

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

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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) over a sustained period

Team Members

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

Sponsors: Dr Benjamin Ho & Ms. Lorraine Tan

Evidence for a Problem Worth Solving

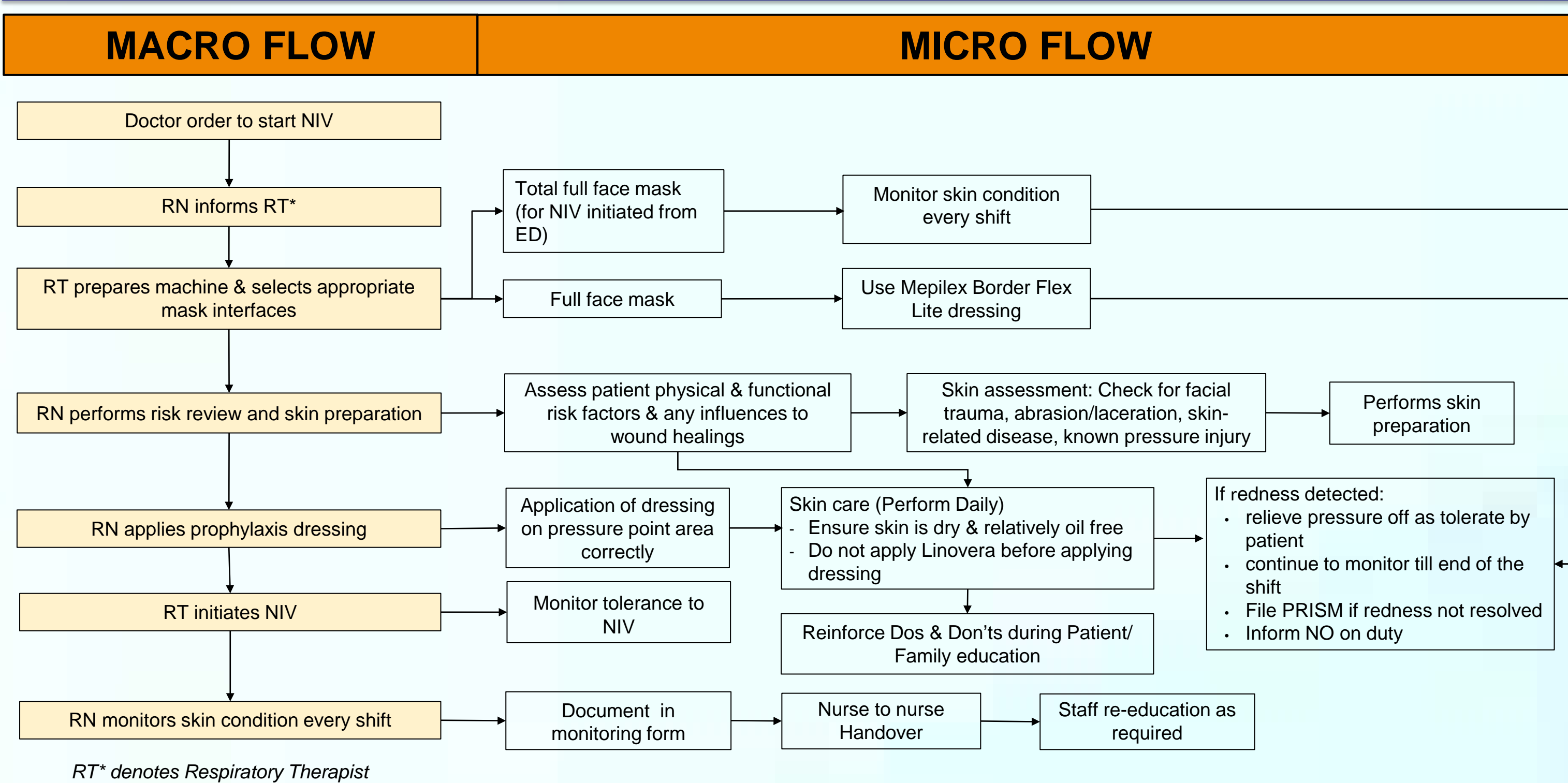
- The current foam dressing (Mepilex foam) is the standard prophylaxis dressing for NIV interfaces
- With new innovations, other protective dressings have been made available in the market incorporating less-pain contact layer with silicone adhesion technology and at a cost-effective price
- Feedback 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

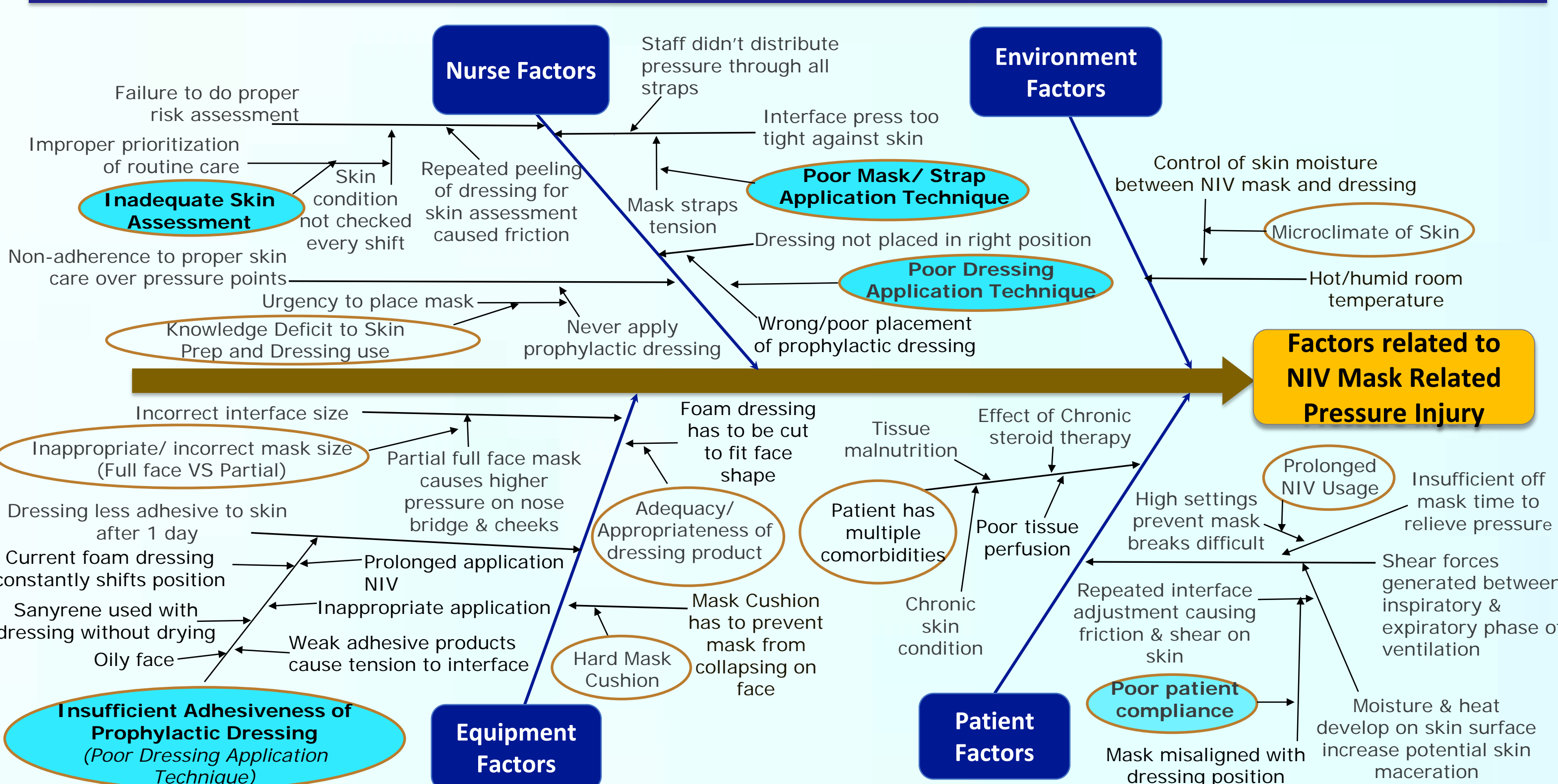
Pre-Intervention Median = 5%

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

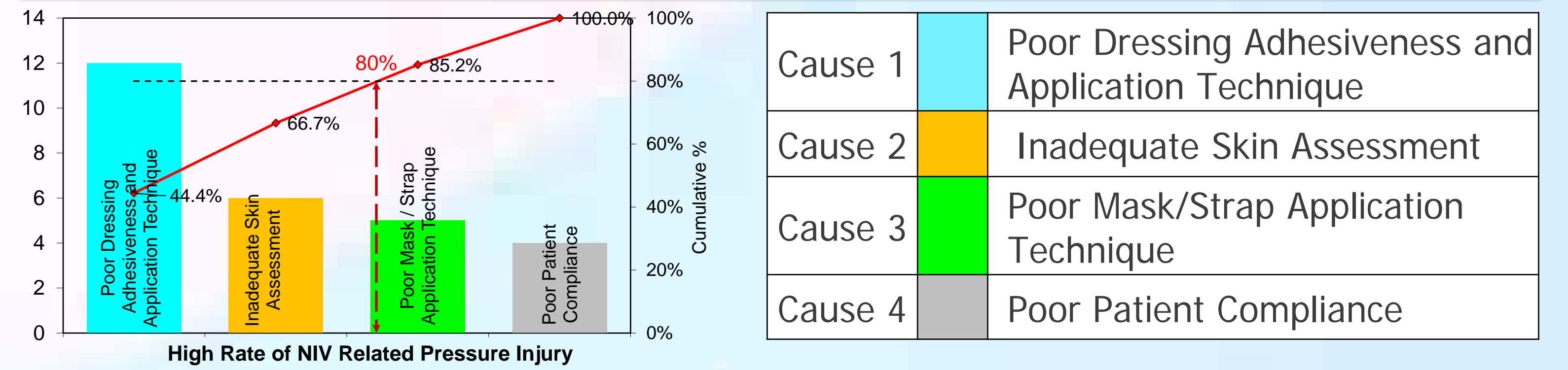
Flow Chart of Process



Cause and Effect Diagram



Pareto Chart

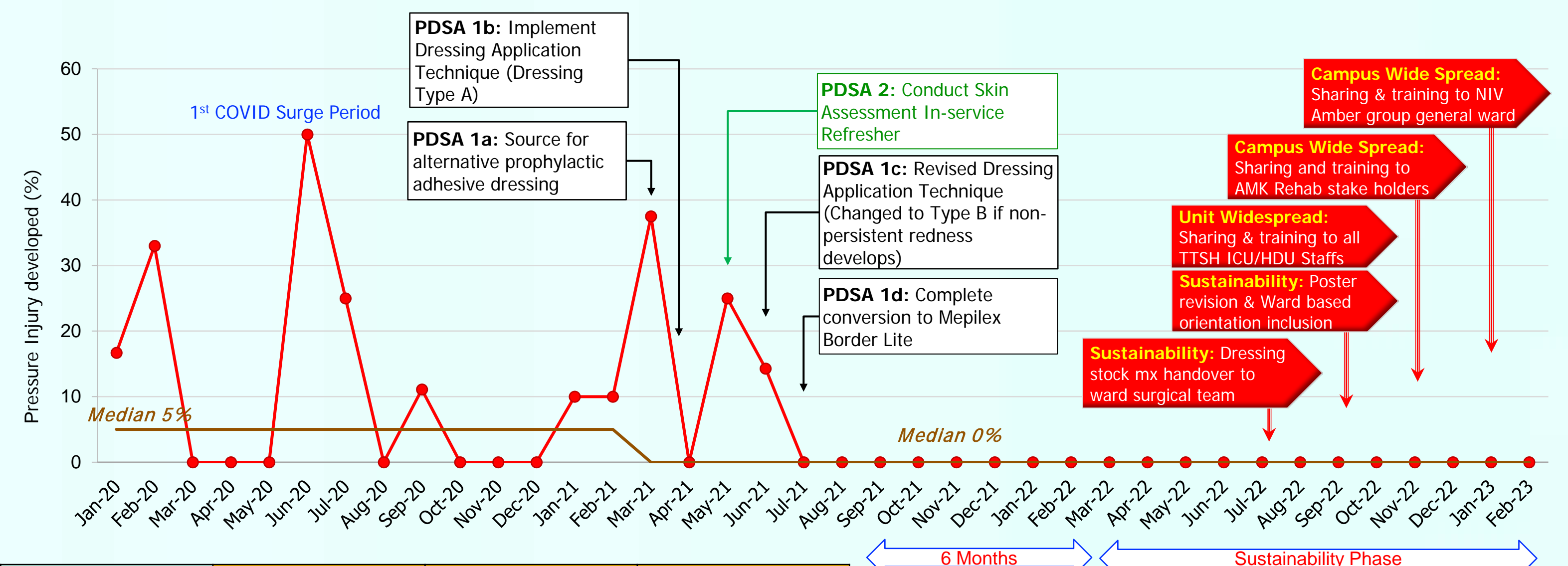


Sustainability & Spread

STRATEGY TYPE	INTERVENTION	IMPLEMENTATION DATE
Sustainability (ICU Ward Specific)	Poster revision and inclusion of project in ward based orientation for new staff •Poster revised for clarity and teaching video created in preparation for unit wide spread •Inclusion in ward based orientation syllabus for new ward nurses	12 September 2022
Spread	Dressing stock management handover to ward surgical stores team •Monitoring usage and ordering of dressing stock to be done by ward surgical stores team instead of project team	26 July 2022
Spread	Unit Wide (All ICUs/HDUs): Project sharing with Nursing Officers & Conduct of Unit Wide staff training •Adoption of project across all TTSH ICUs/HDUs with nursing as the primary driver •Training for nurses done via Zoom	16 September 2022
Spread	Campus Wide (TTSH Ang Mo Kio Rehabilitation Ward): Project sharing & adaptation planning with unit stakeholders & conduct of "Train the Trainers" •Adoption of project with tweaks after discussion with unit stakeholders to cater to unique considerations •Train the "Trainers" session done face-to-face	30 November 2022
Spread	Campus Wide (NIV Amber Group General Wards): Project sharing & adaptation planning with unit stakeholders. Conduct of "Train the Trainers" •Pilot trial of project in NIV amber group general wards with respiratory therapy as the primary driver supported by nursing •Train the "Trainers" session done face-to-face with respiratory therapy & nursing	31 January 2023

Results

Percentage of Facial Pressure Injuries related to NIV



No. Of Pts on NIV (Aug 21 - Feb 2023)	Pre-Intervention (Jan 2020 - Feb 2021)	Post-Intervention (Mar 2021 - Mar 2022)	Sustainability Phase (Mar 2022 - Feb 2023)
122	5%	0%	0%

Date	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23		
No Pts on NIV	6	3	7	6	3	8	8	8	8	27	11	4	11	10	10	8	4	8	8	6	11	8	12	2	7	6	6	13	1	4	5	9	4	1	9	10	2	4	8	
Total No of NIV PI	1	1	0	0	0	4	2	0	3	0	0	0	1	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Developed (%)	16.7	33	0	0	0	50	25	0	11.1	0	0	0	10	10	37.5	0	25	0	16.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Actual Cost Savings

	BEFORE	AFTER
Product Description	Mepilex Foam (10 x 10 cm)	Mepilex Border Flex 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 = \$14.40	\$3.78 x 3 (3pcs upon initiation, dressing kept till 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 minutes	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)		70 patients on NIV over last 12 months : 70 ÷ 12 = 5.83 (6 patients)
Based on average 6 patients per month		
Cost Savings (Monthly)		- (\$19.40 + \$22.46) x 6 = - \$251.16
Cost Savings (Annualized)		- \$251.16 x 12 = - \$3013.92
Potential Time Savings		20 minutes x 6 x 12 = 1440 minutes (24 hours)

^ Number of minutes required to apply dressing by nurse = 10mins; Weighted Ave Cost per min = \$0.97

Lessons Learnt

- Interventions for successful sustainability
 - Indoctrination of project into ward standard of practice – Training a larger pool of trainers to incorporate project training into ward-based orientation for new nurses
 - Savour the journey, and it's not just about KPIs – Trusting others to carry on good work and handling over crucial processes to ward staff responsible for assignment
- Frequent auditing and immediate correction are a project main stay; from implementation through to sustainability
- Spread the project goes beyond simple "copy & paste"
 - Adaptations required
 - Multiple units have the same problem, but each has unique considerations
 - Discussion with unit stake holders required to understand considerations and tweak project implementation accordingly
- Our lessons learnt is crucial to successful project adoption in other units