Accelerated epigenetic clock aging in peripheral blood is associated with preterm birth (PTB)
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BACKGROUND
- Preterm birth (PTB) remains the largest cause of neonatal mortality and mortality among non-anomalous babies delivered in the United States.
- Despite the magnitude of this clinical problem, prediction of PTB remains imperfect, and the underlying pathophysiology is poorly understood.
  - Some established PTB risk factors (e.g., race, smoking, history of childhood abuse) are associated with chronic stress and increased allostatic load, which may result in changes including accelerated biologic and cellular aging.
- Epigenetic clocks use CpG DNA methylation (DNAm) to estimate biologic age in relation to chronologic age.
- Biologic age acceleration is associated with cancer, heart disease, and a shortened lifespan.
- AgeAccelGrim is a novel epigenetic clock that combines 7 DNAm components (Kaplan et al. 2013).
- AgeAccelGrim is a publicly available, online web tool.
- Inputs include individual’s CpG methylation data as measured on the EPIC 450K methylation platform and chronologic age.

METHODS
- To determine if maternal biologic aging (measured by AgeAccelGrim) is associated with early PTB.
- Participants were grouped into quartiles of biologic age (Table).
- Biologic age values (indicate slowing/biologic age) were estimated by the AgeAccelGrim online tool.
- Data were analyzed by chi, t-test, Kaplan-Meier survival curves, and logistic regression. Regression models controlled for a priori known factors associated with PTB in order to unbiasedly estimate the association of accelerated Aging with PTB.

RESULTS
- 163 participants were included. AgeAccelGrim correlated with chronologic age (Rho=0.84, p<0.001). Baseline characteristics are shown below in Table 1.
- Median age was 36.3 years (range 20.24-85.9). Median ageAccelGrim was 0.61 (range -1.42 to 0.98).
- Among individuals at high risk for preterm birth, those who delivered preterm were more likely to have accelerated mid-pregnancy peripheral blood biologic age.

CONCLUSIONS
- Accelerated biologic aging is associated with PTB among high-risk patients. Elucidating factors that slow biologic aging may improve birth outcomes.