



Ritu Chitkara

Clinical Professor, Pediatrics - Neonatal and Developmental Medicine

CLINICAL OFFICE (PRIMARY)

- **Neonatology**

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Bio

CLINICAL FOCUS

- Neonatology
- Patient Simulation
- Neonatal-Perinatal Medicine

ACADEMIC APPOINTMENTS

- Clinical Professor, Pediatrics - Neonatal and Developmental Medicine

ADMINISTRATIVE APPOINTMENTS

- Clinical Instructor, Department of Pediatrics, Division of Neonatal-Perinatal Medicine, Stanford, (2013- present)

HONORS AND AWARDS

- Pete Harman Fellow in Neonatology, Stanford University (2010)
- Member, Stanford Society of Physician Scholars (2010)
- ROSE Award (Recognition of Service Excellence), Lucile Packard Children's Hospital, Stanford University (2011)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Consultant, Center for Fetal and Maternal Health, Stanford (2014 - present)
- Coordinator, Fetal Center, El Camino Hospital (2014 - present)
- Coordinator, Transport Follow Up, El Camino Hospital NICU (2014 - present)
- Member, NICU Partnership Council, El Camino Hospital (2014 - present)
- NICU Liaison, Department of Pediatrics, El Camino Hospital (2014 - present)
- Fellow, American Academy of Pediatrics (2012 - present)
- Instructor, Neonatal Resuscitation Program (2009 - present)
- Faculty, Center for Advanced Pediatric and Perinatal Education (CAPE) at Stanford (2009 - 2012)

PROFESSIONAL EDUCATION

- Medical Education: University of California San Diego School of Medicine (2006) CA
- Fellowship: Stanford University Neonatology Fellowship (2012) CA
- Board Certification: Neonatal-Perinatal Medicine, American Board of Pediatrics (2014)
- Board Certification, American Board of Pediatrics , Neonatal-Perinatal Medicine (2014)
- Board Certification: Pediatrics, American Board of Pediatrics (2009)
- Residency: Lucile Packard Children's Hospital (2009) CA

COMMUNITY AND INTERNATIONAL WORK

- Volunteer Physician, Nepal
- Volunteer Physician, Guatemala
- Volunteer Physician, Ecuador

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My particular area of research interest lies in using simulation methodology to understand the cognitive, technical and behavioral skills needed during neonatal resuscitation. First, I wanted to understand how accurate human senses are in the detection of neonatal heart rate during simulated resuscitation. As providers of neonatal resuscitation we are taught an algorithm that presumes we are able to precisely detect a newborn's heart rate and, based on that value, respond appropriately according to set guidelines. But what if the accuracy of the current standard is deficient and providers either fail to perform appropriate interventions or perform inappropriate interventions? Using simulation based methodology I was the principle investigator in a prospective, randomized controlled trial investigating how accurate certified providers of neonatal resuscitation are at determining heart rate when faced with various resuscitation scenarios. I found that providers were inaccurate in their heart rate determination ~40% of the time using either auscultation of the chest or palpation of umbilical pulsations. It is time to study other means of heart rate determination in the delivery room (oximetry, ECG leads) because the accuracy of the current standard is deficient and results in errors of omission (lack of appropriate interventions) and commission (inappropriate interventions). This work was published in the journal Resuscitation.

Next, I wanted to investigate a way to optimize the organization of equipment and supplies required when responding to neonatal resuscitations in our hospital. There have been several emergent resuscitations I have responded to during my fellowship where I was frustrated at the lack of appropriate equipment at my disposal and/or the delay in obtaining such equipment. At Lucile Packard Children's Hospital (LPCH) supplies for certain resuscitations must be obtained from up to four different places, taking on average 6-8 minutes. After surveying medical directors in NICUs across the United States I found that, although 75% of NICUs have all of their supplies located in one area, it takes an average of 5 minutes (range 1-30 minutes) to gather this equipment. Such preparation times are too long to allow for an efficient, timely resuscitation. I believed that creation of a resuscitation cart specifically designed for neonates of various sizes and with differing disease states could greatly improve our ability to respond to and appropriately care for these newborns. As such, my co-fellow and I designed a neonatal resuscitation cart (NRC) based on the ABC's (airway, breathing, circulation) of resuscitation. Using simulation-based methodology, we performed a prospective, randomized, controlled, crossover trial design to compare the utility of a NRC with the current standard at LPCH. We found that use of a supply cart designed specifically for use during neonatal resuscitation (NRC) allowed healthcare professionals to more quickly acquire equipment and supplies and institute indicated resuscitation procedures when compared to our current standard. We believe that this is likely to result in improved human performance during actual neonatal resuscitations and potentially better patient outcomes. I was the principle investigator on this project and our work has been published in BMJ Quality and Safety. The NRCs are now in use in our delivery rooms and NICUs at LPCH.

PROJECTS

- NICHD Trial, Research site coordinator - El Camino Hospital (2014)
- Principal Investigator, ET-1 and BNP as Predictors of Pulmonary HTN Risk in Premature Infants with BPD - Stanford University (2011 - 2013)

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neonatal-Perinatal Medicine (Fellowship Program)

Publications

PUBLICATIONS

- **Pallister-Killian Syndrome.** *NeoReviews*
Chitkara, R., Chock, V., Barth, R., Dahmouch, H., Smith, C., Matalon, D. R., Herring, M., Hintz, S.
2024; 25 (11): e751-e756
- **Prenatal Diagnosis and Postnatal Management of a Fetal Pericardial Mass.** *NeoReviews*
Weigel, N., Hintz, S., Kaplinski, M., Barth, R., Balakrishnan, K., Panelli, D., Ma, M., Chitkara, R.
2023; 24 (10): e683-e689
- **In Situ Simulation and Clinical Outcomes in Infants Born Preterm.** *The Journal of pediatrics*
Chitkara, R., Bennett, M., Bohnert, J., Yamada, N., Fuerch, J., Halamek, L. P., Quinn, J., Padua, K., Gould, J., Profit, J., Xu, X., Lee, H. C.
2023: 113715
- **Neonatal Healthcare Professionals' Experiences When Implementing a Simulation and Debriefing Program in Neonatal Intensive Care Settings: A Qualitative Analysis.** *Advances in neonatal care : official journal of the National Association of Neonatal Nurses*
Quinn, J., Quinn, M., Lieu, B., Bohnert, J., Halamek, L. P., Profit, J., Fuerch, J. H., Chitkara, R., Yamada, N. K., Gould, J., Lee, H. C.
2023
- **Heterogeneity of Treatment Effects of Hydrocortisone by Risk of Bronchopulmonary Dysplasia or Death Among Extremely Preterm Infants in the National Institute of Child Health and Human Development Neonatal Research Network Trial: A Secondary Analysis of a Randomized Clinical Trial.** *JAMA network open*
Gentle, S. J., Rysavy, M. A., Li, L., Laughon, M. M., Patel, R. M., Jensen, E. A., Hintz, S., Ambalavanan, N., Carlo, W. A., Watterberg, K.
2023; 6 (5): e2315315
- **Spinal Muscular Atrophy Type 1: Fetal Diagnosis, Prenatal Coordination, and Postnatal Management in the Era of Novel Therapies.** *NeoReviews*
Chitkara, R., Chock, V., Davis, A., Rocha, C. T., Day, J. W., Fluharty, B., Hintz, S.
2022; 23 (7): e520-e526
- **Hydrocortisone to Improve Survival without Bronchopulmonary Dysplasia.** *The New England journal of medicine*
Watterberg, K. L., Walsh, M. C., Li, L., Chawla, S., D'Angio, C. T., Goldberg, R. N., Hintz, S. R., Laughon, M. M., Yoder, B. A., Kennedy, K. A., McDavid, G. E., Backstrom-Lacy, C., Das, et al
2022; 386 (12): 1121-1131
- **Lessons Learned from a Collaborative to Develop a Sustainable Simulation-Based Training Program in Neonatal Resuscitation: Simulating Success.** *Children (Basel, Switzerland)*
Arul, N. n., Ahmad, I. n., Hamilton, J. n., Sey, R. n., Tillson, P. n., Hutson, S. n., Narang, R. n., Norgaard, J. n., Lee, H. C., Bergin, J. n., Quinn, J. n., Halamek, L. P., Yamada, et al
2021; 8 (1)
- **A Neonatal Intensive Care Unit's Experience with Implementing an In-Situ Simulation and Debriefing Patient Safety Program in the Setting of a Quality Improvement Collaborative.** *Children (Basel, Switzerland)*
Eckels, M. n., Zeilinger, T. n., Lee, H. C., Bergin, J. n., Halamek, L. P., Yamada, N. n., Fuerch, J. n., Chitkara, R. n., Quinn, J. n.
2020; 7 (11)
- **Liver Failure and Rash in a 6-week-old Girl** *PEDIATRICS IN REVIEW*

- Mediratta, R., Schwenk, H., Rao, A., Chitkara, R.
2018; 39 (6): 315–U22
- **Prediction of neonatal respiratory distress in pregnancies complicated by fetal lung masses.** *Prenatal diagnosis*
Girsan, A. I., Hintz, S. R., Sammour, R., Naqvi, A., El-Sayed, Y. Y., Sherwin, K., Davis, A. S., Chock, V. Y., Barth, R. A., Rubesova, E., Sylvester, K. G., Chitkara, R., Blumenfeld, et al
2017
 - **Using simulation to study difficult clinical issues: prenatal counseling at the threshold of viability across american and dutch cultures.** *Simulation in healthcare*
Geurtzen, R., Hogeveen, M., Rajani, A. K., Chitkara, R., Antonius, T., Van Heijst, A., Draaisma, J., Halamek, L. P.
2014; 9 (3): 167-173
 - **The accuracy of human senses in the detection of neonatal heart rate during standardized simulated resuscitation: implications for delivery of care, training and technology design.** *Resuscitation*
Chitkara, R., Rajani, A. K., Oehlert, J. W., Lee, H. C., Epi, M. S., Halamek, L. P.
2013; 84 (3): 369-372
 - **Comparing the utility of a novel neonatal resuscitation cart with a generic code cart using simulation: a randomised, controlled, crossover trial** *BMJ QUALITY & SAFETY*
Chitkara, R., Rajani, A. K., Lee, H. C., Hansen, S. F., Halamek, L. P.
2013; 22 (2): 124-129
 - **Newborn with prenatally diagnosed choroidal fissure cyst and panhypopituitarism and review of the literature.** *AJP reports*
Chitkara, R., Rajani, A., Bernstein, J., Shah, S., Hahn, J. S., Barnes, P., Hintz, S. R.
2011; 1 (2): 111-114
 - **Comparison of Umbilical Venous and Intraosseous Access During Simulated Neonatal Resuscitation** *PEDIATRICS*
Rajani, A. K., Chitkara, R., Oehlert, J., Halamek, L. P.
2011; 128 (4): E954-E958
 - **A National Survey of Pediatric Residents and Delivery Room Training Experience** *JOURNAL OF PEDIATRICS*
Lee, H. C., Chitkara, R., Halamek, L. P., Hintz, S. R.
2010; 157 (1): 158-U211
 - **A National Survey of Pediatric Residents and Delivery Room Training Experience** *Journal of Pediatrics*
Lee, H., Chitkara R, Halamek LP, Hintz SR
2010; 157 (1): 158-161
 - **Delivery Room Management of the Newborn** *PEDIATRIC CLINICS OF NORTH AMERICA*
Rajani, A. K., Chitkara, R., Halamek, L. P.
2009; 56 (3): 515-?
 - **Pediatric Resident Attendance at Deliveries** *Journal of Investigative Medicine*
Chitkara R, Lee HC, Hintz SR
2009; 57 (1): 504
 - **Visual Diagnosis: Prenatally Diagnosed Abdominal Cystic Mass** *Neoreviews* 2007 8: e554
Chitkara R, Lee HC
2007; 8: e554

PRESENTATIONS

- Using Simulation to Answer Clinically Important Questions - International Meeting on Simulation in Healthcare (IMSH) (1/2014)
- The Accuracy of Human Senses in the Detection of Neonatal Heart Rate during Standardized Simulated Resuscitation - International Pediatric Simulation Symposia and Workshops (IPSSW) (4/2013)
- Comparing the Utility of a Novel Neonatal Resuscitation Cart with a Generic Code Cart using Simulation - International Pediatric Simulation Symposia and Workshops (IPSSW) (4/2013)
- NRP 2010 Guidelines - MCCPOP (Mid-Coastal California Perinatal Outreach Program) (1/2011)

- Pediatric Resident Attendance at Deliveries - WSPR/WSMRF (1/2009)
- Newborn with Prenatally Diagnosed Choroidal Fissure Cyst, Panhypopituitarism - WSPR/WSMRF (1/2010)