Growth Charts

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Background

- 2007 - *Best Start: Report on the Inquiry into the Health Benefits of Breastfeeding*
- Recommendation: that Australian health ministers agree on a standard growth chart for use by all states and territories
- The Australian Government response was to agree in principle that growth charts be considered as part of the Australian Government's review of the *Dietary Guidelines for Children and Adolescents in Australia incorporating the Infant Feeding Guidelines for Health Workers*
- 2010 - the Australian Government commissioned a project to explore options for the use of a single standard national growth chart in Australia

Background continued

- It was also agreed in principle that the Australian Government would consult with state and territory governments to determine :
  - the merits of adopting a single evidence-based population level reference for use as a growth monitoring tool
  - the need for appropriate education and explanatory materials to ensure growth charts are interpreted appropriately

History of Growth Charts

- Widely used by health policy developers and practitioners for monitoring the growth and development of infants and children in developed countries for the past seventy-five years
- Charts for infants up to five years of age focus on:
  - Weight, height, head circumference and body mass index
  - Age and gender
- Growth charts are used for a variety of purposes:
  - A clinical tool for assessment of an individual child
    - surveillance tool for early identification of problems with growth in a child over time
    - screening tool to diagnose an abnormal condition
    - early identification tool for nutritional conditions
  - A population health tool for analysis and reporting of population growth data and trends
  - An educational tool for parents in relation to their child's growth and development

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Growth Charts in Australia

- Prior to 2003: US National Centre for Health Statistics (NCHS-1977)
- 2003: the NHMRC recommended a change to the CDC Charts (2000)
  - Data source: US National Health and Nutrition Examination Survey Program
  - Data were collected from a proportion of breastfed and formula fed infants between 1963 and 1994 and included infants from a range of ethnic backgrounds across several states in the United States.
- The CDC charts are currently used in all Australian states except NT and have been largely adopted and used internationally

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The WHO Growth Charts (2006)

- The WHO 2006 Child Growth Standards were developed on data from infants selected on the basis of having an optimal environment for growth
- Data were 8,440 infants in developing and developed countries including Brazil, Ghana, India, Norway, Oman, and the United States
- Infants were from affluent families, nourished according to recommended infant and child feeding practices, exclusively breast fed for the first 4 months and had non-smoking mothers
- They describe "how children *should grow,"* they establish breastfeeding as the biological "norm" and the breastfed infant as the standard for measuring healthy growth

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CDC Growth Charts

Benefits:

- applicable to 'the vast majority' of Australian children
- the CDC 2000 charts have been used consistently by Australian health professionals over the last decade and the majority of practitioners are familiar with the use of these charts
- high degree of 'usability' from a practitioner's perspective, and they are easily accessible

Limitations:

- a belief they are inconsistent with contemporary Australian policy which encourages breastfeeding
- mask the obesity problem by being a reference based on bigger infants from six months
- less applicability to the particular 'multicultural mix' of the contemporary Australian population (including Asian, Pacific Islander, and Indigenous children)

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WHO Growth Charts

Benefits:

- Seen as the 'gold standard' of growth charts in terms of promoting good health outcomes, including across cultures
- Establishes breastfeeding as the biological norm
- More suitable to the Aboriginal population as these infants, especially in remote communities, are predominantly breastfed
- Have greater capacity to assist the early identification of development of overweight

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WHO Growth Charts

Limitations:

- Do not reflect current feeding practices in Australia
- The rapid weight gain demonstrated in the breastfed infants' first six months may not be appropriate for all breastfed babies
  - May inadvertently discourage exclusive breastfeeding
- Slower than expected growth rates may be interpreted as neglect especially in aboriginal communities
- There are a high proportion of Asian babies in Australia, and Asian populations were not represented in the development of the WHO Charts

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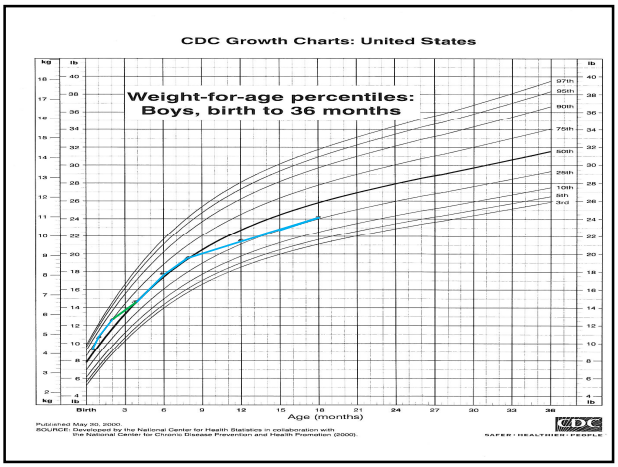

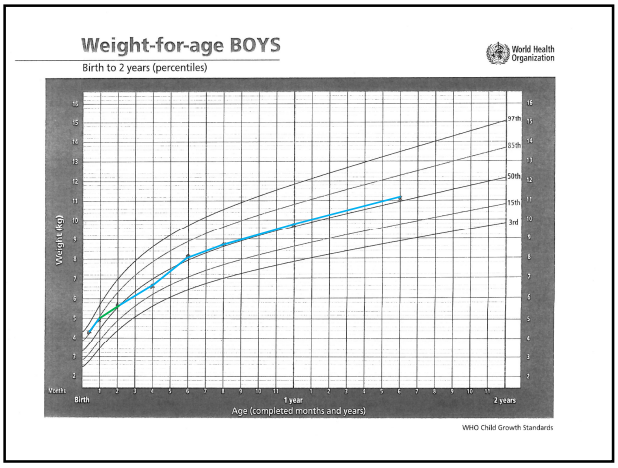

Implications for diagnosing over or under weight infants

The CDC 2000 charts and the WHO 2006 charts produce slightly different curves for children at different age points

- More children could be assessed as underweight prior to six months of age and less after six months of age by using the WHO 2006 charts compared to the CDC 2000 charts
- Breastfed infants may track well against the CDC 2000 reference for the first four to six months of life but poorly after the first four to six months
- Mothers of breastfed babies who do not show the rapid growth rates in the WHO 2006 model in the first two to four months, may also be at greater risk of introducing complementary feeding at an early age

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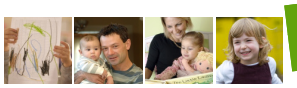
Considerations

Reference versus standard

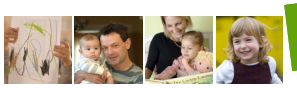
- Previous growth charts were established as reference points to which health professionals and parents could compare the growth of individual children. This distinction is important in the assessment of which growth chart is the most appropriate to a given population
- **A growth reference** describes the growth of a sample of individuals who are representative of the general population, without making any association with health (CDC Charts)
- **A standard**, on the other hand, describes the growth of a healthy population and provides a reference to which all populations can aspire. (WHO Charts)



Considerations

Effectiveness of growth charts:

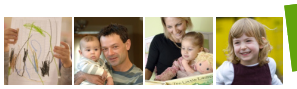
- To what extent does growth monitoring results in positive health outcomes for children?
  - Systematic review of studies in developing countries which compared the health outcomes of children whose growth was monitored using standardised charts to those of children not monitored in this way, found no difference in outcomes for the two groups
- Growth is an individual process, individuals do not grow according to statistical distributions of size and age
- The wide range within normal growth patterns is not always well understood by health professionals or parents, leading to unnecessary anxiety for parents and the possibility of ceasing breastfeeding too soon, or of overfeeding



Considerations

Maternal Perceptions

- The effectiveness of using growth charts depends heavily on the knowledge and understanding that mothers have of growth charts, and the value that mothers place on them.
- Researchers have found that mothers do not always define their children's growth patterns according to the standards set by growth charts or by the health professionals who use them
- Parents' perceptions of the ideal weight for their children is culturally embedded



Conclusion

- Review of the literature shows that no existing growth chart is a perfect match in the Australian context
- The CDC 2000 and WHO 2006 growth charts commonly in use have both benefits and limitations:
  - Australian breastfeeding practices, birth weights, multicultural population mix
- The CDC website recommends that health care providers use the WHO growth standards to monitor growth for infants and children ages 0 to 2 years of age and use the CDC growth charts for children age 2 years and older
- The process to decide about a national commitment to a growth chart is ongoing

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Conclusion

- Irrespective of the growth chart used, it is only one tool to measure growth
- Growth charts must be used in conjunction with other clinical assessments of growth
- Training and understanding of growth charts is the key to the effective use of growth charts
- Communication with parents must be based on a clinical judgement using all forms of growth assessment

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