



The Handtevy System---- System 1 Thinking for Pediatric and Adult Medication Dosing.

“On Scene – No Math – Save Lives”

What We've Learned

BLUE

RESUSCITATION

Anaphylaxis dose (1/10th strength) not listed

Epinephrine (1:10,000)	0.21 mg (2.1 mL)
Epinephrine ET (1:1,000)	2.1 mg (2.1 mL)
Atropine (0.1 mg/mL)	0.42 mg (4.2 mL)
Atropine ET (0.4 mg/mL)	0.6 mg (1.5 mL)
Sodium Bicarbonate	21 mEq
Lidocaine	20 mg
Lidocaine ET	40-60 mgs
Defibrillation	
1st/2nd Dose (may repeat)	40J/80J
Cardioversion	
1st/2nd Dose	20J/40J
Adenosine	
1st Dose	2.1 mg
2nd Dose If Needed	4.2 mg
Amiodarone	105 mg
Calcium Chloride	420 mg
Magnesium Sulfate	1050 mg

RAPID SEQUENCE INTUBATION

PREMEDICATIONS

Atropine	0.42 mg
Pan/Vecuronium (Defasciculating Agent)	0.21 mg
Lidocaine	32 mg
Fentanyl <small>6 fold higher dose</small>	63 mcg

INDUCTION AGENTS

Etomidate	6.3 mg
Ketamine	42 mg
Midazolam <small>3 fold higher dose</small>	6.3 mg
Propofol	63 mg

PARALYTIC AGENTS

Succinylcholine (give atropine prior)	40 mg
Pancuronium	4.2 mg
Vecuronium	4.2 mg
Rocuronium	21 mg

MAINTENANCE

Pancuronium/Vecuronium	2.1 mg
Lorazepam	1 mg

19 KG

20 KG

22 KG

10X

3X

3X

Handtevy Medication Guide

Customized to Your Agency

PREMIE

EQUIPMENT

BVM	Infant
Blade	0 Straight
ETT Size	2.5 or 3.0 Uncuffed
Suction Catheter	6 French
ETT @ Lip	7.5 - 9 cm
King Supraglottic Airway	use BVM
iGel LMA	use BVM
EZ-IO <small>Place needle on bone → Upper hash tag should be visible before drilling</small>	15 mm
NG Tube	5 French
Blood Pressure Cuff	Neonatal #4 or Infant

DRIPS (2 KG)

DRUG	CONCENTRATION	RATE	DOSE/KG
Dopamine Vial 200 mg/5 mL	3200 mcg/mL	0.19 mL/hr	5 mcg/kg/min 2 - 20 mcg/kg/min
Epinephrine Amp/Vial 1 mg/mL	16 mcg/mL Epinephrine 8 mg + NS 500 mL	0.75 mL/hr	0.1 mcg/kg/min 0.05 - 5 mcg/kg/min
Fentanyl Vial 250 mcg/5 mL	2.5 mcg/mL Fentanyl 250 mcg + NS 100 mL	0.8 mL/hr	1 mcg/kg/hr 1 - 2 mcg/kg/hr
Ketamine Vial 500 mg/5 mL	5 mg/mL Ketamine 500 mg + NS 100 mL	0.4 mL/hr	1 mg/kg/hr 0.5 - 2 mg/kg/hr
Midazolam Vial 10 mg/2 mL	1 mg/mL Straight Drug	0.12 mL/hr	0.06 mg/kg/hr 0.06 - 0.12 mg/kg/hr
Norepinephrine Vial 4 mg/4 mL	8 mcg/mL Norepinephrine 4 mg + NS 500 mL	1.5 mL/hr	0.1 mcg/kg/min 0.05 - 2 mcg/kg/min

LIFEPAK	JOULES/KG	1ST	2ND	3RD	4TH
Defibrillation	2 → 4 → 6 → 8	4	8	15	15
Cardioversion	1 → 2 → 2 → 2	2	4	4	4

ZOLL-X	JOULES/KG	1ST	2ND	3RD	4TH
Defibrillation	2 → 4 → 6 → 8	4	8	15	15
Cardioversion	1 → 2 → 2 → 2	2	4	4	4

VITALS	SBP	SS - 90	HR	120 - 170	RR	40 - 70
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- Option 1 -USE ACTUAL AGE (IF STANDARD SIZED CHILD)
Option 2 -ESTIMATE AGE USING HANDTEVY LENGTH BASED TAPE (HEAD TO HEEL)

PREMIE

North Memorial Ambulance & Air Care 2 KG IDEAL WEIGHT

DRUG	CONC	VOL	RT	DOSE/KG	AMOUNT
3% Saline ICP	3%	10 mL	IV/IO	5 mL/kg	10 mL
Adenosine (1st dose)	6 mg/2mL	0.07 mL	IV/IO	0.1 mg/kg	0.2 mg
Adenosine (2nd dose)	6 mg/2mL	0.13 mL	IV/IO	0.2 mg/kg	0.4 mg
Amiodarone	50 mg/mL	0.2 mL	IV/IO	5 mg/kg	10 mg
Atropine	0.1 mg/mL	1 mL	IV/IO	Dose =	0.1 mg
Bicarb 4.2% Dilute	8.4% 1:1 NS	4 mL	IV/IO	1 mEq/kg	2 mEq
Blood (PRBC)	N/A	20 mL	IV/IO	10 mL/kg	20 mL
Calcium Chloride 10%	100 mg/mL	0.4 mL	IV/IO	20 mg/kg	40 mg
Calcium Gluconate	100 mg/mL	1.2 mL	IV/IO	60 mg/kg	120 mg
D10W (D50W - 40 mL) + 40 mL NS		10 mL	IV/IO	0.5 g/kg	1 g
Diphenhydramine	50 mg/mL	0.04 mL	IV/IO/IM	1 mg/kg	2 mg
Epi 1:1,000 IM	1 mg/mL	0.02 mL	IM	0.01 mg/kg	0.02 mg
Epi 1:10,000 IV	1 mg/10mL	0.6 mL	IV/IO	0.03 mg/kg	0.06 mg
Fentanyl	50 mcg/mL	0.08 mL	IV/IO/IM/IN	2 mcg/kg	4 mcg
Glucagon	1 mg/mL	0.2 mL	IV/IO/IM/IN	0.1 mg/kg	0.2 mg
Glucose (oral)	15 g/tube	N/A	PO		Not indicated
Hydromorphone	2 mg/mL	0.02 mL	IV/IO/IM	0.015 mg/kg	0.03 mg
Ketamine (analgesia)	500 mg/5mL	0.01 mL	IV/IO/IM/IN	0.25 mg/kg	0.5 mg
Ketamine (intubation)	500 mg/5mL	0.04 mL	IV/IO	2 mg/kg	4 mg
Ketamine (sedation)	500 mg/5mL	0.02 mL	IV/IO/IM	1 mg/kg	2 mg
Lidocaine 2%	20 mg/mL	0.1 mL	IV/IO	1 mg/kg	2 mg
Lorazepam	2 mg/mL	0.05 mL	IV/IO/IM/IN	0.05 mg/kg	0.1 mg
Magnesium Sulfate	500 mg/mL	0.2 mL	IV/IO	50 mg/kg	100 mg
Midazolam IM/IN	5 mg/mL	0.08 mL	IM/IN	0.2 mg/kg	0.4 mg
Midazolam IV	5 mg/mL	0.04 mL	IV/IO	0.1 mg/kg	0.2 mg
Morphine	10 mg/2mL	0.04 mL	IV/IO/IM	0.1 mg/kg	0.2 mg
Naloxone	1 mg/mL	0.2 mL	IV/IO/IM/IN	0.1 mg/kg	0.2 mg
Normal Saline Bolus	0.9%	20 mL	IV/IO	10 mL/kg	20 mL
Ondansetron	2 mg/mL	0.15 mL	IV/IM	0.15 mg/kg	0.3 mg
Ondansetron ODT	4 mg/tab	N/A	PO		Not indicated
Racemic Epi	Add 2 mL NS	N/A	NEB		Not indicated
Rocuronium	10 mg/mL	0.1 mL	IV/IO/IM	0.5 mg/kg	1 mg
Vasopressin	20 unit/mL	0.04 mL	IV/IO	0.4 unit/kg	0.8 unit
Vecuronium	1 mg/mL	0.2 mL	IV/IO	0.1 mg/kg	0.2 mg

San Antonio Fire Department



New Patient P-16:34

PREEMIE 2 KG Ideal Weight

Gray

NB 4 KG Ideal Weight

Gray

4MO 6 KG Ideal Weight

Pink

6MO 8 KG Ideal Weight

Red

1YR 10 KG Ideal Weight

Purple

2YR 12 KG Ideal Weight

Yellow

3YR 15 KG Ideal Weight

White

4YR 17 KG Ideal Weight

White

Handtevy Medication Guide

Ages Premie to Adult

Option 1 -USE ACTUAL AGE (IF STANDARD SIZED CHILD)
Option 2 -ESTIMATE AGE USING HANDTEVY LENGTH
BASED TAPE (HEAD TO HEEL)

PREMIE

North Memorial Ambulance & Air Care 2 KG IDEAL WEIGHT

DRUG	AMOUNT
3% Saline ICP	
Adenosine (1st dose)	
Adenosine (2nd dose)	
Amiodarone	
Atropine	
Bicarb 4.2% Dilute 8	
Blood (PRBC)	
Calcium Chloride 10%	
Calcium Gluconate	
D10W (D50W - 40 mL)	
Diphenhydramine	
Epi 1:1,000 IM	
Epi 1:10,000 IV	1
Fentanyl	5
Glucagon	
Glucose (oral)	
Hydromorphone	
Ketamine (analgesia)	
Ketamine (intubation)	
Ketamine (sedation)	
Lidocaine 2%	
Lorazepam	
Magnesium Sulfate	
Midazolam IM/IN	
Midazolam IV	
Morphine	1
Naloxone	
Normal Saline Bolus	
Ondansetron	
Ondansetron ODT	
Racemic Epi	Ad
Rocuronium	
Vasopressin	2
Vecuronium	

Option 1 -USE ACTUAL AGE (IF STANDARD SIZED CHILD)
Option 2 -ESTIMATE AGE USING HANDTEVY LENGTH
BASED TAPE (HEAD TO HEEL)

6MO

North Memorial Ambulance & Air Care 8 KG IDEAL WEIGHT

DRUG	CONC	VOL	RT	DOSE/KG	AMOUNT
3% Saline ICP	3%	40 mL	IV/IO	5 mL/kg	40 mL
Adenosine (1st dose)	6 mg/2mL	0.27 mL	IV/IO	0.1 mg/kg	0.8 mg
Adenosine (2nd dose)	6 mg/2mL	0.53 mL	IV/IO	0.2 mg/kg	1.6 mg
Amiodarone	50 mg/mL	0.8 mL	IV/IO	5 mg/kg	40 mg
Atropine	0.1 mg/mL	1.6 mL	IV/IO	0.02 mg/kg	0.16 mg
Bicarb 4.2% Dilute 8.4% 1:1 NS		16 mL	IV/IO	1 mEq/kg	8 mEq
Blood (PRBC)	N/A	80 mL	IV/IO	10 mL/kg	80 mL
Calcium Chloride 10%	100 mg/mL	1.6 mL	IV/IO	20 mg/kg	160 mg
Calcium Gluconate	100 mg/mL	4.8 mL	IV/IO	60 mg/kg	480 mg
D10W (D50W - 40 mL) + 40 mL NS		40 mL	IV/IO	0.5 g/kg	4 g
Diphenhydramine	50 mg/mL	0.16 mL	IV/IO/IM	1 mg/kg	8 mg
Epi 1:1,000 IM	1 mg/mL	0.08 mL	IM	0.01 mg/kg	0.08 mg
Epi 1:10,000 IV	1 mg/10mL	0.8 mL	IV/IO	0.01 mg/kg	0.08 mg
Fentanyl	50 mcg/mL	0.32 mL	IV/IO/IM/IN	2 mcg/kg	16 mcg
Glucagon	1 mg/mL	0.8 mL	IV/IO/IM/IN	0.1 mg/kg	0.8 mg
Glucose (oral)	15 g/tube	N/A	PO	Not indicated	
Hydromorphone	2 mg/mL	0.06 mL	IV/IO/IM	0.015 mg/kg	0.12 mg
Ketamine (analgesia)	500 mg/5mL	0.02 mL	IV/IO/IM/IN	0.25 mg/kg	2 mg
Ketamine (intubation)	500 mg/5mL	0.16 mL	IV/IO	2 mg/kg	16 mg
Ketamine (sedation)	500 mg/5mL	0.08 mL	IV/IO/IM	1 mg/kg	8 mg
Lidocaine 2%	20 mg/mL	0.4 mL	IV/IO	1 mg/kg	8 mg
Lorazepam	2 mg/mL	0.2 mL	IV/IO/IM/IN	0.05 mg/kg	0.4 mg
Magnesium Sulfate	500 mg/mL	0.8 mL	IV/IO	50 mg/kg	400 mg
Mannitol 25% Vial	12.5 g/50mL	16 mL	IV/IO	0.5 g/kg	4 g
Midazolam IM/IN	5 mg/mL	0.32 mL	IM/IN	0.2 mg/kg	1.6 mg
Midazolam IV	5 mg/mL	0.16 mL	IV/IO	0.1 mg/kg	0.8 mg
Morphine	10 mg/2mL	0.16 mL	IV/IO/IM	0.1 mg/kg	0.8 mg
Naloxone	1 mg/mL	0.8 mL	IV/IO/IM/IN	0.1 mg/kg	0.8 mg
Normal Saline Bolus	0.9%	160 mL	IV/IO	20 mL/kg	160 mL
Ondansetron	2 mg/mL	0.6 mL	IV/IM	0.15 mg/kg	1.2 mg
Ondansetron ODT	4 mg/tab	1/2 tab	PO	Dose =	2 mg
Racemic Epi	Add 2 mL NS	0.5 mL	NEB	Dose =	0.5 mL
Rocuronium	10 mg/mL	0.8 mL	IV/IO/IM	1 mg/kg	8 mg
Vasopressin	20 unit/mL	0.16 mL	IV/IO	0.4 unit/kg	3.2 unit
Vecuronium	1 mg/mL	0.8 mL	IV/IO	0.1 mg/kg	0.8 mg

Option 1 -USE ACTUAL AGE (IF STANDARD SIZED CHILD)
Option 2 -ESTIMATE AGE USING HANDTEVY LENGTH
BASED TAPE (HEAD TO HEEL)

5YR

North Memorial Ambulance & Air Care 20 KG IDEAL WEIGHT

DRUG	CONC	VOL	RT	DOSE/KG	AMOUNT
3% Saline ICP	3%	100 mL	IV/IO	5 mL/kg	100 mL

Adenosine (1s)	
Adenosine (2r)	
Amiodarone	
Atropine	
Bicarb 8.4%	
Blood (PRBC)	
Calcium Chlori	
Calcium Glucc	
D10W (D50W	
D25W (D50W	
Diphenhydran	
Epi 1:1,000 IM	
Epi 1:10,000 I	
Fentanyl	
Glucagon	
Glucose (oral)	
Hydromorpho	
Ketamine (ana	
Ketamine (intu	
Ketamine (sed	
Lidocaine 2%	
Lorazepam	
Magnesium S	
Mannitol 25%	
Midazolam IM	
Midazolam IV	
Morphine	
Naloxone	
Normal Saline	
Ondansetron	
Ondansetron	
Racemic Epi	
Rocuronium	
Vasopressin	
Vecuronium	

Option 1 -USE ACTUAL AGE (IF STANDARD SIZED CHILD)
Option 2 -ESTIMATE AGE USING HANDTEVY LENGTH
BASED TAPE (HEAD TO HEEL)

ADULT

North Memorial Ambulance & Air Care 75 KG IDEAL WEIGHT

DRUG	CONC	VOL	RT	DOSE/KG	AMOUNT
3% Saline ICP	3%	375 mL	IV/IO	5 mL/kg	375 mL
Adenosine	12 mg/4mL	4 mL	IV/IO	Dose =	12 mg
Adenosine (1st dose)	6 mg/2mL	2 mL	IV/IO	Dose =	6 mg
Adenosine (2nd dose)	6 mg/2mL	4 mL	IV/IO	Dose =	12 mg
Amiodarone (No Pulse)	50 mg/mL	6 mL	IV/IO	Dose =	300 mg
Atropine	0.1 mg/mL	10 mL	IV/IO	Dose =	1 mg
Bicarb 8.4%	50 mEq/50mL	50 mL	IV/IO	Dose =	50 mEq
Blood (PRBC)	N/A	300 mL	IV/IO	Dose =	300 mL
Calcium Chloride 10%	100 mg/mL	10 mL	IV/IO	Dose =	1 g
Calcium Gluconate	100 mg/mL	10 mL	IV/IO	Dose =	1 g
D10W (D50W - 40 mL) + 40 mL NS		250 mL	IV/IO	Dose =	25 g
D50W	0.5 g/mL	50 mL	IV/IO	Dose =	25 g
Diphenhydramine	50 mg/mL	1 mL	IV/IO/IM	Dose =	50 mg
Epi 1:1,000 IM	1 mg/mL	0.3 mL	IM	Dose =	0.3 mg
Epi 1:10,000 IV	1 mg/10mL	10 mL	IV/IO	Dose =	1 mg
Fentanyl	50 mcg/mL	1 mL	IV/IO/IM/IN	Dose =	50 mcg
Glucagon	1 mg/mL	1 mL	IV/IO/IM/IN	Dose =	1 mg
Glucose (oral)	15 g/tube	1 tube	PO	Dose =	15 g
Hydromorphone	2 mg/mL	0.5 mL	IV/IO/IM	Dose =	1 mg
Ketamine (analgesia)	500 mg/5mL	0.19 mL	IV/IO/IM/IN	0.25 mg/kg	18.75 mg
Ketamine (intubation)	500 mg/5mL	1.5 mL	IV/IO	2 mg/kg	150 mg
Ketamine (sedation)	500 mg/5mL	0.75 mL	IV/IO/IM	1 mg/kg	75 mg
Lidocaine 2%	20 mg/mL	3.8 mL	IV/IO	1 mg/kg	75 mg
Lorazepam	2 mg/mL	1 mL	IV/IO/IM/IN	Dose =	2 mg
Magnesium Sulfate	500 mg/mL	4 mL	IV/IO	Dose =	2 g
Mannitol 25% Vial	12.5 g/50mL	150 mL	IV/IO	0.5 g/kg	37.5 g
Midazolam IM/IN	5 mg/mL	1 mL	IM/IN	Dose =	5 mg
Midazolam IV	5 mg/mL	1 mL	IV/IO	Dose =	5 mg
Morphine	10 mg/2mL	1.5 mL	IV/IO/IM	0.1 mg/kg	7.5 mg
Naloxone	1 mg/mL	2 mL	IV/IO/IM/IN	Dose =	2 mg
Normal Saline Bolus	0.9%	1000 mL	IV/IO	Dose =	1000 mL
Ondansetron	2 mg/mL	2 mL	IV/IM	Dose =	4 mg
Ondansetron ODT	4 mg/tab	1 tab	PO	Dose =	4 mg
Racemic Epi	Add 2 mL NS	0.5 mL	NEB	Dose =	0.5 mL
Rocuronium	10 mg/mL	7.5 mL	IV/IO/IM	1 mg/kg	75 mg
Vasopressin	20 unit/mL	1.5 mL	IV/IO	0.4 unit/kg	30 unit
Vecuronium	1 mg/mL	7.5 mL	IV/IO	0.1 mg/kg	7.5 mg



What we Teach

- 4 hour class instead of PALS
- Skills based course
- Our Protocols- Our Meds
- App on Phones and Tablets
- Books in Medic units

Bread and Butter

What are the dosages?

Anaphylaxis

Femur Fracture

Seizure



Epi 1:1000 IM



Fentanyl IN





Midazolam IN



What do my medics say about the program ...

- “I wish we had this sooner”
- “It makes Peds calls less stressful”
- “Really..... NO MATH !!!!!”
- “I am less afraid of making a mistake”

We Gave More Medications and had fewer Errors !!!!!

3 Months	Before Handtevy	After Handtevy	
<u>Midazolam(Versed) SZ</u>			
Correct Dose	4	30	
Wrong Dose/Route	16		
Total administrations	20	34	70%
<u>Fentanyl (pain)</u>			
Correct Dose	2	14	
Wrong Dose/Route	14		
Total administrations	16	21	31%



Denver Paramedic HandTevy Update

Kevin McVaney, MD
Medical Director, Denver Paramedics



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**NO EXPERIENCE
NECESSARY**



**CherryCreekSchools
TRANSPORTATION**

We Gave More Medications with fewer Errors !!!!!

	2016 Q4	2017
Medication Doses	93	457
Deviations	17	3
Rate of Deviation	18.28%	0.66%

3 Deviations

- Did not use HandTevy
- Overdosage



Summary Points

- No More Math Required
- Utilize the Handtevy Medication Guide for ALL calls
- It reduces Errors and Increases Medic Confidence

LET'S SAVE LIVES!

Thank You

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