arity

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# The True Cost of Distracted Driving to Insurers

Measure the costs of distracted driving with mobile phone telematics data to reduce costs and save lives

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# Distracted driving is more of a problem than you think

Distracted driving isn't only a dangerous behavior—it's an expensive one. According to a recent National Highway Traffic Safety Administration (NHTSA) study, distracted driving costs the U.S. about $129 billion per year.[1] Roughly $9 billion of that annual cost comes out of insurers' pockets.

Those numbers won't drop by themselves, especially because distracted driving isn't a behavior that can be tackled from a single angle. It will require a considered, concerted effort from the entire transportation industry to reduce distracted-driving-related costs and crashes. Fewer accidents means safer drivers, and that's the #1 goal for Arity, as well as most insurers.

But what constitutes distracted driving? According to NHTSA, safe driving requires you to have three activities in sync:

- Visual: Eyes on the road
- Manual: Hands on the wheel
- Cognitive: Mind on the task[2]

If one piece is out of sync, you've impaired your driving ability, which increases the likelihood of an accident.

Although distracted driving can be caused by anything from a baby crying in the backseat to eating a sandwich to answering your phone while behind the wheel, we'll focus on the one activity that has skyrocketed in the last decade: phone use.

By "phone use," we're not only referring to texting and driving, although that is a significant part of it; drivers can be distracted by other phone activities, such as:

- Taking a photo
- Playing a game
- Switching stations on a music app
- Glancing at incoming push notifications
- Interacting with a map

These behaviors become even more risky when combined with other elements, such as speeding, bad weather, heavy traffic, or other people in the car needing the driver's attention. Most of us understand the risk—more than 3,000 fatal accidents were tied to distracted driving involving phone use in 2017—yet we can't seem to kick the habit.[3]

Measuring distracted driving behaviors that contribute to accidents is the first step to finding methods that encourage safer driving habits.

[1] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013

[2] http://www.nhtsa.gov.edgesuite-staging.net/Driving+Safety/Distracted+Driving/Policy+Statement+and+Compiled+FAQs+on+Distracted+Driving

[3] https://www.nhtsa.gov/risky-driving/distracted-driving

# Why is it so hard to stop using our phones?

This might be explained by the psychological factors that are tied with phone use, such as addiction and the perception of benefits outweighing the risks. Drivers feel it's worth it.

The technology that fuels unsafe driving, like in smartphones, is engineered to be addictive. Each text message and push notification brings a little burst of pleasure, which makes them hard to ignore.

Sure, people could turn on "do not disturb" while driving to block those hard-to-resist notifications. But the strength of the addiction and the fact that it's socially sanctioned (i.e., everyone else is doing it) makes that an unlikely scenario.

When drivers take their eyes off the road, take their hands off the wheel, or focus on things other than driving, it's easy to understand how those activities could contribute to sudden braking. And they do. Sudden braking increases seven times[4] after phone usage, and that is a significant component of increased accident risk.

Also, using a phone while driving impairs the driver's scanning ability, which means they may miss oncoming traffic or pedestrians in their peripheral vision. It's also causing inattention blindness, which means they'll miss signage, another driver's gesture, or a teen on a scooter ready to zip out into the street. What's more, multi-tasking between phone usage and driving means that neither activity is done particularly well and the driver is challenged by switching activities.[5]

The bottom line is, using the phone while driving can impair visual, manual, and cognitive abilities, which leads to high-risk responses such as sudden braking and potentially, accidents.

The perception of safety and addiction may be hard to break, but there is some good news. Data and behavioral science can help us create programs to overcome these problems and save lives, and insurers can play a key role in making it happen.

[4] Arity analysis
[5] Strayer et al., 2011

In one study of commercial motor vehicle operators, drivers who texted drew their eyes off the road for 4.6 seconds; that's like driving the length of a football field at 55 miles per hour with your eyes closed.[6]

[6] https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/DriverDistractionStudy.pdf

# Insurers can make a significant difference

Since 2011, insurers have experienced an estimated three times increase in auto losses attributed to distracted driving.[7] As a society, we've tried to leverage fear, penalties, awareness campaigns, and restrictive technology to decrease distracted driving, and it's simply not working well enough. We are in the business of not only helping people recover from an accident, but also helping them avoid it in the first place.

Just as auto manufacturers continue to develop new and innovative safety features in vehicles, insurers have access to the tools they need to develop safety programs that save lives while impacting the bottom line.

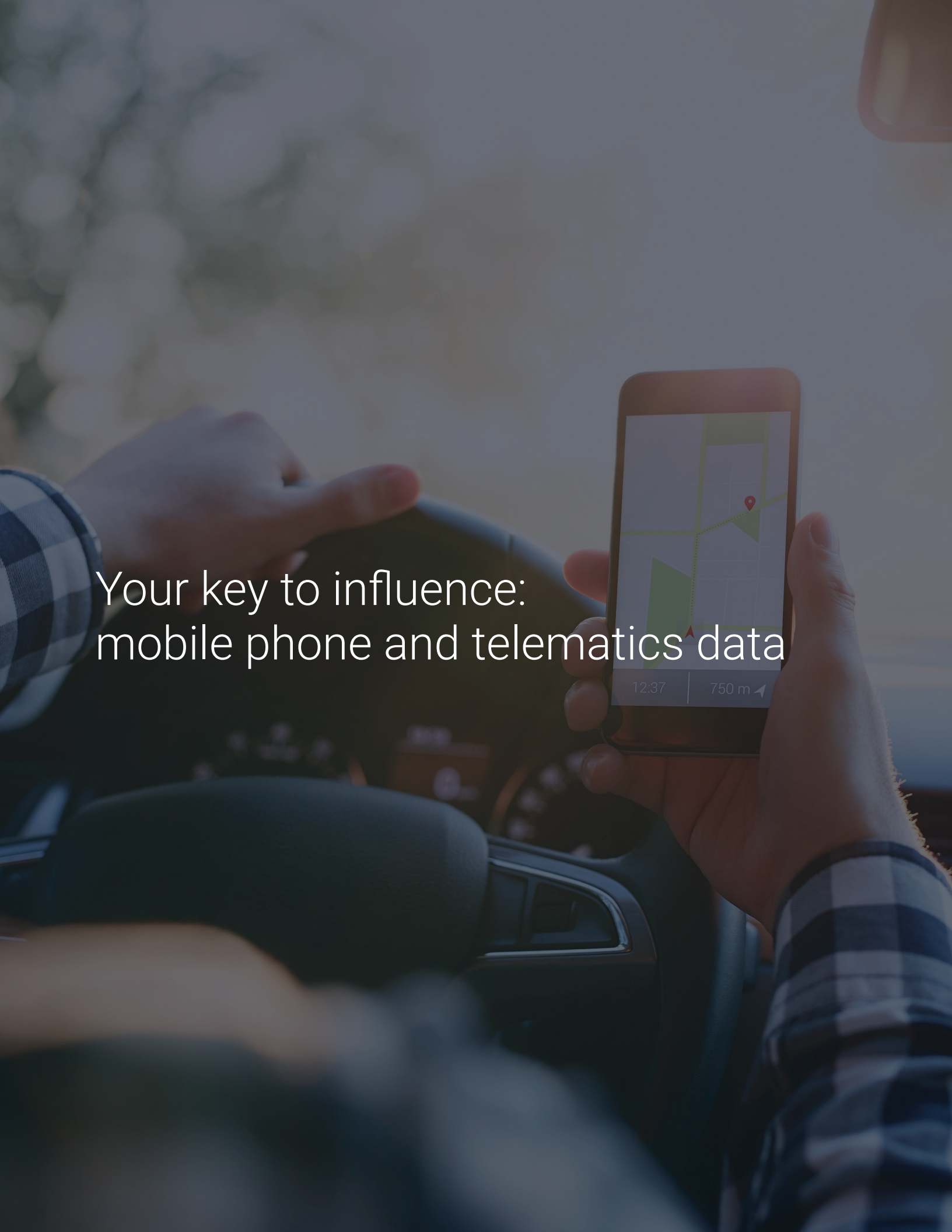
Thankfully, insurance companies are uniquely equipped to engage drivers in ways that other transportation players simply can't. Informed by data and behavioral science insights, insurers can offer:

- Time relevant positive feedback to reinforce safe and distraction-free driving
- Policy discounts for safer drivers
- Personalized coaching based on proven behavioral science methods to drive awareness and ownership

Most importantly, distracted driving is a quantifiable behavior, which means it can be used to understand, predict, and manage driving risk, influence driving behaviors, and adjust rates appropriately.

This is good news: insurers are in a powerful position to save lives and money.

[7] Arity analysis




# Your key to influence: mobile phone and telematics data

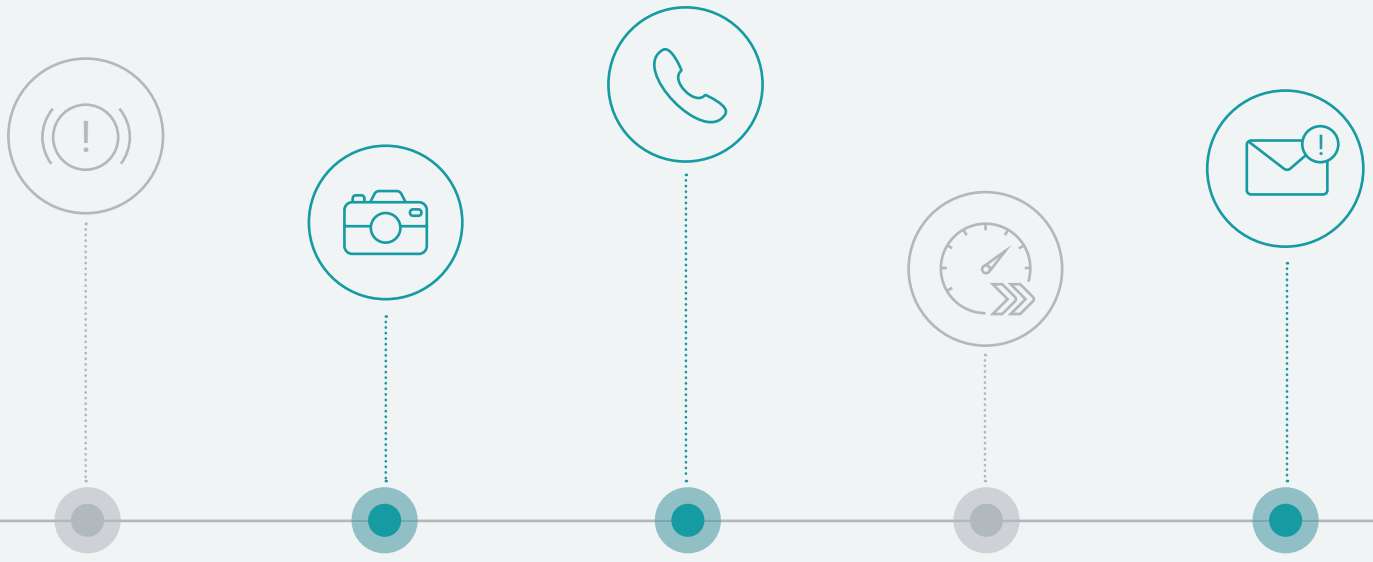
## The mobile phone might be the source of most of our distracting driving problem, but it's also very much a part of the solution.

The mobile phone might be the source of most of our distracting driving problem, but it's also very much a part of the solution. Consider this: After accounting for all other behaviors, the most distracted drivers incur a loss cost 1.5 times higher than the least distracted drivers.[8] As instances of distracted driving have grown, measurements of distraction have become an essential element of accurate loss projection.

And yet, when insurers are looking to create telematics-powered programs, for example, as price incentives to influence drivers, most of these programs rely overwhelmingly on scores that do not include distracted driving.

When it comes to accounting for distracted driving risk, this is a significant restriction. Phone usage—where, when, and how—must also be considered to assess distracted driving risk and develop a successful safety program. Insurers can't simply apply old, device-based models to the mobile sensor data.

Based on the data and behavioral science, comprehensive distracted driving models based on mobile sensor data help us identify and account for different behaviors at different times. And these behaviors change over time, so Arity is continually focused on advancing our models through more and more data, deeper layers of analysis, and constantly improving algorithms.



[8] Arity analysis

### Data and Behavioral Science

Telematics data brings awareness to, and can change perceptions of, the risks of unsafe driving across the board. The danger of distracted driving becomes harder to ignore when you learn, as one potential example, that your odds of crashing increase precisely 1.7 times within one second of a hard-braking event.[9]

Insurers can help drivers understand how their behavior behind the wheel puts them personally at risk. For instance, we can show each driver a score reflecting their frequency of speeding, phone use, sudden braking, and nighttime driving.

Scores personalize risk, which makes it harder to ignore, especially when paired with engaging feedback. For example, rewarding a high score with praise, animations, and other positive reinforcement can lead someone to seek validation from their safe driving habits, instead of seeking that "burst of pleasure" from risky behaviors like responding to texts or push notifications. Reinforce the safe behaviors enough, and they'll begin to replace the risky ones.

Rewarding safe behavior after the fact is one strategy. Another is to send drivers road safety reminders before they get behind the wheel. Based on scientific studies about behavior change, insurers could send pre-trip safety messages on a personalized schedule deduced by a machine learning algorithm. Then we can continually test and refine these messages for optimal effectiveness.

To create programs like these, we need to know what's really happening inside the car. That's where distracted driving models come in to play.

### Distracted Driving Models: A Summary

An effective distracted driving model can help us understand and analyze vehicle context and better correlate phone movements with real-world behaviors. Let's consider two of the elements within a distracted driving session:

- Usage: The phone is showing patterns of being locked and unlocked during a trip.
- Movement: The phone is moving in a way that suggests someone is holding it and using it.

Not all phone behaviors are equally risky. While we can track usage and movement events within the phone, we also want to validate assumptions on why these activities are happening and when. To do so, we must watch drivers as they commute to understand which patterns constitute distraction, boredom, or normal movement of the phone to measure risk. For example, is the pattern happening at red lights or on the interstate? Is a passenger using the driver's phone? Is the phone in a hands-free cradle?

By capturing distracted driving data in a natural setting, we can create a telematics model that reflects the real world. Dash cameras that record actual driving behaviors provide a reliable source of truth, so behaviors can be first manually labeled and then scaled via deep-learning computer vision models.

These models then inform effective programs to reduce distracted driving behaviors.


Your odds of crashing increase precisely 1.7 times within one second of a sudden-braking event.

[9] Arity analysis

# Six steps for insurers to measure distracted driving and help reduce the associated losses

## 1. Start with the source

Although embedded systems and OBD devices are the gold standard for assessing vehicular motion and risky driving patterns, the mobile phone is most pervasive for distracted driving detection. Pinpointing mobile phone movement and interaction is the most effective way to identify and prevent distracted driving risks.

## 2. Expand your inputs

Phone movement only tells part of the story. Distracted driving algorithms that rely solely on sensor information — accelerometers, gravitometers, gyroscopes, etc. — will be subject to false positives and false negatives. For instance, a motorcyclist with a phone safely in a pocket could be unfairly penalized each time he or she puts a foot down for balance. Measuring a driver's actual interactions with their devices is critical to understanding distracted driving behavior.

## 3. Weigh the variables

Not all forms of distracted driving are equally risky. Checking navigation while stopped is generally less risky than taking a selfie during rush hour. To effectively assess relative risks, there are two fundamental considerations: context and mode.

Context defines the conditions at the time of behavior: At what speed was the car being driven? What was the weather like? Was there traffic?

Mode defines the behavior taking place: Is the driver texting? On the phone? Playing a game? Taken together, context and mode offer deeper insight into the extent of the distractions.

## 4. Monitor continuously

Discrete moments only tell part of the story. For instance, considering only episodes of significant phone movement omits important information about the behaviors and interactions that take place in between. Think about distracted driving as a continuous behavior, then work to identify the start and endpoints of these sessions. Understanding the full scope of distracted driving provides the most predictive metrics for risk.

## 5. Fine-tune your models, constantly

Distracted driving models can be founded on logic and intuition, but they should be developed and validated through data. Assess alternatives relative to their performance on labeled data sets, sets composed of both telematics data and reliable labels for periods of distracted driving. A blended approach will keep your models honest and current.

## 6. Connect with your customer

By leveraging telematics data, you can coach and influence safe driving behaviors by connecting through persuasive messaging, safe driving scores, and entertaining feedback or "rewards" for safe driving.

# Translating telematics for effective rates

Marking distracted driving as a significant risk factor is simple. Determining what that means for an individual's rate is not. As an insurer, you must consider these two questions when quantifying the implications of distracted driving:

1. What is the likelihood a distracted driver will be involved in an accident?
2. What will that incident cost?

Answering the first question will help predict risk. But without an answer for the second, it's impossible to determine the true cost of that distracted driving risk.

Insurers that are capable of comparing mobile usage data, including distracted driving behaviors and contexts against associated claims data, can correlate phone use with actual loss to better predict future losses and adjust policy rates accordingly.

What's more, insurers can educate drivers on the impact of distracted driving on their own and their family's personal safety, damage and losses to their vehicles, and potentially their overall driving score, which could impact policy savings.

**Take Action to Save Lives**

Mobile devices are part of the distracted driving problem. They also offer a solution: they help us continually identify distracted driving behaviors.

By leveraging mobile phone and other telematics data along with behavioral science, we can create distracted driving models to help insurers develop programs to facilitate reductions in distracted driving.

It's important to remember that behaviors change over time -- for individuals and as a society. What's acceptable behavior today may evolve tomorrow. The distracted driving programs we create, whether they be policy rate adjustments, positive reinforcement, or personalized behavioral messaging, can be constantly analyzed for effectiveness and refined for best results.

Distracted driving is, no doubt, a danger to us all. It increases the risk of accidents that can claim lives and dollars for insurers and the insured. Through mobile phone telematics data, behavioral science, and distracted driving models, we at Arity are dedicated to helping insurers reduce these risks.

To learn more about reducing distracted driving and the associated costs, contact Meryl Golden at meryl.golden@arity.com

# About Arity

Arity is a mobility data and analytics company that provides data-driven solutions to companies invested in transportation to enable them to make mobility services smarter, safer, and more economical. Insurance companies, automobile OEMs, shared mobility companies, and governments turn to Arity to better understand driving behavior, manage risk, operate more safely, and ultimately increase their bottom line. The Arity platform is built on nearly 80 billion miles of historical driving data, more than 12 million active telematics connections and over 8 years experience analyzing driving data from cars and mobile devices. With global offices and a Chicago headquarters, Arity was founded by The Allstate Corporation and launched in 2016. Visit www.arity.com for more information.