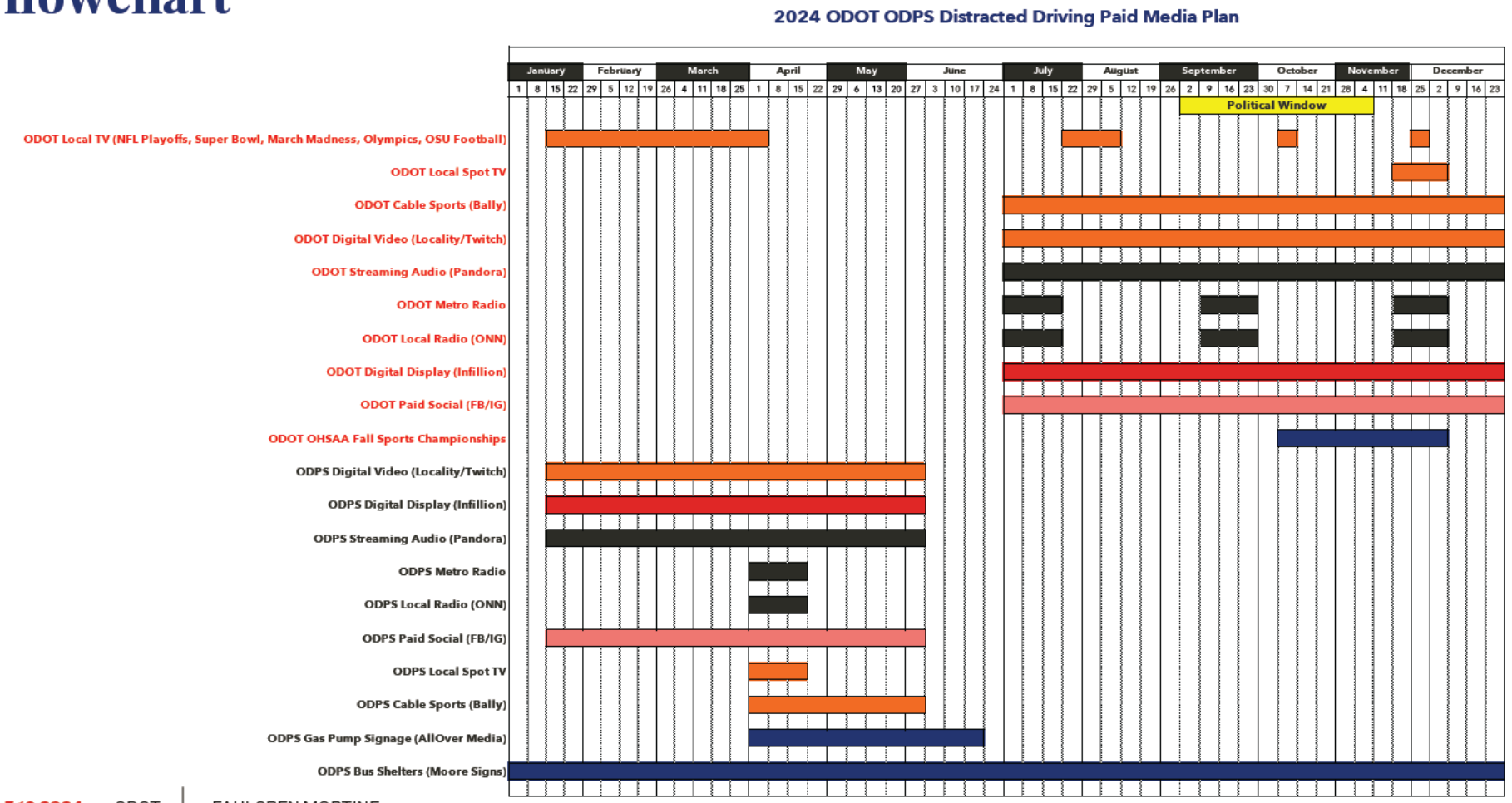
SUSTAINED MEDIA COVERAGE

flowchart



HOW DO WE BUILD ON SUCCESS?

YEAR-LONG MEDIA PLAN

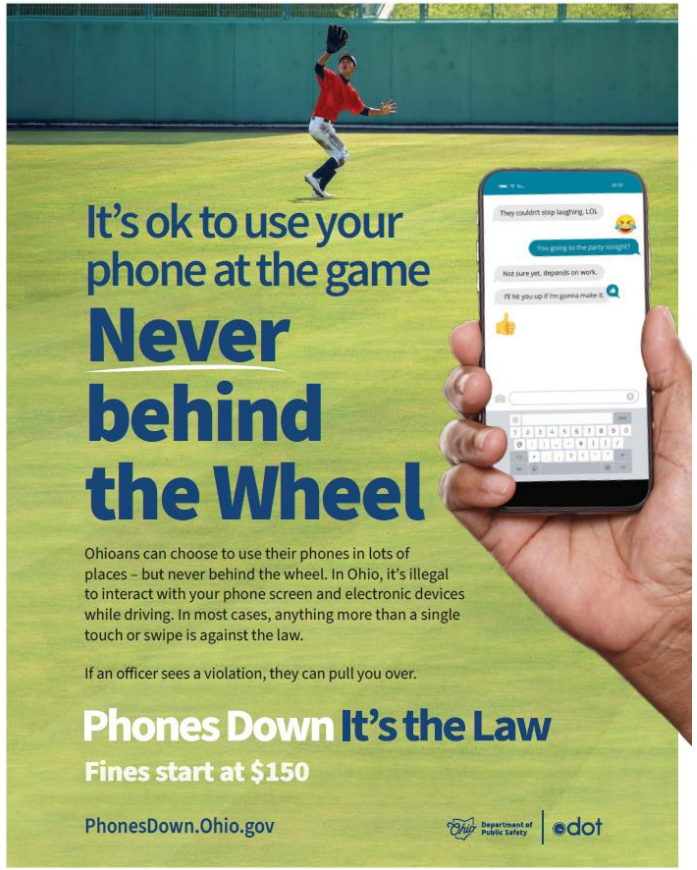
For more information and downloadable assets, visit:
PhonesDown.Ohio.gov

Lock Your Phone

In Ohio, it's not okay to interact with your phone screen while driving. So, lock that screen before you rock the road.

Ohio Department of Public Safety | edot

YEAR-LONG MEDIA PLAN



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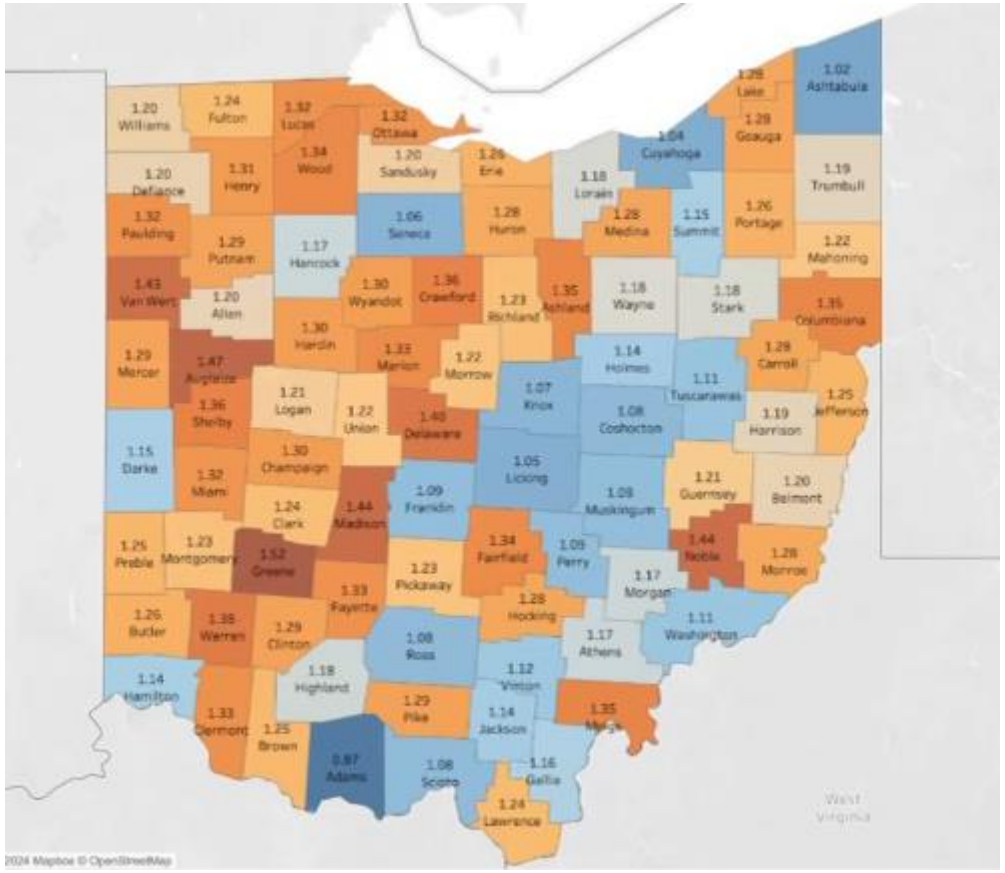
YEAR-LONG MEDIA PLAN

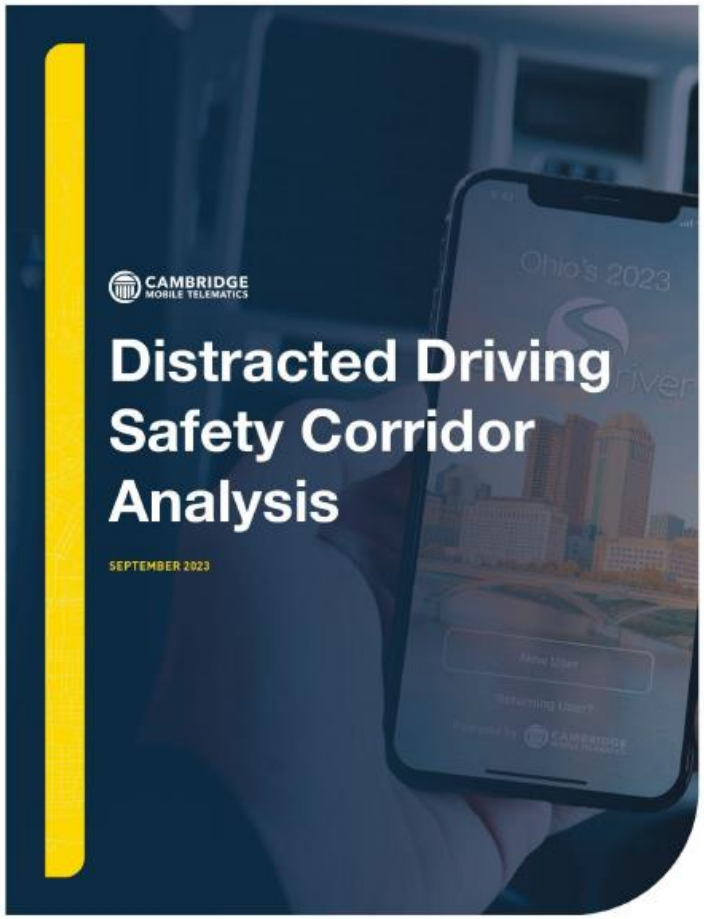
Distraction by County Heatmap

Ohio counties show considerable variation in distraction according to the heatmap below (blue below the state average, orange above) with the most populous counties (and the major cities) tending to have lower rates of distraction compared to the more rural counties.



CAMBRIDGE MOBILE TELEMATICS

TELEMATICS PILOT



Ohio is using telematics data – specifically cell phone data on speed and phone use – to help us better target our traffic safety resources.

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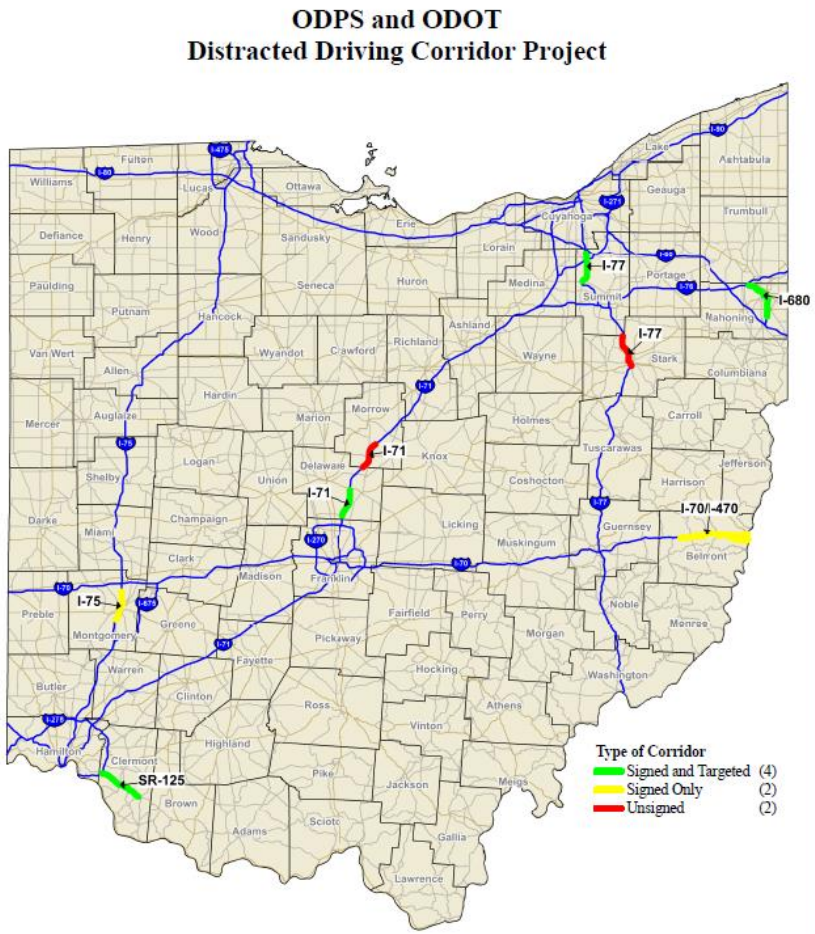
TELEMATICS PILOT



8 corridors covering two time periods. **Before and after targeted enforcement**

Comparing behavior change in heavily enforced vs. lightly enforced and non-enforced corridors

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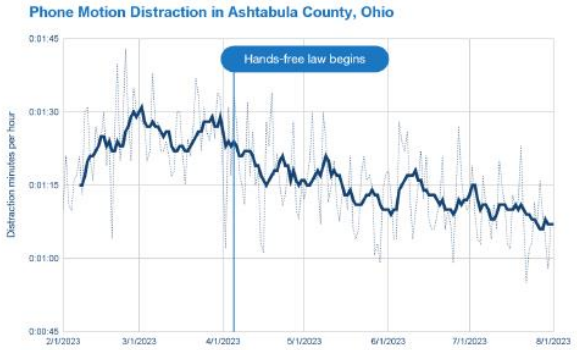
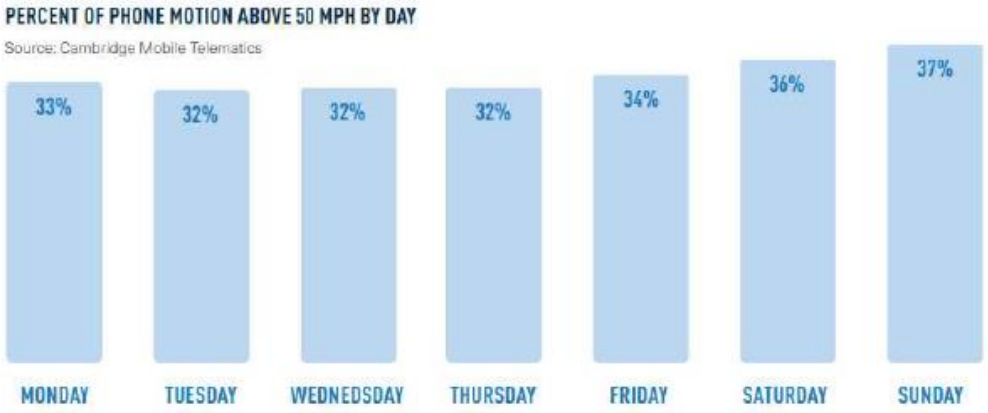
TELEMATICS PILOT

Distracted driving is down in Ashtabula County, Ohio

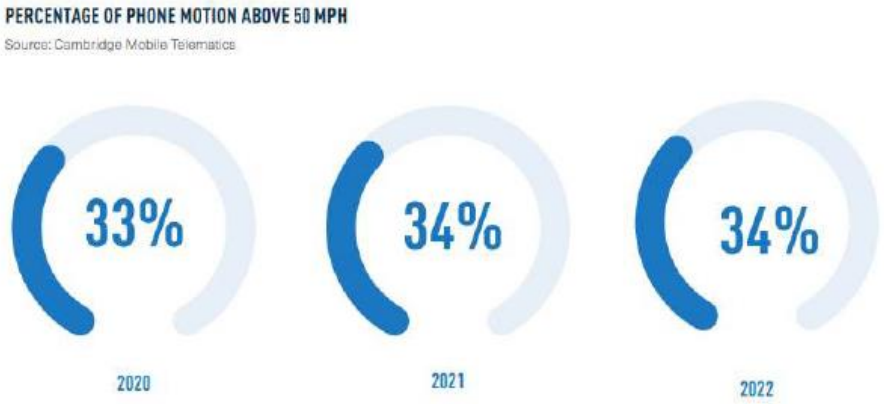
Phone motion distraction down 19.2% since handheld ban

Month	Compared to March
April	8.0% reduction
May	13.1% reduction
June	13.9% reduction
July	19.2% reduction





- Mining the data for **broad trends** that can guide education and enforcement.



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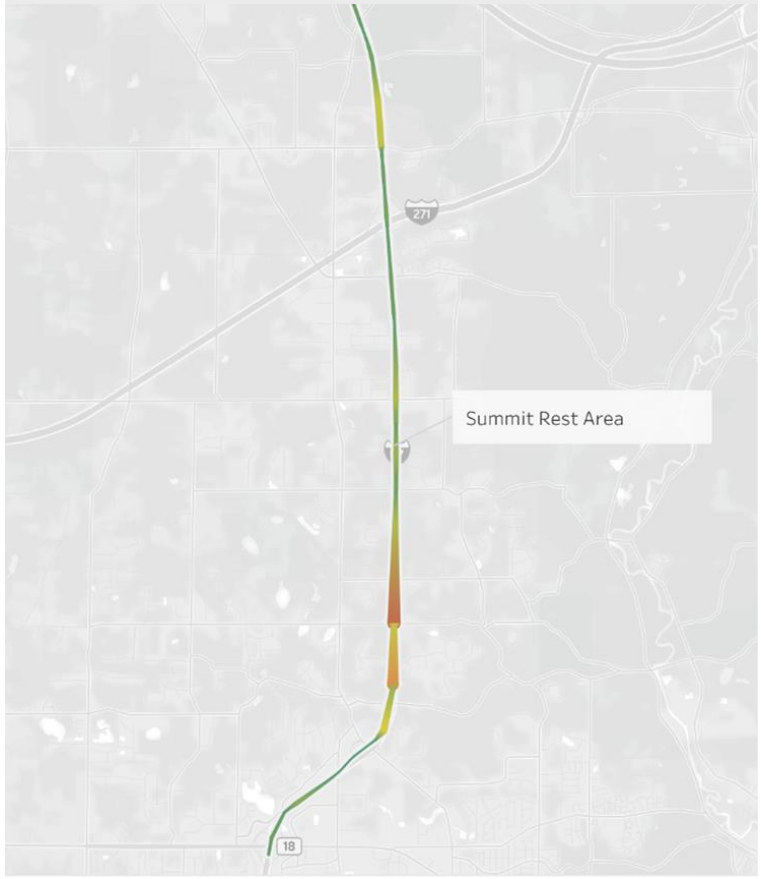
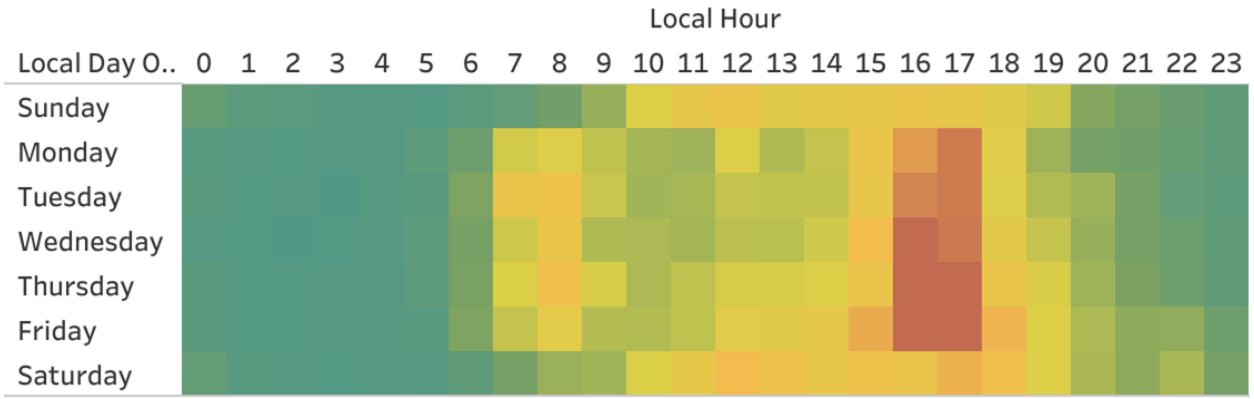
TELEMATICS PILOT

Speeding on I-77 S



- Mining the data for **granular trends** like hot spots and times of day when enforcement and media messaging will be more effective.

Phone Motion on I-77 N/S



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TAKEAWAYS

LEGISLATION IS ONLY THE BEGINNING

- **States need a long-term plan for success**
- **Telematics can help us** sharpen our traffic safety strategies to make them more effective.

Ohio Department of Public Safety

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