# FAILURE MODE EFFECT ANALYSIS (FMEA) PROJECT ON SAFE ADMINISTRATION OF EMERGENCY DRUGS (E-DRUGS) DURING RESUSCITATION Singapore Healthcare

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### Introduction

Medical resuscitation is an extremely chaotic and stressful situation for both nursing and medical staff. There is no time for discussion and verification of patient's treatment plan including medications. Every second counts and every miss-steps or inaction can result in patient harm or death. Calculating drug doses under these conditions is very challenging. Through the use of FMEA, we want to prevent the occurrence of medication error during resuscitation.

Management 2017

#### Aim

- 1.To enhance patient's safety with the implementation of an individualised E-Drug Chart during resuscitation
- 2.Eliminate the risk of errors in calculation during a chaotic resuscitation situation.
- 3. Eradicates the risk of wrong verbal orders or orders that are misheard and not read back

#### Methods

A multidisciplinary team was formed to map out the entire process of IV administration of e-drugs during resuscitation, identify potential "Failure Mode" that can occur and then use the FMEA scoring system to look at probability of occurrence, severity of effects and detectability. Risk priority numbers were solicited from all members to identify failures most in need of attention. The results were collected by the number of incidences reported post resuscitation

FMEA Worksheet - PRE and POST IMPLEMENTATION										
Process	Potential Failure Mode	Potential Causes	Potential Effect (s) of failure	Severity	Probability	Detection	RPN	Post solution Risk reduction	Actions to Reduce Failure Mode - PRE-IMPLEMENTATION IN BLACK - POST IMPREMENTATION IN RED	
Prescription	Wrong dose	<ol> <li>Knowledge deficit</li> <li>Listen wrongly</li> <li>Fail to read back</li> <li>Fail to check emergency drug dosage guide</li> </ol>	- Overdose or underdose - Lethal cardiac arrhythmias - Death		4 2	4 3		63%	<ul> <li>Nursing and medical attend in-hourse Mock Code training</li> <li>Read back doctor's order</li> <li>Refer to emergency drug dosages guide attached at E-trolley</li> <li>Doctor to generate auto compute emergency drug dosages list in EXCEL spreadsheet in high risk areas- CICU, NICU and HD</li> </ul>	
Retrieval of Adrenaline ampoule from E- trolley	- Wrong drug - Wrong Dose	<ol> <li>Knowledge deficit</li> <li>Unfamiliar with E-trolley</li> <li>Difficult access to Adrenaline 1:10,000 as this is placed in the inner compartment and the drawer of E trolley can only be opened partially</li> <li>Easy access to Adrenaline 1:1000 as it is placed in front compartment of the drawer</li> <li>Look-alike drugs</li> <li>Stressful environment (situation)</li> <li>Distraction -multiple orders from doctors.</li> </ol>	- Overdose - Lethal arrhythmias	10 10	5 2	4 2	200 40	80%	<ul> <li>To place different strength of Adrenaline far apart from each other</li> <li>Medications are placed in alphabetical order</li> <li>Staff orientation / Induction program</li> <li>To place common use Adrenaline 1:10,000 in an easily accessible compartment in the E-trolley</li> <li>To get vendor to modify the drawer to allow full view of the drawer on hold due to bdget constraint.</li> <li>To use zip-lock bag to store 1:1000 adrenaline prior to putting in the e-trolley's compartment to ensure that concentrated adrenaline only use whe necessary</li> </ul>	
Preparation	- Wrong drug - Wrong Dose - Inadequate labelling - Wrong dilution	<ol> <li>Drawing out whole ampoule of 10mls Adrenaline 1:10,000 for doctor to give accordingly when required</li> <li>No standardised label used</li> <li>No labelling</li> <li>Fail to check emergency drug dosage guide</li> <li>No counter checking with doctor upon handing over the prepared Adrenaline 1:10,000</li> <li>Rush for time during stressful situation.</li> <li>Under staff</li> <li>Distraction</li> </ol>	- Overdose or underdose - Lethal cardiac arrhythmias - Death		6 2	6 2	360 40	89%	- Take order from doctor prior to preparation - Specific doctor to give order - Refer to emergency drug dosages guide attached at E-trolley if unsure of dosage - There are three practices for preparing Adrenaline1: 1000 for administration: (1) syringe out the whole ampoule of 10ml and pass it to doctor to administer as required. (2) Syringe out exact volume as per doctor order. (3) Dilute 1: 1000 Adrenaline in 10 ml to and pass syringe to doctor to administer required No standard stickers for labelling syringes. Use any sticky labels such as micropopatient's sticky labels for labelling syringes during emergency Standardized preparation practice by syringing out exact volume as per doctor order Syringe out subsequent doses from the ampoule as required. Do not leave oper ampoule around To use standard stickers to label syringes immediately after syringing out the exadosage from ampoule - To refer auto-compute emergency drug dosages guide prior to preparation of dr	
Administration	<ul><li>Wrong dose</li><li>Wrong drug</li><li>Wrong infusion</li><li>Wrong route</li></ul>	<ol> <li>Miscommunication between the RN and doctor</li> <li>Syringe not labelled clearly</li> <li>No read-back of medication dosage when handing medications to doctors.</li> <li>Wrong labelling</li> <li>Take wrong syringe</li> </ol>	- Overdose or underdose - Lethal cardiac arrhythmias - Death	10 10		6 2	360 40	89%	<ul> <li>The doctor will confirmed correct drug by checking the label on the syring before administration</li> <li>Mandatory to read back order dosage.</li> <li>Doctor to refer auto-compute form if necessary.</li> <li>Label syringeclearly with standard drug stickers.</li> </ul>	

## **Old Process**

# **Prescription Process:**

- Verbal order of emergency drugs to be given by doctor during resuscitation
- RN read back to doctor to confirm order
- A laminated drug guide as a reference

KK Women's and Children's Hospital			Paediatri	Emergen	cy Drug Do	oses						
SingHealth			AGE	newborn	1 month	3 month	6 month	1 year	3 year	5 year	10 year	13 year
		Estimated weight:	WEIGHT	3 kg	4 ka	5 ka	8 kg	10 kg	15 kg	18 kg	30 kg	45 kg
		2 X (AGE in yrs + 4)	WEIGHT	3 Kg	4 Kg	5 Kg	8 Kg	10 kg	15 Kg	18 Kg	30 kg	45 Kg
DRUGS	DILUTION / NOTES	DOSE	MAX /dose									
Adenosine (6mg/2mL)	NEAT. RAPID IV bolus.	1st dose : 0.1 mg/kg	6 mg	0.3mg(0.1mL)	0.4mg(0.13mL)	0.5mg(0.17mL)	0.8mg(0.27mL)	1mg(0.33mL)	1.5mg(0.5mL)	1.8mg(0.6mL)	3mg(1mL)	4mg(1.3m
	May repeat after 2 min.	2nd dose: 0.2 mg/kg	12 mg	0.6mg(0.2mL)	0.8mg(0.27mL)	1mg(0.33mL)	1.6mg(0.53mL)	2mg(0.66mL)	3mg(1mL)	3.6mg(1.2mL)	6mg(2mL)	8mg(2.6m
Adrenaline (1:1000/mL)	NEAT for ETT.	0.1 mL/kg (ETT)	2.5 mg	0.3mL	0.4mL	0.5mL	0.8mL	1mL	1.5mL	1.8mL	3mL	4.5mL
	NEAT for IM.	0.01 mL/kg (IM)	1 mg	0.03mL	0.04mL	0.05mL	0.08mL	0.1mL	0.15mL	0.18mL	0.3mL	0.5mL
	Dilute 1mL to 10mL WFI/NS for IV.	0.1 mL/kg (IV, IO) 1:10000	1 mg	0.3mL	0.4mL	0.5mL	0.8mL	1mL	1.5mL	1.8ml	3mL	4mL
Adrenaline (1:10000/10mL)	NEAT.	0.1 mL/kg (IV, IO) 1:10000	1 mg	0.3mL	0.4mL	0.5mL	0.8mL	1mL	1.5mL	1.8mL	3mL	4mL
Amiodarone (150mg/3mL)	Dilute in 20mL D5%. Infuse over 30 mins.	5 mg/kg	300 mg	15mg(0.3mL)	20mg(0.4mL)	25mg(0.5mL)	40mg(0.8mL)	50mg(1mL)	75mg(1.5mL)	90mg(1.8mL)	150mg(5mL)	220mg(4.4
Atropine (0.6mg/mL)	NEAT.	0.1mg)	0.6 mg	0.1mg(0.17mL)	0.1mg(0.17mL)	0.1mg(0.17mL)	0.15mg(0.25mL	0.2mg(0.33mL)	0.3mg(0.5mL)	0.36mg(0.6mL)	0.6mg(1mL)	0.6mg(1n
		Max total dose 3mg		,	,		٥.	"	,	,		
Calcium Chloride 10% (10mL)		0.2 mL/kg	10 mL	0.6mL	0.8mL	1mL	1.6mL	2mL	3mL	3.6mL	6mL	9mL
		5 mL/kg	50 g	15mL	20mL	25mL	40mL	50mL	75mL	90mL	150mL	225mL
		2 mL/kg of D25%	25 g	6mL	8mL	10mL	16mL	20mL	30mL	36mL	60mL	90mL
Diazepam-Rectal 5mg/tube		<10kg 2.5mg; >10kg 5mg	10 mg	2.5mg	2.5mg	2.5mg	2.5mg	5mg	5mg	5mg	10mg	10mg
		0.2 mg/kg	10 mg		0.8mg(0.16mL)	1mg(0.2mL)	1.6mg(0.32mL)		3mg(0.6mL)	3.6mg(0.72mL)		9mg(1.8n
Diphenhydramine (50mg/mL)	•	1 mg/kg	100 mg	3mg(0.06mL)	4mg(0.08mL)	5mg(0.1mL)	8mg(0.16mL)	10mg(0.2mL)	15mg(0.3mL)	18mg(0.36mL)	30mg(0.6mL)	45mg(0.9
				. ,			. ,					
, , ,		5 mcg/kg	0.2 mg	20mcg(0.2mL)	20mcg((0.2mL)	30mcg(0.3mL)	40mcg(0.4mL)	50mcg(0.5mL)	/5mcg(U./5mL	90mcg(0.9mL)	150mcg(1.5mL)	200mcg(2
	Repeat dose (titrate to effect; at 1 min			30mcg(0.3mL)	40mcg(0.4mL)	50mcg(0.5mL)	80mcg(0.8mL)	100mcg(1mi)	150mcg(1.5ml)	180mcg(1.8mL)	300mcg(3mi)	450mcg(4.1
	intervals).	10 mcg/kg (Cumulative 1mg)	0.5 mg	Someg(GISINE)	-10eg(012)	50eg(0.5z)	comeg(oromz)	20008(22)	2506(2.52	200eg(2102)	5006(52)	13011108(111
Frusemide (20mg/2mL)		0.5 - 1 mg/kg	40 mg	3mg(0.15mL)	4mg(0.2mL)	5mg(0.25mL)	8mg(0.4mL)	10mg(0.5mL)	15mg(0.75mL)	18mg(0.9mL)	30mg(1.5mL)	40mg(2n
Hydrocortisone (100mg)	Dilute 100mg in 2mL WFI (50 mg/mL).	5 mg/kg	100 mg	15mg(0.3mL)	20mg(0.4mL)	25mg(0.5mL)	40mg(0.8mL)	50mg(1mL)	75mg(1.5mL)	90mg(1.8mL)	150mg(5mL)	220mg(4.4
, , ,	, , ,	1 mg/kg "stress dose"		3mg(0.06mL)	4mg(0.08mL)	5mg(0.1mL)	8mg(0.16mL)	10mg(0.2mL)	15mg(0.3mL)	18mg(0.36mL)	30mg(0.6mL)	45mg(0.9
Lignocaine 1% (10mg/mL)		1 mg/kg (0.1 mL/kg of 1%)	100 mg	3mg(0.3mL)	4mg(0.4mL)	5mg(0.5mL)	8mg(0.8mL)	10mg(1mL)	15mg(0.5mL)	18mg(1.8mL)	30mg(3mL)	45mg(4.5
lignocaine 1% (10mg/mL)		1 mg/kg (U.1 mL/kg of 1%)	100 mg	Silig(U.SiliL)	4111g(U.4111L)	Silig(U.SiliL)	onig(v.onit)	Tollig(Tille)	15111g(1.5111L)	Tollig(T.ollic)	Sung(Sint)	45111g(4.51
(* ( )	S			0.3mg(mL)	0.4mg(mL)	0.5mg(mL)	0.8mg(mL)	1mg(mL)	1.5mg(mL)	1.8mg(mL)	3mg(mL)	4mg(mL
	Slow IV bolus. Dilute 1mL to 4mL NS (1 mg/mL).		4 mg	00 (1)	0.4 ( 1)	05 ( 1)	00 (1)		45 ( 1)	40 (1)	2 ( 1)	
,,	, , ,	0.1 - 0.3 mg/kg	5 mg	0.3mg(mL)	0.4mg(mL)	0.5mg(mL)	0.8mg(mL)	1mg(mL)	1.5mg(mL)	1.8mg(mL)	3mg(mL)	4mg(ml
, -,	· ·	0.1 mg/kg	2 mg	0.3mg(0.75mL)	0.4mg(1mL)	0.5mg(1.25mL)	0.8mg(2mL)	1mg(2.5mL)	1.5mg(3.75mL)	1.8mg(4.5mL)	3mg(7.5mL)	4mg(10n
Propanolol (1mg/mL)	Infuse over 20 min. Rate < 1 mg/min.	0.1 mg/kg	3 mg	0.3mg(mL)	0.4mg(mL)	0.5mg(mL)	0.8mg(mL)	1mg(mL)	1.5mg(mL)	1.8mg(mL)	3mg(mL)	4mg(ml
Sodium bicarbonate 8.4%	NEAT (1mmoL/mL) in CENTRAL vein.	1 mmoL/kg	1mmoL/kg	3mmoL(mL)	4mmoL(mL)	5mmoL(mL)	8mmoL(mL)	10mmoL(mL)	15mmoL(mL)	18mmoL(mL)	30mmoL(mL)	45mmoL(
	Dilute (NS) to 4.2% (0.5mmoL/mL)			C1(1)	0	10	16	20	20	26		00
	PERIPHERAL vein	1 mmoL/kg	1mmoL/kg	6mmoL(mL)	8mmoL(mL)	10mmoL(mL)	16mmoL(mL)	20mmoL(mL)	30mmoL(mL)	36mmoL(mL)	60mmoL(mL)	90mmoL(ı
Sodium chloride 0.9% (500mL)	Fluid bolus for volume resuscitation.	10 - 20 mL/kg		60mL	80mL	100mL	160mL	200mL	300mL	360mL	600mL	900mL
Sodium chloride 3% (500mL)		2 - 4 mL/kg		6mL	8mL	10mL	16mL	20mL	30mL	36mL	60mL	90mL
		1 - 2 mg/kg	2 mg/kg	3mg(0.3mL)	4mg(0.4mL)	5mg(0.5mL)	8mg(0.8mL)	10mg(1mL)	15mg(1.5mL)	18mg(1.8mL)	30mg(3mL)	45mg(4.5
INFUSIONS	DILUTION	CONCENTRATION	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50mL	Dose in 50m
		1 mL/h = 0.1 mcg/kg/min	(WT x 0.3) mg	0.9mg(mL)	1.2mg(mL)	1.5mg(mL)	2.4mg(mL)	3mg(mL)	4.5mg(mL)	5.4mg(mL)	9mg(mL)	13.5mg(n
	(WT X 30) mg in 50mL of NS/D5%; CENTRAL		(14.77 20)	90mg(2.2mL)	120mg(3mL)	150mg(3.7mL)	240mg(6mL)	300mg(7.5mL)	450mg(11.2mL	540mg(13.5mL)	900mg(22.5mL	350mg(33.
	,	1 mL/h = 10 mcg/kg/min	(WT x 30) mg									
Dobutamine (250mg/5mL)	vein	1 mL/h = 10 mcg/kg/min	(WT x 30) mg	90mg(1.8mL)	120mg(2.4mL)	150mg(3mL)	240mg(4.8mL)	300mg(6mL)	450mg(9mL)	540mg(10.8mL)	900mg(18mL)	1350mg(27
					l	l		1		1	1	
EQUIPMENTS	Small neonate, <1 kg : 2.5mm, 1-2kg : 3mm	ENDOTRACHEAL TUBES				1						
	4)	ETT SIZE	/mm	3 - 3.5	3.5	3.5	4	4	4.5	5	6	6.5
	(AGE in yrs /2 + 12)	ORAL ETT LENGTH	/cm	8.5	10	10.5	11	12	13	14	17	20
	(AGE in yrs /2 + 15)	NASAL ETT LENGTH		10	12	13	14	15	16	17	20	
	( y.o/2 · 20)	DEFIBRILLATION	•	12 J	16 J	20 J	32 J	40 J	60 J	70 J	120 J	180 J
		CHEST TUBE	,	8 F	8 F	10 F	10 F	10 F	14 F	16 F	20 F	20 F
		URINARY FOLEY CATI		5 F	5 F	8 F	8 F	8 F	10 F	12 F	16 F	16 F
PECIALISED EQUIPMENTS		UNINAKT FULET CATI	HEIER	31	31	o F	8 F	D5% - Dextrose 5%	101	12 F NEAT - Undiluted	10 1	16 F
	(Operating Theatre)						LEGEND	D5% - Dextrose 5% ETT - Endotracheal tube		NEAT - Undiluted  NS - Normal saline		
engstaken Blakemore tube												

# **New Process**

## Electronic Drug Prescription

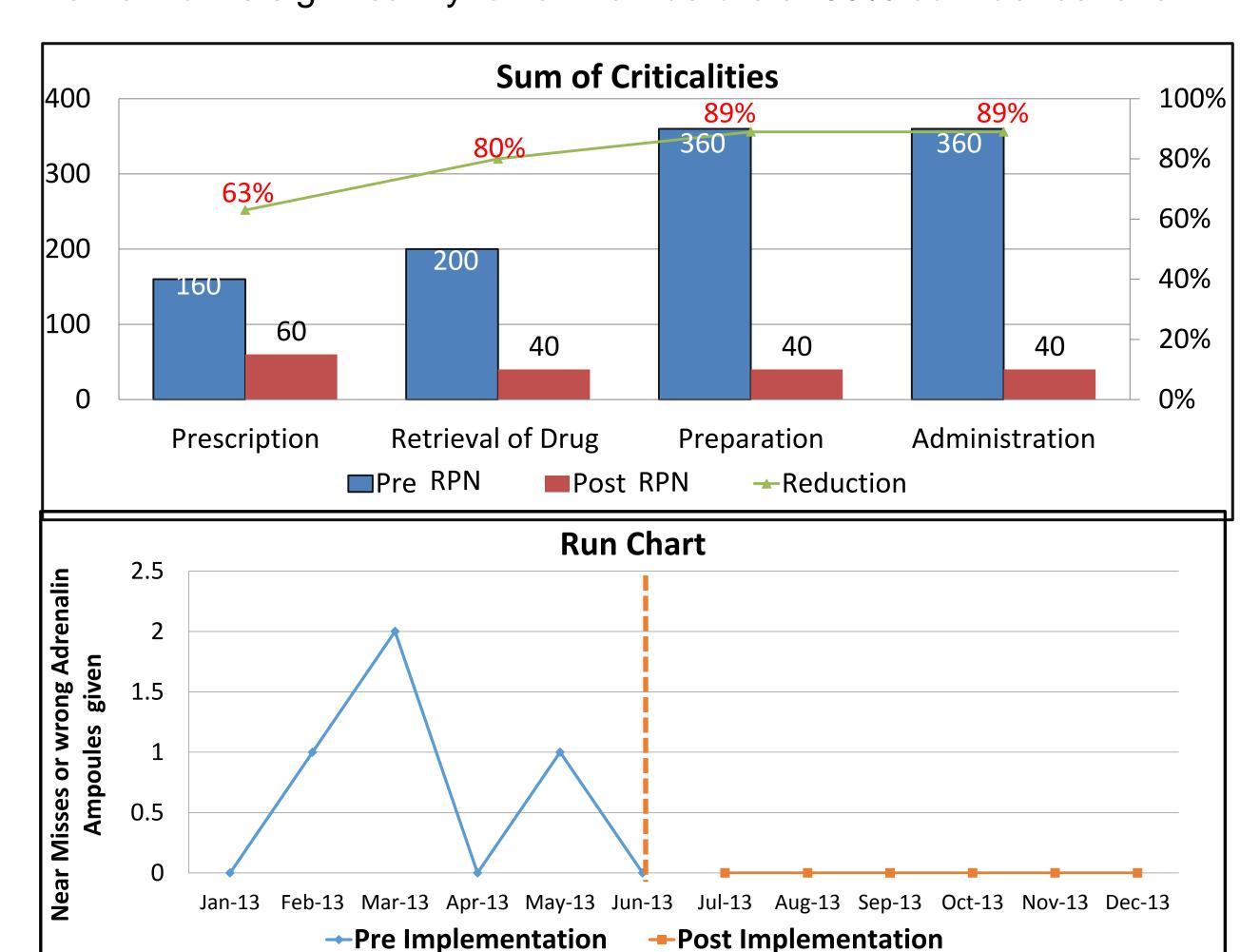
	Paediatric Code Sheet									
Patient's Name Ward /Bed: Allergies: G6PD Def: Weight: (Shows Date where weig	ght last entei	ed/updated)	PRN: Viist No:	Age: DOB:	Sex:					
DRUG	ROUTE	DOSE	CALCULATED DOSE	CALCULATED AMOUNT	Notes					
Adrenaline [EpiNEPHrine] 1:10,000 (1mg/10ml) injection	IV Bolus	0.1 mL/kg	0.1*BW mL	0.1*BW*CF mL						
Atropine Sulfate 600mcg/mL injection	IV Bolus	0.02 mg/kg	0.02*BW mg	0.02*BW*CF mL	MINImum dose: 100mcg (0.17 mL) MAXImum dose: 600mcg (1 mL)					
Albumin 5% Solution	IV Bolus	10 to 20 mL/kg	10*BW to 20*BW mL	10*BW*CF to 20*BW*CF mL						
Calclum Chloride 10% (5.5mmol/10mL) injection	IV Bolus	0.2 mL/kg	0.2*BW mL	0.2*BW*CF mL	Use Large or Central veln					
Dextrose 25% Infusion	IV Bolus	2 mL/kg	2*BW mL	2*BW*CF mL	Dilute Dextrose 50% with same amount of WFI (1:1) to get 25% solution					
Sodlum Chloride 0.9% InFUSion	IV Bolus	10 to 20 mL/kg	10*BW to 20*BW mL	10*BW*CF to 20*BW*CF mL						
Sodium Bicarbonate 8.4% (1mmol/mL) inFUSion	IV Bolus	1 mmol/kg	1*BW mmol	1*BW*CF mL	8.4% - Infuse in Central Vein only					
Sodium Bicarbonate 4.2% (0.5mmol/mL) InFUSion	IV Bolus	1 mmol/kg	1*BW mmol	1*BW*CF mL	4.2% - Safe for peripheral vein Infusion Dilute NaHCO3 8.4% with same amount of WFI (1:1) to get 4.2% solution					
Suxamethonium Chloride 100mg/2mL injection	IV Bolus	1 to 2 mg/kg	1*BW to 2*BW mg	1*BW*CF to 2*BW*CF mL						
Midazolam 5mg/mL injection	IV Bolus	0.1 to 0.3 mg/kg	0.1*BW to 0.3*BW mg	0.1*BW*CF to 0.3*BW*CF mL						
Morphine Sulfate 10mg/mL injection	IV Bolus	0.1 mg/kg	0.1*BW mg	0.1*BW*CF mL						
Rocuronium Br 50mg/5mL injection	IV Bolus	1 mg/kg	1*BW mg	1*BW*CF mL						
DEFIBRILLATION		Range of 0.5 to 4 Joules / kg			]					
Calculated range		0.5*BW to	4*BW	oules						
Printed by:         Name ABC         Nurse           Name :         (Designation)           Verified By:         (Designation)	v -	Comments: Name , User's D and date autiomtically print on User log in Name /Desgir Date of printing	ts out based	tte						
Name (Dr / Pharmacist)		Signature	Da	ito.						

PYXIS ADT TESTING SN19 ROW23						S7317983A / 7615000107H		7y2	?m (20-May-2008) Ma
KKH-CICU-RM	ANG PEI MING SAMUEL					20-05-2008/Malay			
Allergies:									
Wt: 20.5 kg (05-Aug-2015)									
PAM.[Rx] Paeds Code Sheet.KKH [2 orders of 13 are selected]									
Height (cm) Weight (kg) BSA BMI									
05-Aug-2015 18:05									
Medication Name	Start Date	Order Priority	Route	Dose	UOM	Order Details/Instructions	Calc Dose Info	Frequency	Dosing Information
☑  Adrenaline [EpiNEPHrine] 1:10,000 (1mg/10ml) Injection	06-Aug-2015	STAT	IV Bolus	2.05	mL		0.1 mL/Kg/DOSE	Once	MAXimum dose: 1 mg (1mg = 10r
Atropine Sulfate Injection (IV Bolus 600mcg STAT)		STAT	IV Bolus		mg			Once	MINimum dose: 100mcg (0.17 m
☐ Ⅲ Albumin 5% Solution (IV Intermittent 3mL/kg)		STAT	IV Intermittent		mL			Once	MINimum dose: 10 mL/kg ;
☐ 厨 Calcium Chloride 10% (5.5mmol/10mL) Injection (IV Intermittent mmol in NaCl 0.9%)	T	STAT	IV Bolus		mL			Once	Use Large or Central vein
Dextrose 25% Infusion (IV ContinuousmL over 24 hr (Non-Commercial Preparation))	T	STAT	IV Bolus	2	mL/kg	Dilute Dextrose 50% with same amount		Once	
Dextrose 10% Infusion (IV BolusmL.)		Routine	IV Bolus	4	mL/kg			Once	MINimum dose: 4 mL/kg; MAXi
☐ 🖩 Sodium Chloride 0.9% Injection (IV Bolus mL)		STAT	IV Bolus		mL			Once	MINimum dose:10 mL/kg;MAXin
☐ ■ Sodium Bicarbonate 8.4% (1mmol/mL) InFUSion (IV IntermittentmL)		STAT	Other Route		mmol	Infuse in Central Vein only		Once	
☐ ■ Sodium Bicarbonate 4.2% (0.5mmol/mL) Injection (IV Intermittent mL (To mix		STAT	IV Bolus		mmol	Safe for peripheral vein infusion		Once	
☑ Ⅲ SUXAmethonium Chloride Injection	06-Aug-2015		IV Bolus	20.5	mg		1 mg/Kg/DOSE x	Once	MAXimum dose: 2 mg/kg
☐ Ⅲ Midazolam Injection (IV Bolus 0.05mg/kg)		STAT	IV Bolus		mg			Once	Dose Range: 0.1 to 0.3 mg/kg (1
Morphine Sulfate Injection (- IV Bolus 10mg)		STAT	IV Bolus		mg			Once	
ROCUronium Br Injection (IV Bolus mg)	T	STAT	IV Bolus		mg			Once	

#### Results

Four main process steps and 20 sub-processes were outlined. RPN of more than 100 were found in the four main processes indicative that the prescription, retrieval of drugs, preparation and administration processes have the high potential for hazardous errors. Since the implementation of safety measures, patient safety and quality care are evidenced by no reported incidence of medication error till date and the high risk failure modes were reduced by 63% for prescription, 80% for retrieval of drugs and 89% for preparation and administration processes. Before intervention: 4 near misses or actual errors (9%) and 40 correctly administered.

After intervention result showed 0 near misses or actual errors (0%) and 70 correctly administered. Using Fisher Exact test, P value = 0.020344. P value < 0.05 indicates that near misses or actual errors after intervention is significantly lower than before at 95% confidence level.







Placement of Adrenaline 1:10 000 ampoules at back of drawer Placement of Adrenaline 1:1000

of the drawer in a closed container with a metal

'bridge' over the compartment labeled highly

**Pre implementation – Re-location of Adrenaline** Adrenaline 1:1000 ampoules placed at the back ampoules in E-trolley drug drawer



Adrenaline 1:10 000 ampoules placed at front of drawer for easy accessibility





Pre Implementation: Preparation of E drugs – no standard labels used and drug in ampoule is fully drawn out into a syringe



Post Implementation: Preparation of E-drugs – standardized drug labels used with exact volume prepared

#### Conclusion

FMEA is a useful safety improvement tool. It is a risk assessment methodology used to identify weaknesses in a complex hazardous process and generate corrective control measures to counteract these weaknesses before they result in adverse event.