

Nana A. Y. Twum-Danso, MD, MPH, FACPM

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SUMMARY:

Preventive medicine and public health physician executive with more than 20 years of experience in health policy, practice, strategy, evaluation, and research with:

- Subject matter expertise in continuous quality improvement (CQI), patient safety, learning systems development, large-scale change management, leadership coaching, health systems strengthening, maternal, neonatal and child health (MNCH), emergency health transportation, lifestyle medicine, parasitic disease control, pharmacovigilance, and philanthropy.
- Strong leadership, management, and partnership-building skills.
- Excellent track record of training, coaching and mentoring individuals, teams, and leaders for improved performance.
- Demonstrated entrepreneurial success within established organizations and in start-ups.
- Work experience in diverse socioeconomic, political, cultural, and linguistic settings: USA; South Asia (India, Pakistan); and Africa (Cameroon, Ghana, Kenya, Liberia, Nigeria, Uganda).

WORK EXPERIENCE:

Institute for Healthcare Improvement, Boston, MA, USA

Results-Oriented Portfolio

Senior Vice President

Jun. 2021 – present

- Lead strategy, business development and program execution for IHI's results-oriented consulting work in more than 20 countries across six regions of the world. Clients include private sector health care systems; public sector health care, public health and social care systems; multilateral institutions; and non-governmental organizations.
- Provide oversight and accountability for top-line revenue, monitoring, continuous learning and improvement in program operations, team vitality and staff engagement.
- Serve on a 5-member Executive Team that oversees overall organizational strategy, operations, programs, and finances.

Low- & Middle-Income Countries Program

Executive Director for Africa

Jul. 2011 – Feb. 2012

- Oversaw the design, implementation, and monitoring of CQI projects in Ghana, Malawi and South Africa that were focused on MNCH and HIV/AIDS.
- Co-developed IHI's first global strategy with a focus on expansion to emerging markets.

Project Fives Alive!, Ghana

Director

Feb. 2008 – Nov. 2011

- Led the design and implementation of a large-scale CQI project to reduce child mortality in Ghana through systems and process improvements in service delivery for MNCH in partnership with the National Catholic Health Service (NCHS) and the Ghana Health Service (GHS), the two largest health service delivery agencies of the Ministry of Health (MOH).
- Trained and coached the project's technical staff of >12 people in the theory and practice of improvement science and change management; further developed them into trainers and coaches to execute a nationwide decentralized CQI project alongside community leaders, health care providers, middle managers and senior leaders at community, district and regional levels.
- Built and nurtured strategic and technical relationships with NCHS, GHS, WHO, United Nations Children's Fund (UNICEF), non-governmental organizations (NGOs) and other stakeholders in Ghana and other African countries.

The Rockefeller Foundation, New York, NY, USA

Health Initiative

Managing Director

Aug. 2019 – May 2021

- Oversaw a portfolio of grants and contracts designed to transform the practice of community health through digitalization, data analytics, and timely feedback to enable improvement at the frontlines of MNCH in India and several African countries.
- Designed and executed a US \$100 million grant portfolio to assist health institutions in India, Africa, and Latin America in their COVID-19 pandemic response with testing, contact tracing, and strengthening of information systems.

MAZA, Accra, Ghana

Founder & CEO

May 2015 – Apr. 2019

- Founded and led a social enterprise that established a transportation network to meet the urgent and emergency health needs of pregnant women and sick infants in remote rural areas of northern Ghana while also creating income-generating opportunities for drivers, traders and farmers.
- Partnered with the Ghana Health Service, Ghana National Ambulance Service, local communities and academic institutions to design, monitor and adapt MAZA's health transportation offerings to meet local needs and expectations in an iterative manner.

Independent Consultant in CQI, Learning Systems Development & Program Evaluation

Global Alliance for Improved Nutrition, Geneva, Switzerland

Sept. 2018 – Aug. 2019

Integration of CQI principles into workplace nutrition programs in five countries in Sub-Saharan Africa and South Asia.

TD Health, Accra, Ghana

Mar. 2017 – Mar. 2019

Led multi-disciplinary team to evaluate a large-scale health system intervention to improve newborn survival in Ghana.

- **University of California San Francisco, CA, USA** **Jun. 2016 – May 2019**
Designed and led Improvement Collaboratives to improve the quality of intrapartum care and care of preterm babies in selected hospitals in Kenya and Uganda as part of a multi-country implementation research study.
- **The Billions Institute, Claremont, CA, USA** **Feb. 2016 – Jul. 2019**
Longitudinal training and coaching in CQI, large-scale change management and learning systems development to improve MNCH in eight countries in Latin America.
- **Institute for Healthcare Improvement, Boston, MA, USA** **Jan. 2016 – Dec. 2016**
Led IHI's team of advisers on a large-scale CQI program to reduce neonatal mortality in Andhra Pradesh and Telangana, India.
- **World Health Organization, African Region, Brazzaville, Congo** **Jul. 2015 – Sept. 2018**
Conducted a literature review on the functions of community health workers and their effectiveness in different contexts following the Ebola epidemic in West Africa, developed policy briefs and prepared a manuscript for publication.

Bill & Melinda Gates Foundation, Seattle, WA, USA

- Secondment to UNMEER/Ghana & WHO/Liberia** **Medical Officer** **Jan. 2015 – Apr. 2015**
- Contributed to the monitoring and improvement of the restoration of safe essential health services in both public and private health facilities as the Ebola virus disease outbreak waned in Liberia, with a focus on infection prevention and control; assisted the Ministry of Health of Liberia with the development of their Investment Plan for Rebuilding a Resilient Health System.

- Maternal, Neonatal and Child Health Department** **Senior Program Officer** **Apr. 2012 – Jan. 2015**
- Conceptualized, designed, developed, and managed a grant portfolio across the continuum of care from the community to the hospital to improve MNCH outcomes at scale in Sub-Saharan Africa (SSA). Portfolio > US \$100 million.
 - Led the development and execution of a strategy to apply CQI approaches to improving intrapartum and immediate postpartum care delivery and outcomes across multiple initiatives in the MNCH department.
 - Advised internal colleagues on context-relevant strategies and project designs to better achieve large-scale behavior change and population-level impact including the development of a demand generation strategy for the Integrated Delivery team.
 - Co-led a cross-departmental initiative to address structural barriers to adolescent reproductive health, nutrition and empowerment through evidence generation, strategy development and grant shaping.

Task Force for Global Health, Atlanta, GA, USA

- Children Without Worms** **Director** **Mar. 2006 – Feb. 2008**
- Developed and led a start-up initiative to control soil-transmitted helminth (STH) infections in young children in Africa, Asia and Latin America through regular mass deworming, hygiene education and environmental sanitation.
 - Established an advisory committee of technical experts from around the world and collaborated with them to design, execute, monitor and improve the program over time.
 - Built collaborative relationships with MOHs, Johnson & Johnson, UNICEF, WHO, World Food Programme (WFP), and NGOs to promote and advocate for a broad-based, multi-sectoral approach to STH control.

- Mectizan® Donation Program** **Associate Director** **Aug. 2001 – Nov. 2006**
- Serious Adverse Event Research, Surveillance & Management*
- Oversaw Serious Adverse Event (SAE) surveillance, data analysis, and reporting following community-based mass treatment with Mectizan for onchocerciasis control, and with Mectizan and albendazole for lymphatic filariasis (LF) elimination in 35 countries in SSA, the Middle East and Latin America.
 - Provided technical support to MOHs in Cameroon and the Democratic Republic of Congo on SAE surveillance, referral and clinical management in areas co-endemic for onchocerciasis and loiasis, including technical guidelines and policy briefs.
 - Designed and implemented research studies and literature reviews to answer critical operational questions for field programs, in consultation with the Mectizan Expert Committee, the program's technical advisory and policy-setting body.

- Lymphatic Filariasis Program Development, Management & Policy*
- Developed and managed LF operations to ensure safe, effective and appropriate donations of Mectizan and albendazole to LF Elimination Programs in 29 countries in SSA and the Middle East for approximately 400 million people at risk of LF.
 - Collaborated with MOHs, NGOs, WHO, World Bank, Merck & Co., Inc., GlaxoSmithKline, academic institutions and other partners to ensure effective implementation of LF Elimination Programs.

Harvard College, Cambridge, MA, USA

- Cabot House** **Premedical Advisor** **Sept. 1995 – Jun. 1999**
- Provided advising, coaching, and counseling services to Harvard College students exploring careers in medicine and other health sciences.
 - Assisted Harvard College students in Cabot House that were applying to medical school with the entire application process including personal statements, recommendation letters, mock interviews, and school selection.
 - Served as resident tutor in providing overall adult supervision and mentoring support to any undergraduate student in the house.

ADJUNCT FACULTY POSITIONS:

Gillings School of Global Public Health, University of North Carolina at Chapel Hill, NC, USA

Department of Maternal and Child Health

Adjunct Assistant Professor

Feb. 2012 – present

- Teach occasional sessions in courses as a guest lecturer.
- Advise and mentor MPH and PhD students on their theses and dissertations respectively.
- Provide internship and practicum experience opportunities for MPH students where feasible.

Emory University School of Medicine, Atlanta, GA, USA

Department of Family & Preventive Medicine

Clinical Instructor

Oct. 2001 – Feb. 2008

- Taught and facilitated didactic sessions in global health for the Emory Preventive Medicine Residency Program.
- Collaborated on hospital emergency preparedness research with the National Center for Environmental Health of the U.S. Centers for Disease Control and Prevention and Prevention in Atlanta.

TECHNICAL & SCIENTIFIC ADVISORY COMMITTEES:

Facebook, Inc.

Health Data Advisory Group

Mar. 2021 – Dec. 2021

- Advise Facebook Health's team in maximizing the use of data from its ~3 billion users worldwide for understanding and contributing to knowledge, attitudes behaviors and policies related to the COVID-19 pandemic and public health measures.

Lancet Global Health Commission on High Quality Health Systems in the SDG Era

Global Commissioner

Dec. 2016 – Dec. 2018

- Provided technical guidance into the scoping, drafting and finalization of the Report of the Lancet Global Health Commission on High Quality Health Systems in the SDG Era for publication in the Lancet Global Health and dissemination globally as well as other related manuscripts for publication elsewhere. Commission secretariat was the Harvard School of Public Health.

World Health Organization, Service Delivery & Safety

Advisory Committee

Feb. 2014 – Apr. 2018

- Contributed technical input during the conceptualization, drafting and editing of WHO's Global Report on Safety and Quality of Health Care Services.

US National Academy of Sciences, Engineering and Medicine

Advisory Committee

Nov. 2013 – Aug. 2016

- Provided technical input to the Bureau of Global Health's Standing Committee to Support USAID's Engagement in Health Systems Strengthening in Response to the Economic Transition as it evolved its policies, plans and programs.
- Contributed to the conceptualization, drafting and editing of a Consensus Report to the US congress on American investment in health systems in low- and middle-income countries given the increasing economic transition in many recipient countries.

International Development Research Centre

Technical Committee

Jul. 2014 – Jun. 2016

- Reviewed implementation research proposals to improve MNCH in SSA, provided feedback to applicants, and recommended finalists for funding from the Global Health Research Initiative of the Canadian government.

Africa Routine Immunization System Essentials

Advisor

Apr. 2010 – May 2012

- Provided technical and strategic advice on an External Panel of Experts, for a CQI project in childhood immunization in Uganda implemented by JSI International, Dartmouth Institute for Health Policy and Makerere University.

Expanded Quality Management Using Information Power

Advisor

Dec. 2010 – Nov. 2011

- Advised implementers and researchers from Karolinska Institutet and the London School of Hygiene and Tropical Medicine on the design and implementation of a CQI project in maternal and newborn health in Uganda and Tanzania.

Wyeth/Pfizer

Consultant

Apr. 2009 – Oct. 2011

- Served on Wyeth/Pfizer's 3-member Drug Safety Monitoring Board for a clinical trial of a new drug for mass treatment of onchocerciasis. Reviewed and analyzed safety data regularly to advise on continuation or stoppage of the trial.

WHO Special Programme on Tropical Disease Research

Advisor

Oct. 2008 – Sept. 2011

- Provided strategic and technical advice to WHO on its business line for drug development and evaluation for helminths and other neglected tropical diseases through a Scientific Advisory Committee.

National Onchocerciasis Task Force/WHO, Cameroon

Consultant

Oct. 2000 & Apr. 2002

- Evaluated availability, distribution and effectiveness of Information, Education and Communication materials in national onchocerciasis mass treatment program and developed strategies for improvement with key stakeholders in Cameroon.
- Evaluated surveillance system for SAEs following mass treatment with Mectizan in southern Cameroon where onchocerciasis and loiasis are co-endemic and developed strategies for improvement of surveillance with key stakeholders.

PUBLIC SERVICE:

Boards of Directors for Non-profit Organizations

- Muso, Bamako, Mali
 - Member, Board of Directors, Dec. 2021 – present
- Kaya Child Care, Accra, Ghana
 - Chair, Board of Directors, Oct. 2019 – present
- Harvard Alumni Association, Cambridge, MA, USA
 - Member, Board of Directors, Jul. 2007 – Jun. 2010
- Harvard African Students' Alumni Network, Cambridge, MA, USA
 - Chair Emerita, Board of Directors: Jan. 2007 – Dec. 2010
 - Founder, President & Chair, Board of Directors: May 2000 – Dec. 2006
 - Advisor, Philippe E. Wamba Memorial Fund for Road Traffic Safety: Apr. 2004 – Dec. 2010

Editorial Boards/Committees for Scientific Journals

- Global Health Science and Practice: Jan. 2022 – present
- International Journal for Quality in Healthcare Communications: Jun. 2021 – present

Peer Review for Scientific Journals and Conferences

- International Journal for Quality in Healthcare Jun. 2018 – present
- British Medical Journal Quality and Safety in Health Care Jun. 2014 – present
- Global Health Science and Practice Mar. 2014 – present
- IHI National Forum, Scientific Symposium Program Committee Aug. 2014 – Oct. 2019

American College of Preventive Medicine's Annual Conference

- Planning Committee Member, Global Health Track 2014, 2015 & 2016

Harvard Club of Georgia

- Member, Schools & Scholarships Committee: Oct. 2001 – Aug. 2005

PROFESSIONAL TRAINING:

Institute for Healthcare Improvement, Cambridge, MA, USA

Improvement Advisor Feb. 2008 – Dec. 2008

- Completed 10-month professional development course in the theory and practice of the science of improvement which included didactic and practical training in advanced methods, leading and facilitating change, and systems transformation.

Emory Preventive Medicine Residency Program, Atlanta, GA, USA

Medical Resident

Aug. 1999 – Jul. 2001

- Completed residency training in preventive medicine and public health which entailed academic work towards an M.P.H. degree at Emory University and practicum experiences in clinical prevention and public health settings.
- Focused public health experience in epidemiological research on SAEs in Cameroon with the Task Force for Global Health (6mths), project management, training, monitoring and evaluation in polio eradication Pakistan (3mths) and emergency preparedness in the USA and the Pacific Islands with the US Centers for Disease Control and Prevention (3mths).

Harvard Emergency Medicine Residency Program, Boston, MA, USA

Medical Intern

Jul. 1998 – Jun. 1999

- Completed internship training in emergency medicine at the Massachusetts General Hospital and Brigham & Women's Hospital, affiliates of Harvard Medical School in Boston.
- Provided clinical care under the supervision of attending physicians in the emergency care of adult and pediatric patients, inpatient care of adults in medical wards and intensive care units, anesthesia, orthopedics and obstetrics.

EDUCATION:

Emory University School of Public Health, Atlanta, GA, USA

Aug. 1999 – Jul. 2001

- M.P.H. degree in Health Policy & Management

Harvard Medical School, Boston, MA, USA

Sept. 1994 – Jun. 1998

- M.D. degree

Harvard College, Cambridge, MA, USA

Sept. 1990 – Jun. 1994

- A.B. degree in Biochemical Sciences

AWARDS & FELLOWSHIPS:

- Arnold P. Gold Foundation Humanism in Medicine Award 2019
- Echoing Green Global Fellowship 2016
- Jane Rainie Opel Young Alumna Award for Outstanding Contribution to Profession 2004
- William H. & Anne E. Foege Global Health Scholarship 2000
- NBI Healthcare Foundation Humanism in Medicine Award 1998
- Harvard Public Service Work Abroad Fellowship 1993
- Harvard Committee on African Studies Research Fellowship 1993
- Ford Grant for Undergraduate Research 1992

PROFESSIONAL MEMBERSHIPS:

- American College of Lifestyle Medicine 2019 – present
- Health Systems Global 2018 – present
- International Society for Quality in Health Care 2010 – present
 - Member of Academy of Quality and Safety in Health Care since 2020
- American College of Preventive Medicine 2000 – present
 - Fellow since 2006
- American Society of Tropical Medicine and Hygiene 2002 – 2013

MEDICAL LICENSES & CERTIFICATIONS:

- American Board of Preventive Medicine – certification 2003 – present
- State of Georgia, USA – medical license 1999 – present

LANGUAGE SKILLS:

- Fluent in English & Ga
- Proficient in French & Twi

PEER-REVIEWED PUBLICATIONS

1. Martins DC, Babajide O, Maani N, Abdalla S, Gómez EJ, Pongsiri MJ et al. Integrating social determinants in decision-making processes for health: insights from conceptual frameworks—the 3-D Commission. *J Urban Health* 2021;98 (Suppl 1):S51–S59
2. Babjide O, Martins DC, Maani N, Abdalla S, Gómez EJ, Pongsiri MJ et al. Improving decision-making for population health in nonhealth sectors in urban environments: the example of the transportation sector in three megacities—the 3-D Commission. *J Urban Health* 2021;98 (Suppl 1): S60–S68
3. Dadzie D, Boadu RO, Engmann CM, **Twum-Danso NAY**. Evaluation of neonatal mortality data completeness and accuracy in Ghana. *PLOS ONE* 2021;16(3): e0239049.
4. Alhassan RK, Nketiah-Amponsah E, **Twum-Danso, NAY** et al. “Top-down bottom-up” estimation of per capita cost of new-born care interventions in four regions of Ghana: beyond implementation to scalability and sustainability. *Health Economics Review* 2021;11:8.
5. Roder-DeWan S, Nimako K, **Twum-Danso NAY**, Amatya A, Langer A, Kruk M. Health system redesign for maternal and newborn survival: rethinking care models to close the global equity gap. *BMJ Global Health* 2020;5:e002539.
6. Roder-DeWan S, Gage A, Hirschhorn L, **Twum-Danso NAY**, Liljestrand J, Asante-Shongwe K et al. Level of confidence in and endorsement of the health system among internet users in 12 low-income and middle-income countries. *BMJ Global Health* 2020;5:e002205.
7. Brathwaite KP, Bryce F, Moyer LB, Engmann C, **Twum-Danso NAY**, Kamath-Rayne BD et al. Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation Plus* 2020; 1-2:100001. <https://doi.org/10.1016/j.resplu.2020.100001>
8. Lehman U, **Twum-Danso NAY**, Nyoni J. Towards universal health coverage: what are the system requirements for effective large-scale community health worker programs? *BMJ Global Health* 2019; 4(Suppl 9). <http://dx.doi.org/10.1136/bmjgh-2018-001046>.
9. Gage AD, Carnes F, Blossom J, Aluvaala J, Amatya A, Mahat K et al. In low- and middle-income countries, is delivery in high-quality obstetric facilities geographically feasible? *Health Affairs* 2019; 38(9):1576-1584.
10. Roder-Dewan S, Gage AD, Hirschhorn LR, **Twum-Danso NAY**, Liljestrand J, Asante-Shongwe K et al. Expectations of healthcare quality: a cross-sectional study of internet users in 12 low- and middle-income countries. *PLOS Medicine* 2019;16(8): e1002879. <https://doi.org/10.1371/journal.pmed.1002879>.
11. Singh K, Speizer I, Barker PM, Agyeman-Duah JNA, Agula J, Akpabli JK et al. Evaluating the impact of a hospital scale-up phase of a quality improvement intervention in Ghana on mortality for children under five. *International Journal for Quality in Health Care* 2019. <https://doi.org/10.1093/intqhc/mzz073>
12. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution. *Lancet Global Health* 2018;6(11):e1196–e252. [https://doi.org/10.1016/S2214-109X\(18\)30386-3](https://doi.org/10.1016/S2214-109X(18)30386-3).
13. Khan SM, Speizer IS, Singh K, Angeles G, Ilene S, **Twum-Danso NAY**, Barker P. Does postnatal care have a role in improving newborn feeding? A study in 15 sub-Saharan African countries. *Journal of Global Health* 2017;7(2):020506.
14. Kruk ME, Larson E, **Twum-Danso NAY**. Time for a quality revolution in global health. *Lancet Global Health* 2016; 4:e596.
15. Fokom-Domgue J, Pion SD, Gounoue R., Akame J, Nguipdop-Djomo P, **Twum-Danso NAY** et al. Short report: absence of an association between *Plasmodium falciparum* infection and post-ivermectin loa-related non-neurologic serious adverse events. *American Journal of Tropical Medicine and Hygiene* 2014; 90:335-338.
16. **Twum-Danso NAY**, Akanlu GB, Dasoberi IN, Amenga-Etego IA, Adondiwo A, Kanyoke E et al. Using quality improvement methods to test and scale-up a new early postnatal care policy in Ghana. *Health Policy and Planning* 2014; 29(5): 622–632.

17. Singh K, Speizer I, Handa S, Boadu RO, Atinbire S, Barker PM, **Twum-Danso NAY**. Impact evaluation of a quality improvement intervention on maternal and child health outcomes in northern Ghana: early assessment of a national scale-up project. *International Journal for Quality in Health Care* 2013; 25(5):477-487.
18. Darmstadt GL, Marchant T, Claeson M, Brown W, Morris S, Donnay F et al. A strategy for reducing maternal and newborn deaths by 2015 and beyond. *BMC Pregnancy and Childbirth* 2013; 13:216.
19. **Twum-Danso NAY**, Akanlu GB, Osafo E, Sodzi-Tettey S, Boadu RO, Atinbire S et al. A nationwide quality project to accelerate Ghana's progress towards Millennium Development Goal Four: design and implementation progress. *International Journal for Quality in Health Care* 2012; 24(6):601-611.
20. Barker PM, **Twum-Danso NAY**, Provost LP. Retrospective evaluation of UNICEF's ACSD programme. *Lancet* 2010; 375:1521.
21. Thylefors B, Alleman MM, **Twum-Danso NAY**. Operational lessons from 20 years of the Mectizan® Donation Program for the control of onchocerciasis. *Tropical Medicine and International Health* 2008; 13:689-696.
22. Fay MP, Huang C-Y, **Twum-Danso NAY**. Monitoring rare serious adverse events from a new treatment and testing for difference from historical controls. *Clinical Trials* 2007; 4:598-610.
23. Kamgno J, Pion SDS, Tejiokem MC, **Twum-Danso NAY**, Thylefors B, Boussinesq M. Randomized, controlled, double-blind trial with ivermectin on *Loa loa* microfilaraemia: efficacy of a low dose (~25 µg/kg) versus current standard dose (150 µg/kg). *Transactions of the Royal Society of Tropical Medicine & Hygiene* 2007; 101:777-785.
24. Alleman MM, **Twum-Danso NAY**, Thylefors BI. The Mectizan® Donation Program – Highlights from 2005. *Filaria Journal* 2006; 5:11.
25. Gyapong JO, **Twum-Danso NAY**. Global elimination of lymphatic filariasis: fact or fantasy? *Tropical Medicine and International Health* 2006; 11:125-128.
26. Malecela-Lazaro M, **Twum-Danso N**. Towards a strategic plan for research to support the global program to eliminate lymphatic filariasis. Summary of immediate needs and opportunities for research on lymphatic filariasis. 2.4 Program implementation. *American Journal of Tropical Medicine and Hygiene* 2004; 71(5 Suppl):16-19.
27. **Twum-Danso NAY**. Mass treatment of onchocerciasis with ivermectin: should people with epilepsy and/or growth-retardation syndromes be excluded? *Annals of Tropical Medicine and Parasitology* 2004; 98:99-114.
28. **Twum-Danso NAY**, Meredith SEO. Variation in incidence of serious adverse events after onchocerciasis treatment with ivermectin in areas of Cameroon co-endemic for loiasis. *Tropical Medicine and International Health* 2003; 8:820-831.
29. **Twum-Danso NAY**. Serious adverse events following treatment with ivermectin for onchocerciasis control: a review of reported cases. *Filaria Journal* 2003; 2(Suppl 1):S3.
30. **Twum-Danso NAY**. *Loa loa* encephalopathy temporally related to ivermectin administration reported from onchocerciasis mass treatment programs from 1989 to 2001: implications for the future. *Filaria Journal* 2003; 2(Suppl 1):S7.
31. Addiss D, Rheingans R, **Twum-Danso NAY**, Richards FR. A framework for decision-making for mass distribution of Mectizan® in areas endemic for *Loa loa*. *Filaria Journal* 2003; 2(Suppl 1):S9.
32. Keim ME, Pesik N, **Twum-Danso NAY**. Lack of hospital preparedness for chemical terrorism in a major U.S. city: 1996-2000. *Prehospital and Disaster Medicine* 2003; 18:193-199.
33. **Twum-Danso NY**. Disaster epidemiology: prudent public health practice in the Pacific Islands. *Pacific Health Dialog* 2002; 9:58-63.
34. Collins JJ, Geake J, Grier HE, Houck CS, Thaler HT, Weinstein HJ, **Twum-Danso NY**, Berde CB. Patient-controlled analgesia for mucositis pain in children: a three-period crossover study comparing morphine and hydromorphone. *Journal of Pediatrics* 1996; 129: 722-728.