

Clinical Review

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CHILD CAR SEATS: GUIDING PARENTS AND CARERS

Motor vehicle crashes are all too common. Even at slow speeds, the forces on the body can result in injury. Children are especially vulnerable. Car seats that are approved for use in the particular vehicle in which the child travels, provided they are fitted properly and used correctly, dramatically reduce the risk of death and injury. However, according to Good Egg Car Safety, almost 2 out of 3 seats checked in the UK are fitted incorrectly. This module helps midwives and health visitors offer advice to parents and carers about buying and using child car seats.

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LEARNING OBJECTIVES

After reading this module and completing the on-line assessment, you should:

- Understand why children need to use car seats that are designed for their specific weight, height and age.
- Appreciate the differences between ISOFIX and car seats that are restrained by a seat belt.
- Be able to answer common questions from parents and carers about the choice and use of car seats.
- Be able to advise parents and carers about choosing, installing and using a car seat and how to avoid common fitting problems.
- Understand the difference between R44 and R129 (known as i-Size) seats.

QUESTIONS

Visit our website to test your knowledge. Our questions cover:

- Children's anatomical development.
- British law and international regulations regarding child car seats.
- Correct use of child car seats.

COMPLETE YOUR CPD ONLINE

Remind yourself of the main points, take our reflective and multiple-choice on-line assessment, download your CPD certificate and check out our additional resources at www.mumandbabyacademy.co.uk



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HOW TO COMPLETE THIS CPD MODULE

After reading this clinical review, please visit www.mumandbabyacademy.co.uk where you can assess your learning with reflective and multiple-choice questions. You can save work in progress and download a CPD learning log.

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Introduction

According to current British law, children must use a child car seat until they are 12 years old or they are 135 cm (4 foot 5 inches) tall, whichever comes first. In the event of a collision, a child in a car seat that is correctly fitted in the vehicle and appropriate for their weight or height means that the child is less likely to sustain serious injury. However, a survey performed by Good Egg Car Safety found that almost 2 out of 3 seats checked in 2016/17 in the UK were incorrectly fitted.

Babies need to be transported in a correctly fitted and properly used car seat as soon as they leave the maternity hospital or take their first trip away from home. This helps establish good practice early in life. Indeed, a need for authoritative, independent advice about the issues surrounding the choice and use of car seats means that parents might ask midwives and health visitors for guidance. This module offers general advice that healthcare professionals could provide to parents and carers. Parents and carers should, however, always check the specific instructions and compatibility of the car seat for each individual car in which the child travels. The Royal Society for the Prevention of Accidents (RoSPA) website (www.childcarseats.org.uk/choosing-using) provides information on choosing and using a child car seat.

Why children need additional protection

Crashes happen all too frequently. Many crashes damage only the vehicle. As the driver and passenger are safely restrained by the seat belt, they are not thrown forward or ejected out of the vehicle. Nevertheless, even at slow speeds, the forces on the body arising from the change in momentum can be severe and result in injury. An adult seat belt will not restrain young children and so will not adequately

protect their developing body, particularly their heads and necks.

Anatomical and physiological differences mean that children are less able to cope with the stress of a collision than adults. For instance, children have a heavier and larger head in proportion to the rest of their body size compared to adults. The head accounts for 25% of a baby's total body mass, compared to about 6% in an adult. Such anatomical differences, combined with the weaker neck structure of babies and young children, reduce resistance to loads in the neck compared to older children and adults. This necessitates the use of a rear-facing seat to evenly distribute and minimise these forces, especially if the baby is in a car that experiences a frontal impact. The rear-facing position helps distribute evenly, and so reduce, the crash forces acting on the head, thorax and, in particular, the neck. Parents of low birth weight babies should consider buying a car seat that allows the baby to lie as flat as possible and any journeys should be as short as possible.

In adults, the iliac crests at the top of the hips hold the belt in position. A younger child's pelvic development is insufficient to keep the lap belt in position. As a result, young children need crotch straps or a booster seat that is shaped specifically to keep the belt in the correct position. For toddlers and older children, a child car seat harness (or the adult seat belt in a booster seat) passes over the shoulder girdle, rib cage and pelvis to distribute the energy across as wide an area as possible over both sides of the body. A five-point harness ensures the optimal load distribution.

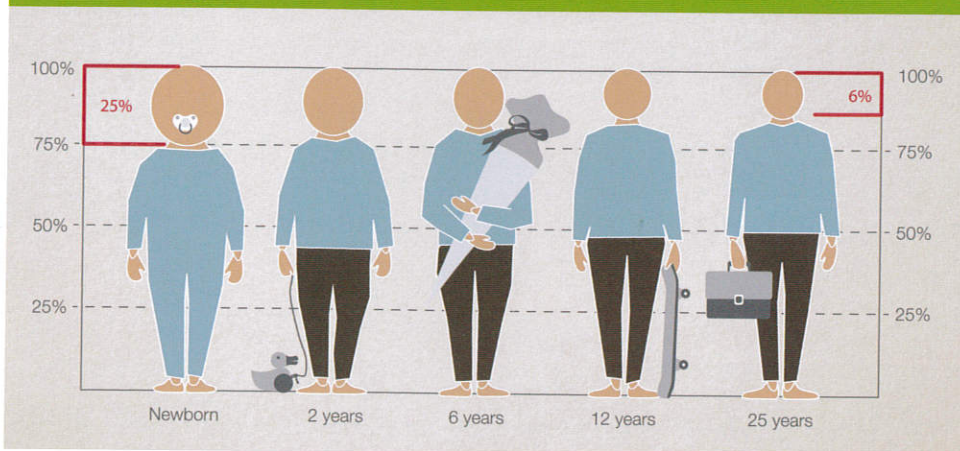
Know the law

Under British law, children must use a child car seat until they are 12 years old or they are 135cm (4 foot 5 inches) tall, whichever comes first.

Two United Nations regulations – R44 and R129 (the latter also referred to as i-Size) – direct the design and testing of car seats in the UK



Children have a heavier and larger head in proportion to the rest of their body size compared to adults



Two regulations – United Nations (UN) regulations R44 and R129 (the latter also referred to as i-Size) – apply to car seats in the UK. These currently run side by side. R44 will, however, be slowly phased out. This can be confusing for parents and carers, but it is important to stress that both regulations meet legal standards. In addition, however, the i-Size seats are tested for side impact protection. Parents and carers can choose the car seat based on weight (R44) or height (R129 'i-Size') – see Table 1. Parents and carers need to change the seat before the child exceeds the upper weight or height limit shown on the orange sticker found on the seat.

Rear-facing seats

Rear-facing seats are safer for the neck if there is a frontal collision, which is the most common place of impact, than front-facing seats. According to the new European-wide R129 standard for child car seats, babies must be placed in a rear-facing baby seat for at least 15 months. A child between 71 cm and 83 cm tall *and* over 15 months old can be carried rear- or forward-facing, although it is best to keep children facing the rear for as long as possible.

Most R44 rear-facing seats will be classified as a group 0+ seat and will have a weight limit of 13 kg. Children in i-Size seats must face the rear for at least 15 months. In some parts of Europe, especially Scandinavia, children often face the rear until they are 18 kg.

Exceptions to the law

There are a few exceptions to the law. A doctor, for example, can issue an exemption certificate for children with disabilities or medical conditions. In some cases, the child may be able to use a disabled person's seat belt or a child restraint that is designed specifically to meet their needs.

Children can travel in taxis and minicabs that do not have a child seat. They must, however, travel on a rear seat and, if they are aged 3 years or older, use a seat belt. Children who are younger than 3 years of age can travel without a seat belt in the rear, although this is not a safe option.

If there are two occupied child car seats in the rear and there is not enough room to fit a third one, a child older than 3 years of age can sit in the rear using the car's seat belt instead of a child car seat. Children younger than 3 years of age must, however, travel in a child car seat. If there is no room for a third child seat in the rear, the child must travel in the front seat

with the correct child seat. The seat should be pushed as far back as possible. Parents and carers should remember that it is illegal to carry a child in a rear-facing seat with an active airbag in the front.

If an appropriate child car seat is not available, a child older than 3 years of age can use an adult seat belt if all of the following apply:

- The journey is unexpected
- The journey is necessary
- The journey is over a short distance.

This exception does not apply to children younger than 3 years old. Parents and carers cannot take children younger than 3 years of age in a vehicle without a seat belt or the correct child car seat, except in a taxi or minicab.

Children younger than 3 years of age must travel in a child car seat. This means they cannot travel in a vehicle that is not fitted with seat belts. Children older than 3 years of age can travel unrestrained in the rear of a vehicle that does not have seat belts. This applies only to vehicles that were originally manufactured without seat belts.

In adults, the iliac crests hold the belt in position; infants' and toddlers' pelvic development is insufficient to keep the lap belt in position



Table 1: Types of car seat

Type	Regulation	Group	Weight/height range of the child	Approximate age range of the child
Rear-facing baby seat	R44	0	0 to 10 kg (22 lbs)	Birth to 6 to 9 months
	R44	0+	0 to 13 kg (29 lbs)	Birth to 12 to 15 months
	R129 i-Size		Check height is in the range for the seat; child seat with an integral restraint (eg five-point harness) for children up to 105 cm	Birth to 15 months
Combination seat (rear-and forward-facing)	R44	0+ and 1	0 to 18 kg (40 lbs)	Birth to 4 years
	R44	0+, 1 and 2	0 to 25 kg (55 lbs)	Birth to 6 years
	R129 i-Size		Check height is in the range for the seat; child seat with an integral restraint (eg five-point harness) for children up to 105 cm	Up to at least 15 months rear facing, then the choice of rear or forward facing up to a maximum child height of 105 cm
Forward-facing child seat	R44	1	9 to 18 kg (20 to 40 lbs)	9 months to 4 years
	R44	1, 2 and 3	9 to 36 kg (20 to 79 lbs)	9 months to 12 years
	R129 i-Size		At least 15 months old and 76 cm tall to a maximum child height of 105 cm	15 months to 4 years
High-backed booster seat	R44	2	15 to 25 kg (33 to 55 lbs)	4 to 6 years
	R44	2 and 3	15 to 36 kg (33 to 79 lbs)	4 to 12 years
	R129		i-Size universal seats: 100 to 135 cm	4 to 12 years
	R129		R129 specific vehicle seats: 135 to 150 cm	4 to 12 years
Booster cushion	R44	2 and 3	15 to 36 kg (33 to 79 lbs)	4 to 12 years
	R44	3	22 to 36 kg (48 to 79 lbs)	6 to 12 years

Adapted from: www.childcarseats.org.uk/types-of-seat

ISOFIX: Improving safety

The child's car seat should be fitted exactly as described in the manufacturer's instructions. This usually involves using a lap and diagonal seat belt or the vehicle's ISOFIX anchorage points.

ISOFIX is the international standard that defines the attachment points to be manufactured into cars, enabling compliant child safety seats to be quickly and safely secured. ISOFIX is an alternative to securing the seat with seat belts. Seats are secured with a single attachment at the top, known as a top tether, and two attachment points between the back of the car seat and the seat cushion. Top tether points became mandatory in all new vehicle models in 2013.

Some ISOFIX seats use a support leg instead of the top tether. The leg extends to the floor of the vehicle and prevents the seat from tipping forward. Most cars with underfloor compartments are not suitable for use with a seat that has a support leg. Parents and carers should always check for compatibility before buying and using an ISOFIX seat.

Midwives and health visitors can suggest that parents and carers contact the car seat or car manufacturer to ensure the seat is compatible

with their car. RoSPA has a compatibility guide on their website: www.childcarseats.org.uk/choosing-using/child-car-seat-fitting-and-compatibility.

Questions that parents and carers may ask

Why should I switch the air bag off?

Front air bags must be deactivated before fitting a rear-facing car seat in a front seat, which could crush and suffocate a baby. About 20% of vehicle accidents involve side-impact collisions. i-Size seats have a side protection feature, which should be used on the side of the car seat nearest the car window (according to the manufacturer's instructions). Side air bags aim to protect the head and are not as powerful as the front ones. They should not pose a risk to a child in a child seat in the rear. Indeed, the side air bags could further protect children in their seats.

Until what age should a child travel facing the rear?

Height-based seats (R129 i-Size seats) must be rear-facing until the child is older than 15 months. A child between 71 cm and 83 cm tall and over 15 months old can be carried rear- or forward-facing. For weight-based seats, the maximum size depends on the weight limit for

the seat – usually 13 kg. As mentioned above, some parents and carers choose to keep the child rear-facing for longer in seats that are certified for greater weights.

Can children be left to sleep in a car seat?

Child car seats are not intended to be places for babies to sleep when not travelling. Midwives and health visitors should encourage parents and carers to move the baby to a Moses basket, crib or cot as soon as possible.

How can I check that an ISOFIX seat is correctly installed?

After checking that the ISOFIX seat is approved for the car, parents and carers should follow the seat manufacturer's instructions. Parents and carers can find the ISOFIX anchorage points by checking the car's handbook and by the ISOFIX label on the rear seats. The two prongs sticking out of the back or base of the child seat are pushed into the ISOFIX anchorage points in the car seat. The car seat will 'click' or have a visible indicator showing that the child seat has been securely attached. The top tether strap is attached to the third ISOFIX point in the car and not to a head restraint or luggage hook. If the child seat has a supporting leg, this should be braced against the floor and should not be placed over an underfloor storage

i-Size seats are tested for side impact protection



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compartment unless specifically approved by the car manufacturer. The compartment may collapse from the force of an impact coming through the support foot.

How can I check that my baby or toddler is correctly harnessed?

The harness straps should be just below the shoulders for rear-facing seats and just above the shoulders for forward-facing seats. In addition to ensuring the harness offers the best protection, this position is the most comfortable for the child. The harness should not be twisted as this will absorb less energy and also be uncomfortable. Any chest pads should be level and the straps should be tight against the body. Parents and carers should only be able to slip two fingers flat between the straps and child's chest or collar bones. Thick clothing, which should be avoided when travelling in car seats, can prevent the harness from fitting properly, which is close to the child's body.

When should my child move to the next stage of seat?

Children grow rapidly. At 5 years of age, a child's body weight is typically six times that at birth. A 10-year-old child's body weight is ten times that of the birth weight.¹ Car seat design takes the child's rapid development into account. Children should be moved to the next stage seat just before they exceed the upper height or weight limit.

When will my child no longer need a car seat or booster?

Assuming that the child does not exceed the height or weight limit for the seat, they should use the seat for as long as possible as they will

be better protected than with just an adult seat belt. UK law requires children to use a child car seat until they are 12 years old or 135 cm tall, whichever comes first.

Where can I get local advice and get the seat checked?

RoSPA can help with general advice through its website (www.childcarseats.org.uk) and has a free helpline (telephone: 0808 801 0822). Some local authorities offer child car seat checks that are organised by Road Safety Officers (parents and carers can check their local government's

website). The website of Road Safety GB also lists local road safety officers.

How can I stop my child from releasing the belts or harnesses?

RoSPA do not recommend buckle guards that are placed over the seat belt or car seat buckle to prevent children from releasing themselves. Buckle guards may reduce the effectiveness of the seat belt or harness and could be difficult to undo in an emergency. Some products are designed to make it more difficult for the child to get their arms out of the harness.

The two prongs sticking out of the back or base of the child seat are pushed into the ISOFIX anchorage points in the car seat



As soon as possible, children should know that their harness keeps them safe and that parents and carers wear a belt. Parents and carers could make the process of 'doing up the belt' into a chant or song and should not start the engine until they are sure that the child is secure. The driver should say that they will not take the child with them if their harness is not done up. Ideally, an adult should sit with the child in the back seat. If the child releases the harness during the journey, parents and carers should pull over as soon as it is safe to do so. Provided the driver is not distracted, word games, songs, toys or games may reduce the child's temptation to fiddle with the harness through boredom.²

Should I buy a second-hand car seat?

Midwives and health visitors should advise parents and carers against buying second-hand car seats. It is often impossible to tell by visual inspection if a second-hand car seat has been damaged in an accident or by being dropped. Parents and carers should try the seat in their car before they buy it or check that the seat can be returned if unsuitable. Parents and carers should make sure the seat can be fitted exactly to the manufacturer's instructions and is secure. A seat that wobbles is either wrongly fitted or unsuitable for the car.

Should I choose a seat that is secured by the car's seat belt or ISOFIX?

Using an ISOFIX seat reduces the likelihood of incorrect fitting and incompatibility. A car seat can be securely fixed with seat belts if the manufacturer's instructions are correctly followed.

Should I choose a R44 or i-Size seat?

Both R44 and i-size seats meet current legal standards. However, i-Size seats are tested for side impact protection. A R44 seat can only be used if it is a R44.04 or R44.03 seat, as shown on the orange seat label.

Is it legal to use a booster cushion?

It is always better to use a high-backed booster seat rather than a booster cushion without a back. A high-backed booster seat provides more protection around the child's head and neck.

New regulations regarding the sale and use of booster cushions became effective in February 2017. This legislation means that manufacturers are no longer allowed to introduce new models of backless booster seats (booster cushions) for children shorter than 125 cm and weighing less than 22 kg. The new regulations apply only to new booster cushions manufactured to the revised legislation. Booster cushions already in use meet existing safety standards. Parents who use old booster cushions will not be breaking the law if they continue to use them after the rule change.

Can car seats from the USA be used in the UK?

Child seats from the USA are approved according to the US standard FMVSS 230. In Europe, child seats must conform to the European safety standards ECE R44/04 or ECE R129. Parents in the UK should choose car seats that conform to the European standards.

Can car seats be used on aeroplanes?

Some car seats are approved for aircraft use. Parents can check the label on car seats, which will certify suitability for airline use, and should contact the car seat manufacturer. Some seats, although approved, can be subject to airline regulations and additional accessory kits might

be required. As airline regulations regarding suitable car seats can change regularly, parents should always check with their airline before travelling.

In conclusion, correctly fitted and used car seats that are approved for use in the particular vehicle in which the child travels markedly reduce a child's risk of death and injury if they are involved in a road accident. However, car seats need to be fitted with care. By offering advice and support about the choice of car seat and its correct use, midwives and health visitors can help reduce road traffic injuries and fatalities among babies and children.

Independent sources of advice

- RoSPA general website: www.rospa.com
- RoSPA car seat information: www.childcarseats.org.uk
- Child Accident Prevention Trust: www.capt.org.uk
- Good Egg Car Safety: www.goodeggcarsafety.com
- Government regulations: www.gov.uk/child-car-seats-the-rules
- Road Safety GB: www.roadsafetygb.org.uk/regions

Children should know that their harness keeps them safe



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