

Stanford



Matthew Strehlow

Associate Professor of Emergency Medicine

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 Strategy for 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 maternal and child referral systems, scalable inservice education, and the intersection of emergency care systems and gender based violence.

CLINICAL FOCUS

- Emergency Medicine

ACADEMIC APPOINTMENTS

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

ADMINISTRATIVE APPOINTMENTS

- Vice Chair of Strategy, 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

- Top 100 Courses for 2020 for "COVID-19: Training for Healthcare Workers", Coursera (2021)

- Keynote Speaker, Society for Ambulance Paramedics, India (2020)
- Contributions to Emergency Medicine Education, Global Emergency Medicine Academy, SAEM (2019)
- Lifetime Achievement Award, Global Emergency Medicine Academy, SAEM (2019)
- Extraordinary Contributions Award, Society for Ambulance Paramedics (2018)
- Chair Development Program, Society for Academic Emergency Medicine (2017-2018)
- Top Global Health Articles of 2016, Global Emergency Medicine, Society of Academic Emergency Medicine (2017)
- Stanford Medicine Leadership Academy, Stanford School of Medicine (2016-2017)
- 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 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

- Chair, Annual Meeting, American College of Emergency Physicians (2020 - present)
- Board Member, Global Emergency Medicine Academy, SAEM (2018 - 2021)
- 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/>
- COVID-19: Training for Healthcare Workers: <https://online.stanford.edu/courses/som-xche0007-covid-19-training-healthcare-workers>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Emergency Care Epidemiology

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. 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. Additionally, I have researched the causes and presentations of emergencies in Cambodia, Nepal, Pakistan, and Uganda.

Maternal Child Newborn and Adolescent Health

In HICs only a few mothers and newborns access care through EMS however, in a number of LMICs fledging EMS systems are becoming critical access mechanisms for pregnant women and infants. In India for example, nearly 40% of the millions of calls to EMS annually are for pregnant women and newborns. Further, we have very little understanding of how the different levels of the public hospital system integrate to form a continuous network of care and the role the private healthcare system plays. We received 7 years of USAID funding focused on maternal child health to strengthen the emergency care and referral system in Cambodia. Our program helped launch national EMS guidelines, standardized triage and EMS protocols, an integrated hospital referral network for pregnant women across one half the country, and stabilization and referral training for healthcare workers at over 650 health centers and hospitals. We continue to study how the maternal and newborn referral network impacts outcomes.

Intimate Partner Violence and Gender Equity

Working at the intersection of emergency care and maternal child health in LMICs has led me to explore how EMS can serve as critical access points for victims of intimate partner violence (IPV). As we researched the epidemiology of medical emergencies across South and Southeast Asia, we identified that a substantial percentage of individuals seeking emergency care were victims of IPV. These victims were presenting with a variety of life-threatening conditions such as poisonings, severe burns, and traumatic injuries. Our work prompted the State Government of Gujarat in India to launch a novel women's helpline operated by our EMS partner and supported by the police, Home Department, and local NGOs. Our team has analyzed the reach and impact of this helpline working to refine its operations. In conjunction with my partners, I aim to advance our understanding of helpseeking behavior for victims of IPV with a focus on marginalized and minority communities.

Inservice Training of Healthcare Workers

Strengthening healthcare delivery requires a better understanding of how to train healthcare workers. While billions of dollars are spent annually on training healthcare workers across the globe little evidence exists on how to effectively reach and train healthcare workers in lower resource settings. We have utilized a number of different approaches depending on learner, resources, and local environment. With each of these we have advanced our understanding of how learners with different training backgrounds, cultures, and resources learn. Currently, to combat the COVID-19 pandemic we worked in partnership with Digital Medic to develop a massive open online course for bedside healthcare workers.

CLINICAL TRIALS

- Protocolized Care for Early Septic Shock, Not Recruiting
- Reevaluation Of Systemic Early Neuromuscular Blockade, 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)
- COVID-19: Training for Healthcare Workers - Stanford EM International, Digital Medic, Coursera, YouTube (6/1/2020)

Publications

PUBLICATIONS

- **A qualitative study of an undergraduate online emergency medicine education program at a teaching Hospital in Kampala, Uganda.** *BMC medical education*
Ayoola, A. S., Acker, P. C., Kalanzi, J., Strehlow, M. C., Becker, J. U., Newberry, J. A.
2022; 22 (1): 84
- **A Deadly Infodemic: Social Media and the Power of COVID-19 Misinformation.** *Journal of medical Internet research*
Gisondi, M. A., Barber, R., Faust, J. S., Raja, A., Strehlow, M., Westafer, L., Gottlieb, M.
1800
- **Development and implementation of a novel Web-based gaming application to enhance emergency medical technician knowledge in low- and middle-income countries.** *AEM education and training*
Lindquist, B., Gaiha, S. M., Vasudevan, A., Dooher, S., Leggio, W., Mulkerin, W., Zozula, A., Strehlow, M., Sebok-Syer, S. S., Mahadevan, S. V.
2021; 5 (3): e10602
- **SARS-CoV-2 IgG Seropositivity and Acute Asymptomatic Infection Rate Among Firefighter First Responders in an Early Outbreak County in California.** *Prehospital emergency care : official journal of the National Association of EMS Physicians and the National Association of State EMS Directors*
Newberry, J. A., Gautreau, M., Staats, K., Carrillo, E., Mulkerin, W., Yang, S., Kohn, M. A., Matheson, L., Boyd, S. D., Pinsky, B. A., Blomkalns, A. L., Strehlow, M. C., D'Souza, et al
2021: 1–10
- **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. n., Zachariah, S. n., 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. n., Gennosa, C. n., Mahadevan, A. n., Niknam, K. n., Patil, S. n., 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. n., Leanza, J. n., Mowafi, H. n., Thadeus Kamara, N. n., Mulogo, E. M., Bisanzo, M. n., Nikam, K. n., Kizza, H. n., Newberry, J. A., Strehlow, M. n., Kohn, M. n.
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. n., Mahadevan, S. V., Strehlow, M. C.
2020; 15 (4): e0230911

- **"So Why Should I Call Them?": Survivor Support Service Characteristics as Drivers of Help-Seeking in India.** *Journal of interpersonal violence*
Newberry, J. A., Kaur, J. n., Gurrapu, S. n., Behl, R. n., Darmstadt, G. L., Halpern-Felsher, B. n., Rao, G. V., Mahadevan, S. V., Strehlow, M. C.
2020; 886260520970306
- **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)
- **Teaching From Afar: Development of a Telemedicine Curriculum for Healthcare Workers in Global Settings.** *Cureus*
Lowe, J. T., Patel, S. R., Hao, W. D., Butt, A., Strehlow, M., Lindquist, B.
2021; 13 (12): e20123
- **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): e7549
- **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. n., Wood, J. n., Britton, C. n., Strehlow, M. n., Goodwin, S. n.
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. n., Gimkala, A. n., Rao, G. V., Matheson, L. n., Mahadevan, S. n., Newberry, J. A.
2020; 12 (2): e7114
- **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. 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
- **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., Newberry, J. A., Hattaway, L. B., Socheat, P., Raingsey, P. P., Strehlow, M. 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)
- **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

- **Seprtris: 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
- **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