

# A non-invasive model for detection of the metabolic syndrome in children and adolescents

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## Aims

- To develop a non-invasive model for the detection of metabolic syndrome (MetS) in school children and adolescents

## Methods

### Participants

7,330 children & adolescents aged 10–18 years in schools across China

### Assessments

Anthropometry measured by research nurses and fasting blood tests

### Data analysis

Prediction models from multivariable logistic regressions, using non-invasive anthropometric and clinical parameters

## Results

- MetS prevalence 3.9%

### Prediction model alone (Figure 1; Table 1)

- Parameters were age, waist-to-height ratio, sex, hypertension, and acanthosis nigricans
- Acceptable discrimination (AUROC 0.75)
- Sensitivity 65.7% (190/289 MetS cases)
- PPV 36.5% but 72% of false-positives (231/320) had one metabolic abnormality other than central adiposity

### Mixed approach (Figure 2, Table 1)

- 1<sup>st</sup> step: all children with hypertension and central adiposity were considered as cases
- 2<sup>nd</sup> step: prediction model developed on remaining normotensive children with central adiposity, yielding possibly-helpful discrimination (AUROC 0.67)
- Mixed approach had higher sensitivity (75.4%) but lower PPV (30.7%)
- More false-positives (n=493) but 57.0% (n=281) had one metabolic abnormality besides central adiposity

## Conclusions

- It is possible to detect most undiagnosed MetS cases in school children and adolescents with non-invasive methods
- Importantly, a large proportion of false-positive cases had metabolic abnormalities, so that the vast majority of youth identified by the models would warrant medical follow-up

Figure 1. Performance of a prediction model for the detection of the metabolic syndrome (MetS) among children and adolescents in China.

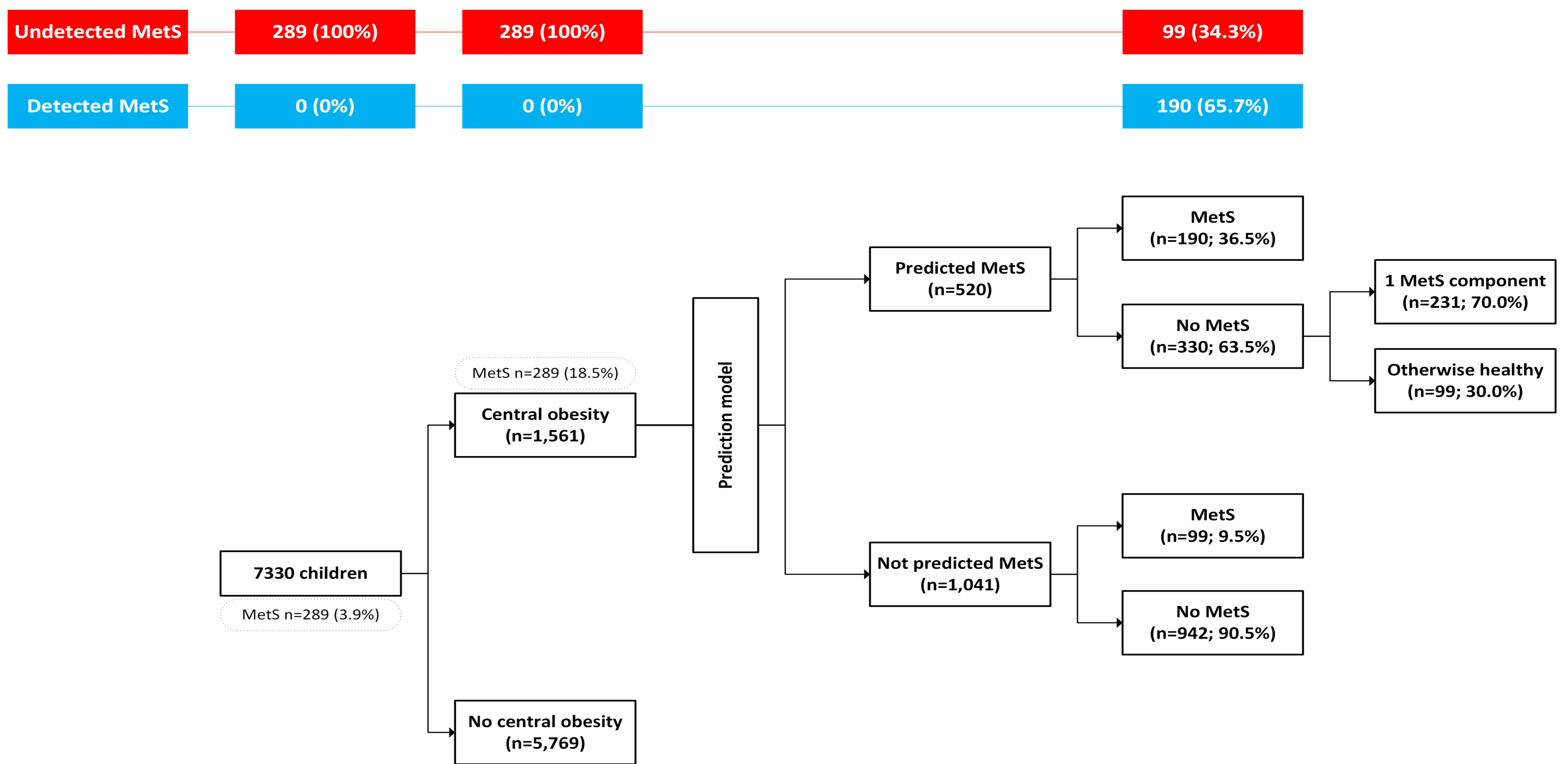


Figure 2. Performance of a mixed approach incorporating hypertension and a prediction model for the detection of the metabolic syndrome (MetS) among children and adolescents in China.

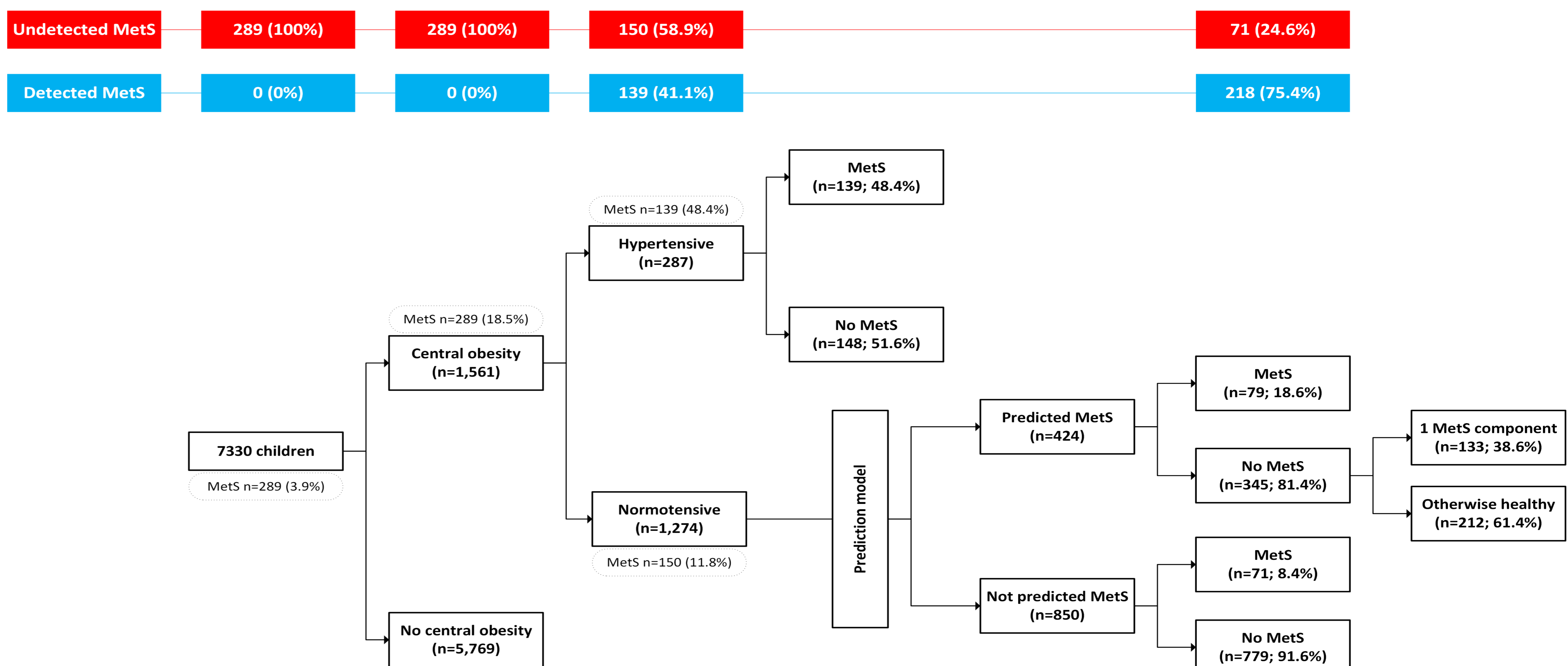
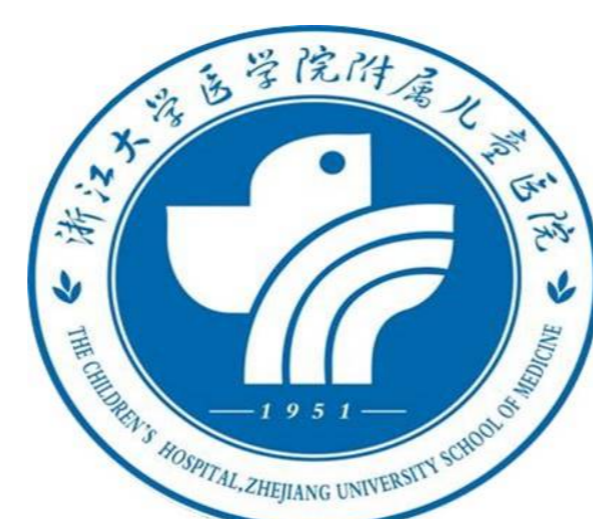


Table 1. Performance of the two models developed for the prediction of metabolic syndrome (MetS) in children and adolescents in China.

	PREDICTION MODEL	HYPERTENSION + PREDICTION MODEL
MetS cases in population (n)	289	289
Total with central adiposity (n)	1,561	1,561
Total number predicted to have MetS [n (%)]	520 (33.3%)	711 (45.5%)
Real cases of MetS detected (n)	190	218
Sensitivity (%)	65.7%	75.4%
Specificity (%)	74.1%	61.2%
Positive predictive value (%)	36.5%	30.7%
Negative predictive value (%)	90.5%	91.8%
Wrong predictions with 1 MetS component [n (%)]	231 (44.4%)	281 (39.5%)
Wrong predictions otherwise healthy [n (%)]	99 (19.0%)	212 (29.8%)



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