

"Time to Take the Pressure Off" : Reducing Facial Pressure Injuries From Non-Invasive Ventilation (NIV)



Adding years of healthy life

Ms Lim Voon Ping & Mr Joel Quek NCID ICU

Mission Statement

To reduce the prevalence for facial pressure injuries related to Non-Invasive Ventilation (NIV) in ICU/HDU patients from 5% to 2.5% (50% reduction) in 6 months

Team Members Designation Department Name Lim Voon Ping Senior Nurse Clinician NCID ICU **Team Leader** Joel Quek Wee Teck Senior Staff Nurse NCID ICU Tneh Yu Xuan Senior Staff Nurse NCID ICU Team Members Vincy Mathew NCID ICU Senior Staff Nurse Senior Staff Nurse NCID ICU Lee Wan Lih NCID ICU Lucius Tan Ren Jie Senior Staff Nurse Chan Cui Peng Staff Nurse NCID ICU Rommel Jude Tambot Senior Respiratory Respiratory Therapy De Guzman Therapist Gacula Levi Leopoldo Senior Respiratory Respiratory Therapy Jr Conguis Therapist Muhamed Maliki Bin Nurse Clinician Senior Staff Nurse **Mohamed Nasir** Specialty Senior Patient Service Helen Hii Shiu Sing NCID ICU Associate

Sponsors: Dr Benjamin Ho & Ms Lorraine Tan

Evidence for a Problem Worth Solving

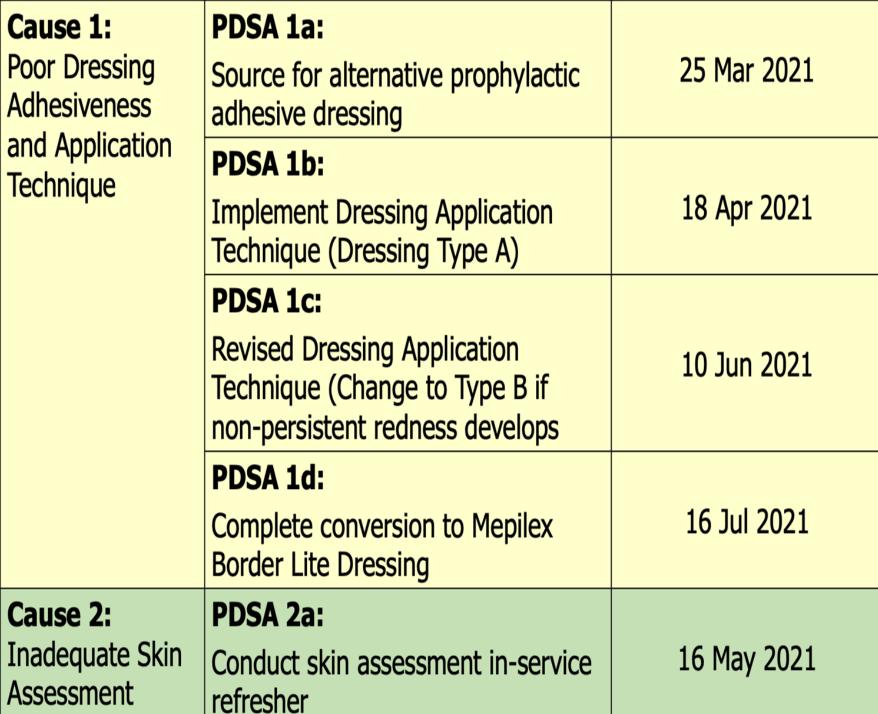
- The current foam dressing (Mepilex foam) is the standard prophylaxis dressing for NIV interfaces
- With new innovations, other protective dressings have been made available in the market incorporating less-pain contact layer with silicone adhesion technology and at a cost-effective price
- Feedback from staff on current prophylaxis dressing used with NIV interface:
- Ineffective in preventing PIs due to the dressing less adhesiveness to skin
- With repeated NIV mask adjustments, it causes a lot of friction and shear
- The need to consider using other prophylactic measures to reduce pressure injuries from face mask interfaces

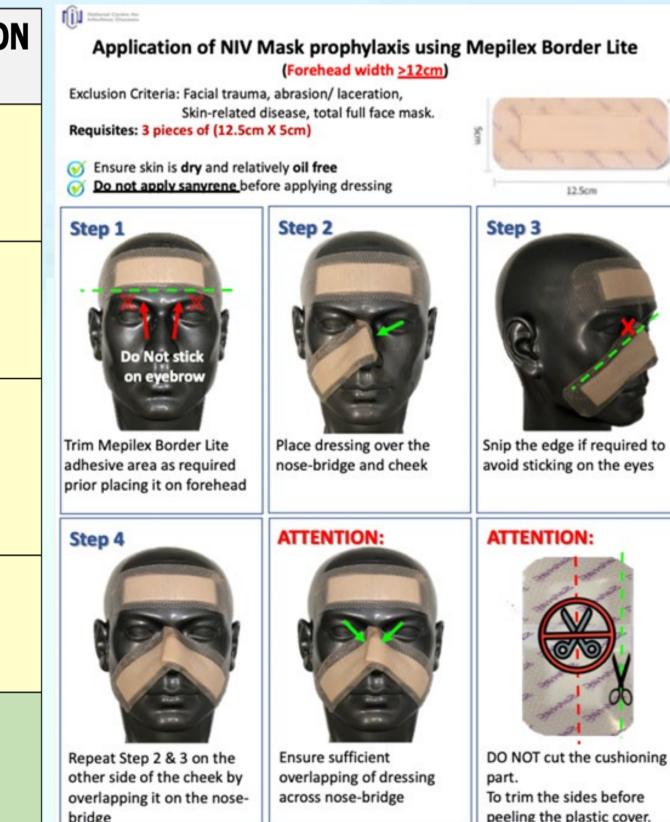
Baseline Data Of Facial Pressure Injuries	Year	Pts on NIV	Staging	Total	%	Location	
	Jun 2020 (1st COVID Surge)	11	Stage 1	2	26.40/	Right Ear (N=1) Nose Bridge (N=1)	
			Stage 2	1	36.4%	Cheeks with forehead (N=1)	
			Deep Tissue Injury	1		Nose Bridge (N=1)	
Pre-Intervention Median = 5 %	Sep 2020	27	Stage 1	2	11.1%	Nose Bridge (N=1) Cheeks (N=1)	
			Stage 2	1		Nose Bridge (N=1)	
	Jan - Mar 2021	28	Stage 1	5	17.9%	Nose bridge (N=4) Nose bridge & Ear (N=1)	

Flow Chart of Process MACRO FLOW MICRO FLOW Doctor order to start NIV **Use Mepilex Foam Dressing** Monitor skin condition (current hospital practice) Total full face mask RN informs RT* (for NIV initiated from Does Patient met Inclusion criteria? Use Mepilex Border RT prepares machine & selects appropriate Full face mask On full face mask mask interfaces Forehead width within 12cm to 17cm Skin assessment: Check for facial Assess factors & any influences to Performs skin RN performs risk review and skin preparation trauma, abrasion/laceration, skinwound healings patient physical & preparation functional risk related disease, known pressure injury Skin care (Perform Daily) relieve pressure off as tolerate by Ensure skin is dry & relatively oil free RN applies prophylaxis dressing on pressure point area Do not apply Sanyrene before applying correctly continue to monitor till end of the Monitor tolerance to File PRISM if redness not resolve RT initiates NIV Reinforce Dos & Don'ts during Patient/ Inform NO on duty Family education Staff re-education as Document in Nurse to nurse RN monitors skin condition required monitoring form Handover RT* denotes Respiratory Therapist

Cause and Effect Diagram Staff didn't distribute **Environment** pressure through all **Nurse Factors Factors** Failure to do proper risk assessment Interface press too tight against skin Improper prioritization Control of skin moisture Repeated peelin Poor Mask/ Strap between NIV mask and dressing of dressing for **Application Technique** condition Inadequate Skin Mask straps skin assessment Microclimate of Skin caused friction Dressing not placed in right position Non-adherence to proper skin Hot/humid room care over pressure points Urgency to place masktemperature `Wrong/poor placement Knowledge Deficit to Skin **Factors related to** of prophylactic dressing prophylactic dressing Prep and Dressing use **NIV Mask Related Pressure Injury** Foam dressind Incorrect interface size Effect of Chronic has to be cut Tissue steroid therapy Inappropriate/ incorrect mask size malnutrition to fit face Partial full face mask (Full face VS Partial) Insufficient off causes higher NIV Usage High settings mask time to pressure on nose Dressing less adhesive to skin Adequacy/ Patient has prevent mask < bridge & cheeks relieve pressure Poor tissue Appropriateness of multiple breaks difficult perfusion dressing product comorbidities Current foam dressing Prolonged application Shear forces constantly shifts position generated between Repeated interface Mask Cushion Chronic inspiratory & Inappropriate application, Sanyrene used with adjustment causing has to prevent skin expiratory phase of dressing without drying friction & shear on Weak adhesive products mask from condition ventilation Oily face cause tension to interface collapsing on Poor patient Moisture & heat insufficient Adhesiveness of compliance **Patient** develop on skin surface **Equipment Prophylactic Dressing Factors** (Poor Dressing Application Mask misaligned with **Factors** maceration dressing position

Tamplementation CAUSES INTERVENTIONS IMPLEMENTATION DATE PDSA 1a: Pr Dressing Source for alternative prophylactic Posiveness Application Application Application Exclusion Criter Requisites: 3 p Source for alternative prophylactic Posiveness Application Applicati

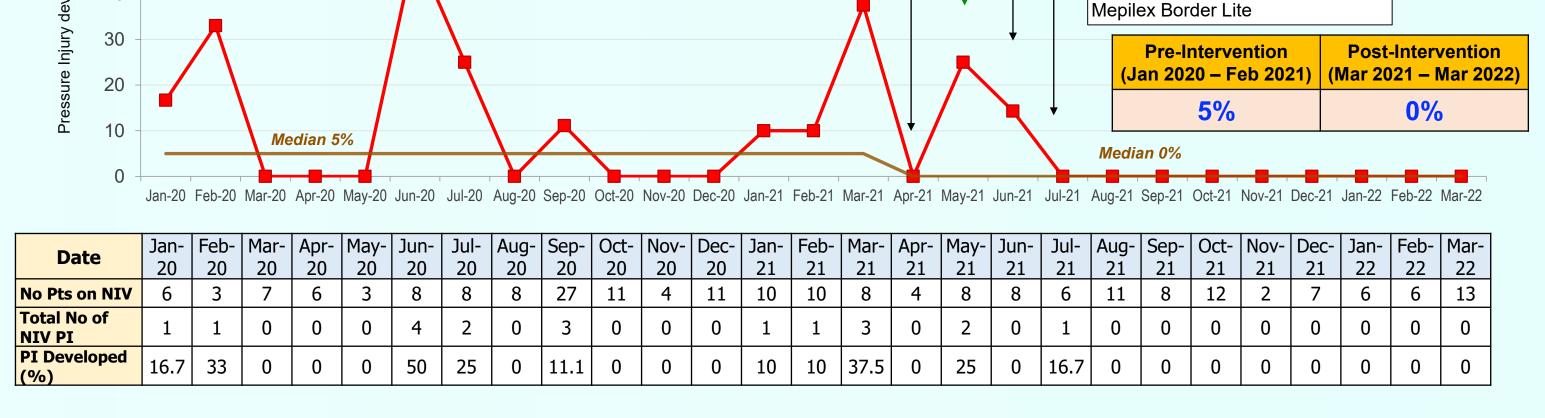




Results

Percentage of Facial Pressure Injuries related to NIV

PDSA 1b: Implement Dressing Application Technique (Dressing Type A) PDSA 1a: Source for alternative prophylactic adhesive dressing PDSA 1a: COVID Surge Period PDSA 1a: Source for alternative prophylactic adhesive dressing PDSA 1a: Complete conversion to



Cost Savings									
	BEFORE		AFTER						
Product Description	Mepilex Foam (10 x 10	0 cm)	Mepilex Border Lite (12.5 X 5 cm)						
Cost (per piece)	\$4.80		\$3.78						
Total Cost Per Patient (Average 3 days application)	\$4.80 x 3 (Average daily change based on current practice)	\$14.40	\$3.78 x 3 (3pcs upon initiation, dressing keep up to 7 days)	\$11.34					
Man-hour Cost^	\$0.97 x 10 x 3	\$29.10	\$0.97 x 10	\$9.70					
Man-hour Required	10 mins x 3 = 30 min	nutes	10 minutes						
Time Savings (Per patient)	30 - 10 = -20 minutes (20 X \$0.97 = -\$19.40)								
Total Cost (Per Patient)	\$43.50		\$21.04						
Difference in Cost	\$21.04 - \$43.50 = - \$22.46								
Average Patient on NIV (Per Month)	121 patients on NIV over last 12 months : 121 ÷ 12 = 10.08 (10 patients)								
	Based on average 10) patients per n	nonth						
Cost Savings (Monthly)	- (\$19.40 + \$22.46) x 10 = - \$418.60								
Cost Savings (Annualized)	- \$418.60 x 12 = - \$5023.29								
Potential Time Savings	20 minutes X 10 x 12 = 2400 minutes (40 hours)								
^ Number of minutes required to ap	oply dressing by nurse = 10mins; W	eighted Ave Cost	per min = \$0.97						

Lessons Learnt

- 1. Challenges of doing quality improvement during pandemic
- Resilience Large augmentation with staff dilution from other care areas making dissemination of practice changes challenging
- Adaptability We Improve as We Do
- 2. Importance of frequent auditing and immediate correction
- 3. Working as a team
- 4. Staff commitment to a changed behaviour ("its just a dressing")
- 5. Change in best practice is most satisfying as it anchors the success of improving patient care

Strategies to Sustain

- 1. PU champion to continue frequent and regular audit
- 2. Inclusion of dressing application/ skin assessment briefing in ward induction for new hires/ transferred in staff
- 3. Continue to provide reinforcement on proper Skin-Prep and assessment prior to dressing application
- 4. Continue to gather feedback from patient to better improve the application process and compliance