

**PROTECTING THE VULNERABLE: A QUALITY
IMPROVEMENT INITIATIVE TO PREVENT DEVICE-
RELATED PRESSURE ULCERS FROM ENDOTRACHEAL
AND NASOGASTRIC TUBES IN CRITICALLY ILL
PATIENTS**

**Quality Improvement Project – ITU/ West Cumberland Hospital
– March 2026 –**

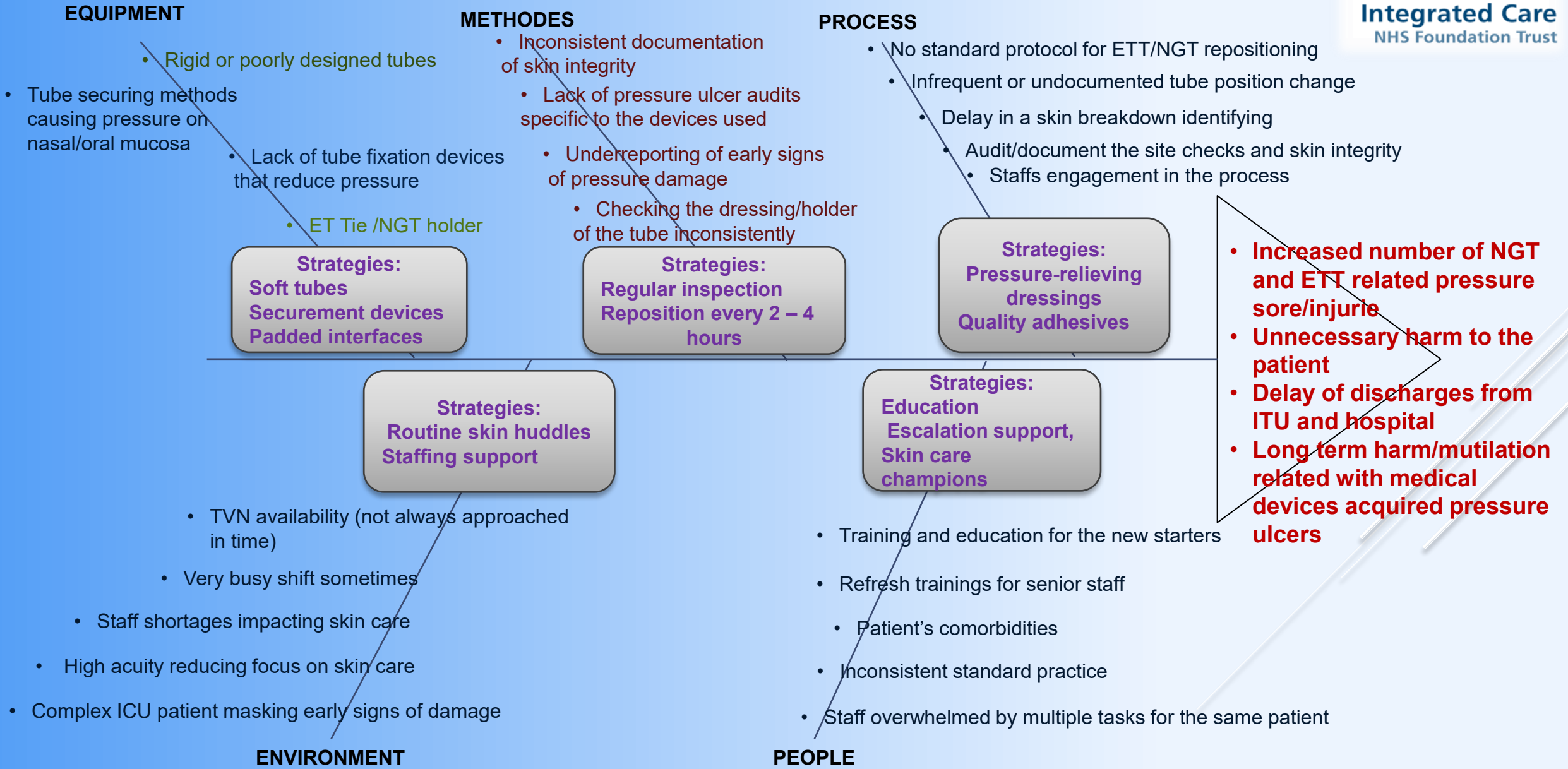
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OVERVIEW OF PRESSURE ULCER RISK ASSESSMENT

- **Pressure ulcers impact significantly on patients' quality of life, morbidity and mortality, as well as resulting in increased length of stay and additional costs (National Institute for Health and Care Excellence [NICE], 2014a).**
- **Critical care patients are at higher risk of all type of pressure ulcer , particularly Medical-Device Related Pressure Ulcers (MDRPU) due to a large numbers of devices in use in this patient population**
- **Risk factors:**
 - ✓ lowered levels of consciousness,
 - ✓ Mechanical ventilation and use of positive pressure
 - ✓ reduced mobility,
 - ✓ vasopressor use,
 - ✓ Renal replacement therapy,
 - ✓ malnutrition,
 - ✓ Hypovolemia and hypotension
 - ✓ hallucinations and sensory perception inhibited

Fishbone Analysis



Risk Factors for Respiratory Device-related Pressure Injury

RDRPIs develop due to several issues.¹ These include:

- Devices secured too tightly that causes poor circulation, friction, or shear
- Prolonged exposure to pressure
- Perspiration, secretions, or moisture under the device or device holder which makes the skin softer and reduces skin integrity
- Lack of awareness by the staff of preventive measures and protocols to reduce RDRPI
- Failure to perform routine assessment of the skin and devices to check for signs of ischemia/infarction
- It was determined that the use of vasopressors ,as well as low total protein, serum albumin, and haemoglobin levels, increased the formation of oral pressure injuries in the fixation of the endotracheal tube
- *Hanonu et al* revealed, in their prospective descriptive study, that advanced age, obesity and risk factors due to chronic disease impact the formation of medical-device-related pressure ulcers.
- Malnutrition, loss of emotional perception and lack of movement, hypoalbuminemia, anaemia, vasopressor therapy, steroid therapy, and sedative medication are the important risk factors in the formation of pressure ulcers.

Recorded Incidents: ICU, West Cumberland Hospital – Past 12 Months

- 6 Grade ≥ 2 pressure ulcers associated with nasogastric (NG) tubes
- 4 Grade ≥ 2 pressure ulcers associated with endotracheal (ET) tubes

Additional Context:

- Some early-stage pressure ulcers were **identified promptly and resolved within 48 hours**, resulting in **no lasting harm**.
- These incidents were **not always reported** in the Ulysses system, as staff considered them minor and self-resolving
- This highlights a need for clearer **reporting thresholds**, enhanced **staff awareness**, and a more **proactive prevention and surveillance approach**



Hollister Anchor Fast™
oral endotracheal tube
fastener



Insight \medical products LTD Endotracheal Tube
Holder



Hollister Brand NG holder (type used at the Wexner Medical Center)

Photo used with permission from M. Holomuzki

Key Features:

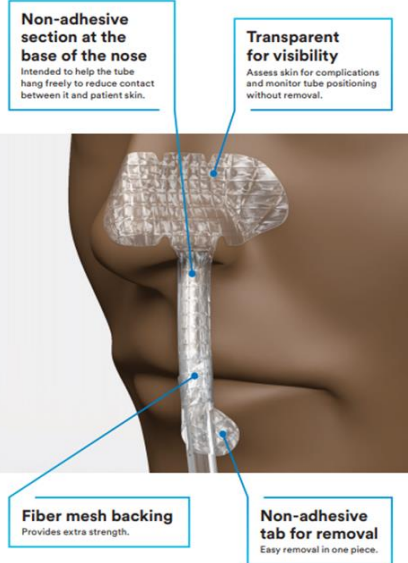
- Skin Protection:** Uses a FlexWear™ skin barrier to protect the skin from irritation.
- Adjustability:** Features a clamping mechanism that allows for easy repositioning of the tube.
- Comfort:** Designed to be more comfortable than traditional tape, reducing the risk of skin breakdown.
- Compatibility:** Suitable for various feeding tubes and drains.

3M Science. Applied to Life.™

Product Guide

3M™ Nasogastric Securement Device

Designed to deliver reliable securement to help keep nasogastric tubes in place with an easy-to-use solution that helps support pressure injury prevention practices and minimize the risk for medical adhesive-related skin injury (MARS).



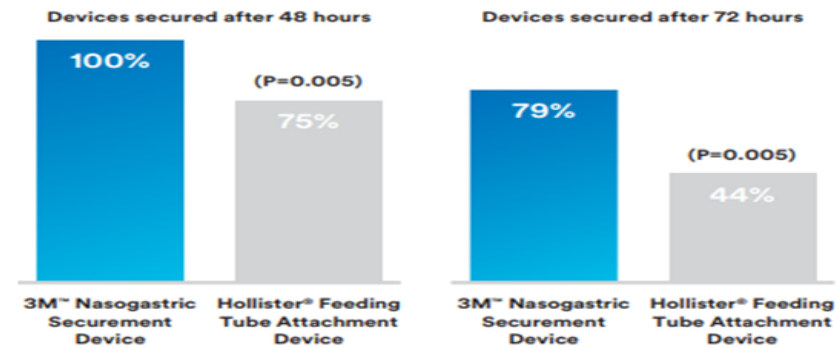
Skin performance: The feather designates products that deliver the securement power you need while minimizing damage to skin.

The securement solution you choose for your patients — whether a device or tape — should keep tubes in place while minimizing migration to help avoid disrupting nasogastric (NG) therapy. Consider how the 3M™ Nasogastric Securement Device performed in a comparative study.

A comparison of the 3M™ Nasogastric Securement Device to the Hollister® Feeding Tube Attachment Device.¹

More Reliable Securement:

3M™ Nasogastric Securement Device had a statistically higher percentage of devices remaining on the skin than Hollister® Feeding Tube Attachment Device after 48 hours and 72 hours of wear.*



Product Guide

Less Migration:

The 3M™ Nasogastric Securement Device showed 60% less migration than the Hollister® Feeding Tube Attachment Device at 72 hours.**



Low Patient Risk + Low Device Pressure

- Short ventilation duration
- Haemodynamically stable
- Normal albumin/Hb
- Good tissue perfusion
- ✓ Either device appropriate
- ✓ Standard 4-hourly repositioning

Low Patient Risk + High Device Pressure

- Stable patient
- Device secured tightly
- Prolonged static positioning
- ⚠ Risk becomes practice-dependent
- Focus: Repositioning compliance

High Patient Risk + Low Device Pressure

- Vasopressors
- Hypoalbuminaemia
- Anaemia
- Reduced perfusion
- ⚠ Tissue tolerance reduced
- Consider softer interface + increased assessment frequency

High Patient Risk + High Device Pressure

- High vasopressor dose
- Low albumin/Hb
- Sedated, immobile (using paralyzing medication)
- Tight securement
- 🚨 Highest likelihood of RDRPI
- **Requires:**
 - Risk-stratified device selection
 - 2–4 hourly repositioning
 - Barrier protection
 - Documented lip assessment

This comparison isn't about promoting one device over another. It highlights that device design influences pressure distribution and repositioning ability. Within our QI project, this allows us to explore whether risk-stratified device selection or improved repositioning compliance can reduce ETT-related pressure injuries

Adjuvants under trial



- Indicated for the prevention of pressure ulcers in at-risk patients as part of a pressure ulcer prevention programme
- wash with soap and water – enabling them to be reused on the same patient and helping to reduce the cost of pressure ulcer prevention even further



- **3M Cavilon No Sting Barrier Film** (including the lollipop/foam applicator format) is specifically designed to be used under adhesive products, such as nasogastric tube (NGT) dressing holders or hydrocolloid dressings, to protect the skin from adhesive trauma and moisture
- It is used to prevent skin breakdown, tears, and irritation caused by the constant friction and daily removal of tape on the faces of patients, including neonates

What was the most important finding?

- Pressure ulcers from NGT/ETT are **multifactorial and largely preventable**
- There is a need of **systemic changes**: staff education, standardised protocols, appropriate equipment, and proactive monitoring
- The **Fishbone Diagram** revealed that **inconsistent practices and lack of standardisation** are major contributors across categories

What things surprised me?

- **Lack of attention to securing techniques** (e.g., ETT fixation) as a major contributor to pressure ulcers was more significant than expected.
- The **interconnectedness** between staffing levels and missed skin checks highlighted how environmental pressures can indirectly lead to harm.
- Despite having protocols, **implementation gaps** were more problematic than the absence of protocols themselves.

Do some causes have a relationship to one another?

- **Inadequate staff training** (People) is directly related to **non-compliance with repositioning protocols** (Process).
- **Lack of protective materials** (Equipment) can exacerbate the effects of **poor fixation techniques** (Methods).
- **High patient acuity** (Environment) leads to time pressures, which impact **documentation** (Process) and **hands-on skin checks** (Methods).

Why does this matter?: it shows that preventing pressure ulcers is not about isolated fixes but **a culture of prevention** that spans people, systems, and tools. Without a multidisciplinary, structured approach, patients remain at risk of avoidable harm.

Areas requiring deeper analysis include:

- ✓ Which staff groups are **most/least compliant** with repositioning and documentation?
- ✓ What are the patient **risk factors** (e.g., sedation, pronning) that make ulcers more likely from devices?
- ✓ How do **current products** (e.g., tube holders) compare in terms of reducing pressure?

What are we going to do with this information?

- Share the fishbone diagram and analysis with **multidisciplinary ICU quality and safety groups**.
- **Initiate an audit** to assess current practice against ideal standards (e.g., frequency of tube repositioning).
- Use the findings to develop a **targeted quality improvement (QI) project**, focusing on two key drivers: **education and equipment**.

What next?

- **Pilot a care bundle** for device-related skin protection (e.g., using foam dressings and 2 – 4 hourly repositioning).
- Introduce **brief in-service training sessions** for all ICU staffs on identifying and preventing device-related ulcers.
- Conduct **monthly audits and feedback loops** to track improvement and maintain momentum.
- Plan to **re-evaluate the strategy** in 3–6 months and revise based on outcomes and staff feedback

Aim to reduce pressure sore /ulcers incidents to $\leq 50\%$ in 6 months.

Summarising:

In critically ill patients, the device itself is only one part of the equation. Our QI focuses on optimising device selection, standardising repositioning practice, and improving early detection — because preventing device-related pressure injury requires both the right equipment and the right behaviours

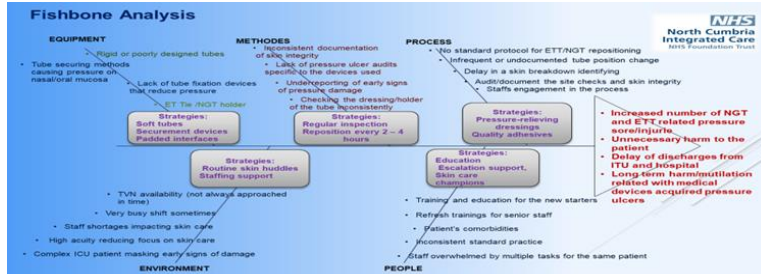
1 Background

- ICU setting at Intensive Care Unit/ West Cumberland Hospital – NCIC Trust
- 10 NGT/ETT-related pressure ulcers in past year
- Harmful to patients, increased length of stay
- Project inspired by incident reports & staff concerns

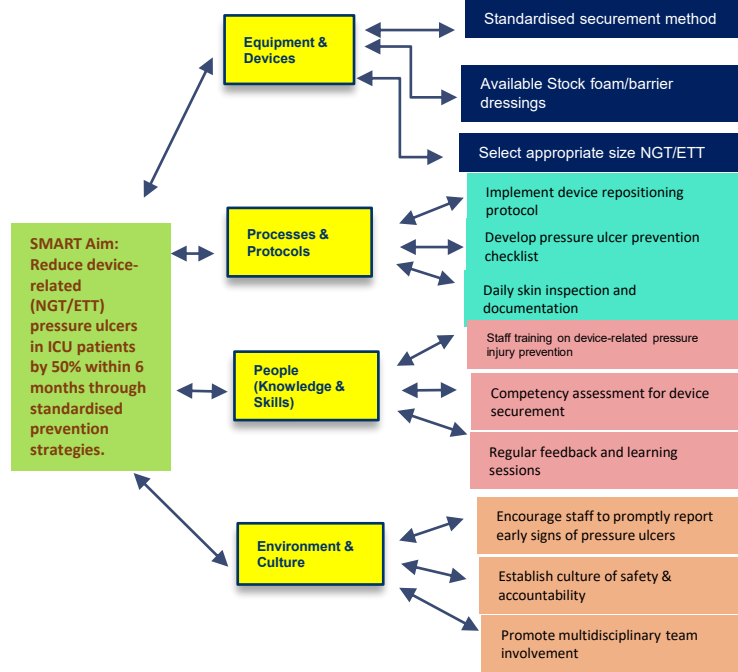
2 Understanding the problem

Fishbone analysis identified root causes:

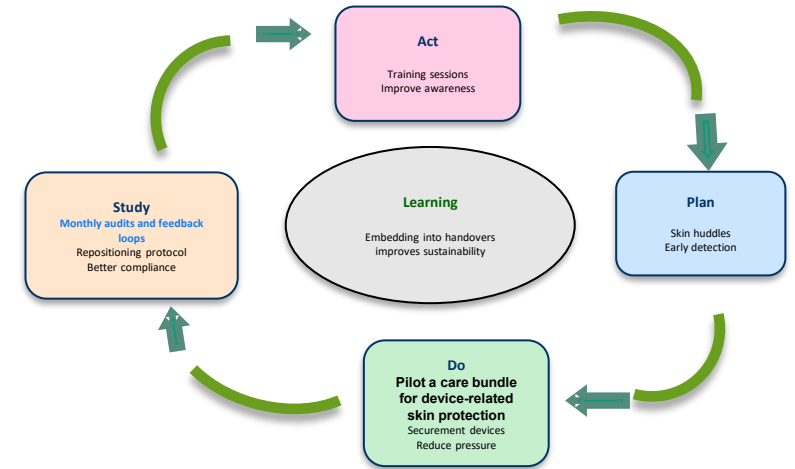
- Equipment: rigid tubes, poor fixation devices
- Process: no standard repositioning protocol
- People: limited training, staff shortages
- Environment: busy ICU, delayed detection



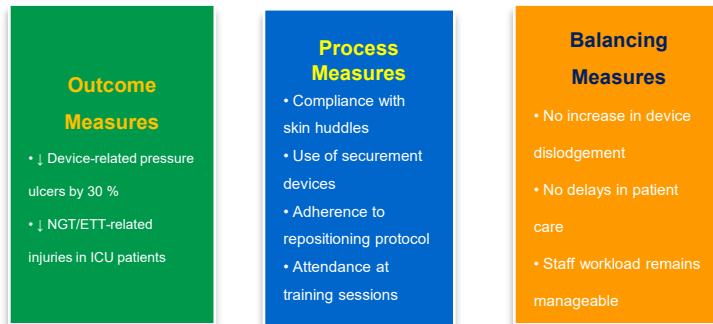
3 What are we trying to accomplish?



5 What have we tested and learned?



4 Have we seen an improvement?



6 Key reflections and next steps



Any Questions?



Thank you