Global Lung Function Initiative (GLI) spirometry equations: Comparison of Lung Function between Indigenous Indian and UK-Indian Children

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Aim

- The GLI recently produced all-age, multi-ethnic reference equations for spirometry
- Equations for the Indian-subcontinent, however are not yet available.
- The aims of the study were:
  - To compare spirometry results from healthy urban indigenous Indian children and UK-Indian children
  - To ascertain whether any of the ethnic-specific GLI equations are appropriate for Indian children

Methods

- Identical spirometry protocols and equipment (EasyOn-PC, ndd) were used.
- Healthy Indigenous Indian children in Bangalore, India and UK-Indian children aged 5-12y were recruited.
- Results were interpreted using each GLI ethnic-specific equation to ascertain best fit.

Results

- Acceptable results were achieved in 348 indigenous Indian (mean(SD) age: 9.3 (1.7) years, 68% male) and 289 UK-Indian children (mean (SD) age: 8.0 (1.7) years, 48% male)
- Despite the significant age difference, there was no significant difference in height z-score (mean diff (India-UK) -0.2z (95%CI:-0.4;-0.1)) or in any spirometric outcomes (Figure 1).
- In comparison with GLI-White reference data, FEV$_1$ and FVC were 10% lower in all Indian children, but FEV$_1$/FVC was similar (Figure 1).


Figure 1: Comparison of spirometric outcomes in indigenous Indian children and UK-Indian children based on GLI-2012 White equation.

Legend: Dashed lines represent limits of normality (0 +/- 2 z-scores) for GLI-white reference data. Solid lines represent Mean and SD for Indian children.

Table 1: Comparison of 637 Indian children to each GLI ethnic-specific equation

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>NE Asian</th>
<th>SE Asian</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV$_1$ z</td>
<td>-0.9 (0.8)</td>
<td>0.4 (0.9)</td>
<td>-0.9 (1.2)</td>
<td>-0.1 (0.9)</td>
<td>-0.3 (0.9)</td>
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<tr>
<td>FVC z</td>
<td>-0.8 (0.8)</td>
<td>0.5 (0.9)</td>
<td>-0.8 (1.2)</td>
<td>0.2 (0.9)</td>
<td>-0.2 (0.9)</td>
</tr>
<tr>
<td>FEV$_1$/FVC z</td>
<td>-0.2 (0.8)</td>
<td>-0.3 (0.8)</td>
<td>-0.3 (0.9)</td>
<td>-0.7 (0.8)</td>
<td>-0.4 (0.8)</td>
</tr>
</tbody>
</table>

Conclusions

- GLI-SE Asian equations are applicable for FEV$_1$ and FVC in urban Indian children whether living in India or the UK, however FEV$_1$/FVC should be based on GLI-White.
- Further work to develop specific coefficients for the Indian subcontinent across all ages is required.