clotted and required exchange with development of a severe left-sided pneumothorax shortly thereafter, leading to hypoxia and associated bradycardia and subsequently cardiac arrest. The patient improved after chest tube placement and cardiopulmonary resuscitation with no further cardiac events.

Both patients 1 and 3 developed hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome. Patient 1 did not have liver enzyme complications, but she did have severe range blood pressures and decreasing platelet counts, as low as 96 mg/dL, which prompted her cesarean delivery. Patient 3 had worsening liver enzymes as early as HD 19, peaking on HD 25 with aspartate aminotransferase levels at 895 U/L, alanine aminotransferase levels at 743 U/L, and lactate dehydrogenase levels at 1302 U/L with continued hypertension requiring labetalol. The diagnosis of HELLP was definitively made retrospectively in both patients after observing rapid improvements in their laboratory results and blood pressures postpartum. In the antepartum period, other differential diagnoses for thrombocytopenia included ECMO-related shear stress and membrane absorption of key platelet factors,[3] preeclampsia-like syndrome observed in severe COVID-19 infection,[4] and heparin-induced thrombocytopenia, making it more difficult to diagnose HELLP and proceed toward delivery in pregnant patients on ECMO.

Mood disorders were common after ECMO in pregnancy. Patient 1 developed depression with significant triggers related to the inability to breastfeed after decannulation. She did not require medications and received psychosocial counseling. An outpatient psychiatry follow-up at 3 months postpartum was attempted, but because of telemedicine connectivity issues, this was not completed. Patient 3 had anxiety requiring trazodone and sertraline and was doing well at the 1-month follow-up. Patient 4 developed insomnia and was started on quetiapine and gabapentin with a stable mood at the 1-month follow-up and a plan for outpatient posttraumatic stress therapy. We agree that long-term follow-up of postpartum mood disorders, especially after an intensive care unit admission during the peripartum period, is needed and recent studies have confirmed an association between psychiatric disorders and COVID-19 infection.[5] ■

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# Interventions to decrease complications after shoulder dystocia: a systematic review and Bayesian meta-analysis: a reply

Check for updates

**TO THE EDITORS:** We congratulate Wagner et al[1] for performing a systematic review and meta-analysis of 16 reports on shoulder dystocia (SD) training and clinical outcomes, but we disagree with the interpretation of their results. The article's key finding that brachial plexus injury (BPI) incidence decreases after simulation training, is true. Moreover, the increase in SD incidence after training is attributable to improved provider awareness of the condition. SD incidence is varied in large part because the diagnosis is subjective. We have found that training with force measurement directly affects the participants' perception of impeded delivery.

Most of the included studies compared clinical outcomes after training for many years, often ≥8 years. There has been an increase in cesarean delivery rates over time: 22.3% in 1990 to 32.3% in 2014 in North America.[2] Certainly, there can be no causative conclusion that simulation training explains this rise over time.

The authors compared 2 studies with opposing results to question whether simulation training can reduce the

incidence of permanent BPI. It was established more than 50 years ago that permanent injuries decreased by 400% after the introduction of fetal maneuvers in the 1940s.[3] This was during an era when the cesarean delivery rate was <5%. Figure 3 demonstrates multiple other studies that have demonstrated that the incidence of permanent injuries can be reduced with proper training.

The authors raise a valid point that the cost of simulation may be prohibitive and impractical to train 44,000 providers in the United States who deliver neonates. However, focusing simulations on incoming obstetrical trainees and on those who have already experienced a permanent injury is a good place to start. Training incoming interns for 12 years demonstrated a 6-fold decrease in BPIs and a concomitant decrease in permanent BPI claims.[4]

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The opinions expressed herein are those of the authors only and do not necessarily represent the opinions of the AHRQ or the Department of Obstetrics, Gynecology, and Women's Health of the Albert Einstein College of Medicine/Montefiore Medical Center.

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# Interventions to decrease complications after shoulder dystocia: a systematic review and Bayesian meta-analysis: a response

Check for updates

We appreciate Dr Robert Allen's and Dr Edith Allen's interest in our systematic review and Bayesian meta-analysis of pre- and postinterventions trials to decrease the complications associated with shoulder dystocia.[1] We disagree with several statements in their letter.

The increase in the diagnosis of shoulder dystocia, without a convincing overall reduction in brachial plexus injury, is not without ill consequences. Aside from being traumatic to both the mother and clinicians,[2] a history of shoulder dystocia may lead to cesarean deliveries in subsequent pregnancies, with associated morbidity and mortality.[3]

Regarding the noted increase in the rate of cesarean delivery before and after the implementation of the intervention, we wrote that "[f]rom the analysis, however, we cannot establish a causal relationship between the intervention and the change in the route of delivery." Nonetheless, clinicians and policymakers who advocate for shoulder dystocia training ought to be cognizant of the possibility that the intervention may unintentionally and unexpectedly increase the rate of cesarean delivery.

Please note that Figure 3 in our article, does not report on the "incidence of permanent injury" before and after the training. The written description for Figure 3 is "[p]roportion of NBPP [neonatal brachial plexus palsy] per shoulder dystocia case during pre- and postintervention." The word permanent was intentionally not in the descriptor. Subsequently, we summarized the results of the 2 publications, which followed children for at least 12 months, and rightly concluded that "[i]n 2 studies, the persistence of neonatal brachial palsy at 12 months was reported with contradicting conclusions."

We appreciate Dr Robert Allen's and Dr Edith Allen's acknowledgment that we have a "valid point" that training all clinicians in the country may be prohibitive and impractical. However, we are doubtful that their suggestion to focus training on incoming trainees suffices. The only cluster randomized trial on the topic[4] noted no reduction when all faculty and trainees participated in the simulation.

We do agree with Dr Robert Allen and Dr Edith Allen that currently there is insufficient evidence for policymakers—be it at an institution or at a national organization committee—to recommend simulation and shoulder dystocia protocols to decrease persistent neonatal brachial plexus palsy.

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