Antenatal Markers of Fetal Growth Restriction Can Predict Childhood Systolic Blood Pressure

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INTRODUCTION

- Being born small for gestational age (SGA) is linked with higher systolic blood pressure (SBP).
- Fetuses with growth restriction (FGR) may be either SGA or appropriate size for gestational age at birth.
- However, it is not known which factors contributing to size at birth influence the relationship with SBP.

AIM

To determine whether antenatal markers of FGR can predict the upper quartile of childhood SBP at age 3 to 6 years.
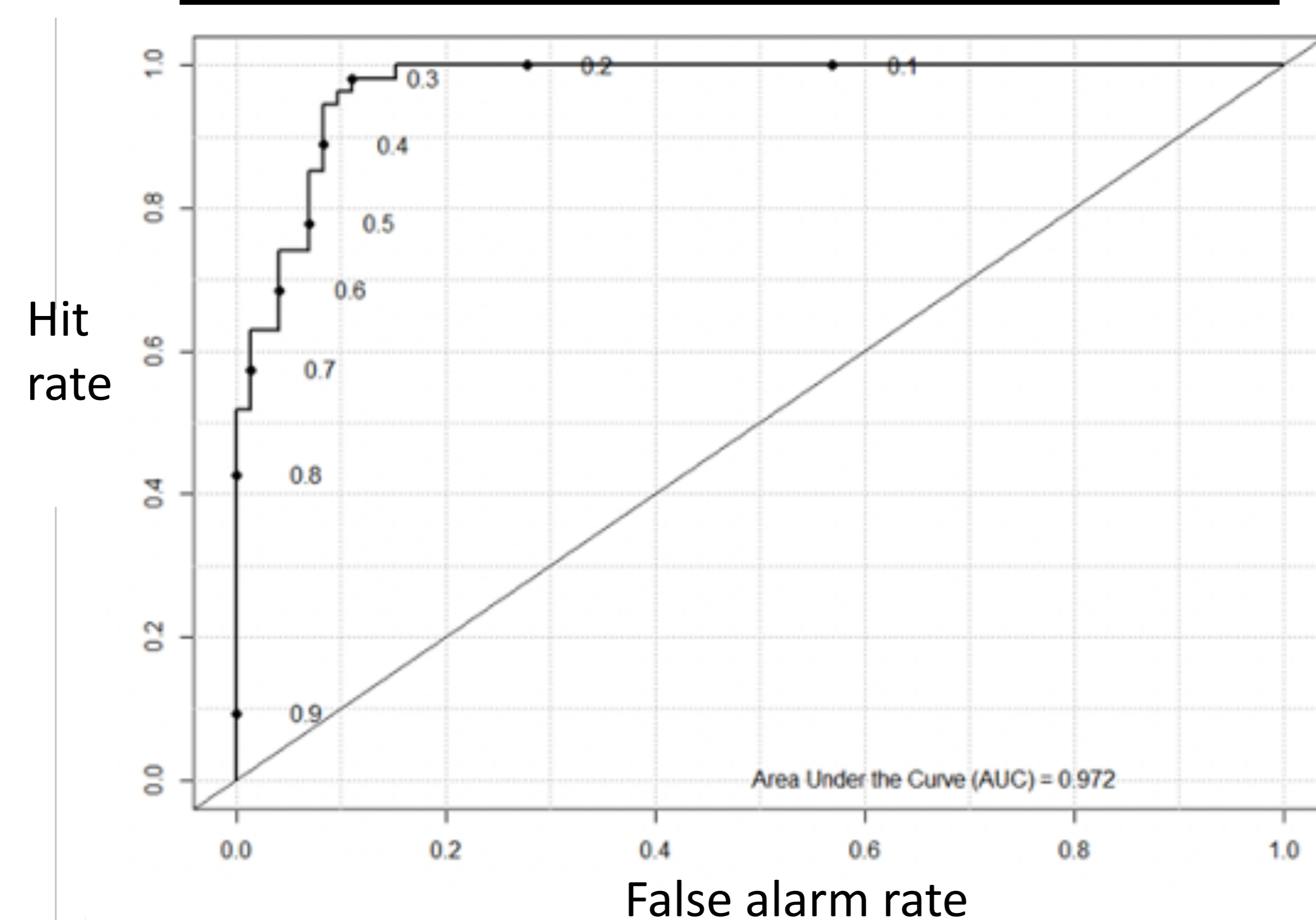
METHODS

- Children aged 3 to 6 years, born to mothers who had attended the Manchester Placenta Clinic were recruited.
- Antenatal ultrasound data at 23 weeks gestation were obtained (see abstract for details).
- Offspring blood pressure, as a cardio-metabolic risk indicator, was measured.
- Random forest is a machine learning approach that generates many independent, uncorrelated decision trees based on multiple variables.
- This was used to determine the relative importance of antenatal variables in prediction of upper quartile of SBP.

RESULTS

- Antenatal markers relating to FGR risk predict the upper quartile of childhood SBP with an area under the curve of 0.97 and an error rate of 13.5% (N=75).
- The top five ranked variables were
  1. Maternal diastolic blood pressure
  2. Birthweight SDS
  3. Parity
  4. Notching (an indicator of increased uterine vascular resistance)
  5. Change in weight centile between 23 weeks gestation and birth

Boruta plot for childhood systolic blood pressure

Receiver operating characteristic curve for childhood systolic blood pressure

Area Under the Curve (AUC) = 0.972
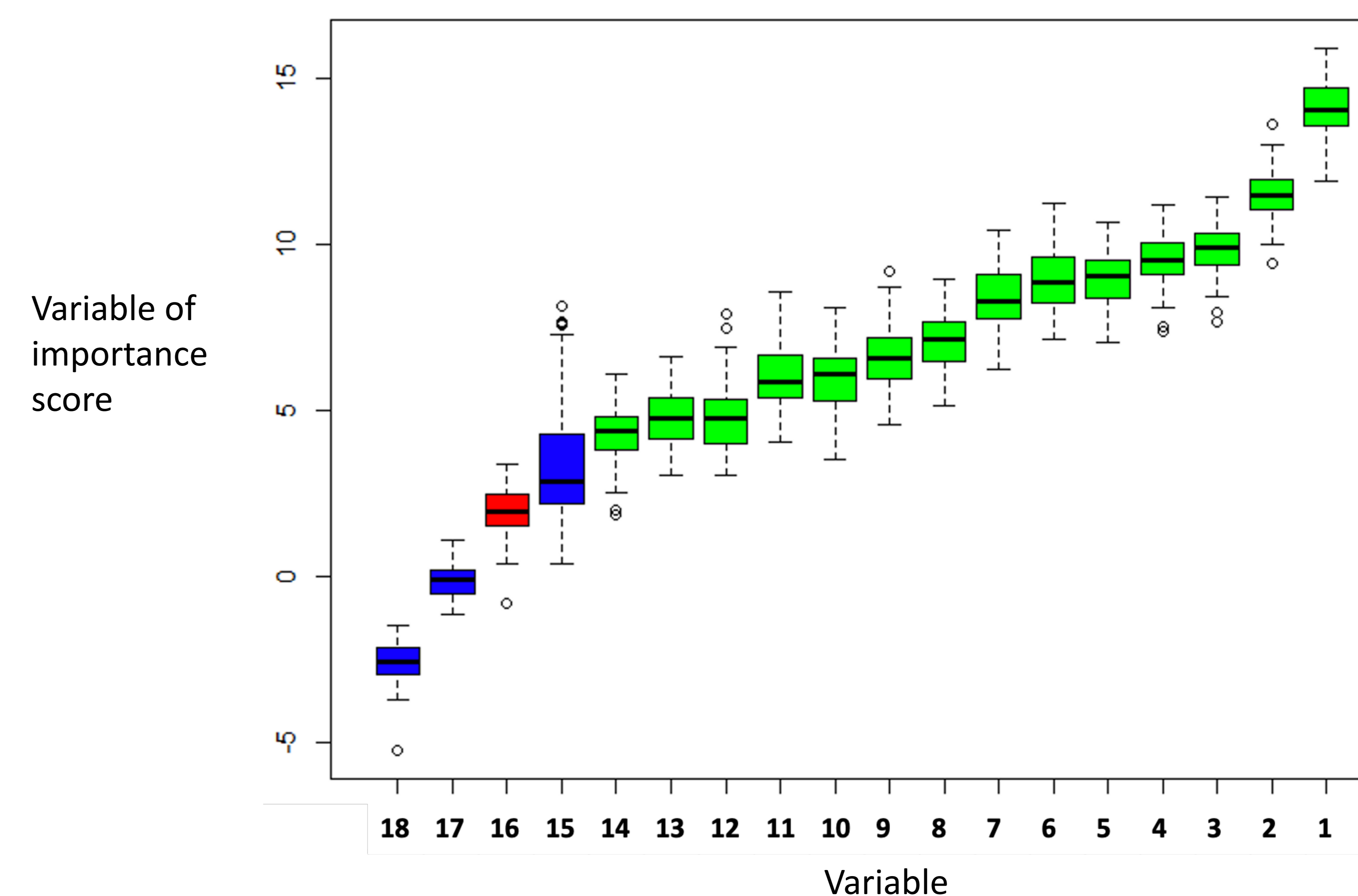
CONCLUSIONS

- Maternal and antenatal markers, as well as birthweight SDS can predict with 97% accuracy the upper quartile of SBP at age 3 to 6 years.
- Antenatal markers were within the top five ranked variables and could help identify those babies at risk of higher SBP in childhood.