

The UK-WHO Growth Charts: What is the difference?



Key new features of the new WHO/UK Growth Charts include:

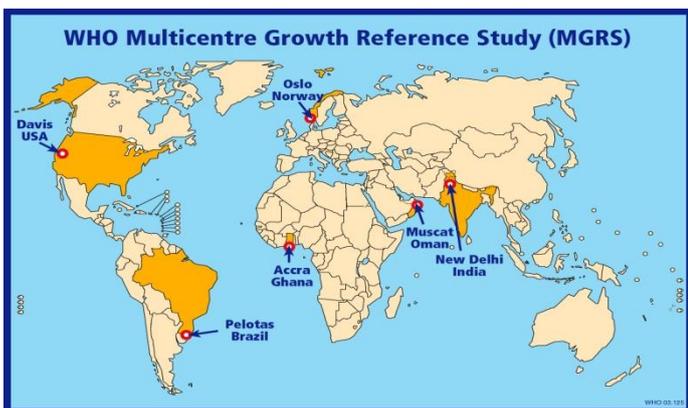
- ✓ Separate preterm birth section
- ✓ No lines for 0 - 2 weeks of age
- ✓ De-emphasised 50th centile
- ✓ Length / height discontinuity at 2 years
- ✓ No 4-18 years section
- ✓ Adult height prediction and BMI lookup

Children's weight gain patterns will appear different

- ✓ No 'dip' on chart at 2 weeks
- ✓ Low weight and centile falls much less

Why did the WHO think we needed new charts?

All previous growth charts have been based on a mixture of breast and bottle fed infants and differences in weight gain were seen between breastfed infants and these charts.



At the same time it was found that that healthy breastfed infants showed very similar growth patterns around the world. The WHO therefore decided to produce charts that set breastfeeding as the norm and described *optimal* rather than average growth, that could be used worldwide. The process of planning, data collection and analysis took 15 years and charts were finally published in 2006.



Infants were only included if they were healthy and born at term, were breastfed exclusively for at least 4 months, with continued partial breastfeeding for a year and weaning solids started by 6 months. Mothers had to be non-smoking and living in comfortable economic circumstances. Data were collected from birth to age five in 6 countries (USA, Norway, India, Ghana, Brazil, Oman) and very similar growth patterns were found in all 6 centres.

The decision to produce UK-WHO Charts

The Scientific Advisory Committee on Nutrition (SACN) studied the charts once they had been released and looked at how UK children compared to them and, in 2007, recommended that they be adopted in the UK.

They decided to adopt from age 2 weeks as this would allow continued use of the UK 1990 preterm and term birth data. There will then be a switch back to UK 1990 charts at age 4 to allow all school entry measures to be plotted on the same charts.

The Royal College of Paediatrics and Child Health (RCPCH) was commissioned to design the new charts and produce these supporting educational materials. The design and instructions were developed by an expert group and tested in focus groups of staff and parents.

The new charts consist of a new A4 chart and 6 PCHR charts on 3 pages both covering 32 weeks gestation to 4 years. In addition there is a new low birthweight chart (23 weeks gestation to 2 years) for very preterm (less than 32 weeks) and sick neonates.

The Department of Health in England recommend that from May 2009 the new charts should be used for all new births, but that there is no need to re-plot for older children where they already have charts. The UK 1990 charts should still be used for all children over age 4 years.

Key features of the UK-WHO Growth Charts

Separate preterm birth section

Birthweight curves do not naturally match infancy curves: e.g. average weight at 2 weeks of age is not actually the same birthweight at 42 weeks gestation. So in the new charts birthweight for gestation (the "preterm section") are in a new separate section to be used for infants born from 32 and before 37 weeks.

Term births plotted at age 0

In addition average birthweight centiles for term infants are shown at age zero on the infancy chart for use for all infants born from 37 completed weeks gestation.

No lines for 0 - 2 weeks of age

All infants show different patterns of weight gain immediately after birth and charts cannot allow for this, though previous charts incorrectly 'smoothed' over this gap. What is important in the first two weeks is looking at weight gain relative to birth weight, not centile position.

De-emphasised 50th centile

Parents tend to expect all 'normal' children to grow along the 50th centile line. However, there are more centile labels and the curve labels sit on the 50th centile to assist orientation when plotting and interpreting.

Length / height discontinuity at 2 years

The WHO standard changes from length to height at age 2, resulting in a small step-down at age 2.

Extra features

- The head circumference curves are extended to two years
- A new adult height predictor that allows approximate prediction of adult height (within 6 cm above or below)

A4 chart only:

- Instructions on how to calculate neonatal percentage weight loss
- A new chart which converts the child's weight and height centiles to a BMI centile, again with no calculations needed
- More detailed instructions including guidance on plotting

PCHR chart only:

- Fold out recording page that will be visible whatever chart is being plotted
- Parental information developed using parent focus groups

What will be the impact on infant growth patterns?

The new chart describes the ideal patterns of growth that we should aspire to for all UK children, whatever their ethnic origin and however they are fed in infancy. This may not be the pattern shown in UK children at present. Length shows a close match at all ages.

From 2 weeks to 6 months UK infants also match the WHO charts closely for weight. Because the charts have more information on weight gain in the first few weeks for the first time they allow for the average tendency for infants to show a slower net weight gain up to age 2 weeks.

After 6 months UK infants then tend to become heavier compared to the WHO charts. The UK 1990 standard also had a similar tendency but was not so pronounced until about the age of 2 years.

As children approach school age the differences in weight between the WHO and UK 1990 charts becomes much smaller except for very light children. For example, a child on the 2nd weight centile at age 4 on the UK 1990 charts would be closer to the 0.4th centile on the WHO charts.

This means that the lengths plotted on both UK 1990 and WHO charts will give very similar centiles.

This means that the 'dip' in weight we are used to seeing between 2-4 weeks will no longer be a normal feature.

This means that compared to the old charts there will be twice as many children above the 98th centile and only 1/200 children will be below 2nd centile for weight.

This means that very light children (<2nd) will appear to drop nearly a centile space for weight when they move from UK-WHO to UK 1990 charts at age 4.

Further Reading

De Onis M, Garza C, Victora CG, Onyango AW, Frongillo EA, Martines J. 2004. The WHO Multicentre Growth Reference Study: planning, study design, and methodology. *Food Nutr Bull* 25(1):S15-S26.

Department of Health. Application of the WHO Growth Standards in the UK. Department of health . 2007. Department of Health. <http://www.sacn.gov.uk/> WHO multicentre growth reference study group. 2006. Assessment of differences in linear growth among populations in the WHO Multicentre Growth Reference Study. *Acta Paediatr Suppl* 450:56-65.

Wright C, Lakshman R, Emmett P, Ong KK. 2008. Implications of adopting the WHO 2006 Child Growth Standard in the UK: two prospective cohort studies. *Arch Dis Child* 93(7):566-9.

Wright CM, Parkinson KN. 2004. Postnatal weight loss in term infants: what is normal and do growth charts allow for it? *Arch Dis Child Fetal Neonatal* Ed 89 (3): F254-F257.