Geographic association between simulation fellowships and maternal mortality

Saanvi Mirchandani: saanvim2003@gmail.com, (646) 644-1441
Aleeza Nasir: aleeza.n22@gmail.com, 516-800-5090
Sambat Bhandari: sambatbhandari8@gmail.com, 516-800-703
Mark Richman: mrichman1@northwell.edu, 310-309-9257
Illan Saji: illan.saji@macaulay.cuny.edu, (516) 754-3102
Jeffrey Wang: Jeffrey Wang - jeffwang3769@gmail.com, 516-528-3760
Raquel Defillo Lopez: Raquel Lopez Defillo: raq.lopez176@gmail.com, 516-655-4645
Esther Gestetner: estgestetner@gmail.com, 516-547-8590
Jennifer Coard: coardj@nychhc.org, 718-883-2774
Camille Matthew: (929) 697-1215, cchin1181@gmail.com
Barry Smith: (773) 322-2136, barrysmith@nychhc.org

Abstract:
Introduction Maternal mortality rates in the United States remain the highest among high-income countries despite advances in medical care. Simulation-based training has been shown to improve team performance in high-acuity obstetric emergencies such as postpartum hemorrhage, peripartum cardiomyopathy, and eclampsia, and simulation fellowships now train physicians to lead this education at over 50 U.S. programs. The geographic relationship between simulation fellowship presence and maternal mortality outcomes remains unexplored. This ecological study evaluates whether geographic areas with simulation fellowship programs have significantly lower maternal mortality rates than areas without such programs.

Methods This ecological study examined maternal mortality rates from 2021-2023 obtained from the CDC WONDER database. These rates were calculated as maternal deaths per 100,000 population, and counties were classified by simulation fellowship presence (none, one, or two fellowships). he data collected was compared using Microsoft Excel, with significance set a priori at $p < 0.05$.

Results Maternal mortality rates were similar between counties without simulation fellowships and those with at least one (0.14 vs. 0.14 per 100,000; $p = 0.94$). However, rates differed significantly when stratified by number of fellowships: 0.14 for no fellowships, 0.16 for one, and 0.10 for two ($p = 0.03$), with two-fellowship counties showing the lowest mortality.

Discussion Overall fellowship presence was not associated with lower maternal mortality, but counties with two fellowships showed significantly lower rates. This finding is based on only two counties and requires cautious interpretation. As an ecological study, these results show association rather than causation. Further research with physician-level data is needed to clarify this relationship.