



## **Position on Rear-facing Child Safety Seats**

Safe Kids Austin supports efforts to develop, maintain, and strengthen child passenger safety for children traveling in motor vehicles. This position outlines the necessity to maintain children in a child safety seat in a rear-facing position at least until age two or as long as possible as allowed by the child safety seat manufacturer's instructions.

### **Background**

Although there has been progress in the field of child passenger safety, motor vehicle collisions (MVCs) remain the leading cause of death for children 5 to 14 years old and a leading cause of death for children under one year old. <sup>1,2</sup> Nearly 5,000 children and adolescents under the age of 21 years die in MVCs in the U.S. each year, representing 15% of all fatal MVCs. <sup>3,4</sup> This fatality rate is twice that of other developed countries, such as Sweden, Japan, and Norway. <sup>5</sup> Additionally, for each fatality, 18 children are hospitalized and 400 receive medical treatment due to injuries from an MVC. <sup>6</sup>

The National Highway Traffic Safety Administration (NHTSA) estimates that highway MVCs cost the United States \$230.6 billion per year or \$820 per citizen. <sup>7</sup> Furthermore, each dollar spent on a child safety seat saved two dollars in medical costs and six dollars in other costs, or 25 dollars in the quality of life. <sup>7</sup>

Rates of death from MVCs vary by race and ethnicity. The highest MVC mortality rates tend to be among African American and American Indian/Alaskan Native children. Mortality rates are lowest among Asian/Pacific Islander children and intermediate among Hispanic and White children. <sup>8</sup> Additionally, Black and Hispanic children are more likely to be unrestrained compared to White children. <sup>9</sup>

### **Child Safety Seat Overview**

Child safety seats (CSSs) are restraint systems that decrease the risk of ejection during an MVC, distribute crash forces across the bones instead of soft tissues, minimize the MVC forces on the occupant by maximizing deceleration time, and limit contact between the occupant and the inside of the vehicle. <sup>4</sup> There are three types of rear-facing CSSs:

1. Rear-facing only seats
2. Convertible seats, when used in the rear-facing position<sup>10</sup>

3. 3-in-1 seats, when used in the rear-facing position.<sup>10</sup>

Once a child outgrows the rear-facing only CSS or height and weight limit of the rear-facing position in their convertible CSS, the child should move to a forward-facing CSS with a harness until the child reaches the forward-facing height and weight limit as specified by the manufacturer.<sup>10</sup> There are three types of forward-facing CSSs:

1. Convertible seats, when in the forward-facing position.
2. Forward-facing only seats with a harness
3. Combination seats, which can be transitioned into a booster seat.<sup>10</sup>

When a child reaches the maximum height or weight limit for the forward-facing seat, the child should transition into a booster seat. Booster seats help to properly position the lap and shoulder seatbelt properly on the child's shoulder and hips. Children should use a booster seat until they are at least 4 feet 9 inches tall to ensure the seatbelt will fill them properly. There are two types of booster seats:

1. High back booster seat
2. Low back booster seat

### **The Importance of Maintaining the Rear-Facing Position In Children**

In 2011, the American Academy of Pediatrics (AAP) released a best practice recommendation that all infants and toddlers should be in a rear-facing child safety seat (CSS) until the age of two or until they reach the height and weight limit of the CSS as specified by the manufacturer.<sup>4</sup> However, an estimated 30% of children move to the forward-facing position at the age of one year old.<sup>11,12</sup> Riding in a forward-facing position is a risk factor for cervical injuries in infants and young children because they have a relatively large head and weak cervical muscles compared to older adults.<sup>13</sup> Consequently, this can cause severe injuries to the cervical spine if this child is in a forward-facing CSS in the event of a frontal MVC.<sup>13-16</sup> Even less serious MVCs can cause serious injuries because less crash force is required to cause spinal damage in infants and young children.<sup>14</sup> Rear-facing CSSs reduce this risk by supporting the neck, head, torso, and pelvis of the child's body to distribute crash forces over the entire body on stronger bony structures and preventing the child's head from moving indecently of the proportionally smaller neck with weaker muscles.<sup>17-19</sup>

**States can reduce serious injuries among children from MVCs through child passenger safety laws.** The first child passenger safety law in the U.S. was passed in 1977 and, by 1985, all 50 states had adopted some form of a law regarding CSSs to increase safety for child passengers.<sup>2</sup> States continue to strengthen these laws as new research shows ways to increase child safety. Twelve states have mandated rear-facing CSS use for infants under one year old or less than 20 pounds and four states now require rear-facing CSS use for children under two years old. These four states are California, New Jersey, Pennsylvania, and Oklahoma.<sup>2,120</sup>

**Research has found that rear-facing CSSs are the safest method to transport children two years old and younger.** Evidence suggests that children should ride rear-facing while riding in a vehicle for as long

as possible and will benefit from riding rear-facing for longer than one year.<sup>21,22</sup> Riding in the rear-facing position allows the child's head to move simultaneously with the body, allowing as little motion as possible to pull on the neck and decreasing risk of severe neck injury.<sup>11</sup> Rear-facing CSSs have been found to be over five times more effective for protecting children two and under versus forward facing CSSs.<sup>15</sup> Due to these benefits, the AAP recommends that manufacturers produce rear-facing CSSs that can be used for children up to four years old or 45 pounds and that children remain in a rear-facing position until at least age two.<sup>24</sup>

### **Safe Kids Austin Position:**

Safe Kids Austin maintains a position that childhood MVC injuries and deaths are preventable. In conjunction with the AAP and NHTSA, Safe Kids Austin advocates the position that children should ride in a rear-facing position until age two or as long as possible as allowed by the child safety seat manufacturer's instructions. Safe Kids Austin advocates this position supported by the best available research evidence to minimize the morbidity and mortality of childhood MVC injuries.

### **Best Practices Currently Supported by Safe Kids Austin:**

- Children should ride in a rear-facing position in their CSS until the age of two years.<sup>10</sup> If a child is in a rear-facing only CSS and outgrows the height or weight limit, the child should transition to a convertible or 3-in-1 CSS that can be used rear-facing until the child is at least 2 years old or until the child reaches the height or weight limit.<sup>10</sup>
- Rear-facing CSSs should be properly secured in the vehicle using the seat belt or LATCH system according to the CSS and vehicle manufacturers' instructions.<sup>25</sup>
- Rear-facing CSSs should never be placed in a front seat where an airbag is present.<sup>24</sup> If a child must ride in a rear-facing CSS in the front vehicle seat, such as in a truck with no rear seats, the passenger air bag must be turned off and the vehicle seat should be moved back as far from the front of the vehicle as possible.
- Rear-facing CSSs should be installed securely in the rear of the vehicle. The CSS should not move more than 1 inch front to back or left to right at the belt path.<sup>25</sup>
- Rear-facing CSS's should be reclined at a 30-45 degree angle, or as indicated by the CSS manufacturer, to prevent the child's head from falling forward.
- The harness straps should be adjusted so they are at or below the level of the child's shoulders when the child is riding in a rear-facing position. The harness straps should be snug, and the caregiver should not be able to pinch any slack in the harness above the retainer clip in order to ensure minimal movement of the child in the event of an MVC.<sup>25</sup>
- The retainer clip should be at the armpit level of the child to distribute the forces of an MVC across bones rather than soft tissue to prevent organ damage and ejection of the child.<sup>2</sup>

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