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Study shows successful labor outcomes in expectant mothers using AI

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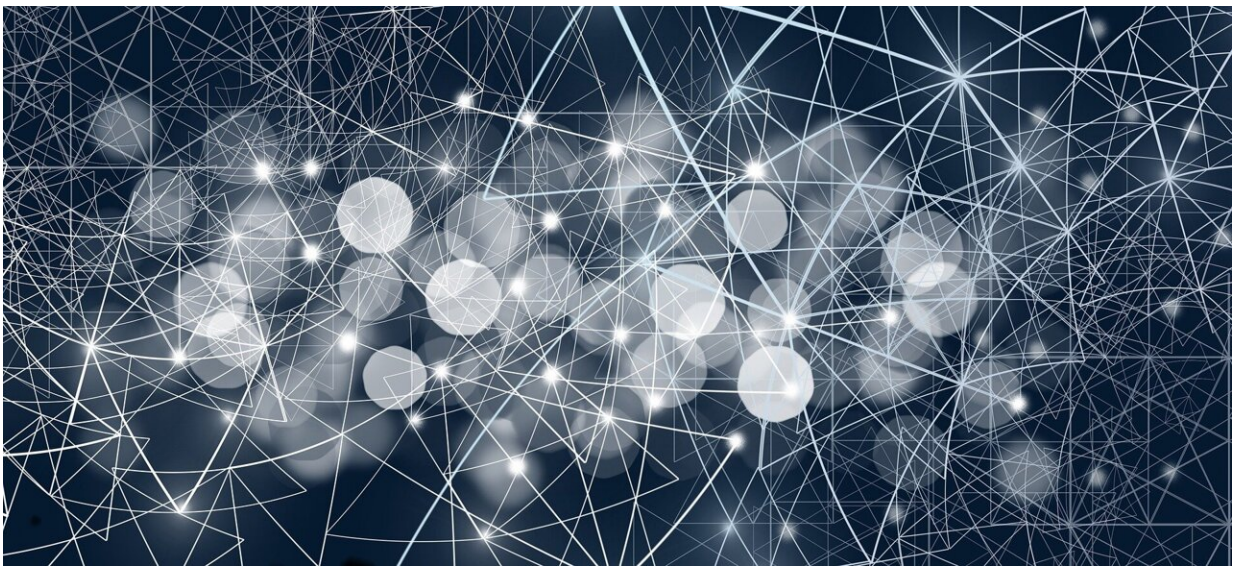

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Mayo Clinic researchers have found that using artificial intelligence (AI) algorithms to analyze patterns of changes in women who are in labor can help identify whether a successful vaginal delivery will occur with good outcomes for mom and baby. The findings were published in *PLOS ONE*.

"This is the first step to using algorithms in providing powerful guidance to physicians and midwives as they make critical decisions during the

labor process," says Abimbola Famuyide, M.D., a Mayo Clinic OB-GYN and senior author of the study. "Once validated with further research, we believe the algorithm will work in real time, meaning every input of new data during an expectant woman's labor automatically recalculate the risk of adverse outcome. This may help reduce the rate of cesarean delivery, and maternal and neonatal complications."

Women in labor understand the importance of periodic cervical examinations to gauge the progress of labor. This is an essential step, as it helps obstetricians predict the likelihood of a vaginal delivery in a specified period of time. The problem is that cervical dilation in labor varies from person to person, and many important factors can determine the course of labor.

In the study, researchers used data from the Eunice Kennedy Shriver National Institute of Child Health and Human Development's multicenter Consortium on Safe Labor database to create the prediction model. They examined more than 700 clinical and obstetric factors in 66,586 deliveries from the time of admission and during labor progression.

The risk-prediction model consisted of data known at the time of admission in labor, including patient baseline characteristics, the patient's most recent clinical assessment, as well as cumulative labor progress from admission. The researchers explain that the models may provide an alternative to conventional labor charts and promote individualization of clinical decisions using baseline and labor characteristics of each patient.

"It is very individualized to the person in labor," says Dr. Famuyide. He adds that this will be a powerful tool for midwives and physicians remotely as it will allow time for transfers of patients to occur from rural or remote settings to the appropriate level of care.

"The AI algorithm's ability to predict individualized risks during the labor process will not only help reduce adverse birth outcomes but it can also reduce healthcare costs associated with maternal morbidity in the U.S., which has been estimated to be over $30 billion," adds Bijan Borah, Ph.D., Robert D. and Patricia E. Kern Scientific Director for Health Services and Outcomes Research.

Validation studies are ongoing to assess the outcomes of these models after they were implemented in labor units.

More information: Sherif A. Shazly et al, Impact of labor characteristics on maternal and neonatal outcomes of labor: A machine-learning model, *PLOS ONE* (2022). DOI: 10.1371/journal.pone.0273178

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