Childhood Growth Measurement Training Module Public Health (Sept 2016)
Purpose of the Training Module:

- to increase awareness of the importance of taking accurate and reliable weights and measures
- to increase knowledge and skills in standard techniques
- to increase the accuracy and reliability of childhood growth measurement
- to increase staff confidence in the ability to use the techniques accurately
Outline

1. Childhood Growth Measurement Protocol
2. Background
3. Equipment for Weighing & Measuring and Calibration
4. General Guidelines
5. Weighing & Measuring-Infants Birth to 24 Months of Age
6. Weighing & Measuring-Children 2 to 19 Years of Age
7. Measurement Technique Assessments
8. Key Messages
9. Resources
10. Questions
1. Childhood Growth Measurement Protocol

**Objective:**
To enhance growth monitoring practices and child health outcomes by providing guidelines to ensure accurate and reliable measurements of infants, children and adolescents (birth to 19 years of age).
Childhood Growth Measurement Protocol

The Growth Measurement (GM) Protocol addresses:

Procedure (Public Health and Clinical Settings)

1. Equipment for weighing and measuring
2. Maintenance and calibration of equipment
3. Infection prevention and control
4. General guidelines for weighing and measuring
Childhood Growth Measurement Protocol

Public Health
5. Measuring weight
6. Measuring length or height
7. Measuring head circumference

Clinical Settings (inpatient and ambulatory)
8. Measuring weight
9. Measuring length or height
10. Measuring head circumference
Appendices include:

• Appendix A - Specifications for New Growth Measurement Equipment
• Appendix B - Childhood Growth Measurement Initiative: Equipment List
• Appendix C - Maintenance and Calibration of Growth Measurement Equipment
• Appendix D - Special Considerations for Length/Height Measurement
2. Background
Why Focus on Growth Measurement?

Accurate Measurements are Used to:

- monitor the growth of an individual
- detect growth abnormalities
- monitor nutritional status
- track the effects of medical or nutritional intervention
- provide descriptive information for program planning and evaluation
Components of Accurate Measurements

- quality equipment which is calibrated and accurate
- a standardized measurement technique
- trained measurers who are reliable and precise in their technique
3. Equipment for Weighing & Measuring
# Equipment for Weighing and Measuring

## Infants - Birth to 24 months of age

<table>
<thead>
<tr>
<th>Measure</th>
<th>Equipment to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Infant scale</td>
</tr>
<tr>
<td>Recumbent length</td>
<td>Infant length board</td>
</tr>
<tr>
<td>Head circumference</td>
<td>Head circumference tape</td>
</tr>
</tbody>
</table>

## Children - 2 to 19 years of age

<table>
<thead>
<tr>
<th>Measure</th>
<th>Equipment to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>• Child and adolescent (adult) scale&lt;br&gt;•*Wheel chair scale for non ambulatory children</td>
</tr>
<tr>
<td>Standing height</td>
<td>• Stadiometer&lt;br&gt;•*Recumbent length board for non ambulatory children</td>
</tr>
</tbody>
</table>

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[www.albertahealthservices.ca](http://www.albertahealthservices.ca)
Maintenance and Calibration

Maintenance is a regular daily event:

- zero scales prior to each clinic and prior to use with each child
- ensure length boards and stadiometers pieces are firmly joined
<table>
<thead>
<tr>
<th>Equipment</th>
<th>Check Calibration</th>
<th>Responsible</th>
<th>Calibration equipment used:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stationary equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant scales</td>
<td>Upon installation and monthly thereafter</td>
<td>End user</td>
<td>Calibration weights</td>
</tr>
<tr>
<td>Length board (pediatric) and stadiometers</td>
<td>Upon installation and monthly thereafter</td>
<td>End user</td>
<td>Calibration rod</td>
</tr>
<tr>
<td>Wheel chair scale for non ambulatory children</td>
<td>Upon installation and yearly</td>
<td>Professional calibration</td>
<td>Professional calibration</td>
</tr>
<tr>
<td>Child/adolescent scale</td>
<td>Upon installation and yearly thereafter</td>
<td>Professional calibration</td>
<td>Professional calibration</td>
</tr>
</tbody>
</table>
# When to Check Calibration

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Check Calibration</th>
<th>Responsible</th>
<th>Calibration equipment used:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Portable equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant scales</td>
<td>At least once per day if used daily</td>
<td>End user</td>
<td>Calibration weights</td>
</tr>
<tr>
<td></td>
<td>Before each use, if used less frequently</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length board (pediatric) and stadiometers</td>
<td>At least once per day if used daily</td>
<td>End user</td>
<td>Calibration rod</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Child/adolescent scale</td>
<td>Upon installation and yearly thereafter</td>
<td>Professional calibration</td>
<td>Professional calibration</td>
</tr>
</tbody>
</table>
Infection Prevention and Control

- refer to AHS, Infection Prevention and Control (IPC) policies and protocols for current standards on:
  - hand hygiene
  - cleaning and disinfecting of measuring equipment
  - cleaning/transporting of portable equipment
4. General Guidelines

- explain all procedures and enlist help as needed
- respect personal, religious or cultural perspectives
- respect privacy
- ensure equipment is placed on a flat, hard, stable and even surface
## Acceptable Standard for Measurement Accuracy:

<table>
<thead>
<tr>
<th>Infants</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Birth to 24 months of age</strong></td>
<td><strong>2 to 19 years of age</strong></td>
</tr>
<tr>
<td>Infant weight: 0.01 kg (10 g)</td>
<td>Child weight: 0.1 kg (100 g)</td>
</tr>
<tr>
<td>Infant length: 0.5 cm</td>
<td>Child height: 0.5 cm</td>
</tr>
<tr>
<td>Head circumference: 0.2 cm</td>
<td></td>
</tr>
</tbody>
</table>
5. WEIGHING AND MEASURING INFANTS BIRTH TO 24 MONTHS
When To Measure

- birth and postnatal period
- routine well-child visits: 2, 4, 6, 12 and 18 months
- follow-up visits
- when a child’s health or nutritional status warrants
# Measurement & Equipment

## Infants – Birth to 24 months of age

<table>
<thead>
<tr>
<th>Measure</th>
<th>Equipment to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight &lt; 20 kg</td>
<td>Infant scale</td>
</tr>
<tr>
<td>Recumbent length</td>
<td>Infant length board</td>
</tr>
<tr>
<td>Head circumference</td>
<td>Head circumference tape</td>
</tr>
</tbody>
</table>
Measure Weight

- weigh infants *birth to 8 weeks* *nude*
- weigh infants *2 to 24 months* in a *clean, dry diaper*
- put paper barrier in place and ‘zero’ scale, place infant in middle of the scale
- measure and immediately record the weight to the nearest 0.001kg or 0.01kg
Modified Measurement Technique

- weigh the infant being held on a standing scale
- subtract the weight of the person holding the child from their combined weight
- measure and immediately record the weight to the nearest 0.1 kg
Measure Length - Preparation

- remove or undo hair styles and hair accessories
- light clothing and/or diaper
- two people are required to get an accurate measurement
- cover the length board with a paper barrier
- place infant on back in centre of length board
Measure Length – Positioning

Frankfort Horizontal Plane

- head against headboard
- eyes looking straight up
- chin not tucked or stretched
Measure Length – Positioning

- align trunk and legs
- extend both legs (keep knees down) with toes pointed up
- bring footboard against the heels
- measure and immediately record the length to nearest 0.1 cm
## Modified Measurement Technique

### Birth to 24 months of age

<table>
<thead>
<tr>
<th>Unable to measure in recumbent position</th>
<th>Equipment to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measure standing height</td>
<td>Stadiometer</td>
</tr>
<tr>
<td>• Add 0.7 cm to convert to length</td>
<td></td>
</tr>
<tr>
<td>• Immediately record the height to the nearest 0.1 cm</td>
<td></td>
</tr>
</tbody>
</table>
Measure Head Circumference

- remove hair accessories and place infant on lap or flat surface
- tape measure above the eyebrows and ears and around the prominent part on the back of the head
- pull the tape snugly to compress the hair
- measure and record to the nearest 0.1 cm.
6. WEIGHING AND MEASURING - CHILDREN 2 TO 19 YEARS
When To Measure

• routine well-child visits: 4-6 years of age
• follow-up visits
• when a child’s health or nutritional status warrants
# Measurement & Equipment

<table>
<thead>
<tr>
<th>Children 2 to 19 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Standing height</td>
</tr>
</tbody>
</table>
Measure Weight

- remove shoes, hats or bulky items like coats and sweaters
- lightweight outer clothing or light undergarments
- place a paper barrier on the scale
- with the paper barrier in place “zero” the scale
Measure Weight

- child/adolescent should stand in the middle of the scale
- child/adolescent must be able to stand without assistance
- measure and immediately record the weight to the nearest 0.1 kg
# Modified Measurement Technique

<table>
<thead>
<tr>
<th>Children 2 to 19 years of age</th>
<th>Alternate Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to Stand Unassisted</td>
<td></td>
</tr>
<tr>
<td>&lt; 20 kg</td>
<td>• Infant scale</td>
</tr>
<tr>
<td>&gt; 20 kg</td>
<td>• Child and adolescent scale for tare weight,</td>
</tr>
<tr>
<td></td>
<td>• Sit-down, wheelchair scale</td>
</tr>
</tbody>
</table>
Measure Height - Preparation

- remove or undo hair styles and hair accessories
- remove shoes, hat and bulky clothing such as coats and sweaters
Measure Height - Positioning

- heels almost together, legs straight, arms at sides, and shoulders relaxed
- heels, buttocks, shoulders and head touching surface
- child looking straight ahead in Frankfort Horizontal Plane
Measure Height - Positioning

- move the headpiece down to touch the crown of the head
- view the measurement with eyes parallel to the headpiece
- measure and immediately record the height to the nearest 0.1 cm
## Modified Measurement Technique

<table>
<thead>
<tr>
<th>Children 2 to 19 years of age</th>
<th>Cannot Stand Unassisted</th>
<th>Alternate Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measure length on a recumbent length board</td>
<td>Recumbent length board</td>
</tr>
<tr>
<td></td>
<td>Subtract 0.7cm to convert it to height</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immediately record the length to the nearest 0.1cm</td>
<td></td>
</tr>
</tbody>
</table>
Special Considerations – 2 to 19 Years of Age

- **vertical plane** - aim for at least 2 points of contact
- **leg asymmetry** - stand on longer leg with shorter leg supported
- **cultural headpiece**
  - topknot - measure to the side of the topknot
  - turban - upper arm length with equation
- **physical disabilities**
  - pediatric length board
  - upper arm length with equation
Upper Arm Length (UAL) - Measurement

• arm at 90°, palm up
• mark the **acromion process**
• measure to the **olecranon process**
• immediately record the UAL to the nearest 0.1cm
7. Measurement Technique Assessment
Assess the Technique: Weight

Is the technique:
- Appropriate
- Inappropriate
Assess the Technique: Weight

The technique is:

- Inappropriate

Weight will be inaccurate:
- too many clothes
- holding a book
- not centred on the scale
Assess the Technique: Weight

Is the technique:
- Appropriate
- Inappropriate
Assess the Technique: Weight

The technique is:
✓ Inappropriate

Weight will be inaccurate:
• parent touching infant
• foot is touching wall
Assess the Technique: Length

Is the technique:

- Appropriate
- Inappropriate
Assess the Technique: Length

The technique is:
☑ Inappropriate

Length will be inaccurate:
- inappropriate equipment
- feet are not flat against footboard
- toes are not pointed upward
- head is not in the Frankfort Horizontal Plane
Assess the Technique: Length

Is the technique:

- Appropriate
- Inappropriate
Assess the Technique: Length

The technique is: ☑ Inappropriate

Length will be inaccurate:
• trunk and legs are not aligned
• hand only on one knee
Assess the Technique: Head Circumference

Is the technique:

- Appropriate
- Inappropriate
Assess the Technique: Head Circumference

The technique is:
☑ Inappropriate

Head circumference will be inaccurate:
• tape over ear
• tape too low
• tape not pulled snugly
Assess the Technique: Height

Is the technique:
- Appropriate
- Inappropriate
Assess the Technique: Height

The technique is:

☑ Inappropriate

Height will be inaccurate:
- shoes, hat and jacket on
- heels are not against the flat surface
- head not in Frankfort Horizontal plane
- measurer not reading at eye level
8. Key Messages

- use the right equipment for the child’s age and size
- double-check measurements when reading the equipment
- record measurements immediately
Weight

- check that the child is wearing the right amount of clothing
- ‘zero’ the scale with the barrier in place before weighing
Length/Height

- ask for assistance when measuring infant length
- fully extend both legs when measuring infants
- check that the head is in the Frankfort Horizontal Plane
- make sure shoes, hats and hair accessories are removed
9. Resources

- AHS Childhood Growth Measurement - Public Health and Clinical Settings Protocol
- Public Health Childhood Growth Measurement Training Module (PPT)
- Childhood Growth Measurement Posters
- Training Videos
- Calibration Recording Form
- FAQ Childhood Growth Measurement (on insite, AHS intranet)
- AHS Website [http://www.albertahealthservices.ca/info/cgm.aspx](http://www.albertahealthservices.ca/info/cgm.aspx)
10. Questions


