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# External validation of the FMF competing risks model for the prediction of small neonates

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## Objective

To examine the external validity of the new Fetal Medicine Foundation (FMF) competing risks model for the prediction of small for gestational age (SGA) neonates at mid-trimester.

## Methods

This is a single center prospective cohort study in 25484 women with singleton pregnancies undergoing routine ultrasound examination at 19 - 24 weeks' gestation. We used the FMF competing risks model for prediction of SGA combining maternal factors, mid-trimester estimated fetal weight by ultrasoundscan (EFW) and uterine artery pulsatility index (UtA-PI), to calculate risks for different cut-offs of birth weight percentile and gestational age at delivery. We examined the predictive performance in terms of discrimination and calibration.

## Results

The validation cohort had significant divergences in composition compared to the FMF cohort where the model was developed. At 10% false positive rate, maternal factors, EFW and UtA-PI yield a sensitivity of 69.6%, 38.7% and 31.7% for SGA <10 percentile delivered before 32, 37 and ≥37 weeks' gestation, respectively. The respective numbers for SGA <3 percentile were 75.7%, 48.2% and 38.1%. These values were equal to the ones reported in the FMF study for SGA born <32 weeks gestation, and lower for SGA born <37 an d ≥ 37 weeks' gestation. The prediction in the validation cohort at a 15% FPR was 77.4%, 50.0% and41.5% for SGA <10 percentile born <32, <37 and ≥ 37 weeks' gestation, respectively, similar to the respective figures reported in the FMF study at a 10% FPR. The performance, was similar to the one reported in the FMF study for the subgroup of Nulliparous and Caucasian women. The new model had satisfactory calibration.

## Conclusion

The new competing risks model for SGA developed by the FMF performs relatively well in an independent large Spanish population.