

# Advanced Alcohol Detection Technologies

October 24, 2007 • Washington, DC

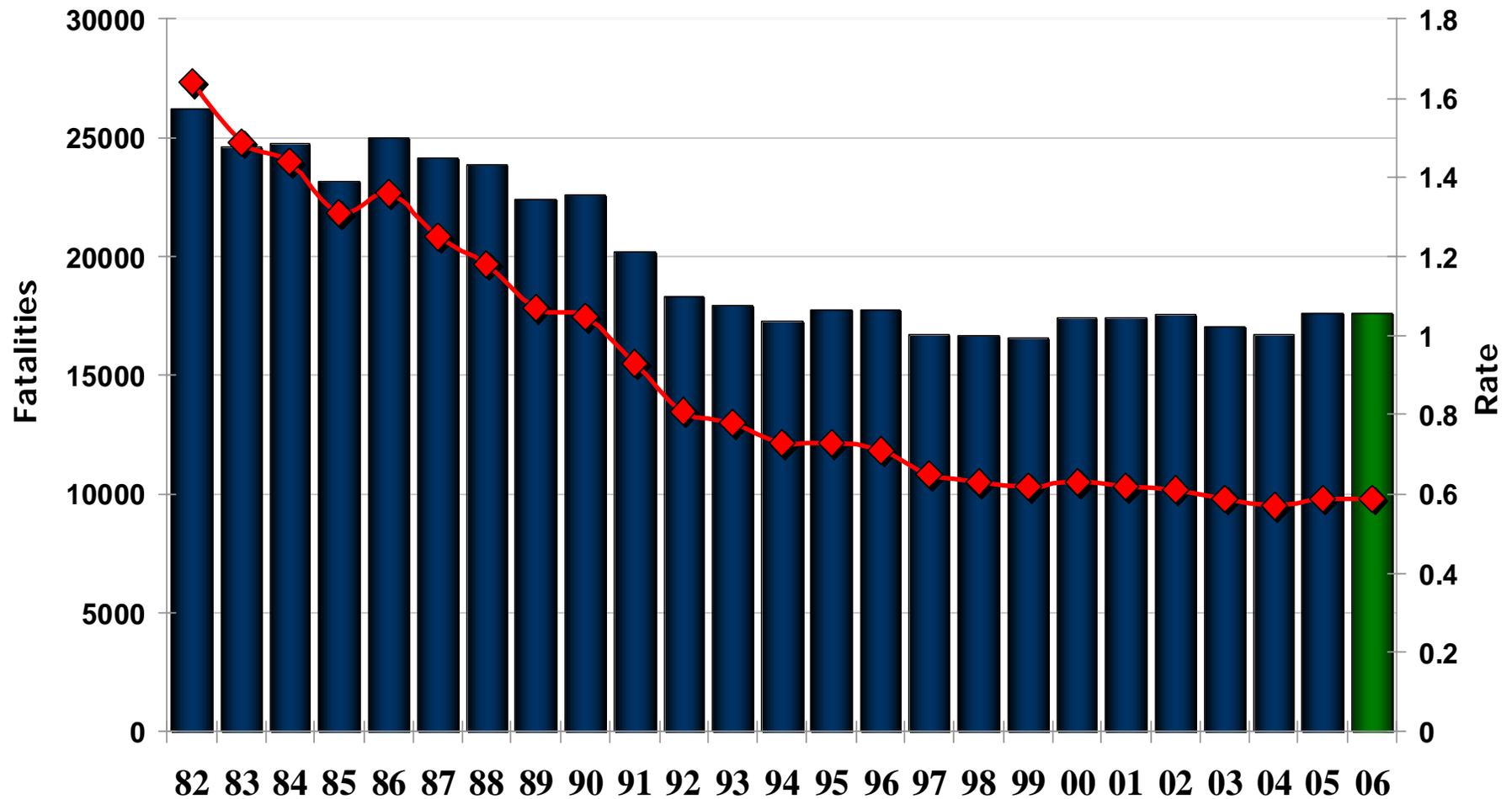


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# Alcohol-Related Fatalities (per 100M VMT) 1982 – 2006



# Development of Advanced Alcohol Sensing Technology



- A **cooperative** research and development effort
  - NHTSA and Automotive Coalition for Traffic Safety (ACTS)
  - 5 Year Effort
- **Concept:** In-vehicle capability to detect impairment before vehicle can be operated
  - TBD: What is the appropriate action if the vehicle detects an impaired driver during operation?
- Significant **technical** as well as **public acceptance** challenges

# Potential Technical Areas of Promise



- Volpe conducted a **Technology review of Technology to Prevent Alcohol Impaired Crashes**
  - Report is now available
- **Potential technologies** include:
  - **Tissue Spectroscopy**
  - **Transdermal Detectors**
  - **Ethanol Vapor Detectors**
  - **Ocular Measures**
- **Combination** of sensors/technology for redundancy and higher accuracy

# Comparison Matrix for Primary- Interlock Applications



Technologies	Criteria					
	Accuracy (sensitivity)	Cost (per unit)	Development Time	Convenience	Circumvention Risk	Technical Risk
<b>Tissue Spectroscopy</b> (beam of near-infrared light on tissue)	+++	?	-	+++	+++	--
<b>BAIID</b> (Breath-Alcohol Ignition Interlock Device)	++	+	+++	-	++	++
<b>Transdermal</b> (Measures perspiration/sweat)	+	-	+	-	+++	+
<b>Environmental Vapor</b>	--	++	+	+++	---	+++
<b>Ocular</b>	+	---	++	--	--	+

Scale: +++ Best to ---Worst

# Technology Requirements – Consumer Acceptance



- **Easy to Use and Transparent to Driver**
  - No special effort, action or time required on part of driver for alcohol measurement
  - Examples could be sensors embedded in steering wheel or gear shift, key fob, cameras in rear view mirror
  
- **Multi-functional**
  - Device not only used for alcohol detection
  - Possibly used for theft protection, fatigue/distraction detection
  - Could help with cost and acceptance
  
- **Potential Bundling** with other desirable features
  - Could be “comfort” or “safety” bundle of technologies

# Technology Requirements - Performance



## ■ **Reliable**

- Long life, low/no maintenance and no tolerance for faulty performance
- 99.99% reliability with 17 million vehicles annually still leaves 1,700 vehicles with faulty products
- Redundancy might be necessary to improve accuracy

## ■ **Precise**

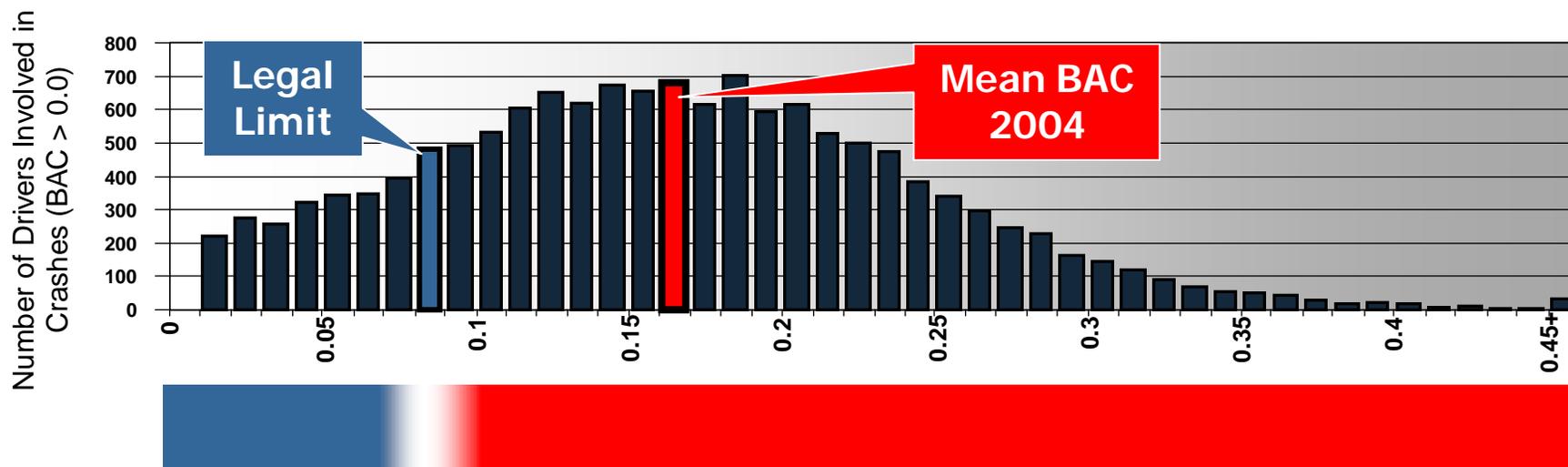
- Able to repeatedly obtain the same measured result

# Technology Requirements – Performance (cont.)



## ■ Accurate

- Must be highly accurate to clearly distinguish levels
- Owners will not tolerate false positives
- Enforcers don't want false negatives



# Technology Requirements – Installation and Upkeep



- **OEM and Aftermarket**
- **Maintenance/Tamper Resistant**
  - Cannot require/need frequent service
  - Should self-calibrate
  - Not easily defeated
- **Programmable**
  - Should there be a function available (embedded in software) to adjust the measurement level that prevents driving?

# The Challenge



- The specifications discussed are our “**ultimate vision**” for the system
- **Intermediate steps are likely needed** to reach the ultimate vision
  - Some populations can test systems that are not fully unobtrusive (fleets, teens) to test specs such as system accuracy and reliability
- One “fixed set of specs” will probably not be reasonable—**will need to evolve over time**
  - With **advances in technology**
  - With **changes in public acceptance**

# Goals for R&D and Deployment: **Device**



## ■ **Short Term**

- Sufficiently accurate, reliable, easy to use
- Low maintenance
- Ready for in-vehicle production and aftermarket version available

## ■ **Mid Term**

- Improvements in accuracy, calibration, maintenance and long-term reliability
- Movement towards multi-functionality and transparency

## ■ **Final Product**

- Tried, tested and refined to reach a level of performance that can be widely used
- All of the specs defined earlier in the presentation are met

# Goals for R&D and Deployment: **Deployment**



## ■ **Short Term**

- Select commercial or corporate fleet applications
- Teen drivers
- Aftermarket applications

## ■ **Mid Term**

- Option on some vehicles; standard equipment in luxury vehicles
- Aftermarket products to general public
- Voluntary standards for products – would boost marketability?

## ■ **Final Product**

- Full fleet deployment

# Goals for R&D and Deployment:

## Public Acceptance



### ■ Short Term

- Develop and deploy strategies for gaining public acceptance

### ■ Mid Term

- Continue to educate public about importance
- Publicize the successes of the fleet experience

### ■ Final Product

- Consumer demand emerging for in-vehicle alcohol detection
- As common and as accepted as key fobs

# Thank You!



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