

## Child Restraint Systems and Airline Travel

Preparing to travel with your child on an airliner can involve decision making that can be fraught with practical and economic decisions, with safety considerations complicating matters. Deciding when and how to use child safety restraints aboard the airliner can be daunting, particularly when already considering the use of an existing automotive safety seat.

The Federal Aviation Agency (FAA), which regulates aviation within the United States, allows children less than two years of age to sit in the lap of an adult while traveling on an airliner, but after two years of age children are required to have their own seat. This leaves the parent of a child less than two years old with some difficult decisions:

- Should I purchase a seat for my under two year old child?
- If I do, is my child really safer in an adult seat?
- Can I afford the additional cost?

Additionally, for a child of any age, parents must decide on:

- How to restrain the child in an adult sized seat?
- When should a child be considered big enough to safely use an adult restraint?

This article will provide parents with information that should help them to understand the technical issues of using a child restraint system on board an aircraft and to make a decision that is appropriate for them.

**Why?** Restraint systems on aircraft are intended to serve two basic purposes:

- Prevention of occupant ejection from his/her seat during turbulence and
- Restraint of the occupant during a crash.

Clearly, the first purpose is required far more often than the latter, but both functions have been shown by the National Transportation Safety Board (NTSB) to be important for occupant safety during travel in commercial aircraft.

**How do injuries occur?** Numerous studies have shown that adults are physically incapable of holding onto a child in severe turbulence or in a crash, resulting in the child to being thrown and at risk of striking objects within the aircraft, possibly incurring serious or fatal injuries as well as injuring other people.

In aircraft crashes, lap held children can sustain crush injuries, or be trapped between the parent and the seat or bulkhead in front of them, as a result of the lap belt restrained parent flailing thrown forward, their upper body folding forward over the child. In response to these occurrences, various devices (e.g., belly belts) have been developed to secure infants to the parent. However, none of these devices provide the desired protection, because they do not prevent the parent from crushing the child in a crash ([13](#)). As a result, these devices are not allowed to be used on US airlines.

**Economics vs. risks:** For these reasons, allowing an exception for children under the age of two years may be economically expedient because it saves the parent or guardian the expense of buying a separate seat for the child, but it also ignores the very real possibility that such a practice could lead to serious or fatal consequences for the child or others. Fortunately, severe turbulence encounters are rare and crashes are even less common. So, is the risk a parent takes by not purchasing a separate seat for their child worth it? When tragedy strikes, the answer is always no!

**The lap held child:** If you are still leaning toward traveling with an unrestrained child, you should be aware that although the FAA allows children under two years old to travel in the lap of an adult, they do not recommend this practice. Additionally, every governmental and safety organization that we know advises against this practice, including the NTSB, the American Academy of Pediatrics (AAP), and the Centers for Disease Control (CDC).

**In an emergency:**

- If you are traveling with an unrestrained child, during heavy turbulence, an emergency landing or anticipated crash, you should provide as uniform support as possible to the infant's head, neck, and body. Lean over the infant to minimize the possibility of injury due to flailing. Flailing injuries occur due to contact of a part of the body (e.g. limbs) with interior structures due to inadequate restraint (flailing).
- Children occupying approved child restraint devices should be braced in accordance with the manufacturer's instructions.
- Children in passenger seats should utilize the same brace position as adults.

**Optimum restraints:** The optimum restraint for children of different ages and, more importantly, different sizes, in aircraft or automobiles is actually a fairly complex issue that requires a number of decisions from the parent or guardian. In order to keep this article brief, the reader is directed to various additional sources of information in the **REFERENCES** section that may help elucidate or provide background information for issues addressed in this article.

**Airliner vs. Automobile Safety:** The technical issues in restraining a child in an airplane are actually quite similar to those encountered in restraining a child in an automobile. Since a child is no different in an airplane than in a car, the basic principles of restraint apply equally to both situations. Consequently, a restraint appropriate in an automobile is also generally appropriate in an airplane with one major caveat: it must be approved for use on airplanes by the FAA. Federal regulations designate the National Highway Safety and Traffic Administration (NHTSA) as the sole agency responsible for certifying "Child Restraint Systems" (CRS) designed for use in automobiles and aircraft (49 CFR Part 571.213). NHTSA certified seats must meet the requirements of Federal Motor Vehicle Safety Standard 213 (FMVSS 213). For use on aircraft, CRSs must meet both the basic requirements and the additional aviation requirements found in FMVSS-213. Consequently, any automobile CRS certified to FMVSS 213 may be allowed to be used in airplanes, with the exception of boosters and harness restraints even if they are labeled for aircraft use. The discrepancy in recommendations between cars and airplanes exists

because automobiles are equipped with 3-point restraint systems, which include both a lap belt and a shoulder belt while airliner seat only have a lap belt.



Figure 1. Example of an FAA approved combination seat

**Combination Seats:** CRSs that can be used forward-facing with an internal harness or as a booster seat are referred to as “combination seats.” They are designed to accommodate the vehicle’s 3-point restraint system to secure the child and the seat, or they can be secured to the vehicle seat with the vehicle’s lap belt while the child utilizes the internal harness. **Figure 1** is an example of an FAA approved combination seat. Typically, combination seats can be used in aircraft when their internal harness is used.



Figure 2. Example of an ACSD

**For Aircraft Only:** The FAA has also approved a class of restraint systems not approved by NHTSA, but that meet the requirements of FAA exclusively for use on board aircraft. The FAA refers to these seats as “Aviation Child Safety Devices” (ACSD) and the FAA regulations regarding the use of CRSs on board aircraft also apply to the use of ACSDs. As an example, **Figure 2** shows an ACSD recently approved by the FAA for use on board aircraft for children weighing between 22 and 44 pounds (10-20 kg) that is not certified by NHTSA for automobile use.

**Bottom line:** If you intend to use a CRS on board an aircraft, it is best to ensure there is the required label stating, “this restraint is certified for use in motor vehicles and aircraft” or similar wording and it is prominent and clearly readable or you may be asked to check the CRS as baggage ([AirSafe.com](http://AirSafe.com)). If your CRS has an unreadable label, the FAA requires that a letter from the manufacturer that “specifically ties the CRS (through a detailed description or specific make and model number) to approval for use on aircraft” be provided to airline personnel. An owner’s manual is also acceptable as proof of safety standards. If the restraint is not

designated as meeting NHTSA requirements, the user should ensure that it is approved by the FAA for use on aircraft (ACSD) before using it for this purpose. Be sure that your ACSD has a placard or label stating, "FAA Approved in Accordance with 14 CFR 21.305(d), Approved for Aircraft Use Only".

**International:** CRSs approved by foreign governments or the UN are also allowed if it has a solid back and seat, has internal restraint straps, and a label showing approval for aviation use.

**Consider phases of your trip:** Since parents should already own a CRS for use in the family automobile and since they may need a CRS for their child when they arrive at their destination, consideration should be given to using that CRS on board the airplane as long as it is appropriately certified and labeled. If you prefer, some airlines provide CRSs for use aboard their aircraft. It is best to check with your airline well before your departure date and, if your trip involves multiple legs, to ensure a CRS is available for all legs of your trip. Only one airline (Virgin Atlantic) provides this service currently.

#### **Recommendations:**

- It is generally recommended that any child under 4 feet 9 inches in stature (147 cm) and weighing less than 80 pounds (36.3 kg) be restrained by an approved CRS when traveling in an automobile (IIHS 2010). However, the American Academy of Pediatrics (AAP) and the FAA recommend that all children use an approved CRS appropriate for their age, height and weight when traveling on an airplane until the child weighs more than 40 lbs (18 kg). Above this weight they consider that a child can safely use the aircraft seat belt.
- The discrepancy in recommendations between cars and airplanes exists because automobiles are equipped with 3-point restraint systems, which include both a lap belt and a shoulder belt while airliners only have a lap belt. For automobiles, booster seats are generally required for children to properly fit both the lap and shoulder belts until they weigh about 80 pounds (36 kg) and it is strongly recommended that parents use an appropriate CRS, combination seat or belt positioning booster seat in automobiles until their child can properly fit an adult restraint (4'9" and >80 lbs).
- Although many authorities believe that children over 40 pounds (18 kg) are adequately restrained by the adult lap belt in airline seats, some approved CRSs may be used by children over 40 pounds. CRS manufacturers have very recently started offering forward-facing, convertible CRSs that are certified for use in automobiles and aircraft for children up to 80 pounds (36 kg). A convertible CRS is a seat that may be secured in a rear-facing direction until the child reaches a specified height and weight and then can be secured forward-facing until the child reaches the height and weight limits of the seat.
- As an alternative to a convertible seat, there are a variety of combination seats with backs and internal harnesses that may be used by children weighing between 40 and 80 pounds (18-36 kg). CRSs have the advantage of providing upper torso restraint to a child occupant, which provides them a level of protection above that provided by a lap belt only, primarily by preventing upper torso flailing during a crash or heavy turbulence.

The ACSD shown in Figure 2 and similar approved systems also provides upper torso restraint, but is only for children up to 44 lbs (20 kg).

**Size Considerations:** In choosing a CRS appropriate for your child, many organizations and experts offer guidelines for choosing the appropriate seat for your child. These guidelines are consolidated and briefly summarized in **Table 1**. You should be aware that some CRSs are too wide to fit in some airline seats, particularly CRSs designed to accommodate children up to 80 lbs. The FAA advises that any seat with a width of 16 inches or less should fit in any airline seat. If your CRS is wider than 16 inches (40.6 cm), you can check with the airline by calling or checking on their web page to find out the width of the seats on the aircraft in which you will be flying. You should know that many airplanes are equipped with some seats with rigid armrests and others that have moveable armrests. Seats with moveable armrests may be able to accommodate some wider CRSs when the armrests are moved to the up position. If your CRS requires this extra space, you should request such a seat when making reservations or request to be moved to such a seat during boarding. Obviously, utilizing the first alternative is greatly preferred since this will save you, the flight attendants and other passengers considerable problems.

**Infants and Small Children:** AAP and CDC agree that infants may safely fly in airplanes and they recommend that infants be secured in approved rear-facing CRSs until they are at least one year old and at least 20 pounds (9 kg). Children older than one year old and between 20 and 40 pounds (9-18 kg) may be secured in an approved forward-facing CRS, although it is best to leave the child in a rear-facing restraint as long as possible ensuring that the child still meets the height and weight requirements for that rear-facing restraint.

**Manufacturer Information and Labels:** Irrespective of these guidelines, it is imperative to read the information provided by the manufacturer to ensure that the CRS is suitable for your child's age, height and weight and that it can be easily installed in an airline seat with a lap belt. Also, ensuring that the seat's approval labels can be readily viewed and are clearly readable will prevent problems at the airport.

**Note:** Although the FAA's recommendations for child restraint use in general aviation (private) aircraft are nearly the same as for airliners, the above summarized guidelines apply **only** to children traveling in airliners. The primary difference is that larger children should be seated directly in the aircraft seat and use the aircraft seat belt and shoulder harness unless it rubs on their face or neck. Crashes of general aviation aircraft involve forces much more similar to those encountered in motor vehicle crashes than those encountered in airline turbulence and landing incidents. Also, general aviation aircraft provide 3-point restraint systems for most seating positions. Consequently, it is recommended that children traveling in general aviation aircraft remain restrained in an approved child restraint system as long as possible or until they reach a height of 4'9" (147 cm) and a weight of 80 pounds (36 kg).

In choosing an appropriate seat, the guidelines that apply to restraining a child in an automobile may be followed **except** it should be remembered that the FAA does **not** permit a child to occupy, during taxiing, takeoff or landing, **booster-type CRS**.

**Table 1**  
**Guidelines for CRS Use on Airliners**

<b>Age Group</b>	<b>Limitations</b>	<b>Type of Seat</b>	<b>Guidelines for Aircraft Use</b>
Infants	Less than 1 year old Less than 20 lbs	<ul style="list-style-type: none"> <li>• Infant seats</li> <li>• Rear facing convertible seats</li> </ul>	<ul style="list-style-type: none"> <li>• Infants should always ride rear-facing until they are at least over 1yr and 20 lbs.</li> <li>• It is advisable for infants to ride rear facing for as long as possible as long as they meet the requirements of their CRS</li> <li>• Rear-facing seats for infants over 20 lbs may be purchased</li> </ul>
Toddlers	Over 1 year old Less than 40 lbs	<ul style="list-style-type: none"> <li>• Rear facing convertible seats</li> <li>• Forward-facing convertible seats. ACSD are also an option for this group.</li> </ul>	<ul style="list-style-type: none"> <li>• When children grow out of their rear-facing seat, they should transition to a forward-facing convertible seat</li> <li>• After 40 lbs children may continue to use a convertible seat until they reach the weight limit of the seat</li> <li>• Some convertible seats accommodate children up to 80 lbs</li> </ul>
School-Age	Over 40 lbs Less than 80 lbs	<ul style="list-style-type: none"> <li>• Lap belt</li> <li>• Convertible seat</li> <li>• Combination seat with an internal harness</li> </ul>	<ul style="list-style-type: none"> <li>• Children over 40 lbs may use the adult lap belt in their airline seat</li> <li>• They may also use an approved combination seat or continue in a convertible seat until they exceed the weight limits for that seat</li> </ul>
Older Children	Taller than 4'9" Over 80 lbs	<ul style="list-style-type: none"> <li>• Lap belt</li> </ul>	<ul style="list-style-type: none"> <li>• Children above this height and weight are considered adult size and should use the lap belt in their airline seat</li> </ul>

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