Objective
Preeclampsia (PE) and small for gestational age (SGA) can be predicted from the first trimester with algorithms that include maternal characteristics, and biophysical and biochemical markers. The most widely used algorithm worldwide is the Fetal Medicine Foundation (FMF) algorithm. The recently described Gaussian algorithm has reported excellent results in the cohort where it was tested for the first time; however, this algorithm is unlikely to be externally validated. Therefore, as an alternative approach, we compared the predictive accuracy for PE and SGA of the Gaussian and FMF algorithms.

Methods
This was a secondary analysis of a prospective cohort study conducted at Vall d’Hebron University Hospital (Barcelona) with 2641 singleton pregnancies from October 2015 to September 2017. Maternal characteristics, medical and obstetric history, mean arterial blood pressure (MAP), and mean uterine artery pulsatility index (UtAPI) were recorded at the first-trimester scan. Serum placental growth factor (PIGF) and pregnancy associated plasma protein-A (PAPP-A) were assessed between 8° and 13° weeks of gestation. The areas under the curve for the predictive performance for early-onset (delivery <32 weeks) and preterm (delivery <37 weeks) SGA, were calculated with the Gaussian and FMF algorithms, and subsequently compared.

Results
Among the 2641 women, 30 (1.14%) developed preterm PE, including 11 (0.42%) early-onset PE. Among the 2483 newborns with available birthweight data, 44 (1.77%) were preterm SGA, including eight (0.32%) early-onset SGA. The FMF and the Gaussian algorithm showed a similar predictive performance for most outcomes and marker combinations. Nevertheless, significant differences for early-onset PE prediction favored the Gaussian algorithm in the following marker combinations: MAP with PAPP-A, MAP with PIGF, and MAP alone.

Conclusion
This study shows that the first-trimester Gaussian and FMF algorithms have similar performances for PE and SGA prediction when applied to a Spanish population within a routine care setting. In our study, accuracy of the FMF algorithm was similar to that reported in the original studies, adding evidence to its external validity.