



# Drug Diluent Guides for DEM Resuscitation Medications

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## Introduction

Resuscitation area in every emergency department (DEM) demands the highest acuity of care. Therefore, the nurses working in these area are required to have the knowledge about the drug and its preparation. However, due to the difference in skill mix, junior nurses often feel that they are inadequate to assist in the resuscitation room with drugs preparation, which may lead to:

- Possible delay of treatment - Being unfamiliar with certain drugs, resulted unnecessary precious seconds or minutes was spent in finding the answer for drug preparation.
- Minor conflicts and confusion - Nil standardization of practise on the most suitable drug diluents/ preparation based on patients' conditions.
- Wastage of medical resources and equipment – Due to incorrect preparation.
- Low confidence among nurses - Lack of visual and clear guide for drug diluents, affecting the ability of the newly trained MTRC (Medical Trauma Resuscitation Course) staff/ novice staff.

Hence, whenever there is a sudden surge of patients in the resuscitation area, the senior nurses are occupied with a deteriorating patient, the junior nurses feared to handle the medications due to lack of confidence and unfamiliarity towards certain medications.

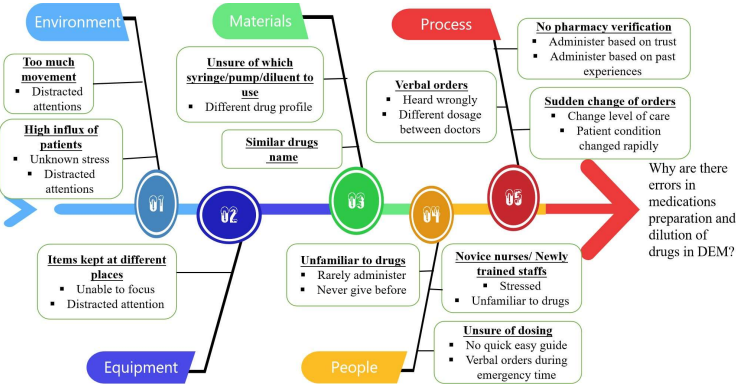
## Objectives

The team aimed to:

- (i) Increase the level of confidence from 50% to 90% among the DEM nurses.
- (ii) Reduce medication errors related to drugs dilution in DEM from the total of 23 incidents (FY2019-FY2020) to 0 incident (from October 2021 to December 2022).

## Analysis of the Problem

To better understand the problem, a root cause analysis was done to identify the possible reasons for the lack of confidence among nurses and the possible reasons for medication errors to occur. A fishbone diagram was used and the result is as per following:



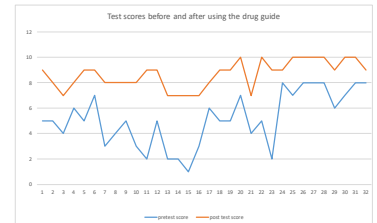
## Methodology

To measure the impact of the drugs guide, a pre- and post-intervention questionnaire given to random staff of different grades and skill mixed (total 32, 8 of each grade) to check on their level of confidence and knowledge that they had towards drug preparation, with and without having a drug guide. The pre-intervention questionnaire was done in October 2021 while the post-intervention questionnaire was done in December 2021 (2-month after the implementation has taken placed).

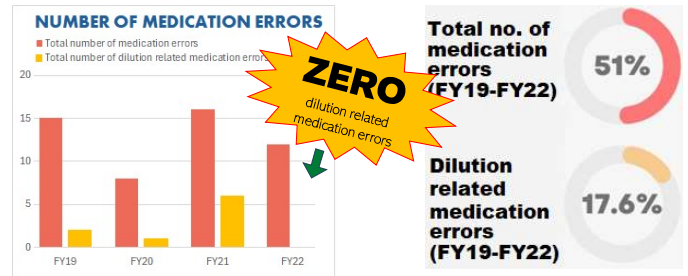
Statistical analysis was used to compare the level of confidence among the nurses pre- and post-intervention. The number of the medication errors related to dilution in DEM was collected from the Risk Management System (RMS) from FY2019 to FY2022.

## Results

After the implementation, a statistical analysis by using the 1 tailed pair t-test was used to compare the level of confidence among the nurses pre- and post-intervention. The result of p-value was 0.000000000000024897, of which p-value<0.05. This shown that there is a significant difference on the level of confidence for the staffs when a drug diluent guide is used.



Financial Year	FY19	FY20	FY21	FY22
Total number of medication errors	15	8	16	12
Total number of dilution related medication errors	2	1	6	0



The data retrieved from the Risk Management System (RMS) from FY2019 to FY2022 shown there is a significant reduction in medication errors related to dilution from 6 RMS cases to 0 RMS case medication error in DEM. Hence, this has shown the possible benefit attained by boosting the level of confidence among DEM staffs during medication preparation.

## Sustainability Plans

Despite having the drug guide (printed) could help to enhance confidences and knowledge among staff, a continuity of enhancement is required to sustain this and prevent future medication errors. Hence, the team has incorporated the following measures and promote continuity learning:

- Incorporate the drugs guide into the Emerge app for easier access.
- Created QR code (place in resuscitation area as reference for students/ deployed staffs).
- Open door concept with the ground staffs, where they can highlight new medications / guidelines that are not found inside, which the team can add into the drug guide for future references.
- Early introduction of the drugs guide during the MTRC teachings.

## Special Acknowledgement

The team would like to thank the following colleagues in assisting in the design of this QI project:

- QI coach: Ms Loo Shin Yi
- Emerge app: Dr Liu Zheng Hong
- APN: NC Genevieve Marie Ng Yu An
- Sponsor: SNM Shashi S/O Chandra Segaran
- Facilitators: SNM Jeremy Zhang Hongjie, NC Siti Juliana Binte Ismail

## Interventions

To increase the level of confidence for newly MTRC trained staff/ novice staff and reduce medication errors related to drugs dilution, the team had created a visual and easy to understand drugs guide with pictorial aids as point of reference. This drugs guide has the following features:

1. Direct and easy guide for common drugs used during resuscitations, without any delays to patient's care.
2. A standardized guideline and prevent confusion during drug preparations.
3. The correct preparation method to prevent wastage of resources.
4. Incorporated with the SGH Smartpump Library.
5. Boost the confidence level among the nurses in drug preparations
6. Prevent medication errors to occur if closely utilized.

