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Duke University Health Collaboration
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Matthew P. Rubach, M.D.

Education	University of Arizona College of Medicine Doctor of Medicine, May 2007 Dean of Students: Christopher Leadem, Ph.D.	Tucson, AZ
	Princeton University B.A. Public & International Affairs (Cum Laude), June 2002 Certificate in Latin American Studies Senior Thesis Advisor: Burton Singer, Ph.D. Thesis: International Migration and Public Health: Tuberculosis Along the U.S.-Mexico Border	Princeton, NJ
Position & Training	Duke University Assistant Professor Department of Medicine Division of Infectious Diseases & International Health, July 2015 Co-Appointment, Assistant Research Professor, Duke Global Health Institute Co-Director KCMC-Duke University Health Collaboration, November 2015 Medical Director KCMC-Duke University Health Collaboration Clinical Research Laboratory, November 2015 Co-Appointment, Assistant Research Professor, Duke-National University of Singapore Graduate Medical School, February 2017	Durham, NC
	University of Utah Department of Pathology Medical Microbiology Fellowship, July 2014 – June 2015	Salt Lake City, UT
	Kilimanjaro Christian Medical Centre-Duke Collaboration Moshi, Tanzania Impact of Bacterial Zoonoses in Northern Tanzania Research Fellowship, August 2012 – June 2014	
	Duke University Department of Medicine Infectious Diseases Fellowship, July 2011 – June 2014	Durham, NC
	University of Utah School of Medicine	Salt Lake City, UT

Internal Medicine-Pediatrics Residency, June 2007 – June 2011

- Board Certification** American Board of Pathology, Medical Microbiology, September 2015
American Board of Internal Medicine, Infectious Diseases, October 2014
American Board of Pediatrics, October 2011
American Board of Internal Medicine, August 2011
- Licensure** Utah Office of Occupational & Professional Licensing, January 2009-Jan 2016
North Carolina Medical Board, July 2011 – Present
Medical Council of Tanganyika (#5192), November 2012 – August 2019
- Professional Societies** American College of Physicians, 2007 – Present
American Society of Tropical Medicine & Hygiene, 2009 – Present
Infectious Diseases Society of American, 2011 – Present
- Career Goal** My goal is to conduct high-quality infectious disease clinical research in resource-limited settings. My main research interest is elucidating etiologies of severe infections, with an intended focus on improving laboratory capacity and validating novel diagnostic assays. Ultimately, I hope that such research can inform clinical management algorithms and disease prevention priorities in resource-limited settings.
- Publications** Maze MJ, Cash-Goldwasser S, **Rubach MP**, Biggs HM, Galloway RL, Sharples KJ, Allan KJ, Halliday JEB, Cleaveland S, Shand MC, Muiruri C, Kazwala RR, Saganda W, Lwezaula BF, , Mmbaga BT, Maro VP, and Crump JA. Risk factors for acute leptospirosis in northern Tanzania. *PLoS Neglected Tropical Diseases* 2018; *Accepted*.
- Carugati M, Zhang HL, Kilonzo KG, Maze MJ, Maro VP, **Rubach MP**, Crump JA. Predicting mortality for adolescent and adult patients with fever in resource-limited settings. *American Journal of Tropical Medicine and Hygiene* 2018; *Accepted*.
- Carugati M, Biggs HM, Maze MJ, Stoddard RA, Cash-Goldwasser S, Hertz JT, Halliday JEB, Saganda W, Lwezaula BF, Kazwala RR, Cleaveland S, Maro VP, **Rubach MP**, Crump JA. Incidence of human brucellosis in the Kilimanjaro Region of Tanzania in the periods of 2007-2008 and 2012-2014. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2018; *Epub ahead of print*. PMID: 29697848.
- Snaveley ME, Maze MJ, Muiruri C, Ngowi L, Mboya N, Beamesderfer J, Makupa GF, Mwingwa AG, Lwezaula BF, Mmbaga BT, Maro VP, Crump JA, Ostermann J, **Rubach MP**. Sociocultural and health system factors associated with mortality among febrile inpatients in Tanzania: a prospective social biopsy cohort study. *BMJ Global Health* 2018; *in Press*.

Cash-Goldwasser S, Maze MJ, **Rubach MP**, Biggs HM, Stoddard RA, Sharples KJ, Halliday JEB, Cleaveland S, Shand MC, Mmbaga BT, Muiruri C, Saganda W, Lwezaula BF, Kazwala RR, Maro VP, Crump JA. Risk Factors for Human Brucellosis in Northern Tanzania. *American Journal of Tropical Medicine and Hygiene* 2017; Dec 11. doi: 10.4269/ajtmh.17-0125. [Epub ahead of print]. PMID: 29231152

Moore CC, Hazard R, Saulters KJ, Ainsworth J, Adakun S, Amir A, Andrews BA, Auma M, Baker T, Banura P, Crump JA, Grobush MP, Huson MAM, Jacob ST, Olamide DJ, Kellett J, Lakhi S, Majwala A, Opio M, **Rubach MP**, Rylance J, Schieffelin J, Scheld WM, Ssekitoleko R, Wheeler I, Barnes LE. Derivation and validation of a universal vital assessment (UVA) score: a tool for predicting mortality in adult hospitalized patients in sub-Saharan Africa. *BMJ Global Health* 2017;2:e000344. PMID: 29082001 PMCID: PMC5656117

Cleaveland S, Sharp J, Abela-Ridder B, Allan KJ, Buza J, Crump JA, Davis A, Del Rio Vilas VJ, de Glanville WA, Kazwala RR, Kibona T, Lankester FJ, Lugelo A, Mmbaga BT, **Rubach MP**, Swai ES, Waldman L, Haydon DT, Hampson K, Halliday JEB. One Health contributions towards more effective and equitable approaches to health in low- and middle-income countries. *Philosophical Transactions of the Royal Society B* 2017;372:20160168. PMID: 2854176 PMCID: PMC5468693

Maze MJ, Biggs HM, **Rubach MP**, Galloway RL, Cash-Goldwasser S, Allan KJ, Halliday JE, Hertz JT, Saganda W, Lwezaula BF, Cleaveland S, Mmbaga BT, Maro VP, Crump JA. Comparison of the Estimated Incidence of Acute Leptospirosis in the Kilimanjaro Region of Tanzania between 2007-08 and 2012-14. *PLoS Neglected Tropical Diseases* 2016;10:e0005165. PMID: 27911902 PMCID: PMC5135036

Zhang HL, Omondi MW, Musyoka AM, Wfwamba IA, Swai RP, Karia FP, Muiruri C, Reddy EA, Crump JA, **Rubach MP**. The challenges of maintaining Good Clinical Laboratory Practices in low-resource settings: a health program evaluation framework case study from East Africa. *American Journal of Clinical Pathology* 2016;146:199-206. PMID: 27473737

Weinberg JB, Volkheimer AD, **Rubach MP**, Florence SM, Mukemba JP, Kalingonji AR, Langelier C, Chen Y, Bush M, Yeo TW, Granger DL, Anstey NM, Mwaikambo ED. Monocyte polarization in children with falciparum malaria: relationship to nitric oxide insufficiency and disease severity. *Scientific Reports* 2016; 6:29151. PMID 27385484 PMCID: PMC4935839

Al-Emran HM, Krumkamp R, Dekker DM, Eibach D, Aaby P, Adu-Sarkodie Y, Ali M, **Rubach MP**, Bjerregaard-Andersen M, Crump JA, Cruz Espinoza LM, Løfberg SV, Gassama Sow A, Hertz JT, Im J, Jaeger A, Kabore LP, Konings F, Meyer CG, Niang A, Pak GD, Panzner U, Park SE, Rabezahary H, Rakotozandrindrainy R, Raminosoa TM, Razafindrabe TJ, Sampo E, Schütt-Gerowitt H, Sarpong N, Soura AB, Tall A, von Kalckreuth V, Wierzbza TF, May

J, Marks F. Validation and Identification of Invasive Salmonella Serotypes in Sub-Saharan African by Multiplex Polymerase Chain Reaction. *Clinical Infectious Disease* 2016;15:62 Suppl 1:S80-82.

Rubach MP, Hanson KE. ID Learning Unit- Diagnostics Update: Current Laboratory Methods for Rapid Pathogen Identification in Patients with Bloodstream Infections. *Open Forum Infectious Diseases* 2015; 2:ovf174. PMID: 26719845 PMCID: PMC46909501

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Rubach MP, Mukemba J, Florence S, Lopansri BK, Hyland K, Volkheimer AD, Yeo TW, Anstey NM, Weinberg JB, Mwaikambo ED, Granger DL. Impaired systemic tetrahydrobiopterin bioavailability and increased oxidized biopterins in pediatric falciparum malaria: association with disease severity. *PLoS Pathogens* 2015;11:e1004655. PMID: 25764173 PMCID: PMC4357384

Poster presented at American Society of Tropical Medicine and Hygiene; Washington, DC (November 2013).

Platform presentation at Nitric Oxide Society Meeting; Cleveland, OH (June 2014).

Rubach MP, Maro VP, Bartlett JA, Crump JA. Etiologies of illness among patients meeting Integrated Management of Adolescent and Adult Illness District Clinician Manual criteria for severe infections in northern Tanzania: implications for empiric antimicrobial therapy. *American Journal of Tropical Medicine and Hygiene* 2015;92:454-462. PMID: 25385866 PMCID: PMC4347355

Platform presentation of these results at American Society of Tropical Medicine and Hygiene; New Orleans, LA (November 2014).

Weinberg JB, Yeo TW, Mukemba JP, Florence SM, Volkheimer AD, Wang H, Chen Y, **Rubach M**, Granger DL, Mwaikambo ED, Anstey NM. Dimethylarginines: endogenous inhibitors of nitric oxide synthesis in children with falciparum malaria. *Journal of Infectious Diseases* 2014;210:913-922. PMID: 24620026 PMCID: PMC4192051

Vanderburg S, **Rubach MP**, Halliday JE, Cleaveland S, Reddy EA, Crump JA. Epidemiology of *Coxiella burnetii* Infection in Africa: A OneHealth Systematic

Review. PLoS Neglected Tropical Diseases 2014;8(4):e2787. PMID: 24722554 PMCID: PMC3983093

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Rubach MP, Halliday JE, Cleaveland S, Crump JA. Brucellosis in low-income and middle-income countries. Current Opinion in Infectious Diseases 2013;26(5):404-412. PMID: 23963260 PMCID: PMC3888775

Rubach MP, Pavlisko EN, Perfect JR. Pericarditis mediated by respiratory syncytial virus in a hematopoietic stem cell transplant patient. Transplant Infectious Disease 2013;15(4):e152-156. PMID: 23725410

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Poster presented at American Society of Tropical Medicine and Hygiene; Philadelphia, PA (December 2011).

Rubach MP, Bender JM, Mottice S, Hanson K, Weng HYC, Korgenski K, Daly JA, Pavia AT. Increasing Incidence of Invasive *Haemophilus influenzae* Disease in Adults, Utah, USA. Emerging Infectious Diseases 2011; 17 (9): 1645-50. PMID: 21888789 PMCID: PMC3322072

Poster presented at Infectious Disease Society of America; Philadelphia, PA (October 2009).

Research Support

Center for AIDS Research Supplement

NIH/NIAID

P30AI064518 (Project PI)

July 2017-June 2018

This administrative supplement to Investigating Febrile Deaths in Tanzania (R01AI121378) provides resources for additional diagnostic testing for emerging viral pathogens via multiplex PCR assays for whole blood and respiratory specimens.

Viral zoonoses and severe febrile illness in northern Tanzania

NIH/NIAID

K23AI116869 (PI)

July 2016-June 2021

Seeks to detect prevalence of viral zoonotic disease as causes of severe febrile illness in northern Tanzania using both conventional microbiologic techniques and innovative pathogen discovery approaches.

Estimating the burden of severe *Salmonella* infections in Tanzania

Bill & Melinda Gates Foundation

OPP1158210 (Co-I) February 2017-January 2019
Aims to quantify morbidity and burden due to typhoid fever in northern Tanzania by conducting surveillance for severe manifestations of typhoid fever, and by conducting longitudinal follow-up of cases across one year from initial onset of illness.

Westat HIV Clinical Trials Network

NIH/NICHD
HHSN2752013000003C MOD-2 (Co-I) December 2015-May 2018
HIV studies as part of the International Maternal Pediatric and Adolescent AIDS Clinical Trials (IMPAACT) Network, in which the KCMC-Duke University Health Collaboration in Moshi, Tanzania is a participating site through NICHD/Westat.

**Completed
Research
Support**

Medical Education Partnership Initiative

HRSA/NIH/FIC
R24 TW10008 (Co-I) January 2015-March 2016
Through the Medical Education Partnership Initiative's Mentored Research Training Program at Kilimanjaro Christian Medical University, we developed a pilot project to prospectively collect data on non-biological risk factors (e.g., delays in care-seeking, health systems delays) that may contribute to poor outcomes among patients presenting with febrile illness.

Fogarty Global Health Fellowship

NIH/FIC
R25 TW009343 (PI) July 2012-June 2013
The goal of this project was to assess impacts of bacterial zoonotic infections among livestock in northern Tanzania upon dietary nutrition and growth of children in livestock-owning households.

Awards

William L. Roberts Memorial Fund, January 2015

- Awarded intramural funds from the University of Utah Department of Pathology to develop a next-generation sequencing platform for pathogen detection in plasma, serum or whole blood of patients from Moshi, Tanzania enrolled in acute febrile illness studies (awarded full request of \$5000 with additional matching funds from faculty mentor, Robert Schlaberg, M.D.).

William L. Roberts Memorial Fund, October 2014

- Awarded intramural funds from the University of Utah Department of Pathology to assess the performance of the Centers for Disease Control and Prevention Rickettsial Branch's Q Fever real-time polymerase chain reaction detection assay among patients from Moshi, Tanzania enrolled in acute febrile illness studies (awarded full request of \$3150). An additional \$1300 was awarded to perform validation of the assay for in-house use on clinical specimens.

William D. Odell Housestaff Award, June 2011

- Awarded by fellow housestaff as well as faculty to acknowledge the outstanding resident among the graduating cohort from the University of Utah Internal Medicine residency program.

Neonatology Resident of the Year, June 2011

- Awarded by neonatology faculty to one of the graduating residents from the University of Utah Pediatrics residency program.

American College of Physicians Clinical Vignette Poster, April 2011

- First place in the national associates clinical vignette poster contest at the ACP 2011 meeting in San Diego, CA. We presented a case of hemophagocytic lymphohistiocytosis secondary to disseminated histoplasmosis.

American Academy of Pediatrics Residency Research Grant, June 2009

- Awarded a \$3000 (maximum stipend) grant for my proposal to characterize more fully the metabolic acidosis in children with severe malaria. Funds were ultimately used to carry out a study demonstrating plasma level of *P. falciparum* histidine-rich protein-2 correlate with disease severity and are a more reliable marker of parasite burden than peripheral blood parasite count.

The Leonard Tow 2007 Humanism in Medicine Award, May 2007

- Awarded to one member of every graduating medical school class in the nation in recognition of exemplary compassion, competence and respect in the delivery of care. Accompanied by a one thousand dollar gift from the Arnold P. Gold Foundation.

Experience

Tuberculosis Diagnostics Short Course February 2013 Moshi, Tanzania

- Two-week microbiology training course at the Kilimanjaro Clinical Research Institute on TB diagnostics—sponsored by the Fogarty International Center, given by Microbiology staff and Infectious Diseases faculty from the University of Virginia. Course provided foundational lectures as well as laboratory practicals for conventional mycobacteriology as well as Gene Xpert, MGIT SIRE drug susceptibility testing, Agar Proportion DST, and TREK minimum inhibitory concentration techniques.

Morning Report Conference Presentations July 2007- June 2011

Salt Lake City, UT

- Atypical hemolytic uremic syndrome secondary to factor H deficiency; diffuse lymphadenopathy and hepatosplenomegaly secondary to Langerhans cell histiocytosis; secondary syphilis; disseminated intravascular coagulation secondary to M3 acute myeloid leukemia; pulmonary embolism; gallstone pancreatitis; idiopathic pericardial effusion; myeloma kidney.

Noon Conference Presentations to Faculty July 2007 – June 2011

Salt Lake City, UT

- Neonate with non-ketotic hyperglycinemia; dearth of evidence for vitamin

B12 deficiency as a reversible cause of dementia; Pediatric Morbidity & Mortality Conference: Appropriateness of Calling a Rapid Response vs. a Code Blue in an eight year old with supraventricular tachycardia; Residency "Senior Talk": Cerebral Malaria Pathogenesis

Commitment to Underserved People January 2005–May 2007 Tucson, AZ
Volunteer

- Over 90 hours of medical volunteer work, primarily at the Shibutz Family Clinic serving immigrants from Mexico, Central America and West Africa.

Medical Students for Life July 2004 – May 2005 Tucson, AZ
Co-Founder and Vice-President

- The College of Medicine's pro-life chapter of the national organization Medical Students for Life. As vice-president I helped organize and arrange lunch-time talks by physicians, embryologists, and community agencies regarding the medical ethics surrounding abortion.

Pediatric Oncology Friends Program August 2004 – May 2005 Tucson, AZ

- A buddy program that paired 2nd year medical students with a pediatric oncology patient. Activities centered around spending time with my buddy during his clinic visits and/or chemotherapy visits. Mainly entailed playing games, reading and helping with homework; usually a weekly commitment of one hour.

Salesians of St. John Bosco August 2002 – June 2003 Guayaquil, Ecuador
Salesian Lay Missioner Volunteer

- I lived and worked at one of the three shelters for street children in Guayaquil, Ecuador run by the Salesian fathers. I worked 12-14 hour days, six days a week and my responsibilities included remedial education, religious formation, and coaching. The essence of my role was to be present as an older brother to the 12-20 children living in our center at any given time.

Woodrow Wilson School Research Program Summer 2001 Princeton, NJ
Senior Summer Research Fellow

- Funding for five weeks of research on national tuberculosis control programs in Peru and Bolivia. My work consisted mainly of interviews and site visits with the Pan-American Health Organization, national health departments and non-governmental organizations in Lima, Peru, La Paz, Bolivia and Santa Cruz, Bolivia.

Hogar de Cristo Unidad Movil Medica March – July 2001 Santiago, Chile
Volunteer

- Volunteered 1-2 times per week during my study abroad semester with the mobile medical unit in Santiago that rotated through the dozens of shanty towns in Santiago.

Amigos de Las Americas June – August 1999 Tarija, Bolivia
Volunteer Community Health Promoter

- Worked in partnership with PLAN International's home improvement

community projects aimed at controlling Chagas disease in southern Bolivia.

Amigos de las Americas June – August 1997 Cotopaxi, Ecuador
Volunteer Community Health Promoter

- Worked in partnership with the agricultural ministry's rural development projects in sustainable farming practices and crop diversification.

Personal/ Skills

Quantitative analysis: proficient in STATA.

Laboratory medicine skills: validation science of diagnostic assays, nucleic acid detection assay design, next generation sequencing platforms for pathogen detection.

Language: Fluent in Spanish; conversational in Kiswahili

Spouse: Jessica A. Rubach

Children: Dominic, Lucy, Anne, John, Genevieve, Beatrice

Activities: trekking, road cycling, distance running

Favorite Literary Works: *The Book of Laughter and Forgetting* (Kundera), *Narcissus and Goldmund* (Hesse), *The Life and Times of Michael K* (Coetzee), *Don Quijote* (Cervantes), *Swann's Way* (Proust).

Music: Sam Cooke, Otis Redding, Silvio Rodriguez, Dvorak, Beethoven, Brahms, Saint-Saens, Sibelius, Rimsky-Korsakov

References

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