



# Child Passenger Safety

*WRHA Injury Prevention Program  
Injury Prevention Champions Meeting  
December 2014*



# Objectives

We will review:

- Burden and patterns of motor vehicle occupant injury in children and youth
- Evidence and current guidelines
- Key messages for parents
- Resources for staff



# Jumping Ahead.. Need to know

- Know age/stage (each as long as possible)
- Refer for inspections
- Back seat until age 13 (teen)
- Secure cargo
- Use car seats only for travel (not for sleep)
- Do not place on elevated surfaces
- Beware after-market products (nothing behind child, uncover face)





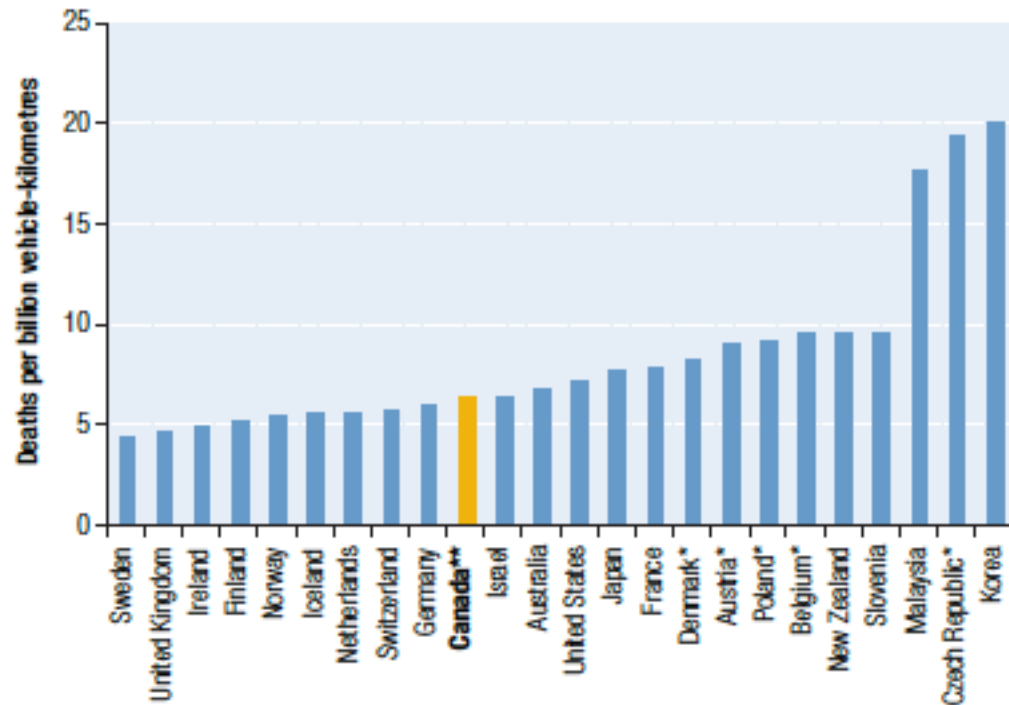
# Why Child Passenger Safety?

- “Traffic crashes are the leading cause of death for children of every age from 5 to 14 years - a fact that can be linked, at least in part, to the reality that most kids are unbuckled or improperly restrained in vehicles.” (NHTSA)



# Canada in Context

**FIGURE 1.1**  
Deaths per billion vehicle-kilometres in 2009, by country



# Leading causes of death

**TABLE 2.1**

**Leading causes of injury-related mortality in Canada, 2007, both sexes combined, by age group**

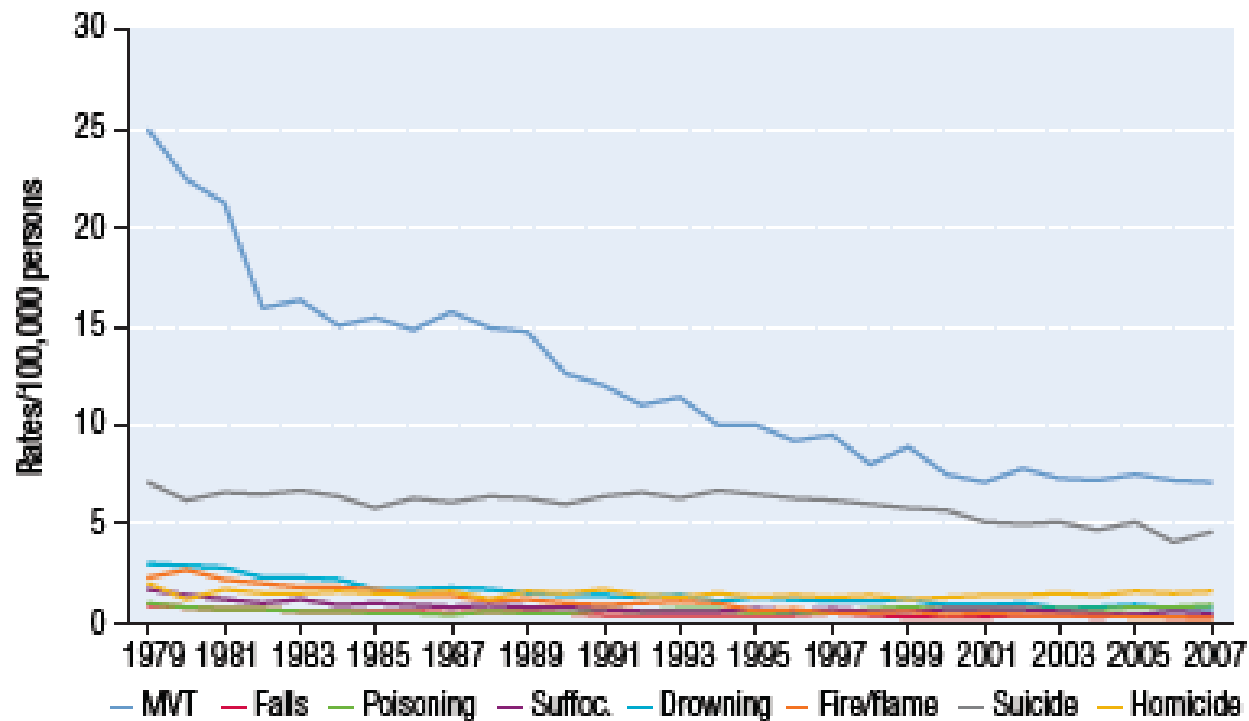
Age group	Leading cause of injury death
Infants	Suffocation
1-24	Motor Vehicle Traffic Collisions
25-69	Suicide
70+	Falls



# Trends in Unintentional Injury

**FIGURE 2.2**

Leading causes of injury-related mortality in Canada, 1979-2007, both sexes combined, ages 0-24 years, standardized rates/100,000 persons



# Leading Causes of Death

**TABLE 2.2**

**Leading causes of injury-related mortality in Canada, 2007, both sexes combined, ages 0-24 years, rates/100,000 persons**

Cause	0-24 years	
	Deaths/100,000 persons (both sexes)	% Males
All injuries (excluding adverse effects of medical care)	19.4	73.6
All unintentional injuries (excluding adverse effects of medical care)	11.9	72.0
Motor Vehicle Traffic (MVT – All)	7.6	70.6
MVT – Occupant	3.4	70.1
MVT – Pedestrian	0.7	61.4
MVT – Motorcyclist	0.5	94.0
MVT – Pedal cyclist	0.2	73.3
Poisoning	1.0	69.7
Drowning	0.8	82.3
Suffocation	0.5	68.8
Falls	0.3	75.8
Fire/flame	0.3	61.5
All intentional injuries	6.8	75.8
Suicide	5.0	74.2
Homicide	1.8	80.4





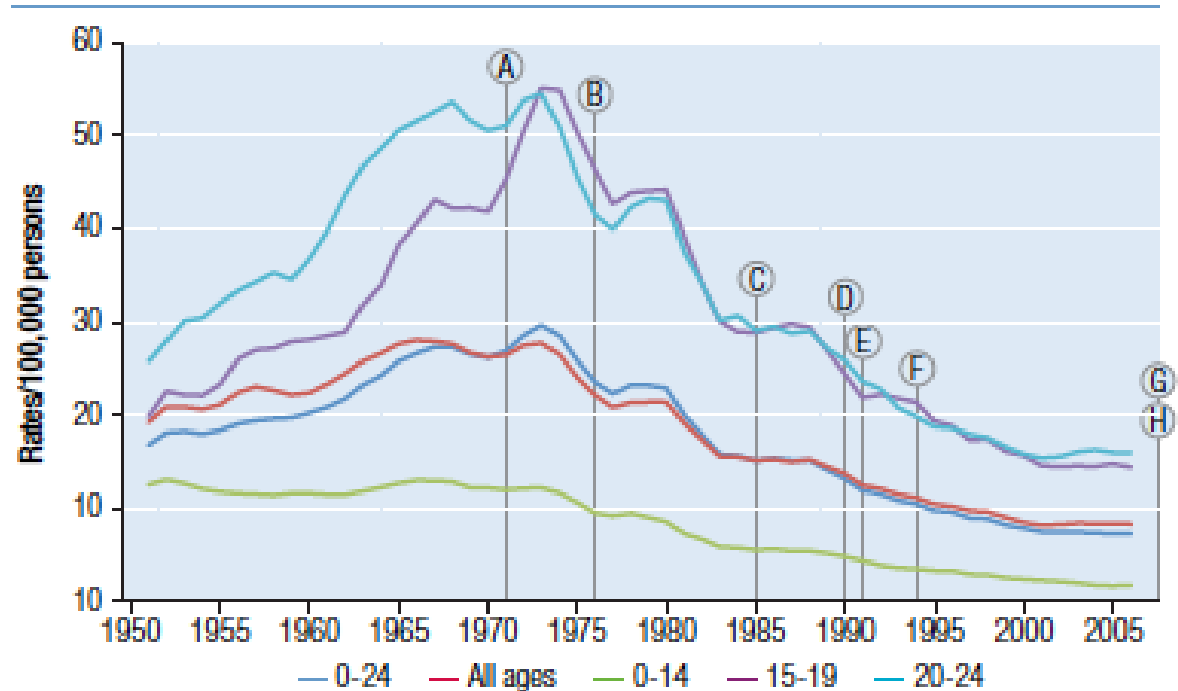
# Road Safety Interventions

## Benchmarks of select road safety legislation in Canada

- (A) **1971:** Seat belts required in all new vehicles<sup>2</sup>
- (B) **1976:** Ontario is the first jurisdiction to pass the mandatory seat belt law<sup>3</sup>
- (C) **1985:** Amendments to the Criminal Code resulted in tougher penalties for impaired drivers<sup>4</sup>
- (D) **1990:** Canadian Motor Vehicle Safety Standard 108 (CMVSS 108) requires daytime running lights on all vehicles made or imported after January 1st, 1990<sup>5</sup>
- (E) **1991:** Seat belt legislation enacted in all jurisdictions<sup>6</sup>
- (F) **1994-2005:** Graduated licensing programs introduced in most Canadian jurisdictions<sup>7,8\*</sup>
- (G) **2008:** New Criminal Code provisions on impaired driving give police better tools to detect and investigate alcohol- and drug-impaired driving. These changes increase the maximum sentences and toughen mandatory penalties.<sup>9</sup>
- (H) **2010:** By 2010, hand-held cell phone use while driving banned in: British Columbia, Saskatchewan, Ontario, Quebec, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador<sup>10</sup>. Canada Motor Vehicle Safety

**FIGURE 2.4**

**Motor vehicle traffic-related mortality in Canada, 1950-2007, selected age groups, standardized rates/100,000 persons**



# Manitoba Data - Deaths

- Deaths: limitations...
- 2009-2013 (preliminary for 2013)
- 43 occupant deaths, range 5-11 per year
- 34 were teens, 13 drivers
- 22 were unrestrained (some unknown)
- Many alcohol-associated crashes



# Manitoba Data - Hospitalizations

- Trauma database (HSC) 2004-2011
- 50% of admissions are transport-related
- 9132 trauma admissions, age <20
- 452 due to Motor Vehicle (traffic),
- 169 with ISS = 12 or more
  - vs 65 pedestrians
  - vs 41 cyclists



# Child Restraint Use

- Snowdon/Transport Canada (2010)
- Correct use rates (60% overall for MB)
  - 88% infants less than 1 year of age
  - 78% toddlers 1-3 years of age
  - 39% age 4-8
- Front seat: 3.4% of infants, 3.7% of toddlers ,17.5% age 4-8
- Unrestrained: 8.7% in Manitoba



# Evidence/Guidelines

- Systematic reviews (Cochrane, Community guide, CORE BC evidence review)
- Child passenger safety guidelines with summaries of evidence:
  - AAP policy statement, Technical report (2011)
  - CPS statement (2008)
- Road safety information/policy
  - Transport Canada, MPI, MIT



# What works?

- Legislation/enforcement
- Education
  - Individual (counselling, inspection, DVD)
  - Group (public/media/community-based, parents)
- More effective when incentive/access programs included in strategy
- More effective when combined approaches
- See references



# What can we do?

- Who: Public health, Primary Care, Child Health, Women's Health (+ MPI, MB govt)
- Prenatal, postpartum guidance (individual, group, future web/email/text)
  - Age/stage, safety tips/key messages
  - Inspections
- Booster seats, back seat
  - Kindergarten entry (letter, fair), TB picnic, MPI
- Access/disparity strategies





# All You Need to Know About Child Passenger Safety

*A Summary of Current Best Practices*







# Selecting a Car Seat

- **What is the law?**
- **Criteria for selection**
  - Child factors
    - Age
    - Size (Weight, Height)
    - Special considerations
  - Vehicle factors





# Stage 1

## Rear-Facing

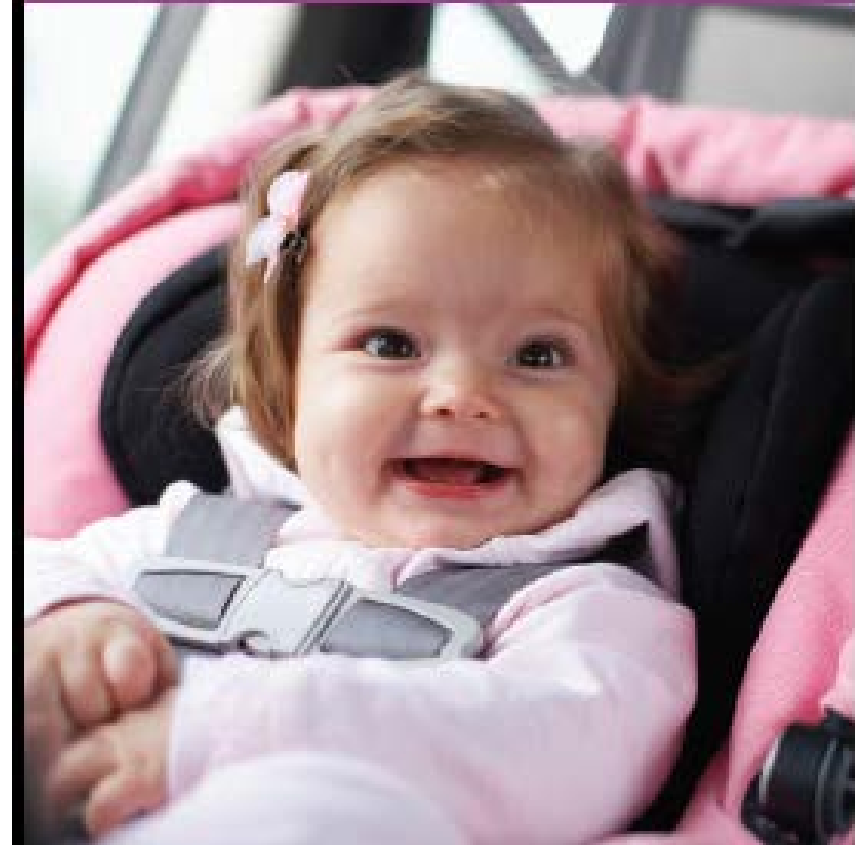
- Birth – age 2
- Up to 20kg (45lb)
- Why rear-facing?
  - Large head
  - Weak neck
  - Spinal cord injuries
  - Serious injuries



# Rear-facing is Safer

- Children 0-23 months
- US NHTSA crash data, 1988-2003
- All crash types OR=1.76, 95% CI 1.40 to 2.20
- Side impact crashes OR=5.53, 95% CI 3.74 to 8.18
- Age 1: OR=5.32, 95% CI 3.43 to 8.24

Please...keep me rear-facing!



# Stage 2

- **Forward-Facing Child Seat**
- Age two years to seat limits
- Up to 30kg (65lb)
- How does it work?
  - Harness secures the child
  - Seat belt or UAS secures the restraint
  - Tether anchors the top of the restraint



# Stage 3

- **Booster Seat**
- By law until 9 years, 4ft 9 inches, or 80lb
- AAP – until age 8-12
- Minimum 18kg (40lbs)
- How does it work?
  - Improves lap belt fit
  - Improves shoulder belt fit
  - Reduces head excursion





# Stage 4

- **Seat Belt**
- Age 9 years +
- Height 4 feet 9 inches +
- Weight 36kg (80lb) +
- How does it work?
  - Lap belt
  - Shoulder belt





# Car Seats on the Market

- Infant only
- Convertible (RF and FF)
- Booster
  - Transitional (harness) and/or Belt-positioning
  - High back or backless
- Combination (3 in 1)



# Car seat stages

## Stage 1 Rear-facing Seats

Use until your child outgrows  
the car seat's weight/height limits\*



## Stage 2 Forward-facing Seats

Use until your child outgrows  
the car seat's weight/height limits\*



## Stage 3 Booster Seats

Use until your child outgrows  
the car seat's weight/height limits\*



Birth

10 kg  
(22 lbs.)

14 kg  
(30 lbs.)

18 kg  
(40 lbs.)

30 kg  
(65 lbs.)

36 kg  
(80 lbs.)

\*Weight requirements may vary by manufacturer. Check car seat manufacturer's instructions and vehicle owner's manual before use. If you have any questions, call the manufacturer's help-line. Many of their toll-free numbers are printed on pages 6 and 7.



All car seats available at Babies"R"Us stores meet Transport Canada's strict safety standards. Adherence to these standards can be identified by the National Safety Mark affixed to each car seat. Only car seats which bear this mark can be legally sold or used in Canada.



# Infant Seats

- Always rear-facing
- With or without a base
- Weight limits:
  - Minimum 4-5lb
  - Maximum 20-45lb
- Straps: below shoulders
- Install with seat belt or UAS



Cosco  
Designer 35



# Convertible Seats

- Rear-facing for infants
- Forward-facing for toddlers
- Weight limits vary
- Tether for forward-facing
- Restraint systems
  - 5 point harness or 3 point harness with shield (older style, not recommended)



Century/Graco  
Bravo  
5-point





# Booster Seats

- High-back booster
  - Transitional: 5 point harness until maximum weight limit then convert to a belt-positioning booster (minimum 40lb)
  - Belt-positioning booster (40-110lb)
- Backless booster (40-110lb)



# Booster seat legislation

- Effective August 2013
- Children are required to use a booster seat until they are 9 years old or 4ft 9 inches or weigh 80lb



# Booster Seat Effectiveness

- 82% reduction in side-impact injuries, 45% reduction in serious injuries, and 14% reduction in all types of injuries among children less than 8 years of age (NHTSA)
- Booster seat legislation increases use and decreases injuries and deaths
  - Deaths: adjusted incidence rate ratio 0.89 for 4-5 year olds (95% CI 0.81–0.99), 0.77 for 6 year olds (95% CI 0.65–0.91) and 0.75 for 7 year olds (95% CI, 0.62–0.91) (FARS data, Mannix 2012)

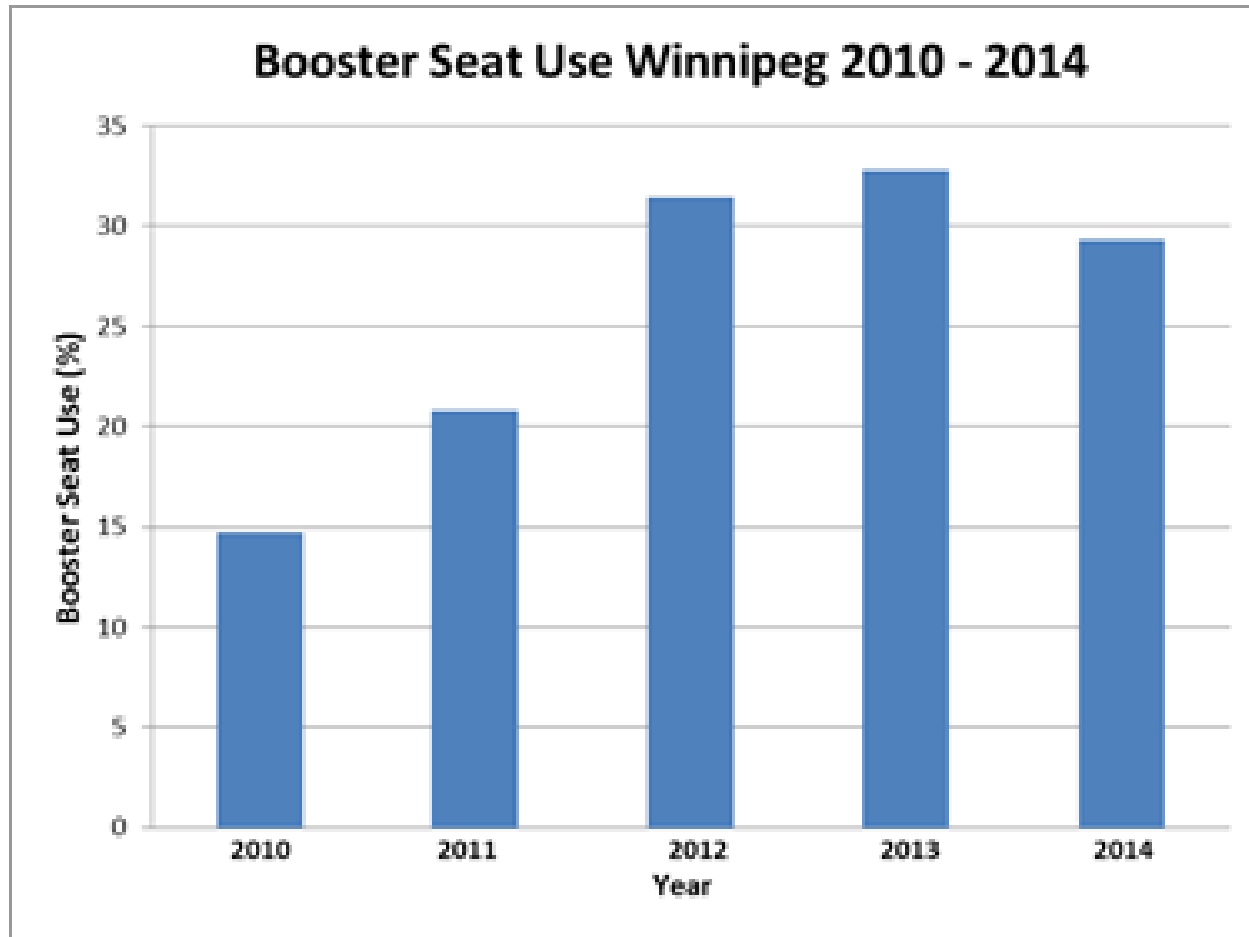


# Booster Seat Use: Winnipeg

- 6926 children 5-8 years of age were observed in 6099 vehicles between 2010 and 2012
- Observed booster seat use increased significantly pre-legislation, from 14.7% in 2010 to 31.4% in 2012 ( $p < 0.001$ ).
- Booster seat use peaked in the third week of June 2012 ( $\chi^2 = 34.20$ ,  $p < 0.001$ ).



# Booster Seat Use: Winnipeg



# Booster seats on the market

- Stage 3 only
  - Backless
  - High back



- Stage 2/3



- Stages 1-3





# Low cost booster seats

- Major retailers: as low as \$10-15
- No PST as of July 1st
- Car/booster seat loan program piloted, new options being explored
- In the meantime call IMPACT for low income families with no other option





# Seat Belt Injuries

- 1. Shoulder belt under the arm
- Aortic/cardiac injuries
- Rib fractures, pulmonary contusions
- 2. Lap belt only (or shoulder belt behind back)
- Ejection from vehicle (crush/multiple)
- Lap belt syndrome: lumbar spine fractures, low spinal cord injuries, abdominal injuries, head injury (jack-knife posture)





# Seat Belt Fit Test

1. Does the child sit all the way back against the seat?
2. Do the child's knees bend comfortably at the edge of the seat?
3. Is the lap belt on the tops of the thighs?
4. Is the shoulder belt centered on the shoulder and chest?
5. Can the child stay seated like this for the whole trip?

If you answered NO to any of these questions, your child needs a booster seat.





# Incorrect Use: Car Seats

- 80% of car seats are installed are used or installed incorrectly
- The most common errors are:
  - **Tether strap and anchor bolt errors**
  - **Locking clip not installed**
  - **Vehicle seat belt not secured tightly**
  - **Chest clip not positioned at armpit level**
  - **Too much slack in harness straps**





## Part II

# Pot Pourri of Hot Topics in Child Passenger Safety

*FAQs and problems parents might  
encounter*





# Inappropriate Graduation

## Major errors in graduation

- forward-facing too early
  - no booster seat at all
  - seat belt too early



# Premature graduation

- Stay in each stage as long as possible
  - Rear-face to age 2 or maximum weight of seat
  - Forward face to 65 lb
  - No booster seat until at least 40 lb and 4 yrs
  - For younger booster-age children use multi-stage seat with seat belt guide at shoulder
  - For older children use backless boosters for better compliance, carpooling etc.



# Air bags and car seats

- Never place a car seat in front of an air bag







# Side Air bags

- Select a position away from the air bag (center, rear).
- Clear the area between the child seat/booster and the door of all objects. Toys, blankets, and even pillows could harm a child if the side air bag inflates.
- Check your child's position frequently - ensure that your child does not lean against the door.





# Where in the car?

- The back seat is the safest place for children 12 and under.
- The center position is preferred.
- For several children, consider the whole picture - seat types and installation requirements, availability of lap/shoulder belts, air bags, compliance issues.





# After a crash...

- Transport Canada recommends against using a car seat that has been in a collision.
- Manufacturers recommend that car seats should be replaced after a crash.
- MPI will cover the cost of a replacement car seat if a claim is made by the parent





# Car seat lifespan?

- Recommended lifespan of car seats...
- AAP - maximum 10 years
- Manufacturers - (vary) 5 years





# Older vehicles

- Problems:
- Lap belts must not be used for booster seats.
- Lap belts provide inferior protection as compared to lap-shoulder belts.
- Solutions:
- Consult your vehicle dealer about installing shoulder belts.



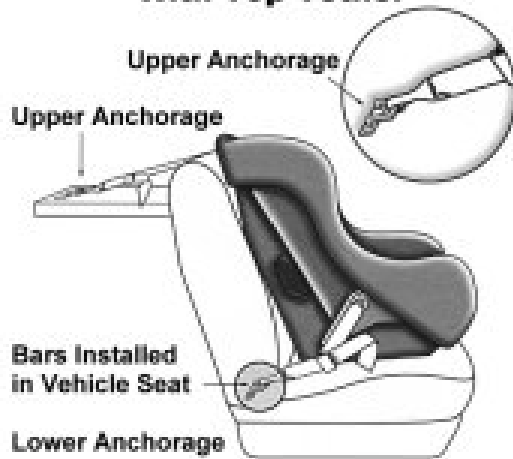


# Incompatibility

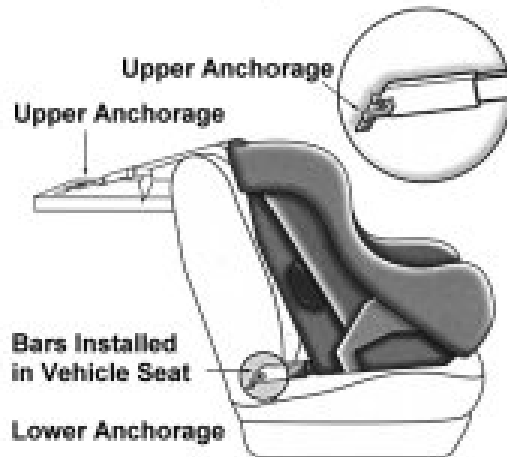
- Check the manufacturers' instructions for both the seat and the vehicle regarding possible installation problems.
- Car seat manufacturers recommend a “try before you buy” approach.
- Ask your local car seat specialist or car seat inspector for an up-to-date list of known incompatible products.



### Flexible 2-Point Lower Attachment With Top Tether



### Rigid 2-Point Lower Attachment With Top Tether



Since September 1, 2002, all new vehicles and child safety seats are equipped with a universal anchorage system (UAS).

All new child safety seats have three standard attachments, one on top and two at the base.

All new cars and trucks have standard anchors in the back seats to link to the seat attachments.

In the vehicle, the new system consists of two lower anchorages and one upper anchorage.

New child safety seats have a hook, buckle or other connector that snaps onto the lower anchorage in the vehicle.



# UAS – New Requirement in US

- Car seat labels in the US now need to show the weight limits of the UAS/LATCH anchor
  - All car seats manufactured after February 27, 2014 will have a label that clearly defines the the maximum weight limit for installing that car seat with lower anchors. That maximum weight limit will be 65 lbs when the car seat weight and the child's weight are combined.
- This new rule does not apply in Canada, however check your vehicle manual and seat label!







# Premature/LBW Infants

- Hospital discharge guidelines
- Minimum weight limits
- Infant only seats (+/-car beds)
- No shields, abdominal pads etc.
- Padding, harness size, recline
- Allowable adjustments - head, crotch rolls



# Available on the market?

	2011	2012	2014
Infant only	\$70	\$80	\$100
Infant travel system	\$130	\$160	\$200
Forward facing	\$80	\$90	\$100
Three in one	\$170	\$170	\$150
Booster	\$18	\$18	\$18



# Lowest cost options?

- Convertible (\$100) + no back booster (\$18)
- Families should be aware that car seats purchased in the US do not meet Canadian safety requirements
- Second hand?
  - Canada safety mark, expiry date, all parts, plastic shell with no cracks, not in a crash

**ANY SEAT IS BETTER THAN NO SEAT!**



# Access to Car Seats

- Funding/programs for low income families?
  - Income assistance newborn allowance (\$250/75)
  - car seat allowance?
  - Loan program (new/gently used)
  - Purchase programs, no tax, rebate
- Getting home from hospital: success stories
  - Borrow
  - Social worker
  - IRCOM



# After-Market Devices/Issues

- No standards
  - Car seat covers
  - Positioners not purchased with the seat
  - Seat-belt positioners
- Nothing behind child (car seat covers)
- Do not cover face (blanket, car seat cover)
- Winter clothing
- Not a crib!



# Child Passenger Safety

*Recommended Resources for Parents*



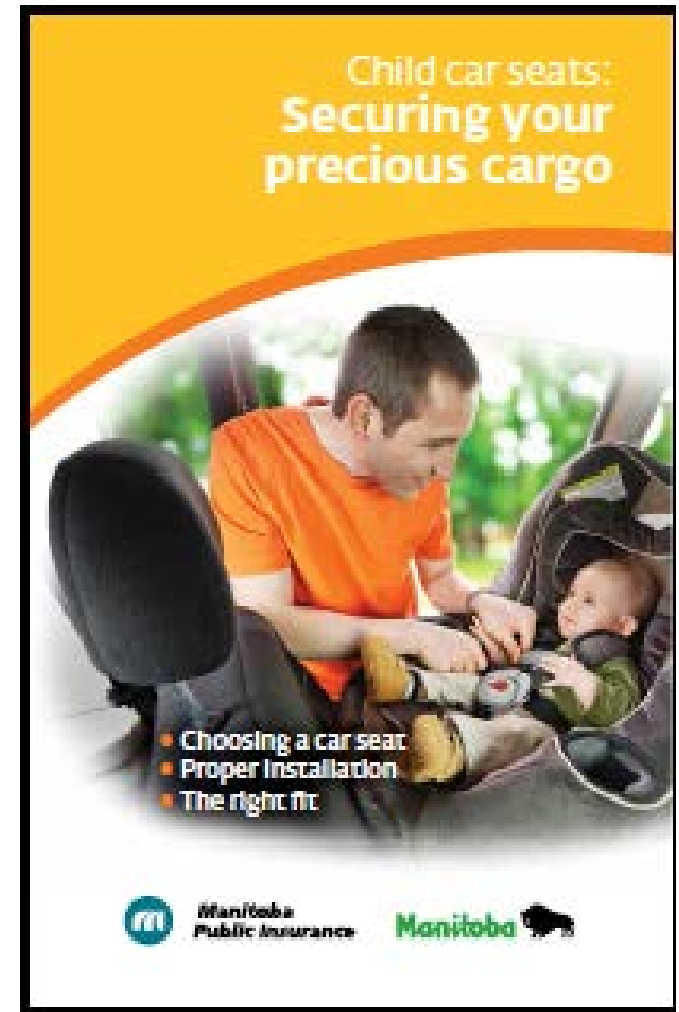
# Consistency?

- Caring for Your Newborn (refers to MPI)
- Babies Best Chance (RF to age 1)
- Making Connections (RF to age 1)
- MPI (no age RF)
- Transport Canada (no age RF)
- Inserts
  - Booster seats
  - Rear-facing to age 2 proposed (WRHA only)



# MPI

- Recommended as the primary resource for families
- Booster insert
- Rear-facing insert being developed (WRHA)





# Transport Canada

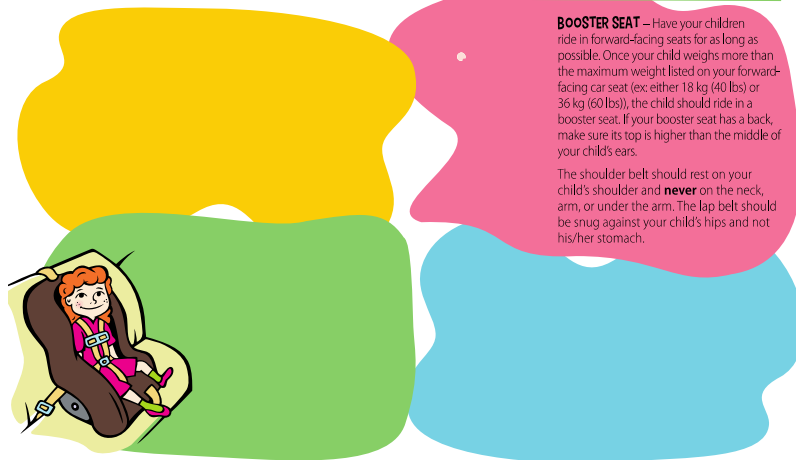
- One for each stage
- Also available in:  
French, Arabic, Chinese  
Punjabi, Somali, Spanish



# Do not use...

- Booster seat postcard and brochure

Use this chart to find out which car seat is best for your child.



**BOOSTER SEAT** – Have your children ride in forward-facing seats for as long as possible. Once your child weighs more than the maximum weight listed on your forward-facing car seat (ex: either 18 kg (40 lbs) or 36 kg (60 lbs)), the child should ride in a booster seat. If your booster seat has a back, make sure its top is higher than the middle of your child's ears.

The shoulder belt should rest on your child's shoulder and **never** on the neck, arm, or under the arm. The lap belt should be snug against your child's hips and not his/her stomach.



To learn more about child car seats, please visit [www.mpi.mb.ca](http://www.mpi.mb.ca)



# Booster Seat Standing Display

- To be distributed across Manitoba
- Growth chart version for outpatient clinics and other community settings
- Use for growing and learning, groups, fairs



# Video Resources

## Car Seat Installation Guides

[https://www.youtube.com/playlist?list=PL7plicVImnW45mR\\_4Oq1SAbuK0ZM33eLf](https://www.youtube.com/playlist?list=PL7plicVImnW45mR_4Oq1SAbuK0ZM33eLf)

## Top 10 Car Seats 2014

<http://youtu.be/5NKqNHDisZ8>

## News Clips

### Child Passenger Safety Week (Edmonton)

<http://globalnews.ca/video/851559/child-passenger-safety-week/>

### Child Passenger Safety Week (Edmonton)

<http://globalnews.ca/video/1566385/child-passenger-safety-week-2>



# Wrapping up.. Need to know!

- Know age/stage (each as long as possible)
- Refer for inspections
- Back seat until age 13 (teen)
- Secure cargo
- Use car seats only for travel (not for sleep)
- Do not place on elevated surfaces
- Beware after-market products (nothing behind child, uncover face)



# Age/Stage Review

1. Rear-facing to age 2 (45 pounds)
2. Forward-facing from age 2
  - As long as possible (to maximum seat limit)
  - Consider size, development, length of trip (falling asleep in booster seat and becoming out of position)
3. Booster seat to age 9 or 4ft 9 inches or 80lb
  - Minimum 40 pounds, delay until bigger/more mature, can stay seated and in position in booster



# What can we do? More?

- Who: Public health, Primary Care, Child Health, Women's Health (+ MPI, MB govt)
- Prenatal, postpartum guidance (individual, group, future web/email/text)
  - Age/stage, safety tips/key messages
  - Inspections
- Booster seats, back seat
  - Kindergarten entry (letter, fair), TB picnic, MPI
- Access/disparity strategies



# Room for improvement?

- Consistent information for parents
  - WRHA prenatal, early childhood resources
- Promote rear-facing to age 2 (insert, social media, etc.)
- Promote booster seat use (immunization letter, K registration, Healthy Schools, e-notes)
- Advocate for inspection and enforcement
- Explore access options (loan program, free seats, tax credit, etc.)





# Questions?

Thank you!

