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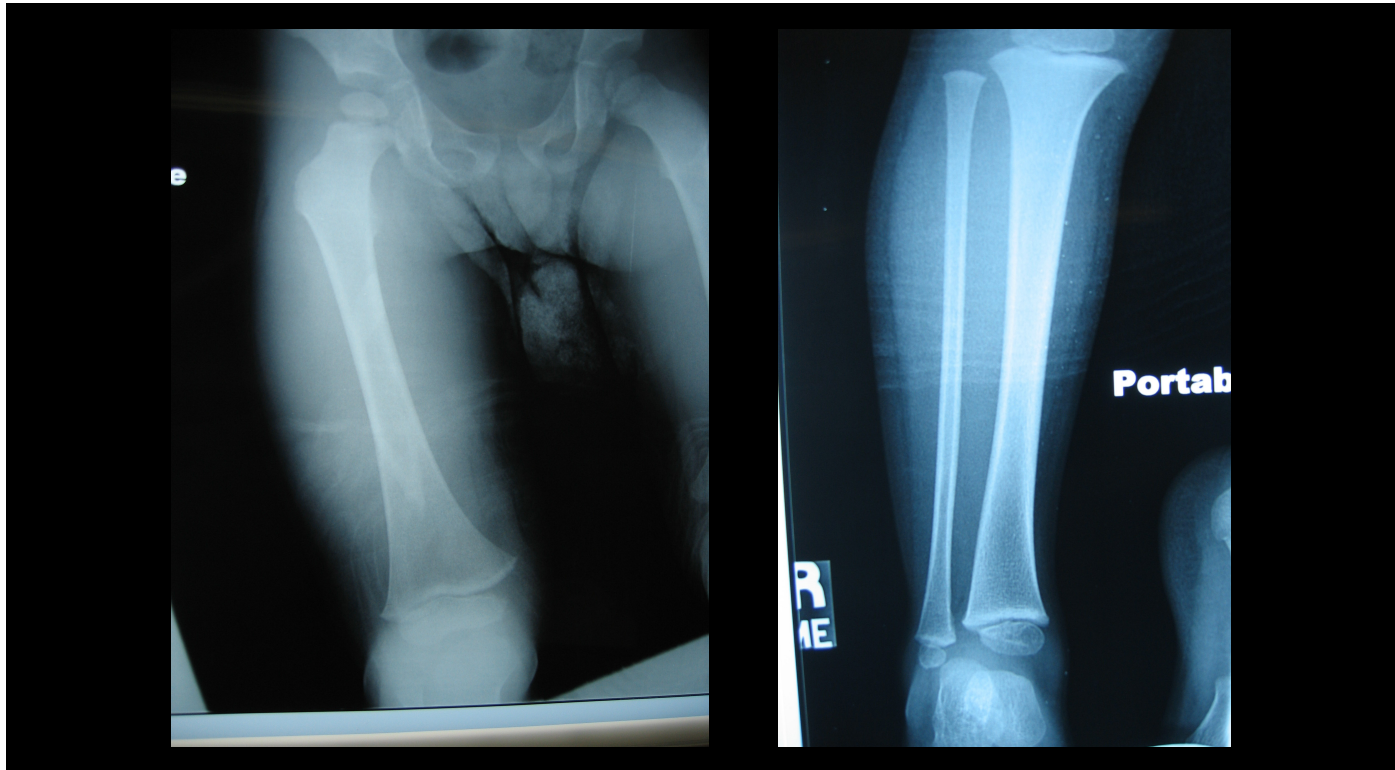
# Implications of Weighing in Pounds and Recording -Thinking it is Kilograms



## Case: 12 month-old male – “Fell Off Bunk Bed”

- 12 month-old male fell off bunk bed now not walking secondary to right thigh pain
- Patient alert, interactive, no retractions and skin color is good
- VS: T 37°C, HR 110, RR 24; weight 23
- Right thigh swollen slightly as compared to left
- Radiographs of the femur and tibia/fib were ordered

# CASE: 12 month-old boy – “fell off bunk bed”





## CASE: 12 month-old boy – “fell off bunk bed”

- **Diagnosis:**

- Right thigh contusion
- Patient given fentanyl 46 mcg IM for pain

- **Plan:**

- Motrin 200 mg orally every 6 h prn pain
- Recheck PMD 1-2 days
- Return precautions

*Where is the pitfall?*

## Pitfall #1

- VS: T 37°C, HR 110, RR 24; weight 23
- ALL infant and child scales should be in kilograms ONLY
- Determining weight....
  - Weigh the kid
  - Estimates:
    - Weight kg=  $2 \times \text{Age (yrs)} + 8-10$
    - Length-based resuscitation tape

Actual Weight  
23lbs – 10.5 kg



### MGH Method:

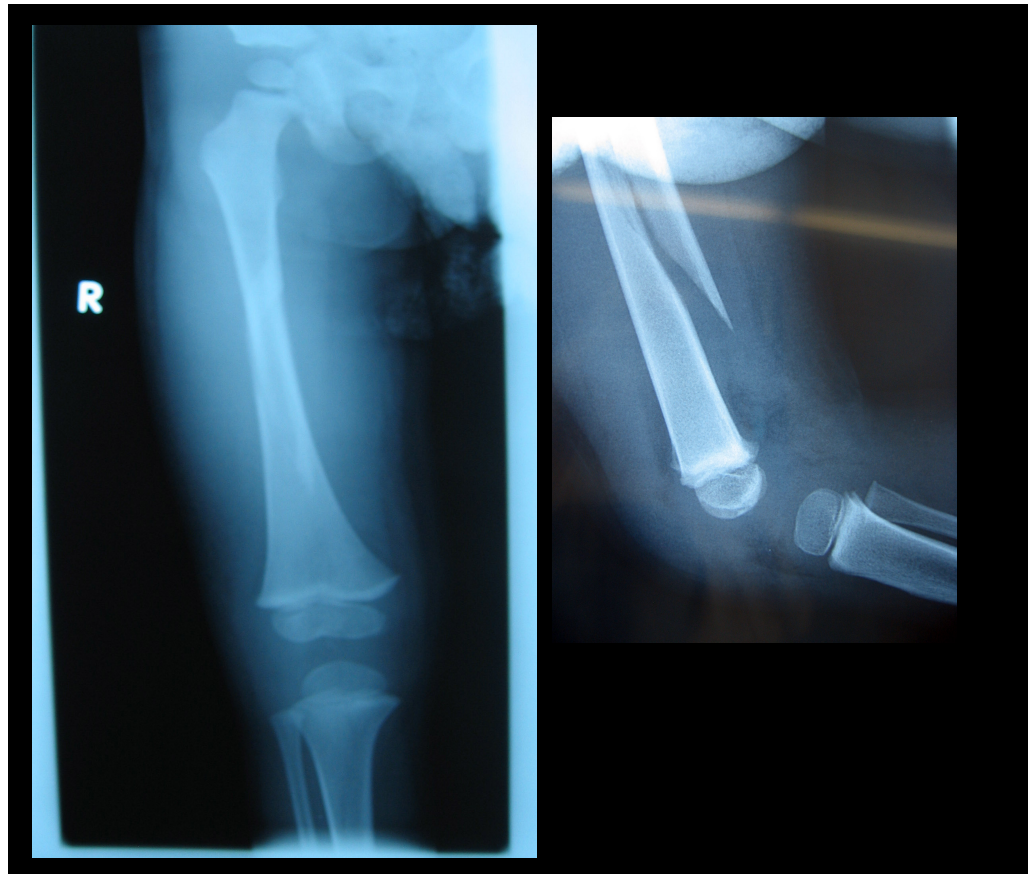
Year	Weight (kg)	ETT
1	10	4.0
5	20	5.0
10	30	6.0

## Pitfall #1 Outcome

- Patient received almost 4 mcg/kg of fentanyl (normal dose 1-2 mcg/kg); became extremely sleepy and periodically dropped oxygen saturations which responded to jaw thrust
- Did not require reversal – was observed and recovered without assisted ventilation

## Pitfall #2

- Don't settle for inadequate films
- Always get at least 2 views



## Baldwin K, et al: *Clin Ortho Relat Res* 2010

- Evaluated 70 patients with femur fractures from abuse vs 139 with fractures and not abuse < 2 years of age
- Risk factors for child abuse
  - A history suspicious for abuse
  - Physical or radiographic evidence of prior injury
  - Age younger than 18 months
- Likelihood of abuse
  - 0 risk factors - 4% chance
  - 1 risk factor - 29% chance
  - 2 risk factors - 87% chance
  - 3 risk factors - 92% chance

## Hot Issues



- *Femur fractures in children...when are they caused by abuse?*
  - 30% of femur fractures in children <2 years are caused by abuse
    - 1% if child 18 months or older
  - Femur fractures in children who are not yet walking
    - + other factors such as inconsistent story, bruises, other fractures suggest need to report

**“If you don’t cruise – you don’t bruise”**

**Height of fall necessary to sustain injury – 25 inches**



## Case: “Fell Off Bunk Bed”

- Case Outcome:
  - Skeletal series negative for other fractures
  - Patient admitted; closed reduction
  - Did well
  - No report made

Take home points: Determine weight in kg ONLY; don't settle for lousy films; femur fractures consider abuse especially if patient not yet walking.

## Case: 8 year-old girl with Sickle Cell Crisis

- 8 year-old girl with history of sickle-cell anemia presents with bilateral leg pain and chest pain
- Immunization UTD including Pneumococcal vaccine
- Patient alert, interactive, no retractions and skin color is good
- VS: T 37°C, HR 120, RR 18; weight 50 kg
- Legs were tender bilaterally without erythema, swelling, bruising or petechiae

## Case: 8 year-old girl with Sickle Cell Crisis

- Diagnosis of vaso-occlusive crisis made and blood drawn for CBC, and reticulocyte count
- Patient also complained of chest pain and a chest x-ray was ordered
- IV was placed and patient given 5 mg Morphine IV
- Recheck at 5 minutes showed the girl was still in pain so another 5 mg Morphine was administered

*Where is the pitfall?*

## Pitfall #1

- *How much should an 8 year-old girl weigh?*
- The patient weight 23 kgs but the nurse multiplied by 2.2 and recorded it as 50 kgs instead of 50 lbs
- Of note mother wanted to know her child's weight in pounds – thus where trouble began as the nurse remembered 50 and that was put into the medical record

### MGH Method:

Year	Weight (kg)	ETT
1	10	4.0
5	20	5.0
10	30	6.0

## Pitfall #1

- “Where pediatric weights are previously expressed or reported in units other than kilograms, conversion templates, electronic patient care record platforms, or other pre-calculated tools should be utilized to convert units from pounds to kilograms. “
- Conversion aid can be given to parents after reporting weight to them in kgs

Pounds pound	Kilograms kg	Pounds pound	Kilograms kg	Pounds pound	Kilograms kg	Pounds pound	Kilograms kg
1	0.4536	26	11.7934	51	23.1332	76	34.473
2	0.9072	27	12.247	52	23.5868	77	34.9266
3	1.3608	28	12.7006	53	24.0404	78	35.3802
4	1.8144	29	13.1542	54	24.494	79	35.8338
5	2.268	30	13.6078	55	24.9476	80	36.2874
6	2.7216	31	14.0614	56	25.4012	81	36.741
7	3.1751	32	14.5149	57	25.8547	82	37.1945
8	3.6287	33	14.9685	58	26.3083	83	37.6481
9	4.0823	34	15.4221	59	26.7619	84	38.1017
10	4.5359	35	15.8757	60	27.2155	85	38.5553
11	4.9895	36	16.3293	61	27.6691	86	39.0089
12	5.4431	37	16.7829	62	28.1227	87	39.4625
13	5.8967	38	17.2365	63	28.5763	88	39.9161
14	6.3503	39	17.6901	64	29.0299	89	40.3697
15	6.8039	40	18.1437	65	29.4835	90	40.8233
16	7.2575	41	18.5973	66	29.9371	91	41.2769
17	7.7111	42	19.0509	67	30.3907	92	41.7305
18	8.1647	43	19.5045	68	30.8443	93	42.1841
19	8.6182	44	19.958	69	31.2978	94	42.6376
20	9.0718	45	20.4116	70	31.7514	95	43.0912
21	9.5254	46	20.8652	71	32.205	96	43.5448
22	9.979	47	21.3188	72	32.6586	97	43.9984
23	10.4326	48	21.7724	73	33.1122	98	44.452
24	10.8862	49	22.226	74	33.5658	99	44.9056
25	11.3398	50	22.6796	75	34.0194	100	45.3592

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## Pitfall #2

- **Patient was re-dosed with a long acting opioid at the initial dose of 0.1 mg/kg**
- Although the time interval for dosing was appropriate it is generally recommended to half the dose 0.05 mg/kg
- Because the initial dose was 2 ½ times the recommended dose for weight; and then a second dose was given – patient received 5 X the recommended dose



## Pitfall #3

- After receiving the medication patient was taken to chest x-ray and returned to room ***but not immediately placed on a monitor***
- Mother notified staff that patient was not responding
- Code was called and patient was found in cardiac arrest
- CPR was begin and patient intubated
- Patient was resuscitated and given naloxone – admitted to PICU

## Other Human Factors

- Staff wanted to know their weights in pounds so disabled the lock on the scale
  - Solution: Post conversion table for staff so they never have to manually convert pounds to kgs
  - Solution: Discuss with mechanical to permanently lock the scale in kg mode



# National Organizations' Position Statement

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## Position Statement

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## Weighing All Patients in Kilograms

# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

**Weighing All Patients in Kilograms**

*Pediatrics* 2017;140;

DOI: 10.1542/peds.2017-2476 originally published online September 25, 2017;

## Best Practice (ENA/AAP 2017)

1. Patient weights are measured, recorded, and displayed in a prominent place on the medical record in kilograms only.
2. Multiple types of scales are available in the emergency setting, all configured to record weights in kilograms only (e.g., examples are stretchers with built-in scales, built-in floor scales, chair scales, and portable standing scales).
3. For patients under 18 years of age, clinical decision support (CDS) functions are used to compare entered weight with expected weight (e.g., based on growth charts) and provide real-time alerts whenever under-dose or overdose is suspected.
4. Electronic medical records (EMRs) only allow for weight entries in kilograms.
5. Institutions consider integrating digital scales with the EMR to eliminate or reduce the need for data entry.
6. The patient's actual weight is considered part of the mandatory nursing assessment, is taken at each visit, and is repeated as warranted in response to changes in the patient's condition unless life-threatening circumstances do not allow it.
7. The patient's weight in kilograms is included in all inter- and intra-disciplinary patient hand-offs.
8. The patient's weight in kilograms is included on any prescription issued for a patient.

# What if best practices fail?



# Establish a Just Culture

## Just Culture Responses

Human Error	At-Risk Behavior	Reckless Behavior
<p><i>Product of Our Current System Design and Behavioral Choices</i></p> <p>Manage through changes in:</p> <ul style="list-style-type: none"><li>• Choices</li><li>• Processes</li><li>• Procedures</li><li>• Training</li><li>• Design</li><li>• Environment</li></ul>	<p><i>A Choice: Risk Believed Insignificant or Justified</i></p> <p>Manage through:</p> <ul style="list-style-type: none"><li>• Removing incentives for at-risk behaviors</li><li>• Creating incentives for healthy behaviors</li><li>• Increasing situational awareness</li></ul>	<p><i>Conscious Disregard of Substantial and Unjustifiable Risk</i></p> <p>Manage through:</p> <ul style="list-style-type: none"><li>• Remedial action</li><li>• Punitive action</li></ul>
Console	Coach	Punish



## Summary

- Weigh and record in kilograms
- Any conversions lead to error
- Post conversion tables for staff and families (provide a handout) so no conversions need to be done by staff
- Process in place for all patients receiving “potentially dangerous” medications to have staff-nurse, nurse-staff handoffs to ensure appropriate monitoring
- Establish a “Just Culture” so staff willing to share errors in order to prevent future errors

# Questions?

