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# Childhood Growth Measurement Training Module

Public Health

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# Purpose

- 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

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# Outline

- Background
- Equipment for Weighing & Measuring and Calibration
- General Guidelines
- Weighing & Measuring-Infants Birth to 24 Months of Age
- Weighing & Measuring-Children 2 to 19 Years of Age
- Measurement Technique Assessments
- Key Messages
- Resources
- Questions

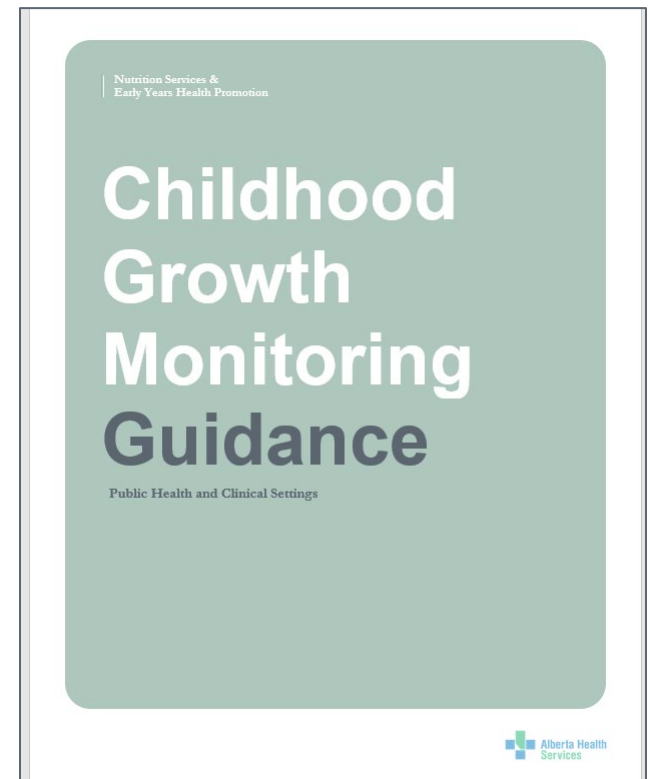
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# Childhood Growth Monitoring Guidance

Purpose: to optimize growth monitoring practices and therefore child health outcomes.

Addresses:

- Growth measurement
- Interpretation
- Growth discussions



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# Growth measurement

Childhood Growth Monitoring Guidance includes the following growth measurement sections:

- When To Measure
- Preparing to Measure
- Weight Measurement
- Length or Height Measurement
- Head Circumference Measurement

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# Growth measurement

Growth measurement appendices:

- Appendix C: Equipment Specifications
- Appendix D: Maintenance and Calibration
- Appendix E: Special Considerations for Length/Height Measurement

# Background

Why focus on growth measurement?



Available from:

<http://www.cps.ca/english/statements/N/growth-charts-statement-FULL.pdf>.

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# 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



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# 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

# Equipment for weighing and measuring



# Equipment for weighing and measuring

Infants - Birth to 24 months of age		Children - 2 to 19 years of age	
Measure	Equipment to be used	Measure	Equipment to be used
Weight	Infant scale	Weight	Child and adolescent (adult) scale *Wheel chair scale for non ambulatory children
Recumbent length	Infant length board	Standing height	Stadiometer *Recumbent length board for non ambulatory children
Head circumference	Head circumference tape		

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# 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

# When to check calibration

Equipment	Check Calibration	Responsible	Calibration equipment used:
Stationary equipment			
Infant scales	Upon installation and monthly thereafter	End user	Calibration weights
Length board (pediatric) and stadiometers	Upon installation and monthly thereafter	End user	Calibration rod
Wheel chair scale for non ambulatory children	Upon installation and yearly	Professional calibration	Professional calibration
Child/adolescent scale	Upon installation and yearly thereafter	Professional calibration	Professional calibration

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# When to check calibration

Equipment	Check Calibration	Responsible	Calibration equipment used:
Portable equipment			
Infant scales	At least once per day if used daily Before each use, if used less frequently	End user	Calibration weights
Length board (pediatric) and stadiometers	At least once per day if used daily Before each use, if used less frequently	End user	Calibration rod
Child/adolescent scale	Upon installation and yearly thereafter	Professional calibration	Professional calibration

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# 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

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# 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



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# Acceptable standard for measurement accuracy

Infants	Children
Birth to 24 months of age	2 to 19 years of age
Infant weight: 0.01 kg (10 g) Infant length: 0.5 cm Head circumference: 0.2 cm	Child weight: 0.1 kg (100 g) Child height: 0.5 cm

# Weighing and measuring infants birth to 24 months



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# When to measure

- Postnatal period as needed to monitor health concerns
- Prioritized at all routine well-child visits at 2, 4, 6, 12 and 18 months based on parent concerns and nursing judgment
- Follow-up visits
- When a child's health or nutritional status warrants



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# Measurement & equipment

## Infants – Birth to 24 months of age

Measure	Equipment to be used
Weight < 20 kg	Infant scale
Recumbent length	Infant length board
Head circumference	Head circumference tape

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# 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

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# 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

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# 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

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# Measure length – Positioning

## Frankfort Horizontal Plane

- Head against headboard
- Eyes looking straight up
- Chin not tucked or stretched





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# 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	
Unable to measure in recumbent position	Equipment to be used
<ul style="list-style-type: none"><li>• Measure standing height</li><li>• Add 0.7 cm to convert to length</li><li>• Immediately record the height to the nearest 0.1cm</li></ul>	Stadiometer

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# 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.

# Weighing and measuring – Children 2 to 19 years



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# When to measure

- Routine well-child visit: 4 years of age
- Follow-up visits
- When a child's health or nutritional status warrants

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# Measurement & equipment

## Children 2 to 19 years of age

Measure	Equipment to be used
Weight	<ul style="list-style-type: none"><li>• Child and adolescent (adult) electronic scale</li></ul>
Standing height	<ul style="list-style-type: none"><li>• Stadiometer</li></ul>

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# 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

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# 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

Children 2 to 19 years of age	
Unable to Stand Unassisted	Alternate Equipment
< 20 kg	<ul style="list-style-type: none"><li>• Infant scale</li></ul>
> 20 kg	<ul style="list-style-type: none"><li>• Child and adolescent scale for tare weight,</li><li>• Sit-down, wheelchair scale</li></ul>

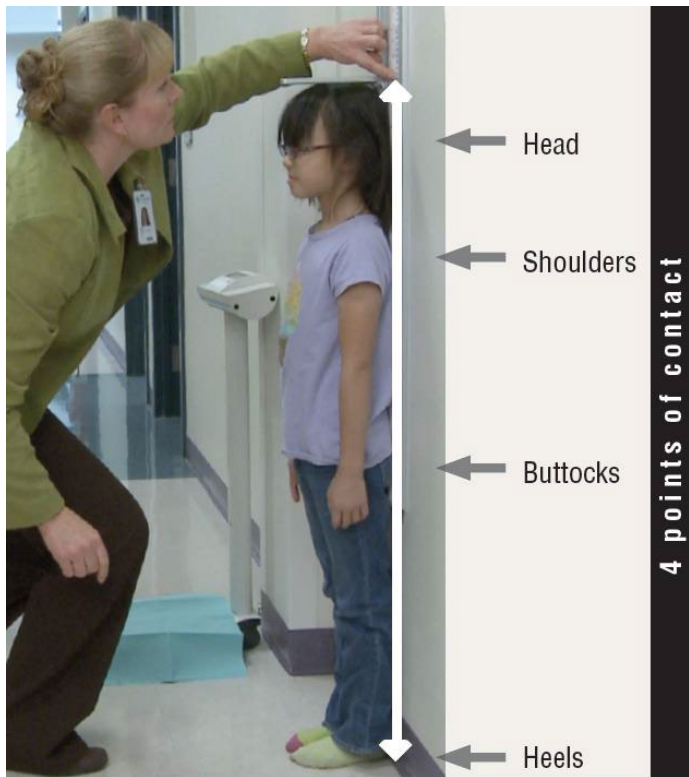
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# Measure height - Preparation



- 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 Frankfurt Horizontal Plane

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# 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

Children 2 to 19 years of age	
Cannot Stand Unassisted	Alternate Equipment
<ul style="list-style-type: none"><li>• Measure length on a recumbent length board</li><li>• Subtract 0.7cm to convert it to height</li><li>• Immediately record the length to the nearest 0.1cm</li></ul>	Recumbent length board

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# 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

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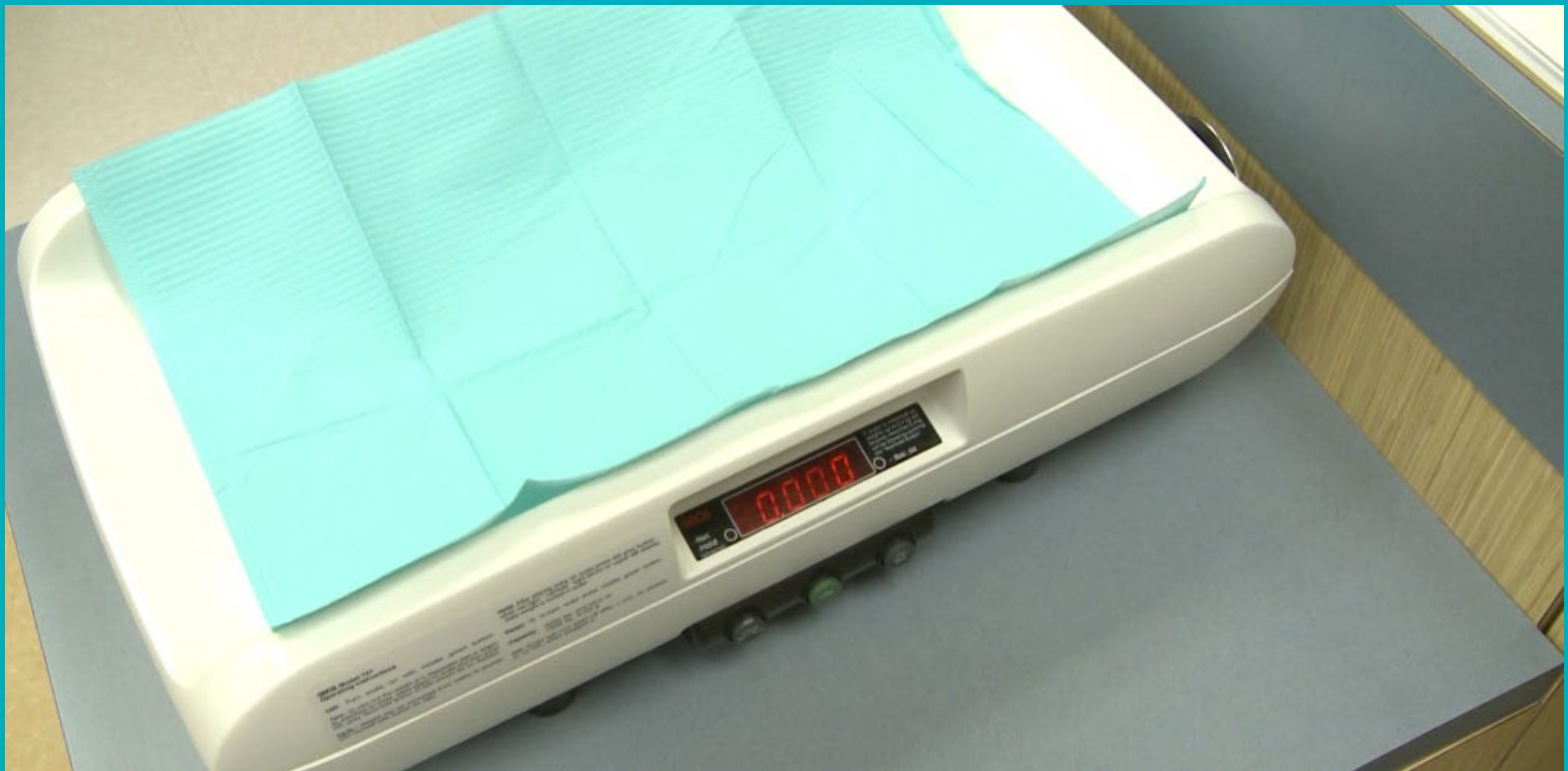
# Upper Arm Length (UAL)

## - Measurement

- Arm at 90°, palm up
- Mark the **acromion process**
- Measure to the **olecranon process**
- Immediately record the UAL to the nearest 0.1cm



# 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

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# Assess the technique: Weight



Is the technique:

- ☐ Appropriate
- ☐ Inappropriate

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# Assess the technique: Weight



The technique is:  
☒ Inappropriate

Weight will be  
inaccurate:

- Parent touching infant
- Foot is touching wall

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# Assess the technique: Length



Is the technique:

- ☐ Appropriate
- ☐ Inappropriate

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# 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



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# 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



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# Assess the technique: Head circumference



Is the technique:

- ☐ Appropriate
- ☐ Inappropriate

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# Assess the Technique: Head circumference



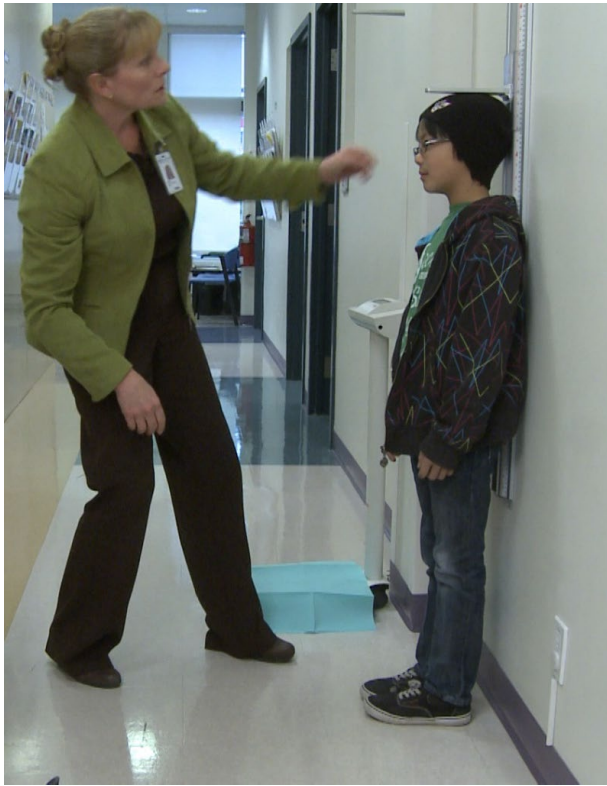
The technique is:  
☒ Inappropriate

Head circumference will be inaccurate:

- Tape over ear
- Tape too low
- Tape not pulled snugly

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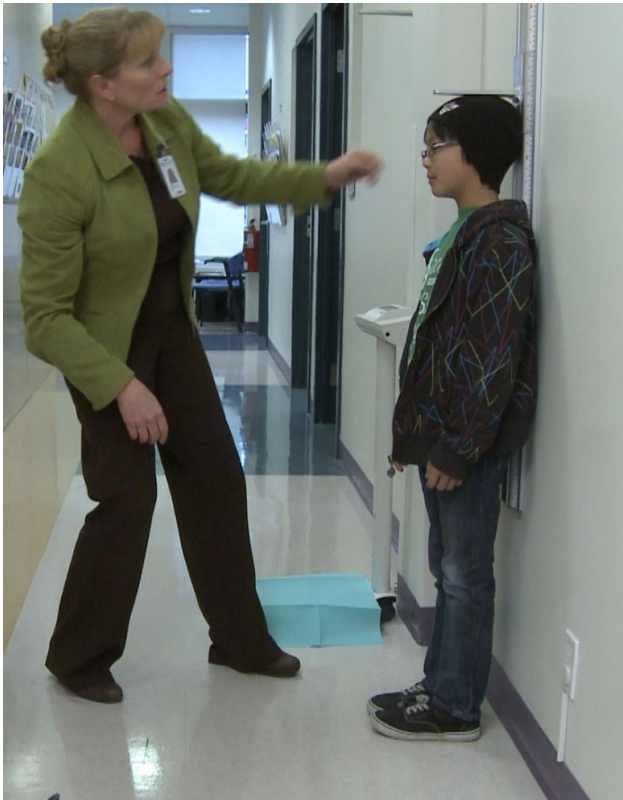
# Assess the technique: Height



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

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# Key Messages



- Use the right equipment for the child's age and size
- Double-check measurements when reading the equipment
- Record measurements immediately

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# Weight

- Check that the child is wearing the right amount of clothing
- 'Zero' the scale with the barrier in place before weighing

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# 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

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# Resources

All available on [www.ahs.ca/cgm](http://www.ahs.ca/cgm)

- Childhood Growth Monitoring Guidance
- Childhood Growth Measurement Posters
- Training Videos
- Calibration Recording Form



# Questions



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# References

- Dietitians of Canada, Canadian Paediatric Society, College of Family Physicians of Canada, Community Health Nurses of Canada. Promoting optimal monitoring of child growth in Canada: using the new WHO growth charts [Internet]. 2010.
- United States Department of Health and Human Services, Human Resources and Services Administration, Maternal and Child Health Bureau. Growth charts training: accurately weighing and measuring infants, children and adolescents: technique.

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# References

- Foote JM, Brady LH, Burke AL, Cook JS, Dutcher ME, Gradoville KM, et al. Evidence-Based Clinical Practice Guideline on Linear Growth Measurement of Children. 2009.
- World Health Organization. WHO Child Growth Standards: Training Course on Child Growth Assessment [Internet]. 2008.