

PRESSURE INJURY PREVENTION: IMPLEMENTATION TOOLKIT

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How to use this document:

This toolkit is designed for nurses leading or participating in pressure injury prevention implementation. It moves through clinical background first, then practical quality improvement tools you can use on your unit.

Best Practice Statements are evidence-based recommendations. Realities identified by the Expert Working Group are honest reflections from the Expert Working Group about what happens in practice and Clinical Tips offer quick and actionable guidance.

Each section ends with a Check Your Understanding box, which includes short reflective questions to help you consolidate what you have read before moving on.

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Foreword

Despite decades of clinical guidance and growing awareness that many pressure injuries are preventable, they continue to affect millions of patients each year and place significant strain on clinicians, health systems and patients themselves.

In hospital settings across North America, the pooled hospital-acquired pressure injury rate has been reported at 8.4%, or 5.1% when Stage 1 injuries are excluded, with nearly two-thirds (61.8%) of all pressure injuries being hospital-acquired (Li et al, 2020).

In the United States alone, an estimated 2.5 million people develop a pressure injury in acute care facilities each year. The average cost per patient is \$10,708, resulting in total annual costs estimated to exceed \$26.8 billion (Padula and Delarmente, 2019).

The burden of pressure injuries extends beyond direct treatment costs. Nursing time accounts for approximately 41% of the total cost associated with hospital-acquired pressure injury care (Posnett et al, 2009). In intensive care settings, the cost of a single hospital-acquired pressure injury may reach \$32,000 per patient (Wassel et al, 2020). When pressure injuries do occur, they can have a profound impact on patient well-being and may be painful, debilitating and, in severe cases, life-threatening (Moore et al, 2011; Sullivan, 2013).

While prevention guidelines are well established, variation in practice remains common. Differences in staffing, workflow, access to prevention technologies and interpretation of recommendations continue to contribute to gaps between evidence and routine care.

As such, in November 2025, a multidisciplinary group of clinicians, researchers and healthcare leaders convened in Boston, Massachusetts, United States, to review current evidence, share clinical experience and develop consensus-based recommendations for pressure injury prevention within the United States healthcare context.

The purpose of this document is to:

- Establish an understanding of pressure injury etiology, with particular focus on sustained soft tissue deformations and the roles of pressure, shear and exposure time
- Evaluate and contextualize the evidence for two prevention modalities: remote patient monitoring sensors and prophylactic dressings, within a pressure injury prevention framework
- Provide an implementation-focused toolkit that translates evidence into action through structured quality improvement tools.

Pressure injury prevention is inherently multifactorial. While many interventions and system-level factors contribute to effective prevention, this document focuses on two elements, the LEAF™ Patient Monitoring System (Smith+Nephew) and prophylactic dressings, as examples of targeted interventions that can be integrated into comprehensive prevention programs.

The accompanying toolkit includes example frameworks, driver diagrams and standardized processes designed to help health systems understand their current state, identify contributing factors, test targeted changes and sustain improvement over time. The suggested tools presented are not intended to be exhaustive or prescriptive but rather to demonstrate how evidence-informed tools can be applied within structured frameworks to address local challenges. The most appropriate approach will depend on the care setting, the team involved and the specific improvement goals.

Note on guidelines

This document references the 2026 fourth edition of the *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline*, an international collaboration by the National Pressure Injury Advisory Panel (NPIAP), European Pressure Ulcer Advisory Panel (EPUAP) and Pan Pacific Pressure Injury Alliance (PPPIA). At the time of document development, the 2026 update chapters had not been fully released; however, available updates have been incorporated where applicable.



Scan QR code to access the *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline*.

Ultimately, this document aims to support healthcare teams to consistently deliver evidence-based, proactive and effective pressure injury prevention, improving outcomes for patients while supporting clinicians and health systems in meeting the growing demands of care.

Cathy Milne, Co-Chair, MSN, APRN, CWOCN-AP, ANP/ACNS-BC, WOCNF

Part 1. Understanding pressure injuries



Figure 1. Stage 4 pressure injury of the right ischium.



Figure 2. Healing Stage 4 sacral pressure injury in a patient with a dark skin tone.



Figure 3. Stage 4 sacral pressure injury in a patient with a light skin tone.



Figure 4. Sacral deep tissue pressure injury associated with a medical device.



Figure 5. Stage 3 medical device-related pressure injury of the left upper thigh associated with lymphedema wraps.

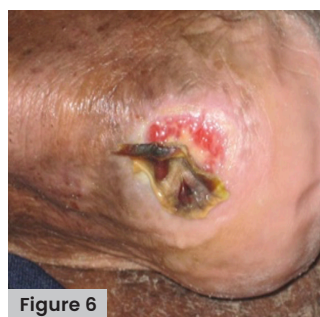


Figure 6. Right heel pressure injury in a patient with a dark skin tone before debridement.



Figure 7. Stage 4 pressure injury of the right heel following wound assessment.

Figures courtesy of Cathy Milne.

1.1 What is a pressure injury (PI)?

A pressure injury [PI; [Figures 1–7](#)] is localized damage to the skin and/or underlying tissue, usually over a bony prominence or related to a medical or other device, resulting from prolonged pressure or pressure in combination with shear (National Pressure Injury Advisory Panel [NPIAP], European Pressure Ulcer Advisory Panel [EPUAP], Pan Pacific Pressure Injury Alliance [PPPIA], 2026). They are also known as pressure ulcers or bedsores and remain one of the most common wounds managed by healthcare staff (Al Aboud and Manna, 2023).

PIs are classified as Stages 1–4, with additional categories for Unstageable PIs and Deep Tissue PIs. Injuries that occur on mucosal membranes cannot be staged and are therefore classified as mucosal membrane PIs. Some PIs are medical device-related, occurring when a device or its securement applies sustained mechanical loading that produces localized deformations and stress concentrations in the skin and underlying tissues. These should be staged according to the affected tissue types wherever possible (NPIAP/EPUAP/PPPIA, 2026).

Avoidable versus unavoidable PIs

Most PIs are preventable. Therefore, understanding the distinction between avoidable and unavoidable PIs is important.

An avoidable PI develops when a healthcare provider fails to implement appropriate preventive measures. This may include (Stefanacci, 2023):

- Not providing consistent pressure injury prevention (PIP)
- Not adequately assessing a patient's clinical condition and risk factors
- Not developing and implementing an individualized care plan
- Not monitoring and evaluating the impact of interventions and revising the plan as appropriate

Part 1. Understanding pressure injuries

- Not using appropriate pressure-redistribution surfaces
- Not repositioning at-risk individuals at indicated intervals
- Not mobilizing the patient according to their level of risk.

An unavoidable PI develops despite appropriate, well-documented preventive care. This may occur when a patient's clinical condition markedly reduces tissue tolerance, for example through impaired perfusion or oxygenation, systemic illness or compromised nutritional status (Stefanacci, 2023). In these circumstances, damaging tissue deformation may not be fully avoidable, even when appropriate prevention strategies are in place.

When PIs do occur, they can have a profound impact on patient well-being and may be painful, debilitating and, in severe cases, life-threatening (Moore et al, 2011; Sullivan, 2013).

Hospital-acquired pressure injuries (HAPIs)

A hospital-acquired pressure injury (HAPI) is a PI that was not present on admission and develops during the patient's hospital stay (Mondragon and Zito, 2025; NPIAP/EPUAP/PPPIA, 2026). Although HAPIs share the same underlying mechanisms as other PIs, they are particularly important because the Agency for Healthcare Research and Quality (AHRQ) and Centers for Medicare & Medicaid (CMS) classify Stage 3, Stage 4, Unstageable and Deep Tissue PIs as "never events," meaning they are non-reimbursable, making the costs the responsibility of healthcare systems (AHRQ, 2019; NPIAP, 2021). From calendar year 2028, the CMS Hospital Harm: PI electronic clinical quality measure (eCQM) becomes mandatory for acute care hospitals. It captures all new Stage 2, 3, 4, Unstageable and Deep Tissue PIs in adult inpatients that were not present on admission, with data extracted directly from the electronic health record (EHR) (NPIAP, 2026).

HAPIs are associated with significant patient harm, longer hospital stays, increased healthcare costs and additional workload for clinical teams (Padula and Delarmente, 2019; Wassel et al, 2020).

In the United States, HAPI-related costs vary substantially by injury severity, with advanced-stage injuries contributing disproportionately to overall treatment costs. On average, a HAPI has been estimated to cost \$10,708 per patient. Based on approximately 2.5 million cases each year, this equates to an estimated annual national cost of more than \$26.8 billion (Padula and Delarmente, 2019).



Summary

A pressure injury is localized tissue damage from pressure alone or pressure plus shear, usually over a bony prominence or under a device. PIs are staged 1–4, or classed as unstageable, deep tissue or mucosal membrane. A HAPI is a PI that develops during the hospital stay.



Check Your Understanding

Reflect on your own practice before moving to the next section.

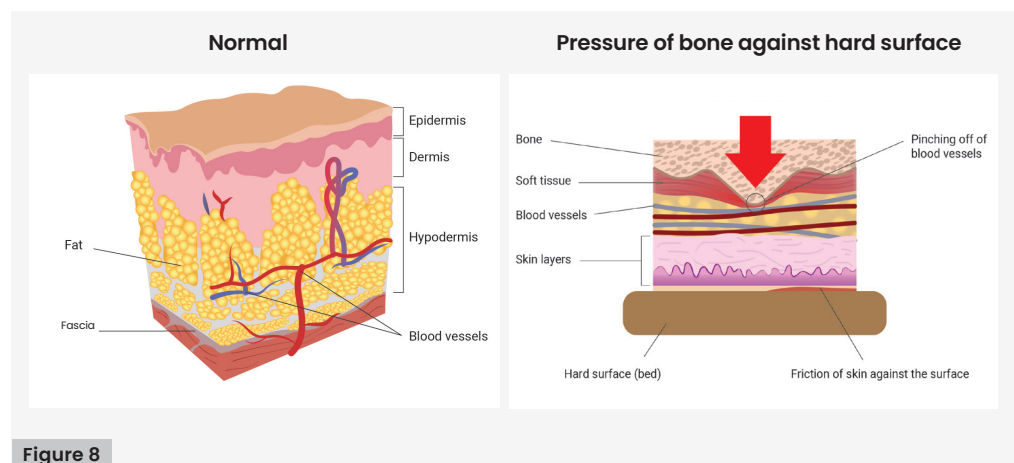
1. In your unit, how is the distinction between avoidable and unavoidable PIs communicated to staff? Is this documented consistently?
2. Can you identify a patient group in your care who would be at highest risk of a HAPI? What factors make them particularly vulnerable?
3. How is the HAPI rate currently tracked in your organization? Is it per patient, per admission or per 1,000 patient days or another way? What are the implications of that method?

1.2 How do pressure injuries (PIs) develop?

PIs develop when a part of the body is dragged against a support surface (such as a mattress) or a medical device for long enough, and with enough force, to damage the tissue underneath.

This is known as sustained mechanical loading where pressure and shear act at the point where skin meets a surface. It causes the tissue to compress, stretch and twist out of shape. If this goes on long enough, it overwhelms what that person's tissue can cope with, and a PI starts to form [Figure 8].

Figure 8. Simplified schematic of one pressure-injury pathway: sustained mechanical loading deforms soft tissues and may obstruct blood vessels. Contemporary etiology also recognizes rapid direct deformation damage and internal soft tissue stress/strain concentrations that are not represented by this schematic (images adapted from Al Aboud and Manna, 2023; see Gefen et al, 2022).



Why “tissue deformation” matters

The tissue itself being deformed is now understood to be the main trigger for tissue damage. Even a few minutes of severe deformation can start damaging cells and the structures that hold tissue together. Sustained deformations can also impair blood and lymphatic flow, so oxygen and nutrients can't get through properly.

These problems build on each other over time:

- Direct damage to cells and tissue structure from deformation
- Swelling (inflammatory edema) caused by that damage
- Reduced blood flow (ischemia) caused by compressed vessels (Van Damme et al, 2020; Gefen et al, 2022; Gefen, 2024).

Because damage often starts deep beneath the skin, before anything is visible on the surface, skin that looks intact or only slightly discolored can be hiding a much more serious injury underneath. Don't let “the skin looks fine” be reassuring on its own.

The roles of pressure, shear and friction

Pressure and shear represent different components of mechanical loading, but they are closely coupled at the skin-support or skin-device interface. Frictional shear requires contact and therefore a normal force between the skin and the contacting surface. Thus, pressure may occur with little or no tangential loading, whereas friction-mediated interface shear cannot be generated without some degree of normal loading. Understanding these relationships and their interaction is important for selecting appropriate preventive strategies.

- **Pressure** is the normal component of external loading at the skin-support or skin-device interface. It deforms skin and soft tissues, and, depending on the individual anatomy and loading duration, may create internal tissue stress concentrations and impair blood and lymphatic transport. Importantly, the interface pressure alone does not directly quantify the internal tissue loading state
- **Shear** is the tangential component of loading at an interface. While sliding down in bed, head-of-bed elevation, transfers or repositioning, tangential forces can be transmitted into skin and underlying soft tissues and produce internal shear strains and stress concentrations. Deep tissue injury commonly reflects combined pressure and shear loading around bony prominences or beneath stiff devices

Part 1. Understanding pressure injuries

- **Friction** is the interfacial phenomenon that resists relative sliding and enables tangential (shear) forces to be transmitted between the skin and a contacting surface, object or device. The coefficient of friction describes the relationship between the frictional force and the normal force at the interface and therefore influences how readily tangential forces can be transmitted. Friction may be static or dynamic and can therefore contribute to internal soft tissue deformations even when no visible sliding occurs. Repetitive rubbing can also cause superficial abrasions or friction blisters, however, these are distinct from PIs and should not be classified or managed as PIs (Brienza et al, 2015; Gefen et al, 2022)
- **Moisture** from perspiration or incontinence can overhydrate and weaken the superficial skin and alter frictional behavior at the skin-interface contact. Heat and humidity can further reduce tissue tolerance. The direction and magnitude of any change in the coefficient of friction depend on the skin and contacting material, so moisture should not be assumed to increase friction uniformly across all interfaces (Coleman et al, 2014).

Figure 9 illustrates the vicious cycle of PI development. Sustained deformation can cause direct cell and tissue damage, which promotes inflammatory edema. Edema can then increase the local tissue loading levels, while vascular and lymphatic compromise contribute additional ischemic damage (Gefen et al, 2022). Deep injury can begin within minutes, but it may take hours before any change is visible on the skin surface (Gefen, 2024).

Figure 9. The vicious cycle of pressure injury development described by Gefen: sustained mechanical loading produces direct deformation damage (cellular damage and subsequently cell death), followed by inflammatory edema that can further increase local tissue deformations and loading levels, together with ischemic damage from compromised perfusion. These mechanisms interact and amplify cumulative tissue damage. Figure adapted from Gefen et al (2022).

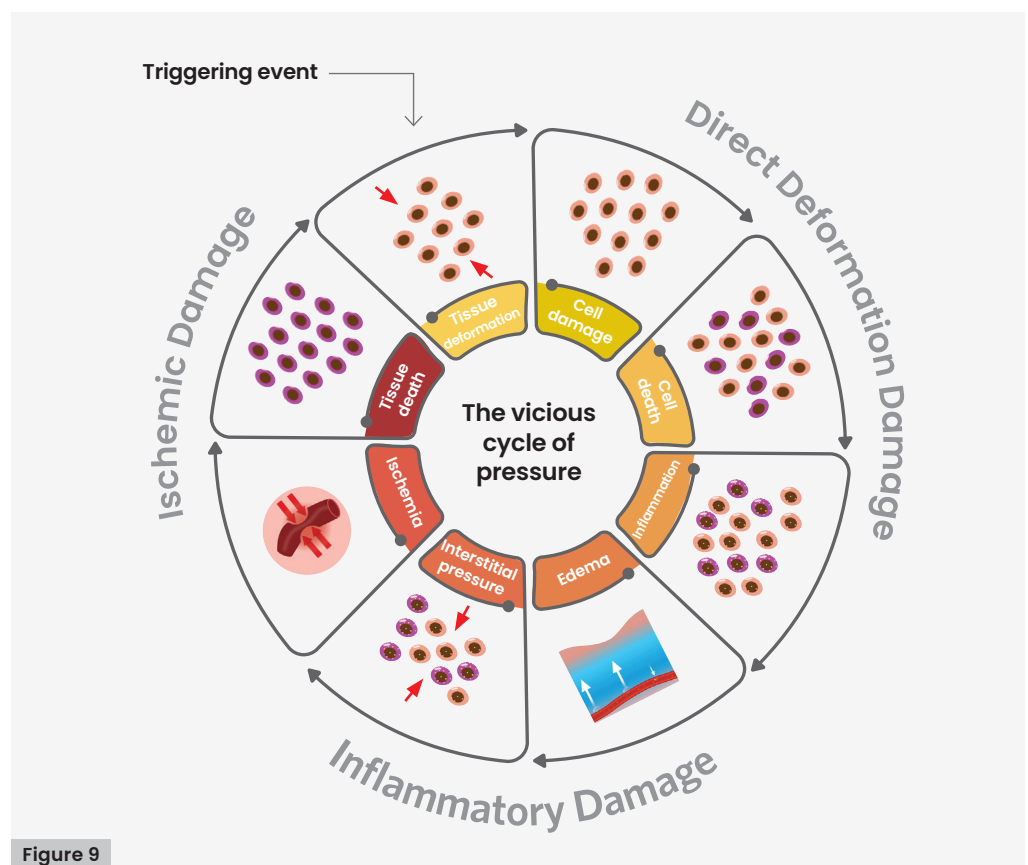


Figure 9

Clinical Tip

A useful analogy for explaining shear is a deck of cards: when a sideways force is applied, the cards shift relative to one another, changing the shape of the deck. This provides a simple visual representation of shear deformation, but it should not be interpreted as meaning that anatomical tissue layers literally slide over one another like individual cards.

A more scientifically accurate explanation is that friction describes the grip at the skin-contact interface, while shear describes tangential loading transmitted into the tissues, where it creates internal distortion within the soft tissue (i.e. shear strain). When a patient slides down in bed or is repositioned, surface friction can increase the tangential load transferred into deeper soft tissues.

In general, a higher coefficient of friction between the skin and the support surface allows greater frictional forces to be transmitted for a given normal load, potentially increasing internal soft tissue deformations and shear strains. The actual magnitude and distribution of the shear strains, however, also depend on factors such as the applied loading, individual anatomy, individual biomechanical tissue properties and the characteristics of the support surface.

Realities Identified by the Expert Working Group

Simplified, clinically relevant education on shear and PI biomechanics, using tangible analogies, was seen as key to improving uptake and confidence in prophylactic dressing use.



Summary

Tissue deformation, not pressure alone, is now understood to be the main driver of damage, and it can start within minutes, deep beneath skin that still looks normal. Pressure, shear, friction and moisture each play a different, interacting role.



Check Your Understanding

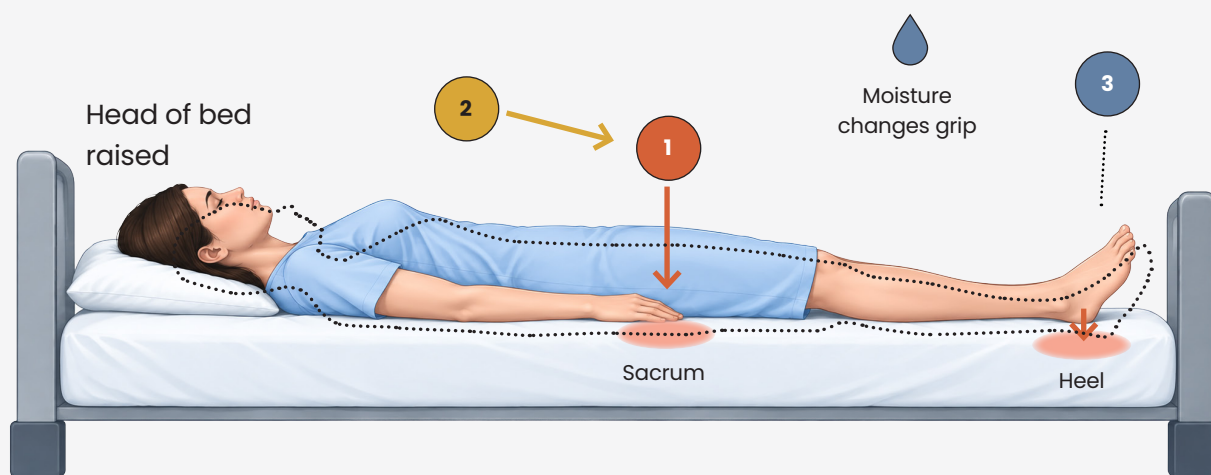
Reflect on your own practice before moving to the next section.

1. A patient has been lying in the same position for three hours after surgery. Which biomechanical factors and phenomena are most likely contributing to their PI risk and where on the body are you most concerned?
2. Why might visible skin changes underestimate the severity of an underlying PI? What does this mean for your assessment approach?
3. How does shear in skin and underlying soft tissues occur during routine care on your unit? Which activities generate the highest tissue shear loads for your patients?

Part 1. Understanding pressure injuries

Pressure, shear and friction summary

Pressure, shear and friction each play a different role at the skin-surface interface, though each of these factors may contribute to tissue damage. Understanding the difference helps guide prevention.



Dotted line = after sliding down the bed

Sacrum and heels: The two highest-risk contact points

1 Pressure

Pressure straight down into the skin. Pressure compresses tissue and can build damaging stress deep inside, even when the surface itself doesn't feel very firm.

Remember surface pressure alone doesn't tell you how much stress the deep tissue is under.

2 Shear

Shear pulls sideways through the tissue, from actions such as sliding down the bed, raising the head of the bed or during transfers. Shear twists deeper tissue internally.

Remember deep tissue injury is often pressure and shear acting together.

3 Friction

The grip between the skin and surface is what allows shear force to transfer into the body. More grip means more sideways force is transferred, even without visible sliding of the body.

Remember friction alone can cause skin scrapes or blisters. This is a separate injury, so do not record or treat it as a pressure injury.

Moisture modifies grip

Sweat or incontinence softens skin and changes friction, but doesn't always increase grip. Heat and humidity also lower tissue tolerance overall.

Clinical Tip: the deck of cards

Push a deck of cards sideways and the cards slide against each other. That's a useful picture of shear, but real tissue layers don't literally slide like cards. Friction is the grip at the surface; shear is the sideways force that grip sends deeper into the tissue.

Evidence base: Coleman et al, 2014; Brienza et al, 2015; Gefen et al, 2022; Gefen, 2024

1.3 Who is at risk of developing a pressure injury (PI) and where?

All individuals carry some risk of developing a PI, but risk is substantially higher in patients with (Chung et al, 2022; Alderden et al, 2025):

- Advancing age
- Impaired sensory perception
- Impaired tissue perfusion
- Limited mobility or reduced activity
- Longer intensive care unit (ICU) length of stay
- Moisture-related skin changes, including incontinence
- Poor nutritional status
- A need for vasopressor support
- Exposure to beds, seating or medical equipment not designed to manage pressure and shear.

Risk increases substantially when sustained mechanical loading (e.g. pressure and shear) is combined with reduced tissue tolerance, a combination that many acutely ill patients are unable to avoid. In these situations, tissues are less able to withstand sustained pressure, making skin and underlying structures more vulnerable to injury.

High-risk sites

Bony prominences are at greatest risk because the local anatomy can concentrate internal tissue stresses and strains when tissues are loaded for prolonged periods. The specific sites at risk depend on the patient's position, tissue anatomy and mass, the biomechanical properties of the tissues subjected to the local loading and any medical devices in use. Common high-risk locations include:

- Any area in prolonged contact with a surface, medical equipment (e.g. oxygen masks and nasogastric tubes) or another body part
- Back of the head, ears and nose
- Heels (particularly in patients who are immobile)
- Hips (greater trochanters) in lateral positioning
- Sacrum and coccyx (especially in supine or semi-recumbent patients)
- Shoulders, elbows, knees and ankles.

Clinical Tip

Medical device-related PIs are increasing in prevalence. Check under and around all devices at every skin assessment and document device type, location and skin condition.



Summary

Risk is highest where reduced mobility or sensation meets sustained loading, especially over bony prominences, under medical devices, and in patients with poor perfusion, moisture issues or vasopressor use.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. Which patient groups in your unit are most frequently affected by PIs and at which anatomical sites? Does this match the risk factors described here?
2. Think about a recent HAPI in your area. Which risk factors were present and were they all captured in the initial risk assessment?
3. How are medical devices routinely checked on your unit? Is there a structured process and who is responsible for it?

Part 1. Understanding pressure injuries

1.4 Assessing pressure injury (PI) risk in your patients

Standardized risk assessment tools, such as the Braden, Norton and Waterlow scales, have been developed to support clinical decision-making and help reduce subjectivity in PI risk assessment, particularly for less experienced staff or in high-turnover environments where clinical judgment alone may vary between individuals (Lim et al, 2019). It's important to remember they are a starting point, not a substitute for clinical observation.

The Braden Scale

The Braden Scale is one of the most widely used tools in acute care settings. It assesses a patient's risk of developing a PI by evaluating six domains: sensory perception, moisture, activity, mobility, nutrition, and friction and shear. The lower the total score, the higher the level of risk:

Braden Score	Risk level
15–18	Mild risk for developing a PI
13–14	Moderate risk for developing a PI
10–12	High risk for developing a PI
≤9	Severe risk for developing a PI

In many organizations, specific Braden scores trigger automatic actions, such as referral to a wound care team, initiation of enhanced prevention bundles or use of additional preventive interventions (Serafin et al, 2025).

Best Practice Statement

Risk assessment tools are most effective when used alongside clinical judgment and ongoing reassessment. A patient's risk can change rapidly, particularly after surgery, following a deterioration in medical status or when a new medical device is placed.

What the guidelines say

The NPIAP/EPUAP/PPPIA (2026) guidelines recommend that all patients undergo risk screening on admission, at regular intervals and whenever their clinical condition changes. For patients identified as "at risk," a structured, comprehensive risk assessment should include:

1. A full skin assessment
2. Use of a validated risk assessment tool (e.g. Braden Scale)
3. Evaluation of additional relevant risk factors
4. Clinical interpretation and clear documentation of findings.

This structured approach ensures that risk is accurately identified and that preventive care can be tailored to each patient's needs.



Summary

Use a validated tool such as the Braden Scale alongside clinical judgment, not instead of it, and reassess whenever a patient's condition changes.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. When was the last time risk assessment practices on your unit were audited? What did the audit find?
2. On your unit, are Braden scores acted on clinically, or are they mainly completed as a documentation exercise? What evidence do you have for your answer?
3. What triggers a reassessment of PI risk on your unit? Is this documented in policy, and does practice match that policy?

Part 2. Prevention strategies

2.1 Principles of pressure injury prevention (PIP)

Effective PIP is not a single intervention. It requires individualized care bundles that combine multiple interventions, including strategies based on specific risk factors or tool subscales and clinical algorithms to support decision-making.

In practice, this means combining patient repositioning, appropriate support surfaces, skin management and, where indicated, prophylactic dressings.

Clinical judgment must guide implementation at every stage, and all preventive actions should be consistently documented (NPIAP/EPUAP/PPPIA, 2026). Prevention plans that are not documented cannot be evaluated or improved.

A key limitation of any prevention bundle is that its components may not adequately control both normal and tangential mechanical loading in every patient and position. Its effectiveness is also dependent on consistent adherence, which is frequently compromised by staffing pressures and workflow interruptions. This is where structured implementation tools, including repositioning monitoring systems and prophylactic dressings, may add value when they address identified local gaps.

Repositioning – what the guidelines say

Repositioning remains the foundation of PIP, regardless of the support surface in use. The NPIAP/EPUAP/PPPIA (2026) guidelines provide the following recommendations [\[Table 1\]](#).

Table 1. Key pressure injury prevention recommendations (NPIAP/EPUAP/PPPIA, 2026).

Recommendation	Notes
Repositioning – good practice statement	It is good practice to reposition individuals at risk of PIs, regardless of the type of pressure redistribution full body support surface being used. The interval between repositioning might be adjusted depending on the pressure redistribution capabilities of the support surface and the individual's response. However, no support surface can entirely replace repositioning.
Repositioning – conditional recommendation	Repositioning at two-hourly or three-hourly intervals could be implemented for most individuals at risk of PIs, if they are also on an appropriate pressure redistribution full body support surface. • Do not routinely extend repositioning intervals to four, five or six-hourly for individuals at risk of PIs • Individualize frequency of repositioning based on a clinical assessment, as specified in the good practice statements • Critically ill individuals or others with systemic hypoperfusion or shock states may require more frequent, incremental repositioning and supplementation of full body repositioning with assisted small shifts in body position • Individuals receiving palliative or end-of-life care should be given the option of repositioning frequency intervals that are best suited to their goals of care and comfort.

Part 2. Prevention strategies

Table 1. Key pressure injury prevention recommendations (NPIAP/EPUAP/PPPIA, 2026) (Continued).

	Recommendation	Notes
Sensor use	A sensor system that monitors the individual's movement could be used to assist in evaluating repositioning needs for individuals at risk of PIs when resources permit.	
Support surfaces statement	It is good practice to use a full body support surface or integrated bed system that appropriately accommodates the weight, height, size and body mass distribution of the individual.	It is good practice to consider the following factors when selecting or changing the mattress, overlay or integrated bed support surface: • Overall risk of PIs • Response of the skin and tissues • Independence, mobility and activity needs • Posture and sleeping position and their effects on pressure redistribution • Need for microclimate management and shear reduction features • Preferences and care goals.
Degree of turning – conditional recommendation	Use 30-degree lateral positioning to prevent PI occurrence in individuals at risk of PIs.	• Individualize turning angles to ensure maximum offloading of both the sacrum and the trochanter. 30-degree lateral positioning may not be maintainable or adequately offload the sacrum in individuals with higher body mass index. Modifying to a 40-degree lateral position might be necessary • In pre-adolescent children, a 30-degree turn is equivalent to a full body turn due to their smaller body width.

Realities Identified by the Expert Working Group

Although the Expert Working Group generally aligned with international guidelines, they reported considerable variability in how recommendations are interpreted and applied at the bedside, limiting consistent uptake in practice. Guidelines were frequently described as difficult to operationalize.



Summary

Repositioning is the foundation of prevention no matter which support surface is used. Individualize frequency and turning angle to the patient, and document every intervention.

Realities Identified by the Expert Working Group

The Expert Working Group recognized that the NPIAP/EPUAP/PPPIA (2026) guidelines are widely known and frequently referenced. However, translating these recommendations into consistent bedside practice remains challenging.

Key implementation challenges

- Recommendations are interpreted and applied differently across units, facilities and individual clinicians, limiting consistent uptake in practice
- Policies may align with guidelines on paper, while actual bedside practice varies in response to local workflows, staffing pressures, clinical judgment, staff education and accountability
- The length and detail of the guidelines, including grading frameworks and conditional statements, can make them difficult to operationalize in busy, time-pressured environments
- Local adaptations may emerge when teams are trying to make guidance usable, but these adaptations can also lead to variation rather than consistent, evidence-based care.

What is needed

Despite widespread awareness of evidence-based guidelines and prevention bundles, the panel identified an ongoing need for more consistent implementation, improved staffing stability and accountability, and smarter tools that support reliable bedside practice.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. What is the standard repositioning interval on your unit? Is it applied consistently across all shifts, including nights and weekends?
2. How do you currently document repositioning? Does your documentation accurately reflect what is being done?
3. Which patients on your unit are most likely to miss repositioning and why? What could change to address this?

2.2 Prophylactic dressings

Prophylactic multilayered foam dressings are frequently applied to the anatomical sites at highest risk of PIs, particularly the heels and sacrum. Being multilayered means the dressing is built from several distinct layers rather than a single block of material, typically including a top film, one or more foam layers and a skin-contact layer. This layered construction is not just about padding; it's what allows the layers to move relative to one another, which is key to how these dressings manage shear. International guidelines recommend the use of prophylactic dressings for patients identified as at risk (NPIAP/EPUAP/PPPIA, 2026).

Prophylactic dressings protect tissue through three distinct mechanisms:

- Reducing tangential loading on the skin and soft tissue – limiting the sideways “drag” forces transmitted through the skin during movement or repositioning
- Dissipating frictional and shear-related mechanical energy within the dressing itself, rather than letting that energy pass through to the tissue below
- Redistributing local skin and soft tissue loads, so pressure and shear forces are spread rather than concentrated at a single point.

Together, these mechanisms reduce stress and strain in the underlying tissues, which are the mechanical forces most closely linked to tissue damage.

Part 2. Prevention strategies

How well a given dressing performs biomechanically depends on several factors, including its materials, construction, layer architecture, frictional behavior, conformability and condition during use. Not every foam dressing achieves this equally well, which is why product-specific evidence matters (see below).

What a prophylactic dressing is not

Prophylactic dressings should not be thought of as “mini-mattresses” or as extra cushioning added to the support surface. These two elements have different jobs. The role of a support surface is to provide immersion and envelopment, mitigating excessive pressure across the body as a whole. A key role of the dressing, in contrast to that of the support surface, is to focus on shear mitigation at the more vulnerable body regions where it is applied.

Understanding this distinction is important because a dressing is not a substitute for an appropriate mattress or cushion, and choosing one does not reduce the need for the other.

What to look for in a prophylactic dressing

As with other prevention products, prophylactic foam dressings are not biomechanically equivalent. When selecting a prophylactic dressing, look for verified evidence of performance under clinically relevant loading and moisture conditions, including:

- **Shear mitigation:** evidence that the dressing reduces tangential load transmission or dissipates frictional/shear-related mechanical energy, for example through controlled internal dressing deformations or interlayer sliding where that’s part of the design
- **Microclimate management:** the dressing’s ability to limit excessive heat and moisture buildup at the skin-dressing interface, reducing skin overhydration and the adverse changes in tissue tolerance and interface friction that come with it
- **Conformability:** the ability to follow irregular anatomical contours without edge loading, folding of the dressing or focal stress concentrations, while maintaining stable and continuous contact with the skin
- **Secure, repositionable adhesion:** the dressing can be lifted regularly to check the skin beneath, without damaging surrounding tissue.

Realities Identified by the Expert Working Group

Prophylactic dressing use is inconsistently defined across guidelines and organizational policies. The Expert Working Group noted that purchasing decisions frequently prioritize unit cost over prevention effectiveness, reflecting purchasing/procurement’s limited understanding of PI biomechanics.

ALLEVYN™ COMPLETE CARE Foam Dressing

ALLEVYN™ COMPLETE CARE (Smith+Nephew) is a next-generation 5-layer foam dressing, designed to provide advanced protection against the biomechanical factors that contribute to PIs. In laboratory testing, the dressing demonstrated a frictional energy absorber effectiveness of 93% under the tested conditions, reflecting dissipation of frictional/shear-related mechanical energy through internal layer-on-layer sliding. Accompanying finite element modeling consistently showed reductions in soft tissue strain and stress concentrations in the supported heel during a simulated sliding-in-bed process (Orlova et al, 2025).

Biomechanically relevant features of ALLEVYN™ COMPLETE CARE include:

- **Comfort STAY™ soft silicone adhesive technology** allows the dressing to be repositioned without losing adhesion, allowing the skin to be inspected throughout the wear period (as demonstrated *in-vitro*; Smith+Nephew, 2025a)
- **HighFLEX multi-way stretch technology** provides a highly conformable, flexible dressing (Smith+Nephew, 2025b-c) that securely adapts to body contours, helping application over difficult-to-dress or awkward anatomical areas (Rossington et al, 2013; Stephen-Haynes et al, 2013; Simon and Bielby, 2014)

- **Highly breathable top film** supports moisture-vapor transfer and microclimate management. Avoiding excessive heat and moisture accumulation helps preserve skin and underlying tissue tolerance (Smith+Nephew, 2025d)
- **ShearDEFENSE™ unbonded layer technology** permits internal layer-on-layer movement that dissipates frictional/shear-related mechanical energy. *In-vitro* and computational studies associated this mechanism with reduced soft tissue strains and stress concentrations under the tested conditions (Orlova et al, 2025; Smith+Nephew, 2024a–b).

ALLEVYN™ COMPLETE CARE Foam Dressing is available in an extensive range of shapes and sizes, including squares, rectangles, sacral, heel and proprietary multisite designs. It is indicated for a variety of wounds, including shallow, granulating, chronic and acute exudative wounds, as well as full- and partial-thickness wounds. Specific clinical applications include PIs, leg ulcers, diabetic foot ulcers, surgical wounds, superficial and partial-thickness burns, skin graft donor sites, skin tears and fungating ulcers. ALLEVYN™ COMPLETE CARE Foam Dressing is also indicated for the prevention of PIs on intact skin, when used as part of a PIP protocol.



Summary

Prophylactic multilayer dressings help reduce shear and redistribute load at high-risk sites, but they should be used alongside repositioning and appropriate support surfaces rather than as a replacement for either.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. Are prophylactic dressings currently in use on your unit? If so, which sites are they applied to and is application consistent across shifts?
2. If a colleague asked you to explain how a prophylactic dressing prevents tissue damage, what would you say?
3. What are the main barriers to consistent prophylactic dressing use in your setting? Are these clinical, operational or financial?

2.3 The LEAF™ Patient Monitoring System

The LEAF™ Patient Monitoring System is designed to support safe, consistent and patient-specific repositioning. Rather than relying on fixed, time-based turning schedules, the system provides real-time information on each patient's movement, position and activity, allowing nurses to tailor repositioning care to individual patient needs.

At the bedside, this means nurses can glance at the dashboard and know:

- **Who** needs to be turned
- **When** they need to be turned
- **Whether** the last turn was performed correctly and maintained for an appropriate length of time.

How the system works

The LEAF™ Patient Sensor is a small, single-use, wireless sensor, similar in application to an electrocardiogram (ECG) lead that is placed on the patient's chest. It continuously tracks movement and body orientation, including whether the patient is lying on their back, on their side or prone, or is sitting or standing.

Data from the sensor is transmitted in near real time to the LEAF™ System nursing dashboard, which displays alerts and repositioning status at the point of care and via centralized views (Meacham et al, 2017; Schutt et al, 2017). At the bedside, this means nurses can quickly see:

- Whether a patient has been repositioned or is repositioning themselves
- Whether the turn was sufficient to offload the targeted pressure area
- How long the patient has remained in their current position.

Part 2. Prevention strategies

Repositioning protocols can be customized for each patient, and the system alerts caregivers if someone stays in one position longer than prescribed, which encourages an intervention to reduce the duration of sustained, localized soft tissue loading.

Over time, by analyzing real-time movement patterns, including turn frequency, angle and position-based unloading intervals (Larson et al, 2017), the LEAF™ System may help reduce unnecessary turning and confirm that patients consistently reach their assigned degree of turn.

The LEAF™ System can also integrate with the facility's EHR, allowing turn events to be documented automatically and in real time rather than through manual charting. This reduces the documentation burden on nursing staff and produces a more complete, timestamped record of repositioning care.

Clinical evidence

Clinical evidence demonstrates significant improvements in repositioning adherence, PI outcomes and workflow efficiency following LEAF™ System implementation. Facilities using the LEAF™ System have reported turn protocol adherence of up to 98% (Schutt et al, 2017). Additional key findings from published studies are summarized in [Table 2](#).

Table 2. Summary of clinical evidence demonstrating outcomes following LEAF™ System implementation.

Study/setting	Clinical outcomes reported
Pragmatic randomized clinical trial (n>1,300; Pickham et al, 2018)	73% reduction (2.7% to 0.7%, $p=.012$) in odds of developing a HAPI compared with standard care
California Magnet hospital (Rosini, 2020)	- Repositioning adherence increased from 67% to 95% over six months 84.6% reduction in sacrococcygeal PIs (2.97% to 0.46%, $p<.0001$)
Long-term acute care hospital, New Jersey (Rogers, 2020)	- Average repositioning adherence of 87.3% 85% reduction in sacrococcygeal HAPIs (29% to 5%, $p<.00001$) - Estimated \$1.4 million in avoided HAPI-related costs over nine months
Florida Magnet hospital ICU 3-month pilot (Gasparini et al, 2021)	67% reduction in ICU-acquired sacrococcygeal PIs (4.11% to 1.34%) \$561,340 in avoided HAPI-related costs during the pilot - Projected \$3.4 million annual enterprise-wide return on investment
Embedded pragmatic cluster randomized controlled trial (n=992; 9 nursing homes; TEAM-UP; Yap et al, 2022)	100% reduction (5.24% to 0.0%, $p<.001$) in PI incidence 4-hour interval had the best repositioning compliance (95% vs 90% at 3-hour and 80% at 2-hour, $p<.001$)
Multiple healthcare settings (Rogers, 2020; Smith+Nephew, 2020)	- Improved repositioning adherence and clinical workflow efficiency - Reduced unnecessary turning and improved staff prioritization



Summary

Sensor-based monitoring gives real-time, patient-specific repositioning data instead of a fixed schedule, and studies link it to higher turn adherence and fewer HAPIs.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. How is repositioning adherence currently measured on your unit? How confident are you in the accuracy of that data?
2. What would a 73% reduction in the odds of HAPIs mean in practical terms for your unit, patients, staff, and the organization as a whole?
3. What infrastructure, workflow or cultural changes would be needed to implement a sensor-based monitoring system on your unit?

Part 3. Implementing change – the quality improvement toolkit

3.1 Why quality improvement?

You may already know what best practice looks like on paper. But knowing guidelines and implementing them consistently are two very different things, and the gap between them is where most HAPIs occur.

Quality improvement (QI) is a structured approach to closing that gap. At its core, QI means noticing when something is not working as well as it should, understanding why, testing a small change and checking whether the change made a difference.

QI is not a bureaucratic exercise – it is how teams can translate evidence into reliable, everyday practice.

Best Practice Statement

QI principles can be seen in everyday life, for example, adjusting how tasks are organized at home to save time, or changing routines at work to reduce errors. In clinical care, the same principle applies: small, well-designed adjustments can lead to safer care and fewer PIs when applied consistently.

Why QI is needed in PIP

PIP is complex and influenced by many factors, including patient condition, staffing levels, equipment availability, workflows, documentation systems and how care is organized across shifts and disciplines. Even when the right products and protocols exist, outcomes vary if prevention is not implemented consistently.

Realities Identified by the Expert Working Group

The Expert Working Group emphasized that while QI processes are generally well defined, the main gap lies in accountability in practice and in having clear, practical tools to support the translation of recommendations into bedside practice.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. Has your unit completed a formal QI project related to PIP in the last two years? What was the outcome and what was learned?
2. In your experience, where does the biggest gap sit between 'what the policy says' and 'what actually happens at the bedside'?
3. Who on your unit would you identify as a natural champion for a PIP QI project and who might be resistant? Why?

Part 3. Implementing change – the quality improvement toolkit

3.2 Overview: the five-step toolkit

This toolkit provides a step-by-step framework to guide teams through PIP improvement work. The steps are designed to build understanding first, then support action.



Step	What you are doing	Suggested tools	Who should be involved
1	Understand your problem	Pathway mapping	Bedside nurses, nurse leaders, support staff
2	Assess your current state	Electronic medical record reports, incident data, audits, observation	QI lead, data team, nursing staff
3	Identify why pressure injuries are occurring	Fishbone diagram, stakeholder map, power-interest grid	Multidisciplinary team
4	Plan, test and implement changes	Driver diagram, project plan, Plan-Do-Study-Act cycles	Full team and leadership
5	Share and learn from feedback	Data review, team reflection, feedback sessions	All staff

Using the toolkit in practice

There is no single “right” tool for QI. This toolkit provides examples, not rules. The most appropriate tools will depend on:

- Who you are working with
- What you are trying to improve
- Your care setting and available resources.

The goal is not to complete every tool, but to select what is most useful and apply it in a way that supports meaningful and sustainable change.



Best Practice Statement

All steps in the toolkit are flexible. As understanding of problems evolves, teams may need to change direction, refocus efforts or adapt interventions. This flexibility is a strength of QI, not a limitation.

Best Practice Statement

Before you start, understand the scope. Is the problem unit-wide or confined to one shift? Are all PI stages affected, or mainly Stage 1 injuries in patients with dark skin tones – bearing in mind that Stage 1 PIs are notoriously difficult to identify in patients with dark skin tones, so apparent trends here may partly reflect detection challenges rather than true incidence? Are all anatomical sites involved, or mainly specific sites such as the sacrum, the heels or device-related injuries? Has anything recently changed, such as leadership, staffing, supply availability or the loss of a key champion?

Understand your problem

Focus: What is actually happening in your setting?

Typical time: 1–2 unit meetings and a 48-hour observation period

Before introducing new tools, products or education, it is important to understand why PIs are occurring in your unit or organization. In practice, it can be tempting to jump straight to solutions, such as new mattresses or additional training. While these actions are well-intentioned, they may not lead to improvement if the underlying problem has not been clearly identified.

Understand how care is delivered

Pathway mapping [Figure 10, page 23] is a practical tool that helps your team understand how care is actually delivered, not how policies or guidelines say it should be delivered. It makes visible the workarounds, gaps and variations that are invisible in documentation.

To run a pathway mapping session:

1. Bring together people involved in care delivery, e.g. bedside nurses, nurse leaders, support staff (see Figure 12, page 28 for stakeholder mapping)
2. Map each stage of care step by step, focusing on what actually happens during a shift (rather than what policies or guidelines suggest should happen)
3. Build in space for notes on variation, workarounds and risks
4. Display the map in the clinical area for 48 hours and invite relevant colleagues (including night staff) to add comments.

Clinical Tip

Allow anonymous comments on the pathway map to encourage honest feedback and help surface issues that may not be raised during formal meetings. It is also important to ensure that night staff are represented, as they may experience care differently from day staff. For example, schedule the initial meeting between 7:00 and 7:30am, while night staff are still on shift and able to attend before handoff.

Best Practice Statement

Your systems create your outcomes. If you want different results, you need to change your systems.

Realities Identified by the Expert Working Group

When the Expert Working Group mapped the pathway for prophylactic dressing use, four distinct breakdown points emerged: unclear procurement guidance, inconsistent staff knowledge about shear mechanics, no bedside decision support for when and how to apply dressings and dressing application being documented in free-text nursing notes rather than the structured EHR field designed to capture it, making the data unreliable for tracking compliance or triggering reminders.

Pathway mapping made these four separate problems visible as a connected system, allowing the Expert Working Group to address the real issue, rather than repeating generic training that has not changed outcomes.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. If you mapped the pathway for PI prevention on your unit right now, where do you think the first breakdown point would be?
2. Are night staff and weekend staff involved in improvement discussions on your unit or only day staff? How might this affect your understanding of the problem?
3. What workarounds are you aware of on your unit that exist because the official process does not work in practice?



Assess your current state

Focus: What do your data and observations tell you?

Typical time: 1–2 weeks of data review and bedside observation

Once you understand the problem, you need to assess how your unit is currently performing. This helps you focus improvement efforts where they are most needed and prevents time being spent on things that are already working.

Part A. Review your data

Most units already have more data available than they realize. Start with what you have and add to it rather than waiting for a comprehensive data set.

Useful data sources include:

- Chart audits and documentation reviews
- EHR systems and internal quality reporting dashboards
- Incident reporting systems and safety event platforms
- Interviewing staff and asking questions on rounds
- Observations from leadership safety rounds or individual unit rounds
- Reports from Quality, Risk, Patient Safety or Health Outcomes teams
- Root cause analyses (a review done after a HAPI is identified, in order to identify underlying causes and prevent recurrence) and case reviews of HAPIs
- Process measure reviews.

National and benchmarking resources may also help contextualize local data and inform best practice. These include the AHRQ patient safety tools, the International Pressure Ulcer Prevalence survey and the National Database of Nursing Quality Indicators.

If baseline data is limited, improvement work does not need to wait. Simple data collection over one to two weeks, on a single unit, shift or patient group, is often enough to get started.

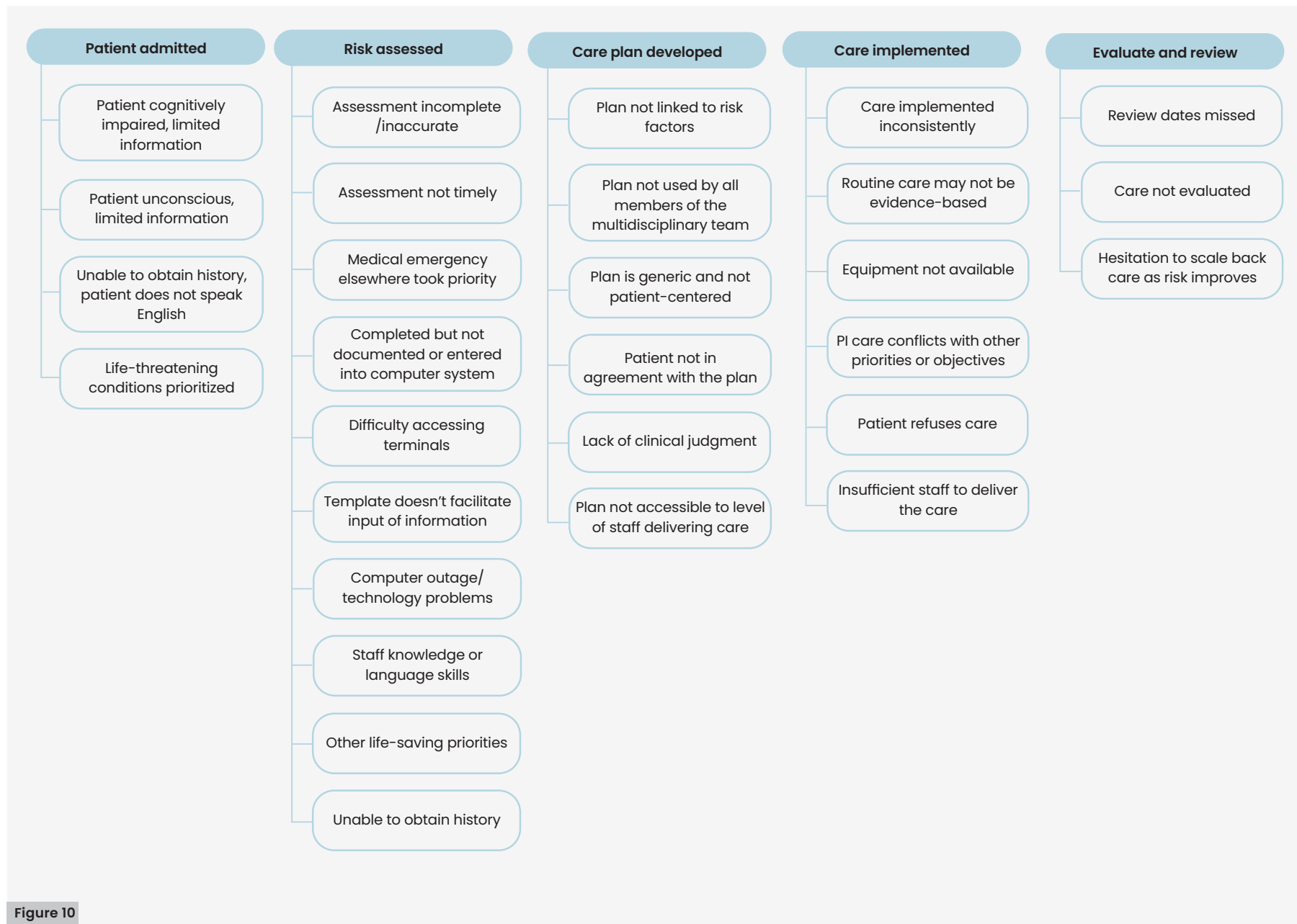


Figure 10. Example pathway map illustrating common contributing factors to hospital-acquired pressure injuries (HAPIs) across the patient care process. The pathway map highlights potential gaps in assessment, care planning, implementation and evaluation that may increase PI risk.

Part 3. Implementing change – the quality improvement toolkit

Realities Identified by the Expert Working Group

The Expert Working Group agreed that most teams have more data than they realize but rarely use it to understand what is actually happening. EHR documentation was described as inconsistent and often reduced to checkbox entries that don't reflect real practice. The Expert Working Group emphasized the value of combining data sources, for example, outcome data, direct observation and incident reports together to paint a much more accurate picture than any single source.

What to measure

When reviewing data, measure across three categories:

Measure type	What it tells you	Examples
Outcome measures	What result is your care producing?	• New HAIs by stage, location and device-related injuries • Common contributing factors • When injuries develop (e.g. during early admission, post-ICU, post-surgery)
Process measures	Are prevention strategies being applied consistently?	• Completion of risk assessments (e.g. the Braden Scale) • Adherence to repositioning schedules • Consistent and appropriate prophylactic dressing use • Correct use of support surfaces and repositioning aids
Balancing measures	Are changes causing unintended problems?	• Increased mobilization may reduce PI risk, but could increase risk of falls – watch for unintended effects of every change you test

Clinical Tip

Comparing your data to other organizations can be useful but interpret comparisons carefully. PI measurement varies widely and differences in definitions and methods can make results misleading.

Important differences may include:

- Whether patients or individual PIs are counted
- Whether rates are reported as raw numbers or per 1,000 patient days
- Whether Stage 1 PIs are included or excluded
- Whether prevalence or incidence data are used
- Whether data comes from documentation or direct skin assessment
- Where data is validated.

Tracking your own trends over time is usually more meaningful than external benchmarking.

Realities Identified by the Expert Working Group

The group agreed that measuring new injuries per 1,000 patient days gives a more accurate picture than counting injuries per person, particularly for repositioning programs. Some organizations also excluded patients receiving hospice care from these counts, although newer quarterly prevalence studies in the United States are expected to begin including them.

Part B. Observe care at the bedside

Numbers alone do not tell the full story. Direct observation shows you what is actually happening during a shift and it often reveals gaps that data never captures.

When observing, look specifically at:

- Whether repositioning is carried out on time and correctly
- Whether skin assessments happen during care and how thorough they are
- Whether pressure-relieving equipment is available, correctly set up and actually in use
- Whether documentation accurately reflects what was done.

Clinical Tip

Use a simple checklist to keep observations consistent. Note who completes each step, when and where variation occurs across staff, shifts or patient groups. Observation often reveals unclear expectations, workflow barriers or equipment that is inaccessible, missed nursing care or lack of staff accountability.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. What data sources does your unit currently use to track PI prevention? Are they being used to drive practice change or only for reporting purposes?
2. If you observed care on your unit tomorrow, what do you predict you would see? How confident are you in that prediction?
3. Where does documentation on your unit tend to diverge from actual practice and why?



Identify why pressure injuries are occurring

Focus: What system factors are driving these outcomes?

Typical time: One team workshop session (1–2 hours)

Once you have reviewed data and observed care, bring your team together to understand the system factors contributing to PIs. This step is about shifting focus from individual performance to shared understanding of why the system is producing these outcomes.

Tool 1. Fishbone diagram

A fishbone (or cause-and-effect) diagram helps a team explore why a problem is happening by looking at multiple contributing factors at once. It structures brainstorming so that related causes are grouped together.

The diagram is shaped like a fish:

- The 'head' represents the problem – for example, a high HAPI rate on the surgical unit
- The 'bones' represent groups of contributing factors – such as practice variation, processes, resources, data, communication and accountability.

Part 3. Implementing change – the quality improvement toolkit

How to use it

1. Write your problem statement at the head of the diagram
2. Brainstorm contributing factors under each category, drawing on your data and observations
3. Identify which factors your team can realistically address first.

Best Practice Statement

You do not need to fix everything at once. The goal of this step is shared understanding, not immediate solutions. When teams invest time in understanding the problem, improvement strategies are more effective, better accepted by staff and easier to sustain.

Realities Identified by the Expert Working Group

A unit with low trust in data outputs was also less likely to invest in governance structures. A manager resistant to additional workload was unlikely to champion the super-user model. Understanding how barriers connect is what allows teams to act on the right lever, rather than addressing surface-level symptoms.

Example fishbone diagrams for PIP

Fishbone diagrams will look different depending on the clinical setting, patient population and systems in place. There is no single “correct” fishbone.

Taking the implementation of a patient sensor monitoring system as the example problem, **Figure 11** presents a completed fishbone diagram highlighting common contributing factors that may impact successful adoption and use. These include challenges related to clinical workflows, staff engagement and resistance, training, technology integration and resource availability. This example demonstrates how gaps in processes, communication and system support can interact to limit effective use of patient sensor monitoring and reduce its potential impact on PIP.

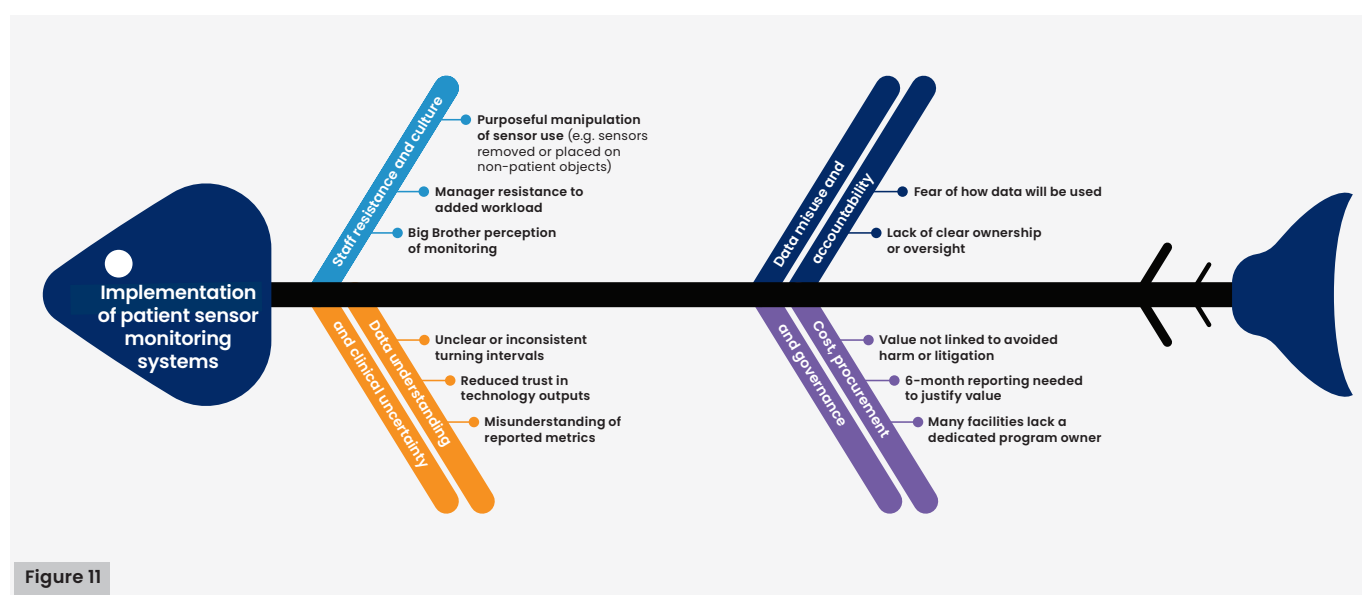


Figure 11. Example fishbone diagram illustrating common contributing factors affecting the implementation of patient sensor monitoring systems. This completed diagram highlights how gaps in workflows, staff training, technology integration and available resources can influence adoption and effectiveness in supporting patient repositioning and PIP.

Tool 2. Stakeholder mapping

PIP is not the responsibility of one person or one discipline. Successful improvement depends on identifying and engaging the right people and understanding that different people need different levels of involvement.

Who counts as a stakeholder?

A stakeholder is anyone who is affected by PIP, influences how care is delivered, controls relevant resources or decisions or can support or unintentionally block change. Stakeholders may include:

- **Frontline care teams:** bedside nurses, nursing assistants and wound care teams who are closest to day-to-day implementation
- **Nursing leadership:** nurse unit managers and directors of nursing responsible for practice standards, staffing decisions and resource allocation
- **Education and clinical support:** clinical educators and clinical nurse specialists who support training, competence and sustained practice change
- **Multidisciplinary clinical teams:** physicians and allied health professionals who influence care planning, mobility, nutrition and other factors affecting PI risk
- **Quality and safety teams:** quality, risk and patient safety teams who provide data, governance and improvement support
- **Executive sponsors:** leaders such as the Chief Nursing Officer, Chief Medical Officer, Chief Quality Officer and finance leads who can support strategic alignment, value-based purchasing and resourcing decisions
- **Operational and support services:** materials management, patient handling and equipment teams who ensure products, devices and support systems are available and usable.

Tool 3. Power–interest grid

Once you have identified your stakeholders, the next step is to prioritize them. Plotting each stakeholder on a grid helps teams decide who needs close involvement, who needs regular updates and who simply needs to be kept informed.

A power–interest grid [Figure 12, page 28] helps teams prioritize engagement by considering:

- **Power:** the ability to influence decisions, resources or outcomes
- **Interest:** how invested the person or group is in PIP outcomes.

Not all stakeholders will have the same level of influence over the project, nor the same level of interest in its outcomes.

Clinical Tip

If someone can approve, delay, redirect or stop your work, they are a stakeholder.

Stakeholder positions change over time. For example, once a stakeholder has fulfilled their role, such as approving a proposal, allocating resources or delegating responsibility, they may no longer remain highly interested as their focus shifts to other organizational priorities. At this point, their influence may remain high, but their level of active engagement may decrease.

Revisit the grid as your project moves through planning, testing and implementation.

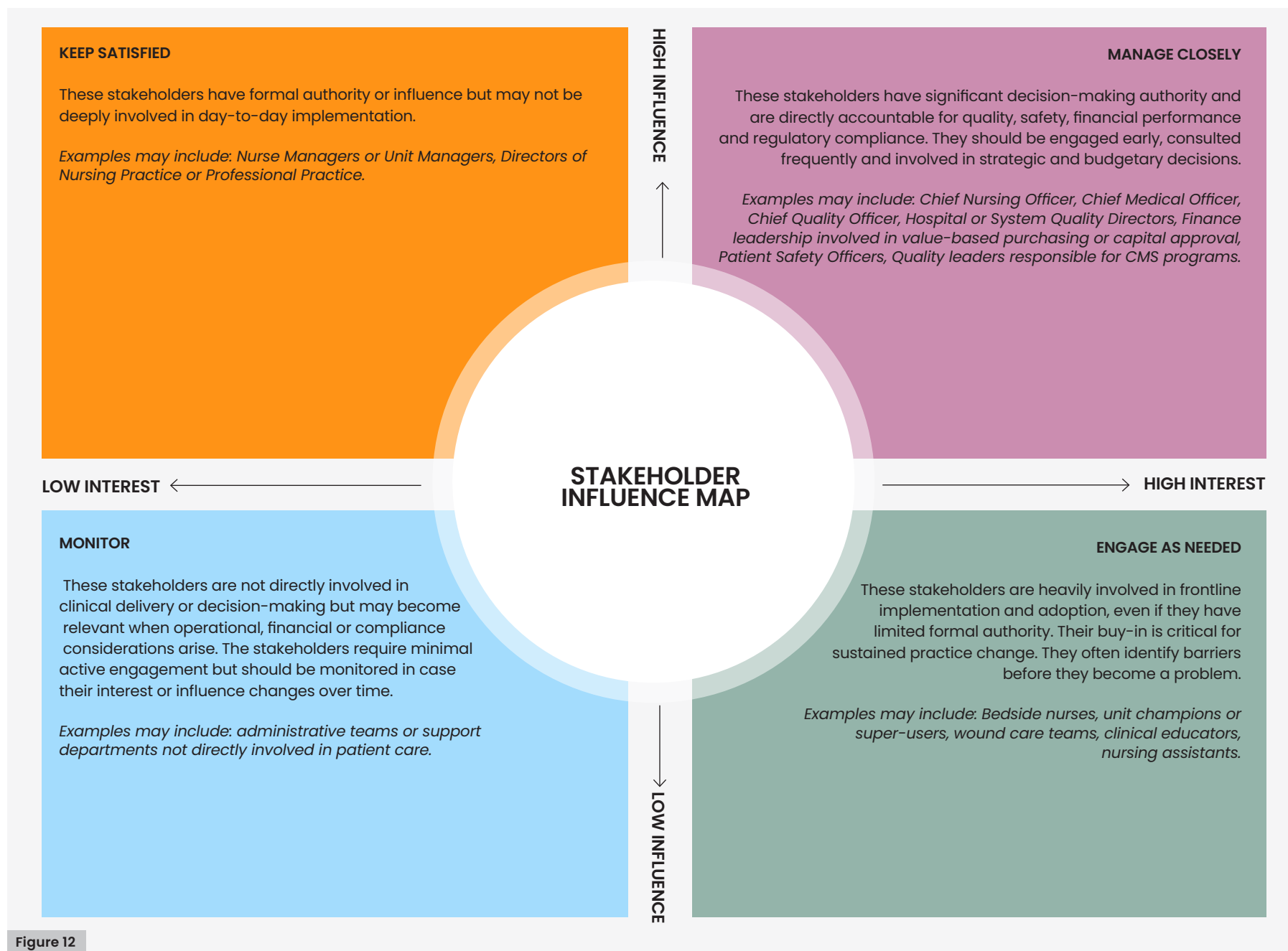


Figure 12

Figure 12. Example of a stakeholder map showing how stakeholders may be grouped based on power and interest (illustrative only: Teams should identify and categorize stakeholders based on their local clinical workflows, governance structures and organizational context).

Part 3. Implementing change – the quality improvement toolkit

Clarifying roles and responsibilities

QI works best when everyone understands what needs to be done, who is responsible and how it connects to everyday care. [Table 3](#) provides an example of how roles and responsibilities might be shared when implementing a turning and repositioning system, including LEAF™ integration. These are illustrative only; adapt to your local staffing model, workflows and resources.

Table 3. Suggested roles and responsibilities for turning and positioning system implementation.

Task/intervention	Suggested person responsible	Suggested roles and responsibilities
Develop a step-by-step QI implementation plan	• QI Lead • QI Manager • Nurse Manager • Wound, Ostomy and Continence (WOC) Nurse	• Lead project planning and timelines • Coordinate multidisciplinary input • Review current evidence and national guidelines (e.g. NPIAP/EPUAP/PPPIA, 2026) • Ensure interventions align with best practice • Define clear workflow and accountability
Identify unit and facility-specific challenges (product access, workflows, patient environment)	• Nurse Manager • Supply Chain/Materials Manager • Nursing Leadership (Director of Nursing) • Digital Solutions teams	• Assess unit-specific workflow and patient care environment • Identify operational, staffing or product-related barriers • Propose feasible solutions within budget and contract constraints
Develop turning and repositioning protocols (including LEAF™ System integration)	• WOC Nurse • Nurse Educator/Clinical Nurse Specialist • QI Lead	• Develop evidence-based repositioning and mobility protocols • Integrate LEAF™ System workflows into standard nursing care • Ensure clarity and consistency for bedside staff
Staff education (initial training, follow-up certification)	• Nurse Educator • WOC Nurse	• Deliver initial and refresher training sessions • Provide hands-on education for LEAF™ System use • Validate and document staff competency • Track education completion for compliance • Coordinate with the vendor's clinical resource specialist (CRS) for additional training and troubleshooting support
Implement bedside support (super-user model and clinical resources)	• Unit-based Super-Users • WOC Nurse	• Provide real-time bedside coaching and troubleshooting • Serve as clinical champions and first-line support • Reinforce best practices and protocol adherence
Access, analyze and review HAPI data	• QI Coordinator/Data Analyst • Quality Management/Risk Management Department	• Provide historical and current HAPI data • Track outcomes • Identify trends for improvement
Display HAPI data and product utilization metrics monthly	• Unit Manager • QI Lead	• Communicate unit-level performance • Facilitate discussions with staff to gather feedback
Assist with implementation and documentation of interventions	• Nurses on shift	• Apply protocols at the bedside • Document interventions and outcomes
Monitor product stock and availability	• Materials Management Personnel • Unit Manager	• Track product use • Manage inventory • Reorder to prevent stockouts



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. Complete a quick mental fishbone for PIP on your unit: what would appear under 'staffing', 'processes', 'equipment' and 'communication'?
2. Who is the most influential stakeholder for a PIP QI project on your unit right now and have they been engaged? What is your relationship with them?
3. Is there a clear owner for PIP on your unit, someone who coordinates across shifts, disciplines and leadership? If not, who could step into that role?



Plan, test and implement changes

Focus: What should be done differently and how will you know if it works?

Typical time: Ongoing. Plan in weeks, test in cycles

With your problem understood, your current state assessed and your contributing factors identified, you are ready to test changes. Three connected tools support this step: a driver diagram to map what needs to change, a project plan to organize the work and Plan–Do–Study–Act (PDSA) cycles to test changes safely before rolling them out.

Tool 1. Driver diagram: What needs to change?

Every QI project begins with a clearly defined aim: what do you want to improve, where, by how much and by when. In the context of PIP, this often relates to reducing the number or severity of HAPIs on a specific unit or within a defined patient population.

A driver diagram is a visual tool that maps the relationship between the overall aim and the factors that influence that outcome.

To ensure clarity and measurability, aims should be written using the SMART framework:

Measure type	What it tells you	Examples
Specific	Clear focus of improvement	Reduce heel PIs in a critical care unit
Measurable	Quantifiable outcome	By 30%
Achievable	Realistic given available resources	Within available staffing and equipment budget
Relevant	Aligned to patient safety priorities	Aligned to our organizational PIP strategy
Time-bound	Clear deadline	Within 12 months

Clearly documenting the aim provides a shared focus for the team and establishes a reference point for evaluating progress over time.

Understanding drivers using a driver diagram:

Once the aim is agreed upon, teams can use a driver diagram to understand what needs to change to achieve it.

Driver diagrams typically include:

- **Primary drivers:** Major system-level factors that directly influence the outcome (e.g. repositioning adherence, prophylactic dressing use)
- **Secondary drivers:** Specific processes or conditions that support each primary driver (e.g. staff education, workflow integration, device availability)
- **Change ideas:** Practical interventions that can be tested to influence the drivers (e.g. add LEAF™ check to shift handoff; assign a unit champion).

Part 3. Implementing change – the quality improvement toolkit

Figure 13, page 32 shows an example driver diagram aimed at reducing HAPIs in the Surgical Intensive Care Unit (SICU) within 12 months, using two primary drivers: LEAF™ Patient Monitoring System implementation and prophylactic dressings.

A key benefit of the driver diagram is that it helps teams prioritize. By visually mapping contributing factors, teams can focus on changes most likely to have an impact, rather than attempting to address all possible issues at once.

The drivers and change ideas presented in this document are illustrative only. Effective driver diagrams should be developed using local data, clinical workflows and frontline experience. This local focus is central to QI because strategies that work well in one setting may not transfer directly to another.

Clinical Tip



When prioritizing actions, it can be helpful to apply the Pareto principle to identify areas of greatest potential impact. Focus on the 20% of factors most likely to drive 80% of improvement. Identifying a few quick wins early in the project builds team confidence and momentum, do not underestimate this.

Scan QR code for information on the Pareto principle

How to read a driver diagram

A driver diagram shows how a team believes improvement will happen:

- The aim (far left) states what the team wants to achieve and by when
- Primary drivers are the major areas that must change to achieve the aim
- Secondary drivers describe the conditions or processes that need to be in place within each primary driver
- Change ideas are specific, testable actions the team can try in practice.

The diagram represents the team's current theory of improvement. It is expected to change as learning occurs.

Tool 2. Project plan – how will you make this happen?

A project plan turns your driver diagram into concrete, accountable actions. It clarifies who does what, when and how you will know if it is working. Importantly, it keeps improvement work realistic and manageable, particularly in busy clinical environments.

At a minimum, it should specify:

- **What** changes will be introduced
- **How** change ideas will be prioritized
- **Who** is responsible for each part of the work
- **When** changes will be tested
- **How** success will be measured – including outcome, process and balancing measures.

Measures should reflect more than outcomes alone. At a minimum, plans should include:

- Outcome measures, such as HAPI rates
- Process measures, such as completion of repositioning or device use
- Balancing measures such as identifying unintended consequences.

Clinical Tip

Include patient experience where possible. Brief bedside interviews or post-discharge surveys asking about comfort and repositioning can reveal the impact of change in ways that outcome data alone is unable to.

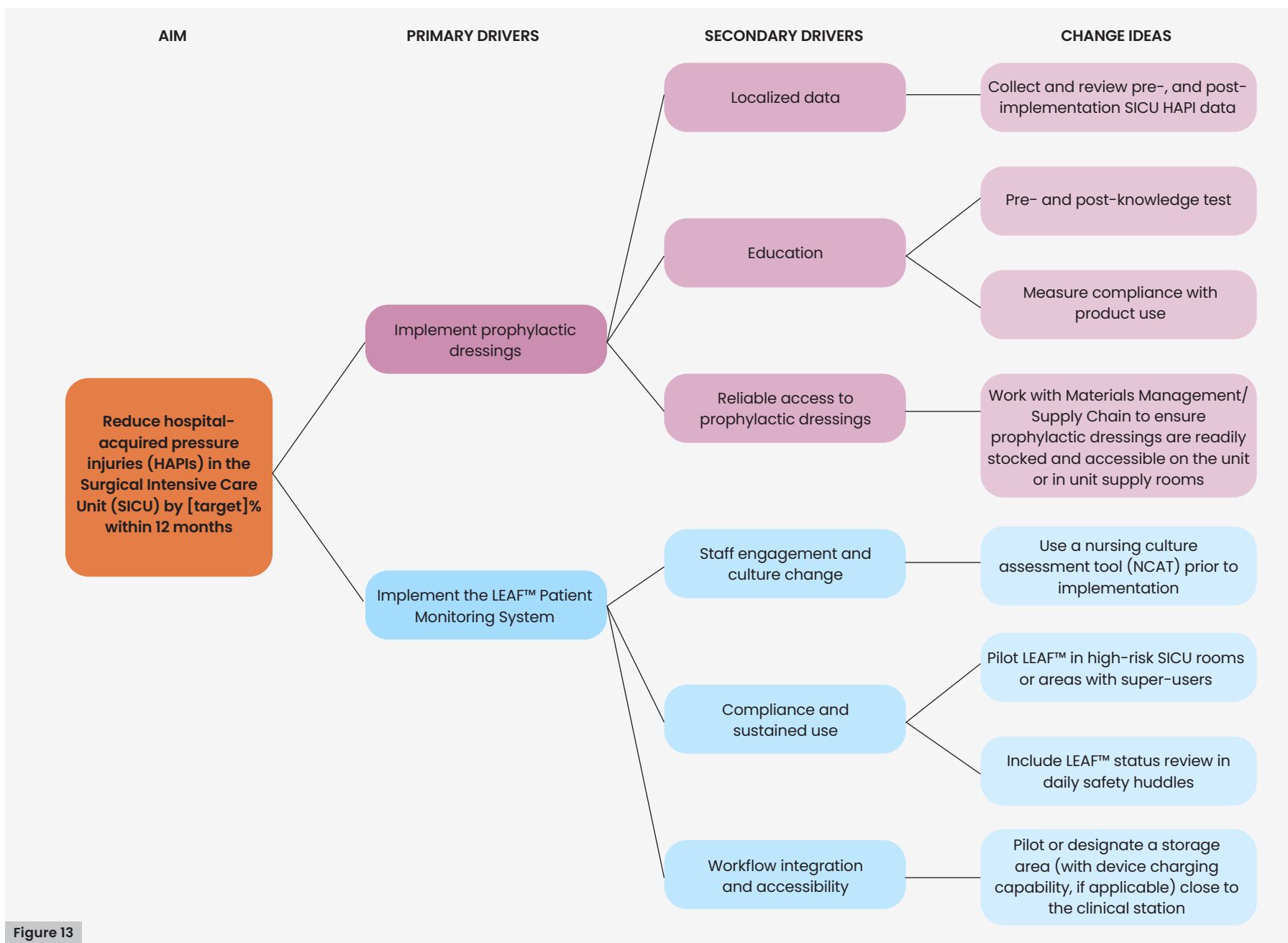


Figure 13

Figure 13. Example driver diagram for reducing HAPIs in the Surgical Intensive Care Unit (SICU) within 12 months, using two primary drivers: LEAF™ Patient Monitoring System implementation and prophylactic dressings.

Part 3. Implementing change – the quality improvement toolkit

Table 4 provides an example of a project plan for implementing the LEAF™ Patient Monitoring System as part of a PIP strategy. This example demonstrates how broad improvement goals can be translated into measurable, practical actions at the unit level.

The measures and targets shown are illustrative only and should be adapted to local priorities, workflows and data availability.

A clear project plan helps ensure that improvement work does not rely on individual effort alone. Instead, it supports consistent practice by aligning education, workflows, leadership support and data visibility.

This structured approach also prepares teams for the next step in QI: testing changes on a small scale and learning from results, which is described in the following section on PDSA cycles.

Table 4. Example project plan to implement the LEAF™ Patient Monitoring System with the overall intention of preventing hospital-acquired pressure injuries (HAPIs).

Driver – list the drivers you'll be working on	Process measure	Goal
1. Staff education and competency on LEAF™ use	• % of staff trained and competent on LEAF™ use • Completion of post-training competency assessments	• ≥95% of nursing staff trained and competent within 8 weeks
2. Workflow integration with nursing routines	• % of eligible patients placed on LEAF™ • % of shifts with LEAF™ data reviewed	• ≥90% of eligible patients placed on LEAF™ within 24 hours of identification
3. Device availability and maintenance	• % of shifts where LEAF™ devices are available and functional • Number of device-related downtime incidents	• 100% device availability on participating units • <5% of shifts affected by device issues
4. Leadership and unit champions	• Number of trained unit champions • Frequency of compliance feedback shared with staff	• At least 1 trained LEAF™ champion per unit • Monthly compliance feedback provided
5. EHR integration/visibility	• % of shifts with LEAF™ data visible in EHR or handoff tools • % of turn events auto-documented via EHR integration	• LEAF™ data visible and used in ≥90% of handoffs within 3 months • ≥90% of turn events auto-documented via EHR integration within 3 months

Tool 3. Plan-Do-Study-Act (PDSA) cycles: test changes on a small scale

In QI, changes are commonly tested using PDSA cycles. The PDSA cycle allows teams to test changes on a small scale, review outcomes and make adjustments before wider implementation. When effectively implemented, it can improve patient care and efficiency. However, improper use can lead to wasted resources and ineffective changes.

Each PDSA cycle follows four linked steps.

P	Plan: decide what to test <i>Objective: Agree on a small-scale test and what you expect to happen.</i> ☐ What are you trying to change? ☐ What do you predict will happen? ☐ How will you measure success? ☐ Who is involved and when?
D	Do: test change on a small scale <i>Objective: Run the test.</i> ☐ Pilot the change on a small scale (e.g. one unit, one shift or a small group of patients) ☐ Communicate and brief all staff involved about the test ☐ Assign one person to oversee the test ☐ Document what happens, including anything unexpected
S	Study: what did you learn? <i>Objective: Review the results and understand why the change did or did not work.</i> ☐ Was the change feasible for staff to implement? ☐ Were staff aware, trained and supported? ☐ Did outcomes improve as expected? ☐ What barriers or unintended effects appeared? ☐ Compare results to baseline and staff feedback ☐ Decide whether adjustments are needed before scaling up
A	Act: decide what happens next <i>Objective: Use your learning to decide whether to adopt, adapt or abandon the change.</i> ☐ Adopt: Integrate into routine practice if it works consistently ☐ Adapt: Refine and test again if it mostly works but needs adjustment ☐ Abandon: Stop if it does not achieve the intended outcome

All decisions should be clearly documented, including rationale and supporting data. Even when an intervention is adopted, further testing is recommended before wider rollout to ensure reliability across different settings, patient populations or staffing conditions.

Why should you test on a small scale?

- Confirms the change works in your local environment
- Minimizes disruption to staff and workflows
- Allows rapid learning and adjustment before wider implementation.

Learning through iteration: Why multiple PDSA cycles matter

QI is rarely a “one-and-done” process. Most interventions, even seemingly simple ones, require several rounds of testing before a sustainable solution emerges. Examples can be seen in [Tables 5 and 6](#).

Part 3. Implementing change – the quality improvement toolkit

Table 5. Example: Sequential PDSA cycles for implementing LEAF™ Patient Monitoring System.

PDSA cycle number	Change tested	Plan/Do	Study/Act	Outcome
1	Nurses check LEAF™ dashboard during rounds	Nurses asked to check LEAF™ dashboard during routine rounds	Dashboard checks were frequently missed during busy shifts	Abandoned
2	Assigning one nurse per shift to monitor LEAF™	One designated nurse responsible for checking dashboard and reminding staff	Role was not sustainable during short staffing; task often deprioritized	Abandoned
3	LEAF™ check added to shift handoff	LEAF™ status reviewed during nurse-to-nurse handoff	Awareness improved, but follow-through remained inconsistent	Adapted
4	LEAF™ unit champions and standard work	Unit champions provided coaching; LEAF™ check added to rounding checklist	Monitoring became routine; repositioning compliance improved	Adopted successfully

Table 6. Example: Sequential PDSA cycles for implementing prophylactic sacral dressings.

PDSA cycle number	Change tested	Plan/Do	Study/Act	Outcome
1	Sacral dressing for one high-risk population	Apply sacral prophylactic dressings to ventilated patients on one shift	Some eligible patients missed; uncertainty about when to apply or remove	Adapted
2	Add simple eligibility criteria	Defined eligibility (ventilated and limited mobility); shared via shift huddle	Criteria improved consistency, but handoff gaps led to missed applications	Refined
3	Assign responsibility at admission	Primary nurse applies dressing on admission for eligible patients	Improved initiation; maintenance and replacement still inconsistent	Adapted
4	Standardize maintenance expectations	Added guidance on reassessment and replacement during daily skin checks	Better maintenance; some confusion during night shifts	Refined
5	Embed into routine workflow	Integrated dressing check into handoff and daily skin assessment documentation	Consistent application and maintenance across shifts	Adopted successfully

Visual reminders: An example of iterative testing

Many guidelines recommend using visual reminders to alert staff to patients at high risk of PIs. However, in practice, finding a solution that is both effective and practical is rarely straightforward.

In one team's experience (Table 7; Gupta et al, 2020), it took five PDSA cycles to get a visual reminder system right. The team tried wristbands, chart markings and door stickers, but each had problems, from confusion with other identifiers to being overlooked entirely. It wasn't until they placed a sticker on the patient's whiteboard, where staff already look for key information, that the reminder was noticed consistently and successfully adopted.

This example highlights an important point: even simple interventions often need multiple rounds of testing and adaptation before they fit naturally into workflows.

Table 7. Example flow PDSA testing of visual reminders (Gupta et al, 2020).

PDSA cycle number	Change tested	Plan/Do	Study/Act	Outcome
1	Wristband	Colored wristband worn by high-risk patients	Staff were confused because patients already wore ID and allergy bands	Abandoned
2	Colored dot on chart	Dot placed on medical record to indicate high risk	Confusion with other chart markings; concerns raised by medical records staff	Abandoned
3	Colored dot with "PI" initials	Dot labeled with "PI" to distinguish it from other chart markings	Staff still found it unclear; compliance inconsistent	Abandoned
4	Sticker on patient's door	Sticker placed on room door to indicate high risk	Many other stickers already present (e.g. infection, fall risk); PI reminder often overlooked	Not effective
5	Sticker on patient whiteboard	Sticker placed inside the patient's room on the whiteboard, where key information is kept	As this is a location that caregivers already look for information, this test finally proved successful and was adopted	Adopted successfully

Best Practice Statement

Involving frontline staff early reduces the number of PDSA cycles needed. Bedside nurses understand which processes are likely to work in practice — and which are not. Their insight is one of your most valuable assets when designing changes that are practical, sustainable and built to last.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. Write a draft SMART aim for a PIP improvement project on your unit right now. Is it specific enough to measure? Realistic enough to achieve?
2. Looking at the PDSA examples above: which abandoned cycle resonates most with something that has been tried on your unit? What happened?
3. Who on your unit would you involve in the first PDSA cycle for a PIP change and why? Who would you make sure was not left out?



Share and learn from feedback

Focus: What did you learn and what needs to change next?

Typical time: Monthly review meetings and team reflection

Improvement does not stop when a change is adopted. The final step, and the one most often skipped, is maintaining and building on what you have achieved.

Regular multidisciplinary review meetings, monthly at minimum, create a structure for examining outcome data, discussing what is working and identifying what needs further attention. Active staff feedback at this stage is especially valuable for detecting unintended consequences and workflow impact before they become problems.

Clinical Tip

Continue reviewing data even when PI rates have decreased. Rates can deteriorate quickly when practices are not actively maintained, particularly after staff turnover or leadership change.

It is also important to recognize that sustaining implementation often requires more than clinical effort. Embedding change long-term may require organizational approval, resource allocation or a formal business case. Nurses and frontline clinicians are key to identifying problems and testing solutions, but collaboration with quality, finance and operational leaders is often essential for long-term adoption.



Check Your Understanding

Reflect on your own practice before moving to the next section.

1. How does your unit currently share data about PI outcomes with frontline staff? Is it visible, understandable and acted on?
2. Think of a change that was successfully implemented on your unit but later 'drifted back' to old practice. What caused the drift – and how could it have been prevented?
3. If you were making a business case to your Chief Nursing Officer for a PIP improvement project, what data would you need and who would you involve in making the case?

Conclusions

PIP is at the heart of delivering safe, high-quality care. While research and guidance have deepened our understanding of how PIs develop, this knowledge only improves patient outcomes when it is put into action consistently at the bedside. Evidence alone is not enough. Prevention works when care teams have the right resources, access to appropriate, innovative technology products and practical strategies that can be applied day after day.

Throughout this toolkit, the “Realities Identified by the Expert Working Group” reflect what the advisory board consistently described: the tools and guidelines already exist, but translating them into everyday bedside practice is where teams struggle most.

Despite ongoing efforts across healthcare systems, PIs remain common and continue to place a significant burden on patients, clinicians and organizations. The causes are often complex, shaped by patient factors, clinical practice, staffing pressures and system limitations. QI provides a way to break this complexity into manageable steps, allowing teams to focus on what can realistically be changed in their own workplace.

That is what this toolkit is designed to support. The pathway mapping, fishbone diagrams, driver diagrams and PDSA cycles described here are not abstract frameworks; they are the practical approaches the Expert Working Group identified as most useful for closing the gap between evidence and action.

Below are core principles to remember as you start or continue this work:

- **Understand the problem before testing solutions:** Generic responses to poorly understood problems rarely produce lasting change
- **Use your data but combine it with direct observation:** Numbers and narratives together give the most accurate picture
- **Test on a small scale first:** The most effective interventions require several PDSA cycles before they are ready to scale
- **Engage the right people early:** Frontline staff know what the barriers are. Leadership controls the resources. You need both
- **Celebrate progress:** Recognizing improvement, even incremental improvement, keeps teams engaged and committed to the work.

QI doesn't have to be complicated. At its heart, it's about using simple tools to understand current practice, spot opportunities to improve and make small, targeted changes that become part of everyday care. A structured QI approach helps teams move beyond assumptions and focus on the real factors that increase PI risk in their setting.

This document outlines practical steps for improvement: understanding the problem, assessing your current state, identifying why PIs are occurring, planning and testing changes and sharing best practice with your team. The tools provided are examples to guide thinking, not rigid instructions. The best approaches are those that fit your local context, use available data and work for the staff delivering care. Likewise, the drivers and interventions described are a starting point – each team will need to adapt them to their patients, workflows and priorities.

It's also important to remember that improvement is rarely a straight path. Not every change works the first time and multiple PDSA cycles may be needed before a sustainable solution is found. Engaging the right people early, from bedside nurses to clinical leaders, helps identify challenges sooner and encourages shared ownership of the work.

Ultimately, QI is a continuous journey, not a one-off project. Regular measurement, reflection and adjustment are key to embedding PIP into everyday practice. Equally important is celebrating successes and recognizing the contributions of everyone involved – this keeps teams motivated, engaged and committed to lasting change. By learning, adapting and working together, care teams can make meaningful and enduring improvements in PIP, helping ensure safer, better outcomes for every patient.

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