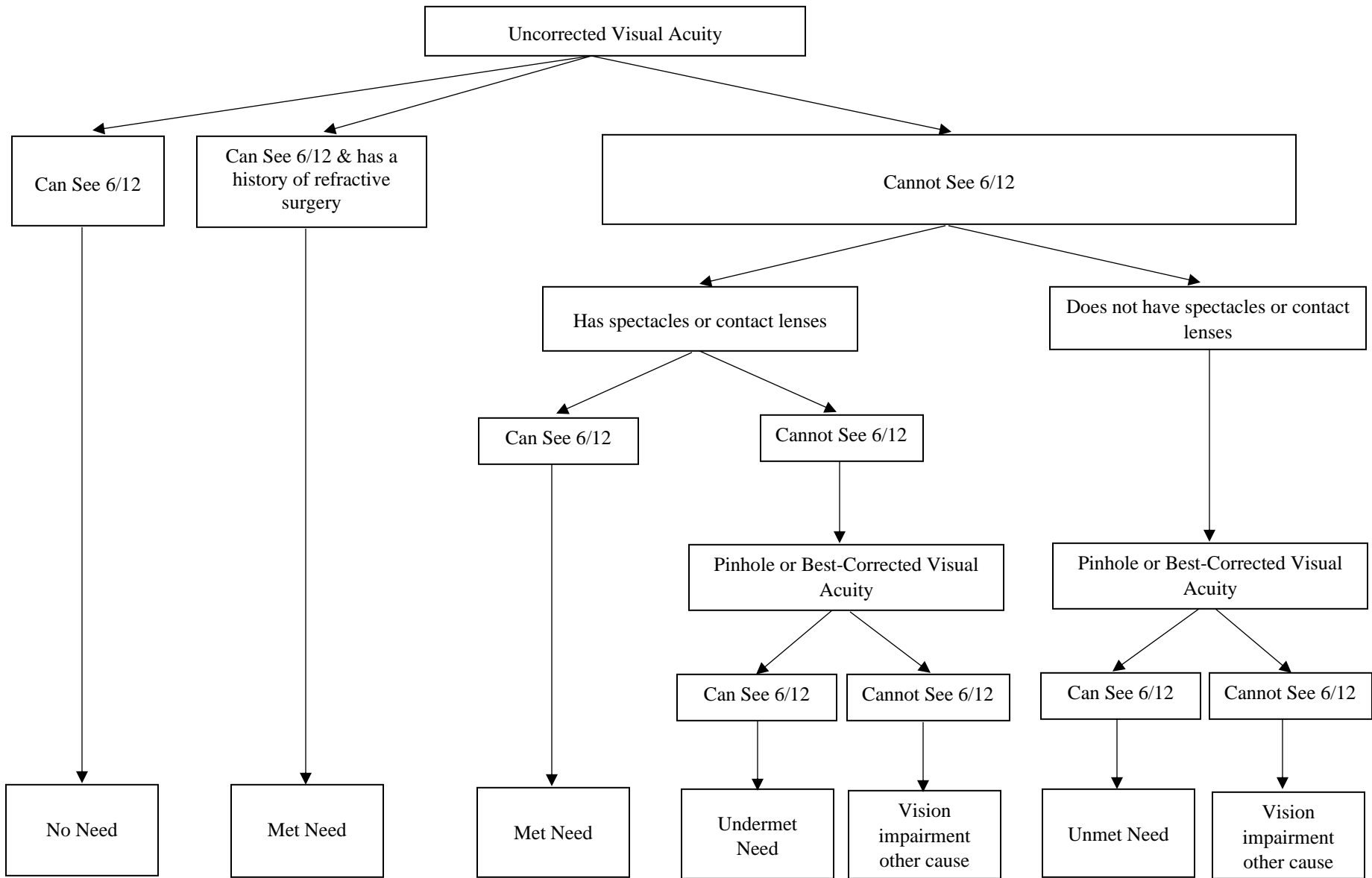# THE LANCET
Global Health
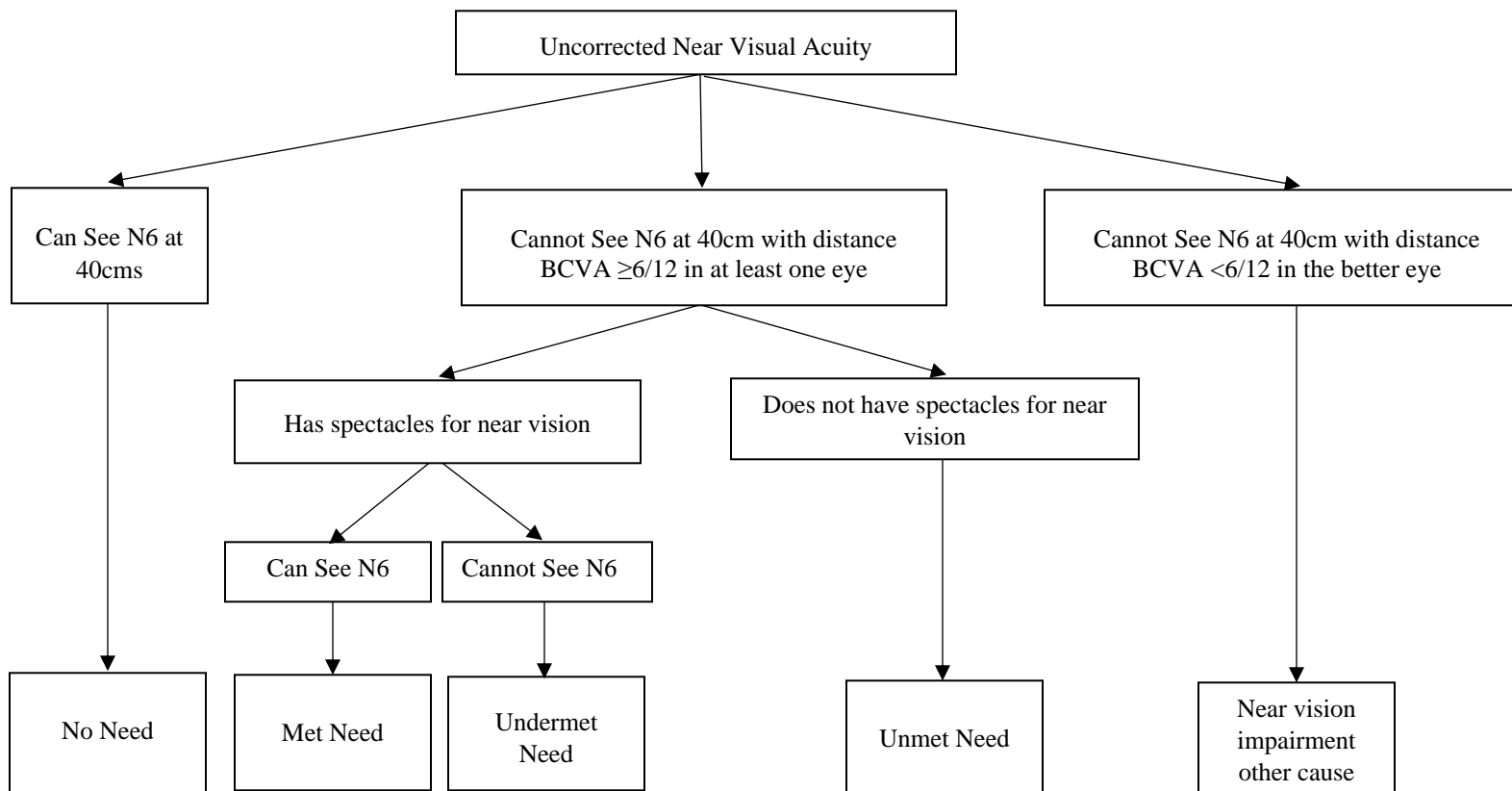
Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Uncorrected Visual Acuity

- Can See 6/12 → No Need
- Can See 6/12 & has a history of refractive surgery → Met Need
- Cannot See 6/12
  - Has spectacles or contact lenses
    - Can See 6/12 → Met Need
    - Cannot See 6/12 → Pinhole or Best-Corrected Visual Acuity
      - Can See 6/12 → Undermet Need
      - Cannot See 6/12 → Vision impairment other cause
  - Does not have spectacles or contact lenses → Pinhole or Best-Corrected Visual Acuity
    - Can See 6/12 → Unmet Need
    - Cannot See 6/12 → Vision impairment other cause

Supplementary file 1. Flow chart depicting the visual acuity measurements required to categorise individuals as having no need, met need, under-met need and unmet need in the context of calculating effective coverage of refractive error (for distance vision). Based on visual acuity in the better eye. Adapted from McCormick et al. (2020)

Uncorrected Near Visual Acuity

Can See N6 at 40cms

Cannot See N6 at 40cm with distance BCVA ≥6/12 in at least one eye

Cannot See N6 at 40cm with distance BCVA <6/12 in the better eye

Has spectacles for near vision

Does not have spectacles for near vision

Can See N6

Cannot See N6

No Need

Met Need

Undermet Need

Unmet Need

Near vision impairment other cause

Supplementary file 2. Flow chart depicting the visual acuity measurements required to categorise individuals as having no need, met need, under-met need and unmet need in the context of calculating effective coverage of refractive error (for near vision). Based on near visual acuity in the better eye.

Supplementary file 3. A comparison of different methods for calculating distance vision effective refractive error coverage

There are two possible methods for the calculation of distance vision effective refractive error coverage, with the key difference being the way in which the 'met' need is determined. That is, *Method 1,* which can be considered the gold-standard method of calculating eREC, utilizes the measure of uncorrected visual acuity (UCVA) to determine the 'met' need of refractive error (i.e. met need = Individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye). While *Method 2,* that has been adopted in most previous reports, does not consider UCVA but rather assumes that all persons who wear spectacles or contact lenses for distance vision have a vision impairment without their correction (i.e. met need = Individuals who present with spectacles or contact lenses for distance vision (or have a history of refractive surgery) and whose PVA is ≥6/12 in the better eye). The objective of this analysis was to compare the accuracy of the two methods of calculating distance vision eREC.

Methods

Direct (i.e. within survey) comparisons of the two methods of calculating distance vision eREC were conducted within four population-based samples from China (Shunyi),[1] Nepal (Kaski),[2] South Africa (Durban)[3] and the United States (Los Angeles).[4] Each of these samples examined both uncorrected and presenting distance visual acuity in each eye in the same study population. The calculation methods applied were as follows:

Method 1

$$\left(\frac{a}{a\ +\ b\ +\ c}\right) \times 100$$

a = Individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye (Met Need);
b = Individuals with UCVA <6/12 in the better eye who present with spectacles or contact lenses for distance vision and a PVA of <6/12 in the better eye, but who improve to ≥6/12 on PHVA or refraction (Undermet Need);
c = Individuals with UCVA <6/12 in the better eye who do not have distance vision correction and who improve to ≥6/12 on PHVA or refraction (Unmet Need);

Method 2

$$\left(\frac{a}{a\ +\ b\ +\ c}\right) \times 100$$

a = Individuals who present with spectacles or contact lenses for distance vision and whose PVA is ≥6/12 in the better eye (Met Need);
b = Individuals who present with spectacles or contact lenses for distance vision and whose PVA was <6/12 in the better eye, but who improve to ≥6/12 on PHVA or refraction (Undermet Need);
c = Individuals with PVA <6/12 in the better eye who do not have distance vision correction and who improve to ≥6/12 on PHVA or refraction (Unmet Need)

Results

Table 1. A comparison of methods for calculating distance vision eREC within four study populations

Study site	n	eREC method 1 (%)	eREC method 2 (%)
Los Angeles (USA)	663	81.6	87.3
Kaski (Nepal)	2156	7.7	19.4
Durban (South Africa)	1939	6.3	13.1
Shunyi (China)	3554	2.7	9.1

Summary of key findings

- eREC method 2, that utilizes presenting VA to determine the 'met' need, produced a higher eREC value in all population-based samples, ranging from 1.1-fold higher in the sample from Los Angeles to 3.4-fold higher in the sample from Shunyi.
- This finding suggests that there are a notable proportion of people who wear spectacles and have a UCVA $\geq$6/12 in the better eye (i.e. they don't meet the VA threshold in which 'need' is defined).

References

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