Background

With the number of portable cellular phone owners reaching 115 million in the United States and 85 percent of those owners saying they use their portable cellular phone while driving, the issue of distracted driving has become prevalent in our society.

The OnStar embedded cellular phone system offers a unique opportunity to gain insights into this issue. Specifically, a study was conducted of the association of air bag-deployment crashes with in-vehicle calls to advisors using the OnStar embedded cellular system.
Issues

- Lack of accurate real-world data to analyze cell phone usage in vehicles:
  - Only statistical studies involving small samples were available.

- This study looks at the complete population of data:
  - Embedded cell phone calls placed to an OnStar call center for personalized assistance.
  - Automatic air bag-notification calls within the same time frame.

- This study compares:
  - Time-stamps for embedded cell phone usage.
  - Time-stamps for automatic air bag-notification calls.

OnStar

- A safety, security and information service that is built into the vehicle, with a three-button user interface.
  - OnStar button calls a service advisor.
  - Emergency button places a priority call.
  - White-dot button ends a call.*

- Uses the Global Positioning System (GPS) satellite network and embedded cellular technology to link vehicle and driver to an OnStar call center.
  - Advisors provide personalized safety and routing assistance.
  - Automatic air bag notification to an OnStar center occurs in the event of a crash in which an air bag deploys.

*OnStar Personal Calling allows personal calls or calls to a “Virtual Advisor” by pressing the white-dot button. It was recently introduced and not included in this study.
Objectives

1. Determine the number of calls in which the use of an embedded cell phone for personalized assistance was followed within 10 minutes by an air bag crash-notification call.

2. Determine the number of calls in which the phone was actually in use at the time of the crash.

3. Identify possible causal variables associated with these crashes.
Scope

- **Voice calls**: Calls between the vehicle and a live OnStar Call Center advisor, using the OnStar embedded cell phone system.
- **Crashes**: A collision in which a frontal air bag, or a side air bag, was deployed.
- **Automatic air bag notification calls**: Only those crashes in which an air bag actually deployed.
- **Time period**: October 1996 to May 2001 (five-year period from the start of OnStar to the time of the study).
- **Vehicles**: GM vehicles only.

Database Methods

The study analyzed the complete database of OnStar’s time-stamped data in the five-year period, involving:

- Embedded cell phone calls from a GM vehicle to the OnStar center for personalized assistance, when any part of the call occurred in the 10 minutes before an air bag crash-notification call time-stamp.
- OnStar advisor text comments, to better understand the nature of each incident.*

*In the interest of maintaining privacy, care was taken to omit any identification of persons involved in the cellular calls made or of those involved in the crashes.*
**Objective 1:**

*Phone in Use Near Time of Crash*

**Method:** Count all embedded cellular phone calls that began (or when the advisor closed the file) within a 10-minute period prior to an air bag-notification call time-stamp.

**Results:** There were nine cases in which the phone could have been used, and followed within 10 minutes by an air bag-notification call.
- In eight of the nine cases there was an actual voice call.
- There were about 8.1 million phone calls.

**Conclusion:** The frequency of association is about one air bag crash per million phone calls with a service advisor.

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**Objective 2:**

*Phone in Use At Time of Crash*

**Method:** Reviewed advisors’ text comments for the 9 cases.

**Results:**
- In two of the nine cases the driver was known to be on the phone at the time of the crash.
- In one case there was no voice call at all.
- In the six remaining cases, there were no indications the people were on the phones at the time of the crashes and it is highly unlikely they were.

**Conclusion:** The frequency of association is about one air bag crash per four million phone calls when the phone is actually in use at the time of the crash.
Objective 3:
Identify Possible Causal Variables

Method: Reviewed advisors’ text comments for the nine cases to determine other possible causal variables related to the crash.

Results:

- No evidence that the call itself contributed to the crash
  - In one case there was no voice call.
  - In another case, the car was parked when the air bag deployed.
  - No specific indication in the text comments for any case that the call itself contributed to causing the crash.
- There was evidence of possible causes other than the call.

Objective 3:
Identify Possible Causal Variables (Cont.)

- In the eight cases with a vehicle in motion, a content analysis of the text comments identified other possible variables that could potentially have caused a crash (and an embedded cell phone call).
  - Fatigued (three cases)
  - Late at night (five cases)
  - Traveling away from home (five cases)
  - Completely lost, going in wrong direction (three cases)
  - Emotional, stressed (two cases)
  - Driver not owner of car, rental car (three cases)

Conclusion: Assuming other possible causes and actual crashes, the frequency of a call uniquely causing an air bag crash approaches zero air bag crashes per eight million embedded cell phone calls.
Final Conclusions

1. An air bag-deployment crash associated with an embedded cell call with an advisor in the 10 minutes prior to the crash is rare, occurring at a frequency of one event per million calls during the five-year period of the study.

2. An air bag-deployment crash associated with an embedded cell phone in use at the time of the crash is even more rare, occurring at a frequency of one event per four million calls.

3. An air bag-deployment crash uniquely caused by embedded cell phone usage occurs even more rarely.