
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;
Stanford University School of Medicine, Stanford, CA, USA

EDUCATION/TRAINING

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 scale-up health interventions. At Stanford University, I am playing a leading role in developing global women 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, and includes several applications of artificial intelligence. Before joining Stanford, I was Senior Fellow at the Bill & Melinda Gates Foundation (BMGF), where I led the development of initiatives to address gender inequalities and empower women and girls. 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 investments ranging from scientific discovery to intervention development and delivery of interventions at scale. I worked closely with the 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 Grand Challenge, 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 leading 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. I led the development of newborn health research, including numerous facility- and community-based maternal and child health research trials. Before joining Johns Hopkins, I was Senior Research Advisor for the \$50M 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

2000-2002 Senior Research Advisor, Saving Newborn Lives, Department of Health, Save the Children

2002-2004 Assistant Professor (2002-04), Associate Professor (2005-08), Department of International Health; Founding Director, International Center for Advancing Neonatal Health (2002-08), Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, MD

2008-2010 Senior Program Officer (Feb-Sept), Newborn Health (2008); Interim Deputy Director (2008-10), Maternal, Newborn and Child Health Strategic Project Team, Integrated Health Systems Development Division, Global Health Program, Bill & Melinda Gates Foundation (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

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

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 Global Health Advisory Board, National Academy of Medicine (NAM),

2013-2016 Executive Committee, Forum on Investing in Young Children Globally, NAM

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 (2016-2020)

2015-present Advisory Board, Maternal & Child Health, World Health Organization, South East Asia Region

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

2016-present Advisory Group, Stanford Digital Medical Education International Collaborative (Digital MEdIC)

2018-present Global Mental Health External Advisory Board, University of Washington

2019-present Elsevier (Lancet) Inclusion and Diversity Advisory Board

2020-present Board of Directors, Kenyan Women and Children's Wellness Center, Nairobi, Kenya

2020-present *The Lancet* Commission on Gender and Health

2020-present Strategic Technical Advisory Group of Experts (STAGE) on Maternal, Newborn, Child and Adolescent Health and Nutrition, World Health Organization

2020-present Chair, WHO Low Birth Weight Infant Guidelines Development Group, World Health Organization

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 experts from diverse disciplines and perspectives across five continents and over 40 organizations to produce five ground-breaking Series papers and an unprecedented 40+ additional original manuscripts. 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, ...**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, ...**Darmstadt GL**. Gender norms and health: insights from global survey data. *Lancet* 2019;393(10189):2455-2468.
3. Heymann J, Levy JK, Bose B, ...**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 illnesses 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 BMGF, 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.

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, et al. 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.

3. Emollient therapy

I have pioneered research on topical emollient therapy, addressing 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. This intervention has also proven effective in reducing mortality of very low birth weight infants by 52% and improving growth in the neonatal period in a large trial in India (unpublished data). I recently completed a trial demonstrating improvements in skin barrier function and promising reduction in risk for infection, improved growth and fatty acid absorption, and modifications of the microbiome in under-two children with severe acute malnutrition in Bangladesh.⁴

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. Shahunja KM, Ahmed T, Hossain I, ...**Darmstadt GL**. Topical emollient therapy in the management of severe acute malnutrition in under-two children: A randomised controlled clinical trial in Bangladesh. *J Glob Health* 2020;10(1):010414.

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 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, ...**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, ...**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 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, ...**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, ...**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, ...**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, ...**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 (selected)

(Darmstadt, G. – SPO 179529) Bill and Melinda Gates Foundation	04/01/2020 - 03/31/2022 \$142,806	0.12 calendar	Impact Evaluation of the National Rural Livelihoods Project. Major goals: Evaluate the impact of women's self-help groups interventions delivered by the Government of Bihar on women's economic empowerment.
OPP1182996 (Darmstadt, G.) Bill and Melinda Gates Foundation	11/02/2017-6/30/2021 \$865,435	2.4 calendar	Determination of gestational age and preterm birth rates in low resource settings using newborn metabolic profiles. Major goals: Develop methodology for using newborn blood spots, cord blood and/or maternal blood to estimate gestational age of newborns in Africa and Asia through metabolic and computational analysis.
OPP1201417 (Darmstadt, G.) American Institutes for Research	11/01/2017-10/31/2021 \$95,568	1.2 calendar	Global Data and Learning Partnership, Women's Empowerment Collectives (WECs) Research Consortium. Major goals: Consolidate and strengthen the evidence base on the impact and cost-effectiveness of WECs.
139035 (Darmstadt, G.) Bill and Melinda Gates Foundation	11/01/2018-2/28/2022 \$10,332,585	0.91 calendar	Gender integration strategy support and product development. Major goals: Support expansion of the BMGF's gender integration work through development of an on-demand model for technical assistance and learning on gender integration. Support program teams to become gender intentional; develop customized gender integration tools, and provide strategic support to leadership on targets, measures and accountability.
OPP1205899 (Darmstadt, G.) Bill and Melinda Gates Foundation	11/29/2018-10/31/2021 \$191,154	0.6 calendar	Landscaping women's economic empowerment (WEE) in East Africa. Major goals: Landscape WEE in East Africa, including a mapping of gender equality researchers, policies, programs, and data.
INV-002664 (Darmstadt, G.) Foundation	12/03/2019 - 03/31/2021 \$757,593	1.2 calendar	Bill and Melinda Gates Ethiopia Gender Transformational Leadership Grant. Major goals: Develop a customized executive leadership program to equip the Ethiopian cabinet to integrate a gender lens comprehensively into organizational management, policies, programs and funding.
INV-004950 (Darmstadt, G.) Bill and Melinda Gates Foundation	06/02/2020 - 11/01/2021 \$859,617	0.12 calendar	Gender Equality Mainstreaming Philanthropy Resources & Workshops #GESI. Major goals: Work with Giving Pledge members and their organizations to integrate an intersectional gender lens into their philanthropy.
(Darmstadt, G. – SPO 184031) New Venture Fund	05/01/2020 - 04/30/2021 \$101,270	1.2 calendar	Analysis and dissemination of learning from Aetiology of Neonatal Infection in South Asia (ANISA). Major goals: Synthesize risk factors for developing possible serious bacterial infection and mortality, care-seeking behaviors, and validation of community health workers' diagnoses compared to health facility workers.
209755 (Darmstadt, G.) Bill and Melinda Gates Foundation	12/07/2020 -12/15/2021 \$499,403	0.6 calendar	African Union COVID Gender Mainstreaming Grant. Major goals: To help advance a gender informed and equitable response globally and in priority geographies around COVID-19 pandemic control efforts by partnering with the African Union's Women, Gender and Development Directorate.