Winnipeg Regional Health Authority | Office régional de la santé de Winnipeg
Caring for Health | *À l'écoute de notre santé*

Long Term Care Program

BED SAFETY

Long Term Care Program Resource Guide

Table of Contents

Contributors

Bed Safety Working Group (a subgroup of the LTC Risk Management and Safety Committee)

- Ev Nickel, (former) Manager, Quality Improvement and Risk Management, WRHA LTC Program
- Sheila Smith, Regional Educator, WHRA LTC Program
- Monique Liarakos, Manager, Infection Prevention and Control, WRHA LTC Program
- Joanne DiNicola, Manager of Initiatives, WRHA LTC Program
- Cari Ringaert, Education Services Manager at Extendicare Oakview Place
- Claudine Lafond, Manager of Therapeutic Services, Community Therapy Services
- Rob Duguay, Manager of Facilities Management, Middlechurch Home of Winnipeg and Bed Safety Working Group, Liaison to PCH FM supervisor committee
- Matthew Braun, Regional Manager of Education and Resident Services, Revera Inc.
- Sara Reid, Assistant Director of Care, Simkin Centre

Acknowledgements:

Revera Inc., Extendicare®, Simkin Centre, Community Therapy Services, and Prairie Mountain Health for their sharing of their tools and resources related to bed safety with this initiative.

Original date: January 2018

Next review date: 2021

Background

In 1999, a working group called the Hospital Bed Safety Workgroup (HBSW) was formed in response to continued reports of bed entrapment. This group was formed in the USA in partnership with the Food and Drug Administration, representatives from hospital bed industry, national healthcare organizations, Resident/client advocacy groups and other US federal agencies. The work of the HBSW was adopted by Health Canada in the publication of guidance documents for bed entrapment in 2008.

The identified need to address Resident risk in the bed environment and risk of entrapment prompted the formation of a working group within the WRHA Long Term Care Program. The work from this group led to the creation of this resource guide.

Purpose

To identify the potential associated risks of bed safety within the bed environment (e.g., entrapment) and to provide interventions to mitigate and/or manage the risks.

Bed Environment Risks

The risks associated with the bed environment include events that result in minor occurrences such as bruising to severe outcomes such as entrapment and death. Clinical experience reveals that the use of bed rails present a risk for limb injuries such as skin tears, abrasions, cuts, and bruises. Several surveys of deaths occurring in the bed environment demonstrate the risk of entrapment when a Resident slips between the mattress and bed rail or when the Resident becomes entrapped in the bed rail itself. The populations at most risk for harm from the bed environment are Residents who are frail and/or elderly or those who have conditions that cause them to move about the bed or try to exit from bed (including but not limited to agitation, delirium, confusion, pain, uncontrolled body movement, hypoxia, fecal impaction, acute urinary retention).

Definitions

Bed entrapment: An occurrence involving a Resident who is caught, trapped, or entangled in the hospital bed system, which includes the spaces in or around the bed rail, hospital bed mattress, or hospital bed frame. Entrapped body parts associated with risk for severe injury include the head, neck, and chest.

Bed rail: Commonly used synonymous terms are side rails, bed side rails, grab bars and safety rails. Bed rails are rigid bars that are attached to the bed and are available in a variety of sizes and configurations from full length to half, one-quarter, and one-eighth length and are used as restraints, reminders, or as assistive devices.

Hospital bed system: Encompasses the bed frame and its components, including the mattress, bed side rails, head and foot board, and any accessories added to the bed.

Mattress overlay: A device placed on top of mattress to improve circulation and prevent pressure injuries.

Personal Assistance Service Device (PASD): Any piece of equipment (e.g., a bed rail of any size, a transfer pole, Arcor rail, etc.) used for the purpose of assisting a Resident with a routine activity of living (e.g., turning themselves independently, transferring to and from the bed, etc.) regardless of whether it is attached or unattached directly to the bed. **Note**: if a bed rail is used to limit or inhibit a Resident's freedom of movement and not to assist with a routine activity of living, then the device is considered to be a restraint.

Restraint: Any restriction/reduction of voluntary movement or freedom implemented to ensure the safety of self, others or the physical environment. This includes physical/mechanical, chemical, and environmental restraints.

Split rail: A pair of half-rails where one set extends along the side of the bed from the head of the bed to the mid-section of the bed. The other set extends from the mid-section of the bed to the foot of the bed. Generally, there is a space between the two sets of rails.

Understanding the Risk: Know Your Zone

Zone 1: Within the rail

Zone 2: Under the Rail, between the rail supports or next to a single rail support

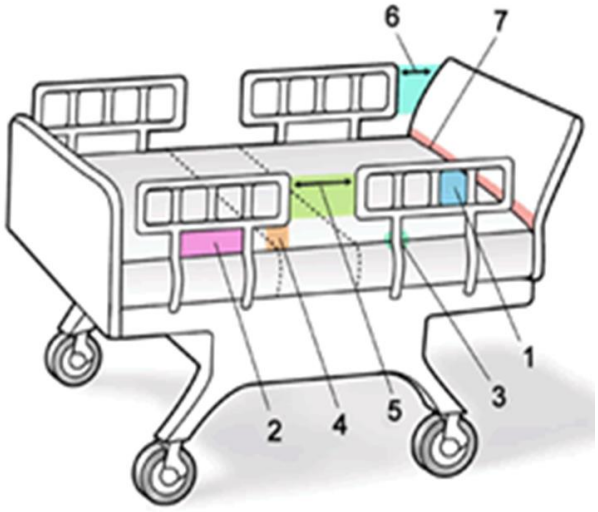
Zone 3: Between the rail and the mattress

Zone 4: under the rail at the ends of the rail

Zone 5: Between split bed rails

Zone 6: Between the end of the rail and the side edge of the head or foot board

Zone 7: Between the head or foot board and the mattress end



Zone 1 – Within the Rail

This zone is any open space within the perimeter of the rail. Openings in the rail should be small enough to prevent the head from entering. A loosened bar or rail can change the size of the space. The recommendation is that the space be less than 120 mm (4¾ inches), representing head breadth.

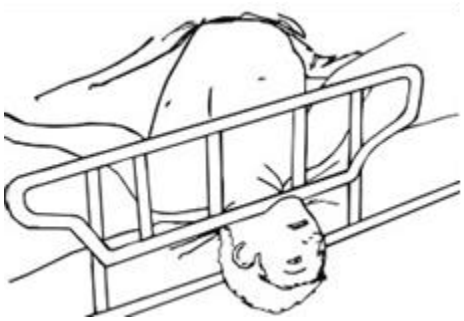
Zone 2 - Under Rail, Between Rail Supports or Next to a Single Rail Support

This zone is the gap under the rail between a mattress compressed by the weight of a Resident's head and the bottom edge of the rail at a location between the rail supports, or next to a single rail support. If there is a single

rail support, entrapment in Zone 2 can occur anywhere along the bottom length of the rail beyond the support, up to the end of the rail (entrapment at the end of the rail is explained in Zone 4). Factors to consider are:

- mattress compressibility which may change over time due to wear
- lateral shift of the mattress or rail
- any degree of play from loosened rails or rail supports

A restless Resident may enlarge the space by compressing the mattress beyond the specified dimensional limit. This space may also change with different rail height positions and as the head or foot section of the bed is raised and lowered. The space may increase, decrease, become less accessible, or disappear entirely. In some positions, the potential for entrapment in this zone may still exist when the deck is articulated. Preventing the head from entering under the rail would most likely prevent neck entrapment in this space. The recommendation is that this space be small enough to prevent head entrapment, less than 120 mm (4 ¾ inches).



Zone 3 - Between the Rail and the Mattress

This zone is the space between the inside surface of the rail and the mattress compressed by the weight of a Resident's head. The space should be small enough to prevent head entrapment when taking into account the mattress compressibility, any lateral shift of the mattress or rail, and degree of play from loosened rails. The recommendation is a dimensional limit of less than 120 mm (4 ¾ inches) for the area between the inside surface of the rail and the compressed mattress.

Zone 4 - Under the Rail at the Ends of the Rail

This zone is the gap that forms between the mattress compressed by the Resident, and the lowermost portion of the rail, at the end of the rail. Factors that may increase the gap size are:

- mattress compressibility
- lateral shift of the mattress or rail
- degree of play from loosened rails.

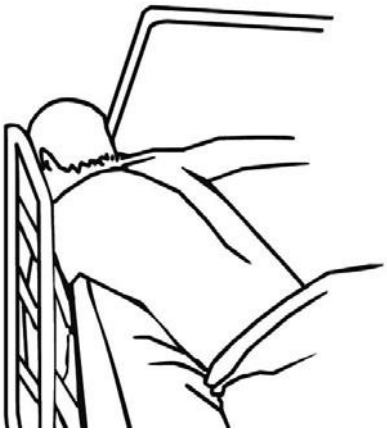
The space poses a risk for entrapment of a Resident/client's neck. It may change with different rail height positions and as the head or foot section of the bed is raised and lowered. The space may increase, decrease, become less accessible, or disappear entirely. Thus, in some positions, the potential for entrapment in this zone may still exist when the deck is articulated. The combination of the gap size and the angle size (created between the mattress and the rail) must be considered. Thus, the V-shaped opening under the rail at its end be of an angle wide enough, i.e. greater than 60 degrees, to prevent wedging entrapment.

Zone 5 – Between Split Bed Rails

This zone occurs when partial or split length head and foot bed rails (split rails) are used on the same side of the bed. The space between the split rails may present a risk of either neck entrapment or chest entrapment between the rails if a Resident attempts to, or accidentally, exits the bed at this location. In addition, any V-shaped opening between the rails may present a risk of entrapment due to wedging. A dimensional limit of less than 60mm (2.375") or greater than 318mm (12.5")

Zone 6 - Between End of Rail and Side Edge of Headboard or Footboard

This zone may present a risk of either neck entrapment or chest entrapment. In addition, any V-shaped opening between the end of the rail and the headboard or footboard may present a risk of entrapment due to wedging. This space may change when raising or lowering the head or foot section of the bed. Thus, in some positions, the potential for entrapment may exist when the deck is articulated. A dimensional limit of less than 60mm (2.375") or greater than 318mm (12.5")



Zone 7 - Between Headboard or Footboard and End of the Mattress

This zone is the space between the inside surface of the headboard or footboard and the end of the mattress. This space may present a risk of head entrapment when taking into account the mattress compressibility, any shift of the mattress, and degree of play from loosened headboard or footboard. The recommendation is a dimensional limit of less than 120 mm (4.75”) for the area between the inside surface of the headboard and footboard and end of the mattress.

IMPORTANT: Ensure the foot board and head board is oriented correctly. During the WRHA Long Term Care testing, several beds failed because the headboard was not installed in the proper direction. In the recent PCH bed audit, one PCH mitigated 87% of bed zone failures by correcting the orientation of foot board/head board Also, ensure mattress stops are engaged, without their use zone 7 is likely to fail.

Understanding the Risk: Mitigating and Managing the Risk

Bed Rails

The automatic use or removal of bed rails may pose unwarranted hazards to Resident safety. Reducing and/or eliminating the existing use of bed rails should be undertaken incrementally using an approach that is **individualized to each resident**, systematic, and documented

1. Refer to the WRHA Side Rail Use Brochure available at http://home.wrha.mb.ca/ltc/files/SideRailUseBrochure_Bilingual_Nov2013.pdf when considering whether or not to use siderails for a particular resident. The following considerations should be discussed with the interdisciplinary team which should include the Resident or the substitute decision maker (SDM).

- The relative risk of using the bed rail must be compared to not using it for an individual Resident. The benefit must outweigh the risk.

- Removal of bed rails can have the detrimental effect of reducing the Resident's ability to move about their beds and to independently transfer to and from their bed environment. This can result in a variety of consequences such as (but not limited to); increasing dependency, loss of functional ability, increased risk of falls, skin breakdown, and increased waiting, which can exacerbate mental health issues (such as depression, anxiety and agitation). Any decision to remove a bed rail must consider these risks for the Resident and alternatives to compensate for lost independence must be exhausted (e.g., a PASD). An alternative to removing the bed rail is to fix them in the down position with the use of ties.

- The potential for serious injury is more likely to be related to a fall from a bed with raised bed rails when the Resident attempts to climb over, around, between, or through the rails, or over the foot board, than from a bed without rails in use.

- Bed rails sometimes restrain Residents. When used as restraints, bed rails can pose the same risk to Resident safety as other types of physical restraints.

- Resident safety is paramount. In an emergency situation the Interdisciplinary Team needs to do whatever is necessary in their professional judgment to secure the Resident's safety.

Decisions to use bed rails shall be based on the Resident's assessed need (e.g., turning and positioning within the bed; providing a hand-hold for getting into or out of bed), approved by the IDT, and be clearly documented within the Resident's health record, the care plan and activities of daily living form.
The bed must be reevaluated at a minimum of every two years, as well as anytime an episode of entrapment or near-entrapment occurs, with or without serious injury. Reassessment following an episode should be done immediately because fatal "repeat" events can occur within minutes of the first episode.

Interdisciplinary Team

Role of the Nurse-Care Planning

1. To review the resident's risk in the bed environment as a part of the Integrated Care Planning process and determine which corrective actions/safety interventions best meet the Resident's needs (see Appendix A, "Bed System Altering Accessories and Devices"). Considerations when developing the bed safety portion of an individualized care plan include:
    - Recognition of changes in condition that increase the risk of entrapment e.g., confusion, delirium, agitation, repetitive and/or involuntary movements, neuropathy, bed mobility changes, medication side effects, and infections
    - Underlying medical conditions
    - Sleep habits
    - Acute medical or surgical interventions

- Ability to safely toilet independently
- Ability to communicate
- Mobility (in and out of bed)
- Risk of falling

If bed safety interventions have not been effective, initiate alternative approaches and update the care plan as necessary.

2. Document the decision to utilize, remove or change bed rails in current use. Determine if the bed rail is a restraint per WRHA Restraints in Personal Care Home (Safe Use of) #110.130.050 http://home.wrha.mb.ca/corp/policy/files/110.130.050.pdf or a Personal Assistive Service Device (PASD).

3. Communicate to the team and the Resident/SDM whenever there is a significant change to the care plan regarding the use of bed rails on an ongoing basis and annually at the care conference.

4. Consider embedding the following risk intervention approaches into the care plan as appropriate:

- Provide individually scheduled toileting
- Develop a schedule for turning and positioning
- Clean urine and/or feces promptly
- Elevate head of bed for Residents with congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), reflux, and actively infusing enteral fluids
- Position Residents to maximize comfort and change positions in a timely manner, maintaining comfort and reducing risk for skin breakdown
- Accommodate Residents' preferred bedtime habits
- When medically indicated, use padded bed rails for individuals with an active seizure disorder or active movement disorder
- Use of a high-impact mat (bedside floor mat) and/or a high/low bed
- Provide distractions such as music, television, or food and fluids for Residents who do not sleep through the night
- Provide calming interventions and pain relief
- Plan time during the day to provide periods of physical activity that help promote a restful sleep
- Mobility and fitness, e.g., restorative care to enhance abilities to stand safely and to walk.

5. If the care plan indicates that bed rails are not to be used, nursing is responsible to contact in Facilities Management or designate to secure the bed rail so that it cannot be raised (e.g. tie wrap) or to remove the bedrail (the latter is not recommended unless there is an inventory tracking system that permits the rail and the bed to be reunited should the care plan change to require bed rail use and/or when a new resident who does require the use of a bed rail occupies the bed).

6. If Facilities Management identifies a zone has failed, nursing staff are responsible to collaborate with the interdisciplinary team to identify corrective actions as a part of the Resident's individualized care plan. In the event that the care plan requires the use of a bed rail for bed mobility but the bed rail has failed testing refer to Appendix A for a list of suggested corrective actions.

7. Place the bed rail logo near the bed environment so that all staff, family and visitors are informed of the care plan (see Appendix B).

Role of the Nurse-Bed Testing

Nursing staff are responsible to initiate bed re-testing process by notifying the Facility Manager:

- Following a change in components of the bed system (e.g. rails or mattress)
- When there is reason to believe that some components are worn (e.g. rails wobble, rails have been damaged, mattress is softer, ripped or torn)
- When accessories that alter the openings of bed systems are added or removed (see Appendix A: Bed System Altering Accessories and Devices)
- Following a bed entrapment incident

Role of Facility Manager

1. Ensure the bed is assembled according to manufacturer specifications (e.g., head/foot board are oriented correctly, bed rails are properly installed and matched to the bed frame).

2. To develop competence in testing zones of entrapment, watch the Dimensional Test Methods for Bed Systems DVD, refer to bed safety powerpoint and the section "Understanding the risk: Know your zones" in this resource guide. Additional details can be found in Health Canada's Guidance Document, "Adult Hospital Beds: Patient Entrapment Hazards, Rail Latching Reliability, and Other Hazards".

3. Test each bed system at **minimum every two years** using the Bed System Safety Measurement Test Form (Appendix C) to record results. Re-testing is required upon receipt of a report from nursing

- Following a bed entrapment incident
- Following a change in components of the bed system (e.g. rails or mattress)
- When there is reason to believe that some components are worn (e.g. rails wobble, rails have been damaged, mattress is softer)
- When accessories such as mattress overlays or positioning/transfer poles are added or removed

Note: Zone 7, the area between the head or foot board and the end of the mattress must be tested even if there are no bed rails in use.

4. When testing identifies a failure in any zone of the bed system, collaborate to develop a corrective action plan with the IDT as appropriate. Document the corrective action(s) on the bed safety spreadsheet.

5. Transcribe the bed safety testing results into the Bed Safety Spreadsheet provided by the WRHA LTC Program or a site specific documentation record. Sites wishing to maintain their own version of the bed safety spreadsheet must ensure the following minimum data elements are collected:

- Bed make, model and serial number
- Mattress make, model and serial number
- Specify zone failure(s)
- Identify corrective action(s) and date bed system corrected

Note: The WRHA Long Term Care Program may occasionally request results of bed assessment testing.

6. Retain completed hardcopy forms in facility specific maintenance records along with documented corrective actions per your facility specific record retention policy.

Role of the Health Care Aide

1. Follow the interventions as outlined on the care plan.
2. Collaborate on developing the integrated care plan by sharing your knowledge of individual resident's preferences, needs and which interventions align with meeting those needs.
3. Report to nurse:
    - Following a change in physical or clinical condition increasing the risk of entrapment
    - Following a bed entrapment incident
    - Following a change in components of the bed system (e.g. rails or mattress)
    - When there is reason to believe that some components are worn (e.g. rails wobble, rails have been damaged, mattress is softer)
    - When accessories such as mattress overlays or positioning poles are added or removed

Role of the Rehabilitation Assistant

1. Collaborate on developing the integrated care plan by sharing your knowledge of individual resident's preferences, needs and which interventions align with meeting those needs.
2. Report to nurse:
    - Following a change in physical condition increasing the risk of entrapment
    - Following a bed entrapment incident when the rehab aide is the person discovering the incident
    - When there is reason to believe that some components are worn (e.g. rails wobble, rails have been damaged, mattress is softer)

Role of Physiotherapy/Occupational Therapy

1. Determine and document the functional ability of the Resident as it pertains to bed mobility and transfers with or without the use of bed rails or PASDs.
2. Collaborate on developing the integrated care plan by sharing your expertise and knowledge of individual resident's preferences, abilities, needs and which interventions align with meeting those needs.
3. Recommend alternatives to maximizing safety when bed rails have been removed.
4. Promote restorative care strategies to help improve and/or maintain overall mobility and functions.

Evaluation

The Bed Safety Program will be evaluated and updated as evidence-based practices dictate, or at a minimum of every three years.

References

Health Canada. (March 2008). Adult Hospital Beds: Patient Entrapment Hazards, Side Rail Latching Reliability, and Other Hazards.

Hospital Bed Safety Workgroup. (April, 2003). Clinical Guidance for the assessment and implementation of Bed Rails in Hospital, Long Term Care Facilities, and Home Care Settings.

Hospital Bed Safety Workgroup. (June, 2006). A Guide for Modifying Bed Systems and Using Accessories to Reduce the Risk of Entrapment.

Miles S.H. (2002). Death between Bedrails and Air Mattresses. Journal of American Geriatric 1124-1125.

Region of Peel Long Term Care Centres (April, 2013). Bed Entrapment Prevention Program.

Appendices

Appendix A: Bed System Altering Accessories and Devices

This list is provided for information only and does not represent any endorsement by the WRHA LTC Program of the products listed, or the ability or effectiveness of any product to address any specific entrapment issue with beds and mattresses. Bed and mattress combinations may present differing levels of risk. Adding accessories and devices may resolve the risk of entrapment but present other risks (e.g., when a Resident turns toward a rail pad and does not have the bed mobility to prevent accidental suffocation when they cannot turn their head enough to breathe). Additionally, each combination must be examined in the context of the specific Resident using the bed. Use appropriate clinical judgment when selecting or using any accessory device. Always monitor Residents to ensure continued use of bed rails and accessories are warranted. Collaboration with the interdisciplinary team to determine the most appropriate accessories and devices is required.

Accessories and Devices	Potential Entrapment Zones
Mattresses with optimal length, width and depth for bed deck, frame, and bed rails	2, 3 4, 7
Gap Fillers: • Bed rail inserts – rigid plastic that inserts into the bed rail openings to narrow the openings. • Stuff pads – Plastic covered pads used to decrease open spaces between bed rails and mattresses, mattresses and head/foot boards. • Slip-On Cover- Designed to go over the bed rail to close the gap between the rail and mattress	1, 4, 7
Pads & Wedges: • Rail bumper wedges – elongated pads that address openings between the mattress and bed rail, and cover the openings in bed rails • Rail pads – elongated pads that address openings between the mattress and bed rail, and cover the openings in bed rails	1, 4, 5, 6
Drapes, Covers and Shields: • Rail covers – fabric devices or plastic that slips over the bed rails to close openings. • Entrapment shields – rigid plastic device attached to a bed rail which occludes all openings along the side of the bed	1, 2, 3, 4, 5, 6

a) Use of low beds with an adjacent mat on the floor (with consideration given to using mechanical lifts and proper lift technique training for caregiver staff).

b) Use of low beds that can be elevated electronically for transfer and activities of daily living (ADL) care.
c) Placement of the Resident/client's call bell within easy reach and provision of visual and verbal reminders to use the call bell when necessary.
d) Use of bed alarms to warn of Residents' attempts to exit from bed.
e) Use of "perimeter reminders" or "border definers" such as body pillow/cushions or mattresses with lipped/raised edges.
f) Use of a trapeze affixed to the bed to increase a Resident's bed mobility. (For Resident's with shoulder conditions, trapeze use should be carefully scrutinized.)
g) Placement of inconspicuous signs, without Residents' names, to inform caregivers of interdisciplinary care team recommendations.
h) If utilizing a transfer pole, ensure that it is situated at a distance from the bed that is greater than or less than that which would result in entrapment. That is, there must be no entrapment risks in Zone 3 and 6 when a transfer pole is installed.
Zone 3: Transfer Pole *must be* less than 120 mm from the edge of the bed.
Zone 6: Transfer Pole *must be* either less than 60 mm or more 318 mm from the head of the bed.
Note: To ensure that these distances are maintained, the position of the bed must be marked with red "tuk" tape.

Additional products and devices that may be helpful when bed rails are not used can provide some of the benefits of bed rails without introducing the disadvantages, but **must be assessed. For example, assist bar and transfer pole.**

NOTE:

Although **pressure reduction therapeutic** products are excluded from FDA's dimensional Guidance except for Zone 1, air and water mattresses may pose unique issues if the mattress edges collapse under the weight of a person, pushing the individual into the rail and **potentially increasing risk of entrapment** in or around the rail or suffocation if the face is pushed against a mattress without air flow (Miles, 2002). When a mattress overlay is used, steps must be taken to assess the therapeutic benefit to the Resident when applying a mattress overlay to a bed system that does not meet the recommended guidelines. When using overlays, evaluate which of the available bed frames is most compatible with the mattress, and confer with the manufacturer to obtain their recommendations. When using pressure reduction products, the clinical benefit should outweigh the risk of entrapment presented by use of such systems.

Appendix B: Bed Rail Logo

Appendix C: Bed System Safety Measurement Test Form

Bed System Safety Measurement Test Form

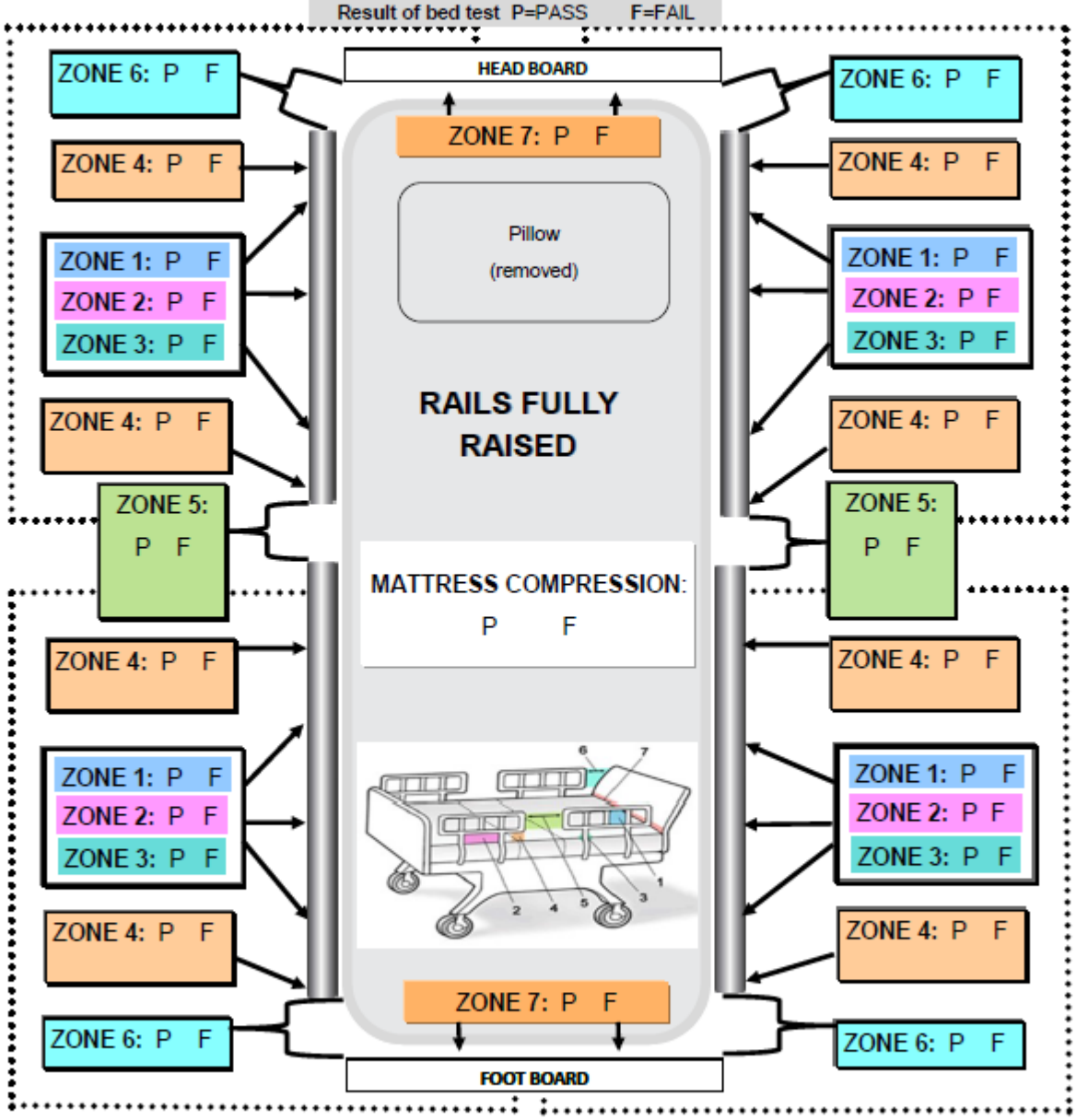
ROOM NUMBER:_____ DATE TESTED_____ TESTED BY:_____

BED FRAME MAKE/MODEL:_____ FRAME SERIAL #:_____

MATTRESS MAKE/MODEL:_____ MATTRESS SERIAL #:_____

RAIL MAKE/MODEL:_____ RAIL SERIAL #:_____

Result of bed test P=PASS F=FAIL



Ensure to follow Routine Practices when testing beds. Remove sheets and pillow from bed before testing. Ensure head/foot board are oriented correctly. Leave sections blank that do not apply (e.g., use only the upper sections if the bed only has 2 upper rails).

Winnipeg Regional Health Authority *Caring for Health* | Office régional de la santé de Winnipeg *À l'écoute de notre santé*

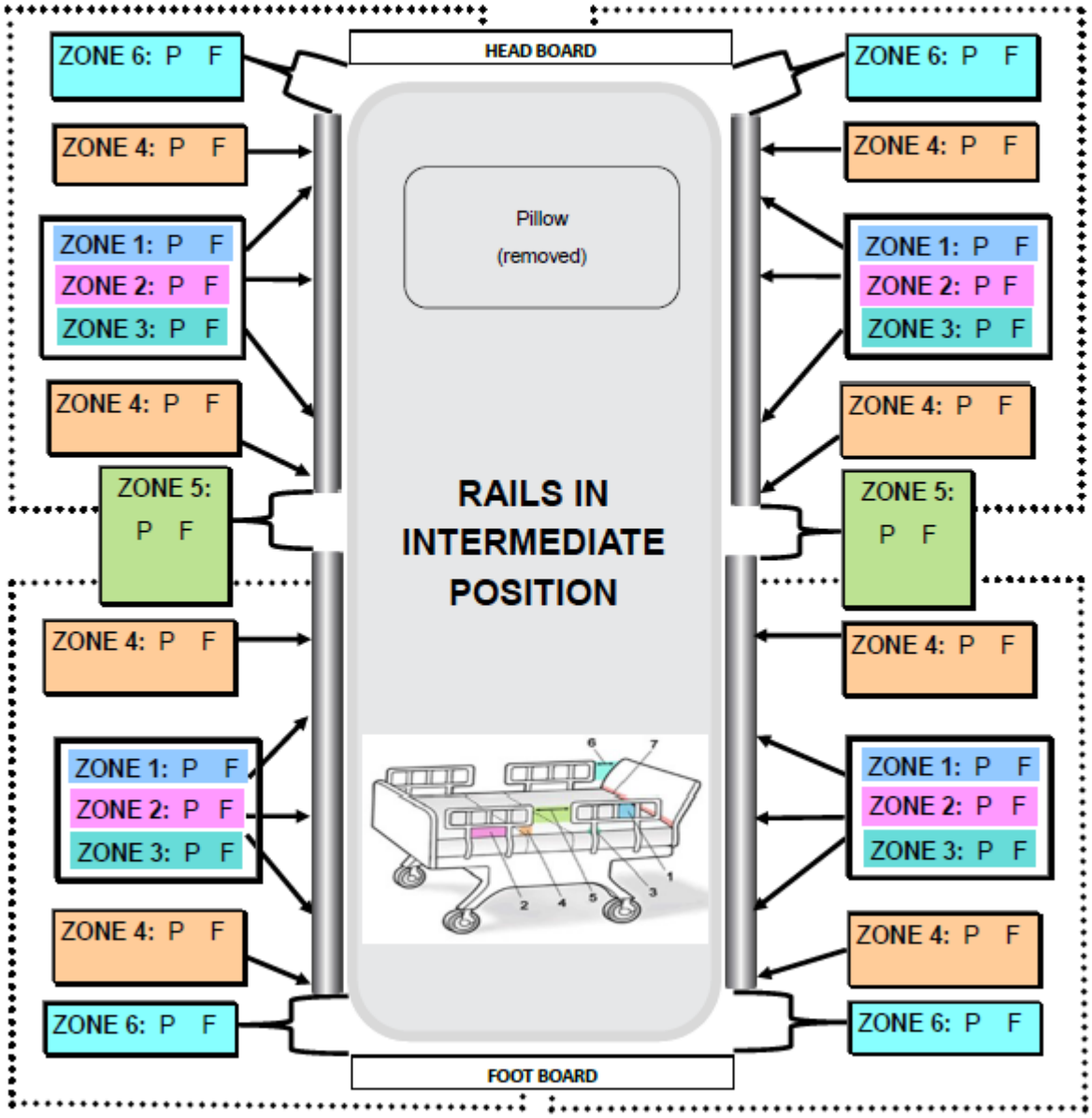
January 2018

Adapted from Hospital Bed Safety Workgroup and National Safety Technologies™

CONTINUED ON REVERSE

Bed System Safety Measurement Test Form

Repeat testing on Zones 1—6 **with rails in intermediate position** and record results below:



January 2018

Winnipeg Regional Health Authority
Caring for Health
Office régional de la santé de Winnipeg
À l'écoute de notre santé

Adapted from Hospital Bed Safety Workgroup and National Safety Technologies™

Bed System Safety Measurement Test Form

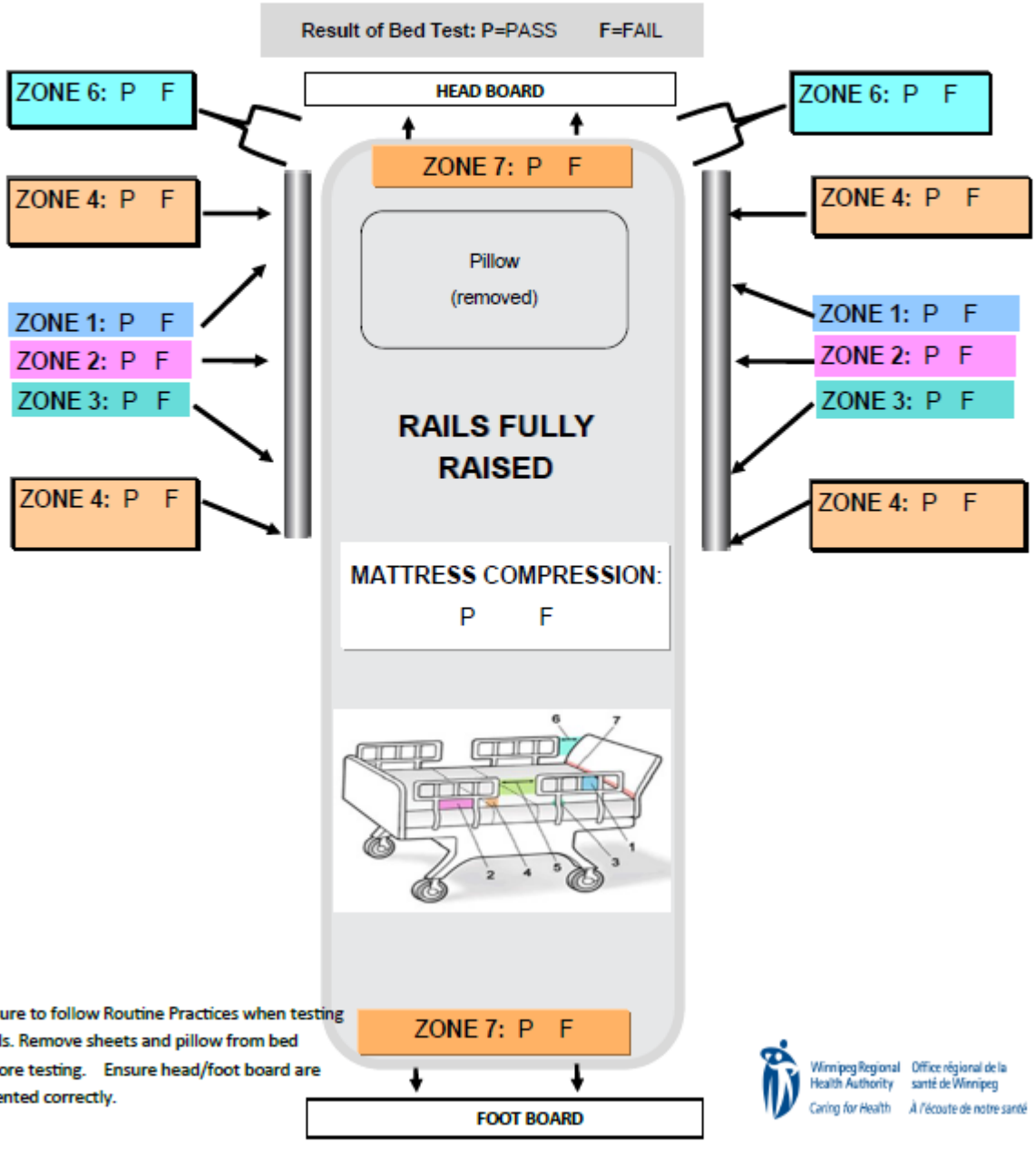
ROOM #:_____ DATE TESTED:_____ TESTED BY:_____

BED FRAME MAKE/MODEL:_____ FRAME SERIAL #:_____

MATTRESS MAKE/MODEL:_____MATTRESS SERIAL #:_____

RAIL MAKE/MODEL:_____RAIL SERIAL #:_____

Use this test form for beds with side rails at the headboard end only



Ensure to follow Routine Practices when testing beds. Remove sheets and pillow from bed before testing. Ensure head/foot board are oriented correctly.

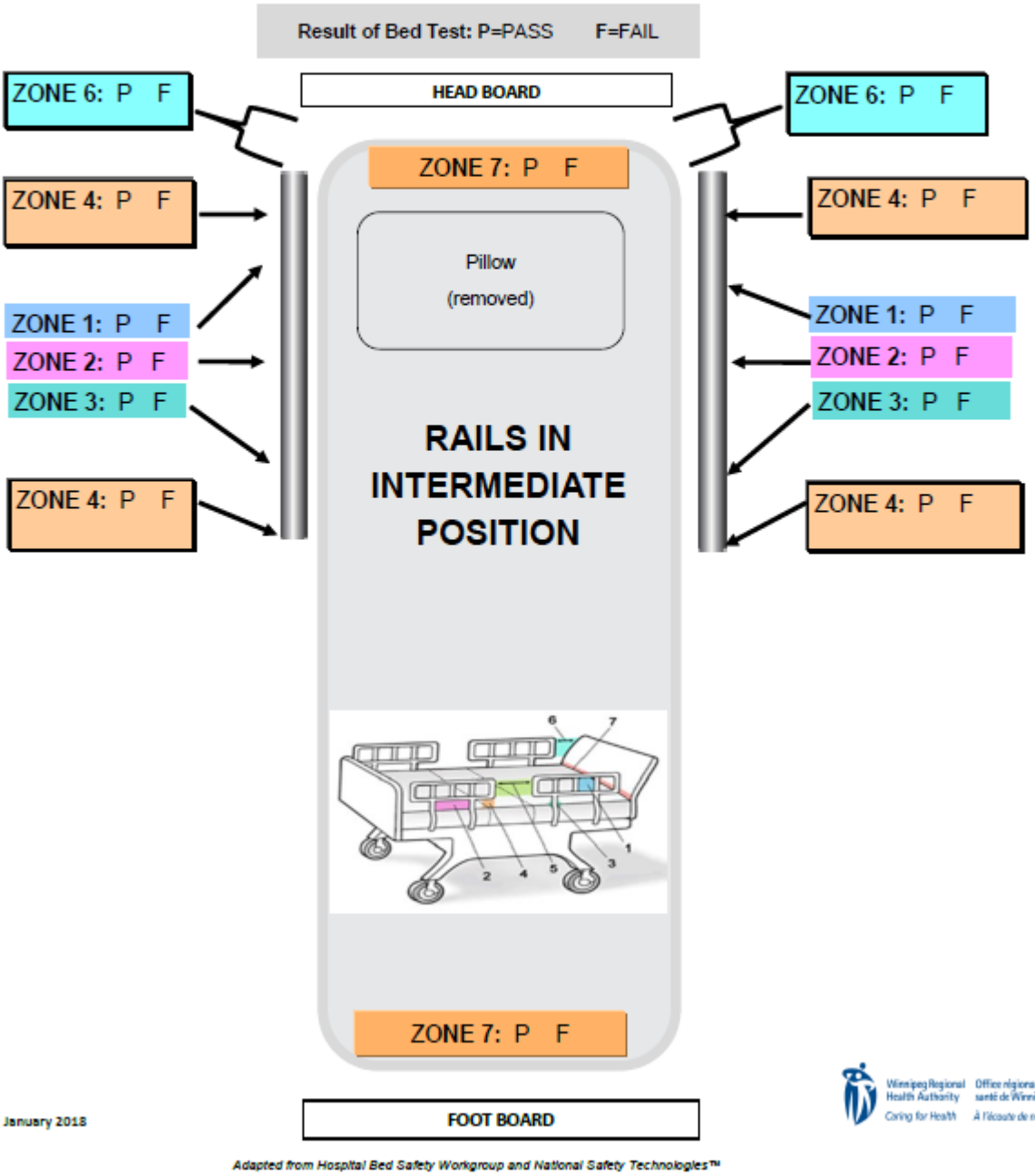
Winnipeg Regional Health Authority / Office régional de la santé de Winnipeg
Caring for Health / À l'écoute de notre santé

January 2018

Adapted from Hospital Bed Safety Workgroup and National Safety Technologies™

Bed System Safety Measurement Test Form

Repeat testing for beds with side rails at headboard end only and if the side rails can be adjusted to an intermediate position. Test zones 1-4, and zone 6



January 2018

Adapted from Hospital Bed Safety Workgroup and National Safety Technologies™