

# Stanford

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## Sonia Bonifacio

Clinical Professor, Pediatrics - Neonatal and Developmental Medicine

### CLINICAL OFFICE (PRIMARY)

- **Neonatology**

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### Bio

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#### CLINICAL FOCUS

- Neonatal-Perinatal Medicine

#### ACADEMIC APPOINTMENTS

- Clinical Professor, Pediatrics - Neonatal and Developmental Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)

#### PROFESSIONAL EDUCATION

- Board Certification: Neonatal-Perinatal Medicine, American Board of Pediatrics (2010)
- Fellowship: Univ of California San Francisco, School of Medicine (2009) CA United States of America
- Board Certification: Pediatrics, American Board of Pediatrics (2006)
- Residency: Univ of California San Francisco, School of Medicine (2006) CA United States of America
- Internship: Univ of California San Francisco, School of Medicine (2004) CA United States of America
- Medical Education: University of California at San Francisco School of Medicine (2003) CA

### Research & Scholarship

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#### CLINICAL TRIALS

- TIME Study: Therapeutic Hypothermia for Infants With Mild Encephalopathy, Not Recruiting

### Publications

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#### PUBLICATIONS

- **Relationship of Neonatal Seizure Burden Prior to Treatment and Response to Initial Anti-Seizure Medication.** *The Journal of pediatrics*  
Numis, A. L., Glass, H. C., Comstock, B. A., Gonzalez, F., Maitre, N. L., Massey, S. L., Mayock, D. E., Mietzsch, U., Natarajan, N., Sokol, G. M., Bonifacio, S., Van Meurs, K., Thomas, et al  
2024: 113957

- **Acute kidney injury in neonates with hypoxic ischemic encephalopathy based on serum creatinine decline compared to KDIGO criteria.** *Pediatric nephrology (Berlin, Germany)*  
Ahn, H. C., Frymoyer, A., Boothroyd, D. B., Bonifacio, S., Sutherland, S. M., Chock, V. Y.  
2024
- **Neuroprotective therapies in the NICU in preterm infants: present and future (Neonatal Neurocritical Care Series).** *Pediatric research*  
Molloy, E. J., El-Dib, M., Soul, J., Juul, S., Gunn, A. J., Bender, M., Gonzalez, F., Bearer, C., Wu, Y., Robertson, N. J., Cotton, M., Branagan, A., Hurley, et al  
2023
- **Evolution of the Sarnat exam and association with 2-year outcomes in infants with moderate or severe hypoxic-ischaemic encephalopathy: a secondary analysis of the HEAL Trial.** *Archives of disease in childhood. Fetal and neonatal edition*  
Mietzsch, U., Kolnik, S. E., Wood, T. R., Natarajan, N., Gonzalez, F. F., Glass, H., Mayock, D. E., Bonifacio, S. L., Van Meurs, K., Comstock, B. A., Heagerty, P. J., Wu, T. W., Wu, et al  
2023
- **Evolution of the Sarnat exam and association with 2-year outcomes in infants with moderate or severe hypoxic-ischaemic encephalopathy: a secondary analysis of the HEAL Trial** *ARCHIVES OF DISEASE IN CHILDHOOD-FETAL AND NEONATAL EDITION*  
Mietzsch, U., Kolnik, S. E., Wood, T., Natarajan, N., Gonzalez, F. F., Glass, H., Mayock, D. E., Bonifacio, S. L., Van Meurs, K., Comstock, B. A., Heagerty, P. J., Wu, T., Wu, et al  
2023
- **Scalp Swelling, a Proxy for "Birth Trauma," Is Not Associated With Neonatal Brain Injury.** *Neurology*  
Bonifacio, S. L., de Vries, L. S.  
2023
- **Association of EEG Background and Neurodevelopmental Outcome in Neonates With Hypoxic-Ischemic Encephalopathy Receiving Hypothermia.** *Neurology*  
Glass, H. C., Numis, A. L., Comstock, B. A., Gonzalez, F. F., Mietzsch, U., Bonifacio, S. L., Massey, S., Thomas, C., Natarajan, N., Mayock, D. E., Sokol, G. M., Van Meurs, K. P., Ahmad, et al  
2023
- **Neonatal encephalopathy and hypoxic-ischemic encephalopathy: moving from controversy to consensus definitions and subclassification.** *Pediatric research*  
Molloy, E. J., Branagan, A., Hurley, T., Quirke, F., Devane, D., Taneri, P. E., El-Dib, M., Bloomfield, F. H., Maeso, B., Pilon, B., Bonifacio, S. L., Wusthoff, C. J., Chalak, et al  
2023
- **Association of Primary Language with Very Low Birthweight Outcomes in Hispanic Infants in California.** *The Journal of pediatrics*  
Feister, J., Kan, P., Bonifacio, S. L., Profit, J., Lee, H. C.  
2023: 113527
- **Early Discontinuation of Phenobarbital After Acute Symptomatic Neonatal Seizures in the Term Newborn.** *Neurology. Clinical practice*  
Carrasco, M., Bonifacio, S. L., deVeber, G., Chau, V.  
2023; 13 (2): e200125
- **Neuromonitoring in neonatal critical care part I: neonatal encephalopathy and neonates with possible seizures.** *Pediatric research*  
El-Dib, M., Abend, N. S., Austin, T., Boylan, G., Chock, V., Cilio, M. R., Greisen, G., Hellström-Westas, L., Lemmers, P., Pellicer, A., Pressler, R. M., Sansevere, A., Tsuchida, et al  
2022
- **Risk of seizures in neonates with hypoxic-ischemic encephalopathy receiving hypothermia plus erythropoietin or placebo.** *Pediatric research*  
Glass, H. C., Wusthoff, C. J., Comstock, B. A., Numis, A. L., Gonzalez, F. F., Maitre, N., Massey, S. L., Mayock, D. E., Mietzsch, U., Natarajan, N., Sokol, G. M., Bonifacio, S. L., Van Meurs, et al  
2022
- **Neuromonitoring in neonatal critical care part II: extremely premature infants and critically ill neonates.** *Pediatric research*  
El-Dib, M., Abend, N. S., Austin, T., Boylan, G., Chock, V., Cilio, M. R., Greisen, G., Hellstrom-Westas, L., Lemmers, P., Pellicer, A., Pressler, R. M., Sansevere, A., Szakmar, et al  
2022
- **Neuroprotective therapies in the NICU in term infants: present and future.** *Pediatric research*

- Molloy, E. J., El-Dib, M., Juul, S. E., Benders, M., Gonzalez, F., Bearer, C., Wu, Y. W., Robertson, N. J., Hurley, T., Branagan, A., Michael Cotten, C., Tan, S., Laptook, et al  
2022
- **Altered biventricular function in neonatal hypoxic-ischaemic encephalopathy: a case-control echocardiographic study.** *Cardiology in the young*  
Altit, G., Bonifacio, S. L., Guimaraes, C. V., Sivakumar, G., Yan, B., Chock, V., Van Meurs, K., Bhombal, S.  
2022: 1-10
  - **Trial of Erythropoietin for Hypoxic-Ischemic Encephalopathy in Newborns.** *The New England journal of medicine*  
Wu, Y. W., Comstock, B. A., Gonzalez, F. F., Mayock, D. E., Goodman, A. M., Maitre, N. L., Chang, T., Van Meurs, K. P., Lampland, A. L., Bendel-Stenzel, E., Mathur, A. M., Wu, T., Riley, et al  
2022; 387 (2): 148-159
  - **Neuroprotection for hypoxic-ischemic encephalopathy: Contributions from the neonatal research network.** *Seminars in perinatology*  
Bonifacio, S. L., Chalak, L. F., Van Meurs, K. P., Laptook, A. R., Shankaran, S.  
2022: 151639
  - **Continuous EEG monitoring still recommended for neonatal seizure management: commentary on NEST trial.** *Pediatric research*  
Soul, J. S., Glass, H. C., Mohammad, K., Ment, L. R., Smyser, C. D., Bonifacio, S. L., Massaro, A. N., El-Dib, M.  
2022
  - **Association between multi-organ dysfunction and adverse outcome in infants with hypoxic ischemic encephalopathy.** *Journal of perinatology : official journal of the California Perinatal Association*  
Yan, E. S., Chock, V. Y., Bonifacio, S. L., Dahlen, A., Guimaraes, C. V., Altit, G., Bhombal, S., Van Meurs, K.  
2022
  - **Hypoxic ischemic encephalopathy: Do peripartum risk factors account for observed changes in incidence?**  
Minor, K. C., Liu, J., El-Sayed, Y. Y., Druzin, M. L., Profit, J., Hintz, S., Bonifacio, S., Karakash, S.  
MOSBY-ELSEVIER.2022: S210
  - **Perinatal infection, inflammation, preterm birth, and brain injury: A review with proposals for future investigations.** *Experimental neurology*  
Reiss, J. D., Peterson, L. S., Nesamoney, S. N., Chang, A. L., Pasca, A. M., Mari#, I., Shaw, G. M., Gaudilliere, B., Wong, R. J., Sylvester, K. G., Bonifacio, S. L., Aghaeepour, N., Gibbs, et al  
2022: 113988
  - **Does magnesium sulfate for hypertensive disease reduce the risk of neonatal hypoxic ischemic encephalopathy?**  
Minor, K. C., Liu, J., El-Sayed, Y. Y., Druzin, M. L., Profit, J., Hintz, S., Bonifacio, S., Leonard, S. A., Karakash, S.  
MOSBY-ELSEVIER.2022: S526
  - **Neonatal Seizures: Challenges and the Road Ahead.** *Pediatric neurology*  
Chau, V., Bonifacio, S. L., Wintermark, P., Newborn Brain Society Guidelines and Publications Committee  
1800
  - **Standardized Evaluation of Cord Gases in Neonates at Risk for Hypoxic Ischemic Encephalopathy.** *Hospital pediatrics*  
Blecharczyk, E., Lee, L., Birnie, K., Gupta, A., Davis, A., Van Meurs, K., Bonifacio, S., Frymoyer, A.  
2021
  - **Characteristics of Neonates with Cardiopulmonary Disease Who Experience Seizures: A Multi-Center Study.** *The Journal of pediatrics*  
Massey, S. L., Glass, H. C., Shellhaas, R. A., Bonifacio, S., Chang, T., Chu, C., Cilio, M. R., Lemmon, M. E., McCulloch, C. E., Soul, J. S., Thomas, C., Wusthoff, C. J., Xiao, et al  
2021
  - **Neuroimaging in the term newborn with neonatal encephalopathy.** *Seminars in fetal & neonatal medicine*  
Wisnowski, J. L., Wintermark, P., Bonifacio, S. L., Smyser, C. D., Barkovich, A. J., Edwards, A. D., de Vries, L. S., Inder, T. E., Chau, V., Newborn Brain Society Guidelines and Publications Committee  
2021: 101304
  - **Proposing a care practice bundle for neonatal encephalopathy during therapeutic hypothermia.** *Seminars in fetal & neonatal medicine*  
Wintermark, P., Mohammad, K., Bonifacio, S. L., Newborn Brain Society Guidelines and Publications Committee. Electronic address: publications@newbornbrainsociety.org,  
2021: 101303

- **Cardiac Dysfunction in Neonatal HIE Is Associated with Increased Mortality and Brain Injury by MRI.** *American journal of perinatology*  
Altit, G., Bonifacio, S. L., Guimaraes, C. V., Bhombal, S., Sivakumar, G., Yan, B., Chock, V., Meurs, K. V.  
2021
- **The Term Newborn: Evaluation for Hypoxic-Ischemic Encephalopathy.** *Clinics in perinatology*  
Bonifacio, S. L., Hutson, S.  
2021; 48 (3): 681-695
- **Unanswered questions in neonates with NE.** *Seminars in fetal & neonatal medicine*  
Wintermark, P., El Dib, M., Bonifacio, S. L., Newborn Brain Society Guidelines and Publications Committee  
2021: 101260
- **Issues in the daily management of neonates with NE.** *Seminars in fetal & neonatal medicine*  
Wintermark, P., El Dib, M., Bonifacio, S. L., Newborn Brain Society Guidelines and Publications Committee  
2021: 101255
- **Unanswered questions regarding therapeutic hypothermia for neonates with neonatal encephalopathy.** *Seminars in fetal & neonatal medicine*  
Sabir, H., Bonifacio, S. L., Gunn, A. J., Thoresen, M., Chalak, L. F., Newborn Brain Society Guidelines and Publications Committee  
2021: 101257
- **Seizure Control in Neonates Undergoing Screening vs Confirmatory EEG Monitoring.** *Neurology*  
Wusthoff, C. J., Sundaram, V., Abend, N. S., Massey, S. L., Lemmon, M. E., Thomas, C., McCulloch, C. E., Chang, T., Soul, J. S., Chu, C. J., Rogers, E. E., Bonifacio, S. L., Cilio, et al  
2021
- **Outcomes of infants with hypoxic ischemic encephalopathy and persistent pulmonary hypertension of the newborn: results from three NICHD studies.** *Journal of perinatology : official journal of the California Perinatal Association*  
Agarwal, P., Shankaran, S., Lupton, A. R., Chowdhury, D., Lakshminrusimha, S., Bonifacio, S. L., Natarajan, G., Chawla, S., Keszler, M., Heyne, R. J., Ambalavanan, N., Walsh, M. C., Das, et al  
2021
- **Early MRI Predicts 30-Month Outcomes After Therapeutic Hypothermia for Neonatal Encephalopathy.** *The Journal of pediatrics*  
Bach, A. M., Fang, A. Y., Bonifacio, S., Rogers, E. E., Scheffler, A., Partridge, J. C., Xu, D., Barkovich, A. J., Ferriero, D. M., Glass, H. C., Gano, D.  
2021
- **Seizure Severity and Treatment Response in Newborn Infants with Seizures Attributed to Intracranial Hemorrhage.** *The Journal of pediatrics*  
Herzberg, E. M., Machie, M., Glass, H. C., Shellhaas, R. A., Wusthoff, C. J., Chang, T., Abend, N. S., Chu, C. J., Cilio, M. R., Bonifacio, S. L., Massey, S. L., McCulloch, C. E., Soul, et al  
2021
- **Associations between Infant and Parent Characteristics and Measures of Family Well-Being in Neonates with Seizures: A Cohort Study.** *The Journal of pediatrics*  
Franck, L. S., Shellhaas, R. A., Lemmon, M. n., Sturza, J. n., Soul, J. S., Chang, T. n., Wusthoff, C. J., Chu, C. J., Massey, S. L., Abend, N. S., Thomas, C. n., Rogers, E. E., McCulloch, et al  
2020; 221: 64–71.e4
- **Management of Multi Organ Dysfunction in Neonatal Encephalopathy.** *Frontiers in pediatrics*  
O'Dea, M., Sweetman, D., Bonifacio, S. L., El-Dib, M., Austin, T., Molloy, E. J.  
2020; 8: 239
- **Characterization of Death in Infants With Neonatal Seizures.** *Pediatric neurology*  
Lemmon, M. E., Bonifacio, S. L., Shellhaas, R. A., Wusthoff, C. J., Greenberg, R. G., Soul, J. S., Chang, T. n., Chu, C. J., Bates, S. n., Massey, S. L., Abend, N. S., Cilio, M. R., Glass, et al  
2020; 113: 21–25
- **Neonatal Neurocritical Care: Providing Brain-Focused Care for All at Risk Neonates.** *Seminars in pediatric neurology*  
Bonifacio, S. L., Van Meurs, K.  
2019; 32: 100774
- **Differences in patient characteristics and care practices between two trials of therapeutic hypothermia** *PEDIATRIC RESEARCH*  
Bonifacio, S. L., McDonald, S. A., Chock, V. Y., Wusthoff, C. J., Hintz, S. R., Lupton, A. R., Shankara, S., Van Meurs, K. P.

2019; 85 (7): 1008–15

- **Differences in patient characteristics and care practices between two trials of therapeutic hypothermia.** *Pediatric research*  
Bonifacio, S. L., McDonald, S. A., Chock, V. Y., Wusthoff, C. J., Hintz, S. R., Laptook, A. R., Shankara, S., Van Meurs, K. P.  
2019
- **Response to antiseizure medications in neonates with acute symptomatic seizures** *EPILEPSIA*  
Glass, H. C., Soul, J. S., Chu, C. J., Massey, S. L., Wusthoff, C. J., Chang, T., Cilio, M., Bonifacio, S. L., Abend, N. S., Thomas, C., Lemmon, M., McCulloch, C. E., Shellhaas, et al  
2019; 60 (3): E20–E24
- **Response to antiseizure medications in neonates with acute symptomatic seizures.** *Epilepsia*  
Glass, H. C., Soul, J. S., Chu, C. J., Massey, S. L., Wusthoff, C. J., Chang, T., Cilio, M. R., Bonifacio, S. L., Abend, N. S., Thomas, C., Lemmon, M., McCulloch, C. E., Shellhaas, et al  
2019
- **Toward the elimination of bias in Pediatric Research.** *Pediatric research*  
Bearer, C. n., Agostoni, C. n., Anand, K. J., Ambalavanan, N. n., Bhandari, V. n., Bliss, J. M., Bloomfield, F. n., Bonifacio, S. L., Buhimschi, I. n., Cilio, M. R., Coppes, M. n., Czinn, S. J., El-Khuffash, et al  
2019
- **Development of a NeuroNICU with a Broader Focus on All Newborns at Risk of Brain Injury: The First 2 Years** *AMERICAN JOURNAL OF PERINATOLOGY*  
Van Meurs, K. P., Yan, E. S., Randall, K. S., Chock, V. Y., Davis, A. S., Glennon, C. S., Clark, C. L., Wusthoff, C. J., Bonifacio, S. L.  
2018; 35 (12): 1197–1205
- **Pulmonary Hypertension Associated with Hypoxic-Ischemic Encephalopathy-Antecedent Characteristics and Comorbidities** *JOURNAL OF PEDIATRICS*  
Lakshminrusimha, S., Shankaran, S., Laptook, A., McDonald, S., Keszler, M., Van Meurs, K., Guillet, R., Chawla, S., Sood, B. G., Bonifacio, S., Das, A., Higgins, R. D.  
2018; 196: 45-+
- **Development of a NeuroNICU with a Broader Focus on All Newborns at Risk of Brain Injury: The First 2 Years.** *American journal of perinatology*  
Van Meurs, K. P., Yan, E. S., Randall, K. S., Chock, V. Y., Davis, A. S., Glennon, C. S., Clark, C. L., Wusthoff, C. J., Bonifacio, S. L.  
2018
- **Seizures in Preterm Neonates: A Multicenter Observational Cohort Study.** *Pediatric neurology*  
Glass, H. C., Shellhaas, R. A., Tsuchida, T. N., Chang, T., Wusthoff, C. J., Chu, C. J., Cilio, M. R., Bonifacio, S. L., Massey, S. L., Abend, N. S., Soul, J. S.  
2017
- **Brain-focused care in the neonatal intensive care unit: the time has come.** *Jornal de pediatria*  
Van Meurs, K. P., Bonifacio, S. L.  
2017
- **Characterization of Death in Neonatal Encephalopathy in the Hypothermia Era.** *Journal of child neurology*  
Lemmon, M. E., Boss, R. D., Bonifacio, S. L., Foster-Barber, A., Barkovich, A. J., Glass, H. C.  
2017; 32 (4): 360-365
- **Treatment Duration After Acute Symptomatic Seizures in Neonates: A Multicenter Cohort Study.** *journal of pediatrics*  
Shellhaas, R., Chang, T., Wusthoff, C., Soul, J., Massey, S., Chu, C., Cilio, M. R., Bonifacio, S., Abend, N., Tsuchida, T., Glass, H.  
2017; 181: 298-301 e1
- **Decreased Morphine Clearance in Neonates With Hypoxic Ischemic Encephalopathy Receiving Hypothermia** *JOURNAL OF CLINICAL PHARMACOLOGY*  
Frymoyer, A., Bonifacio, S. L., Drover, D. R., Su, F., Wustoff, C. J., Van Meurs, K. P.  
2017; 57 (1): 64-76
- **Contemporary Profile of Seizures in Neonates: A Prospective Cohort Study** *JOURNAL OF PEDIATRICS*  
Glass, H. C., Shellhaas, R. A., Wusthoff, C. J., Chang, T., Abend, N. S., Chu, C. J., Cilio, M. R., Glidden, D. V., Bonifacio, S. L., Massey, S., Tsuchida, T. N., Silverstein, F. S., Soul, et al  
2016; 174: 98-?
- **High-Dose Erythropoietin and Hypothermia for Hypoxic-Ischemic Encephalopathy: A Phase II Trial** *PEDIATRICS*

Wu, Y. W., Mathur, A. M., Chang, T., McKinstry, R. C., Mulkey, S. B., Mayock, D. E., Van Meurs, K. P., Rogers, E. E., Gonzalez, F. F., Comstock, B. A., Juul, S. E., Msall, M. E., Bonifacio, et al  
2016; 137 (6)

- **The Neurointensive Care Nursery and Evolving Roles for Nursing** *NEONATAL NETWORK*  
Peloquin, S., Carley, A., Bonifacio, S. L., Glass, H. C.  
2016; 35 (2): 87-94
- **Predictive Performance of a Gentamicin Population Pharmacokinetic Model in Neonates Receiving Full-Body Hypothermia** *THERAPEUTIC DRUG MONITORING*  
Sampson, M. R., Frymoyer, A., Rattray, B., Cotten, C. M., Smith, P. B., Capparelli, E., Bonifacio, S. L., Cohen-Wolkowicz, M.  
2014; 36 (5): 584-589
- **Predictive performance of a gentamicin population pharmacokinetic model in neonates receiving full-body hypothermia.** *Therapeutic drug monitoring*  
Sampson, M. R., Frymoyer, A., Rattray, B., Cotten, C. M., Smith, P. B., Capparelli, E., Bonifacio, S. L., Cohen-Wolkowicz, M.  
2014; 36 (5): 584-589
- **Risk factors for EEG seizures in neonates treated with hypothermia: A multicenter cohort study.** *Neurology*  
Glass, H. C., Wusthoff, C. J., Shellhaas, R. A., Tsuchida, T. N., Bonifacio, S. L., Cordeiro, M., Sullivan, J., Abend, N. S., Chang, T.  
2014; 82 (14): 1239-1244
- **Every 36-h gentamicin dosing in neonates with hypoxic-ischemic encephalopathy receiving hypothermia.** *Journal of perinatology*  
Frymoyer, A., Lee, S., Bonifacio, S. L., Meng, L., LUCAS, S. S., Guglielmo, B. J., Sun, Y., Verotta, D.  
2013; 33 (10): 778-782
- **Gentamicin pharmacokinetics and dosing in neonates with hypoxic ischemic encephalopathy receiving hypothermia.** *Pharmacotherapy*  
Frymoyer, A., Meng, L., Bonifacio, S. L., Verotta, D., Guglielmo, B. J.  
2013; 33 (7): 718-726