

Safe Patient Handling and Mobility Equipment Purchasing Checklist

4th Revision 2018

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Introduction

There are many variables to consider when selecting, purchasing, implementing and evaluating safe patient handling and mobility (SPHM) equipment and accessories such as, slings to ensure that the goals of a safe patient handling program are met. The checklist was created as a guide for health care organizations and caregivers involved in the selection and purchase of SPHM equipment and accessories. It is intended to be used as part of a comprehensive a SPHM program plan.

The checklist can be adapted as needed for community-based settings and to meet specific regulations required for installation of ceiling lift systems in non-US locations.

The checklist incorporates information from ergonomics and medical equipment design standards and guidelines and from reference materials published in peer reviewed journals, together with the author's experience in developing safe patient handling programs and purchasing and installation of SPHM equipment in a wide variety of health care facilities.

Purchase of equipment should occur *after* you have identified the hazards to be addressed that are related to patient handling e.g. the type of lift, transfer, movement or patient care task, the needs of the patient population (physical and cognitive abilities and clinical needs), the physical environment where equipment is to be used, and the work systems the equipment is used within.

This check list is **not** all inclusive. Other stakeholders who are impacted by the SPHM program such as, equipment vendors, purchasing staff, facilities engineering, maintenance, and biomed staff, infection control, wound care, environmental services and staff who will use the equipment and members of your multidisciplinary safe patient handling team will also provide valuable information. A collaborative approach helps to ensure that the equipment choice made is one that fits your patient, staff, facility's design, and organizations' needs.

When choosing any medical device including patient handling equipment keep in mind basic ergonomics design principles that is, to ensure the device accommodates a majority of the *user* population's physical, perceptual, and cognitive (mental) capabilities, so that the equipment is

used safely and efficiently, is comfortable for patients, and the risk of operator error is minimized. ^{1,2}

In health care the equipment user population may include staff who perform direct patient care, support care staff (e.g., radiology), transportation, environmental services and maintenance, and patients or residents and their families, especially in the home care setting. ³

It is also important that your SPHM program and the equipment you purchase will 'fit' future needs of the organization, e.g. a changing patient population, changing surgical procedures or medical treatment protocols, facility design changes (new building, renovations or movement of units/depts.) etc., so that the maximum return on investment of the equipment purchase is achieved. ⁴

Remember to 'Try Before You Buy'. Conduct structured trials of equipment with the users before purchase to determine the best fit for patients, staff, and the physical work environment, etc. Consider the following when evaluating SPHM equipment (or any other medical device). ³⁻⁵

- Effectiveness of device/system – does it fulfill the work-related needs and functions of the clinician using it (or needs of the user) and clinical goals?
- Efficiency of use.
- Acceptance by intended users of the system.
- Comfort associated with the operator's use of the system.
- Potential safety or ergonomics related hazards or risk of error during use and anticipation of misuse of the device. Ensure new hazards are not created.
- Needs related to support processes/systems., e.g. training, maintenance, infection control, etc.
- Integration with other devices and overall clinical systems and with the physical layout within other department's if the equipment is transported and used in multiple care and diagnostic areas. Consider the impact of the equipment within the work system 'upstream' and 'downstream' from the point of use.

Contents (Hyperlinked)

A.	Basic Ergonomics Design Principles for SPHM Equipment:	1
1.	Designing for the User - Physical Capabilities	1
2.	Designing for the User – Perceptual, Cognitive/ Mental Capabilities	1
3.	Some Other Considerations Related to Usability of the Equipment and Operator Training Needs	2
B.	Design Considerations Applicable to Powered Lift Equipment (Ceiling, Floor, Sit to Stand/Stand Assist Lifts)	2
1.	General	2
2.	Hanger or Spreader Bar	3
3.	Handset or Controller	4
4.	Battery	4
5.	Other	5
C.	Design Considerations Applicable to Powered Floor & Sit to Stand/Stand Assist Lifts	5
	Portable Floor Based Lift Systems	5
D.	Design Considerations Applicable to Ceiling Lift System Components	6
1a.	Facility Structure and Space Considerations & Track Configuration	6
1b.	Gantry Frames	7
2.	Ceiling lift motor	7
3.	Portable ceiling lift motors (moved from room to room as needed)	7
4.	Battery <i>Also refer to Section B4</i>	8
5.	Hanger/Spreader Bar <i>Refer to B2</i>	8
6.	Handset or Controller <i>Refer to B2</i>	8
7.	Installation Preparation	8
8.	Room Preparation – Pre-& Post Installation	8
9.	Other Safety Considerations	9
10.	Load Testing	9
11.	Other - Post Installation	10
E.	Equipment Design Considerations: Slings	10
1.	Sling and Hanger Bar Compatibility	10
2.	General	11
3.	Labels	11
4.	Safety	11
5.	Laundry/Cleaning	12
6.	Other	12
F.	Equipment Management	13
1.	Storage Equipment and Supplies (Hanger Bars and Slings)	13
2.	Infection Control Considerations	13
3.	Maintenance Considerations	13
G.	Vendor Service	14
1.	Overall Also Refer to Ceiling Lift Installation	14
2.	Local Consultant/ Representative Information	14
3.	Manufacturer Information	14
4.	Specific to Equipment Purchase	14
5.	After Service	15
6.	Training	15
H.	Regulatory Requirements	16
	Federal, State, Local	16
I.	Patient & Facility Considerations When Choosing SPHM Equipment and Slings	16
1.	General	17
2.	Patient Characteristics that Should be Considered	17
	References & Related Resources	18

Note – some questions are applicable to powered equipment only

Usability Factors	Considerations	Yes	No	Notes
A. Basic Ergonomics Design Principles for SPHM Equipment:				
<p>1. Designing for the User - Physical Capabilities Goal: Design within physical capabilities for at least a majority of users (90%)⁶⁻⁸</p>	<p>a. Provide Adjustability.</p> <p>b. Allow for neutral working postures (ability to use proper body mechanics) when operating or using equipment e.g., working with arms in front of body between knuckle and waist height.</p> <p>c. Ensure easy reach distance to access controls for hands and feet.</p> <p>d. Avoid static postures especially when combined with force.</p> <p>e. Ensure acceptable force to activate hand/finger/foot controls. *</p> <p>f. Ensure minimal grip force to hold hand controls or lever mechanisms e.g., raising the head of a stretcher when loaded, lowering side rails on beds and gurneys.*</p> <p>g. Ensure acceptable force to maneuver, push or pull equipment such as floor lifts, stretchers and beds. Consider floor covering; entryways; slopes uneven floors and wheel type.**</p> <p>h. Ensure minimal repetitive motion is required to operate equipment especially if combine with forceful motions e.g., using a hand crank or foot pump mechanism when operating equipment.</p> <p>i. Ensure that there is no contact stress on soft tissue when using equipment e.g. from sharp edges, and ensure potential pinch points are guarded on all moving parts (for employees or patients).</p> <p>j. Prevent or minimize transmission of vibration from equipment to operator, e.g. from powered tools or motors.</p>			
<p>2. Designing for the User – Perceptual, Cognitive/ Mental Capabilities^{2,9} Goal: Equipment is intuitive to use & user friendly thus reducing training time and risk of operator error.</p>	<p>a. When activating equipment controls ensure that feedback to indicate if action is correct or incorrect is immediate, visible, and meaningful (e.g., light comes on, or equipment does not operate).</p> <p>b. Equipment operation errors can be easily reversed.</p> <p>c. Procedures (menus and navigation) if present are logical and intuitive e.g. use of electronic scales on a lift device.</p> <p>d. Equipment controls, and displays are consistent – consider standardization between groups of equipment <i>and</i> between units or departments if appropriate.</p> <p>e. Device Control and Display functions are clearly communicated: i. Control type is appropriate for function/use* ii. Labels are legible, consistent and adjacent to corresponding control iii. Comprehensible icons or pictograms iv. Activation of controls and information on displays meet population stereotypes v. Redundant coding systems are used (e.g., shape, size, color)</p>			

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Usability Factors	Considerations	Yes	No	Notes
	vi. Consider impact of lighting, glare and viewing distance (bifocal use considered) if displays must be read e.g. operating a lift in low light conditions.			
	f. Controls are designed to prevent accidental activation – e.g. not too close together or too easily activated.			
3. Some Other Considerations Related to Usability of the Equipment and Operator Training Needs 3,4,11	a. Consider the impact of standardizing or not standardizing the type, design, and functionality of equipment and slings chosen within a facility e.g., using more than one brand of ceiling lift motor and/or slings from a variety of manufacturers may increase the risk of operator or user error and increase the time to conduct and cost of staff training. b. When considering training costs, time, and competency needed to ensure safe and error free use of the equipment etc., consider: i. What level of competency is required to operate the equipment? ii. What specialist training /knowledge/competency is required to ensure the completion of the SPHM task or process safely? iii. What level of peer communication is required for the safe completion of the SPHM task? iv. What learning tools may be needed e.g. patient assessment protocols, checklists, algorithms, information related to the patients’ needs that is posted in the patient room, etc.?			
<p>* For information about grip force requirements refer to <i>Kodak’s Ergonomic Design for People at Work</i>. 2nd edition (2003). John Wiley & Sons, Inc. http://www.wiley.com or the MIL-STD 1472G Department of Defense Design Criteria Standard Human Engineering. (2012) http://www.everyspec.com/MIL-STD/MIL-STD-1400-1499/MIL-STD-1472G_39997/ and ISO 10535: 2006</p> <p>** For information about the maximum push force (initial and sustained) that a majority of the user population may safely exert refer to <i>The Liberty Mutual Manual Materials Guidelines 2005</i>. http://libertymhtables.libertymutual.com/CM_LMTablesWeb/taskSelection.do?action=initTaskSelection</p>				

B. Design Considerations Applicable to Powered Lift Equipment (Ceiling, Floor, Sit to Stand/Stand Assist Lifts)^{11,12}				
1. General Refer to Sections C and D for additional consideration specific to Floor, Sit to Stand/Stand Assist and Ceiling, Lifts	Yes	No	Notes	
a. What is the weight capacity of a motor?				
b. Is weight capacity marked on the motor?				
c. What is the lifting range i.e. the range of travel from hanger bar connection point in its highest and lowest position?				
d. Is there an emergency stop control (must be red)? i. Is it easily clearly visible during operation accessible and easy (physically, intuitively) to use? ii. Can the emergency stop be easily reset (e.g., consider reach distance to reset emergency pull cord mechanisms that are activated accidentally when environmental services personnel cleaning the lift motor)?				

e. Will the device discontinue operation if load or weight capacity is exceeded?			
f. Is there a manual override control if the battery loses power e.g., alternate mechanism to lower the patient safely? i. Is it easily clearly visible during operation, accessible and easy (physically, intuitively) to use? ii. Is there protection against free falling?			
g. Is the speed of operation satisfactory for staff and patients? Note - the rate (velocity) of lifting and lowering the hanger bar where connected to the motor strap shall not exceed 0,15 m/s when loaded or 0,25 m/s when unloaded. <i>ISO 10535:2006</i>			
h. Is the motor designed in a way to ensure that, when lowering, should the hanger bar come into contact with the lifted person, the total load imposed on the lifted person shall not be greater than the total mass of those parts and shall not increase by more than 50 N due to the lifting machinery of the hoist, nor allow the hoist to become unsafe when operated? <i>ISO 10535:2006</i>			
i. What is the noise level when in operation?			
j. Is there automatic shut-off if hoist strap (if present) is twisted?			
k. Is the soft start/stop (smooth acceleration/deceleration)?			
l. Can the lift motor and all components to be used in wet and humid environments (bathrooms, showers, bathing areas or pools, outside of buildings) if applicable?			
m. Is a scale incorporated or can portable scale unit be attached to the lift?			
n. Are there any application limitations?			
o. Does the motor/lift system have features that are not available on other products? If so, what are they?			
p. Does the motor/ lift system have other 'smart' technology features such as: i. Digital displays with built-in diagnostics and service reminders for maintenance? ii. Lift counter to track use? iii. Battery status indicator to indicate level of charge?			
q. What is the life expectancy of equipment and parts? <i>Applicable to all equipment and slings and equipment accessories</i>			
2. Hanger or Spreader Bar	Yes	No	Notes
a. What type of hanger bar does the lift have e.g., 2, 3 or 4 sling connection points; configuration shape is X or H 4 point or 3-point pivot configuration; configuration is specialized e.g., 8-point frame?			
b. Does the configuration (shape, size and number of connection points) meet your patient handling task needs e.g., for bariatric, pediatric patients etc.? Are several configurations offered?			
c. Does the design of the mechanism for attaching a <i>sling</i> to the hanger bar prevent accidental unhooking or release?			
d. Are edges, corners, surfaces on the hanger bar that will be in contact with the sling attachment point smooth –i.e., there are no sharp edges or burrs that could damage the sling connection point and/or protruding or pinch points that may cause injury to caregiver or patient?			
e. Are the hanger bar connection points large enough to allow the sling (e.g. a loop) attachment to be seated in the connection point without risk of shearing, crushing, trapping e.g. multiple			

loops on a sling can be easily seated in the hanger bar connection point with locking device closed correctly?			
f. Does the design of the mechanism for attaching a hanger bar to the lift strap (if present) prevent accidental unhooking or release?			
g. If the hanger bar detaches from a lift: <ul style="list-style-type: none"> i. Is it easy to remove and reattach (consider grip force and manual dexterity required)? ii. Can it be easily handled and stored (consider weight of the bar and size for storage as relevant)? iii. Does it meet load testing requirements as required by ISO 10535? iv. Is the maximum load capacity of the ceiling lift indicated on the hanger bar? 			
h. Does the hanger bar allow enough clearance for taller/wider patients when being moved in sling?			
i. The manufacturer clearly states in the instructions for use and/or on the hanger bar, information about the type(s) and design(s) of slings, e.g. number of connection points, dimensions and material of connection means, which can be used in combination with the hanger bar? Refer to Section E for more information on Slings and Hanger Bar compatibility and safety.			
3. Handset or Controller	Yes	No	Notes
a. Are function keys easily understood on control device (intuitive)?			
b. Is it easy to tell if the control is upside down or right-side up?			
c. Are forces to operate controls acceptable? Per ISO 10535:2006 <ul style="list-style-type: none"> • operation by using a finger: 5 N • operation by using a hand/arm: 105 N <ul style="list-style-type: none"> • operation by using a foot: 300 N • operation by a turning: 1,9 N.m <p>NOTE For hoists operated by disabled persons or other non-professionals, Annex C in EN 12182:1999 can be used as a guideline</p> <p>Forces required to operate control functions on pneumatic hand controllers (ceiling lifts) can be higher than electrically powered controls. Consider the user population e.g., those with arthritis or with reduced grip capacity and ease of use.</p>			
d. Is there an easy access area on equipment to place hand control when attaching a sling to the device and when assisting or maneuvering the patient?			
e. Is it resistance to water damage and droppage?			
f. If the control is a wireless device – will it interfere with other equipment? <i>Refer to FDA requirements for wireless medical devices</i>			
4. Battery	Yes	No	Notes
a. What is the type of battery that is used e.g. Lithium Ion?			
b. Is there a battery status indicator?			
c. How long will the battery operate before needing to be recharged e.g. how many patients lifting tasks can be completed?			
d. What is the battery recharge time?			
e. What is the expected life of a battery?			
f. Can a 'dead' battery be replaced with a fully charged battery or does the equipment need to be plugged in to charge?			

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g. Will extra batteries be needed e.g., one is charging in a charging station and one is loaded in the lift ready for use?			
h. Is there an automatic shutdown of power on the equipment when not in use to save energy and battery life?			
i. What is the battery replacement cost?			
j. Does the manufacturer offer a recycling program for used batteries?			
k. What is the weight of the battery (floor-based lift systems)?			
5. Other	Yes	No	Notes
a. What are the primary SPHM tasks that can be performed when using the lift equipment/slings and does this meet identified needs?			
<i>Primary SPHM tasks:</i> a. Bed to chair seated transfers b. Horizontal/supine lifting c. Turning in bed d. Re-positioning up and down in bed e. Sit-stand transfers f. Bathing g. Toileting h. Limb holding i. Assisted walking/ambulation j. Bathroom access k. Fall recovery from the floor			
b. Are there special features of the equipment or product not offered by comparable products e.g. equipment has multiple SPHM functions such as a sit to stand device that also converts to a walking aid or a low based floor lift that offers an ambulating and weighing function?			
c. Consider environmental impact and energy-efficiency			
C. Design Considerations Applicable to Powered Floor & Sit to Stand/Stand Assist Lifts^{3,4,13,14}			
Portable Floor Based Lift Systems	Yes	No	Notes
a. Is the lift or height adjustment mechanism powered?			
b. Can the device be easily maneuvered in area of use to ensure safe and efficient operation e.g. caregiver and/or patient posture is not constrained? Consider: <ul style="list-style-type: none"> ▪ Required diameter of turning circle ▪ Clearance through doorways/in the bathroom/elevators/in other depts. ▪ Clearance of leg support <i>under</i> beds (especially motors) and chairs ▪ Height of leg supports/size of casters ▪ Adjustability of base to allow the legs to fit <i>around</i> chairs, bed motors, commodes, etc. ▪ Sufficient vertical height to perform lifting task on beds, exam and imaging tables. 			
c. Are base legs power adjust or require manual adjust?			
d. Is high force required to start pushing the device?			
e. Is high force required to sustain movement of the device? Consider: <ul style="list-style-type: none"> ▪ Distance to be pushed ▪ Force to control equipment when turning corners ▪ Force required to push equipment on carpet, over thresholds, on uneven or sloping and/or slippery floors and gratings ▪ Steering mechanism peak and sustained push force turning etc 			

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f.	Does the diameter of the caster assist to minimize force required to push the equipment (in general, larger casters require less force to push/pull and maneuver)?			
g.	Is caster material and size suitable for floor type?			
h.	Can brakes be easily activated and released with foot?			
i.	Is powered steering or steering assist provided? If so, is the function easy to use e.g., speed and direction of travel can be easily controlled by the user etc.?			
j.	Handle design – can operator maneuver equipment using vertical handles and neutral body postures?			
k.	Can the device be used to lift/transfer a patient from car?			
l.	Stability – Can the device be easily pulled over – tipped with and without load?			
m.	<p>Additional considerations for Sit to Stand/Stand Assist Devices:</p> <ul style="list-style-type: none"> ▪ Do leg or shin pads have adequate range of adjustment to accommodate to be positioned below the knees of patients with of various stature? ▪ Can the depth of the foot plate be adjusted? ▪ Is a leg strap available if needed? ▪ If the foot plate is removable? If so is it easy to remove (consider access to remove and weight of plate)? ▪ Is the width of the footplate and space between device frame enough to allow a patient to stand comfortably (e.g., consider use with Bariatric patients)? ▪ Does arm rest or handles allow the patient to use neutral hand and arm postures? 			
<p>D. Design Considerations Applicable to Ceiling Lift System Components ^{4,11,12,15-17}</p>				
<p>1a. Facility Structure and Space Considerations & Track Configuration</p> <p><i>Also refer to the Patient Handling and Movement Assessments: A White Paper (PHAMA). The Facilities Guideline Institute (2010).</i></p>		Yes	No	Notes
a.	Are ceiling lifts to be installed in new construction or existing facility (retrofit)? (<i>This may impact the mounting systems and track configuration that can be used</i>)			
b.	<p>Can they be installed in the ceiling or installed as wall mount systems?</p> <ul style="list-style-type: none"> ▪ There are many types of mounting systems and considerations related to structures in and above a ceiling or behind walls such as, HVAC and electrical systems, and multilevel ceilings, soffits, or radius walls? Is asbestos and/or lead an issue to be abated? ▪ Work with the ceiling lift manufacturer and Facility Engineering to determine feasibility for and the type of installation. Perform pre-installation walkthrough to confirm full understanding and consensus of design drawing(s) and installation conditions. ▪ During a walkthrough access the space above the ceiling lid to view mechanical, HVAC, and fire systems components, within the lift installation area is typically required plus access to structural blueprint drawings etc. 			
c.	<p>Is there enough vertical clearance (from beds, gurneys or other surfaces to ceiling height) to allow minimum lifting range required for use of lifting equipment?</p> <p>Consider the:</p> <ul style="list-style-type: none"> ▪ Combined vertical measurement of the installed track lift motor, and hanger bar when fully retracted in the motor, and bed, stretcher and chair heights at lowest height from floor. ▪ Consider clearance needed for privacy curtains, medical gases delivery systems, exam lighting, and sprinkler heads, etc. ▪ Check clearance if detachable weigh scale is to be used with a lift. ▪ Vertical clearance needed will be greater for lifting of bariatric patients. 			

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d. Is there enough clearance to operate the motor in relation to wall mounted fixtures i.e., horizontal clearance such as, headwalls, booms, wall mount televisions? Consider access to patient in full bed traction; Posey beds etc.?			
e. What is the maximum safe working load of the tracking system? <ul style="list-style-type: none"> ▪ Consider installation of 1000lb track to accommodate bariatric patients in future 			
f. What configuration is available and best for patient handling tasks to be performed: <ul style="list-style-type: none"> i. Full room coverage vs. straight track? ii. Curved, turntable, access into bathroom, other? iii. Single; 2 motors mounted on traverse rail, or dual motor on rotating turntable? 			
g. How track will be configured to cover larger spaces e.g., 2-bed patient rooms; into adjacent bathroom? <ul style="list-style-type: none"> i. Is it feasible (consider cost, fire code requirements, etc.) to track through door walls or other load bearing walls? ii. Will connection points between a long span of track and/or turntables/switch track work easily and reliably? 			
h. Can ceiling lift tracks be moved or reconfigured after they are installed to accommodate changing needs?			
i. Does the hanger bar pose a safety hazard to staff and/patients when not in use e.g., staff could hit their head on the bar etc.? If yes, review use of a wall hook system to store hanger bar is a safer position when attached to the motor.			
j. Can the lift motor and hanger bar be quickly and easily removed from a patient room (e.g., by facilities maintenance) if it poses a safety issue to the patient e.g. patients in medical units who are violent or could harm self?			
1b. Gantry Frames	Yes	No	Notes
Refer to c, d, e, f, h, i, j above. For single track mobile gantry frames: <ul style="list-style-type: none"> i. How easily does the gantry collapse (lower and decrease in width) to allow portability within a room or transfer to another room? ii. Are brakes easy to apply and release? 			
2. Ceiling lift motor	Yes	No	Notes
a. Are 2 motors required to lift patients who weigh over 500-600lbs and/or a 1000lbs capacity motor?			
b. Does the system have low friction wheels or trolley (minimal effort required to move lift along track)?			
c. Are there any application limitations?			
d. Does the motor/lift system have features that are not available on other products? If so, what are they?			
3. Portable ceiling lift motors (moved from room to room as needed)	Yes	No	Notes
a. Refer to Batteries below for questions about charging			
b. What is the weight and size of the motor unit?			
c. Can the motor be easily detached and attached to the overhead rail system without staff standing on step stools or chairs etc.?			

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d. Is a cart offered to store and transport the motor from room to room?			
4. Battery <i>Also refer to Section B4</i>	Yes	No	Notes
<p>a. How is lift motor recharged?</p> <p>i. Continuous Charge (Lift charges anywhere on the rail and does not have to be returned to a charging station)</p> <p>ii. Automatic Return to Charge (Lift returns automatically to charging station when caregiver pushes a button)</p> <p>iii. Charging station or specific area on rail for charging (caregiver is required to return lift to charging station to charge)</p> <ul style="list-style-type: none"> • Can the handset be easily ‘knocked’ off the charging station or is there a feature e.g. magnetic ‘lock’ to prevent accidental removal thus preventing the battery from being charged? • Ensure location of charging station is easily accessible to staff (e.g. not hindered by wall mount computer stations) and located at a height that allows 90% of the staff population to use neutral body postures to access the handset and charging station, i.e. not lower than 39” or over 55” from the floor ^{6,7} <p>Charging options will dependent electrical requirements - consider whether you need power outlets closer to the ceiling, above the ceiling, or hard-wired into standard or emergency power.</p>			
5. Hanger/ Spreader Bar <i>Refer to B2</i>	Yes	No	Notes
6. Handset or Controller <i>Refer to B2</i>	Yes	No	Notes
Ceiling Lift System Installation			
7. Installation Preparation	Yes	No	Notes
a. Who will conduct a structural engineering inspection and provide stamped structural drawings and calculations for the new lift installation specific to the facility?			
b. What building, electrical, fire and seismic codes must be met? <i>Also refer to Regulatory Requirements H</i>			
c. Who will install the tracking system – employees of the vendor or other contractors?			
d. How are the installers trained and certified by the lift system manufacturer? Have vendor provide applicable documentation?			
e. Are the installers licensed and bonded to work in your state? Have vendor provide prove of insurance etc.?			
f. Ask the vendor is ceiling lift installation meets any international safety design standards e.g., at a minimum the ISO 10535 standard ‘Hoists for the transfer of disabled persons-requirements and test methods’?			
8. Room Preparation – Pre-& Post Installation	Yes	No	Notes
<p>Consider:</p> <ul style="list-style-type: none"> ▪ Communication about installation activity etc., to staff, patients, families <p><i>Pre-Install -</i></p> <ul style="list-style-type: none"> ▪ Relocation of patient to appropriate site ▪ Removal of beds, equipment, privacy curtains 			

<ul style="list-style-type: none"> ▪ Secure area from staff and patients and meet infection control containment requirements ▪ Consider areas where all staff/ patients cannot be removed (e.g., ICU, emergency) ▪ Design work procedures/work plan to accommodate <p><i>Post Install -</i></p> <ul style="list-style-type: none"> ▪ Cleaning of room ▪ Undo lockout ▪ Replace beds and equipment ▪ Replace privacy curtains etc. ▪ Site safety inspection(s) prior to use of room and to ensure compliance of the installation per the design drawing(s) and manufacturer's instructions ▪ Perform operational test to verify lift functionality (all functions are verified) including battery charging function; warning/status indicator lights work; full extension and recoils of strap ▪ Inspection of lift strap and all components for damages or missing connector pieces ▪ Documentation of installation completion and approval for use ▪ Also refer to Environment of Care and Life Safety codes (Joint Commission /CMS) accreditation standards or related standards required by other regulatory entities 			
9. Other Safety Considerations	Yes	No	Notes
a. If concrete drilling is required, ensure location of electrical, gas, and water lines are known?			
b. Is there is the risk of asbestos disturbance?			
c. Are there confined space requirements (per OSHA standards)?			
d. What lockout considerations are required to work on room consider electrical, gas, etc.?			
e. Is there a staging area for ceiling tracking materials and equipment?			
10. Load Testing	Yes	No	Notes
a. What is the vendor load testing policy or recommendations post installation prior to use?			
b. Will all room covering overhead track systems, joints and attachments used for lifting be tested?			
c. What is the test load e.g. maximum weight plus x%? Testing should be conducted for static and dynamic loads.			
d. Will load test be administered by installers in the presence of administration and facilities personnel and other authorities as necessary?			
e. What is the recommended routine load testing schedule?			
f. Can in-house maintenance staff perform this testing?			
g. Will the vendor provide training re this procedure?			
h. Per ISO 10535:2006 <ul style="list-style-type: none"> • Maximum deflection of any horizontal track used in the construction of a hoist system shall not be more than 1 mm in every 200 mm of track length. 			

<ul style="list-style-type: none"> When a track, installed in accordance with the manufacturer’s instructions is loaded with the maximum load, the deflection between each set of fixings of the track shall be recorded in the test report. 			
11. Other - Post Installation	Yes	No	Notes
a. Are rail end stops or docking gates present and properly installed e.g., secured well?			
b. Are stops present as needed to prevent motor traverse rails contacting wall mounted equipment etc.?			
c. Are all fasteners and set screws are properly tightened on the trollies and rails/tracks?			
d. Is rail/track free of gaps (unless required by design)?			
e. If included in installation, verify rail turntable function, exchanger function, gate alignment, and safety block installation.			
f. Is track clean and clear of all debris? (Use manufacturer’s recommended cleaning materials to avoid damage to the motor case and other components.)			
g. Who will certify the installation e.g. a structural engineer?			
h. Confirm that the manufacturer's operating and maintenance manuals for this lift have been received and distributed to appropriate departments etc.			
E. Equipment Design Considerations: Slings^{11, 18-20}			
1. Sling and Hanger Bar Compatibility	Yes	No	Notes
Per the AASPHM “Healthcare Recipient Sling and Hanger Bar Compatibility Guidelines”, April 2016. Refer to the guidelines for more information about sling selection and use.			
<p>a. Are slings compatible for use with the ceiling, floor, and/or sit to stand lift equipment to purchased/used?</p> <p>In the sling/lift manufacturer’s instructions for use, information shall be given about the type(s) and design(s) of slings (e.g., number of connection points, dimensions, and the type of material that is used to connect a sling to a hanger bar) which can be used in combination with the hanger bar. Each healthcare organization has the final responsibility to ensure any slings purchased from a lift manufacturer, and/or from a third-party sling manufacturer are compatible with the hanger bar(s) in their system(s) or facility. (AASPHM, 2016)</p> <p>Clip and loop slings should never be used interchangeably. A sling with a clip attachment should <u>only</u> be used on a hanger bar that is designed for a clip attachment. A sling with a loop attachment should <u>only</u> be used on a hanger bar designed for a loop system.</p> <p>When possible, standardization of lifts, hanger bars and slings is recommended within a setting to reduce the risk of healthcare worker error and simplify training. A setting using lifts with hanger bars accommodating loop slings should avoid, when possible, the use of lifts with hanger bars accommodating clip slings.</p>			
b. Does the design of the sling when attached to a hanger bar change the center of gravity or affect the lift’s stability?			
c. Does the design of the sling and hanger bar combination allow the patient to be positioned safely and comfortably as needed to meet the patient’s physical and clinical needs?			
d. Can the operator of the lift able to attach a sling to a hanger bar using minimal hand and finger force?			
e. Do slings to meet the specialized needs of specific healthcare recipients such as a pediatric, orthopedic, or bariatric population?			

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2. General	Yes	No	Notes
a. What type of sling is available and required? e.g., Seated; toileting/hygiene; supine/flat or repositioning; limb; ambulation; amputee sling. Single patient use, reusable slings or slings that can be wiped clean. Consider cost, usage and available laundry system or process etc.			
b. What size of slings should be available (consider head neck support, removal of seated slings)?			
c. How many of each type of sling is needed? Consider delivery and return time to/from laundry and facility and restock delivery time to units for reusable slings.			
3. Labels	Yes	No	Notes
a. Is the sling sizing/weight capacity clearly and easily identified e.g. color-coding and text is used to indicate size?			
b. Is the safe or maximum working load is clearly marked on a sling?			
c. Is a symbol for cleaning and/or written cleaning instructions included on the sling label?			
d. Is there a warning not to use a damaged or eroded/threadbare sling?			
e. Is the manufacturer's company name, website, address, telephone, and country of origin indicated?			
f. Is there a serial or batch numbering or bar code system?			
g. Is there a place to mark or indicate 'date of first use' on a sling?			
h. Other information that may also be helpful to have on a sling label (or should be included in <i>instructions for use</i> if it cannot be provided on the sling label) includes: <ul style="list-style-type: none"> • The type of hanger bar that the sling is to be used with e.g. key or clip vs. loop connection and hanger bar configuration 2 or 3 or 4 or other. • A warning to always inspect a sling before use. • A reminder not to use a damaged or badly worn sling. 			
i. Is the information provided on sling labels easy to read and meaningful for the user population?			
j. Can customized labels be added to the slings by the vendor e.g. identifying a specific facility and/or unit?			
4. Safety	Yes	No	Notes
a. Are there instructions for proper use of slings provided by the manufacturer that include at least the following information? <ol style="list-style-type: none"> i. How the sling can be safely applied, adjusted and removed ii. If sling is unsuitable for a specific handicap (disability) or clinical condition iii. Indication about the type(s) and design(s) of slings (e.g., number of connection points, dimensions, and the type of material that is used to connect a sling to a hanger bar) which can be used in combination with the hanger bar. iv. Information about the materials used in the sling fabric. v. That a SPHM assessment should be performed to ensure that the correct size, type and shape of sling are used for the patient vi. The information listed in 3 a, b, c, e, h and 6a. 			
b. Are reusable slings (those that can be laundered) load tested for safety (by manufacturer) e.g., cleaned and dried ten (10) times in accordance with the manufacturer's instructions and then tested with a static load of 1.5 x the maximum load for 20 min as required by ISO 10535:2006?			

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<p>c. Sling inspection and management: Consider how slings will be inspected for wear and tear, fraying etc.</p> <ul style="list-style-type: none"> ▪ Before placing into first use ▪ On a periodic basis ▪ By staff before each use ▪ Determine sling safety training and documentation needs etc. ▪ Develop a process to for removal of damaged slings from service, tracking sling date of purchase and first use, inspections completed; inventory, any repairs performed, monitor sling recalls or upgrades. 			
5. Laundry/Cleaning	Yes	No	Notes
a. Where will reusable slings be laundered – external or in-house laundry? Consider how they will be collected e.g. with regular linens to be laundered or in separate bags/containers.			
<p>b. What are the laundering requirements for reusable slings?</p> <ul style="list-style-type: none"> i. Washing temperature required ii. Special drying requirements e.g. no high heat dry? iii. Can slings tolerate washing in chlorine (bleach) and peroxide-based cleaning agents? iv. Can slings be laundered with other linens? v. Can slings be laundered to be in compliance with the Centers for Disease Control (CDC) Guidelines for Environmental Infection Control in Health-Care Facilities?²¹ 			
c. Are laundering instructions available from the vendor?			
d. Do specialty slings such as ambulating harnesses require special washing protocols e.g. placing in a mesh bag for laundering?			
<p>d. If using Single-Patient use slings:</p> <ul style="list-style-type: none"> ▪ Is there identification on a sling that indicates that they must not be laundered? ▪ Do slings have some type of symbol that indicates if the sling has been laundered e.g. a label that changes color if laundered? 			
<p>e. For Wipeable slings:</p> <p>What types of sanitizer or disinfectant can be used to wipe down or clean a sling? Can the manufacturer show that their recommended cleaning methods etc., meet FDA published guidelines for reprocessing non-critical medical devices? Consider effectiveness of cleaning stitched seams, rope and Velcro attachments etc.</p>			
f. What is the sling <i>laundry</i> management process e.g. process to send slings to be laundered; time to send and return clean slings to/from the laundry to a patient care unit; delivery and stocking of slings in patient care areas, par stock requirements, storage of slings and ease of access by staff and processing of damaged slings?			
6. Other	Yes	No	Notes
a. What material are slings made of e.g. synthetic, blend or natural fibers? Are they a solid material, mesh, padded or have a rigid component?			
b. Can the slings be left under the patients’ body when in bed and/or in a chair without compromising the patient’s skin? If yes, does the manufacturer provide evidence (as tested by a third-party) to support this claim?			
c. Is information provided about flammability of the fabric/material used, if relative to use?			
d. Do slings have positioning handles for correct sling and patient positioning?			
e. Are custom made specialty slings are available?			
f. What is the warranty on the slings?			

g. How long will reusable slings last? (Note this will depend on how they are laundered)			
h. What is the replacement/repair policy including turnaround time and costs?			
i. What is the sling trade-in policy?			
F. Equipment Management			
1. Storage Equipment and Supplies (Hanger bars and Slings)	Yes	No	Notes
a. What is the storage “footprint” requirements?			
b. Can staff access the equipment easily and efficiently? Consider time to access and ease of transporting the equipment to where task is being performed			
c. Is storage available with easy access to electrical outlets to charge equipment and/or equipment batteries (as applicable)?			
2. Infection Control Considerations ^{4,18} For Slings refer to Section E	Yes	No	Notes
a. How easily can equipment be cleaned?			
b. What chemicals can be used to clean equipment and slings that can be wiped clean? What information does the manufacturer supply?			
c. Is the wipe down (with approved disinfectant) of slings, belts and transfer devices that do touch patient’s skin an acceptable practice?			
d. Has the infection control officer approved decontamination procedure for all equipment and accessories etc.?			
e. If 1 lift motor is to be shared on between 2 treatment areas or beds - consider if caregivers will take the time to clean the motor between each use e.g., in a busy acute care unit?			
3. Maintenance Considerations ^{4,18,23,24}	Yes	No	Notes
a. What preventative maintenance and inspection is required and how often? Consider: <ul style="list-style-type: none"> ▪ The recommended standard interval for cleaning tracks on ceiling lift systems ▪ The recommended standard interval for cleaning motors, moving parts; wheels and casters. 			
b. Can this be performed by facilities maintenance staff?			
c. Can facilities maintenance staff perform emergency maintenance?			
d. Will the vendor or representative provide training and orientation for facilities maintenance with equipment training?			
e. How difficult is the device to maintain/service? Consider: <ul style="list-style-type: none"> ▪ Access and clearance for facility maintenance techs/Biomed & IT personnel ▪ Time and effort to diagnose/troubleshoot problem ▪ If special tools are required 			
f. What is the availability of replacement and spare components, cost and time to delivery?			
g. What is the procedure for replacing defective parts, or getting replacement and spare components? Do you have to buy parts from the vendor or can you buy parts at a local			

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supplier or store? Some sales representatives stock their own parts, whereas others rely on the Manufacturer to supply parts.			
h. Is loaner equipment available if repairs are extensive or replacement is required? If so how quickly can it be delivered and placed into service?			
i. Consider environmental impact & disposal of equipment and accessories such as batteries.			
G. Vendor Service 4,18,21,25			
1. Overall Also Refer to Ceiling Lift Installation	Yes	No	Notes
a. Obtain references from vendor and contact other facilities (possible include the Better Business Bureau) re their experience with purchase, training and after service.			
b. Check with your organizations Purchasing Dept. re group purchasing plan discounts or criteria that may apply to the equipment purchase.			
c. If this product is currently in the facility and/or vendor is or has provided services – evaluate product performance including maintenance record and vendor service provided.			
2. Local Consultant/ Representative Information	Yes	No	Notes
a. How many years of experience with lift and transfer equipment does the local consultant/rep have? Be specific to the type of systems you wish to purchase e.g. ceiling lift systems.			
b. How long has the current representative worked with them?			
c. How many customer representatives are in this state?			
d. How many clients do you service in this state?			
e. Can the company provide data on the success of using their equipment?			
f. What other hospitals in the state have this equipment? Will they talk to you about their experience and attest to the quality, timeliness and satisfaction with their work for the installation lift and transfer equipment?			
3. Manufacturer Information	Yes	No	Notes
a. How many years of experience does the manufacturer have in lift/transfer equipment production?			
b. How long has the manufacturer done business in the state?			
c. Does the manufacturer/vendor provide service technicians? If yes, please provide the names of those who would respond to service calls at XXX			
4. Specific to equipment purchase	Yes	No	Notes
a. Has the device or equipment been evaluated in a published study by an independent third-party organization?			
b. Can they provide information about usability testing conducted when designing the equipment?			
c. Has the device been listed on the FDA product recall or safety alert list at http://www.fda.gov/Safety/Recalls/default.htm ²⁴			
d. What is the equipment trial evaluation period?			

e. What is the new equipment delivery time?			
f. What is the life expectancy of equipment and parts? Compared to similar products?			
g. Is there an option to rent or lease equipment? Is so what are the lease terms?			
h. What is the vendor trade-in policy?			
i. Does the vendor offer bariatric or larger versions of the standard equipment?			
j. If the manufacture changes the design of slings and or equipment hardware in the future: <ul style="list-style-type: none"> i. What is the customer notification period related to a change in device and/or sling design? ii. What assistance/service will the manufacturer or vendor provide related to replacing equipment components and training if applicable? 			
5. After Service	Yes	No	Notes
a. What is the average on-site response time for service?			
b. What is the equipment warranty or guarantee for length of service?			
c. Consider limitations of the warranty			
d. What is the warranty for batteries and motors, slings and other ‘soft’ goods, etc.?			
e. Will the manufacturer or vendor notify customers when an upgrade for equipment and accessories is needed or available?			
f. What are the terms or policy for upgrading equipment etc.?			
g. Will the manufacturer or vendor notify customers about recalls?			
6. Training Also refer to AASPHM “Healthcare Recipient Sling and Hanger Bar Compatibility Guidelines” 2016	Yes	No	Notes
a. Will the vendor or factory representative do training for all users on all shifts?			
b. Does training include the use of all types of slings available for the equipment? (i.e. walking slings, disposable slings, supine slings, octopus, and custom made for amputees etc.)			
c. Is the vendor qualified to provide <i>clinical</i> competency-based training related to use of the lift device and slings e.g., patient assessment protocols; ability to address specific clinical challenges and SPHM needs?			
d. What training materials are provided for the facility to use when training new employees etc.? Consider availability of training videos or on-line training support			
e. Will the vendor return and train new staff periodically?			
f. Is there a fee for this?			
g. Will vendor provide any special orientation and training for doctors or other specialty groups, e.g., therapists; maintenance, etc.?			

H. Regulatory Requirements ^{11, 26-30}			
Federal, State, Local	Yes	No	Notes
a. Does the ceiling lift system and slings meet design FDA regulations e.g. many patient handling devices are considered Class 1 Medical Devices by the FDA and ISO 10535? ISO 10535 is a recognized consensus standard by the FDA as applied to Patient Transfer Devices; both ac-powered and non-ac-powered patient care lifts, thus manufacturers of such devices should meet ISO 10535:2006 requirements.			
b. Are there any Joint Commission, CMS or other Federal agency regulations to consider regarding the use and storage of the equipment?			
e. Are there any state agency regulations to consider e.g., OSHA, state/county/city building, electrical and fire codes? If using equipment and slings in the operating room environment check if specific OR fire standards apply. Review compliance for National Fire Protection Association (NFPA) codes for fire sprinklers systems; access to electrical and safety systems etc.			
f. <i>Electrical:</i> Many patient handling devices are manufactured ‘offshore’ in Canada or Europe. Determine per your state, county and city fire codes etc., what safety certification is acceptable for medical electrical devices. For example, the typical acceptable designation is the UL rating in the US from the Underwriters Laboratories-Standard (UL): 60601-2(2006) Medical Electrical Equipment: General Requirements for Safety Other relevant UL standards <ul style="list-style-type: none"> • 94-2013 UL Standards for Safety Test for Flammability of Plastic Material for Parts in Devices and Appliances-Fifth Edition • International Electromagnetic Commission (IEC): 60601-1-2(2015) Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral Standard: Electromagnetic disturbances – Requirements and tests. <i>Your facilities engineering/clinical technology department should be able to assist you to determine these requirements.</i>			
g. Are there personnel assigned who will be responsible for monitoring and acting on upgrade or recall notices for equipment or software within the facility or healthcare organization?			
I. Patient & Facility Considerations When Choosing SPHM Equipment and Slings ^{4,18,31-33}			
1. General	Yes	No	Notes
Determining what and how much lift equipment is needed in a care environment and how to prioritize purchase and installation depends on many factors such as: <ol style="list-style-type: none"> a. Fiscal feasibility that considers cost of the lift systems and slings, installation and maintenance b. The physical structure and design of the patient care area where a lift(s) is needed including considerations for space requirements of rooms; structural capacity (ceiling lifts) and how well a lift will function with existing equipment c. Work areas where caregiver injury and severity rates due to patient handling are high such as, intensive care units, units that care for Bariatric patients, and medical units d. The SPHM tasks that need to be performed in the care area and frequency of occurrence e.g., repositioning in bed; transfers to a stretcher or chair; early ambulation etc. e. The percentage of patients who require total or extensive assistance to mobilize on a daily basis and in a worst-case scenario 			

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<p>f. The proportion of patients who are considered Bariatric for example those over 400lbs and those over 600lbs. This can help determine how many higher capacity lifts may be needed</p> <p>g. The number of beds on a patient care unit and patient census (daily average; peak load; range)</p> <p>h. Future changes to patient characteristics and/or census</p> <p>i. Future changes to unit/dept. design</p> <p>j. Staffing ratios, mix, and variance</p>			
<p>2. Patient Characteristics That Should Be Considered Include:</p>	<p>Yes</p>	<p>No</p>	<p>Notes</p>
<ul style="list-style-type: none"> ▪ Medical condition or diagnoses (physical & cognitive) e.g., surgical (type), orthopedic, neurological, trauma, cognitive deficits e.g., dementia, behavioral health conditions, brain injury etc. ▪ Demographics groups such as, adult, pediatric, bariatrics and associated body habitus (weight, torso width and girth, height and body shape or weight distribution) etc. ▪ Mobility status that is, the functional mobility level of the patient including the ability to sit unsupported, bear weight, and standing balance. ▪ Level of postural support required in a sling (e.g., support needs for the head and trunk or asymmetrical body position and the likelihood of unpredictable movement, spasm or pain during the process). ▪ Sensory deficits or disturbance. ▪ Dignity when using the equipment. ▪ The preferences of the individual being hoisted and other characteristics ▪ Attachments to the patient (e.g., intravenous line, catheters, feeding tube, chest tube, tracheotomy; monitors, orthopedic supports such as Halo brace, Thoraco-Lumbo- Sacral-Orthosis (TLSO) brace, traction of extremities). ▪ Task to be accomplished (e.g., repositioning in bed, lateral transfer from bed to stretcher, vertical transfer to/from bed to chair, bathing, wound care, ambulation). 			
<p>The following resources provide useful recommendations for SPHM equipment coverage/quantity, recommendations by clinical unit/area, and for user trials of equipment:</p> <ul style="list-style-type: none"> ▪ The Facility Guidelines Institutes Patient Handling and Movement Assessments (PHAMA) 2010, https://www.fgiguilines.org/wp-content/uploads/2015/08/FGI_PHAMA_whitepaper_042810.pdf ▪ The Veterans Health Administration also provides Safe Patient Handling and Mobility (SPHM) Technology Coverage and Space Recommendation’s 2016 Revision https://www.publichealth.va.gov/employeehealth/patient-handling/index.asp <p>Note, that recommendations in both of above documents are based on Veterans Health Administration patient populations</p> <ul style="list-style-type: none"> ▪ Refer to References and Resources below for more information. 			

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 - Guidelines for Environmental Infection Control in Health-Care Facilities (2003) <https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/laundry.html>
 - [Methicillin-resistant Staphylococcus aureus \(MRSA\) -Laundry](https://www.cdc.gov/mrsa/community/environment/laundry.html) <https://www.cdc.gov/mrsa/community/environment/laundry.html>
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Selected Related Resources

ADA: Access to Medical Care for Individuals with Mobility Disabilities Standard (2010) – Use of patient lifting equipment in clinics http://www.ada.gov/medicare_ta.htm

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- Code of Federal Regulations Title 21, Volume 8 Revised as of April 1, 2017 [PART 880 -- GENERAL HOSPITAL AND PERSONAL USE DEVICES](#) Subpart F--General Hospital and Personal Use Therapeutic Devices:
 - 21CFR880.5510 - <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=880.5510> and
 - 21CFR880.5500 - <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=880.5500>
- MAUDE - Manufacturer and User Facility Device Experience or MAUDE data represents reports of adverse events involving medical devices. <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm>
- Home Healthcare Medical Devices: A Checklist. FDA
<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/ucm070217.htm>
- Human Factors Program and Medical Device Use resources. Information for Health Care Professional, Manufacturers and Consumers. <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/HumanFactors/default.htm>
- Medical Devices - General Hospital Devices and Supplies: Patient Lifts
<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/ucm308622.htm>
- MedSun reports – adverse event reporting by users
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/Medsun/searchReportText.cfm>

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www.nationalbackexchange.org/files/training_guidelines/hoisting_guidelines.pdf

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