



Matthew Strehlow

Associate Professor of Emergency Medicine at the Stanford University Medical Center

 Curriculum Vitae available Online

CLINICAL OFFICES

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Bio

BIO

Dr. Matthew Strehlow is an Associate Professor of Emergency Medicine. He received his doctorate from the University of Washington and completed his emergency medicine residency in the Stanford Kaiser Emergency Medicine Residency Program. Following completion of the Global EM Fellowship at Stanford, he stayed on as faculty with a focus on global health. Currently, Dr. Strehlow serves as Vice Chair of the Department of Emergency Medicine along with his roles as Director of Stanford Emergency Medicine International (SEMI) and as Director SEMI's International EM Fellowship. As a Fellow at the Center for Innovation in Global Health and as an advisor to Stanford's Digital Medic initiative, he works across the campus to help advance the University's mission of improving health and education worldwide. Dr. Strehlow is a recognized educator both nationally and internationally focusing on emergency care in developing countries, cardiology, and critical care. His research focuses on the epidemiology of emergencies in developing countries, emergency referral systems, and the intersection of emergency care systems and gender based violence.

CLINICAL FOCUS

- Emergency Medicine

ACADEMIC APPOINTMENTS

- Associate Professor - Med Center Line, Emergency Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Vice Chair, Emergency Medicine, (2016- present)
- Director, Stanford Emergency Medicine International Fellowship, (2015- present)
- Director., Stanford Emergency Medicine International, (2015- present)
- Fellow, Centers for Innovation in Global Health, (2015- present)

HONORS AND AWARDS

- Special Contributions to Emergency Medicine, King Saud University (2014)

- Fellow, American College of Emergency Physicians (2011)
- Lantern Award for exceptional and innovative performance by ED staff, National Emergency Nurses Association (2011)
- Team Award International for development of of 1st prehospital EMS service Nepal, California Emergency Medical Services (2011)
- Fellow, Stanford University Faculty Fellows Program (2010)
- Malinda S. Mitchell Award for Service Quality, Stanford Hospital (2009)
- Annual Resident Bedside Teaching Award, Stanford-Kaiser Emergency Medicine Residency (2007)
- Annual Resident Bedside Teaching Award, Stanford-Kaiser Emergency Medicine Residency (2006)
- Rising Star: Speaker Award, American College of Emergency Physicians (2006)
- Outstanding Contributions in International Medical Education, Egyptian Ministry of Health (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board Member, Global Emergency Medicine Academy, SAEM (2018 - present)
- Member, American College of Emergency Physicians Education Committee (2016 - present)
- Fellow, American College of Emergency Physicians (2010 - present)
- Fellow, American Academy of Emergency Medicine (2005 - present)
- Member, Society of Academic Emergency Medicine (2005 - present)

PROFESSIONAL EDUCATION

- Fellow, Stanford Emergency Medicine , Global Emergency Medicine (2006)
- Internship: Stanford University Medical Center (2003) CA
- Residency: Stanford University Medical Center (2005) CA
- Board Certification: Emergency Medicine, American Board of Emergency Medicine (2006)
- Medical Education: University of Washington School of Medicine (2002) WA
- MD, University of Washington , Medicine (2002)
- Bachelor of Science, Pacific Lutheran University , Biochemistry (1996)

COMMUNITY AND INTERNATIONAL WORK

- Online Medical Research, India
- Pre-Service Education in Emergency Medicine, Cambodia
- Myanmar Emergency Medicine Training Program, Myanmar
- Quality Health Services, Cambodia
- Post-Graduate Program in Emergency Care, India

LINKS

- Stanford Emergency Medicine International: <http://emed.stanford.edu/education/international.html>
- Stanford GVK EMRI Partnership: <http://www.emri.in/>
- Stanford URC Quality Health Services Cambodia: <http://www.urc-chs.com/news/urc-lead-quality-health-services-project-cambodia-continue-improving-systems-maternal-and>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research interests center around the development and delivery of emergency care in Low- and Middle-Income-Countries (LMICs), specifically the epidemiology of emergencies and referral systems in these nations. For example, up to 40% of ambulance runs in India are for obstetric emergencies. By improving our understanding of how medical and traumatic emergencies vary in these unique and diverse settings as compared to High-Income-Countries, nations and development agencies will be better equipped to advocate for emergency care and optimize the allocation of scarce healthcare resources. The foundation of my research efforts has been as part of Stanford Emergency Medicine International's (SEMI's) work developing, launching, and researching India's prehospital care system from the ground up. In 2007, our Indian partner, GVK EMRI, introduced EMS service in a single city. A decade later, this service is now the largest provider of prehospital and interfacility emergency care in the world, serving over 750 million people. Our pivotal role in this expansive venture has been many-fold: 1.) development of their educational programs and operational care manuals, 2.) training of care providers and faculty on best practices, and 3.) cultivation and guidance of their research program. We have built a team of research assistants across seven states in India that conduct prospective epidemiology and quality assurance research on prehospital care in India. Much of this prospective work is just now coming to fruition with studies on cardiovascular, vehicular and non-vehicular trauma, burns, pediatric respiratory illness, seizures, stroke, and maternal care being in various stages of data analysis and manuscript development. We also are parsing through retrospective data from this system, concluding an analysis of over 1 million pediatric prehospital emergency transports.

My experiences strengthening referral systems in a variety of countries across the globe has afforded me the opportunity to work on a Lancet-commissioned paper assessing gaps in maternal care. We found that emergency referral systems are underdeveloped and understudied. In the past two years, our group has launched a number of efforts looking at the referral systems for obstetric and neonatal patients throughout India. Additionally, we are working with the Stanford Geospatial Center to analyze our pediatric data set for referral patterns and to calculate the rates of bypassing, the common practice of selectively moving past a facility with the appropriate care designation to arrive at a facility that lies a further distance away. Similar work in Southeast Asia has resulted in a recently completed analysis of referral system interventions in Cambodia; this work has been preliminarily accepted and is in the revisions stage.

Due to limited resources and infrastructure, investments in emergency care systems are being leveraged in unique ways in LMICs. States in India have launched 911-like systems for women in distress using the currently existing emergency call center platforms. Our prior work published in the Bulletin of the WHO analyzing the impact of these women's emergency helplines in the State of Gujarat, helped support the expansion of this program nationwide. As part of our ongoing efforts, the past two summers SEMI has sent research teams to two states in India to conduct in-depth interviews with women utilizing the service as a means to better understand the outcomes and risks to callers.

Moving forward I aim to further advance our understanding of formal and informal emergency referral systems in LMICs and to better understand how emergency care resources can be leveraged to combat gender-based violence in South Asia.

CLINICAL TRIALS

- Reevaluation Of Systemic Early Neuromuscular Blockade, Recruiting
- Protocolized Care for Early Septic Shock, Not Recruiting

PROJECTS

- GVK EMRI Prehospital Emergency Care
- Myanmar Post Graduate Education Program in Emergency Medicine - Stanford University (9/1/2015 - present)
- USAID Quality Health Services Cambodia - Stanford University (2/17/2014 - present)

Publications

PUBLICATIONS

- **Telemedicine to Decrease Personal Protective Equipment Use and Protect Healthcare Workers.** *The western journal of emergency medicine*
Ribeira, R., Shen, S., Callagy, P., Newberry, J., Strehlow, M., Quinn, J.
2020
- **Continuing Education for Prehospital Healthcare Providers in India - A Novel Course and Concept.** *Open access emergency medicine : OAEM*
Lindquist, B. D., Koval, K. W., Acker, P. C., Bills, C. B., Khan, A., Zachariah, S., Newberry, J. A., Rao, G. V., Mahadevan, S. V., Strehlow, M. C.
2020; 12: 201–10
- **First look at emergency medical technician wellness in India: Application of the Maslach Burnout Inventory in an unstudied population.** *PloS one*
Koval, K. W., Lindquist, B., Gennosa, C., Mahadevan, A., Niknam, K., Patil, S., Rao, G. V., Strehlow, M. C., Newberry, J. A.
2020; 15 (3): e0229954
- **Defining high-risk emergency chief complaints: data-driven triage for low- and middle-income countries.** *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine*
Rice, B., Leanza, J., Mowafi, H., Thadeus Kamara, N., Mulogo, E. M., Bisanzo, M., Nikam, K., Kizza, H., Newberry, J. A., Strehlow, M., Kohn, M.
2020
- **Acute respiratory illness among a prospective cohort of pediatric patients using emergency medical services in India: Demographic and prehospital clinical predictors of mortality.** *PloS one*
Bills, C. B., Newberry, J. A., Rao, G. V., Matheson, L. W., Rao, S., Mahadevan, S. V., Strehlow, M. C.
2020; 15 (4): e0230911
- **Workplace violence among prehospital care providers in India: a cross-sectional study.** *BMJ open*
Lindquist, B., Koval, K., Mahadevan, A., Gennosa, C., Leggio, W., Niknam, K., Rao, G. V., Newberry, J. A., Strehlow, M.
2019; 9 (11): e033404
- **A profile of traumatic injury in the prehospital setting in India: A prospective observational study across seven states.** *Injury*
Newberry, J. A., Bills, C. B., Matheson, L., Zhang, X., Gimkala, A., Ramana Rao, G. V., Janagama, S. R., Mahadevan, S. V., Strehlow, M. C.
2019
- **Timely access to care for patients with critical burns in India: a prehospital prospective observational study** *EMERGENCY MEDICINE JOURNAL*
Newberry, J. A., Bills, C. B., Pirrotta, E. A., Barry, M., Rao, G., Mahadevan, S., Strehlow, M. C.
2019; 36 (3): 176–82
- **Timely access to care for patients with critical burns in India: a prehospital prospective observational study.** *Emergency medicine journal : EMJ*
Newberry, J. A., Bills, C. B., Pirrotta, E. A., Barry, M., Ramana Rao, G. V., Mahadevan, S. V., Strehlow, M. C.
2019
- **Comparing Teaching Methods in Resource-Limited Countries.** *AEM education and training*
Mahadevan, S. V., Walker, R., Kalanzi, J., Stone, L. T., Bills, C., Acker, P., Apfeld, J. C., Newberry, J., Becker, J., Mantha, A., Tecklenburg Strehlow, A. N., Strehlow, M. C.
2018; 2 (3): 238
- **Reducing early infant mortality in India: results of a prospective cohort of pregnant women using emergency medical services** *BMJ OPEN*
Bills, C. B., Newberry, J. A., Darmstadt, G., Pirrotta, E. A., Rao, G., Mahadevan, S. V., Strehlow, M. C.
2018; 8 (4): e019937
- **The scale, scope, coverage, and capability of childbirth care** *LANCET*
Campbell, O. M., Calvert, C., Testa, A., Strehlow, M., Benova, L., Keyes, E., Donnay, F., Macleod, D., Gabrysch, S., Rong, L., Ronsmans, C., Sadruddin, S., Koblinsky, et al
2016; 388 (10056): 2193-2208
- **Using an emergency response infrastructure to help women who experience gender-based violence in Gujarat India** *BULLETIN OF THE WORLD HEALTH ORGANIZATION*
Newberry, J. A., Mahadevan, S., Gohil, N., Jamshed, R., Prajapati, J., Rao, G. V., Strehlow, M.
2016; 94 (5): 388-392

- **Characteristics and outcomes of women using emergency medical services for third-trimester pregnancy-related problems in India: a prospective observational study.** *BMJ open*
Strehlow, M. C., Newberry, J. A., Bills, C. B., Min, H. E., Evensen, A. E., Leeman, L., Pirrotta, E. A., Rao, G. V., Mahadevan, S. V.
2016; 6 (7)
- **Correction to: Epidemiology of patients presenting to a pediatric emergency department in Karachi, Pakistan.** *BMC emergency medicine*
Ijaz, N., Strehlow, M., Wang, N. E., Pirrotta, E., Tariq, A., Mahmood, N., Mahadevan, S.
2020; 20 (1): 66
- **Experiences of Workplace Violence Among Healthcare Providers in Myanmar: A Cross-sectional Survey Study** *CUREUS*
Lindquist, B., Feltes, M., Niknam, K., Koval, K. W., Ohn, H., Newberry, J., Strehlow, M., Walker, R.
2020; 12 (4)
- **Fostering a Diverse Pool of Global Health Academic Leaders Through Mentorship and Career Path Planning.** *AEM education and training*
Newberry, J. A., Patel, S., Kayden, S., O'Laughlin, K. N., Cioe-Pena, E., Strehlow, M. C.
2020; 4 (Suppl 1): S98–S105
- **Medevac Utilization and Patient Characteristics in Rural Alaska 2010 to 2018.** *Air medical journal*
Rice, B., Wood, J., Britton, C., Strehlow, M., Goodwin, S.
2020; 39 (5): 393–98
- **Critical Communication: A Cross-sectional Study of Signout at the Prehospital and Hospital Interface.** *Cureus*
Janagama, S. R., Strehlow, M., Gimkala, A., Rao, G. V., Matheson, L., Mahadevan, S., Newberry, J. A.
2020; 12 (2): e7114
- **Experiences of Workplace Violence Among Healthcare Providers in Myanmar: A Cross-sectional Survey Study.** *Cureus*
Lindquist, B., Feltes, M., Niknam, K., Koval, K. W., Ohn, H., Newberry, J., Strehlow, M., Walker, R.
2020; 12 (4): e7549
- **Epidemiology of patients presenting to a pediatric emergency department in Karachi, Pakistan.** *BMC emergency medicine*
Ijaz, N., Strehlow, M., Ewen Wang, N., Pirrotta, E., Tariq, A., Mahmood, N., Mahadevan, S.
2018; 18 (1): 22
- **Characteristics and outcomes of pediatric patients presenting at Cambodian referral hospitals without appointments: an observational study** *INTERNATIONAL JOURNAL OF EMERGENCY MEDICINE*
Yore, M. A., Strehlow, M. C., Yan, L. D., Pirrotta, E. A., Woods, J. L., Somontha, K., Sovannra, Y., Auerbach, L., Backer, R., Grundmann, C., Mahadevan, S. V.
2018; 11: 17
- **Comparison of online and classroom-based formats for teaching emergency medicine to medical students in Uganda** *AEM Education and Training*
Mahadevan, S., Walker, R., Kalanzi, J., Luggya, T., Bills, C., Acker, P., et al
2018; 2 (1)
- **Comparison of Online and Classroom-based Formats for Teaching Emergency Medicine to Medical Students in Uganda.** *AEM education and training*
Mahadevan, S. V., Walker, R., Kalanzi, J., Stone, L. T., Bills, C., Acker, P., Apfeld, J. C., Newberry, J., Becker, J., Mantha, A., Tecklenburg Strehlow, A. N., Strehlow, M. C.
2018; 2 (1): 5–9
- **Comparison of Live Versus Online Instruction of a Novel Soft Skills Course in Mongolia** *CUREUS*
Mahadevan, A., Strehlow, M. C., Dorjsuren, K., Newberry, J. A.
2017; 9 (11): e1900
- **Preparing for International Travel and Global Medical Care** *EMERGENCY MEDICINE CLINICS OF NORTH AMERICA*
Mahadevan, S. V., Strehlow, M. C.
2017; 35 (2): 465-?
- **Adaptive leadership curriculum for Indian paramedic trainees.** *International journal of emergency medicine*
Mantha, A., Coggins, N. L., Mahadevan, A., Strehlow, R. N., Strehlow, M. C., Mahadevan, S. V.
2016; 9 (1): 9-?
- **One-two-triage: validation and reliability of a novel triage system for low-resource settings.** *Emergency medicine journal*

- Khan, A., Mahadevan, S. V., Dreyfuss, A., Quinn, J., Woods, J., Somontha, K., Strehlow, M.
2016; 33 (10): 709-715
- **Barriers to Real-Time Medical Direction via Cellular Communication for Prehospital Emergency Care Providers in Gujarat, India** *Cureus*
Lindquist, B., Strehlow, M., Rao, G., Newberry, J.
2016
 - **Characteristics and outcomes of women using emergency medical services for third-trimester pregnancy-related problems in India: a prospective observational study.** *BMJ open*
Strehlow, M. C., Newberry, J. A., Bills, C. B., Min, H. E., Evensen, A. E., Leeman, L., Pirrotta, E. A., Rao, G. V., Mahadevan, S. V.
2016; 6 (7): e011459
 - **Implementing an Innovative Prehospital Care Provider Training Course in Nine Cambodian Provinces** *Cureus*
Acker, P. C.
2016; 8 (6)
 - **Barriers to Real-Time Medical Direction via Cellular Communication for Prehospital Emergency Care Providers in Gujarat, India.** *Cureus*
Lindquist, B., Strehlow, M. C., Rao, G. V., Newberry, J. A.
2016; 8 (7)
 - **Implementing an Innovative Prehospital Care Provider Training Course in Nine Cambodian Provinces.** *Cureus*
Acker, P., Newberry, J. A., Hattaway, L. B., Socheat, P., Raingsey, P. P., Strehlow, M. C.
2016; 8 (6)
 - **EPIDEMIOLOGY OF SHORTNESS OF BREATH IN PREHOSPITAL PATIENTS IN ANDHRA PRADESH, INDIA** *JOURNAL OF EMERGENCY MEDICINE*
Mercer, M. P., Mahadevan, S. V., Pirrotta, E., Rao, G. V., Sistla, S., Nampelly, B., Danthala, R., Strehlow, A. N., Strehlow, M. C.
2015; 49 (4): 448-454
 - **Epidemiology of Shortness of Breath in Prehospital Patients in Andhra Pradesh, India.** *journal of emergency medicine*
Mercer, M. P., Mahadevan, S. V., Pirrotta, E., Ramana Rao, G. V., Sistla, S., Nampelly, B., Danthala, R., Strehlow, A. N., Strehlow, M. C.
2015; 49 (4): 448-454
 - **Cerebrospinal fluid and plasma oxytocin concentrations are positively correlated and negatively predict anxiety in children** *MOLECULAR PSYCHIATRY*
Carson, D. S., Berquist, S. W., Trujillo, T. H., Garner, J. P., Hannah, S. L., Hyde, S. A., Sumiyoshi, R. D., Jackson, L. P., MOSS, J. K., Strehlow, M. C., Cheshier, S. H., Partap, S., Hardan, et al
2015; 20 (9): 1085-1090
 - **Sepris: a novel, mobile, online, simulation game that improves sepsis recognition and management.** *Academic medicine*
Evans, K. H., Daines, W., Tsui, J., Strehlow, M., Maggio, P., Shieh, L.
2015; 90 (2): 180-184
 - **An observational study of adults seeking emergency care in Cambodia** *BULLETIN OF THE WORLD HEALTH ORGANIZATION*
Yan, L. D., Mahadevan, S. V., Yore, M., Pirrotta, E. A., Woods, J., Somontha, K., Sovannra, Y., Raman, M., Cornell, E., Grundmann, C., Strehlow, M. C.
2015; 93 (2): 84-92
 - **Sepris: A Novel, Mobile, Online, Simulation Game That Improves Sepsis Recognition and Management** *Academic Medicine*
Evans, K. H., Daines, W. P., Tsui, J., Strehlow, M., Maggio, P., Shieh, L.
2015; Vol. 90, No. 2 (February 2015)
 - **PHYSICIAN IDENTIFICATION AND PATIENT SATISFACTION IN THE EMERGENCY DEPARTMENT: ARE THEY RELATED?** *JOURNAL OF EMERGENCY MEDICINE*
Mercer, M. P., Hernandez-Boussard, T., Mahadevan, S. V., Strehlow, M. C.
2014; 46 (5): 711-718
 - **INDIAN AND UNITED STATES PARAMEDIC STUDENTS: COMPARISON OF EXAMINATION PERFORMANCE FOR THE AMERICAN HEART ASSOCIATION ADVANCED CARDIOVASCULAR LIFE SUPPORT (ACLS) TRAINING** *JOURNAL OF EMERGENCY MEDICINE*
Goodwin, T., Delasobera, B. E., Strehlow, M., Camacho, J., Koskovich, M., D'Souza, P., Gilbert, G., Mahadevan, S. V.
2012; 43 (2): 298-302
 - **National Survey of Preventive Health Services in US Emergency Departments** *Scientific Assembly of the American-College-of-Emergency-Physicians*

Delgado, M. K., Acosta, C. D., Ginde, A. A., Wang, N. E., Strehlow, M. C., Khandwala, Y. S., Camargo, C. A.
MOSBY-ELSEVIER.2011: 104–8

- **Evaluating the efficacy of simulators and multimedia for refreshing ACLS skills in India** *RESUSCITATION*
Delasobera, B. E., Goodwin, T. L., Strehlow, M., Gilbert, G., D'Souza, P., Alok, A., Raje, P., Mahadevan, S. V.
2010; 81 (2): 217-223
- **Early Identification of Shock in Critically Ill Patients** *EMERGENCY MEDICINE CLINICS OF NORTH AMERICA*
Strehlow, M. C.
2010; 28 (1): 57-?
- **A better way to estimate adult patients' weights** *AMERICAN JOURNAL OF EMERGENCY MEDICINE*
Lin, B. W., Yoshida, D., Quinn, J., Strehlow, M.
2009; 27 (9): 1060-1064
- **Internationalizing the Broselow tape: How reliable is weight estimation in Indian children** *Conference of the Western-Society-for-Academic-Emergency-Medicine*
Ramarajan, N., Krishnamoorthi, R., Strehlow, M., Quinn, J., Mahadevan, S. V.
WILEY-BLACKWELL PUBLISHING, INC.2008: 431–36
- **Images in emergency medicine - Diagnosis: Serum sickness-like reaction to amoxicillin** *ANNALS OF EMERGENCY MEDICINE*
Lin, B., Strehlow, M.
2007; 50 (3): 350-?
- **National study of emergency department visits for sepsis, 1992 to 2001** *Scientific Assembly of the American-College-of-Emergency-Physicians*
Strehlow, M. C., Emond, S. D., Shapiro, N. I., Pelletier, A. J., Camargo, C. A.
MOSBY-ELSEVIER.2006: 326–31