I-TECH
International
Training & Education
Center for Health

Digital Square Notice E0

Improving Shelf-Readiness by Sharing Patient Data Across Systems: OpenMRS, Mobile WACh, an SHR, and OpenHIE

Final Technical Application
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This application is valid for 90 days from the date of submission.

Two-Sentence Overview

Both OpenMRS and Mobile WACh are critical components in providing care to patients, and collect data at different points in the healthcare system that should be shared with each other through a Shared Health Record (SHR) to improve decision making and patient outcomes. This project aims to 1) build FHIR support and OpenHIM mediators to send and receive data from both OpenMRS and Mobile WACh with the SHR, 2) test the resulting code in the Instant OpenHIE project, and 3) disseminate code and OpenHIE implementation guides for the broader global goods community.

High-Level Budget Summary

	Work Package 1: Expand FHIR Module for OpenMRS for interoperability with Mobile WACh through a Shared Health Record	Work Package 2: Build Mobile WACh FHIR Support for Shared Health Record Interoperability	Total Cost (USD)
Total Project Costs	$47,352	$60,361	**$107,713**

Executive Summary

Patient centered care (PCC) is defined as "providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions", and was identified by the Institute of Medicine as a critical gap in achieving high quality

healthcare and improving patient outcomes.[1] Evidence shows that a shift to PCC in the US significantly improved patient outcomes and reduced costs, but global health has yet to make this shift, partly due to information silos. Digital health tools can serve to support PCC, but just having tools that involve patients does not equal PCC. Those tools must also be properly integrated across the ecosystem, making information about patients' evolving needs, preferences and contexts accessible and usable across the longitudinal record to inform shared decision making by providers and patients.

This proposal identifies a specific use case to improve shelf-readiness of digital health tooling that can better support the shift towards PCC in LMIC. Our use case builds upon a provider-centered EMR, a patient-centered technology (PCT), and the longitudinal shared health record (SHR) that integrates the data and informs the patients' needs, preferences, and contexts. Our provider-centered EMR, OpenMRS, is a high quality, open source platform used in over 5,500 health facilities in 64 countries, and is a founding block to the data needs across a health program. We will improve the OpenMRS interoperability capabilities by expanding the FHIR module to interact with a Shared Health Record using the OpenHIE architecture.

Our patient-centered technology, Mobile WACh, is a recognized digital health global good supporting patient centered care through bidirectional mobile messaging between clinic health care workers (HCW) and patient consumers. It is used for managing urgent, episodic, and chronic health conditions (e.g. MCH, mental health, HIV). Mobile WACh provides patients real-time personalized education, support, advice and referrals. Although Mobile WACh has successfully supported care within a siloed program, in order to be shelf-ready for maximally effective care and treatment in broader implementations, and to provide tailored support and guidance for patient decision-making about their health, Mobile WACh will need longitudinal data for a patient. In return, Mobile WACh collects critical patient-reported data, such as significant events, symptoms and concerns, that should be shared back to other care providers and the health record. We will improve the shelf-readiness of Mobile WACh by adding FHIR-support for interoperability with a Shared Health Record using the OpenHIE architecture.

The results contribute to a more complete longitudinal patient record that can be utilized within national implementations for improved continuity of care, and supports the shift towards PCC. Both products will also be able to be used by Instant OpenHIE for rapid deployment. The project includes leadership from University of Washington and Kenyatta National Hospital collaborating with OpenMRS, Mobile WACh, and OpenHIE communities; and leverages existing country-level projects in Haiti and Kenya to contribute to the requirements and ensure real-world applicability and implementability.

Consortium Team

The project team will be led by the Digital Initiatives Group (DIGI) at the International Training and Education Center for Health (I-TECH) at the University of Washington (UW). I-TECH is a Center within the UW Department of Global Health (DGH) that leads health systems strengthening initiatives in more than 20 countries.

The Digital Initiatives Group at I-TECH (DIGI), University of Washington (UW) is a global health informatics center within the International Training and Education Center for Health at the University of Washington. Launched in December 2018 under the leadership of faculty members

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[1] Institute of Medicine (US) Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington DC: National Academies Press (US); 2001. https://doi.org/10.17226/10027

Nancy Puttkammer and Jan Flowers, DIGI brings together experienced I-TECH informatics experts and staff with a broad range of expertise in setting global health informatics standards and leading global goods communities and products at the domain level, as well as, applying those in real-world settings in LMIC in a sustainable, scalable, replicable manner. The DIGI team brings together In addition to the core team members, the center collaborates and harnesses expertise from faculty, staff, and students from the UW's Schools and Departments including Health Sciences, Computer Science and Engineering, Bioengineering, Information Sciences, Business and others.

Related to this proposal, DIGI faculty and team members are leaders in the global goods communities at large, founding and actively leading the OpenHIE LIS Community of Practice; as well as, serving on the Board of Directors and in strategic leadership roles for both the OpenMRS and OpenELIS communities. Since 2009, DIGI staff have led multiple national-level OpenMRS engineering, implementation, and interoperability projects, including in Kenya (KenyaEMR), Haiti (iSantePlus), Mozambique (eSaude), and Vietnam (eClinica). DIGI has been lead interoperability architects for Haiti, Kenya, Cote d'Ivoire, Mozambique, and Vietnam health programs. DIGI is the steward of OpenELIS Global development and national implementations in Haiti and Cote d'Ivoire since 2009 and 2010 respectively, in more than 75 national public health reference labs as well as in large-volume clinical laboratories. With funding from Digital Square Notice C and in coordination with existing country-level projects in Haiti, DIGI established standards-based integration between OpenMRS and OpenELIS using FHIR, supporting the identification of gaps in the FHIR profiles and implementation guides for LMIC use, and led and published the OpenHIE LIS-EMR architectural specification with the OpenHIE LIS Community of Practice.

The Mobile WACh team is a multidisciplinary collaboration between researchers at UW and Kenyatta National Hospital (KNH) in Kenya. The team includes obstetrician-gynecologists and pediatricians at UW and KNH, nurses at KNH, and epidemiologists and digital health researchers at UW. Since 2012, the team has developed and implemented 7 projects using Mobile WACh to support maternal-child, HIV and reproductive health in Kenya, including 5 randomized controlled trials. Drs. Unger and Kinuthia are obstetrician-gynecologists, physician researchers, who led the platform's original development. Their perspectives as clinicians who provide care in diverse healthcare systems (Dr. Kinuthia in Kenya and Dr. Unger in the US), and as digital health researchers will ensure that the proposed project develops tools with clinical utility. Dr. Ronen is a digital health researcher with expertise in development, implementation and evaluation of digital health interventions in Kenya, including Mobile WACh. Dr. Ronen's experience working closely with software developers and translating research and implementation priorities into software decisions will ensure the proposed project develops tools that meet stakeholder needs. Mobile WACh was originally developed in collaboration with researchers in the UW Department of Computer Science and Engineering, employing human-centered design principles to develop a platform that integrated into healthcare worker workflow. With each implementation of the platform, iterative changes have been made in collaboration with software developers, to facilitate rapid deployment of new instances and improve the platform's scalability.

Background or Problem Statement

Despite being a mature product and global good, there is still a need to address a standards-based approach to connecting OpenMRS to a national repository of longitudinal data. Mobile WACh has focused on flipping the paradigm of healthcare in LMIC by moving towards a more direct to beneficiary, patient-centered approach for patient consumers; but remains an information silo in interoperable architectures. Providers using OpenMRS and HCWs supporting remote care in Mobile WACh would both highly benefit from access to the others' data from a more complete longitudinal medical record for improving decision making and moving towards PCC to improve patient outcomes.

We propose to build interoperability between OpenMRS, Mobile WACh, and a Shared Health Record, using the OpenHIE architecture and FHIR standards. For the purpose of this project, the Shared Health Record will also serve as a patient index, but may not do so in real-world applications where another designated software serves as that source of truth for the patient index. In addition, we will show the improved shelf-readiness by testing the products as part of the Instant OpenHIE project. We will work with applicable global goods communities in all phases of the work, and collaborate with our real-world implementations of these tools to ensure appropriate requirements are specified to meet the needs of users and that final products are accepted as meeting the specified requirements.

Digital Health Technologies

OpenMRS is the most widely used open-source electronic medical record (EMR) system globally. The OpenMRS platform is a generic platform for developing electronic medical record (EMR) system implementations. It is designed to collect and manage patient-centric longitudinal medical data. The platform consists of a database, an abstraction layer between code and the database (i.e., Hibernate, a tool to map between Java objects and a database), a Java-based service layer, and a web services (a bespoke REST interface and a standard FHIR interface). The data model is heavily influenced by the HL7 reference information model and uses a central concept dictionary to define the data it contains. As a result, the system is very flexible – not focused on a specific vertical use case – and can be adapted for any patient-centric health solution. The platform is also designed to be modular, making it extremely extensible by allowing customizations to be added or removed to meet local needs. Multiple APIs are available, supporting interoperability. Proven interoperability already exists between multiple systems, and, in fact, OpenMRS has been proven to support case based reporting using the OpenHIE architecture.

MobileWACh is a semi-automated platform that connects patients with healthcare workers by SMS messaging.The platform automatically sends patients a pre-composed curriculum of scheduled messages (1-way "push" messaging) based on their medical condition or health status. Patients may send messages to the system at any time to be answered by a live HCW, leading to personalized dialogue (2-way messaging). The platform has been tailored to deliver SMS curricula targeting multiple health behaviors and evaluated in 2 completed randomized controlled trials (RCTs) with pregnant and postpartum women in Kenya as well as a large demonstration project among adolescent and young women (AGYW). The trials found that interactive Mobile WACh SMS led to extension of exclusive breastfeeding and higher contraception use. The demonstration project led to an increase in PrEP use and retention in care for AGYW. Building

on these studies, 3 additional RCTs are ongoing, evaluating the impact of Mobile WACh on antiretroviral treatment adherence in women living with HIV, neonatal health, and at-home mid-upper arm circumference measurement of children by their caregivers for early detection of malnutrition

Use Cases and User Stories

As a **patient**, I would like to:
● know that when I receive care, my medical history is available to the provider that I am seeing for care at any time
● know that when using a patient centered service that provides care and support outside of the traditional clinic facility and programs, my preferences, values, and relevant data will be available for use by my traditional providers when I utilize their services.
● know that all of my medical record information will be available to any care provider I include as part of my whole medical home so that I receive the best possible care based on my specific situation and history.
● communicate remotely with my healthcare provider team

As a **clinical provider in a routine care program**, I would like to:
● be able to share the patient data I have collected from visits with other programs that the patient may be having clinical encounters with, such as an MCH clinic program or visits with community health workers.
● be able to view the clinical and other information collected during visits my patient had with other providers before receiving care with me, or between visits I've had with her at the clinic - such as with a community health worker.
● be able to know what relevant concerns have been communicated with nurses and CHWs between visits, such as side effects of prescriptions, or concerns about fetal movements, etc.
● be able to see if my patient has had prescriptions filled by other providers or community health workers between visits to my clinic

As **an antenatal care nurse**, I would like to:
● be able to review a woman's longitudinal medical record for pertinent information from her routine visits to inform my decision making.
● be able to communicate with patients remotely and have that be part of their patient data.

As a **postpartum nurse**, I would like to:
● be able to review a woman's longitudinal medical record for pertinent information from her routine visits to inform my decision making.
● be able to tailor educational materials more effectively with information from the full patient longitudinal medical record.

As a **community health worker**, I would like to:
● be able to review a patient's longitudinal medical record to inform my visit with that patient

● know that the tailored content within the tool I'm using is based on the patient's full medical context, not just the limited set of clinical information I've gathered from my visits

● share the medical data that I have collected on a patient with the longitudinal medical record so that others can use that clinical data if that patient goes to a clinic for care

As a **program manager**, I would like to be able to:

● utilize data from longitudinal medical records to determine if patients are receiving care according to best clinical practice, are lost to follow up, or have transferred care between clinics, services, or programs.

Objectives and Activities

Work Package 1: Expand FHIR Module for OpenMRS for interoperability with Mobile WACh through a Shared Health Record

OpenMRS has developed an early version of a FHIR module to address FHIR-based interoperability with a small set of specific use cases. The FHIR module is governed and managed by an OpenMRS community squad that includes several engineering and implementation teams, external engineering contributors, and both interoperability and FHIR experts. Our team will continue to participate in this squad, spearheading this initiative as part of the overall FHIR module strategic roadmap with that squad.

To properly build the exchange with the Shared Health Record, we will need to engage additional contributors and collaborators with this FHIR squad. Our team will recruit interested members of the OpenHIE SHR subcommunity to participate as stakeholders, providing input into the requirements from the SHR perspective. Our team will also leverage our existing OpenMRS and FHIR module implementation in Haiti to engage country-level members from those projects to provide real-world experience and input into the requirements to ensure the end product can be feasibly implemented in a real-world setting. Lastly, we will include members of the Mobile WACh community to provide domain expertise into the requirements.

In this work package, we propose working with the FHIR squad to prioritize the expansion of the FHIR module to include the specified resources and pathways for exchanging critical patient medical record information with a shared health record as part of a national health information ecosystem, with the intention that we will utilize this work to exchange data with the Mobile WACh system.

As part of shelf-readiness, OpenMRS FHIR interoperability must be well tested to create trust in the use of the product in a production environment, particularly when adding to a standards-based HIE, such as Instant OpenHIE. We will work with the OpenHIE team throughout the project to design a testing strategy for inclusion of this exchange architecture in the Instant OpenHIE product.

Our team proposes the following objectives and activities:

Objective 1.1: Develop FHIR-based interoperability for OpenMRS to exchange a standards-based patient summary

Activity 1.1.1: Develop requirements and specification for the OpenMRS-SHR exchange in collaboration with OpenMRS FHIR Squad, OpenHIE SHR subcommunity, Mobile WACh; and members from the Haiti implementation of OpenMRS.

Activity 1.1.2: Expand FHIR Module to include OpenMRS-SHR API: Based upon the HL7 FHIR International Patient Summary, map appropriate FHIR resources to the OpenMRS data model and develop the workflow.

Activity 1.1.3: OpenHIM mediators for OpenMRS-SHR exchange: Develop appropriate mediators for processing the exchange transaction between OpenMRS and the SHR.

Activity 1.1.4: Document the FHIR module additions

Objective 1.2: Test and document the OpenMRS patient summary exchange with OpenHIE

Activity 1.2.1: Document testing with Instant OpenHIE: Collaborate with the Instant OpenHIE team to design systematic testing for adding OpenMRS to the Instant OpenHIE project, specifically for exchanging a patient clinical summary.

Activity 1.2.2: OpenHIE architecture workflow specification for EMR-SHR: Provide input into the OpenHIE EMR-SHR workflow for the next publication of the specification.

Work package 2: Build Mobile WACh FHIR Support for Shared Health Record Interoperability

To date, Mobile WACh has not addressed the need for interoperability with other health systems. However, with critical clinical data being collected by this system in patient centered programs that provide care outside of the traditional clinical setting (such as with MCH nurses and community health workers), it is paramount that this system be able to receive a patient's longitudinal record from traditional visits, as well as, share clinical data back to the patient's full longitudinal record. As such, our team proposes to conduct activities that increase shelf-readiness through the addition of a FHIR-based API for exchanging data within a national health information architecture.

Although the community for the Mobile WACh specific system is still emerging, our team will actively recruit and engage similar system stewards and implementers to collaborate on requirements for this type of exchange. Such systems could include Commcare, Medic Mobile, and such. Our team will do the initial groundwork to determine which systems may have similar requirements, and create a small forum to collaborate during the project. Conducting the project this way will improve the possibility of the work serving as an example workflow for that can be contributed towards the overall OpenHIE architecture specification, and for a broader set of systems to adopt.

To properly build the exchange with the Shared Health Record, we will need to engage additional contributors and collaborators from the OpenHIE SHR subcommunity to participate as stakeholders, providing input into the requirements from the SHR perspective. Our team will also leverage our existing Mobile WACh implementations in Kenya to engage country-level members to provide real-world experience and input into the requirements to ensure the end product can be feasibly implemented in a real-world setting.

As part of shelf-readiness, interoperability must be well tested to create trust in the use of the product in a production environment, particularly when adding to a standards-based HIE, such as Instant OpenHIE. We will work with the OpenHIE team throughout the project to design a testing strategy for inclusion of this exchange architecture in the Instant OpenHIE product.

Our team proposes the following activities:

Objective 2.1 Develop FHIR-based interoperability for MobileWACh to exchange a standards-based patient summary

Activity 2.1.1: Develop requirements and specification for the Mobile WACh-SHR exchange in collaboration with Mobile WACh implementers, OpenHIE SHR subcommunity, and similar systems stewards and implementers.

Activity 2.1.2: Mobile WACh release with FHIR support for SHR exchange: Leveraging our team's experience in developing FHIR APIs for other global goods, our team will utilize HAPI FHIR libraries to include a new API for the Mobile WACh product to exchange an HL7 FHIR international patient summary.

Activity 2.1.3: Create OpenHIM mediators for Mobile WACh-SHR exchange: Develop appropriate mediators for processing the exchange transaction between OpenMRS and the SHR.

Activity 2.1.4: Document Mobile WACh FHIR API

Objective 2.2 Test the MobileWACh patient summary exchange with OpenHIE

Activity 2.2.1: Document testing with Instant OpenHIE: Collaborate with the Instant OpenHIE team to design systematic testing for adding OpenMRS to the Instant OpenHIE project, specifically for exchanging a patient clinical summary.

Community Feedback

This consortium expects to collaborate closely with the OpenMRS and OpenHIE communities of practice, and will actively engage other global good partners interested in developing FHIR-based interoperability with a Shared Health Record. In addition, this consortium will work closely with the HL7 FHIR working groups to ensure gaps for use of FHIR in LMIC are identified and taken into consideration.

For Workstream 1, the project team will work most closely with the OpenMRS Community. The OpenMRS Community has multiple pathways for engaging with the various cadres of community members. The OpenMRS FHIR Squad will be the prime engagement for this particular project, but other groups and specific members, such as the Technical Advisory Committee (TAC) and the Director of Product will be engaged for specific strategic discussions and decision-making input. We will join the FHIR squad each week in planning for sprints, providing updates on the work, and testing the product. The team will also work with Instant OpenHIE project members to align towards use of OpenMRS-SHR interoperability within that tool, and to conduct testing with Instant OpenHIE.

For Workstream 2, the project team will work closely with Mobile WACh researchers and other CHW global goods developers and implementers to define the requirements for sharing data from and to Mobile WACh. These workflows will serve as an example for the development of an exchange architecture specification for CHW and PCT tools exchanging with SHRs. In addition, the team will work with the Instant OpenHIE project members to align towards use of OpenMRS-SHR interoperability within that tool.

Schedule

The following is a high-level work plan:

Activity	Team	Months

	Location	1	2	3	4	5	6	7	8	9
Work Package 1: Expand FHIR Module for OpenMRS for interoperability with Mobile WACh through a Shared Health Record										
Objective 1.1: Develop FHIR-based interoperability for OpenMRS to exchange a standards-based patient summary										
Activity 1.1.1: Develop requirements and specification for the OpenMRS-SHR exchange in collaboration with OpenMRS FHIR Squad, OpenHIE SHR subcommunity, Mobile WACh; and members from the Haiti implementation of OpenMRS.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote	X	X	X						
Activity 1.1.2: Expand FHIR Module to include OpenMRS-SHR API: Based upon the HL7 FHIR International Patient Summary, map appropriate FHIR resources to the OpenMRS data model and develop the workflow.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote			X	X	X	X			
Activity 1.1.3: OpenHIM mediators for OpenMRS-SHR exchange: Develop appropriate mediators for processing the exchange transaction between OpenMRS and the SHR.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote					X	X			
Activity 1.1.4: Document the FHIR module additions	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote			X	X	X	X	X	X	X
Objective 1.2: Test and document the OpenMRS patient summary exchange with OpenHIE										
Activity 1.2.1: Document testing with Instant OpenHIE: Collaborate with the Instant OpenHIE team to design systematic testing for adding OpenMRS to the Instant OpenHIE project, specifically for exchanging a patient clinical summary.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote				X	X	X	X	X	X
Activity 1.2.2: OpenHIE architecture workflow specification for EMR-SHR: Provide input into the OpenHIE EMR-SHR workflow for the next publication of the specification.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote					X				
Work package 2: Build Mobile WACh FHIR Support for Shared Health Record Interoperability										
Objective 2.1 Develop FHIR-based interoperability for MobileWACh to exchange a standards-based patient summary										
Activity 2.1.1: Develop requirements and specification for the Mobile WACh-SHR exchange in collaboration with Mobile WACh implementers, OpenHIE SHR subcommunity, and similar systems stewards and implementers.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote		X	X						

Activity	Location											
Activity 2.1.2: Mobile WACh release with FHIR support for SHR exchange: Leveraging our team's experience in developing FHIR APIs for other global goods, our team will utilize HAPI FHIR libraries to include a new API for the Mobile WACh product to exchange an HL7 FHIR international patient summary.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote					X	X	X				
Activity 2.1.3: Create OpenHIM mediators for Mobile WACh-SHR exchange: Develop appropriate mediators for processing the exchange transaction between OpenMRS and the SHR.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote						X	X				
Activity 2.1.4: Document Mobile WACh FHIR API	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote					X	X	X	X	X	X	
Objective 2.2 Test the MobileWACh patient summary exchange with OpenHIE												
Activity 2.2.1: Document testing with Instant OpenHIE: Collaborate with the Instant OpenHIE team to design systematic testing for adding OpenMRS to the Instant OpenHIE project, specifically for exchanging a patient clinical summary.	DIGI, Seattle, WA; MobileWACh, Seattle, WA, Kenya; others remote					X	X	X	X	X	X	

Deliverables

Deliverable	Month/Quarter Due
Work Package 1	
Activity 1.1.1 OpenMRS-SHR Specification Document	M3
Activity 1.1.2 Link to Expanded FHIR Module Release	M6
Activity 1.1.3 Link to OpenHIM mediator repository	M7
Activity 1.1.4 FHIR Module Additions Documentation	M9
Activity 1.2.1 OpenMRS-SHR Test Documentation	M9

Activity 1.2.2 OpenMRS FHIR Module Release Documentation	M9
Work Package 2	
Activity 2.1.1 MobileWACh-SHR Specification Document	M3
Activity 2.1.2 Link to Mobile WACh Release	M6
Activity 2.1.3 Link to OpenHIM mediator repository	M7
Activity 2.1.4 MobileWACh Release Documentation	M9
Activity 2.2.1 MobileWACh-SHR Test Documentation	M9

Global Good Maturity Model Assessment

MobileWACh Global Good Maturity Model Assessment:

https://docs.google.com/spreadsheets/d/1W-FzwYLMp4YQtgcHpwd977eJv4dImJKCt16g8LasdX8/edit?usp=sharing

OpenMRS Global Good Maturity Model Assessment:

https://docs.google.com/spreadsheets/d/1vz_C95KPh8CxBFgWIsAz84k5xDi6iymXGMFN6a83t0A/edit?usp=sharing

CURRICULUM VITAE

Jan Flowers, MS
Proposed Role: Principal Investigator

SUMMARY STATEMENT

Ms. Flowers is a Clinical Faculty member within the Department of Biobehavioral Nursing & Health Informatics at the University of Washington, the Director of Global Health Informatics in the Clinical Informatics Research Group (CIRG) at University of Washington, and the faculty Co-Lead of the Digital Initiatives Group at I-TECH (DIGI). Ms. Flowers area of focus is on innovative strategies and technologies for healthcare systems strengthening in resource constrained settings through appropriate electronic collection and use of quality health data for evidence-based decision making. Her work involves leadership in health informatics standards organizations and digital health communities of practice, digital health policy and compliance, health information systems engineering and implementation, digital health evaluation and maturity modeling, patient centered technologies and mHealth, and standards-based interoperability for improved care at the point of service, surveillance, and program monitoring. Ms. Flowers has led and supported country-wide digital health projects in Cameroon, Cote d'Ivoire, Haiti, Kenya, Mozambique, Namibia, Nigeria, Uganda, and Vietnam and provided support to U.S. based resource-constrained agencies, such as the Indian Health Services (IHS) in their agency-wide HIT modernization project. Ms. Flowers will join the Senior Management Team for the project and provide leadership and strategic visioning to achieving the objectives of the program related to interoperability of systems, including the overlap of those with related to program evaluation and capacity building.

RELEVANT EXPERIENCE

Faculty Co-Lead, Digital Initiatives Group at I-TECH (DIGI), University of Washington (UW), Seattle, WA, 2018-present
Co-lead DIGI technical resource team within I-TECH, which provides leadership to global domain-setting organizations and digital health communities of practice (including digital health global goods), technical assistance on strategic eHealth planning, digital health evaluation, developing and deploying digital health tools, building health workforce capacity in digital health, and data use and analytics using routine data systems.

Director of Global Health Informatics in Clinical Informatics Research Group (CIRG), Biobehavioral Nursing & Health Informatics, School of Nursing, University of Washington (UW), Seattle WA, 2015-present
Develop and direct the global health and underserved populations informatics portfolio focused on software engineering for resource-constrained environments, in both the U.S. and abroad. Projects include establishing and leading international digital health software engineering communities of practice, eHealth architectures, and software engineering and standards-based interoperability for improved care delivery at the point of service, surveillance, and program monitoring.

Clinical Faculty in Clinical Informatics & Patient Centered Technologies (CIPCT), Biobehavioral Nursing & Health Informatics (BNHI), University of Washington (UW), Seattle, WA, 2014-present

Teach NMETH 526 "Patient-Centered Interactive Health Communication Technologies", a Masters-level and Biohealthinformatics (BHI) Post-doctoral course for approximately 25-30 students per year. Mentor CIPCT and BHI students on PhD dissertations, Masters theses, and practicum projects.

Sr. Informatics Program Manager, International Training and Education Center for Health (I-TECH), Department of Global Health, University of Washington (UW), Seattle WA, 2012-2015
Manage the global health informatics programs and team across Cote d'Ivoire, Haiti, Kenya, Mozambique, Namibia, and Vietnam. Responsible for setting the direction for eHealth architecture strategy, developing and advising on eHealth policies and governance, and managing health information systems development and capacity building.

Clinical Lecturer in Doctoral in Nursing Practice (DNP), Biobehavioral Nursing & Health Informatics (BNHI), University of Washington (UW), Seattle, WA, 2011-2013
Teach "Introduction to Health Informatics", a PhD course for approximately 70 students per year. Mentor CIPCT and BHI students on PhD dissertations, Masters theses, and practicum projects.

Sr. Informatics Program Manager in Clinical Informatics Research Group (CIRG), Biobehavioral Nursing & Health Informatics, School of Nursing, University of Washington (UW), Seattle WA, 2009-2012
Manage the global health informatics programs for digital health informatics projects supporting LMIC programs in collaboration with I-TECH. Responsible for setting the direction for eHealth architecture strategy, developing and advising on eHealth policies and governance, and managing health information systems development and capacity building.

Technical Program Manager, Electronic Medical Records and Patient Centered Technologies, UW Medicine Information Technology Services, Seattle WA, 2006-2009
Program Manager for the UW Medicine MINDscape EMR and Epic and Cerner integration; Manage and execute the UW Medicine Patient Centered technologies portfolio; including, the UW Medicine patient portal, patient mHealth tools for chronic disease management, and *games for health* applications for patient knowledge improvement for disease management.

EDUCATION
- MS, Health Policy and Law (HPL), University of California, San Francisco, 2017
- Certificate, Implementation Science, University of Washington, Seattle, WA, 2017
- BS, Psychology with Honors, Bioethics & Medical History minor, University of Washington, Seattle, WA, 2013

PROFESSIONAL AFFILIATIONS

2019-present	Founder, Project Co-Lead	OpenHIE LIS Community
2017-present	Board of Directors, Chair	OpenMRS, Inc.
2017-Present	Governance Committee	Bahmni Collaborative
2016-Present	Board of Directors	OpenELIS Foundation
2013-Present	Strategic Leadership	OpenMRS Community

RELEVANT PUBLICATIONS AND PRESENTATIONS

1. Cullen T., **Flowers J.** (co-first author), Sequist T., Hays H., Biondich P., Laing M. (2019). Envisioning health equity for American Indian/Alaska Natives: a unique HIT opportunity. Journal of the American Medical Informatics Association: JAMIA. https://doi.org/10.1093/jamia/ocz052. PMCID:PMC6696492.
2. **Flowers J**. (2018). Different Labs Need Different Systems: An Exploration of Open Source Laboratory Information Systems Use in Global Health and the Community of Practice that Brings Them Together. Presented at the Global Digital Health Forum, Washington D.C.
3. **Flowers J**. (2018). Ensuring an open source digital health solution has a healthy community: An OpenMRS case study on good governance, fiscal sponsorships, and partnerships. Presentation at the Global Digital Health Forum, Washington D.C.
4. **Flowers J**. (2017). Building an Informatics Community and Non-Profit Foundation for Health Systems Strengthening Sustainability. Panel at the Global Digital Health Forum, Washington D.C.
5. Brandt P., Lober B., **Flowers J**. (2017). Enabling Collaboration for Building High Quality, Sustainable and Scalable National Health Information Systems in Resource-Limited Settings. Poster at AMIA Conference, Washington D.C.
6. **Flowers J**. (2017). OpenMRS EMR in Point of Care: Real World Case Studies of Approaches and Challenges in Kenya, Mozambique, and Haiti. Presented at the Global Digital Health Forum, Washington D.C.
7. **Flowers, J**., Odawo, P., Wanyee, S., Baseman, J., & Lober, W. (2011). Using successful HIV program tools in the strengthening of national health care: Expansion of Haiti's HIV Electronic Medical Record into primary care. Presented at the Consortium of Universities for Global Health, Montreal, CA.
8. **Flowers, J**., Odawo, P., Wanyee, S., Baseman, J., & Lober, W. (2011). Global OpenELIS: Progress on an Open-source Laboratory Information System in Haiti and Cote d'Ivoire. In AMIA Annu Symp Proc. Presented at the American Medical Informatics Association Annual Scientific Symposium, Washington DC.
9. Lober WB, **Flowers JL**. Consumer empowerment in health care amid the internet and social media. Semin Oncol Nurs. 2011 Aug;27(3):169-82. doi: 10.1016/j.soncn.2011.04.002. PubMed PMID: 21783008.
10. Baseman, J., Emmanuel, E., Charles, K. J., Bijou, S., Antilla, J., **Flowers, J**., & Lober, W. (2011). Supporting Clinical and Public Health Decision Making Through An EMR System In Haiti. Presented at the CDC Public Health Informatics Conference, Atlanta GA.
11. **Flowers JL**, Odawo P, Wanyee S, Baseman J, Lober WB (2011). Improving patient management in low resource settings through standards based interoperability: Demographic surveillance and electronic medical records. Poster at CDC Public Health Informatics Conference, Atlanta, GA.
12. Lober, W., **Flowers, J**., & Baseman, J. (2011). EMR-Lab Interoperability for Low Resource Settings: a Design Pattern for Facility-Level Architecture. Presented at the CDC Public Health Informatics Conference, Atlanta GA.
13. **Flowers, J.,** Odawo, P., Wanyee, S., Baseman, J., & Lober, W. (2011c). Improving Patient Management In Low Resource Settings Through Standards Based Interoperability: Demographic Surveillance and Electronic Medical Records. Presented at the CDC Public Health Informatics Conference, Atlanta GA.

14. Nelson JW, Frederic R, Philippe R, Pierre-Lys D, Nagel M, Antilla J, Schwartz P, **Flowers JL**, Bijou S, Boncy J (2011, August) Collaboration with Haitian Laboratories to Develop and Implement OpenELIS for Integrated Management of Laboratory Network Data, Poster at Consortium of Universities for Global Health.
15. Sutton P, Boncy J, Wesley J, Adje C, Sogo J, Schwartz PF, **Flowers JL**, Nixon L, Hill P, Antilla J, Puttkamer N, Lober WB (2010, August). OpenELIS: Open-source laboratory information system for clinical and reference laboratories: Implementations in Haiti and Cote d'Ivoire. Poster at Consortium of Universities for Global Health, Seattle, WA.
16. Sutton P, Labbe-Coq R, Joseph P, Valles, JS, Lamothe R, Edouard F, White C, Wagner S, Sibley J, Webster E, **Flowers JL**, Teggar M, Puttkamer N, Lober WB (2010, August). The iSanté electronic medical record system; responding to the needs of post-earthquake Haiti. Poster at Consortium of Universities for Global Health, Seattle, WA.
17. Lyles CR, Harris LT, Le T, **Flowers J**, Tufano J, Britt D, Hoath J, Hirsch IB, Goldberg HI, Ralston JD. Qualitative evaluation of a mobile phone and web-based collaborative care intervention for patients with type 2 diabetes. Diabetes Technol Ther. 2011 May;13(5):563-9. Epub 2011 Mar 15. PubMed PMID: 21406018.

INVITED PRESENTATIONS
- 2020: Real World Interoperability for the Greater Good, Integrating the Healthcare Enterprise North America Connectathon Conference, Cleveland
- 2019: Building Capacity for HIS in Global Health, World Health Organization, Geneva
- 2019: Lessons in Implementing Medical Records Systems, World Health Organization, Geneva
- 2018: HIS Community Governance – OpenMRS Case Study, Digital Square Annual Meeting
- 2018: Global Goods Guidebook – OpenMRS, World Health Organization, South Africa
- 2018: Global Goods Guidebook – OpenELIS, World Health Organization, South Africa
- 2017: The Future of Global Health Informatics – Pursuit of Health Equity and Improved Outcomes, Association of Professional Futurists
- 2017: Policy Recommendations for Health IT for Continuity of Care during Regional Crisis, UCSF
- 2017: Policy and Roadmap for a National Data Sharing Architecture, Vietnam VAAC/MoH
- 2017: Facility-level Architectures and Data Exchange Planning, UCSF Global Health
- 2016: Open Source Community and Leadership, OpenMRS Implementers Meeting, Uganda
- 2016: Data Management Policies for Health Systems in RCS Clinics, WHAA
- 2016: Electronic Medical Records for Free and Charitable Clinics, WHAA
- 2016: National Policy for Laboratory Information Systems, Ministry of Health, Hanoi Vietnam
- 2015: Community Governance and Policy for Health Systems, OpenMRS Summit, Singapore
- 2014: eHealth Architecture and National Policy, UW HIHIM Certificate Program
- 2014: eHealth Architecture and National Policy, UCSF Global Health Conference
- 2013: Laboratory Informatics, MOH Zambia
- 2011: Haiti National Architecture, WHO eHealth Architecture and Interoperability, Vietnam
- 2011: Interoperability in Resource Constrained Settings, Change Initiative

Jennifer A. Unger, MD, MPH
Proposed Role: Subject Matter Expert

SUMMARY STATEMENT

Jennifer Unger, MD, MPH, is an Assistant Professor, Obstetrician-Gynecologist and clinical researcher focusing on the utilization of novel technologies and behavioral interventions to improve global maternal child health (MCH) and family planning. With collaborators from computer science and global health at the University of Washington and University of Nairobi, Dr. Unger designed Mobile WACh (Mobile Solutions for Women's and Children's Health) a unique mobile platform harnessing the capability of the computer-human interaction to send and receive personalized, tailored and novel messaging with pregnant and post-partum women in Kenya. She has done reproductive health research and programmatic work in Mexico, Nicaragua and most recently in Kenya. She has clinical expertise in maternal health and family planning as well as design of mHealth behavioral interventions to impact reproductive health. Dr. Unger is Associate Director of the UW Global WACh Center and co-instructor of the Global Perspectives in Reproductive Health course at the University of Washington.

EDUCATION

1991 - 1995	B.A. Neuroscience, *cum laude* Mount Holyoke College South Hadley, Massachusetts
1996 - 1998	M.P.H. University of Connecticut School of Medicine Farmington, Connecticut
1998 - 2003	M.D. University of Connecticut School of Medicine Farmington, Connecticut

POSTGRADUATE TRAINING

1997-1998	Fellowship University of Connecticut Health Center Department of Community Medicine Farmington, Connecticut
2003-2005	Residency Columbia University New York Presbyterian Hospital New York, New York
2005-2007	Residency

University of Washington
School of Medicine
Department of Obstetrics & Gynecology
Seattle, Washington

FACULTY POSITIONS HELD

2007 - 2009   Acting Instructor
                               University of Washington
                               Department of Obstetrics & Gynecology
                               Seattle, Washington

2009-2011   Clinical Instructor
                               University of Washington
                               Department of Obstetrics & Gynecology
                               Seattle, Washington

FACULTY POSITIONS HELD (continued)

2011-2015	Acting Assistant Professor University of Washington Department of Obstetrics & Gynecology Harborview Medical Center Seattle, Washington
2015-present	Assistant Professor University of Washington Department of Obstetrics & Gynecology Harborview Medical Center Seattle, Washington
2015-2016	Adjunct Assistant Professor University of Washington Department of Global Health Harborview Medical Center Seattle, Washington
2016-present	Assistant Professor University of Washington Department of Global Health Harborview Medical Center Seattle, Washington

HOSPITAL POSITIONS HELD

2009-2011	Staff Physician National Health Service Yakima Valley Farmworkers Clinic Toppenish, Washington
2009-2011	Staff Physician Toppenish Community Hospital Toppenish, Washington
2011-present	Attending Physician University of Washington Harborview Medical Center Seattle, Washington
2014-2016	Clinic Director

Columbia Health Clinic
King County, Seattle, Washington

HONORS and AWARDS

1994	Karen Snyder Sullivan Memorial Travel Award
	Mount Holyoke College
	South Hadley, Massachusetts

HONORS and AWARDS (continued)

1995	Student Leadership and Service Award
	Mount Holyoke College
	South Hadley, Massachusetts
1995	Seven Sisters Scholar Athlete Award
	Mount Holyoke College
	South Hadley, Massachusetts
1995	*Cum Laude*
	Mount Holyoke College
	South Hadley, Massachusetts
1997	Graduate Program Fellowship Recipient
	University of Connecticut
	Farmington, Connecticut
2000	National Health Service Scholar Award
	United States Department of Health and Human Services
	Washington D.C.
2003	Janet M. Glasgow Citation for Academic Excellence
	Americans Medical Women's Association
2003	Lyman M. Stowe Award for Patient Care and Service
	University of Connecticut
	Farmington, Connecticut
2004	Intern Surgical Skills Award
	Columbia Presbyterian Hospital
	New York, New York
2007	Chief Resident Teaching Award
	University of Washington

Seattle, Washington

2007	Frontiers in Reproduction (FIR) Scholar
	Marine Biological Laboratory
	Woods Hole, Massachusetts
2008	Young Faculty Award
	Berlex Foundation
	Pittsburgh, Pennsylvania
2011-2014	NIH Women's Reproductive Health Research Scholar
	University of Washington
	Department of Obstetrics & Gynecology
	Seattle, Washington
2015	Resident Research Mentor Award
	University of Washington
	Department of Obstetrics & Gynecology
	Seattle, Washington

HONORS and AWARDS (continued)

2019 Seminar	AAMC Early Career Women Faculty Development
	Endorsed Candidate University of Washington Committee for Women in Medicine and Science

BOARD CERTIFICATIONS

2010-present	Board Certified American Board of Obstetrics & Gynecology

CURRENT LICENSURE

2007-present	Physician and Surgeon MD00048667 State of Washington

PROFESSIONAL ORGANIZATIONS

2003-present	Member Physicians for Reproductive Health
2008-present	Member Institute for Translational Health Sciences University of Washington
2012-Present	Member Society for Family Planning

TEACHING RESPONSIBILITIES

2011-2013	Lecturer Clinical Seminar Series International Training & Education Center for Health (I-TECH) University of Washington
2011-present	Lecturer Harborview Women's Health Lecture Series

Core Topics Covered:
Early Pregnancy Loss
Treatment of Ectopic Pregnancy

2012-2013   Faculty Leader
Adolescent Mentoring Training Program
School of Medicine
University of Washington

TEACHING RESPONSIBILITIES (continued)

2012-2014	Lecturer Adolescent Health in Resource Limited Settings Department of Global Health University of Washington
2012-present	Lecturer Clinical Management of HIV Department of Global Health University of Washington
2012-present	Lecturer Global Health Leadership Course Department of Global Health University of Washington
2012-present	**Co-Director** Global Health Lecture Series Department of OBGYN University of Washington
2014	Lecturer Reproductive Health in Women with HIV: An Update Annual NW AETC Faculty Development Workshop Seattle, Washington
2014	Lecturer Reproductive Health in Women with HIV AIDS Clinical Conference Seattle, Washington
2014-2016	Mentor Intensive Course on Implementation Science for Family Planning Reproductive Health University of Washington
2014-2017	Lecturer Legal and Policy Solutions Department of Global Health University of Washington
2014-2018	Lecturer Responsible Conduct of International Research

Department of Global Health
University of Washington

2014-2019ical   Lecturer
Tropical Medicine Course
School of Medicine
University of Washington

TEACHING RESPONSIBILITIES (continued)

2014-present	**Course Co-Director** Global Perspectives in Reproductive Health Department of Global Health University of Washington
2014-present	Lecturer Bioengineering Solutions in Global Health Department of Global Health University of Washington
2017-present	Lecturer Global Health Seminar Department of Global Health University of Washington

Trainees

Medical Students

2011-2013	Maya Newman, MD Global Health Project "Pilot testing SMS for Maternal and Child Health in Kenya" Awarded GO Health Fellowship from University of Washington
2013-2016	Emily Eck, MD Underserved Pathway Mentor University of Washington
2014-2018	Karren Lewis, MD, MPH (2018) **MPH Thesis Chair** "Perspectives of mobile health messaging for increasing uptake of maternal child health services and family planning among HIV positive women, male partners and HIV providers in Kenya: a mixed-methods analysis" University of Washington Presented at the Global Digital Health Forum, 2016 Publication BMC Health Services, 2020
2019-2020	Alyssa Hummel, MD (p) MPH (p, 2020) **MPH Thesis Chair**

"Factors associated with a maternal depression in a Kenyan cohort"
University of Washington

2019-present   Gifti Abbo, MD (p), MPH (p, 2021)
                                MPH Thesis Chair

TEACHING RESPONSIBILITIES (continued)

Graduate Students

2014	Juan Nie, MPH MPH Thesis Committee "Association of mobile phone ownership with the use of maternal and newborn health services among pregnant women in Timor-Leste-A cross-sectional study" University of Washington Published, BMC Pregnancy & Childbirth, December 2015
2012-2014	Mona Wiggins, DNP 3 Global Health Project Committee "Family Planning Needs Assessment for Maternal Child Health Clinics in Rural Western Kenya"
2015	Julia Velonjara, MPH MPH Thesis Committee "Knowledge, Attitudes and Practices for Family Planning Among Adolescents and Health Care Workers in Western Kenya" Published, Sexual and Reproductive Healthcare
2017-2019	Trevor Perrier, PhD PhD Thesis Committee "Mobile WaCH: A Bidirectional SMS Messaging Platform for Maternal Health" University of Washington
2018-present	Clair Rothchild, PhD(p) F31 Grant Advisory Committee
2020-present	Esther Choo, MPH PhD Thesis Committee
2020-present	Alana Lopez MPH Thesis Committee
2020-present	Mame Mareme Diakhate MPH Thesis Committee

Residents

2011-2016   Malavika Prabhu, MD
"Bacterial Vaginosis Among Pregnant Women in Low Resource Settings"
Presented at IDSOG

2012-2017   Melanie Andersen, MD
"Reproductive Desire and Sexual Knowledge among HIV-Discordant Couples in Kenya"
Presented at Society for Family Planning

TEACHING RESPONSIBILITIES (continued)

Residents

	2015-2017	Tirza Cannon, MD "In-depth analysis of Mobile WACh MCH messaging"
	2015-2017	Bonnie Crouthamel, MD "Knowledge, Attitudes and Practices for Family Planning Among Adolescents and Health Care Workers in W. Kenya" Published Sexual and Reproductive Healthcare
	2017-2018	Carlie Field, MD "Using Best Friend Report to determine prevalence of induced abortion among HIV infected women in Kenya". Presented at the International Conference on Family Planning, 2018 In preparation for Contraception
	2017-present	Kevin Saiki, MD "The Effect of Health Care Worker Strike on Maternal and Child Health". Presented at the Nairobi Collaborative Meeting, 2019 East Africa mHealth Meeting, 2019
	2019-present	Anne Erickson, MD "Determinants of family planning behaviors among high-risk post-partum women"

Fellows

	2014-2015	Eve Rajula (Kenyan, Prime K Fellow) "Use of mobile phones to improve paediatric post-discharge follow-up in rural Kenya"
	2015-2019	Elizabeth Harrington, MD, MPH (2017) (Family Planning Fellow) **Primary Fellowship Research Mentor** Thesis Committee Member "Mobile phone SMS dialogue among couples for postpartum contraceptive uptake in Kenya: (Mobile WACh XY) A randomized controlled trial" Multiple publications

| 2016-present | Brenda Wandika (IARTP, non-degree)
Kenyan scholar |

SPECIAL LOCAL RESPONSIBILITIES

2014-present	Associate Director UW Global Center for Integrated Health for Women, Adolescents and Children Seattle, Washington
2019-present	Member Royalty Research Fund Review Committee University of Washington Office of Research
2019-present	Member Women's Reproductive Health Research Grant Advisory Committee University of Washington
2019-present	Member Women in Science and Medicine Committee University of Washington
2020-present	Member Global Health Family Planning Search Committee University of Washington

OTHER LOCAL RESPONSIBILITIES

| 2012-2019 | Mentor
Young Global Leaders Program
One by One – Fighting Fistula
Seattle, Washington |

RESEARCH FUNDING

Past

Grant #:   AID-OAA-F-16-00026 (PI, Unger)   7/1/16-12/30/19   Effort: 1%, PI
Agency: USAID $250,000
Title: **"Mobile WACh NEO: Communication Empowering Mothers and Newborns"**
We developed a human-computer hybrid communication system (Mobile WACh: Mobile Solutions for Women's and Children's Health) that engages mothers to increase demand for care, and improves outcomes for both mothers and infants. Mobile WACh NEO is an adaptation of this system focused on the period close to delivery when risk to mothers and infants is highest, bringing a virtual healthcare worker into homes to support preparation for labor, early postpartum and neonatal care, and family planning (FP).
We will utilize the *Saving Lives at Birth Validation Award* to address the scalability and sustainability of Mobile WACh NEO with three targeted interwoven strategies:
1.) Mobile WACh NEO Demonstration Project   2.) Business model
2.) Integration of Mobile WACh NEO platform within the Kenya Ministry of Health (MOH) MNCH and e/mHealth strategies

RESEARCH FUNDING (continued)

Grant #:   OPP1172004 (PI, Drake)   4/01/17-4/30/19   Effort: .08 Calendar, Co-I
Agency: Gates Grand Challenge Explorations   Annual Direct Costs: $80,000
Title: **Real-time, dynamic capture of contraceptive behaviors, experiences, and needs of Kenyan Women**
We will use a novel, tailored mobile messaging platform to continually assess women's contraceptive experiences, needs, and behaviors in 'real-time among women initiating or continuing family planning in Kenya.

Past

Grant #:   37188-1088 MOD01 (PI, John-Stewart) 10/1/16-3/30/19   Effort: 10%, Co-I
Agency: PEPFAR $3,509,305.75
Title: **"Pre-exposure prophylaxis implementation in young women and adolescents in Kenya: DREAMS Innovation Challenge - PrIYA"**
Implement a program to scale-up oral pre-exposure antiretroviral prophylaxis (PrEP) counselling and delivery to young women and adolescents at high risk for HIV in public health sector Maternal and Child Health (MCH) and Family Planning (FP) clinics. To address the scalability and sustainability of PrEP with three targeted interwoven strategies: 1) Evaluate two models of PrEP delivery, both will use universal approach of giving women a risk assessment and one of

the models will also utilize partner self-tests.; 2) Build capacity and streamline HIV prevention services, through training staff, facilitating harmonization of data systems for tracking and *gain proficiency in efficient SMS management of adherence for PrEP*; 3) Assess cost, and cost-effectiveness of delivering PrEP.

Grant#: CFAR AI027757 (PI, Unger)   3/2012-3/2013   Effort: 0% PI
Agency: Center for AIDS Research International Core $20,000
Title: Center for AIDS Research International Core, Infrastructure Award.
Awarded funds to build solar power into clinic space for ongoing studies in Kenya.

Grant#: K12 HD-09-026 (PI, Eschenbach)   5/1/2011-10/30/2014   Effort: 75%, Trainee
Agency: NIH/NICHD $473,368
Title: Women's Reproductive Health Research (WRHR) "Mobile Solutions to Improve Women's and Children's Health *(Mobile WaCH)"*
A randomized clinical trial to determine the effect of using mobile phones to deliver information to patients over SMS (one-way communication) versus using mobile phones to create an interactive dialogue over SMS (two-way communication) on uptake of reproductive and neonatal health services.

Current

Grant #: 1R01HD098105 (PI, Unger)   06/01/2019 – 03/31/2024   Effort: 30%, PI
Agency: NIH/NICHD   Annual Direct Costs: $558,692
Title: **Mobile WACh NEO: Mobile Solutions for Neonatal Health and Maternal Support**
The goal of this project is to evaluate the impact of two-way SMS on neonatal mortality, maternal depression and early infant care, using a randomized clinical trial. Our overarching aim is to determine the effect of Mobile WACh NEO on neonatal mortality and understand the mechanisms by which this innovation impacts neonatal health. In AIM 1 we will determine the effect of Mobile WACh NEO on neonatal mortality, compared to no SMS control. In AIM 2, we will examine the effect of Mobile WACh NEO on maternal implementation of essential newborn care and care seeking. In AIM 3 we will examine the effects of Mobile WACh NEO on maternal social support, self-efficacy and depression.

Grant #: A139241(PI, Unger)   4/01/19-3/31/2020   Effort: 8%, PI
Agency: Royalty Research Fund   Annual Direct Costs: $31,826
Title: **Does the message matter? Assessing the effect of SMS content and participant characteristics on enjoyment and care-seeking outcomes from the Mobile WACh studies.**

RESEARCH FUNDING (continued)

Current

Grant #:   63-7689 (PI, McGrath)   2018-2020   Effort: 5%, Co-I
Agency: Thrasher   Annual Direct Costs: $250,000
Title: **Maternal Administered Malnutrition Monitoring System "MAMMS" Trial**
We propose to test the "Maternal Administered Malnutrition Monitoring System" (MAMMS) in a randomized controlled trial in western Kenya. Mothers will be taught to measure their child's mid-upper arm circumference (MUAC) at 6 or 9-month immunization visits and during 6-month follow up they will receive weekly SMS messages prompting them to measure and send their child's MUAC to a computer system which will alert a health worker when a child with malnutrition is identified. This scalable childhood growth monitoring system could enable nutrition programs in low and middle income countries to optimize screening coverage, leading to early identification of malnutrition, lower costs and a reduction in global under-five mortality.

Grant #:   1R34MH114834 (PI, Guthrie)   9/01/17-8/31/20   Effort: 2%, Co-I
Agency: NIH/NICHD   Annual Direct Costs: $150,000
Title: **Planning the mPACT Trial - mHealth strategies for the Pediatric to Adult HIV Care Transition**
This planning grant will support the development of a novel mHealth strategy for the Pediatric to Adult HIV Care Transition (mPACT) in preparation for a future cluster-randomized trial in Kenya. The conceptual framework for this intervention is based on providing support to youth who are transitioning to adult care through a combination of virtual group peer support and 1-to-1 communication with a healthcare worker trained in youth HIV care. These modes of support will be facilitated by an mHealth platform that will enable a high degree of interaction and tailoring of communication content.

Grant #:   R01 MH114522-01 (PI, John-Stewart)   7/1/17-6/30/22   Effort: 10%, Co-I
Agency: NIH   Annual Direct Costs: $460,919
Title: **"PrEP Adherence Among AGYW: A Multidimensional Evaluation"**
Pre-exposure prophylaxis, or PrEP, is a highly effective anti-HIV medication taken by HIV-negative people to lower their chances of getting infected. In South and East Africa, PrEP is becoming more available to adolescent girls and young women (AGYW) to prevent infection. In order for this highly at-risk group to continue daily medication, they need to understand their potential risk for infection, believe in using PrEP for prevention, and be able to access and continue using PrEP.
Study investigators in Kenya and UW, aim to provide a multi-dimensional evaluation of PrEP adherence by analyzing cell phone messages and using simulated patient actors, to provide insights and tools to improve PrEP adherence in adolescent girls and young women.

Grant #:   1R01HD080460-01 (PI, John-Stewart)   5/1/14-4/30/20   Effort: 0%, Co-I
Agency: NIH/NICHD   Annual Direct Costs: $685,067

Title: **"Evaluation of mHealth Strategies to Optimize Adherence and Efficacy of PMTCT/ART"**

We are conducting a 3-arm randomized trial comparing one-way SMS vs, two-way SMS vs. control (no SMS) among HIV-infected Kenyan mothers in Kenyan PMTCT-ART programs. In AIM 1, we will compare trial arms for impact on maternal retention, adherence, virologic failure and resistance and infant HIV or HIV-free survival. In AIM 2, we will determine correlates of maternal loss to follow-up and virology failure and correlates of infant HIV in the overall and stratified by trial arm. In the two-way SMS arm, we will determine rate of SMS interactivity, impact of critical time-points, and characteristics of high and low "interactors". In AIM 3, we will determine cost-effectiveness of one-way and two-way SMS interventions. These data will contribute a potential scale-able strategy to improve PMTCT-ART as programs aspire to "virtual elimination" of infant HIV.

BIBLIOGRAPHY

Publications in Refereed Journals

1.   Affleck G, Apter A, Tennen H, Reisine S, Barrows E, Willard A, **Unger J**, Zuwallack R. Mood states associated with transitory changes in asthma symptoms and peak expiratory flow. Psychosom Med 2000 Jan-Feb;62(1):61-8. PMID: 10705912.

2.   Lewis J, **Unger, JA**, Fichtner L, Hurley M, DelGaudio MB, Plessy B. Twenty-five years of collaboration between the University of Connecticut Health Center and Hartford Public Schools. Metropolitan University: An International Forum 2000;11:48-58. (no PMID)

3.   **Unger JA**, Whimbey E, Gravett M, Eschenbach DA. The emergence of Clostridium difficile infection among peripartum women: a case-control study of a C. difficile outbreak on an obstetrical service. Infect Dis Obstet Gynecol 2011; 1022:267249. PMID:21811379; PMCID:PMC3146991.

4.   Roxby AC, **Unger JA**, Slyker JA, Kinuthia J, Lewis A, John-Stewart G, Walson JL. A lifecycle approach to HIV prevention in African women and children. Curr HIV/AIDS Rep 2014 Jun; 11(2):119-27. PMID:24659344; PMCID:PMC4077944.

5.   **Unger JA**, Richardson BA, Otieno PA, Farquhar C, Wamalwa D, John-Stewart, GC. Mode of delivery and postpartum HIV-1 disease progression and mortality in a Kenyan cohort. BMC Pregnancy Childbirth 2014;14:257. PMID:25086834; PMCID:PMC4133616.

6.   Perrier T, Dell N, DeRenzi B, Anderson R, Kinuthia J, John-Stewart G, **Unger JA**. Engaging pregnant women in Kenya with a hybrid computer-human SMS communication system. CHI 2015 Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing System; 1429-143. DOI: 10.1145/2702123.2702124. (no PMID)

7.   **Unger JA**, Matemo D, Pintye J, Drake A, Kinuthia J, McClelland RS, John-Stewart G. Patient-delivered partner treatment (PDPT) for chlamydia, gonorrhea and trichomonas infection among pregnant and postpartum women in Kenya. Sex Transm Dis 2015 Nov;42(11):637-42. PMID:26462189; PMCID:PMC4758370.

8.   Patel SJ, Bogeart K, Gachuno OW, Kibore M, **Unger JA**, Walker DM. Clinician attendance and delivery practices at hospital-based vaginal deliveries in Western Kenya. Int J Gynaecol Obstet 2016 May;133(2):168-72. PMID:26873124.

9.   Nie J, **Unger JA**, Thompson S, Hofstee M, Gu J, Mercer MA. Does mobile phone ownership predict better utilization of maternal and newborn health services? A cross-sectional study in Timor-Leste. BMC Pregnancy Childbirth 2016 Jul 23:16(1):183. PMID:27448798; PMCID:PMC4958409.

10.   Kinuthia J. Richardson BA, Drake AL, Matemo D, **Unger JA**, McClelland RS, John-Stewart G. Sexual behavior and vaginal practices during pregnancy and post-partum: Implications for HIV prevention strategies. J Acquir Immune Defic Syndr 2017 Feb 1;74:142-9. PMID:27828872.

11.   Pintye J, Drake AL, **Unger JA**, Matemo D, Kinuthia J, McClelland RS, John-Stewart G. Male partner circumcision associated with lower Trichomonas vaginalis incidence among pregnant and postpartum Kenyan women: a prospective cohort study. Sex Transm Infect 2017 Mar;93(2):137-43. PMID:27519258.

Publications in Refereed Journals (continued)

12. Pintye J, Drake AL, Kinuthia J, **Unger JA**, Matemo D, Heffron R, Barnabas R, Kohler P, McClelland RS, John-Stewart G. A risk assessment tool for identifying pregnant and postpartum women who may benefit from pre-exposure prophylaxis (PrEP). Clin Infec Dis 2017 Mar 15;64(6):751-58. PMID:28034882.

13. Drake AL, **Unger JA**, Ronen K, Matemo D, Perrier T, DeRenzi B, Richardson BA, Kinuthia K, John-Stewart G. Evaluation of mHealth strategies to optimize adherence and efficacy of Option B+ prevention of mother-to-child HIV transmission: rationale, design and methods of a 3-armed randomized controlled trial. Contemp Clin Trials. 2017 Jun;57:44-50. PMID:2831540

14. Bhat A, Reed S, Mao J, Vredevoogd M, Russo J, **Unger J**, Rowles R, Unutzer J. Delivering perinatal depression care in a rural obstetric setting: a mixed methods study of feasibility, acceptability and effectiveness. J Psychosom Obstet Gynaecol 2017 Sep 7:1-8. PMID:28882096.

15. Achwoka D, Pintye J, McGrath CJ, Kinuthia J, **Unger JA,** et al. Collaborative HIV Impact on MCH Evaluation (CHIME) Study Team. Update and correlates of contraception among postpartum women in Kenya: results from a national cross-sectional survey. Contraception 2018 Mar; 97(3); 227-235. PMID:29031815.

16. **Unger JA**, Kinuthia J, John-Stewart G. Texting condolences: Adapting mHealth programs after unexpected pregnancy and infant outcomes. JMIR Mhealth Uhealth 2017 Dec 8;5(12):e176. PMID:29222078.

17. Ronen K, **Unger JA**, Drake AL, Perrier T, Akinyi P, Osborn L, Matemo D, O'Malley G, Kinuthia J, John-Stewart G. SMS messaging to improve ART adherence: perspectives of pregnant HIV-infected women in Kenya on HIV-related message content. AIDS Care. 2017 Dec 18:1-6. PubMed PMID: 29254362.

18. Bhat A, Mao J, Unutzer J , Reed S, **Unger JA.** Text messaging to support a perinatal collaborative care model for depression: a mixed methods inquiry. Gen Hosp Psychiatry 2018, Jan 31; 52:14-20. PMID: 29494854.

19. Velonjara J. Crouthamel B, O'Malley G, Wiggins M, Matemo D. John-Stewart G, **Unger JA**, Kinuthia J. Drake A. Motherhood increases support for family planning among Kenyan adolescents. Sex Reprod Healthc 2018, Jun; 16: 124-131.   PMID: 29804756; PMCID: PMC5975971.

20. **Unger JA**, Ronen K, Perrier T, DeRenzi B, Slyker J, Drake A, Mogaka D, Kinuthia J, John-Stewart G. SMS communication improves exclusive breastfeeding and early postpartum contraception in a low to middle income country setting. BJOG 2018 Nov; 125(12): 1620-1629. PMID 29924912.

21. Gimbel S, Kayakyu N, Dau H, **Unger JA**. A missing link: HIV/AIDS-related mHealth interventions for health workers in low- and middle- income countries. Curr HIV/AIDS Rep 2018 Sept 26. PMID: 30259258.

22. Warr AJ, Pintye J, Kinuthia J, Drake AL, **Unger JA**, et al. Sexually transmitted infections during pregnancy and subsequent risk of stillbirth and infant mortality in Kenya: a prospective study. Sex Transm Infect 2018 Sept 18. PMID: 30228109.

23. Perrier T, Harrington E, Ronen K, Matemo D, Kinuthia J, John-Stewart G, Anderson R**, Unger J**.   Male Partner Engagement in Family Planning SMS Conversations at Kenyan Health Clinics. 2018 Compass June 20-22 Association for Computing Machinery. https://doi.org/10.1145/3209811.3209857

Publications in Refereed Journals (continued)

24. Harrington EK, McCoy EE, Drake AL, Matemo D, John-Stewart G, Kinuthia J, **Unger JA**. Engaging mend in an mHealth approach to support postpartum family planning among coupled in Kenya: a qualitative study. Reprod Health 2019 Feb 11;16(1):17. PMID 30744697.

25. Velloza J, Ngure K, Kiptinness C, Quame-Amaglo J, Thuo N, Dew K, Kimani M, Gakuo S, **Unger JA**, Kolko B, Baeten JM, Celum C, Mugo N, Hefrron R. A clinic-based tablet application to support safer contraception among HIV serodiscordant couples in Kenya: feasibility and acceptability study. mHealth 2019; 5:4. PMID: 30976596.

26. Harrington EK, Drake AL, Ronen K, Matemo D, Osoti A, John-Stewart G, Kinuthia J, **Unger JA**. The effect of an mHealth SMS dialogue intervention on postpartum contraceptive use among women and couples in Kenya: A randomized controlled trial. Am J Public Health. 2019 Jun; 109(6):934-941. PMID: 31067089

27. Dev R, Woods N, **Unger JA**, Kinuthia J, Matemo D, Farid S, Kohler P, Drake A. Acceptability, feasibility and utility of a mobile health family planning decision aid for postpartum women in Kenya. Reproductive Health 2019, Jul. PMID: 31286989

28. Dev R, Kohler P, Feder M, **Unger JA** et al. A systematic review and meta-analysis of postpartum contraceptive use among women in low- and middle-income countries. *Reprod Health* **16,** 154 (2019) PMID: 31665032

29. Lewis K, Harrington EK, Matemo D, Drake AL, Ronen K, O'Malley G, Kinuthia J, John-Stewart G, **Unger JA**. Utilizing perspectives from HIV-infected women, male partners and healthcare providers to design family planning SMS in Kenya: A qualitative study. BMC Health Serv Res. 2019, Nov 21; 19(1):870. PMID: 31752872

30. Pintye J, Rogers Z, Kinuthia J, Mugwanya K, Abina F, Laga H. Sila J, Kemunto V, Baeten J, John-Stewart G, **Unger JA**. Two-way short message communication may increase pre-exposure prophylaxis continuation and adherence among pregnant and postpartum women in Kenya.   Glob Health Sci Pract. 2020 March. PMID: 32139420.

31. Fuchs E, Dwiggins M, Lokken E, **Unger JA**, Eckert L. Influence of sexually transmitted infections in pregnant adolescents on preterm birth and chorioamnionitis. Infect Dis Obstet Gynecol. 2020 April. PMID: 32273674.

Other Publications

1. **Unger JA,** Cummings, D. *Informed Consent and Methods of Contraception: A Guide to Patient Rights;* IPAS Mexico, June 2003. (no PMCID)

ABSTRACTS

1. **Unger JA**, Hannon N. The FDA's phase out of "Essential Use' status of CFC in asthma inhalers. Presented at the New England Public Health Association Annual Conference, 1999, Providence, Rhode Island.

2. **Unger, JA.** Translation services available to Spanish speaking residents in Hartford. Presented at the University of Connecticut Health Center and Area Health Education Council, 2000, Hartford, Connecticut.

ABSTRACTS (continued)

4.   Lewis J, **Unger JA**, Brown Lindsay S, Tessema B. Preparing medical students to teach in an urban cross cultural setting. Presented at the Community Campus Partnerships in Health Annual Conference, 2000, Seattle, Washington.

5.   **Unger JA** and Duffy, P. Quantification and localization of interferon gamma and ferritin in malaria infected and uninfected placentas and their association with intrauterine growth restriction (IUGR). Presented at the Infectious Disease Society of Obstetrics and Gynecology Annual Conference, August 2008, Boston, Massachusetts.

6.   Amies Oelschlager AM, **Unger JA,** Mitchell C, Chiang S. Meeting the ACGME competencies abroad: the development of a global health elective for OB/Gyn residents. Presented at the APGO/CREOG Annual Meeting, 2009, San Diego, California.

7.   **Unger JA,** DeRenzi B, Kinuthia J, Ryan S, Newman M, Borriello G, John-Stewart G. Mobile phone one way short message service (SMS) versus SMS dialogue for women's and children's health (MOBILE WaCH) in Kenya: a randomized control trial. Oral presentation at the STD/ AIDs Collaborative Group Annual Meeting, 2013, Nairobi, Kenya.

8.   Kinuthia J, Odem-Davis, K, Wagner A, Drake A, Matemo D, **Unger JA,** McClelland RS, John-Stewart G. Sexual behavior and vaginal practices during pregnancy and postpartum: Implications for HIV prevention strategies. Presented at the International AIDS Society, July 2013, Kuala Lumpur, Malaysia.

9.   Drake A, Kinuthia J, Matemo D, **Unger JA,** John-Stewart G. Prevalence and cofactors for STIs among pregnant adolescents in Western Kenya. Poster presentation at the International Society for Sexually Transmitted Diseases, July 2013, Vienna, Austria.

10.   Prabhu M, **Unger JA**, Drake A, Odem-Davis K, Merkel M, Kinuthia J, Balkus, J, John-Stewart G. The Performance of Syndromic Criteria and Amsel's Criteria in the Diagnosis of Bacterial Vaginosis among Pregnant Women in Low-Resource Settings. Presented at the Infectious Disease Society of Obstetrics and Gynecology, August 2013, Santa Fe, New Mexico.

11.   Drake A, **Unger JA,** Kinuthia J, Matemo D, John-Stewart G. Late initiation of contraception among unmarried, less educated postpartum women in Kenya. Presented at the Society for Family Planning Meeting, October 2013, Seattle, Washington.

12.   **Unger JA,** DeRenzi B, McCoy E, Kinuthia J, Ryan S, Newman M, Borriello G, John-Stewart G. How mobile phone messaging can support proven maternal child health (MCH) strategies – A qualitative evaluation. Presented at the Women's Reproductive Health Research (WRHR) Annual Meeting, October 2013, Denver, Colorado.

13. **Unger JA,** Matemo D, Kinuthia J, Drake A, John-Stewart G. Expedited Partner Therapy (EPT) for Sexually Transmitted Infections Among Pregnant and Postpartum Women in Kenya. Presented at the STD/ AIDs Collaborative Group Annual Meeting, 2014, Nairobi, Kenya.

14. **Unger, JA**. The manufacturing of a message in Mobile WACh: how to develop personalized mHealth messages in the age of automation and scale up. Presented at the mHealth Summit, Global Health Forum, December 2014, Washington, DC.

15. **Unger JA,** Perrier T, DeRenzi B, Kinuthia J, Ryan S, Mogaka D, Borriello G, John-Stewart G. Mobile WACh: Developing and evaluating a human-computer hybrid mobile messaging system for women's and children's health in Kenya. Presented at the WHO STD/ AIDs Collaborative Group Annual Meeting, 2015, Nairobi, Kenya.

ABSTRACTS (continued)

16. Drake A, Pintye J, Odongo, B, **Unger JA**, Kiuthia J, McGrath C, Obudha N, Langat A, John-Stewart G. Uptake of highly effective contraception among HIV-infected postpartum women in Kenya: results from a national survey. Presented at the International AIDS Society, July 2015, Vancouver, Canada.

17. **Unger JA,** Perrier T, DeRenzi B, Kinuthia J, Ryan S, Mogaka D, Borriello G, John-Stewart G. Mobile WACh: Developing and evaluating a human-computer hybrid mobile messaging system for women's and children's health in Kenya. Oral presentation at the 2015 World Congress of the International Federation of Gynaecology and Obstetrics (FIGO), October 2015, Vancouver, Canada.

18. **Unger JA,** Wandika B, Ronen K, Rothschild C, Shih J, Wamalwa D, Muthigani W, Batra M, Kinuthia J, John-Stewart G. Mobile WACh NEO: Engagement of pregnant and postpartum women with a two-way SMS service to improve neonatal outcomes. Oral presentation at the Pediatric Academic Society, April 29, 2019, Baltimore, Maryland.

INVITED LECTURES/SYMPOSIUMS

October 2015   Plenary Speaker
                Mobile health (mHealth) technology to strengthen family planning programs
                Human Right to Family Planning (HR2FP)
                Seattle, Washington

November 2016   *Adolescents in Context: Improving adolescent health through critical relationship*
                Adolescent Health Symposium
                Bill & Melinda Gates Foundation
                Seattle, Washington

March 2017   Grand Rounds
                mHealth to address maternal and neonatal mortality
                University of Washington
                Department of Obsetrics & Gynecology
                Seattle, Washington

May 2018   Plenary Speaker
                Mobile technologies to support family planning
                Family Planning Symposium
                University of Washington
                Department of Obsetrics & Gynecology
                Seattle, Washington

March 2018   Young Professionals International Netowrk (YPIN)'s International Women's
                Day Speed Mentoring
                Seattle, Washington

May 2019   Plenary Speaker
                Reproductive Biology for Contraceptive Technology
                Bill & Melinda Gates Foundation
                Seattle, Washington

INVITED LECTURES/SYMPOSIUMS (continued)

March 2020   Grand Rounds
                  A mobile revolution for maternal and neonatal health
                  Massachusetts General Hospital
                  Department of Obstetrics and Gynecology
                  Boston, Massachusetts

CURRICULUM VITAE

Keshet Ronen, PhD, MPH
Proposed Role: Subject Matter Expert

SUMMARY STATEMENT

Keshet Ronen, PhD, MPH, is a Clinical Assistant Professor in the Department of Global Health. Her research interests are in the use of mobile communication technology such as text messaging and social media to improve the health of underserved and hard-to-reach populations, including peripartum women and adolescents in Kenya and the US. She is also interested in the health of gender and sexual minorities. Keshet is passionate about social justice and committed to working with communities to develop strategies to address their priorities and improve health equity.

EDUCATION

2002-2005	**BA, Natural Sciences (Pathology**)
	Churchill College, University of Cambridge, UK
	First Class
	Thesis title: Effect of HCMV on the cell cycle of terminally differentiated myeloid cells
2005-2010	**PhD, Cell and Molecular Biology**
	University of Pennsylvania, Philadelphia, PA
	Dissertation title: Lentiviral integration site selection: host determinants and consequences
2015-2017	**MPH, Epidemiology**
	University of Washington, Seattle, WA
	Thesis title: Comprehensive characterization of humoral correlates of HIV-1 superinfection acquisition in high-risk Kenyan women

POSITIONS HELD

2005-2010	**PhD Candidate**
	University of Pennsylvania, Philadelphia, PA
2010	**Intern**
	Emory University / Rwanda Zambia HIV Research Group, Kigali, Rwanda
2010-2015	**Post-doctoral Fellow**
	Fred Hutchinson Cancer Research Center, Seattle, WA
2015-2016	**Senior Fellow**
	University of Washington, Seattle, WA
2016	**Intern**
	Assessment, Policy Development & Evaluation Unity
	Public Health – Seattle & King County, Seattle, WA
2016-present	**Research Scientist**
	Department of Global Health, University of Washington, Seattle, WA
2018-present	**Clinical Assistant Professor**
	Department of Global Health, University of Washington, Seattle, WA

HONORS AND AWARDS

2003-2005	Churchill College Scholarship
	University of Cambridge
2008	Global Health Framework Fellowship
	University of Pennsylvania
2009	Young Investigator Award
	Conference on Retroviruses and Opportunistic Infections

2009-2010	Health and Society in Africa Research Award University of Pennsylvania
2014	Young Investigator Award Conference on Retroviruses and Opportunistic Infections
2014	Scholar NIMHD Translational Health Disparities Course, National Institutes of Health
2015	Best Poster 7th International Workshop on HIV Pediatrics
2015-2016	MPH Tuition Support Fellowship Institute of Translational Health Sciences, University of Washington
2019	Scholar NIH MD2K mHealth Training Institute, University of California, Los Angeles

PUBLICATIONS

Peer-reviewed research articles
^ Equal contribution, * Lead author, ** Senior author

1. Borders CW, Courtney A, **Ronen K**, Laborde-Lahoz MP, Guidry TV, Hwang SA, Olsen M, Hunter RL, Hollmann TJ, Wetsel RA, Actor JK. Requisite role for complement C5 and the C5a receptor in granulomatous response to mycobacterial glycolipid trehalose 6,6'-dimycolate. Scand J Immunol. 2005 Aug;62(2):123-30

2. Marshall HM^, **Ronen K*^**, Berry C, Llano M, Sutherland H, Saenz D, Bickmore W, Poeschla E, Bushman FD. *Role of PSIP1/LEDGF/p75 in lentiviral infectivity and integration targeting.* PLoS ONE. 2007 Dec 19;2(12):e1340

3. Wang GP, Garrigue A, Ciuffi A, **Ronen K**, Leipzig J, Berry C, Lagresle-Peyrou C, Benjelloun F, Hacein-Bey-Abina S, Fischer A, Cavazzana-Calvo M, Bushman FD. *DNA bar coding and pyrosequencing to analyze adverse events in therapeutic gene transfer.* Nucleic Acids Res. 2008 May;36(9):e49

4. Bushman FD, Hoffmann C, **Ronen K**, Malani N, Minkah N, Rose HM, Tebas P, Wang G. *Massively parallel pyrosequencing in HIV research.* AIDS. 2008 Jul 31;22(12):1411-5

5. Ciuffi A, **Ronen K**, Brady T, Malani N, Wang G, Berry CC, Bushman FD. *Methods for integration site distribution analyses in animal cell genomes.* Methods. 2009 Apr;47(4):261-8

6. Brady T, Lee YN, **Ronen K**, Malani N, Berry CC, Bieniasz PD, Bushman FD. *Integration target site selection by a resurrected human endogenous retrovirus.* Genes Dev. 2009 Mar 1;23(5):633-42

7. Gijsbers R, **Ronen K**, Vets S, Malani N, De Rijck J, McNeely M, Bushman FD, Debyser Z. *LEDGF hybrids efficiently retarget lentiviral integration into heterochromatin.* Mol Ther. 2010 Mar;18(3):552-60

8. Ocwieja KE^, Brady TL^, **Ronen K*^**, Huegel A, Roth SL, Schaller T, James LC, Towers GJ, Young J, Chanda S, König R, Malani N, Berry CC, Bushman FD. *HIV integration targeting: a pathway involving transportin-3, the nuclear pore protein RanBP2, and viral Gag.* PLoS Pathog. 2011 Mar;7(3):e1001313

9. **Ronen K*^**, Negre O^, Roth S, Colomb C, Malani N, Denaro M, Brady T, Fusil F, Gillet-Legrand B, Hehir K, Beuzard Y, Leboulch P, Down J, Payen E, Bushman FD. *Distribution of lentiviral vector integration sites in mice following therapeutic gene transfer to treat β-thalassemia.* Mol Ther. 2011 Jul;19(7):1273-86

10. Schrijvers R, De Rijck J, Demeulemeester J, Adachi N, Vets S, **Ronen K**, Christ F, Bushman FD, Debyser Z, Gijsbers R. *LEDGF/p75-independent HIV-1 replication demonstrates a role for HRP-2 and remains sensitive to inhibition by LEDGINs.* PLoS Pathog. 2012;8(3):e1002558

11. **Ronen K***, McCoy CO, Matsen FA, Boyd DF, Emery S, Odem-Davis K, Jaoko W, Mandaliya K, McClelland RS, Richardson BA, Overbaugh J. *HIV-1 superinfection occurs less frequently than initial infection in high-risk Kenyan women: a prospective cohort study.* PLoS Pathog. 2013;9(8): e1003593

12. Lehman DA, **Ronen K**, Blish CA, Baeten J, Jalian-Lechak Z, Jaoko W, Mandaliya K, Richardson B, McClelland RS, Overbaugh J. *Systemic cytokine levels show limited correlation with risk of HIV-1 acquisition.* J Acquir Immune Defic Syndr. 2014 Jun 1;66(2):135-9

13. **Ronen K***, Richardson BA, Graham SM, Jaoko W, Mandaliya K, McClelland RS, Overbaugh J. HIV-1 superinfection is associated with accelerated viral load increase but has limited impact on disease progression. AIDS, 2014 Sep 24;28(15):2281-6

14. Cortez V, Wang B, Dingens A, Chen MM, **Ronen K**, Georgiev IS, McClelland RS, Overbaugh J. The broad neutralizing antibody responses after HIV-1 superinfection are not dominated by antibodies directed to epitopes common in single infection. PLoS Pathog. 2015 Jul 9; 11(7): e1004973

15. **Ronen K*^**, Sharma A^, Overbaugh J^. *HIV Transmission Biology: Translation for HIV Prevention.* AIDS, 2015 Nov; 29(17):2219-27

16. Graham SM, Chohan V, **Ronen K**, Deya RW, Masese LN, Mandaliya KN, Peshu NM, Lehman DA, McClelland RS, Overbaugh J. *Genital shedding of resistant HIV-1 among women diagnosed with treatment failure by clinical and immunologic monitoring.* Open Forum Infectious Diseases 2016; doi: 10.1093/ofid/ofw019

17. **Ronen K***, McGrath C, Langat A, Kinuthia J, Omolo D, Singa B, Katana A, Nganga L, John-Stewart G. *Gaps in adolescent engagement in antenatal care and prevention of mother-to-child transmission services in Kenya.* JAIDS 2017; 1;74(1):30-37

18. Cranmer LM, Langat A, **Ronen K,** McGrath CJ, LaCourse S, Pintye J, Odeny B,Singa B, Katana A, Nganga L, Kinuthia J, John-Stewart G. *Integrating tuberculosis screening in Kenyan Prevention of Mother-To-Child Transmission programs.* Int J Tuberc Lung Dis. 2017 Mar 1;21(3):256-262. doi: 10.5588/ijtld.16.0478

19. Drake AL, Unger JA, **Ronen K**, Matemo D, Perrier T, DeRenzi B, Richardson BA, Kinuthia J, John-Stewart G. *Evaluation of mHealth strategies to optimize adherence and efficacy of Option B+ prevention of mother-to-child HIV transmission: Rationale, design and methods of a 3-armed randomized controlled trial.* Contemp Clin Trials. 2017 Mar 14. pii: S1551-7144(16)30359-7. doi: 10.1016/j.cct.2017.03.007

20. **Ronen K*^**, Dingens AS^, Graham SM, Jaoko W, Mandaliya K, McClelland RS, Overbaugh J. *Comprehensive Characterization of Humoral Correlates of Human Immunodeficiency Virus 1 Superinfection Acquisition in High-risk Kenyan Women.* EBioMedicine. 2017 Apr;18:216-224. doi: 10.1016/j.ebiom.2017.04.005. Epub 2017 Apr 7.

21. McGrath CJ, Singa B, Langat A, Kinuthia J, **Ronen K**, Omolo D, Odongo BE, Wafula R, Muange P, Katana A, Ng'anga' L, John-Stewart GC. *Non-disclosure to male partners and incomplete PMTCT regimens associated with higher risk of mother-to-child HIV transmission: a national survey in Kenya.* AIDS Care. 2017 Nov 11:1-9.

22. **Ronen K***, Unger JA, Drake AL, Perrier T, Akinyi P, Osborn L, Matemo D, O'Malley G, Kinuthia J, John-Stewart G. *SMS messaging to improve ART adherence: perspectives of pregnant HIV-infected women in Kenya on HIV-related message content.* AIDS Care. 2017 Dec 18:1-6. AIDS Care. 2018 Apr;30(4):500-505. doi: 10.1080/09540121.2017.1417971. Epub 2017 Dec 18. PubMed PMID: 29254362; PubMed Central PMCID: PMC5839109.

23. Fairbanks J, Beima-Sofie K, Akinyi P, Matemo D, Unger JA, Kinuthia J, O'MalleyG, Drake AL, John-Stewart G, **Ronen K****. *You will know that despite being HIV-positive you are not alone: qualitative study to inform content of a text messaging intervention to improve prevention of mother-to-child HIV transmission.* JMIR Mhealth Uhealth. 2018 Jul 19;6(7):e10671. doi: 10.2196/10671.

24. Unger JA, **Ronen K**, Perrier T, DeRenzi B, Slyker J, Drake AL, Mogaka D, Kinuthia J, John-Stewart G. *Short message service communication improves exclusive breastfeeding and early postpartum contraception in a low- to middle-income country setting: a randomised trial.* BJOG. 2018 Nov;125(12):1620-1629. doi: 10.1111/1471-0528.15337. Epub 2018 Aug 28.

25. Simoni JM, **Ronen K**, Aunon FM. *Health behavior theory to enhance e-health intervention research in HIV: rationale and review.* Curr HIV/AIDS Rep. 2018 Dec 3. doi: 10.1007/s11904-018-0418-8. Review.

26. Sherr K, Ásbjörnsdóttir K, Crocker J, Coutinho J, de Fatima Cuembelo M, Tavede E, Manaca N, **Ronen K**, Murgorgo F, Barnabas R, John-Stewart G, Holte S, Weiner BJ, Pfeiffer J, Gimbel S. *Scaling-up the Systems Analysis and Improvement Approach for prevention of mother-to-child HIV transmission in Mozambique (SAIA-SCALE): a stepped-wedge cluster randomized trial.* Implement Sci. 2019 Apr 27;14(1):41.doi: 10.1186/s13012-019-0889-z.

27. Harrington EK, Drake AL, Matemo D, **Ronen K**, Osoti AO, John-Stewart G, Kinuthia J, Unger JA. *An mHealth SMS intervention on Postpartum Contraceptive Use Among Women and Couples in Kenya: A Randomized Controlled Trial.* Am J Public Health. 2019 Jun; 109(6):934-941. doi: 10.2105/AJPH. 2019.305051.

28. **Ronen K***, Golden MR, Dombrowski JC, Kerani RP, Bell TR, Katz DA. *Uptake and Impact of Short Message Service Reminders via STI Partner Services on HIV/STI Testing Frequency among Men Who Have Sex with Men.* Sex Transm Dis. 2019 Oct;46(10):641-647. doi: 10.1097/OLQ.0000000000001043.

29. Lewis K, Harrington EK, Matemo D, Drake AL, **Ronen K**, O'Malley G, Kinuthia J, John-Stewart G, Unger JA. *Utilizing perspectives from HIV-infected women, male partners and healthcare providers to design family planning SMS in Kenya: A qualitative study.* BMC Health Serv Res. 2019 Nov 21;19(1):870. doi: 10.1186/s12913-019-4708-7

30. Wagner AD, Gimbel S, Ásbjörnsdóttir KH, Cherutich P, Coutinho J, Crocker J, Cruz E, Cuembelo F, Cumbe V, Eastment M, Einberg J, Floriano F, Gaitho D, Guthrie BL, John-Stewart G, Kral AH, Lambdin BH, Liu S, Maina M, Manaca N, Matsuzaki M, Mattox L, Mburu N, McClelland RS, Micek MA, Mocumbi AO, Muanido A, Nduati R, Njuguna IN, Oluoch G, Oyiengo LB, **Ronen K**, Soi C, Wagenaar BH, Wanje G, Wenger LD, Sherr K. Cascade Analysis: An Adaptable Implementation Strategy Across HIV and Non-HIV Delivery Platforms. J Acquir Immune Defic Syndr. 2019 Dec;82 Suppl 3:S322-S331. doi: 10.1097/QAI.0000000000002220.

31. Pankau MD, Reeves DB, Harkins E, **Ronen K**, Jaoko W, Mandaliya K, Graham SM, McClelland RS, Matsen Iv FA, Schiffer JT, Overbaugh J, Lehman DA. Dynamics of HIV DNA reservoir seeding in a cohort of superinfected Kenyan women. PLoS Pathog. 2020 Feb 5;16(2):e1008286. doi: 10.1371/journal.ppat.1008286.

32. Gimbel S, Mocumbi AO, Ásbjörnsdóttir K, Coutinho J, Andela L, Cebola B, Craine H, Crocker J, Hicks L, Holte S, Hossieke R, Itai E, Levin C, Manaca N, Murgorgo F, Nhumba M, Pfeiffer J, Ramiro I, **Ronen K**, Sotoodehnia N, Uetela O, Wagner A, Weiner BJ, Sherr K. Systems analysis and improvement approach to optimize the hypertension diagnosis and care cascade for PLHIV individuals (SAIA-HTN): a hybrid type III cluster randomized trial. Implement Sci. 2020 Mar 6;15(1):15. doi: 10.1186/s13012-020-0973-4.

Invited chapters

1. **Ronen K*,** Milligan C, Overbaugh J. *The role of antibodies in HIV transmission.* Encyclopedia of AIDS, 2014

FUNDING HISTORY

Active

2020-2022   **PI, Leveraging Interactive SMS Messaging to Monitor and Support Maternal Mental Health in Kenya**
This project aims to use natural language processing and machine learning to develop an adaptive SMS intervention that supports healthcare workers to deliver effective SMS messages to support perinatal depression.
NIH/NIMH K18MH122978
Direct Costs: $118,626   75% Effort

2019-2021   **PI, Social media support for peripartum adolescents in Seattle**
This project adapts an evidence-based in-person group cognitive behavioral therapy intervention to a social media format in order to prevent perinatal depression in adolescent women in the Seattle area.
University of Wisconsin Technology & Adolescent Mental Wellness
Direct Costs: $158,581   6.7% Effort

2018-2021   **Co-I, Planning the mPACT Trial – mHealth strategies for the Pediatric to Adult HIV Care Transition**
(PI: Brandon Guthrie)
This planning grant will support development of a novel mHealth intervention to support youth living with HIV who are transitioning to adult care through a combination of virtual group peer support and 1-to-1 communication with a healthcare worker.
NIH/NIMH R34MH114834
Direct Costs: $152,357   6.7% Effort

2019-2024   **Co-I, Mobile WACh NEO: Mobile Solutions for Neonatal Health and Maternal Support**
(PI: Jennifer Unger)
This project is a RCT of the Mobile WACh interactive SMS intervention to improve neonatal and maternal health in Kenya.
NIH/NICHD R01HD098105
Direct Costs: $ 435,807   6.7% Effort

2020-2025   **PI, CHV-NEO: Community-based digital communication to support neonatal health**
Impact score 19, pending council review
This study will develop an interactive SMS text messaging intervention that remotely connects mothers with community health volunteers, and evaluate the intervention's effect on neonatal health, service outcomes, and implementation outcomes, when implemented as part of routine CHV workflow in Western Kenya.
NIH/NICHD R01HD103581
Direct Costs: $512,700   30% Effort

2020-2025   **Co-I, mWACh-PrEP: A SMS-based Support Intervention to Enhance PrEP Adherence during Pregnancy and Breastfeeding**
(PI Jillian Pintye)
Impact score 24, pending council review
This project seeks to evaluate the effectiveness of the Mobile WACh interactive SMS platform to improve HIV PrEP adherence.
NIH/NINR R01NR019220
Direct Costs: $500,000   15% Effort

Completed

2018-2023   **Co-I, Spreading the Integrated District Evidence-To-Action Program for Neonatal Mortality Reduction (IDEAS) In Mozambique**
(MPI: Kenneth Sherr, Quinhas Fernandes)
This proposal scales-up a health systems intervention (modified and enhanced audit and feedback) targeting facility and district managers and studies the implementation to build evidence on how to achieve rapid, sustainable and scalable improvements in services to improve population health in resource limited countries.
NIH/NICHD R01HD092449
Direct Costs: $548,844   5% Effort

2019-2024   **Co-I, Systems Analysis and Improvement Approach to Optimize the Hypertension Diagnosis and Care Cascade for HIV-Infected Individuals (SAIA-HTN)**
(PI: Sarah Gimbel)
This proposal evaluates an evidence-based intervention designed to improve chronic care services (SAIA) for hypertension detection and management in people living with HIV.
NIH/NHLBI R01HL142412
Direct Costs: $528,056   5% Effort

2019-2022   **Co-I, Developing Low-Cost Universal Malnutrition Screening for Low-Income Countries**
(PI: Christine McGrath)
The goal of this project is to develop and evaluate the impact of an interactive SMS platform to remotely support caregivers to measure and report mid-upper arm circumference of their children to facilitate early diagnosis of malnutrition.
Thrasher Foundation
Direct Costs: $166,387   5% Effort

2014-2020   **Co-I, Evaluation of mHealth Strategies to Optimize Adherence and Efficacy of PMTCT/ART (Mobile WAChX)**
(PI: Grace John-Stewart)
The goal of this project is to evaluate the impact of one-way vs. two-way SMS on efficacy of PMTCT/ART in Kenyan women, using a three-armed RCT.
NIH/NICHD R01 HD080460 (NCE)
Direct Costs: $554,285   5% Effort

2019-2020	**PI, Understanding trajectories of participant engagement in an interactive text messaging intervention for women living with HIV**
	The goal of this project is to define trajectories of longitudinal messaging patterns by participants in the Mobile WAChX trial and evaluate association of these trajectories with participant characteristics and clinical outcomes.
	Investment of Catalytic Funds to Access Research Award
	P30 AI27757, UW/Fred Hutch CFAR (PI: Jared Baeten)
	Direct Costs: $15,000 5% Effort

2019-2020	**Co-I, Does the Message Matter? Assessing the Effect of SMS Content and Participant Characteristics on Engagement and Care Seeking Outcomes from the Mobile WACh Studies**
	(PI: Jennifer Unger)
	The goal of this project is to analyze data on participant interactions with interventions in the Mobile WACh suite in order to understand how women engage with SMS interventions and how this engagement impacts care seeking behaviors.
	UW Royalty Research Fund
	Direct Costs: $ 31,602 5% Effort

2017-2019	**PI, Social Media for ART Adherence and Retention in Adolescents and Young Adults**
	The goal of this project was to develop and pilot-test a standardized WhatsApp intervention that supports retention in care and adherence to ART in adolescents and young adults in Kenya.
	CFAR New Investigator Award
	P30 AI27757, UW/Fred Hutch CFAR (PI: Jared Baeten)
	Direct Costs: $150,000 15% Effort

2017-2022	**Co-I, Scaling up the Systems Analysis and Improvement Approach for Prevention of Mother-to-child HIV Transmission in Mozambique (SAIA-Scale)**
	(PI: Kenneth Sherr)
	This proposal scales-up a health systems intervention (SAIA) that packages systems engineering methods and was previously shown to be effective in improving the prevention of mother-to-child HIV transmission cascade.
	NIH/NIMH R01MH113435

2016-2018	**Co-I, Mobile WACh NEO: Communication Empowering Mothers and Newborns**
	(PI: Jennifer Unger)
	The goal of this *Saving Lives at Birth Validation Award* was to address the scalability and sustainability of a human-computer hybrid communication system (Mobile WACH) that engages mothers to increase demand for care in the period close to delivery when risk to mothers and infants is highest.
	USAID-OAA-F-16-00026

2015-2018	**Co-I, STD AAPPS Supplemental Funding for Enhanced Program Evaluation**
	(PI: Teal Bell)
	The goal of this project was to evaluate integration of HIV-related outcomes into STI Partner Services at Washington State Department of Health and Public Health – Seattle & King County.
	CDC H25PS004364

2018-2019	**Consultant, Lesbian, Bisexual, Trans, and Queer Women's Health Needs Assessment and Feasibility Study**
	(PI: Tobi Hill-Meyer)
	The goal of this project was to conduct a mixed-methods needs assessment of the health needs of queer women and gender non-binary people in the Seattle area, to inform development of new services at Gay City, a local non-profit.
	Pacific Hospital Preservation & Development Authority

2010-2020	**Postdoctoral fellow, Early and Reinfection in High Risk Women**
	(PI: Julie Overbaugh)
	This study takes advantage of a unique, 20-year cohort study to identify viral and host factors that impact the risk of HIV acquisition and disease progression in both singly and superinfected women to inform development of an effective HIV vaccine.
	NIH/NIAID R37AI038518

2013-2014	**Postdoctoral appointee, Consequences of HIV-1 Superinfection: Disease Progression and Neutralizing Antibody Response**

2013-2014   **Postdoctoral appointee, Consequences of HIV-1 Superinfection: Disease Progression and Neutralizing Antibody Response**
This postdoctoral fellowship project used molecular biology and epidemiology methods to compare the immune response and HIV progression of Kenyan women superinfected with HIV to those of singly infected women.
Fred Hutch Interdisciplinary Training Grant

2011-2013   **Postdoctoral appointee, High-throughput Analysis of Incidence and Outcome of HIV-1 Superinfection**
The goal of this postdoctoral fellowship was to develop a novel laboratory and computational pipeline to identify cases of HIV superinfection in a cohort of high-risk Kenyan women.
NIH/NIAID T32 AI1007509 Diseases of Public Health Importance Research Training Program (PI: Leanne Campbell)

2008-2010   **Predoctoral appointee, Host Factors and Consequences of Lentiviral Integration Site Selection**
The goal is this predoctoral fellowship was to investigate the genomic distribution of lentiviral gene therapy vectors following transduction and culturing of wild-type and knockdown cell-lines.
NIH/NIAID T32 AI007324 Training in Virology (PI: Nigel Fraser)

2006-2008   **Predoctoral appointee, Host Factors and Viral Determinants of Retroviral Integration Site Selection**
The goal of this predoctoral fellowship was to use gene knockdown approaches to identify host and viral determinants of the genomic distribution of retroviral proviruses.
NIH/NIGMS T32GM007229 Training Program in Cell and Molecular Biology (PI: Richard Schultz)

CONFERENCE PRESENTATIONS

Contributed oral presentations

06/2008   **Lentiviral integration site selection: LEDGF and histone modifications**
Mid-Atlantic Transposon Meeting, Philadelphia, PA

05/2009   **Novel host factors in HIV infection: effects on integration site selection**
Cold Spring Harbor Retroviruses Meeting, Cold Spring Harbor, NY

02/2010   **Use of LEDGF/p75 fusion proteins to retarget lentiviral integration outside of genes**
Conference on Retroviruses and Opportunistic Infections, San Francisco, CA

03/2012   **Detection of frequent superinfection among Kenyan women using ultra-deep pyrosequencing**
Conference on Retroviruses and Opportunistic Infections, Seattle, WA

03/2014   **Accelerated viral load increase and CD4 decline in HIV-1 superinfected women**
Conference on Retroviruses and Opportunistic Infections, Boston, MA

07/2015   **Lower ANC attendance and PMTCT uptake in adolescent versus adult pregnant women in Kenya**
8th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention, Vancouver, BC

07/2018   **Food insecurity is common and associated with unsuppressed viral load in HIV-infected pregnant women in Kenya**
22nd International AIDS Conference on HIV Science (AIDS 2018), Amsterdam, Netherlands

10/2019   **Self-disclosure of HIV status by Adolescents and Young Adults Associated With Higher Levels of Stigma and Depression**
HIV and Adolescence workshop, Nairobi, Kenya

Contributed poster presentations

02/2013   **HIV-1 superinfection occurs less frequently than initial infection in a cohort of Kenyan Female Sex Workers**
Keystone Symposia on HIV Vaccines, Keystone, CO

07/2015   **Lower ANC attendance and PMTCT uptake in adolescent versus adult pregnant women in Kenya**
7th International Workshop on HIV Pediatrics, Vancouver, BC

07/2017	**SMS messaging to improve adherence to PMTCT/ART: demand for overt HIV-related content among peripartum HIV-infected women in Kenya**
	9th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention, Paris, France
03/2018	**Disparities in antenatal virologic failure among women receiving Option B+ in Kenya**
	Conference on Retroviruses and Opportunistic Infections, Boston, MA
07/2018	*I have made friends with whom we remind and encourage each other*: **Youth perspectives on and access to a *WhatsApp*-based HIV treatment support tool in Nairobi, Kenya**
	22nd International AIDS Conference on HIV Science (AIDS 2018), Amsterdam, Netherlands

TEACHING

2010	Guest lecturer
	University of Washington, GS414: Molecular Evolution
2011	Guest lecturer
	University of Washington, MICRO301: General Microbiology
2016-2019	Guest lecturer
	University of Washington, GH532: Responsible Conduct of Research: Global and Local
2016-2019	Workshop instructor
	University of Washington Global WACh & CFAR: Digital data collection workshop
2018	Guest lecturer
	University of Washington, GH590B: Adolescent Health in Resource-limited Settings
2018-2019	Guest lecturer
	University of Washington, NURS581: Global Health Nursing
2019	Guest lecturer
	University of Washington, GH454: Bioengineering Solutions to Problems in the Global Health of Women, Adolescents & Children
2019-present	Instructor
	University of Washington, GH547: Adolescent Health in Resource-limited Settings

ADVISING AND MENTORING

* MPH thesis committee member, ** PhD dissertation committee member, *** MPH thesis committee chair

2008	Alyssa Huegel
	PhD student, Cell and Molecular Biology
	University of Pennsylvania
2009	Karen Ocwieja
	MD-PhD student, Cell and Molecular Biology
	University of Pennsylvania
2011	David Boyd
	PhD student, Pathobiology
	University of Washington
2012-2013	Willimark Obenza
	Post-baccalaureate student, UW Post-baccalaureate Research Education Program
	University of Washington
2013-2014	Christopher Cottrell
	Technician
	Fred Hutchinson Cancer Research Center
2014-2015	Bingjie Wang
	Technician
	Fred Hutchinson Cancer Research Center
2017	Jade Fairbanks

	MPH student, Global Health University of Washington
2016- present	Lusi Osborn MS student, Statistics Jomo Kenyatta University of Agriculture and Technology, Kenya IARTP non-degree student University of Washington
2016- 2019	Trevor Perrier** PhD student, Computer Science and Engineering University of Washington
2017- 2018	Yilin Chen MPH student, Global Health University of Washington
2017- present	Wenwen Jiang** PhD student, Epidemiology University of Washington
2017- 2019	Kevin Saiki Resident physician, Obstetrics and Gynecology University of Washington
2018- 2019	Brenda Kharono*** MPH student, Global Health University of Washington
2019- 2020	Elise Healy*** MPH student, Global Health University of Washington
2019- present	Brenda Wandika IARTP non-degree student University of Washington
2019- present	Narshion Ngao MS student, Computer Science Jomo Kenyatta University of Agriculture and Technology, Kenya
2019- present	Anupa Gewali*** MPH student, Global Health University of Washington
2019- present	Alana Lopez*** MPH student, Global Health University of Washington
2019- present	Alyssa Hummel* MD/MPH student, Global Health University of Washington
2020- present	Naveena Karusala PhD student, Computer Science and Engineering University of Washington

PROFESSIONAL SERVICE

Committees

2016- present	Member Adolescent working group Global Center for Integrated Health of Women, Adolescents and Children University of Washington

2018-	Member
2019	Diversity, Equity and Inclusion Committee
	Department of Global Health, University of Washington

2019-	Co-chair
present	Diversity, Equity and Inclusion Committee
	Department of Global Health, University of Washington

Manuscript peer review

Journal of Virology
PLoS Pathogens
JAIDS
BMC Public Health
BMC Infectious Diseases
AIDS Care
BMJ Open
Lancet HIV
Journal of Adolescent Health

Journal issue editorship

HIV and Technology, *Current HIV/AIDS Reports*, 2018

Conference organizing

Leveraging Smartphone-enabled Group Messaging for Global Health, International Workshop, May 2019, New York, NY.

LANGUAGE PROFICIENCIES

French   Advanced proficiency in reading, writing and speaking
Hebrew Intermediate proficiency in speaking, basic proficiency in reading and writing

<u>CURRICULUM VITAE</u>

Michelle Virgin, MA
Proposed Role: Grant Administrator

SUMMARY STATEMENT

Ms. Virgin is an experienced grant manager with 10 years' international program management and leadership experience in a wide array of challenging assignments in Afghanistan, Turkey/N. Syria, Haiti, the Philippines, Rwanda, Cameroon and Argentina, as well as education and work experience in Canada and the United States.

EMPLOYMENT

University of Washington Department of Global Health

Senior Program Manager, **I-TECH, Seattle, WA**   **January 2020-Present**

- Collaborate with Haiti-based stakeholders, including CDC and Ministry of Health, to design, conduct, and achieve global health deliverables, with focus on health information systems and HIV care and treatment
- Lead award administration for the Digital Initiatives Group at I-TECH

*Program Manager***, Int'l AIDS Research & Training Program, Seattle, WA   May 2019-January 2020**

- Managed daily operations of five training and research grants with focus on low- and middle-income countries.
- Oversaw pre- and post-award administration for National Institutes of Health/Fogarty International Center and Health Services and Resources Administration awards, exceeding $1.5 million annually.
- Supervised program team of four staff.
- Prepared grant applications and marshaled through University of Washington and NIH systems; successful competitive win of $1.5M.

Catholic Relief Services

Interim Education Coordinator, **Afghanistan**   **September 2018 – November 2018**
Proposal Coordinator, **Philippines**   **May 2018 – June 2018**
Emergency Food Security Program Manager, **Turkey/N. Syria**   **January 2017 – April 2018**

- Managed $84M Food for Peace (FFP) grant targeting 25,000 households in over 140 villages of Northern Syria with life-sustaining monthly food support in the form of in-kind food commodities and food vouchers, preparing and adjusting annual, monthly, and weekly implementation plans based on security and operating constraints.
- Remotely managed team of over 60 staff in complex operating environment, ensuring high quality supervision.
- Worked closely with operations, supply chain, compliance, and finance teams for timely procurement, cross-border delivery, and payment for food commodities and vouchers.
- Ensured compliant reporting, prepared proposals, budgets, budget narratives, cost modifications, and pipelines for FFP and joint FFP-Office of U.S. Foreign Disaster Assistance (OFDA) award.

Head of Office, **Bamiyan & Daykundi Provinces, Afghanistan   October 2015 – October 2016**

- Responsible for all 100+ programming and operations staff in two provinces to deliver community-based education and agricultural livelihoods portfolio of >$2.5M to over 100 remote communities. Oversaw all aspects of programming, operations, finance, and HR for primary office, four sub-offices, and five smaller satellite offices located more than 12 hours' drive from one another.
- Proactively managed staff security across broad geographic territory, updating Country Representative on incidents and trends, consulting with senior staff and external stakeholders,

proposing adjustments to SOPs and security posture as needed. Oversaw government and community relations, promoting acceptance through high quality program design and implementation, transparent systems, careful recruitment, and strong staff management.
- Managed expansion of operations to support program growth, including expansion to over 20 new communities: established one new sub-office and guesthouse and four satellite offices, oversaw recruitment and onboarding of new staff; managed changes in base location for 10 employees.
- Led provincial participation in Afghanistan CP Strategy Development Process.

Education Program Manager, **Bamiyan & Daykundi Provinces, Afghanistan** **May 2014 – September 2015**
- Led cross-functional team of 28 programming and support staff across three offices to implement high quality community-based education programming for over 1400 students (> 50% of whom were girls), establishing community-based schools in 40 new communities, for a total of 56 communities and 70 classes.
- Managed budget for Government Affairs Canada (formerly DFATD)-funded Community Based Education Enrichment Program (>$5M over five years across five provinces); Caritas Australia CBE in Western Afghanistan (>$300,000)
- Facilitated office set-up in remote province of Daykundi, ensuring facilities and systems in place to allow for smooth program implementation.
- Built staff capacity through mentoring, regular inter-office exchanges, trainings, and adherence to CRS performance management standards.
- Promoted linkages between between monitoring, evaluation, accountability, and learning (MEAL) initiatives and programming, conducting regular data reflection sessions and follow-up to encourage adaptive management.
- Initiated and led all recruitment for education programming in Bamiyan and Daykundi.
- Ensured productive coordination with government and partners, including New York University for CRS' participation in a randomized controlled trial (see www.alseproject.com).
- Participated in CRS proposal design training (12/2014) and leadership training (6/2015).

International Development Fellow, **Les Cayes, Haiti** **September 2013 – May 2014**
- Conducting work in French, oversaw microenterprise and savings & internal lending components in support of agricultural value chains programming, including staffing, partner collaboration, and revision of work plans.
- Supported start-up activities for Inter-American Development Bank-funded $5M cacao value chain project: launch event for 100+ participants; operations manual development; organization of meetings with partners; development of project steering committee; coordination of sub-recipient assessment; drafting of sub-recipient terms of reference.
- Assisted in assessments and proposal development for WASH, disaster risk reduction, and agricultural programming, including for OFDA and World Bank opportunities,.
- Participated in prepositioning workshop (10/2013) and finance training for non-finance staff (02/2014).

University Neighborhood Housing Program
Program Assistant, **Bronx, NY** **January 2013 – April 2013**
- Provided financial advising in Spanish and English to low income residents of the Bronx, including completion of tax returns and referrals to other financial services.
- Managed recruitment, training, and support for 40+ volunteers.

United States Agency for International Development
Democracy and Governance Unit Intern, **Kigali, Rwanda** **June 2012 – August 2012**
- Conducted monitoring visits to USAID-funded projects and provided feedback to project coordinators.

- Collaborated with Mission team leaders to revise Mission's gender assessment, identifying actionable items.
- Developed curriculum for young women's entrepreneurship training.

Refine+Focus
Project Coordinator, **Boston, MA (from Buenos Aires, Argentina)   December 2010 – September 2011**
- Developed outreach and marketing strategies with clients (including NGOs), leading clients through visioning, goal-setting, and project development.
- Set, developed and budgeted deliverables, integrating measurable outcomes.
- Performed timely research relevant to client needs.

United States Peace Corps
Small Enterprise Development Volunteer, **Ngaoundéré, Cameroon   June 2008 – August 2010**
- Identified, trained, and provided technical support to 10 groups of women (200+ individuals) in *Village Savings & Loans Associations* program, which offers independent financial services and social insurance.
- Initiated and taught business classes and financial literacy classes for adults and youth at microfinance bank, government Center for the Promotion of Women, local high school, and seminars held by Cameroonian and international organizations.
- Provided technical support to a microfinance bank with over 1000 clients and net worth of US $500,000, turning a profit for the first time at the end of 2008; concentrated assistance on analysis of loan applications. Served as liaison between local associations and the bank, explaining concepts of savings and credit to clients and assisting with loan applications.
- Linked honey producers of Adamawa Region with the United States Embassy's Trade Section to start procedure for honey exportation under African Growth and Opportunities Act (AGOA).
- Completed two Peace Corps Partnership Projects; conducted needs assessment and consultation with beneficiaries regarding their contribution, obtained funding for completion of a school, as well as funding for start-up capital for young women's entrepreneurial projects.
- Designed and conducted training for 15 new Peace Corps Small Enterprise Development volunteers.

International Centre for the Prevention of Crime
Analyst, **Montreal, Canada   September 2007 – May 2008**
- With a multi-lingual team representing seven countries and three continents, produced first ever biennial report on international trends in crime prevention and community safety published in three languages.
- Researched and drafted chapter for biennial report on international, national and local policies and practices to prevent violence against women.
- Co-coordinated compendium of inspiring practices in crime prevention.
- Researched and drafted chapter for compendium on practices addressing prevention of youth gang formation and recidivism.
- Wrote commissioned paper on violence against women in Central America for Observatorio Centroamericano sobre Violencia (Central American Observatory on Violence), translated to Spanish.

Connections Group, LLC
Analyst, **Seattle, WA   June 2006 – August 2006**
Center for Peace & Human Security, Sciences Po
Intern, Paris, France   March 2006 – June 2006

EDUCATION
MA, International Political Economy & Development   February 2013
Fordham University, Bronx, NY
- Awardee, Public Service Assistantship

- Recipient, Matteo Ricci Award for Academic Excellence (highest academic honor awarded)
- Campion Institute Research Fellow, Emerging Markets, South Africa 2012
- Campion Institute Research Fellow, Monitoring & Evaluation, Philippines 2012
- Coursework including: Project Assessment, Project Accounting, Project Design, Project Proposal Writing; Applied Econometrics; Agricultural & Development; Community Economic Development; Financial Analysis

BA, Joint Honours Political Science and International Development Studies   May 2007
McGill University, Montreal, Canada
- *Certificate,* Université Paris-Sorbonne, Paris, France   *Spring 2006*
- *Exchange,* University of Hong *Kong*, Hong Kong, PRC   *Fall 2005*

Rotary International Youth Exchange   2001-2002
Lycée Mme de Staël, Montluçon, France

OTHER SKILLS & TRAININGS
Proficient in French and Spanish

Humentum USAID Rules & Regulations: Grants & Cooperative Agreements training	**2017**
eCornell Project Leadership Certificate	**2014**
Project Management for Development Professionals (PMD Pro) Level 1 Certification	**2014**