

What do we need to know and do?





Safe Kids Worldwide



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Driver Assistance & Autonomy

Safety and convenience features like anti-lock braking and cruise control have been developed since the 1950s.

Advanced safety, driver assistance and foundation systems have existed and evolved since the early 2000s and continue to advance.

Children in Automated Vehicles







Level 1 – Driver Assistance Vehicle assists the driver with a single task such as: braking lane-keeping adaptive cruise control Increasingly common features of vehicle models for over a decade (Many vehicles have had these features for the past several years.)

Level 2 – Partial Automation 0 Vehicle assists the driver with Not considered two or more Level 1 tasks self-driving; braking . lane-keeping **Human driver** acceleration still required steering • adaptive cruise control (Examples: Tesla Autopilot, Mercedes-Benz Drive Pilot, Volvo Pilot Assist)

Children in Automated Vehicles

Level 3 – Conditional Automation

- Vehicle can self-drive from point A to point B under certain conditions
- Driver must take control in a moment's notice in an emergency or when conditions change.

Driver must be present and attentive at all times and ready to take control

(No current examples exist on the consumer market.)

Level 4 – High Automation

Vehicle operates autonomously, **Envisioned for** but in limited situations, such as:

- Within a set geographical area • Up to a maximum speed

(What is

Driver or remote operator may be required for some models and situations

fixed route vehicles, In favorable weather conditions like shuttles or commercial deliveries

Passengers free to

shift focus (to

reading, working,

watching TV, etc.)

(No current examples exist on the consumer market.)

Level 5 – Full Automation

- Vehicle can self-drive from point A to point B regardless of weather condition or speed
- No driver required
- All humans are passengers
- Some vehicles could be occupantless

(No current examples exist on the consumer market.)

How Do New Technologies Help?

94% of serious crashes are due to human error.

By reducing or eliminating human error, AVs are expected to significantly reduce crashes, injuries and fatalities.

AV: Safety Advantages

• Single-year crash toll in the U.S. (2019):

- 119,095 children ages 0–14 visited an ER
- 7,908 children ages 0–14 were hospitalized
- 280 children ages 0–14 died
- 94% of serious crashes are due to human error
- AV technologies remove human error from crashes
- Fewer crashes mean fewer deaths & injuries
- Reductions in pedestrian and other non-occupant injuries and deaths are also expected.

AV: Economic Advantages

- Societal costs of child passenger traffic fatality and injury include medical, work loss, and quality of life loss costs:
- \$4.1 Billion Emergency Department Visits \$4.8 Billion Child Hospitalizations

\$2.5 Billion – Child Deaths \$11.38 Billion TOTAL per year in the United States

- Economic costs are accompanied by devastating social impacts for road users, their families, and the broader community
- Elimination of crash-related deaths and serious injuries is an urgent priority.

AV: Additional Possibilities

• AV Rideshare and other options for families

- More accessible mobility for unlicensed individuals
- More accessible mobility for people with disabilities
- Independent possibilities for older children

Cost Savings

- Likely shift in family insurance costs
- Reduced product costs due to improved delivery efficiency
- Further Potential
 - Less need for parking space if vehicles are share/active
 - Further technological advances and robotics

Are AVs Safe?

Current regulations, vehicles and laws make the driver or attending parent responsible for child safety.

Regulations, laws and education must adapt to the changing technology and continue to assure child safety.



















Example AV Child Safety Considerations

Seat Configuration

- Require front-facing seat for CR use?
- Can directional misuse be mechanically prevented?
- Instruction label on vehicle seats or belts?
- Labels for booster seat use facing front?
- Mechanical block to force compliance?

Compatibility

Differences in lower or tether anchors?Differences in air bags?



- Front seat installation?
- Potential crash interaction among occupants?
- How will bi-directional vehicles address CRs?

Children in Automated Vehicles







Children Must Be Supervised for Safety

- Current vehicles and laws make the driver or attending parent responsible for child safety
- Who is responsible when the potential exists for no parent/caregiver to be present or alert?
 - children may unbuckle themselves or others
 - · bored children may play unsafely with unused seat belts
- What is the appropriate age when a child can ride alone?

Children under 13 must not be transported without appropriate adult supervision.



EMS Possibilities

Fewer crashes and significant injury reduction

Benefits for emergency vehicles

- Collision avoidance technologies
- Features for braking, parking, etc.
- Communicate with other vehicles
- Less divided attention for patients
- Rideshare for non-emergent transport



Who is responsible for patient-care decisions? Will any AV systems require special deactivation training?

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Law Enforcement and AV

Fewer crashes and significant injury reduction

Human error crashes

Distracted driver crashes

- Impaired driver crashes
- Officers multitask in patrol vehicles



Did the driver assume emergency control in a Level 2 or 3 vehicle? Who is responsible for crashes in vehicles with no driver? Have laws been updated to include autonomous vehicles?

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Laws Must Guide Safe Practices

Model Law for Child Transport in AV

- Responsible party duties
- Supervision requirements
- Restraint requirements
- Vehicle requirements
- Definitions

In addition to requiring compliance, usage laws are a crucial part of educating road users.

Model Law for State Use

• Applies to children under 13

- Requires that a responsible party be present
- Requires restraint use
- Requires technological verification of compliance
- Provides definitions for state consistency

Child Safety at the Forefront

AV Developers, Vehicle Manufacturers, Car Seat Manufacturers, Regulators and Safety Experts... MUST COMMUNICATE THROUGHOUT PROCESSI

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Introduction ... Carify that the

CPS Techs Need Updated Info

2017 survey: 1300 certified CPS Technicians

- 131 actively following and 811 "know a little" about AV
- 975 have never started a conversation about AV
- Child supervision (1005) is the biggest AV concern
- Believe AV is in distant future

W design & development have been progressing for lecades, but widespread visibility is now increasing

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Safety Is Important for All Uses

Multiple User Vehicles Becoming More Common

- Rideshare, rentals, shared vehicles
 Certain car seats are becoming more portable, lightweight
- Easy use, accessible instructions and dexterity are needed
- Labels—pictorial

Standardized, harmonized terms for a new field

10 years ago, no one talked about GOOGLING, for example

Vehicle Differences – Cars, trucks, shuttles

- Interior designs
 Swivel seats
- Number of rows and configurations



What do CPS Advocates Need to Know?

Advocates play an important role in family education

- Restraint use for all
- · Car seat selection, installation and use
- Air bag interaction and warnings
- Supervision for children under age 13



Advocates can also play a role in state legislation. Familiarity with basic vehicle features is important. Vehicle owner's manuals and online resources must be consulted.

















