Welcome to West 11
Overview of Pediatrics
Medication Administration

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9/17
West 11

- 24-bed acute care unit
- general medical patients
- Specialties:
  - gastroenterology
  - endocrine/diabetes
  - cystic fibrosis
  - pulmonary
  - adolescent eating disorders
  - failure to thrive
A little about you:

- Why become a nurse
- What is your experience with kids/families
- What excites/frightens you about this clinical rotation?
- Area of interest; plans after graduation
- Your prior degree
- One thing that no one knows about you
Pediatric Considerations

- Greater percent of total body weight is water
- Greater insensible loss
- Greater potential for dehydration
- Infants have decreased ability to concentrate urine
- More susceptible to fluid/electrolyte shifts
- Decreased glycogen storage
- Higher metabolic rates
- Drugs metabolize at different rate than adults
Tips for Pediatric Assessment

- Varies with child
- Approach slowly
- Non-invasive assessment FIRST and involved system LAST
- Allow child to play with equipment
- Do procedures on toys or parents first
- Save intrusive procedures for last
  - Do as much as possible with the child being held by parent
- Give kids toys to play with during history-taking time
- Make assessment a game
- Get down to child’s level
- Ask history questions of child, if old enough
- If directions necessary, keep them simple
- Use praise
- Use distraction
Initial Assessment Impression

- Facial expression
- Posture
- Activity level/behavior
- Skin assessment
- Overall state of health
- ‘gut feeling’
Hydration Status

- Weight
- Mucous membranes
- Skin turgor
- Tears
- Urine output
- Fontanel
- History: vomiting, diarrhea, etc.
Metrics

- Pediatric fluids and medication doses are calculated by weight in kilograms.
- Patient’s weight - kilograms BUT parents often do not know what this means.
- Need to be able to convert to pounds for the family.
- Conversion: 2.2 lb = 1 kg.
Fluid Maintenance

Critical

• You **must understand** your child’s fluid maintenance
• This includes IV and oral/GT/JT intake
• **Hourly documentation** of fluid intake (IV, po, g-tube, j-tube) is required
• Fluids used to administer IV medications are included in the hourly fluid volumes
**Fluid Maintenance**

*MUST BE calculated for all your patients*

### Hourly Fluid Maintenance

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>first 10 kg</td>
<td>4 ml/kg</td>
</tr>
<tr>
<td>next 10 kg</td>
<td>2 ml/kg + 40 ml</td>
</tr>
<tr>
<td>20 kg</td>
<td>1 ml/kg + 60 ml</td>
</tr>
</tbody>
</table>

### Daily Fluid Maintenance

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>first 10 kg</td>
<td>100 ml/kg</td>
</tr>
<tr>
<td>Next 10 kg</td>
<td>50 ml/kg + 1000 ml</td>
</tr>
<tr>
<td>&gt;20 kg</td>
<td>20 ml/kg + 1500 ml</td>
</tr>
</tbody>
</table>
Hourly Fluid Maintenance

- **8.2 kg**: 8.2 kg x 4 ml = 32.8 ml/hour
- **12.6 kg**: 1st 10 kg x 4 ml (40 ml) + Remaining 2.6 kg x 2 ml = 5.2 ml Total = 45.2 ml/hour
- **28.2 kg**: 1st 10 kg: 4 ml x kg (40 ml) + Next 10 kg: 2 ml x kg = 20 ml + Remaining: 8.2 kg x 1 = 8.2 ml Total = 68.2 ml/hour

**Total**: (per day -> hourly fluids x 24)
Practice Scenario

• Marisa is a 10 year old admitted to the unit with pneumonia. She weighs 80 lbs.
• What is her weight in kilograms?
• What is her hourly fluid maintenance requirements?
• What is her daily fluid maintenance requirements?
80 lbs - using hourly fluid equation

- 80 lbs/2.2 kg = 36.4 kg
- First 10 kg = 4 ml + 40 ml
- Second 10 kg = 2 ml x 10 + 20 ml
- Remaining: 16.4 kg x 1ml + 16.4 ml
- Fluid maintenance/day = 76.4 ml/hour

Fluid maintenance/day -> 1834 ml/day
Some more practice
Calculate the daily and hourly fluid maintenance

- 4.8 kg
- 222 pounds
- 34.5 kg

- 18.2 pounds
- 16.2 kg
What information is unique to pediatrics?

- Fluid Maintenance
- Medications: safe dose, calculations,
- IV: dilution, safe range, infusion time
- Policy and Procedures
- Growth and Development
- Teaching strategies
Drug dosing in infants and children

- Doses based on weight in kilograms
- Accurate drug dose is critical
- Infants/children do not have the mature physiological responses to compensate for drug errors
General guidelines for administration of medications to pediatric patients

• **Growth and development**
  – Developmental age = functional level of the child.
  – Strategies consistent with the child's developmental level -> to ensure safe and effective medication administration.
  – Assessing the child's temperament can lead to determining best method of administering a medication.

• **Honesty, reward, and praise** help to gain trust and cooperation

• **Ask parent or other staff member to assist**

• **Provide rewards for good behavior and for trying**
# Strategies for Medicating Children

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants</td>
<td>Cuddle and comfort</td>
</tr>
<tr>
<td>Toddlers</td>
<td>Use play, minimize restraint, give praise and stickers as rewards</td>
</tr>
<tr>
<td>Preschoolers</td>
<td>Offer choices</td>
</tr>
<tr>
<td>School-age</td>
<td>Provide choices, explanations, distraction, and support</td>
</tr>
<tr>
<td>Adolescents</td>
<td>Explain, allow participation in decisions, praise cooperation, provide outlet for frustrations</td>
</tr>
</tbody>
</table>

**HONESTY, REWARD, & PRAISE ARE KEY!**
BEFORE giving a med MUST know

• Generic & brand name of drug
• Action of drug
• Why child is receiving med
• Recommended safe dosage
• Common side effects
• Nursing implications
• Teaching implications for family
Oral Medications

- Infants – may take liquid med out of nipple, oral syringe, or medication dropper. Do not mix with large volume of liquid.
- Toddlers & Preschoolers – may use oral syringe, dropper, or medication cup.
- Pre-school & School-age – may use chewable tablet.
- Do not mix with large volume of liquid.

“He spit it up” = notify the physician BEFORE giving another dose!
SAFETY

• Increased opportunities for error -> weight-based dosing for all medications
• Most recognized errors>computation of dosage; dosing interval; transcription of drug orders; drug preparation or conflicts with prescribed dosages
• Children are at particular risk for these errors -> dosage individualization requiring dosage equations.
• Dosages calculated on weight -> significantly different from adults.
• Computation error can result in a significant under or over-dosage.
• ‘ten-fold’ error (e.g., a misplaced decimal point can mean a ten-fold change in the appropriate dosage of medication)
• Example: Jose Eric Martinez; ill two-month-old with signs of CHF: MD ordered IV Digoxin; a decimal point error in calculating appropriate dosage -> infant given dose that was 10 times safe dose -> cardiac arrest and child died

• **AS THE NURSE YOU ARE THE LAST PERSON TO TOUCH THE MEDICATION BEFORE THE PATIENT RECEIVES IT; THUSTHE LAST LINE BEFORE IT BECOMES AN ACTUAL ERROR WITH POTENTIAL PATIENT RISK versus a safety event**

• **HUGE RESPONSIBILITY**
Med Calculation

- MD order
- Calculate parameters of safe dose and safe range
- Is the patient’s ordered dose within the safe range?
  - If yes, what do you do?
  - If no, what do you do?
Two year old: weight is 36 lbs
Amoxicillin 215 mg, po, tid for pneumonia

- **Convert lbs -> kg**
  - 36 lb divided by 2.2 kg = 16.36 kg

- **Recommended safe range:**
  (PO < 40 kg: 6.7 to 13.3 mg/kg q 8 hours)
  - 16.36 kg x 6.7 mg = 109.6 mg q 8 hours
  - 16.36 kg x 13.3 mg = 217.5 mg q 8 hours
  - Safe range: 110 mg to 218 mg Q 8 hours

- **Question** → Is the dose safe?
How much to you give?

- Amoxicillin suspension is dispensed as 250 mg per 5 ml. How much do you give?
  - 250 mg / 5 ml = 215 mg / X ml
  - Give 4.3 cc po every 8 hours
Giving Medications: Intravenous Route
Fluid Maintenance
Key concepts

• Pediatric population requires keen awareness of fluid maintenance
• Fluid overload or dehydration are critical components in pediatric population
• Minimal and maximum dilution is important for medication safe administration
• REMEMBER: you are the last person to touch the med before it touches the patient
Fluid Maintenance

Key concepts

• CHW policies reflect specific pediatric principles for children who are receiving IV fluids/IV medication

• IVF and meds must be placed on an infusion pump or syringe pump (emergent situations, ICU, surgery may have exceptions)

• All flushes are placed on syringe pumps (emergent situations, ICU, surgery may have exceptions)

• Infusion time is critical information.

• Dilution volume is critical information.
Infusion pumps

All IV medications and infusions must be on an infusion pump, except emergent situations.
Large volume medications

With Alaris infusion pump:
* medication volumes greater than 60 ml
* secondary infusion
* separate Alaris channel used for medication administration and IV fluids
Med Flush

• The MD will not order to flush the line after medication – institution policy
• From IV pump to patient –> 30 ml of IV line
• The line must be flushed to ensure all medication is given to patient
• SO, flush is 30 ml after each medication
Syringe pump: for infusion less than 60 mls

• Used for both continuous infusion and intermittent medications

• Syringe size from 1 ml to 60 ml
Med Flush for syringe pump

- The MD will not order to flush the line after medication – institution policy
- Line volume from syringe pump to patient → 0.5 ml of IV line (microtubing)
- However, med flush protocol is 2 ml after each medication (with exceptions)
- The line must be flushed to ensure all medication is given to patient (using syringe pump)
Review: Intravenous calculations

- Medication order
- Allergies
- Weight
- Fluid maintenance – per day/per hour
- Safe dose
- PIV or CVL - will effect dilution of medication
- Dilution
- Infusion time
- Infusion rate
- Syringe pump or mini bag
- Discuss how you are going to give the medication
IV rate calculation

• **Formula:**
  \[
  \text{Amount of fluid} \times 60 \text{ (min)} \\
  \text{Time in minutes for infusion}
  \]

• **OR:**
  - 60 minutes: multiple volume in infuse \times 1
  - 30 minutes: multiple volume in infuse \times 2
  - 20 minutes: multiple volume in infuse \times 3
  - 15 minutes: multiple volume in infuse \times 4
  - 10 minutes: multiple volume in infuse \times 5
Key points - IV med administration

- Weight
- Fluid maintenance
- Allergies
- Safe dose
- Does child have PIV or a CVL
- Any cardiac/renal/fluid restrictions
- If < 60 ml total use syringe pump
- If > 60 ml mini bag/secondary infusion
PREP TIME

• What Baseline Information Do I Need To Get
  – Admitting diagnosis and previous health history
  – Weight, height; fluid requirements
  – Medical and nursing orders
  – Medications
  – Policy and Procedures
  – Medical tests and procedures
  – Age: developmental and cognitive