

Minimizing Bed Entrapment Risk in Long Term Care Homes

Presented by:

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Objectives

- By the end of this session, participants will be able to:
 - Identify the Seven Zones of Bed Entrapment
 - Analyze bed rail use as it relates to restraint minimization, fall prevention & entrapment risks
 - Implement corrective strategies & product solutions for reducing bed entrapment risks for their LTC Home

The Context

- Between 1980 and early 2008, Health Canada received 67 reported incidents of life-threatening bed entrapments in Canada; just over half of these incidents led to deaths.
- LTC facilities report the majority of entrapments, as compared to hospitals, etc.
- Despite many published articles on the risks of hospital bed side rails, there has not been a significant decrease in entrapment incidents.

Acknowledging the Benefits of Bed Rail Use

- Bed rails serve a variety of purposes, some of which benefit residents' health & safety:
 - Aid in turning & repositioning within bed
 - Providing a transfer aid for getting in/out of bed
 - Providing a sense of comfort & security
 - Providing easy access to bed controls
 - Remind resident of bed perimeters, or to ask for nursing assistance
- The decision to use or remove bed rails should be based on individualized resident assessment – as part of a Quality Improvement initiative

Regulatory Environment

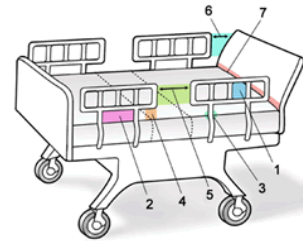
- Over the years, manufacturers have modified the design of hospital beds & side rails to reduce entrapment risks ...BUT... many older beds, rails and/or mattresses are still in use today
- Ontario LTC regulations state that where bed rails are used, staff must minimize the risk of injury to the resident by assessing the resident and evaluating the bed system, taking steps to prevent entrapment, & addressing other potential safety issues related to bed rails (*Ont. Regs. 79/10, c.15, s.1*)

What is Entrapment?

- Entrapment occurs when part of a person's body (e.g., head, neck, chest) is caught, trapped or entangled in the spaces in or about the hospital bed rail(s), mattress, or bed frame
 - Such incidents may cause serious bodily harm, including strangulation or suffocation
 - In other cases, a resident may experience a limb fracture, skin tear, or other adverse event

How Entrapment Happens?

- The risk of entrapment increases when gaps or spaces exist between components of the bed system
- These gaps can result from:
 - Older bed rail design
 - Loose, damaged bed rail(s), headboard or footboard
 - Mattress of improper width, length, thickness & density relative to the bed platform
 - Lateral shift of the mattress (away from rails)
 - Mattress compression – wear & tear, certain therapeutic mattresses

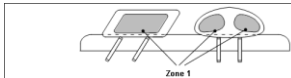


SEVEN ZONES OF ENTRAPMENT

Identified by Health Canada (member of the Hospital Bed Safety Working Group)

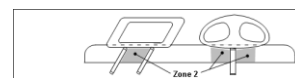
Zone 1: Within the Bed Rail

- Any open space within the perimeter of the rail
- Openings should be small enough to prevent the head from entering



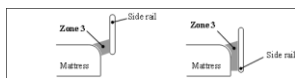
Zone 2: Under the Rail

- The space under the rail, between a mattress compressed by the weight of the resident's head and the lower edge of the rail



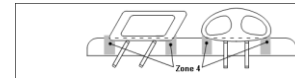
Zone 3: Between Rail & Mattress

- The space between the inside surface of the rail and the mattress



Zone 4: Under the Rail, at Rail End(s)

- The gap that forms between the mattress compressed by the resident and the lower edge of the rail



Zone 5: Between Split Bed Rails

- The gap that forms when partial or split rails are used on the same side of the bed



Zone 6: Between End of Rail & Side Edge of Head- or Footboard

- The space between the end of the rail and the side edge of the headboard or footboard



Zone 7: Between Head- or Footboard & Mattress End

- The space between the inside surface of the headboard or footboard, and the end of the mattress



ASSESSING RESIDENTS & BEDS

Is there a RISK of BED ENTRAPMENT?
Is the resident at risk to be caught, trapped or entangled in the space in or around the bed rail, mattress or hospital bed frame?

Not all RESIDENTS are at risk for entrapment. Not all BEDS pose a risk of entrapment.
Bed systems may FAIL, a zone entrapment test (a) because of their overall design – especially re: bed side rails – and/or (b) due to use, regardless of the mattress used.

Identify VULNERABLE residents &/or HIGH-RISK units

- Resident Characteristics**
- Dementia, delirium, disorientation
 - Incontinence
 - Pain (uncontrolled)
 - Movement disorder, or spasticity
 - Impaired communication, including ability to access call bell
 - Small body frame
 - Previous entrapment event, or "near miss"

- Physical Environment**
- Low visibility of resident, e.g., "Room 7a"
 - Inconvenience
 - Private room (vs. shared ward room)
 - Bed system with unsafe gaps (e.g., incompatible rails, mattress, frame, accessories)
 - Conduct evaluation of Entrapment Zones (1 to 7)

- Staffing**
- Limited:
 - Staffing (esp. at night)
 - Familiarity with resident
 - Care planning re: toileting, hunger, thirst, pain, repositioning
 - Use of monitoring devices

Identify why BED SIDE RAILS are being used

- Restraints**
- The LTC/4A prohibits homes from restraining residents in any way, for the convenience of staff, or as a disciplinary measure, 2007, c.43 s.38(1)
 - (When raised) full-length, three-quarter or split-rail configurations generally create a restraint effect

- PASDs**
- Depending on their configuration & placement, bed side rails are occasionally categorized as a PASD – to assist residents with turning & repositioning, and/or for transfers
 - Bed rails may improve resident's access to bed controls

- Other**
- Do staff use bed rails?
 - Out of habit?
 - To prevent falling/rolling out of bed?
 - To facilitate bed rest?
 - To help with positioning?
 - To offer a sense of comfort & security (e.g., resident/family request?)

Evaluate and address these factors, alone and in combination, to REDUCE bed entrapment risk*
* Ideally, Town an interdisciplinay team including: DCC, Admin, Nursing, OT/PT, Maintenance & SHHC, LTC rep
* As per LTC/4A, 2007 Ontario Regulations 79/10, c.15, s.1

Who are High-Risk Residents?

- Dementia, delirium, disorientation
- Incontinence
- Pain (uncontrolled)
- Movement disorder, or spasticity
- Impaired communication, including ability to access call bell or verbalize
- Small body frame
- Previous entrapment event, or "near miss"

Think of these factors in relation to your RAI-MDS tool....

Evaluating Beds for Entrapment Risk

- Health Canada recommends the test method developed by the Hospital Bed Safety Workgroup that measures gaps in **Zones 1, 2, 3 & 4**
 - Over 70% of entrapment incidents occur in Zones 1-4
- Beds manufactured b/n 1999 & 2002, typically pass Zones 1-3, but fail Zone 4
- Beds manufactured after 2002 most likely pass all four zones – but only when the correct sized mattress with a firm perimeter edge is used
 - Use particular caution when “mixing & matching” beds & (older) mattresses

When to Assess

- As part of an initial bed entrapment audit, for Ministry compliance
 - Annually??
- When rails or mattresses are changed or replaced
- When overlays or positioning items are added or removed
- When any bed components are changed beneath a “high risk” resident
- (Recommended) ongoing preventative maintenance: Check for wobbly bed rails, damaged rails, too soft mattresses that cause increased spaces within the bed system

Step 1: Inventory of Bed Systems

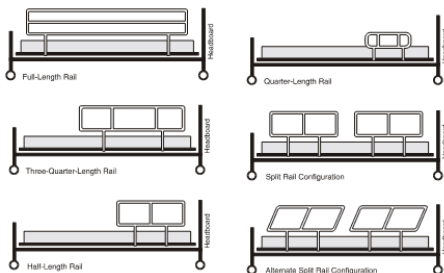
- A comprehensive, consistent, accurate & systematic assessment of the bed systems used at a LTC Home
 - Ideally, track on an electronic spreadsheet, using existing records and/or direct observation*
 - By designing & creating a ‘living’ document – vs. a point-in-time list – it can provide up-to-date info as needed (for Ministry, asset management, etc.)
 - Helps prioritize beds, rails, mattresses for replacement and/or corrective strategies needed – as well as ‘safe’ bed-rail-mattress combinations
- *SHHC can offer guidance, resources (e.g., sample spreadsheet, bed rail types, etc) but does NOT complete this inventory for the Home

Sample Inventory Spreadsheet

Side Rail/Entrapment Risk Audit										
Name of Home	Bed				Mattress		Rails			
Floor/Stone Area	Room/Bed #	Make	Model	Serial/Tracking #	Make	Model	Type	Configuration	Accessories in use	

- From this inventory, decide how many bed systems will be measured
 - Every single room/bed?
 - Or a representative example of each different system?

Bed Rail Design



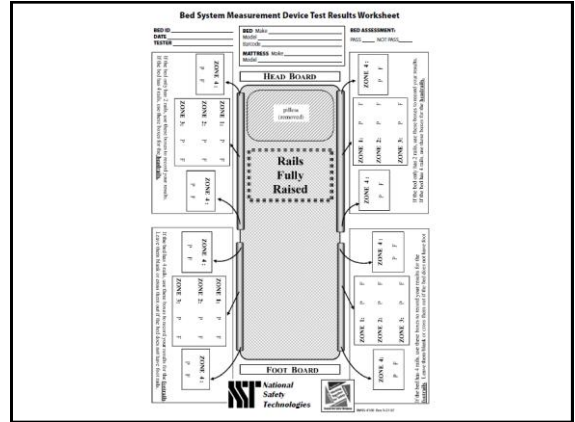
Therapeutic Support Mattresses

- “Air” mattresses are easily compressed by the resident’s weight & may pose an even greater risk of entrapment – due to increased space between the mattress & bed rails.
- When using these products with bed rails, ensure the mattress is centred on bed system, using mattress keepers or tie-downs.
- Experts generally agree that these surfaces are partially excluded from entrapment guidelines. However, the Ontario coroner still recommends they be assessed & residents be frequently monitored.

Step 2: Measuring Bed Systems



- Cone & Cylinder Tool is the standardized measurement device used to assess for Zone 1-4 entrapment risk
- Simulates the size & weight of a small adult head and neck (based on anthropometric studies)
- SHHC can train your staff on how to measure your beds, using this tool (owned or borrowed*) – but does NOT currently measure beds for the Home



Step 3: Interpreting Results

- A bed system is said to FAIL/NOT PASS if it fails one or more of the Zone 1 to 4 entrapment tests
- It's important to understand WHY a bed system failed. That is, is it due to:
 - Rail(s) only?
 - Mattress only?
 - Rail/Mattress incompatibility?
 - A combination of factors?
- SHHC can offer guidance, resources & support – and direct you towards product solutions (except where restricted by exclusive purchasing agreements)

Sample Results Report

Entrapment Inspection Data Sheet										
Name of Home: LTC Home X						Inspection Date: Oct-11				
Inspected by: MA, AB, JT (Shoppers Home Health Care) + EY (Eng. Student, LTC Home X)										
Room #	Bed #	Bed Type	1	2	3	4	5	6	7	Notes
10		RRR	P	F	F	F	F	F	F	Failures - Zones 1, 2, 4, 7 Mattress - Plastic foam mattress. Failure of bedrail design - mattress. Solution options) include: (A) replace bed with one with compliant rails; (B) replace mattress with one of compatible width (39"), length (84") & firm perimeter edges; OR (C) install bed safety products in Zone 1, 2, 4, 7 failures - e.g. bed rail pads (1" x 4" wide), or wedge side rail pads + mattress extension bolster (75x39x19x75")
13	34	SH	P	F	F	F	F	F	F	Pass - no failures Failure - Zone 2, 4, 7 Control Area bed + Pressure Plastic foam mattress. Failure of bedrail design + Mattress. Solution options) include: (A) replace bed rails with Raising Bed Assist Rails; OR (B) replace mattress with one of compatible width (39"), length (78") & firm perimeter or "wider" edges; OR (C) install bed safety products in Zone 2, 4, 7 failures - e.g. bed rail pads (1" x 4" wide), or wedge side rails + mattress extension bolster (75x39x19x75")
13		RRR	P	F	F	F	F	F	F	Pass - no failures Control Area bed + Pressure Plastic foam mattress
20	34	SH	P	F	F	F	F	F	F	Failures - Zones 2, 4, 7 Have RN confirm clinical need for air mattress See Shoppers Therapeutic Support Surface Selection Guide Control Area bed + KCI ProCare air mattress. Failure of bedrail design, "wider" perimeter rail + mattress (is product of some therapeutic surfaces). Solution options) include: (A) replace bed rails with Raising Bed Assist Rails; OR (B) replace mattress with one of compatible width (39"), length (84") & firm perimeter edges or bolsters (available on some air mattresses); OR (C) install bed safety products to address Zone 2, 4, 7 failures - e.g. bed rail pads (1" x 4" wide), or wedge side rail pads + mattress extension bolster (75x39x19x75")
21	3	RRR	P	F	F	F	F	F	F	Failures - Zones 1, 2, 4, 7 Have RN confirm clinical need for air mattress See Shoppers Therapeutic Support Surface Selection Guide Control Area bed + KCI ProCare air mattress. Failure of bedrail design, "wider" perimeter rail + mattress (is product of some therapeutic surfaces). The perimeter rail fails the test, because even with foam mattress, it's reaching the bed (See RN 103. Solution options) include: (A) replace bed rails with Raising Bed Assist Rails; OR (B) replace mattress with one of compatible width (39"), length (84") & firm perimeter edges or bolsters (available on some air mattresses); OR (C) install bed safety products to address Zone 1, 2, 4, 7 failures - e.g. bed rail pads (1" x 4" wide), or wedge side rail pads + mattress extension bolster (75x39x19x75") + HB & B pads or wedges (optional)
23	3	RRR	P	F	F	F	F	F	F	Failures - Zone 3 Have RN confirm clinical need for air mattress See Shoppers Therapeutic Support Surface Selection Guide Control Area bed + KCI ProCare air mattress. Failure of mattress (is product of some therapeutic surfaces). Solution options) include: (A) replace mattress with one of compatible width (39"), length (78") & firm perimeter edges or bolsters (available on some air mattresses); OR (B) install bed safety products to address Zone 3 failure - e.g. wedge side rail pads

**RESTRAINT MINIMIZATION,
FALL PREVENTION**

Bed Rails as Restraints

- RAI-MDS 2.0 requires that LTC homes record the use of restraint devices, including bed rails
 - P4a. Full rails may be one or more rails along both sides of the resident's bed that block ¾'s to the whole length of the mattress from top to bottom. It also includes beds with one side placed against the wall (prohibiting the resident from entering and exiting on that side) and the other side blocked by a full rail (one or more rails).
 - P4b. Other types of bed rails used (e.g., half rail, one side)

Falls from Bed

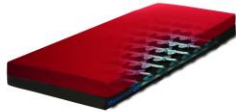
- 70-90% of falls in a health care setting occur as the patient tries to exit the bed for toileting purposes.
- Between 50-90% of falls from bed occur as a result of older persons falling to the floor while climbing over bed rails or footboards.
- Screen residents for strength, balance, mobility, transfers
- Interdisciplinary teams to address medications, mobility, assistive devices, etc

Alternatives to Bed Restraints

- As with other types of restraints, the goal is to seek alternatives –including equipment OR nursing interventions, such as:
 - Individualized toileting schedule
 - Turning & repositioning schedule
 - Accommodate resident's preferred bedtime habits
 - Provide distractions such as music, TV, food or fluid
 - Provide calming interventions & pain relief
 - Daytime physical activity to promote restful sleep
 - Mattress that promotes restful sleep

ThevoVital 'Dementia' Mattress

- The first mattress designed to specifically help people who have sleep disorders, associated with dementia
- Non-powered mattress, offers micro-stimulation & sensory feedback – shown to improve sleep patterns
- Available through SHHC, for a fully-supported trial, and for purchase



Reporting an Entrapment/Fall Incident

- Health Canada recommends that facilities report entrapment incidents
- To facilitate this process, they created the: Bed Entrapment and Fall Report Form
www.hc-sc.gc.ca/dhp-mps/alt_formats/hpfb-dgpsa/pdf/md-im/md_im_form_beds_lits-eng.pdf
- This reporting helps Health Canada & manufacturers identify unsafe devices that require modification

BED ENTRAPMENT REDUCTION STRATEGIES

Consider Using Bed w/o Side Rails

- Eliminating the use of bed rails reduces potential **Zone 1-6** entrapment risks
- Educate staff, to avoid "automatic" use of bed rails
- Address resident/family member concerns (e.g., bed rails may give a sense of comfort, security)
- If bed rails must be used, consider lowering one or more sections (e.g., foot rail, one side, etc.)
- Document use/non-use of bed rails on care plan

Replace Unsafe Bed Rails

- Retrofit kits or replacement rails may be available for beds currently in use
- Contact manufacturer/supplier for more information
- Conduct preventative maintenance on loose rails



Match Bed Frame & Mattress Dimensions

- Openings between rails, or between headboard & footboard, are typically larger than the 35"x76" or 35"x80" bed specifications.
- Reduce **Zones 2, 3, 4** and/or **Zone 7** entrapment risks by using:
 - Mattress of compatible width, length, height, and density/compressibility
 - Mattress keepers or tie-downs (if applicable) to prevent lateral shifting
 - Gap fillers or mattress extension bolsters

Rail Sleeves & Pads

- Covering the rail(s) with sleeves or pads can reduce **Zone 1, 2** & **Zone 5** entrapment risks
- Depending on the rail design, a custom solution may be needed



Gap Filler



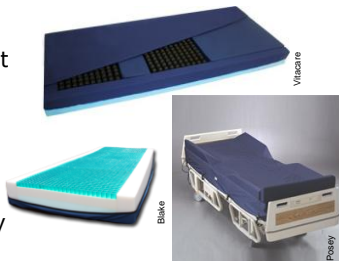
Rail Pads & Wedge



Mattress Keeper

Mattress with Firm Perimeter or Raised Edges

- Reduce **Zone 2, 3** & **4** entrapment risk
- Firm or raised perimeter mattresses (or overlays) keep the resident away from bed edge



Positioning Rolls, Wedges

- Positioning rolls, wedges or body pillows offer a gentle reminder re: outside bed edge



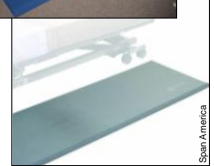
Hi-Lo Beds

- Keep bed in the lowest position, with wheels locked, to protect residents who are at risk of falling out of bed
- Advise staff to raise bed to safe working height during care



Bedside Fall Mats

- Fall mats – made of medium density foam or rubber, with beveled edges – on exit side(s) of bed, are part of fall/injury prevention programs



Monitoring Alarms

- Bed alarms alert staff when a resident attempts to stand/exit the bed
- Alarm may be triggered by magnetic tab clip (attached to clothing), sensor pad, or motion sensor



Hip Protectors

- For residents with osteoarthritis, arthritis of the hip, dementia, and/or unsteady walking with a tendency to self-transfer, as well as those with a previous hip fracture or history of falls
- Foam pads protect the hip joint from impact fracture
- Waist & hip circumference measurements needed at time of order, to ensure proper fit



In Summary

- Minimizing bed entrapment risks involves knowing your residents, your equipment (inventory, tracking) & available solutions
- Assessing, monitoring & addressing risks requires a **team** approach – that can include Nursing, Rehab (OT, Physio), Environmental Services, Asset Management, Risk Management, etc. – and Shoppers Home Health Care! 😊
 - Resources, products (including custom solutions), staff training & education, etc.