Weighing of Children in Metric Units

INTERVENTION BUNDLE #1

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Introduction

BACKGROUND

In 2013, the Emergency Medical Services for Children (EMSC) Program in partnership with the American Academy of Pediatrics, the American College of Emergency Physicians, and the Emergency Nurses Association launched the National Pediatric Readiness Project (NPRP) to ensure high quality emergency care for children regardless of their geographic location. The project began with a national assessment based on the 2009 "Guidelines for Care of Children in the Emergency Department," to determine the capacity of our nation's emergency departments to meet the needs of children. Eighty-three percent of EDs across the US participated in the 2013 National Pediatric Readiness Assessment. This was a clear indication of the nation's desire to ensure high quality emergency care for children. Three of the common gaps identified were:

- Presence of physician (47.5%) and nurse (59.3%) pediatric emergency care coordinators (PECC);
- Presence of quality improvement plans that include children (45.1%);
- Process to ensure pediatric weights are measured in kilograms (67.7%);

This intervention bundle focuses on the weighing of children in metric units. Over the past 15 years, patient safety has become a key priority for health systems.[1] The American Academy of Pediatrics published many statements addressing pediatric patient specific safety issues.[2,3] In pediatric patients, many factors contribute to the risk of medication errors, including weight-based dosing, off-label drug use, decreased communication abilities, an inability to self-administer medications, and the high vulnerability to harm of young, critically ill and injured children, particularly those with immature renal and hepatic systems.[4]

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[1] Institute of Medicine. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academies Press; 2000

[2] American Academy of Pediatrics, National Initiative for Children's Health Care Quality Project Advisory Committee. Principles of patient safety in pediatrics. *Pediatrics*. 2001;107(6):1473–1475

[3] American Academy of Pediatrics, Committee on Drugs and Committee on Hospital Care. Prevention of medication errors in the pediatric inpatient setting. *Pediatrics*. 2003;112(2):431– 436

[4] Steering Committee on Quality Improvement and Management and Committee on hospital Care. Policy Statement—Principles of Pediatric Patient Safety: Reducing Harm Due to Medical Care. *Pediatrics* 2011;127:1199–1210

SUBJECT MATTER EXPERTS

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CONSIDERATIONS

This intervention bundle was designed exclusively for sites participating in the Pediatric Readiness Quality Collaborative, and as such, this content should not be used for other purposes or by other sites without written consent from the EMSC Innovation and Improvement Center.

Each physician/practitioner must use his or her independent judgment in the management of any specific patient and is responsible, in consultation with the patient and/or the patient family, to make the ultimate judgment regarding care.

This intervention bundle may conflict with "existing" local quality improvement efforts. You are encouraged to seek support from ED and hospital leadership regarding the adoption of the proposed change strategies as standard practice for your emergency department.

Aim Statement

By December 2019, at least 85% of pediatric patients, treated at sites adopting the weight measurement bundle, will have their weight measured and recorded exclusively in kilograms.

Quality Measures

Structural Measure #1:	Presence of a policy that outlines standards for weighing pediatric patients in kilograms
Process Measure #1:	Percentage of pediatric patients presenting to the emergency department that are exclusively weighed in kilograms
Process Measure #2:	Percentage of pediatric patients presenting to the emergency department whose weight is exclusively documented in the medical records in kilograms
Outcome Measure #1:	Percentage of medication dosing errors identified during the reporting period

Data Collection

#	Variable / Question	Data Type	Responses
1	Select intervention bundle for reporting period	site	**1 - Weight in Kilograms** / 2 - Abnormal Vitals / 3 - Interfacility Transfers / 4 - Disaster Planning
2	Select key drivers for reporting period	site	1 – Policy Statement / 2 – Infrastructure Changes / 3 – EMR Optimization / 4 – Education / 5 - Knowledge Reinforcement / 6 – Prescribing Patterns / 7 – Medication Administration / 8 – Patient/Family Engagement
3	Weight Policy	site	1 – Yes (Upload) / 2 – No
4	Does the policy specify that weight be **measured** in KG only?	site	1 – Yes / 2 – No
5	Does the policy specify that weight be **recorded** in KG only	site	1 – Yes / 2 - No
6	Date of Birth	patient	MM: DD: YYYY
7	Date/Time of Arrival	patient	MM: DD: YYYY hh:mm
8	Mode of Arrival	patient	1 - Ambulance, either air or ground / 2 - Walk-in, this include car, taxi, bus, or foot / 3 - Other or Unknown
9	Triage Level	patient	Color; Numeric; Other; Unknown
10	Weight in Medical Record	patient	1 - Yes / 2 - No
11	Weight Measurement Unit	patient	1 - Kilograms / 2 - Pounds/ 3-Both
12	Patient Weight as Entered in Chart	patient	0-275 (kg) / 0-500 (lbs)
13	Target Medication Administered	patient	1 - Yes / 2 - No
14	Medication given (select all that apply)	patient	1 - Acetaminophen / 2 - Ceftriaxone / 3 - Decadron / 4 - Dextrose 10% / 5 - Dextrose 25% / 6 - Epinephrine (Intramuscular) / 7 - Fentanyl / 8 - Fosphenytoin / 9 - Ibuprofen / 10 - Lorazapam / 11 - Midazolam / 12 - Morphine / 13 - Normal Saline Bolus / 14 - Ondansetron / 15 - Phenytoin / 16 – Toradol
15	Medication Dosage	patient	0-1000
16	Medication Unit	patient	mcg/mg/ml (branching according to med selected)

Intervention Strategies

KEY DRIVER 1: GUIDELINES STATEMENTS

Change Strategies:

- Weight should be recorded at every ED encounter: scale/gurney (electronic) preferred over length-based tape
    - Actual weight should be obtained whenever possible. When it is not possible, weight should be estimated using a standard method of estimating weight in metric units (e.g., length-based system)
- Ensure that length-based tape is used for all resuscitations
- Include family-centered care elements within guidelines document (i.e., informing families prior to weighing children and medication administration the importance of weighing children in kilograms as a method for reducing pediatric medication errors.

KEY DRIVER 2: INFRASTRUCTURE CHANGES

Change Strategies:

- Utilize a scale that only weighs pediatric patients in kilograms or a scale that can be locked in kilograms mode
- Utilize a length-based tape and ensure that it is available/secured in resuscitation bay as well
- Utilize a single formulation for each medication

KEY DRIVER 3: EMR OPTIMIZATION

Change Strategies:

- EMR alerts care team when weight is not recorded in correct unit
- EMR alerts care team that weight does not coincide with patient's height and age
- For resuscitation, weight is a required entry in the patient's medical record
- Consider using standard weight nomograms (e.g., World Health Organization)
- EMR automatically calculates medication dosing based on weight entered in medical record

KEY DRIVER 4: EDUCATION

Change Strategies:

- Develop training/educational content for care team
- Learning objectives should include: proper use of length-based tape, necessity of weight measurement required in cases of resuscitation, safety issues (e.g., number of reported medication errors), methods of measuring weight, nomograms, family engagement, your site's guidelines, and reinforce that weight should not be estimated but measured
- Identify training modality (e.g., online, in-person, staff-meetings, peer to peer, electronic medical record alerts)
- Identify strategies to increase families' engagement

KEY DRIVER 5: KNOWLEDGE REINFORCEMENT FOR CARE TEAM

Change Strategies:

- Posters in triage area
- Direct feedback to care team following chart audits
- Develop script/cards (weight conversion for families) for use by triage nurse

KEY DRIVER 6: MEDICATION ORDERING PATTERNS (DEEP DIVE FOR OUTCOME MEASURE)

Change Strategies:

- Integrate a process to track the number of incidences when an incorrect dose of a medication was ordered for a patient based on their weight
- Track high risk conditions with common errors in prescribing and administration
- Monitor family engagement in medication administration
- Integrate a tool that nurses can reference to ensure that medication dosing is appropriate (use standard nomograms as reference)
- Integrate a nurse to nurse cross-check to ensure that medication dosing is appropriate. If site has bandwidth to accommodate this effort, consider cross-check for high-risk patients/medications or cross-checks during off-peak hours in the ED.

- Work with pharmacy team to develop notification system in the event that a prescribed medication does not coincide with standard practice

KEY DRIVER 7: PATIENT & FAMILY ENGAGEMENT

Change Strategies:

- Include process where family are advised of medication and dose prior to administration
- Disseminate weight infographic/conversion chart to empower caregiver engagement

Resources

ARTICLES

- American Academy of Pediatrics Committee on Pediatric Emergency Medicine, American College of Emergency Physicians Pediatric Committee, & Emergency Nurses Association Pediatric Committee. (2009). Joint Policy Statement—Guidelines for Care of Children in the Emergency Department. Pediatrics, 124(4), 1233-1243.

- Benjamin, L., Frush, K., Shaw, K., Shook, J. E., & Snow, S. K. (2018). Pediatric Medication Safety in the Emergency Department. Ann Emerg Med, 71(3), e17-e24. Pediatrics. (2017). Weighing All Patients in Kilograms. Pediatrics, 140(4).

- In March 2017, the American Academy of Pediatrics endorsed the following publication: Emergency Nurses Association. Weighing All Patients in Kilograms. Des Plaines, Illinois: Emergency Nurses Association; 2016. Available at: http://www.ena.org/docs/default-source/resource-library/practice-resources/position-statements/weighingallpatientsinkilograms.pdf?sfvrsn=9c0709e_6

SCALES

- **Health o Meter® #600KL:** Pediatric and Adult Scale; Lockout to Metric Unit
- **Cardinal® Detecto Baby Scale Model:** Metric-only infant scale

EXAMPLE OF SCRIPT FOR WEIGH-IN PROCESS

- "Mom / Dad / Caregiver, I'm going to weigh your child now. The number you hear me call out as the weight will sound odd to you, because in the hospital, we weigh in the metric system. The reason we do that is because, everything we do for your child will be based on his/her metric weight. That means medication dosing, and everything. Now, I'm going to give you a card which will help you convert that number to pounds and ounces. DO NOT TELL ME WHAT THAT IS! I don't want to take the chance of entering your child's weight into the record incorrectly, and possibly cause someone to make an error. That card is for your information only."

TOOLS

- **Kansas Conversion Chart**
  This card eliminates mathematical calculations and would be of benefit in high stress situations.

- **Kansas Conversion Card for Parents**
  The pad can be secured to a scale with a binder ring. As a pediatric patient is weighed, the easy to tear conversion chart would be given to the guardian and states the weight of the child and the date. The table ranges from 2.4kgs to 49kgs.

- **NEDARC's Weight in Kilo Infographic**
  The infographic could be displayed near the weighing station at your site as a reminder for families and the care team.

My Child weighs _____ kilograms on ___/___/___

kgs	Pound	Ounce	kgs	Pound	Ounce	kgs	Pound	Ounce	kgs	Pound	Ounce	kgs	Pound	Ounce
2.4	5	5	3.0	6	10	4.0	8	13	5.0	11	0	6.0	13	4
2.5	5	8	3.1	6	13	4.1	9	1	5.1	11	4	6.1	13	7
2.6	5	12	3.2	7	1	4.2	9	4	5.2	11	7	6.2	13	11
2.7	5	15	3.3	7	4	4.3	9	8	5.3	11	11	6.3	13	14
2.8	6	3	3.4	7	8	4.4	9	11	5.4	11	14	6.4	14	2
2.9	6	6	3.5	7	11	4.5	9	15	5.5	12	2	6.5	14	5
			3.6	7	15	4.6	10	2	5.6	12	6	6.6	14	9
			3.7	8	3	4.7	10	6	5.7	12	9	6.7	14	12
			3.8	8	6	4.8	10	9	5.8	12	13	6.8	14	16
			3.9	8	10	4.9	10	13	5.9	13	0	6.9	15	3

EMSC Emergency Medical Services for Children KANSAS

Visit us at kdheks.gov/emsc

Kansas Department of Health and Environment

PEDIATRIC WEIGHT CONVERSION

Pound	Ounce	kgs
5	5	2.4
5	8	2.5
5	12	2.6
5	15	2.7
6	3	2.8
6	6	2.9
6	10	3.0
6	13	3.1
7	1	3.2
7	4	3.3
7	8	3.4
7	11	3.5
7	15	3.6
8	3	3.7
8	6	3.8
8	10	3.9
8	13	4.0
9	1	4.1
9	4	4.2
9	8	4.3
9	11	4.4
9	15	4.5
10	2	4.6
10	6	4.7
10	9	4.8
10	13	4.9
11	0	5.0
11	4	5.1
11	7	5.2
11	11	5.3
11	14	5.4
12	2	5.5
12	6	5.6
12	9	5.7
12	13	5.8
13	0	5.9

Pound	Ounce	kgs
13	4	6.0
13	7	6.1
13	11	6.2
13	14	6.3
14	2	6.4
14	5	6.5
14	9	6.6
14	12	6.7
14	16	6.8
15	3	6.9
15	7	7.0
15	10	7.1
15	14	7.2
16	2	7.3
16	5	7.4
16	9	7.5
16	12	7.6
16	16	7.7
17	3	7.8
17	7	7.9
17	10	8.0
17	14	8.1
18	1	8.2
18	5	8.3
18	8	8.4
18	12	8.5
18	15	8.6
19	3	8.7
19	6	8.8
19	10	8.9
19	13	9.0

Pounds	kgs
22	10
24	11
26	12
29	13
31	14
33	15
35	16
37	17
40	18
42	19
44	20
46	21
49	22
51	23
53	24
55	25
57	26
60	27
62	28
64	29

Pounds	kgs
66	30
68	31
71	32
73	33
75	34
77	35
79	36
82	37
84	38
86	39
88	40
90	41
93	42
95	43
97	44
99	45
101	46
104	47
106	48
108	49

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KANSAS

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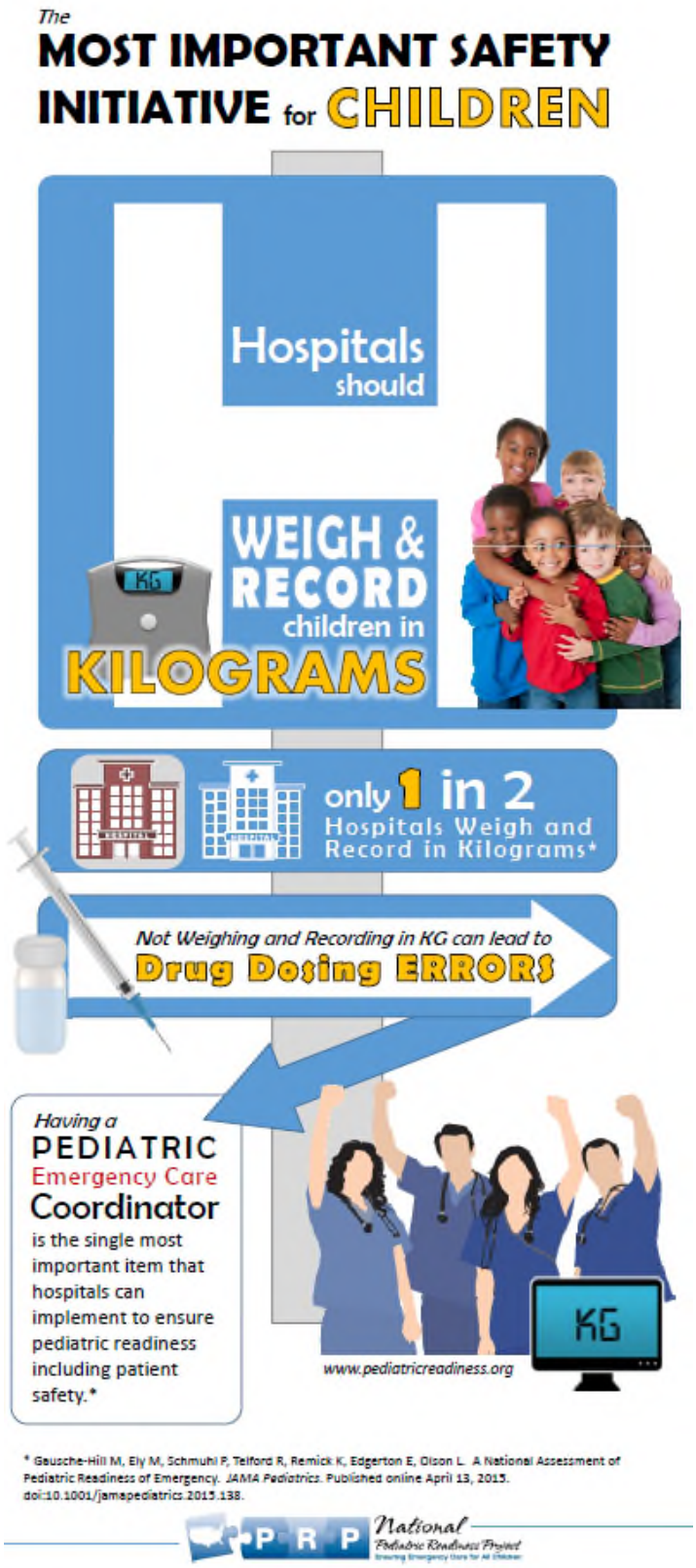
The
MOST IMPORTANT SAFETY INITIATIVE for CHILDREN
Hospitals should
WEIGH & RECORD children in KILOGRAMS
KG
only 1 in 2 Hospitals Weigh and Record in Kilograms*
Not Weighing and Recording in KG can lead to
Drug Dosing ERRORS
Having a PEDIATRIC Emergency Care Coordinator is the single most important item that hospitals can implement to ensure pediatric readiness including patient safety.*
KG
www.pediatricreadiness.org
* Gausche-Hill M, Ely M, Schmuhl P, Telford R, Remick K, Edgerton E, Olson L. A National Assessment of Pediatric Readiness of Emergency. JAMA Pediatrics. Published online April 13, 2015. doi:10.1001/jamapediatrics.2015.138.
PRP
National Pediatric Readiness Project