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#### SAFE KIDS BUCKLE UP Extraction

#### SAFE KIDS Buckle Up

Provided by: Eric Guevin, Director of Education, Regional Emergency Medical Services Authority; Washoe County SAFE KIDS Coalition

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#### Children's National Medical Center (CNMC) CIREN (Crash Injury Research & Engineering Network) Program Report, December 2001 (DOT HS 809 377)

#### **SUMMATION**

Motor vehicle crashes are the most significant cause of unintentional death and injury to children less than 15 years old in the United States. The use of a booster seat for the "forgotten child" of 4 – 8 years old places them in the right position for the seat belt to adequately protect them.

Children between the ages of 4 and 8 years old represent an important at-risk population for motor vehicle occupant protection. Having outgrown child safety seats designed for younger passengers, children in this age group frequently sit unrestrained or are placed prematurely in adult seat belt systems. In fact, children between the ages of 5 and 9 years represented one of only three age groups that did not demonstrate a significant decline in motor vehicle crash morbidity and mortality over the 20-year period of 1978-1998 (65-74 years and 75+ years being the other two groups). Yet we have an effective intervention for these injuries—booster seats.

Safety belts designed for adults do not protect children as well as safety seats designed with pediatric proportions in mind. Lap/shoulder belts result in hyperflexion-related injury to the abdominal viscera and lumbar spine of children. Adult three-point restraint systems are not adequate for children who have not attained most of their adult stature. Several unique anatomic features of infants and children are believed to contribute to the nature and severity of the injuries they sustain as motor vehicle occupants.

Seatbelt misuse puts children at additional risk for injury. The types of safety belt misuse (excluding non-use) commonly seen include restraining two occupants with a single belt, allowing a loose fit for the shoulder belt, re-routing the shoulder belt under the child's outboard arm, and routing the shoulder belt behind the child's back.

#### Seatbelt Injuries

Martin Eichelberger, MD became interested in further study of pediatric injuries associated with motor vehicle crashes after reviewing cases of injuries associated with lap belt use. All trauma admissions to CNMC during a three-year period were reviewed to determine the frequency of abdominal and spinal injury in children wearing safety belts. Ten of the 95 children (10.5%) wearing safety belts sustained a significant "seatbelt syndrome" or "lapbelt complex" injury to the lumbar spine or intestines; seven of these children also experienced head injuries.

The "lap belt syndrome" is caused by the transfer of deceleration forces to the spine. The typical complex of belt-related injuries includes a hallmark lap belt ecchymosis (Figure 7), and lumbar fracture or distraction (Figure 8), with or without spinal cord involvement. Damage to the spinal cord is most often is caused by blunt, non-penetrating trauma rather than by laceration or transection. These mid-lumbar spinal injuries may be associated with paraplegia and life-threatening visceral injury. Additionally, abdominal organs may be compressed between the belt and the spine resulting in perforations of the hollow viscera (Figure 9), and contusions or lacerations of the solid organs. These injuries result in considerable physical disability, emotional distress for the child and family, lost future productivity, and astronomical national health care expenditures.

Figure 7.
Lap Belt Ecchymosis

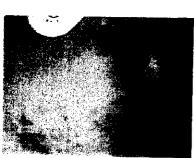


Figure 8. Spinal Fracture

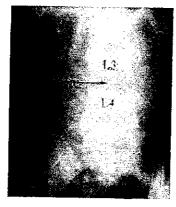


Figure 9
Intestinal Rupture



Several factors place children at special risk of seat belt syndrome. Due to a child's shorter torso length, shoulder straps frequently ride across the neck and face (Figure 10) increasing the likelihood that the child will place the strap behind his or her back. Three-point belts have been installed in cars produced since 1990, but there are still millions of cars on the road with only two-point restraints in the rear seats. Behavioral characteristics of children put them at further risk of lap belt syndrome. Restrained children usually sit in a more slouched posture than adults, increasing the likelihood that the lap belt will ride up across the abdomen. Even when the lap belt is properly placed across the iliac crests of the pelvis, children often move around altering the proper fit of the belt or they loosen the belts to allow greater freedom of movement.

Figure 10.
Incorrect Belt Fit



Children in forward-facing safety seats in the front seat also have a high risk of traumatic brain injury if the air bag deploys. In addition, they are at increased risk for cervical spine injury resulting from hyperextension. Thus, NHTSA child passenger safety guidelines require children less than 12 years of age to be seated in the back of a vehicle.

Figure 11.
Airbag Deaths to Children by Year

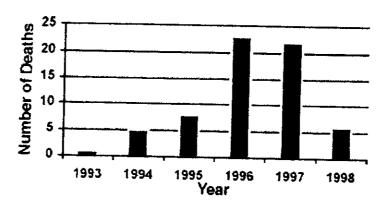
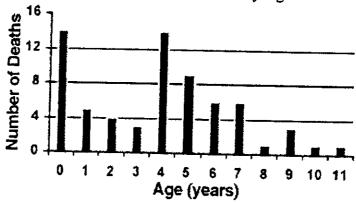


Figure 12.
Airbag Deaths to Children by Age



Our data indicates that except in cases of blatantly incorrect restraint use (failure to buckle safety straps), it is generally more dangerous to use inappropriate restraints than it is to use restraints somewhat incorrectly. The high injury rate among children who were correctly but inappropriately restrained suggests that we need to change our message to parents. It is not enough to emphasize using a restraint correctly; it is equally, if not more important, to enable parents to choose the correct restraint for their children based on the child's size and weight. NHTSA's current child safety guidelines are shown in Table 2.

Table 2.
Child Passenger Safety Guidelines
Buckle Everyone. Children Age 12 and Under in Back!

	Infants	Toddlers	Young Children
Weight	Birth to 1 year up to 20-22 lbs.	Over 1 year and over 20 up to 40 lbs	Over 40 pounds up to 80 lbs.
Type of Seat	Infant only or rear- facing convertible	Convertible / Forward-facing	Belt-positioning booster seat
Seat Position	Rear-facing only	Forward-facing	Forward-facing
Always Make Sure:	below shoulder	Harness straps should be at or above shoulders.  Most seats require top slot for forward facing	Belt positioning booster seat must be used with both lap and shoulder belt.  Make sure the lap belt fits low and tight across the lap/upper thigh area and the shoulder belt fits snug crossing the chest and shoulder to avoid abdominal injuries.
Warning! and under should ride in the back		All children age 12 and under should ride in the back seat.	All children age 12 and under should ride in the back seat.

#### Restraint Misuse Research

In an analysis of CIREN data, misuse was found for 84% of restrained children (n=121). Improperly restrained children experienced a higher mean Injury Severity Score (ISS) than properly restrained children (p<.05) and incurred medical charges more than 2 times higher (p<.05). The most common type of misuse was failure to use a restraint that was appropriate for the child's size and age. More than 76% of children were restrained inappropriately. Children between 40-80 pounds were at greatest risk since they should have been restrained in a booster seat but were most commonly restrained by the vehicle's safety belt. Infants were also at considerable risk of being incorrectly restrained in forward facing safety seats before reaching 20 pounds and one year of age.

#### Predictors of Injury Severity

Two additional aspects of restraint use, appropriateness and correctness of use, were used to assess child passenger safety in a crash. The children were divided into 4 weight classifications (0-20 pounds, 21-40 pounds, 41-60 pounds, and greater than 60 pounds) based on the weights recommended by safety experts and seat manufacturers for rearward-facing infant safety seats, forward-facing child safety seats, booster seats, and lap/shoulder belts.

Children who were restrained in safety belts appear to be at greater risk of severe injury than are children restrained in safety seats, even though the misuse rate is higher among safety seats.

Belted children also appear to be at greater risk of injury to the abdomen and lumbar spine. Approximately 34% of the belted children sustained abdominal injury compared to 9% of the children in safety seats (p<.05); additionally, 13% of belted children versus none of the children in safety seats sustained fractures of the lumbar spine (p<.05). Lap/shoulder belts do not seem to provide adequate restraint of the upper torso for children aged 8 or younger, as 75% sustained "lap belt complex" injuries while only 1 of 5 older children were so injured.

#### NEVADA'S CHILDREN: 2001 and 2002

Source: Nevada FARS (Fatality Analysis Reporting System)
Nevada Office of Traffic Safety

Nevada lost ground in child safety seat usage between 2001 and 2002. Even with a primary child restraint law for under age 5 and 40 pounds, the State of Nevada had a 25 percent drop in observed usage from 49.8 percent to 37.2 percent for infants and toddlers. Four children ages zero to eight died in crashes in 2001; only one child was using some type of restraint (a seat belt or child safety seat). Thirty-four children from the same age group were injured survivors in fatal crashes for 2001; 61% of these survivors were using some type of restraint. This is consistent with national data that reveals safety restraint usage in cars increases the survival rate of occupants in crashes, for both children and adults.

For the thirteen month period of October 1, 2001 to October 31, 2002, Nevada lost eight children in the zero to eight age group, seven of which used no restraint at all. Forty children of this same age group were injured survivors in fatal crashes during that time period, with a 77% restraint usage rate for survivors, vs a 13% usage rate for the eight children that died.

#### Economic Cost Impact Motor Vehicle Fatalities/Injuries

#### Relating to: Primary Seat Belt Law, and Child Restraint Law Booster Seats Prepared 12/13/2002, Nevada Office of Traffic Safety

- NHTSA (National Highway Traffic Safety Administration) estimates the U.S. economic costs of an average roadway fatality at \$977,000 and the cost for a critical injury crash survivor at \$1.1 million (as of calendar year 2000; this estimate currently applies to both adults and children; logic would indicate an even higher cost for children due to life span)
- If Nevada became a primary seat belt law state, it would increase its seat belt usage rate by a conservative 12% (from 74.5% in 2001 to 86.5%). With this increase in usage, Nevada would save 26 lives, 575 non-fatal injuries, resulting in \$69.6 million in economic cost savings (annualized figures).
- Millions of unnecessary additional dollars are spent on health care every year for unrestrained occupants in motor vehicle crashes (MVC's). From the following tables, it is evident that unrestrained occupant costs are significantly and consistently higher than restrained occupants in MVC's.

The total difference in average amounts billed for Medicaid or County Pay insured, between unrestrained and restrained occupants from 1999-2001, is \$3,690,560.00\*. This astounding sum displays the additional dollars needed for unrestrained vs restrained occupants in MVC's, and how unrestrained occupants place a significant and direct fiscal burden on all Nevadans.

#### Billed Amounts for MVC Trauma Patients, Medicaid & County Pay ONLY

Year	MVC Unrestrained occupants average cost	MVC Restrained occupants average cost	Difference in average cost of unrestrained vs. restrained	Number of MVC unrestrained occupants	Additional Cost to all Insurers, unrestrained occupants
1999	\$30,086	\$22,526	\$ 7,560	60	\$ 453,600
2000	\$47,993	\$31,071	\$ 16,922	55	\$ 930,710
2001	\$84,060	\$37,935	\$ 46,125	50	\$2,306,250

From 1999-2001, the average health care cost of all insurers combined, for an unrestrained occupant involved in a motor vehicle accident was \$30,829.00. The average health care cost of a restrained occupant involved in a motor vehicle accident was \$22,777.00.

<sup>\*</sup> This data was obtained from the State of Nevada Health Division, Bureau of Health Planning and Statistics, and specifically, the Nevada Trauma Registry. Please note that this data *only* refers to those patients who met Trauma Criteria reporting requirements as outlined in NAC 450B.770

#### Billed Amounts for MVC Trauma Patients, All Insurers

Year	MVC Unrestrained occupants average cost	MVC Restrained occupants average cost	Difference in average cost of unrestrained vs. restrained	Number of MVC unrestrained occupants	Additional Cost to all Insurers, unrestrained occupants
1999	\$28,460	\$21,119	\$ 7,341	1209	\$ 8,875,269
2000	\$37,436	\$23,499	\$13,937	1116	\$15,553,692
2001	\$36,775	\$31,932	\$ 4,843	1118	\$ 5,414,474

Overall, nearly 75 percent of the costs of the nation's roadway crashes are paid by those not primarily involved in them, through insurance premiums, taxes and travel delay. In calendar year 2000 these costs, borne by society rather than individual crash victims, totaled \$171 billion

♦ Clarification has been requested on whether the enactment of primary seat belt laws has had a direct relationship to the saving of a certain number of lives and/or statistics from other states that have enacted a primary law

Argument: NHTSA has already determined that almost half (45%) of those unrestrained fatalities in MVC's could have survived if they'd only been wearing their seat belt (or in a child safety seat, as applicable). New Mexico, which is similar to Nevada demographics, enacted a primary seat belt law in 1986 (front seat occupants), adding pick-up's in 1989, and extended to all seating positions in 2001. Their seat belt usage in 1985 was 20%, and has increased to 88% as of 2001. The effect on incapacitating and visible injuries is large. The rate of incapacitating injuries per 100 million vehicle miles fell from 19 in 1985 to 11.3 in 2001, and the rate of visible injuries fell from 34 in 1985 to 18 in 2001.

♦ The primary seat belt bill draft should contain language specifying the wearing of seat belts dependent on size of occupant (i.e., younger children are not adequately protected by a seat belt alone, "seat belt syndrome;").

### Steps For Kids

**How to Protect Your Children** with Child Safety Seats



#### Step 1

**Rear-Facing Infant Seats** 

- Birth to at least one year old and
- At least 20 pounds.

#### Step 2

Forward-Facing Child Safety Seats

- Age one to about age four and
  - 20 to 40 pounds.





#### Step 3

**Booster Seats** 

- About age four to at least age eight and
- Under 4-feet 9-inches tall.

#### Step 4

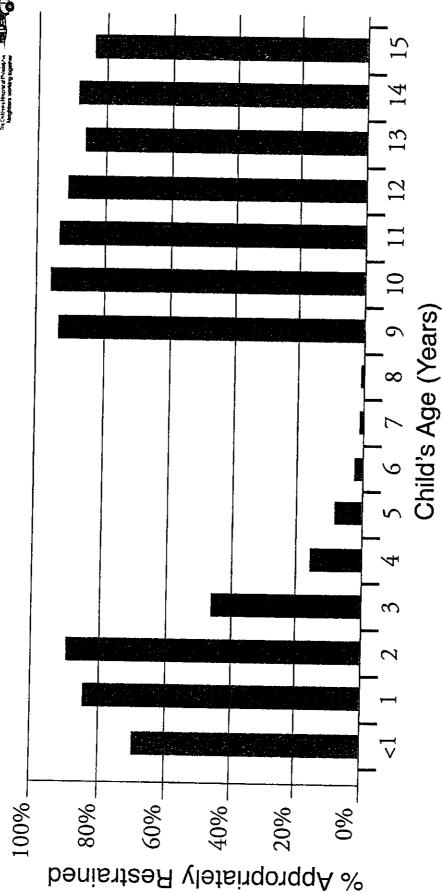
**Seat Belts** 

- At least eight years old or
  - Over 4-feet 9-inches tall.



# Recommended Restraint Use Among Children Child Passer Safet





restrained children between 3 and 8 years old drops significantly. Instead of using car seats and belt-positioning-booster seats, many of these children While parents generally do a good job of restraining children under age 3 and over age 8, this graph shows that the number of appropriately are inappropriately restrained in adult seat belts, putting them at greater risk of injury.

Copyright@ 2001 by **(E)** The Children's Hospital of Philadelphia

Source: "The Danger of Premature Graduation to Seat Belts for Young Children." PEDIATRICS, 6/00

#### CONTACT: for Child Safety Seat Checks

Beatty: Nye County Sheriff's Office, 775.553.2380

Carson City: Carson Fire Department, 775.887.2210

Churchill County: Churchill County P.E.A.C.E. Project, 775.423.8628

Clark County SAFEKIDS Coalition, 702.731.8666, www.ccsafekids.com

Dayton: Family to Family Connection, 775.577.4440 X 26

Douglas County Sheriff's Office: Lt. Mike Biaggini, 775.782.9906 or 775.782.9935

Elko: Elko Family Resource Center, 775.778.9223, frcnen@elko-nv.com

Ely: Family to Family Connection, 775.289.9081, famtofam@idsely.com

Esmeralda County: Esmeralda County Sheriff's Office, 775.485.6370

Fallon: FRIENDS Family Resource Center, 775.428.2600, FRIENDS@churchill.k12.nv.us

Fallon Police Department: Lt. Frank Shyne, 775.423.2111

Fernley: Family to Family Connection, 775.577.4440 X 26

Hawthorne: Family Resource Center, 775.945.3374, susanschott@hotmail.com

Henderson: Family to Family Connection, 702.568.9601, FTFC10@earthlink.net

Las Vegas: Family to Family Connection, University Medical Ctr, 702.383-7058, www.umc-ares.org

Pahrump: Family to Family Connection, 775.751.5898, F2FC@wizard.com or Nye County

Sheriff's Office, 775.751.7000

Lovelock: Pershing County P.E.A.C.E. Project, 775.273.7303

Silver Springs: Family to Family Connection, 775.577.4440 X 26

Sparks: Washoe County P.E.A.C.E. Project, 775.355.6880

Storey County: Storey County Fire Department, 775.847.0954

Tonopah: Nye County Sheriff's Office, 775.482.8101

Washoe County SAFEKIDS Coalition, 775.858.KIDS, www.remsa-cf.com

West Wendover: West Wendover Fire Department, 775.664.2274

Winnemucca: Humboldt County P.E.A.C.E. Project, 775.623.1166

Yerington: Family to Family Connection, 775.577.4440 X 26



#### Why Care About Booster Seats??? Because we love our children!

As parents and caregivers we put our children=s safety at the top of our list of what is important. We never purposely put our children in danger. Yet one of the things that we do most often: travel in our vehicles, puts our children in danger every day. In Nevada we have a **AChild Passenger Safety** Seat Law@ which protects children under age five and less than 40 pounds. At the time that this law was enacted research told us we were making the best choice to save our children. We still know this to be true for our littlest children, but what about those a little older?

When cars are crash tested they use adult dummies. We now know there is a AForgotten Childe that is in the most danger of death or injury from a crash. Children between the ages of 5 and 9 who are too small to be properly restrained with an adult seat belt are being killed and injured by the very belt that we thought would keep them safe.

In a report released by the National Highway Traffic Safety Administration, (NHTSA), measuring crash data over a twenty year period, only three age groups have not

dramatically reduced their fatality rates. The first two groups are those ages 65-74 and 75 and higher. (Older bodies have a more difficult time surviving serious crashes.) The other age group that has shown no improvement is children from ages 5 to 9. Every other group has shown dramatic decreases in fatalities and injuries. We know that if these children were properly restrained they would be surviving these crashes.

Why don=t seat belts work for children? Mainly because they don=t fit. The lap belt that is so successful in saving adult lives Arides up@ and rests along the child=s neck. One of two things can happen: either the child will be uncomfortable and put the strap behind their back, or in a crash situation, the belt itself can cause severe head and neck injuries. In a crash, if the belt is put behind the child=s back the lap portion of the belt causes severe internal injuries, and with no shoulder belt, the child can be thrown from their seat. Studies in the past few years have claimed that children may be safer with no safety belt at all, versus the placing of a shoulder belt behind their back. Booster seats are designed to position safety

belts so they fit smaller bodies. Booster seats are easy to use and are much less expensive than traditional child safety seats. Booster seats sit on top of the vehicle seat and use the vehicle seat belt system; there is no Ainstallation@ required. They Aboost@ the child up so that they are physically tailer and the shoulder belt fits them correctly. From the booster raising the child=s hips higher, the lap portion of the belt also fits properly across the upper thighs and the risk of internal injuries is much less in the event of a crash.

#### KEY POINTS

- \* Children ages 5 to 9 are the only age group less than age 65 to not show dramatic decreases in fatality and injury rates from motor vehicle collisions over the past 20 years.
- \* Booster seats make adult seat belts fit small bodies, enabling them to work at full capacity.
- \* Booster seats are inexpensive and easy to use. \*In 2001 and 2002 in NV twelve children under age 9 died in traffic crashes: only 2 of them, (13 percent) were restrained. Restraint usage for the children that survived fatal crashes was 77 percent.

#### **NEVADA**

#### **General Statement/Composite**

Nevada's child occupant protection law has some important characteristics, including requiring all children to be restrained in all seating positions in some manner. However, the law allows some of its young children to ride in an inappropriate restraint when traveling in a motor vehicle. Furthermore, Nevada does not place a legislative priority on educating its citizens about the law or about the importance of protecting children when they travel. SAFE KIDS applauds Nevada for its strong enforcement measure that assesses a potentially high monetary penalty. Overall, though, Nevada's poor showing clearly demonstrates the immediate need for the Nevada Legislature to improve its child occupant protection law.

#### **Grade Breakdown**

Criteria	How Nevada Fared
Restraint Use Required Through Age 15 35 points out of a possible 35 points	Nevada's law requires children ages 15 and under to be restrained in some manner regardless of seating position.
Appropriate Child Restraint Requirement by Age  16 points out of a possible 24 points	Only children ages 4 and under and weighing less than 40 pounds must be properly restrained in an appropriate child safety seat in all seating positions. Children ages 5 – 8 can be restrained like adults in a safety belt alone – putting them in a potentially dangerous situation.
Proper Child Safety Seat Adjustment Clause  O points out of a possible 9 points	Although it may have been intended by the Nevada Legislature, the law fails to expressly recognize the importance of <i>properly</i> securing both the child and the child safety child safety seat.
Public Education/Public Fund Component  O points out of a possible 5 points	Unfortunately, Nevada does not recognize the importance of legislatively mandating a public education campaign, nor does it provide public funds to offset the costs of programs that would help protect children while traveling.
Penalty Provisions 4 points out of a possible 9 points	Nevada was awarded 4 points for its high maximum fine of \$100 and received no points for its failure to assess license points for violations.
No Exemptions for Certain Drivers or Vehicles  9 points out of a possible 9 points	Based on SAFE KIDS' criteria, Nevada's law received the full 9 points for allowing no relevant exemptions.
Other Provisions  O points out of a possible 9 points	Nevada's law does not contain any additional provisions worthy of recognition.

#### **Nevada's Call to Action**

The National SAFE KIDS Campaign is troubled by Nevada's grade. The Nevada Legislature should, among other things:

- Expressly require children ages 4 8 and weighing 40 80 pounds to use booster seats.
- Add language that requires not only use, but proper use according to child safety seat manufacturer's instructions.
- Establish a child occupant protection public education program and supply sufficient funds to implement it.
- Consider creating a child safety seat loaner/giveaway program for families in need and establishing a child occupant protection class for violators.
- Eliminate its "proof of child safety seat purchase waiver."
- Consider adding a well-crafted back seat mandate for its child passengers.

#### What is the program's cost?

- ➤ The violator will be required to pay \$25 for the class.
- ➤ If the violator does not have an appropriate car seat, low-cost car seats will be available for purchase.
- ➤ If the violator cannot afford a car seat, one will be provided by the Coalition.



For more information, contact:

Washoe County SAFE KIDS

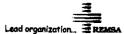
Lead organization: REMSA 450 Edison Way Reno Nevada 89502

775.858.5700 / voice 775.858.5720 / fax

Also visit our web site at...

www.remsa-cf.com





SAFE KIDS
Buckle Up
Court Diversion
Program

#### Children may be ready for the adult safety belt when they are around 8 years old.

The safety belt fits a child correctly when:

The shoulder belt remains snugly positioned across the chest and collarbone.

The child can sit all the way back against the vehicle seat, with his/her knees bent over the edge.

> The lap belt remains snugly positioned over the hips and upper thighs.

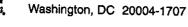
For more information, visit www.safekids.org or call the Auto Safety Hotline at 1-888-DASH-2-DOT.



**⊈Childrens** 

National SAFE KIDS Campaign 1301 Pennsylvania Avenue, NW **Suite 1000** 







www.safekids.org

**Severe Spinal Cord** ion in a Crash.

## **Most Kids** at Risk.

**Could Yours** Be One of Them?



Proud Program Partners



www.safekids.org 1-800-441-1888





#### Lea esto antes de que salga a conducir.

edique un minuto para asegurar que su niño está seguro mientras viaja. Estudie cuidadosamente el manual de su vehículo y las instrucciones del asiento de seguridad.

- Nunca coloque a un bebé en el asiento delantero equipado con una bolsa de aire.\* El asiento trasero es siempre el lugar más seguro para niños de cualquier edad.
- Remita de vuelta la tarjeta de registro del asiento de seguridad para que el fabricante le notifique en caso de que se descubra un defecto de fábrica del producto. Si tiene alguna pregunta, llame a la línea gratuita de la Oficina para la Seguridad Automovilística de NHTSA (888-DASH-2DOT).
- Reemplace cualquier asiento de seguridad que haya estado implicado en un choque.
- Ajuste el cinturón de seguridad correctamente a través del asiento de seguridad.
- Asegure correctamente el asiento de seguridad al vehículo.
- Para que quede ajustado, el asiento de seguridad no debe moverse más de una pulgada de un lado a otro o hacia delante.
- Consulte el manual de su vehículo para ver si necesita una presilla de cierre porque no todos dad pueden asegurar el él.



4 de cada 5 asientos de seguridad se usan incorrectamente.



¿Puede ser el suyo uno de ellos?



**General Motors** 



# Warning!

may be defective or have a recall. It appears your car seat may be to protecting your loved ones. We share your commitment installed incorrectly,

For dates, times and locations of the next

# FREE CAR SEAT INSPECTION

please call the Washoe County SAFE KIDS Coalition at

858-KIDS

(858-5437)





fistributed Replaced seats 715 Child Safety Seat Use in Washoe County

4 out of 5 car seats are Make sure yours isn't installed improperly. one of them!







Improperty Installed Seats 1,493 Last year in Washoe County Alone, We checked 1,522 car seats.

Only 29 were installed properly.

Call 858-KTDS (858-5437)

for car seat checkpoint dates, times & locations.