

## I've measured axial length- but what does my result mean?

### Normative data for axial length in children and young adults

The normative data below, in the form of centile curves or charts, were obtained from monitoring hundreds of children's eye growth over a nine-year period. None of the children were undergoing myopia control interventions. Where optical correction was worn, it was in the form of conventional spectacles or contact lenses.

The centiles on the chart show the axial length expected across a range of ages and allow you to see how a child compares to the expected norms for their age. Each line at Nth centile marks the axial length of children of that age e.g. a measure at the 25th centile indicates 25% of children typically have measures below that value and 75% above that value. The 50<sup>th</sup> centile represents the median (average) for the population.

By plotting a patient's axial length on these charts you can use these published centile curves (McCullough et al. 2020) to compare your patient's measurements to those expected for their age, monitor eye growth over time and use these measures to help predict risk of future myopia and, if undertaking myopia control interventions you can use the data to indicate whether your intervention is having a positive effect.

Typically, a child's axial length should follow an expected pattern, remaining on the same line or within the same centile band with increasing age. In cases where axial growth results in a child's measurements moving across the centile lines, to a higher band (e.g. from 75<sup>th</sup> to 90<sup>th</sup>), this is indicative of developing myopia.

Children who go on to develop myopia are likely to have longer axial lengths at a young age compared to their peers. Children at greatest risk for future myopia have axial lengths longer than the 75<sup>th</sup> centile, indicated on the charts by the grey shaded area.

To use these charts:

## YOU WILL NEED:

- ✓ Age of the child (years)
- ✓ Axial Length

Precise measurement of axial length is recommended for monitoring eye growth and myopia management; however, you can make an estimation of axial length using the table below if you have cycloplegic refractive error (SER, D) and average keratometry values for the child (K, mm).\*

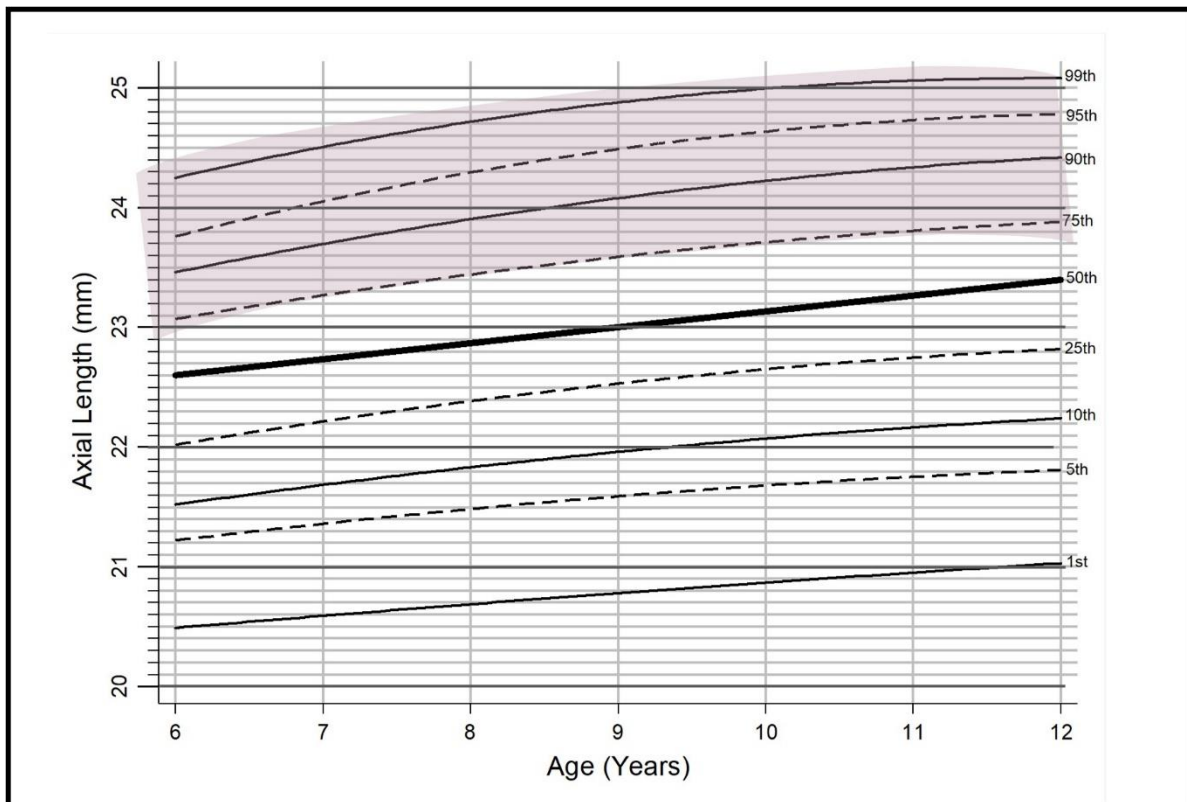
|     | -0.25 | 0.00  | +0.25 | +0.50 | +0.75 | +1.00 | +1.25 | +1.50 | +1.75 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 7.1 | 22.15 | 22.07 | 21.98 | 21.90 | 21.81 | 21.73 | 21.64 | 21.56 | 21.48 |
| 7.2 | 22.37 | 22.28 | 22.20 | 22.11 | 22.02 | 21.94 | 21.85 | 21.77 | 21.69 |
| 7.3 | 22.59 | 22.50 | 22.41 | 22.32 | 22.23 | 22.15 | 22.06 | 21.97 | 21.89 |
| 7.4 | 22.80 | 22.71 | 22.62 | 22.53 | 22.44 | 22.35 | 22.26 | 22.18 | 22.09 |
| 7.5 | 23.02 | 22.92 | 22.83 | 22.74 | 22.65 | 22.56 | 22.47 | 22.38 | 22.29 |
| 7.6 | 23.23 | 23.13 | 23.04 | 22.95 | 22.85 | 22.76 | 22.67 | 22.58 | 22.49 |
| 7.7 | 23.44 | 23.34 | 23.24 | 23.15 | 23.06 | 22.96 | 22.87 | 22.78 | 22.68 |
| 7.8 | 23.65 | 23.55 | 23.45 | 23.35 | 23.26 | 23.16 | 23.07 | 22.97 | 22.88 |
| 7.9 | 23.85 | 23.75 | 23.65 | 23.55 | 23.46 | 23.36 | 23.26 | 23.17 | 23.07 |
| 8.0 | 24.06 | 23.95 | 23.85 | 23.75 | 23.65 | 23.55 | 23.46 | 23.36 | 23.26 |
| 8.1 | 24.26 | 24.16 | 24.05 | 23.95 | 23.85 | 23.75 | 23.65 | 23.55 | 23.45 |
| 8.2 | 24.46 | 24.35 | 24.25 | 24.15 | 24.04 | 23.94 | 23.84 | 23.74 | 23.64 |
| 8.3 | 24.66 | 24.55 | 24.45 | 24.34 | 24.24 | 24.13 | 24.03 | 23.93 | 23.83 |
| 8.4 | 24.86 | 24.75 | 24.64 | 24.53 | 24.43 | 24.32 | 24.22 | 24.12 | 24.01 |
| 8.5 | 25.05 | 24.94 | 24.83 | 24.72 | 24.62 | 24.51 | 24.40 | 24.30 | 24.20 |
| 8.6 | 25.25 | 25.14 | 25.02 | 24.91 | 24.81 | 24.70 | 24.59 | 24.48 | 24.38 |

Generated from Morgan et al. (2019) Estimation of ocular axial length from conventional optometric measures, *Contact Lens & Anterior Eye*, 43(1):18-20.

\*The 95 % limits of agreement of using this formula to generate an estimate of axial length compared to 'real' axial length measures from the NICER study were -0.73 to +0.99 mm (an average of  $\pm 3.7$  %).

For patients aged between 6 and 12 years

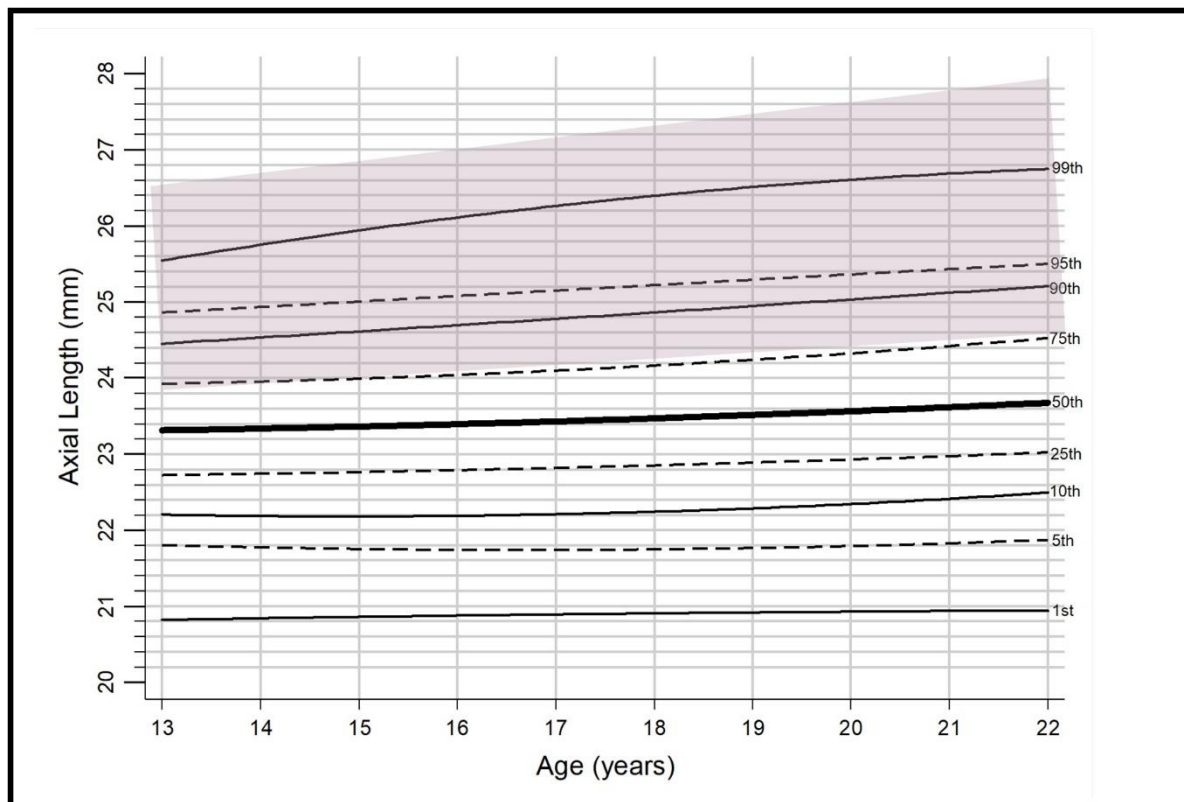
## AXIAL LENGTH



Axial length (mm) centile curves (1<sup>st</sup> to 99<sup>th</sup>) for children aged 6 to 12 years. The bold solid 50<sup>th</sup> centile line indicates the median axial length expected for children aged 6-12 years. The grey shaded area indicates the axial lengths which are typically found in the 'top' (longest) 25% of eyes in children aged 6 to 12 years (i.e. above than the 75<sup>th</sup> centile). Measures in the shaded area signal greatest risk of future myopia development.

For patients aged between 13 and 22 years

## AXIAL LENGTH



Axial length (mm) centile curves (1<sup>st</sup> to 99<sup>th</sup>) for children and young adults aged between 13 to 22 years. The bold solid 50<sup>th</sup> centile line indicates the median axial length expected for children/young adults aged 13-22 years. The grey shaded area indicates the axial lengths which are typically found in the 'top' (longest) 25% of eyes in children/young adults aged 13 to 22 years (i.e. above than the 75<sup>th</sup> centile). Measures in the shaded area signal greatest risk of future myopia development.