
BIOGRAPHICAL SKETCH

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NAME: Gary L. Darmstadt

eRA COMMONS USER NAME: DARMSTADT.GARY

POSITION TITLE: Associate Dean for Maternal and Child Health; Professor, Department of Pediatrics; Co-Director, Global Pediatric Health

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
California Polytechnic State University, San Luis Obispo	B.S.	06/79	Crop Science
University of Wisconsin, Madison	M.S.	06/82	Agronomy
University of California, San Diego	M.D.	06/89	
Johns Hopkins University, Baltimore, MD	Resident	1992	Pediatrics
Stanford University, Stanford, CA	Resident	1994	Dermatology
Children's Hospital & Medical Center, University of Washington School of Medicine, Seattle, WA	Fellow	1997	Pediatric Infectious Disease

A. Personal Statement

I have extensive experience in the development of global health innovations and in working to test and to scale-up health interventions. At Stanford University, I am playing a leading role in developing global women's and children's health research and educational programs, including the establishment of a Global Center for Gender Equality at Stanford University. My research focuses on advancing child health and development in low resource settings and advancing gender equality and health globally. Before joining Stanford, I was Senior Fellow at the Bill & Melinda Gates Foundation (BMGF), where I led the development of new global initiatives to address gender inequalities and empower women and girls in ways that lead to improved health and development outcomes. Prior to this role, I served as the BMGF Director of Family Health, leading strategy development and implementation across maternal, newborn and child health, nutrition, and family planning. In this role, I was responsible for the pipeline of investments from scientific discovery to intervention development and delivery of interventions at scale. I worked closely with the foundation Discovery team to shape discovery and development investments and was a co-founder of the Saving Lives at Birth Development Grand Challenge, the Putting Women and Girls at the Center of Development initiative, and the Healthy Birth, Growth and Development initiative. Based on these experiences, I understand how to identify knowledge gaps and generate evidence of impact for new interventions, and how to utilize evidence to influence the policy dialogue that is essential to programmatic adoption and scale-up of interventions in low income settings. As Director of Family Health, I also co-led the development and implementation of the BMGF global health strategy for India, which cuts across multiple health and development sectors. Before joining BMGF, I was Associate Professor and Founding Director of the International Center for Advancing Neonatal Health in the Department of International Health at the Johns Hopkins Bloomberg School of Public Health. There I led the development of newborn health research and was Principal Investigator and investigator on numerous facility-based and community-based maternal and child health research trials. Before joining Johns Hopkins, I was Senior Research Advisor for the \$50 M Saving Newborn Lives program of Save the Children-US, where I led the development and implementation of the global research strategy for newborn health and survival.

B. Positions and Honors

Positions and Employment

- 1998-2000 Acting Assistant Professor (1998-1999) and Assistant Professor (1999-2000), Division of Infectious Disease, Rheumatology & Immunology, and Division of Dermatology, Department of Pediatrics, Children's Hospital & Regional Medical Center; and Division of Dermatology, Department of Medicine, University of Washington School of Medicine, Seattle, WA
- 1998-2002 Adjunct Assistant Professor, Division of Community Health and Health Systems, Department of International Health, Bloomberg School of Public Health (BSPH), The Johns Hopkins University (JHU), Baltimore, MD
- 2002-2004 Assistant Professor, Department of International Health, BSPH, JHU, Baltimore, MD
- 2005-2008 Associate Professor, Department of International Health; Founding Director, International Center for Advancing Neonatal Health, BSPH, JHU, Baltimore, MD
- 2008 Senior Program Officer (Feb-Sept), Newborn Health, MNCH Team Member, Integrated Health Systems Development Division, Global Health Program, Bill & Melinda Gates Foundation (BMGF), Seattle, WA
- 2008-2010 Interim Deputy Director, Strategic Project Team Lead, Maternal, Newborn and Child Health (MNCH), Integrated Health Solutions Development Division, Global Health Program, BMGF, Seattle, WA
- 2010-2013 Director, Family Health Programs (MNCH, Nutrition, Family Planning), Global Development Division, BMGF, Seattle, WA
- 2013-2014 Senior Fellow, Global Development Division, BMGF, Seattle, WA
- 2015-present Associate Dean for Maternal and Child Health, Professor and Co-Director of Pediatric Global Health, Department of Pediatrics, Stanford University School of Medicine, Stanford, CA

Other Experience and Professional Memberships

- 2011 & 2012 Judge, Saving Lives at Birth Development Exchange, Washington, DC & Seattle, WA
- 2010-2013 Steering Committee, Saving Lives at Birth, A Grand Challenge for Development
- 2010-2013 Global Alliance for Improved Nutrition, Board of Directors Co-chair and Member
- 2011-2013 World Economic Forum, Global Action Council on Population Growth
- 2012-2014 Founding Curator, Catapult.org (crowd-funding platform for women's & girls' empowerment)
- 2013-2015 Strategic Advisory Group, Saving Newborn Lives, Save the Children
- 2013-2014 Steering Committee, Every Newborn Lancet Series
- 2013-2016 Steering Committee, Early Child Development Lancet Series
- 2013-2014 Chair, Evaluation Committee, Partnership for Maternal, Newborn and Child Health (PMNCH)
- 2010-2015 Agros International, Board of Directors
- 2011-2015 Institute of Medicine, Global Health Advisory Board
- 2013-2016 Executive Committee, Forum on Investing in Young Children Globally, Institute of Medicine
- 2016-2018 Program Planning Committee, Pediatric Academic Society
- 2015-2019 Steering Committee Chair, *The Lancet* Series on Gender Equality, Norms and Health
- 2017-present Advisor, Global Health 50:50
- 2013-present GlaxoSmithKline-Save the Children R&D Advisory Board
- 2013-present Project Mercy, Board of Directors, Chair (2016-present)
- 2015-present Advisory Board, Maternal & Child Health, World Health Organization, South East Asia Region
- 2016-present Member, Global Hygiene Council
- 2016-present Pediatric Infectious Diseases Society (PIDS) Liaison to the Infect Dis Soc of America (IDSA)
- 2016-present Steering Committee, Coalition for Centres in Global Child Health
- 2018-present Global Mental Health External Advisory Board, University of Washington

Honors

- 1978 Phi Kappa Phi Honor Society
- 1991 & 1992 Johns Hopkins Francis F. Schwentker Research Award, Department of Pediatrics, JHU
- 1994 San Francisco Dermatologic Society Resident Forum, First Place
- 2008 Paper of the Year, *The Lancet*
- 2009 Paper of the Year nomination, *British Medical Journal*
- 2010 BRAVO Award (for most outstanding cross-program), India Project Team, Bill & Melinda Gates Foundation, Quarter 1, 2010; Annual award

2011	Holy Cow Award (for extraordinary contribution in Social and Behavioral Change initiatives), Bill & Melinda Gates Foundation
2012	Top 10 Global Health Milestones of 2012, First Place: London Summit on Family Planning Ignites \$2.6 billion in Commitments, (PSI Impact Magazine, Issue 11, 2012).
2015	Sidney Hurwitz Visiting Professor, Society for Pediatric Dermatology
2016	Society of Scholars, Johns Hopkins University
2017	Outstanding Alumnus, University of California – San Diego
2017-2018	Faculty Research Fellow, Clayman Institute for Gender Research, Stanford University

C. Contributions to Science

1. Gender equality

While at BMGF, I led strategy and planning for the London Summit on Family Planning, which raised \$2.6 billion from donors toward family planning programs globally, and I catalyzed the creation of the Foundation's gender equality programs as Senior Fellow, including internal and external initiatives on Putting Women and Girls at the Center of Development. Recently, I led *The Lancet* Series on Gender Equality, Norms and Health,¹⁻³ bringing together over 100 leading researchers, program managers and advocates from highly diverse disciplines and perspectives across five continents and over 40 organizations to produce five ground-breaking Series papers and an unprecedented 28 additional original manuscripts. To maximize the relevance and cross-cultural, global impact of this effort, I have cultivated new conversations, new partnerships, new scholarship and new actions to refocus global priorities for addressing gender norms and gender inequalities as critical to achievement of the Sustainable Development Goals. At Stanford, I am Faculty Director of the Global Center for Gender Equality and am leading the establishment of gender equality programs for the Kenyan Women and Children's Wellness Center in Nairobi.

1. Gupta GR, Oomman N, Grown C, Conn K, Hawkes S, Shawar YR, Shiffman J, Buse K, Mehra R, Bah CA, Heise L, Greene ME, Weber AM, Heymann J, Hay K, Raj A, Henry S, Klugman J, **Darmstadt GL**. Gender equality and gender norms: framing the opportunities for health. *Lancet* 2019;393(10190):2550-2562.
2. Weber AM, Cislighi B, Meausoone V, Abdalla S, Mejía-Guevara I, Loftus P, Hallgren E, Seff I, Stark L, Victora CG, Buffarini R, Barros AJD, Domingue BW, Bhushan D, Gupta R, Nagata JM, Shakya HB, Richter LM, Norris SA, Ngo TD, Chae S, Haberland N, McCarthy K, Cullen MR, **Darmstadt GL**. Gender norms and health: insights from global survey data. *Lancet* 2019;393(10189):2455-2468.
3. Heymann J, Levy JK, Bose B, Ríos-Salas V, Mekonen Y, Swaminathan H, Omidakhsh N, Gadoth A, Huh K, Greene ME, **Darmstadt GL**. Improving health with programmatic, legal, and policy approaches to reduce gender inequality and change restrictive gender norms. *Lancet* 2019 Jun 22;393(10190):2522-2534.

2. Child infections

A focus of my research in global health has been on the identification, prevention and treatment of infections in young children. I led the first low-income country study of the impact of a bundle of infection control practices on the incidence of healthcare-associated neonatal infections (HAIs) and neonatal mortality due to HAIs.¹ I also led the first-reported population-based study on the incidence and etiology of neonatal bacterial and viral infections.² Several of my studies involved the validation of clinical algorithms for the detection of neonatal illness, principally infections, and validation of the ability of community health workers to identify newborns with infections.³ I also participated in seminal studies of chlorhexidine cord cleansing of newborns in Nepal and Bangladesh, demonstrating reductions in cord infections and mortality.^{4,5} These studies played a key role in informing WHO global guidelines on newborn chlorhexidine cord cleansing and catalyzed the scale-up of this intervention in numerous countries, which is averting many newborn deaths globally. At the Gates Foundation, I initiated and funded the most comprehensive and robust study of the etiology of neonatal infections to date (*Lancet*. 2018 Jul 14;392:145-159). My work has influenced global guidelines and recommendations on Integrated Management of Childhood Illness, and on reporting of neonatal infections.⁶

1. **Darmstadt GL**, Ahmed ASMNU, Saha SK, et al. Infection control practices reduce nosocomial infections and mortality in preterm infants in Bangladesh. *J Perinatol* 2005;25:331-5.
2. **Darmstadt GL**, Saha SK, Arifeen SE, et al. Population-based incidence and etiology of community-acquired neonatal sepsis in Mirzapur, Bangladesh. *J Infect Dis* 2009;200:906-15.

3. Young Infants Clinical Signs Study Group (Writing group and Steering Committee: Carlin JB, **Darmstadt GL**, Hamer DH, Weber MW). Clinical signs predicting severe illness in young infants: a multicentre study. *Lancet* 2008;371:135-42.
4. Tielsch JM, **Darmstadt GL**, Mullany LC, et al. Impact of newborn skin-cleansing with chlorhexidine on neonatal mortality in southern Nepal: A community-based, cluster-randomized trial. *Pediatrics* 2007;119:e330-40.
5. Mullany LC, **Darmstadt GL**, Khatri SK, et al. Topical applications of chlorhexidine to the umbilical cord prevent omphalitis and reduce neonatal mortality in southern Nepal: a community-based, cluster-randomized trial. *Lancet* 2006;367:910-8.
6. Fitchett EJA, Seale AC, Vergnano S, Sharland M, Heath PT, Saha S, Agarwal R, Ayede AI, Bhutta ZA, Black R, Bojang K, Campbell H, Cousens S, **Darmstadt GL**, Madhi SA, Meulen AS, Modi N, Patterson J, Qazi S, Schrag SJ, Stoll B, Wall S, Wammanda R, Lawn JE. Strengthening Publications Reporting Infections in Newborns Globally (SPRING): A checklist to implement the STROBE statement. *Lancet Infect Dis.* 2016;10:e202-13.

3. Emollient therapy

Studies I have pioneered in topical emollient therapy address two major causes of child mortality: complications of preterm birth (the top cause of deaths globally in under-five children) and serious infections in childhood. These studies have taken a novel approach to prevention of infections in preterm infants, and have shown in trials in Egypt, Bangladesh, and Pakistan that topical applications of the widely available, natural vegetable oil - sunflower seed oil (SSO) - to the skin of preterm infants <33 weeks gestational age reduced the incidence of culture-proven bloodstream infections by 40-50%.¹⁻³ Further analysis of data from the study in Bangladesh showed that the intervention reduced mortality by 26%, was highly cost effective [US\$ 61 per death averted and US\$ 2.15 per Year of Life Lost averted], showed promise in improving neurodevelopment, and appeared to act by preserving skin integrity and containing pathogens on the skin surface. A meta-analysis showed that topical emollient therapy reduced neonatal infections by 50% and reduced neonatal mortality by 25%. This intervention has also proven effective in reducing mortality of very low birth weight infants and improving growth in the neonatal period in a large cluster-randomized, community-based trial in India (unpublished data). Moreover, I recently completed a trial demonstrating improvements in skin barrier function and promising reduction in risk for infection, improved growth and modifications of the microbiome in under-two children with severe acute malnutrition in Bangladesh (unpublished data). The existence of widespread oil massage practices in millions of newborns each year in countries throughout South Asia and sub-Saharan Africa provides a broad platform for spread of improved emollient therapy practices and for saving hundreds of thousands of lives.

1. **Darmstadt GL**, Mao-Qiang M, Chi E, et al. Impact of topical oils on the skin barrier: possible implications for neonatal health in developing countries. *Acta Paediatr* 2002;91:1-9.
2. **Darmstadt GL**, Badrawi N, Law PA, et al. Topical therapy with sunflower seed oil prevents nosocomial infections and mortality in premature babies in Egypt: a randomized, controlled clinical trial. *Pediatr Infect Dis J* 2004;23:719-25.
3. **Darmstadt GL**, Saha SK, Ahmed ASMNU, et al. Effect of topical treatment with skin barrier-enhancing emollients on nosocomial infections in preterm infants in Bangladesh: a randomized controlled trial. *Lancet* 2005;365:1039-45.

4. Impact of packages of newborn health interventions

I played a fundamental role in creating the evidence base for what works to save newborn lives in low resource settings. During the 2000s, I led and participated in several major trials to develop and test community-based approaches to improving household and community maternal and neonatal health, including behavior change management interventions to promote preventive maternal and newborn care practices.¹⁻³ In the context of these studies, I also demonstrated the capability of well-trained community health workers to implement packages of maternal and newborn interventions, resulting in reductions in newborn mortality. The findings from these studies played a key role in the development of global guidelines by WHO on home visits to promote newborn survival.

1. **Darmstadt GL**, Choi Y, Arifeen SE, et al. Evaluation of a cluster-randomized controlled trial of a package of community-based maternal and newborn interventions in Mirzapur, Bangladesh. *PLoS ONE* 2010;5(3):e9696.

2. Kumar V, Mohanty S, Kumar A, Misra RP, Santosham M, Awasthi S, Baqui AH, Singh P, Singh V, Ahuja RC, Singh JV, Malik GK, Ahmed S, Black RE, Bhandari M, **Darmstadt GL**. Effect of community-based behaviour change management on neonatal mortality in Shivgarh, Uttar Pradesh, India: a cluster-randomised controlled trial. *Lancet*. 2008;372(9644):1151-62.
3. Baqui AH, Arifeen SE, **Darmstadt GL**, et al. Effect of a package of community-based newborn care delivered by two strategies in Sylhet district, Bangladesh: a cluster-randomised controlled trial. *Lancet* 2008;371:1936-44.
4. Kumar V, Kumar A, Das V, Srivastava NM, Baqui AH, **Darmstadt GL**. Community-driven impact of a newborn-focused behavioral intervention on maternal health in Shivgarh, India. *Int J Gynecol Obstet* 2012;117:48-55.

5. Early childhood development

I have worked with Dr. Naila Khan and colleagues in Bangladesh to develop, validate and scale up the use of neurodevelopmental assessment tools for children and adolescents 0-16 years of age,^{1,2} and advised on scale-up of services nationwide in Bangladesh. I shaped global strategy on the Steering Committee (co-chair) for *The Lancet Series on Advancing Early Childhood Development*,³ and the Institute of Medicine's Forum for Investing in Young Children Globally,⁴ and am participating in development of machine learning tools to accelerate identification of children with Autism Spectrum Disorder in low resource settings.⁴

1. Khan NZ, Muslima H, Begum D, Shilpi AB, Akhter S, Bilkis K, Begum N, Parveen M, Ferdous S, Morshed R, Batra M, **Darmstadt GL**. Validation of rapid neurodevelopmental assessment instrument for under-two-year-old children in Bangladesh. *Pediatrics* 2010;125:e755-62.
2. Khan NZ, Muslima H, Arifeen SE, McConachie H, Shilpi AB, Ferdous S, **Darmstadt GL**. Validation of a rapid neurodevelopmental assessment tool for 5 to 9 year-old children in Bangladesh. *J Pediatr*. 2014 May;164(5):1165-1170.
3. Richter LM, Daelmans B, Lombardi J, Heymann J, Lopez-Boo F, Behrman JR, Lu C, Lucas JE, Perez-Escamilla R, Dua T, Bhutta ZA, Stenberg K, Gertler P, Bouhouch RR, **Darmstadt GL**. Investing in the foundation of sustainable development: pathways to scale for early childhood development. *Lancet* 2017;389(10064):103-118.
4. Tariq Q, Fleming SL, Schwartz JN, Dunlap K, Corbin C, Washington P, Kalantarian H, Khan NZ, **Darmstadt GL**, Wall DP. Detecting developmental delay and Autism through machine learning models using home videos of Bangladeshi children: Development and validation study. *J Med Internet Res*. 2019 Apr 24;21(4):e13822.

D. Research Support

Enlight Foundation

06/01/2016 – 12/31/2019

Creating a scalable model to end poverty: Delivery of an integrated childhood development strategy in rural China, Role: PI

Goal: Address inequities in maternal and child health in China through piloting, delivering and evaluating a comprehensive community-based health program (including pregnancy and newborn care, breastfeeding support, nutritional education and supplementation, hygiene, maternal mental health) for new mothers.

OPP1163688

10/01/2016 – 12/31/2019

Bill & Melinda Gates Foundation

Learning from Ananya-Scaling Up Family Health Outcomes in Bihar, Role: PI

Goal: Leverage existing data sets and generate new insights and analysis about the BMGF-funded Ananya program in Bihar, India, which will be captured in a series of publications and policy briefs and broadly disseminated to provide a robust evidence base to inform state and national-level scale-up, and global efforts to improve primary healthcare system performance.

Stanford Human-centered Artificial Intelligence Institute

05/01/2019 – 04/30/2020

Uncovering gender inequalities in East Africa: Using artificial intelligence to gain insights from media data, Role: PI

Goal: Create word embeddings for gendered terms utilizing Kenya media data to gain insights into the ways different gender groups may be perceived and labelled in the region.