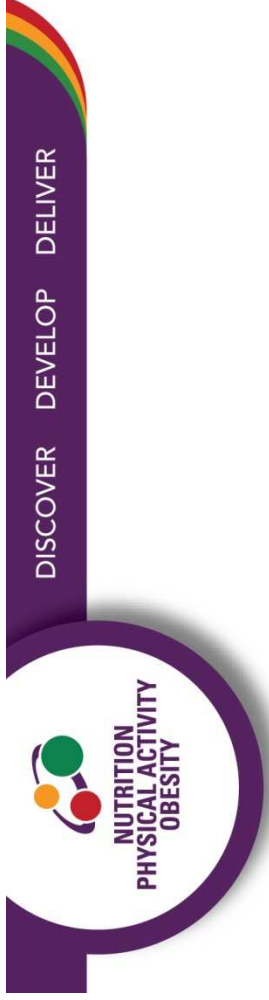




IN-SERVICE FOR WIC NUTRITIONISTS

Implementation of WHO Growth Charts
for Infants and Children,
Birth to 2 Years of age





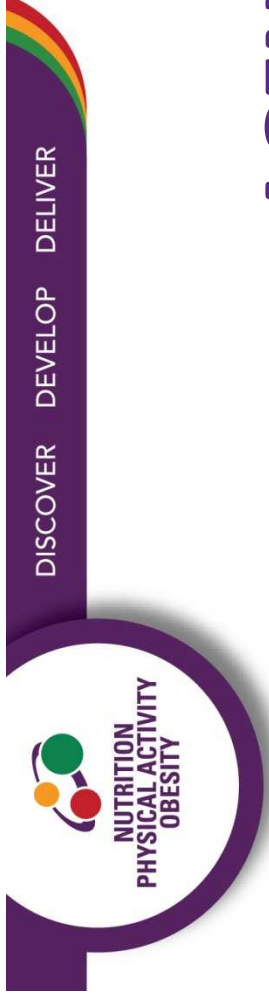
RESOURCES

Nutrition Branch
Division of Nutrition, Physical Activity and Obesity
Center for Disease Control (CDC)

Food and Nutrition Services (FNS)

USDA



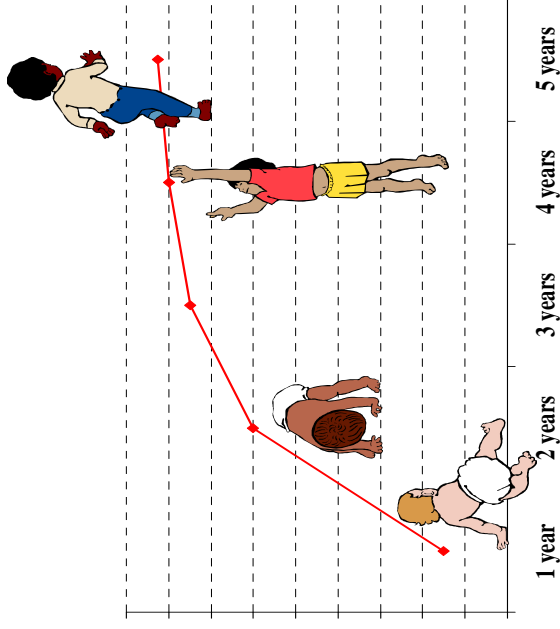


AGENDA

- International WHO Growth Charts
- WIC Risk changes based on WHO Growth Charts
- TWIST Implementation



The 2006 International WHO Growth Charts





DISCOVER DEVELOP DELIVER

Background

- Growth charts are a key tool used to interpret growth measurements
- Child growth is monitored to:
 - Assess adequacy of nutrition and care
 - Screen for adverse genetic or hormonal conditions
 - Assist in disease diagnosis
 - Identify childhood obesity



History

- National Center for Health Statistics (NCHS) growth **reference** used worldwide from 1977 to 2000
- CDC growth **reference** for children aged 0-20 years used since 2000
- April 2006, WHO released a new international growth **standard** for children aged 0-5 years



Reference vs. Standard

- A reference describes how children do grow in a particular time and place, gives point of comparison, does not imply value judgments
- A standard describes how children should grow, regardless of time or place, defines what is normal or optimal and allows value judgments



CDC 2000 Growth Reference

- Describes growth in the U.S. in the 1970s and 1980s
- Based on nationally representative data
- VLBW infants excluded





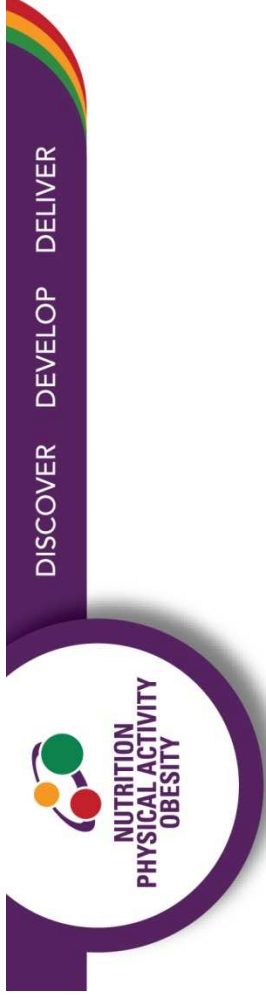
DISCOVER DEVELOP DELIVER

WHO International Growth Standard

- **Optimal Nutrition**
 - Breastfed infants
 - Appropriate complementary feeding
- **Optimal Environment**
 - No microbiological contamination
 - No smoking
- **Optimal Care**
 - Immunization
 - Pediatric routines

↑
Optimal
Growth





WHO International Growth Standard

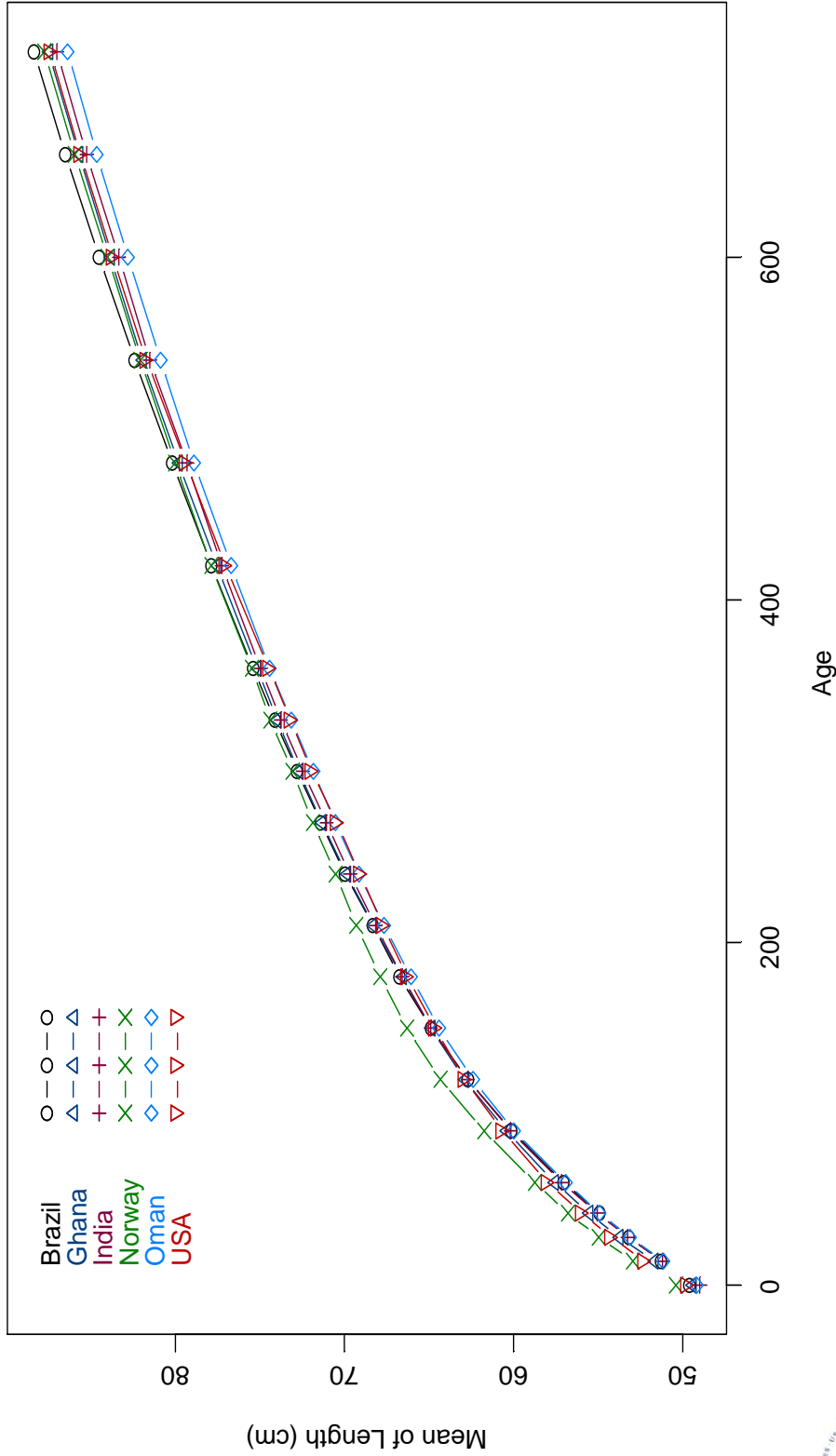
- Data collected in:
 - United States
 - Brazil
 - Norway
 - India
 - Oman
 - Ghana
- Hypothesis was that children throughout the world will grow similarly if exposed to optimal circumstances





DISCOVER DEVELOP DELIVER

Mean Length from Birth to 24 Months for the Six WHO Sites





DISCOVER DEVELOP DELIVER

WHO International Growth Standard

- Attained growth
 - Weight-for-age
 - Length/height-for-age
 - Weight-for-length/height
 - Body mass index-for-age
 - Mid-upper arm circumference-for-age
 - Triceps skinfold-for-age
 - Subscapular skinfold-for-age
 - Head circumference-for-age
- Growth velocity
 - Weight
 - Length/height
 - Head circumference
 - Arm circumference
 - Body mass index





DISCOVER DEVELOP DELIVER

Key Differences (Birth-2 yrs)

WHO

- Longitudinal data
- Frequent data collection
 - biweekly 0-8 weeks
 - Monthly 2-12 months
 - Bimonthly 14-24 months
- Feeding requirements
 - Exclusive/predominant breastfeeding \geq 4 months
 - Complementary feeding by 6 months
 - Continued breastfeeding \geq 12 months
- 18,973 observations

CDC

- Cross-sectional data
 - NHANES I, II, & III
 - National Birth Certificates
 - MO & WI Birth Certificates
 - Fels data, PedNSS data
- No data between birth and 3 months
 - mathematical models used
- No feeding requirements
 - ~50% ever breastfed
 - ~33% breastfeeding at 3 months
- 4,697 observations





Smaller Differences at 2-5 Years

WHO

- Cross-sectional data
- Feeding requirements
 - Breastfed at least 3 months
- Stop at age 5
- Overweight children (above +2SD) excluded
- 6,669 observations

CDC

- Cross-sectional data
- No feeding requirements
- Continuous with curves up to age 20
- No data exclusions
- 9,894 observations





DISCOVER DEVELOP DELIVER

Recommendations for the U.S.

- Expert panel was convened June 29-30, 2006
- Sponsored by CDC/NIH/AAP
- Considered
 - Rationale for standard vs. reference
 - Methods in construction of both curves
 - Statistical comparisons between the curves
 - Implications for breastfed as well as formula-fed infants
 - Practicalities of using multiple charts
- AAP board voted to recommend use of the WHO charts from birth-2 years, but continued use of the CDC charts from 2-5 years.



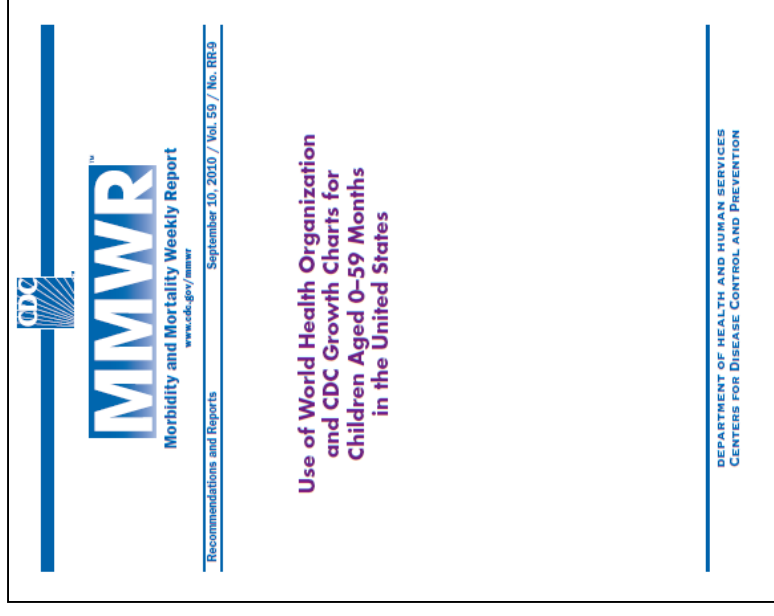


DISCOVER DEVELOP DELIVER

Use of World Health Organization and CDC Growth Charts in the U.S.

- CDC recommends that health care providers:
 - Use the [WHO growth standards](#) to monitor growth for infants and children ages 0 to 2 years of age in the U.S.
 - Use the [CDC growth charts](#) for children age 2 years and older in the U.S.

MMWR: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm>



Rationale for Recommending WHO at 0-23 Months

- Clinicians use growth curves as a standard—must judge growth as abnormal or unhealthy.
- WHO curves based on high quality longitudinal study.
- CDC curves based on very little data birth-3 months and combine very distinct datasets at different ages.
- Concern that children 3-18 months are inappropriately evaluated for failure-to-thrive, when WHO charts indicate that growth is normal.





DISCOVER DEVELOP DELIVER

Rationale for Not Recommending WHO at 24-59 Months

- Methodology similar between the WHO and CDC curves.
- Use of the WHO curves for <5 yrs and then CDC curves >5 years would require that clinicians switch curves.
- Switching curves at 2 years of age matches switch from recumbent length to standing height.





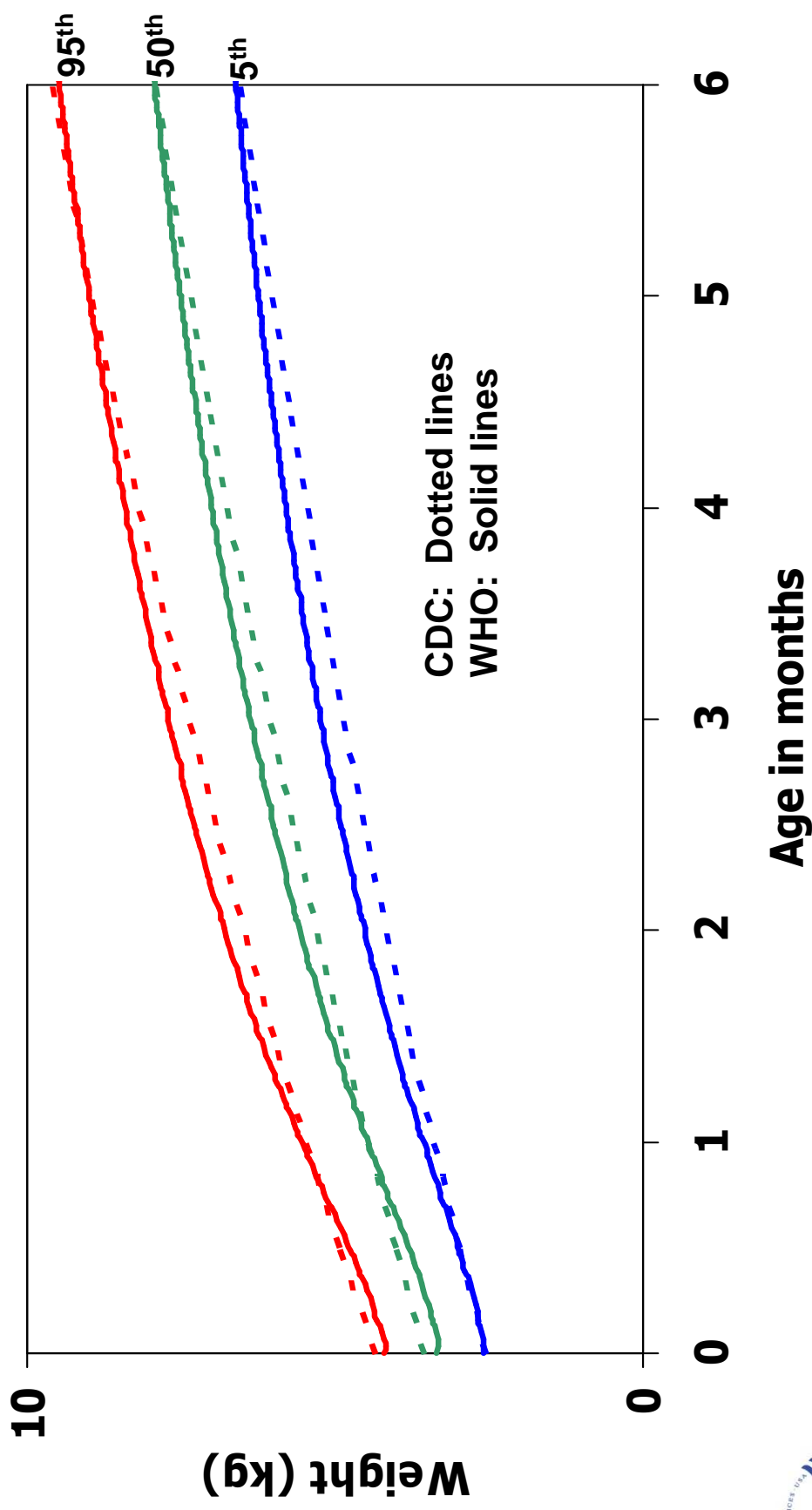
DISCOVER DEVELOP DELIVER

Differences in Final Charts

- Fewer infants would be below 5th percentile on WHO weight-for-age charts
- More infants would be above 95th percentile on WHO weight-for-length or BMI-for-age charts
- More infants would be below 5th percentile on WHO length-for-age charts



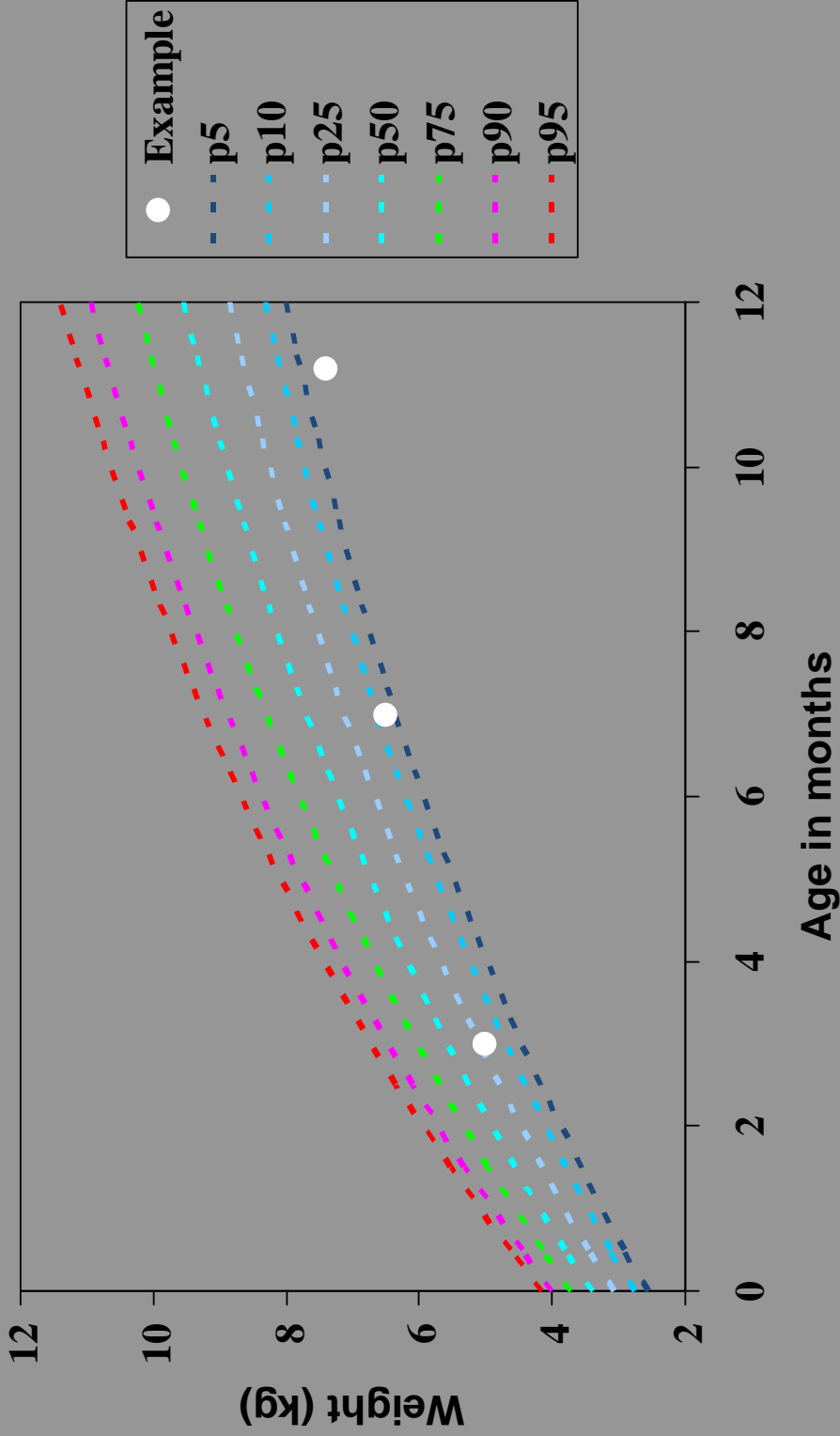
Comparison of WHO with CDC 2000 Weight-for-Age Percentiles for Boys





DISCOVER DEVELOP DELIVER

Weight-for-age, Girls 0-12 mos, CDC reference

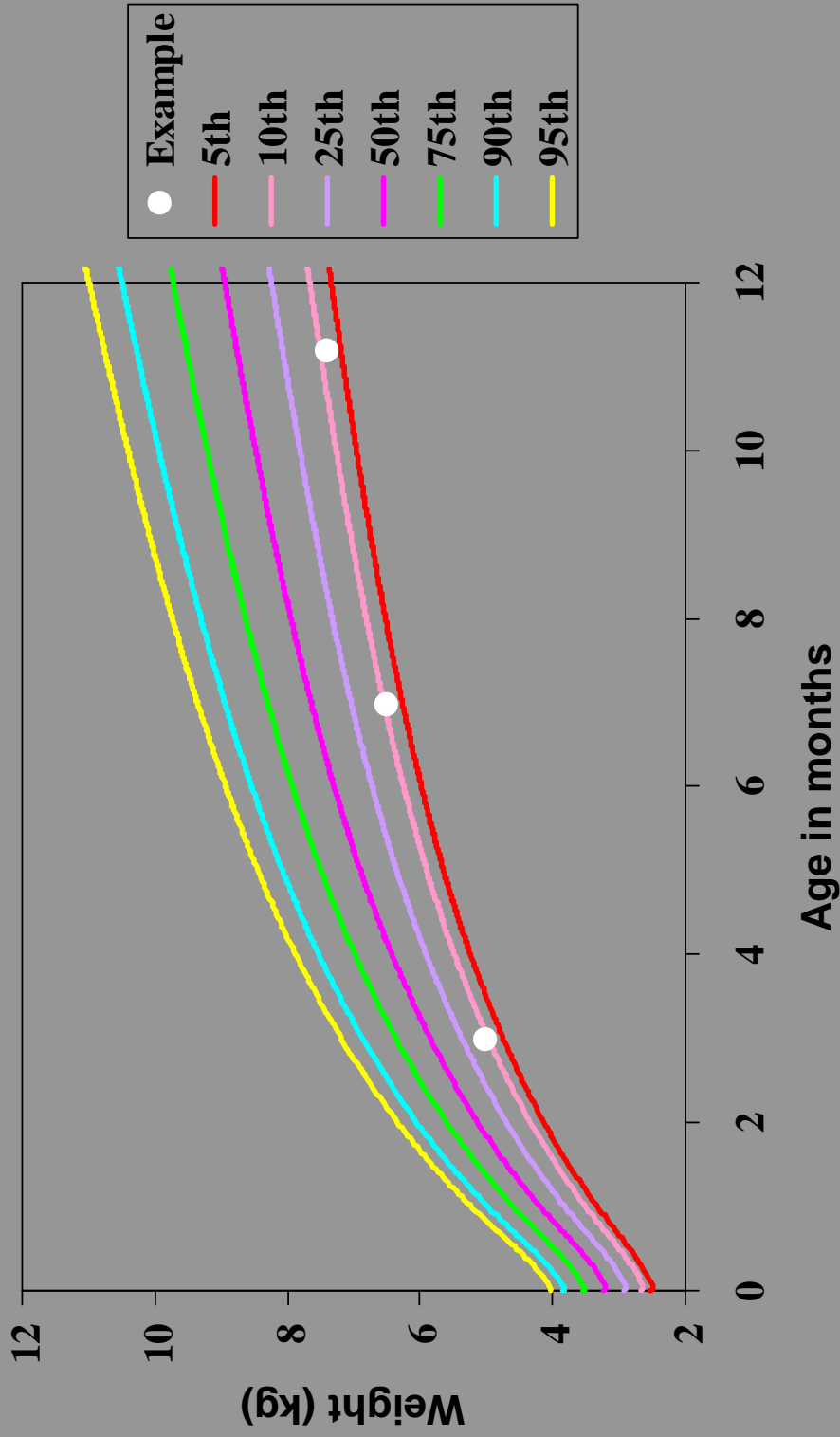




NUTRITION
PHYSICAL ACTIVITY
OBESITY

DISCOVER DEVELOP DELIVER

Weight-for-age, Girls 0-12 mos, WHO reference





DISCOVER DEVELOP DELIVER

Cutoffs

- WHO recommends cutoffs at 2.3rd percentile and 97.7th percentile
- Because WHO standard measured healthy children under optimal conditions, the more extreme cutoffs are appropriate for younger children
- 5th and 95th percentiles will continue to be used with CDC growth charts for older children





DISCOVER DEVELOP DELIVER

Impact of WHO Growth Charts on Height and Weight Growth Assessment

- Formula-fed infants tend to gain weight more rapidly after approximately age 3 months and therefore cross upward in percentiles, perhaps becoming classified as overweight.
- Fewer children aged 6-23 months will be identified as being underweight.
- Differences in the length-for-age 2006 WHO and 2000 CDC charts are small.





DISCOVER DEVELOP DELIVER

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OBESITY

Impact of WHO Growth Charts on Height and Weight Growth Assessment

- For the first 3 months of age, the WHO charts show a somewhat faster rate of weight gain than the 2000 CDC charts.
- This may lead to the identification of more infants who appear to be growing slowly. This slower rate of weight gain is typical for formula fed infants, but not for breastfed infants.

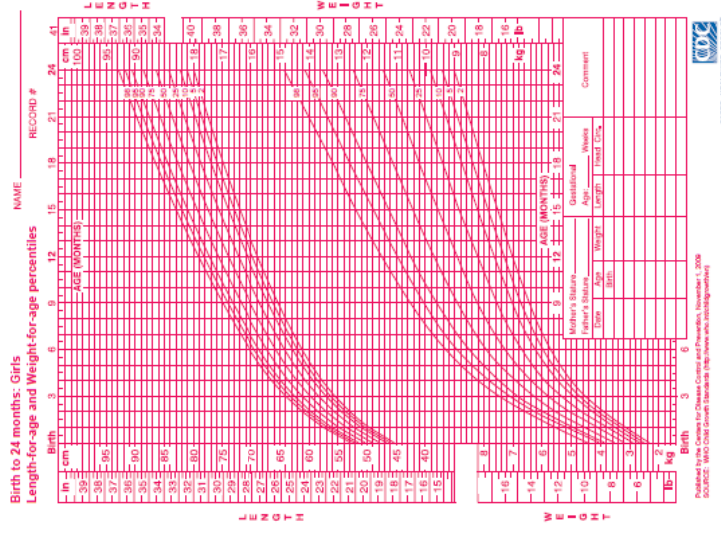




DISCOVER DEVELOP DELIVER

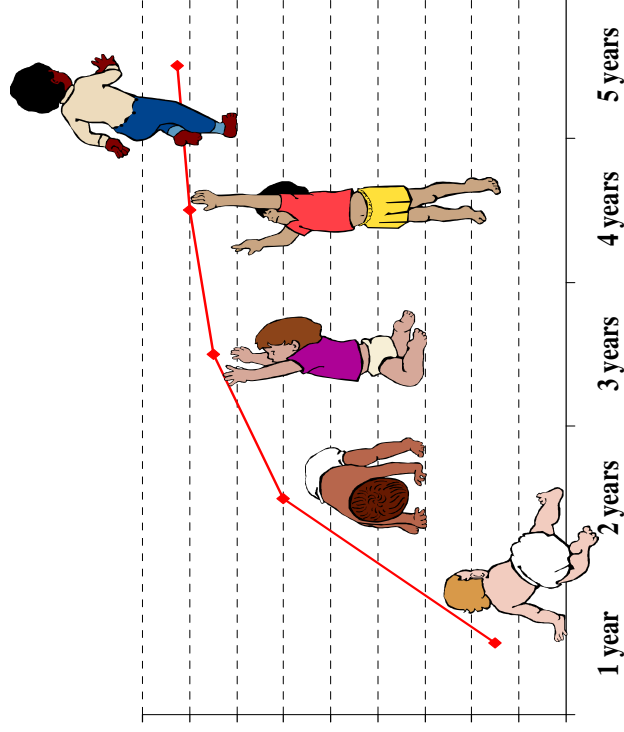
Dissemination

- CDC website (www.cdc.gov/growthcharts)
- AAP News article
- WIC policy change
- CDC interactive online training modules in progress





WIC Risk Changes based on the WHO Growth Charts





103 Underweight or At Risk of Underweight (Infants and Children)

- **Underweight**
 - Birth to < 24 months
 - \leq 2.3rd percentile weight-for-length
 - 2-5 years
 - \leq 5th percentile Body Mass Index (BMI)-for-age
- **At Risk of Underweight**
 - Birth to < 24 months
 - > 2.3rd percentile and \leq 5th percentile weight-for-length
 - 2-5 years
 - >5th percentile and \leq 10th percentile BMI-for-age





High Risk

- Fewer children will be assigned underweight risk.
- Assignment will indicate significant issue with weight.
- Consider programming TWIST to assign **high risk** level to any participant with underweight risk.
- All children identified as underweight would be referred to WIC Nutritionist





DISCOVER DEVELOP DELIVER

113 Obese (Children 2-5 Years of Age)

2-5 years:

≥ 95th percentile BMI or weight-for-stature
(standing height measurements only, risk may not
be assigned when using recumbent lengths)

- Title changed from “Monitor Weight” to “Obese” to differentiate from other weight based risks.
- Language used in counseling should continue to avoid “obese” labels and include supportive phrases such as monitor weight, watch weight gain, weight higher than average or weight above most children at that age etc.





114 At Risk of Overweight (Children 2- 5 years of age)

2 - 5 years:

≥85th and < 95th percentile (BMI)-for-age or
weight-for-stature

(standing height measurements only, risk may not
be assigned when using recumbent lengths)





DISCOVER DEVELOP DELIVER

NEW RISK!

115 High Weight-for Length (Infants and Children < 24 Months of Age)

Birth to < 24 months:

≥97.7th percentile weight for length





DISCOVER DEVELOP DELIVER

121 Short Stature or At Risk of Short Stature (Infants and Children)

Short stature:

- Birth to < 24 months: <2.3% length/age
- 2-5 years: $\leq 5\%$ stature/ age

At Risk:

- Birth to < 24 months: > 2.3% to $\leq 5\%$ length/ age
- 2-5 years: >5% to $\leq 10\%$ stature/age





DISCOVER DEVELOP DELIVER

NEW RISK OPTION
(Not related to growth charts!)

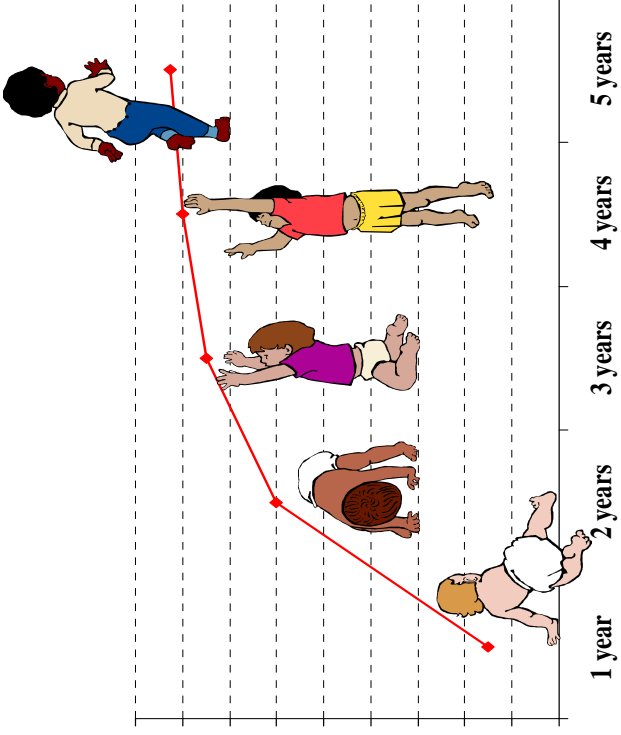
344 Thyroid Disorders

- Hyperthyroidism
- Hypothyroidism
- Postpartum thyroiditis





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TWIST Implementation





DISCOVER DEVELOP DELIVER

December 2011 TWIST release

- **WHO charts available in TWIST**
- **Auto selection of appropriate growth charts for age will continue**
- **Risk updates complete**
- **Auto assignment of growth related risk factors will continue**





November 2011 Staff Inservice

- Introduction of WHO growth charts
- Transition from the WHO to the CDC charts at age 2 years
- Describe risk changes
- Update Risk Policy 675
- Update risk information sheets for the Nutrition Risk Module





Suggestions?

Requests?

Questions?

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