

The Chronic Diseases Clinic of Ifakara (CDCI) and the Kilombero and Ulanga Antiretroviral Cohort Study (KIULARCO) at the St. Francis Referral Hospital

Annual Report for the year 2017

A collaboration between

- St. Francis Hospital Referral (SFRH), Ifakara, Tanzania (Chief Medical Officer: Dr. W. Gingo)
- Ifakara Health Institute (IHI), Ifakara, Tanzania (Director: Dr. H. Masanja)
- Swiss Tropical and Public Health Institute (Swiss TPH), Basel, University of Basel, Switzerland
Project Coordinators: PD Dr. Maja Weisser, Prof. Daniel Paris, Prof. Ch. Hatz, Prof. M. Tanner)
- Division of Infectious Diseases and Hospital Epidemiology, University Hospital Basel, Basel, Switzerland (Head of Department: Prof. M. Battegay)
- Division of Infectious Diseases Inselspital Bern, University of Bern, Switzerland (Head of Department: Prof. HJ. Furrer)



Report prepared by:
PD Dr. Maja Weisser, MD
Ifakara, 25.01.2018



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I. Summary

HIV/AIDS remains one of the most important diseases in sub Saharan Africa despite tremendous achievements in the last 15 years. According to the UNAIDS report 2017 and the Tanzania Impact Surveillance the HIV prevalence in Tanzania 2016 was 4.7% (similar to the previous year). The 90-90-90 WHO goals were not reached for the first goal, but for the 2 others nearly: Of all persons, 50-70% knew their HIV status and 63%-90% were enrolled in care and 88% were virally suppressed.

Since 2005 the Chronic Disease Clinic of Ifakara (CDCI) is the Care and Treatment Center (CTC) for People living with HIV (PLWHIV) of the St. Francis Hospital Referral (SFRH) in Ifakara, Morogoro. CDCI is a joint project of the Swiss Tropical and Public Health Institute, the Ifakara Health Institute, the SFRH and the University Hospitals Basel and Berne.

Voluntary counseling and testing (VCT) is offered to all patients coming to seek testing, but also as 'provider-initiated testing and counseling (PITC), aiming at testing all patients seen at SFRH (in- and outpatients, pregnancy) irrespective of the clinical presentation. Patients with positive test results are enrolled into care on the same day in order to start antiretroviral treatment ('test and treat'). CDCI takes care of in-and outpatients with an HIV-infection according to the Tanzanian National AIDS Control Program (NACP) guidelines and also is in charge of all patients with Tuberculosis. CDCI works in close collaboration with district authorities and national stakeholders such as Boresha Afya. For the Kilombero district, CDCI offers supervision and training of staff of peripheral CTCs and organizes educational community events, e.g. radio casting, World AIDS day (1.12.2017).

Along with clinical services, CDCI aims at improving care through research. Attending patients are asked for informed consent to participate in the Kilombero and Ulanga Antiretroviral Cohort (KIULARCO), a database of demographic and clinical information and storage of blood. The database provides a unique opportunity to study the epidemiology and needs of patients with HIV in rural Africa. More than 9,000 patients have been enrolled and about 3'600 are under active care. The third pillar of CDCI is training of and capacity building of young medical doctors and clinical officers, nurses, laboratory scientists and epidemiologists.

Highlights and achievements of 2017 at CDCI

- Moving to the newly renovated Outpatient Department
- Patient-centered Blood withdrawal (on ward rounds and within the clinic)
- Implementation of yearly routine viral load testing
- Enrolment of baseline patient the same day (lab and visit by the doctor) in order to reduce 'Early lost to Follow-up rates' and assurance of 'test and treat'
- Reduction of routine lab testing to once yearly
- Implementation of drug-dispensing within One Stop Clinic
- Roll-out of Early Infant Diagnosis to the District
- Establishment of the Malnutrition Project for malnourished children
- Presentation of Scientific Work at National and International Conferences

II. Patient Numbers

Number of HIV Testing at SFRH 2016-2017

Figure 1 and 2 show HIV test results at the SFRH from January 2016 to December 2017 in routine care, whereby Figure 1 shows absolute numbers and Figure 2 the percentage of positive tests from all patients tested. We could not assess the numbers of all patients seen at SFRH.

Figure 1

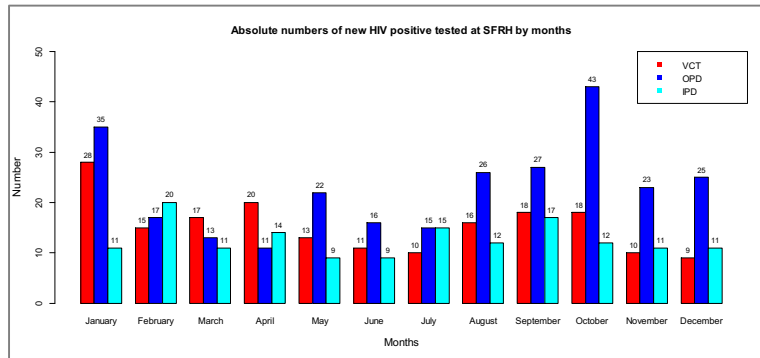
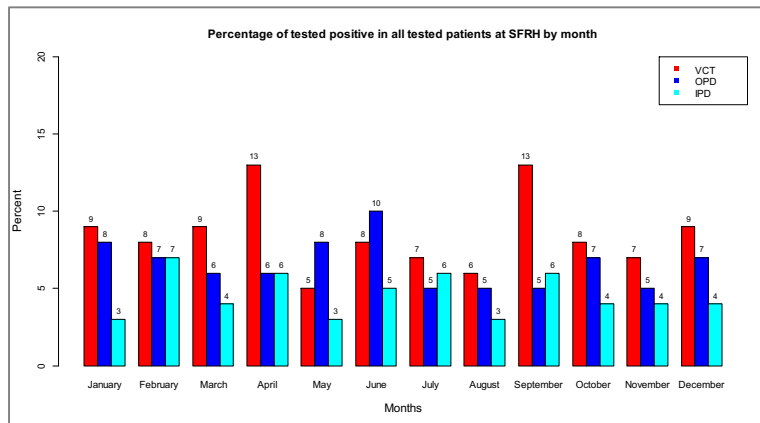


Figure 2



VCT voluntary counseling and testing, OPD outpatient department, IPD inpatient department



Number of patients attended in CDCI 1.1.-31.12.2017

(numbers from the National AIDS Control Database (NACP))

Table 1 shows overall patient numbers with a documented HIV infection seen at SFRH

	Adult (≥15 year-old)		Children (<15year-old)		Total
	Female	Male	Female	Male	
Cumulative number of persons enrolled, n	5'932	3'217	469	473	
Total, n	9'149		942		10'091
Cumulative number of persons on ART, n(%)*	4'812	2'450	367	387	
Total, n(%)	7'262		745		8'007



Number of patients enrolled into KIULARCO until December 2017

(numbers form openMRS database)

Figure 3 shows the number of patients enrolled yearly into KIULARCO

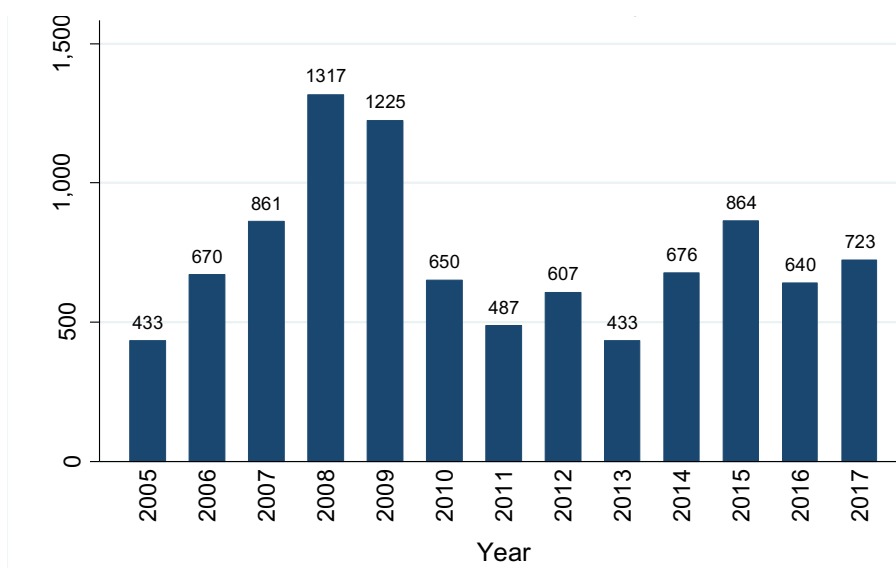


Table 2 shows the details of patients ever and monthly enrolled according the OpenMRS database

KIULARCO monthly report for January - December, 2017 for database updated on 04/01/2018

Characteristics	Cumulative numbers since 2005 until December, 2017	January, 2017			February, 2017			March, 2017			April, 2017			May, 2017			June, 2017		
		All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male
Newly enrolled patients¶	723	56	34	22	52	29	23	58	38	20	53	38	15	50	28	22	59	36	23
Total enrolled patients	9,586																		
On active follow-up	3,896	55	33	22	50	29	21	56	37	19	51	37	14	49	28	21	56	33	23
Died	925	0	0	0	1	0	1	2	1	1	2	1	1	1	0	1	1	1	0
Lost to follow-up	3,529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transfer out	1,236	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	2	2	0
Age at enrolment§																			
0 - 15	890	5	2	3	3	1	2	4	3	1	5	4	1	5	2	3	9	3	6
16 - 49	7,358	41	26	15	41	22	19	45	30	15	40	30	10	37	24	13	41	31	10
50 and Above	1,330	10	6	4	8	6	2	9	5	4	8	4	4	8	2	6	9	2	7
Pregnancy status at enrolment																			
No	5,702	33	33	0	27	27	0	38	38	0	38	38	0	23	23	0	35	35	0
Yes	344	1	1	0	2	2	0	0	0	0	0	0	0	5	5	0	1	1	0
ART information																			
Started ART	6,345	32	21	11	24	16	8	29	22	7	23	17	6	21	11	10	25	16	9
Started ART in other clinics	1,251	13	7	6	12	6	6	12	8	4	13	12	1	15	8	7	20	13	7
Never started ART	1,990	11	6	5	16	7	9	17	8	9	17	9	8	14	9	5	14	7	7
All enrolled patients																			
Follow-up visits*																			
Cumulative number of visits	177,096	1,380	931	449	1,359	899	460	1,573	1,070	503	1,243	835	408	1,515	1,004	511	1,494	1,017	477
Patients on ART and on active follow-up**	3,783	4,245	2,818	1,427	4,210	2,798	1,412	4,172	2,779	1,393	4,140	2,758	1,382	4,100	2,738	1,362	4,072	2,717	1,355

¶New enrolment of a specific year (its from January - August, 2017). §There are 8 patients missing date of birth. *Number of visit includes visits for transit patients too, transit patients are patients who are registered in other HIV clinics but they can come to our HIV clinic either for ART drug refill or when they are sick and they need clinical consultation. **In each month this is cumulative number from 2005.

KIULARCO monthly report for January - December, 2017 for database updated on 04/01/2018

Characteristics	Cumulative numbers since 2005 until December, 2017	July, 2017			August, 2017			September, 2017			October, 2017			November, 2017			December, 2017		
		All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male
Newly enrolled patients¶	723	53	37	16	73	46	27	88	59	29	81	51	30	56	32	24	44	26	18
Total enrolled patients	9,586																		
On active follow-up	3,896	53	37	16	71	46	25	83	55	28	79	49	30	54	30	24	40	25	15
Died	925	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	1	0	1
Lost to follow-up	3,529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transfer out	1,236	0	0	0	1	0	1	5	4	1	1	1	0	2	2	0	3	1	2
Age at enrolment§																			
0 - 15	890	5	3	2	4	3	1	15	9	6	11	4	7	10	5	5	5	3	2
16 - 49	7,358	41	28	13	51	33	18	60	43	17	54	40	14	37	24	13	33	20	13
50 and Above	1,330	7	6	1	18	10	8	13	7	6	16	7	9	9	3	6	6	3	3
Pregnancy status at enrolment																			
No	5,702	33	33	0	40	40	0	54	54	0	46	46	0	30	30	0	24	24	0
Yes	344	4	4	0	6	6	0	5	5	0	5	5	0	2	2	0	2	2	0
ART information																			
Started ART	6,345	21	16	5	43	27	16	51	33	18	42	25	17	35	20	15	24	16	8
Started ART in other clinics	1,251	16	10	6	12	8	4	21	16	5	22	13	9	10	6	4	9	6	3
Never started ART	1,990	16	11	5	18	11	7	16	10	6	17	13	4	11	6	5	11	4	7
All enrolled patients																			
Follow-up visits*																			
Cumulative number of visits	177,096	1,264	834	430	1,576	1,055	521	1,525	1,057	468	1,595	1,064	531	1,689	1,123	566	1,503	1,037	466
Patients on ART and on active follow-up**	3,783	4,033	2,699	1,334	4,003	2,677	1,326	3,950	2,638	1,312	3,903	2,607	1,296	3,854	2,580	1,274	3,783	2,537	1,246

¶New enrolment of a specific year (its from January - August, 2017). §There are 8 patients missing date of birth. *Number of visit includes visits for transit patients too, transit patients are patients who are registered in other HIV clinics but they can come to our HIV clinic either for ART drug refill or when they are sick and they need clinical consultation. **In each month this is cumulative number from 2005.

III. Staff of the CDCI

Forty local staff members are employed at the CDCI by four different organizations, namely IHI/SwissTPH (25), SFRH (6), USAID-BORESHA AFYA (8), and Swiss TPH (1). Additionally, 6 persons work on granted research or implementation projects. The CDCI team is currently composed of 8 medical doctors, 1 clinical officer, 7 nurses, 3 counselors, 5 auxiliary nurses, 1 nutritionist, 2 pharmacists, 2 statisticians, 6 data clerks, 4 biologists, 1 lab technician, and 6 auxiliary staff. The team has been quite stable over the last years, allowing to enhance established structures.

Until 2017, the CDCI was led by PD Dr. Maja Weisser, an infectious disease specialist from the University Hospital Basel, Switzerland. In 2018, a Tanzanian senior doctor (Dr. Herry Mapesi) is head of the clinic, supported by a PD Dr. Maja Weisser and locally by Dr. Anna Eichenberger, a doctor, specialized in Internal Medicine, from the University Hospital Berne, Switzerland.

IV. Infrastructure

Since January 2017 the CDCI is located at the new outpatient department of SFRH, which has been funded by the Swiss Agency for Development and Collaboration (SDC). CDCI rooms are on the posterior side of the building with an extra building for TB-patients and an additional testing room within the general patient triage.

The clinic consists of the following rooms

- reception
- triage
- 2 testing and counseling rooms
- 6 clinician's offices
- blood withdrawal room
- 2 drug dispensing rooms (1 HIV, 1 TB)
- 1-day hospital room
- data and server room
- meeting hall
- toilets for patients and staff



The One Stop Clinic, the integrated service clinic for HIV-affected families is located within the Reproductive and Child Health Clinic (RCHC) of SFRH.



The pharmacy storage room remained within the SFRH in order to closely link to the hospital pharmacy with an integrated electronic system to order antiretroviral drugs from the governmental pharmacy MSD (ELMIS). The drug dispensing room is located at the clinic. The laboratory activities are located within the Ifakara Health Institute laboratory, in close proximity to the hospital.

V. Clinical Activities

HIV testing services

Three trained counselors (2 for adult patients, 1 for pediatric patients and families) are in charge of voluntary counseling and testing (VCT) and provided-initiated testing and counseling (PITC) according national guidelines. During regular working hours (see Figure 1) this is achieved. During weekends and nights, we still face challenges with universal testing. Testing numbers are registered and regularly reported to hospital staff and to the district authorities. Additionally, the team takes care of counseling of patients with adherence issues on an individual patient level.

CDCI activities within the Outpatient Department

Newly diagnosed patients from SFRH are enrolled on the same day into HIV care. Blood is withdrawn at the clinic for baseline investigations (full blood count, creatinine, alanine aminotrans-ferase, CD4, VDRL, hepatitis B serology, cryptococcus antigen (if CD4<150/ul)). If diarrhea, stool is analyzed for parasites. All patients receive a chest xray. The patient is seen by the counselor and if



possible on the same day by the clinician. Follow-up controls are done every 3 months – (2/year by a nurse and 2/year by a clinician). Monitoring of treatment response by CD4 cell count and newly viral load as well as safety laboratory has been reduced to once yearly in stable patients. Additionally, if clinical or immunological treatment failure is suspected, viral load is measured. If >1000copies/ml, resistance testing is done. Patients with TB are seen by clinicians and treated according National Guidelines.

Improving Retention in care

To tackle retention in care, patients are called within 2 weeks of a missed visit. If patients cannot be reached, a network of more than 30 volunteers funded by USAID-Boresha Afya tracks patients at their home, in collaboration with a data clerk from our team. Since implementation of routine viral load testing we also track patients with a positive viral load results for counseling, retesting and if needed, switch to second-line treatment.



CDCI activities within SFRH Wards

Hospitalized patients with an HIV or TB infection are seen by a designated doctor from the CDCI, who takes care of these patients together with an intern from the SFRH doing daily ward rounds. Once a week a grand round is conducted under the supervision of the head of CDCI.

Integration of HIV and Tuberculosis Activities

TB being the most common comorbidity in HIV-infected patients, we integrated - in agreement with the hospital directorate - the TB clinic into CDCI in order to screen both patient groups accordingly and to manage co-infections properly and in a patient-centered care model.

Confirmation of TB after clinical suspicion and chest x-ray is done with Xpert MTB/RIF from sputum according to the Tuberculosis and Leprosy National Control Programme (NTLP).

For patients, included in the TB cohort (TB DAR), sputum is sent for testing to IHI laboratory in Bagamoyo. Within the research projects, other materials such as pleural, pericardial fluid, ascites, cerebrospinal fluid are tested by xpert. Sonography is performed in case of suspicion of extrapulmonary TB according to the FASH protocol (focused assessment with Sonography for HIV-associated Tuberculosis). According to government requirements, the setup of a ward and outpatient department to treat multidrug resistance (MDR) TB is planned in order for SFRH to become one of the referral centers for MDR-TB in Tanzania.

Integration of the CDCI with the antenatal and under-five clinic of SFRH

To improve services for HIV-infected pregnant women, measures to reduce/eliminate mother-to-child transmission and early infant diagnosis, the 'One Stop Clinic' was funded 2013 and integrated in the normal Antenatal and Under-five Clinic of SFRH. Within this specific project, an integral part of CDCI, a team of two medical doctors, a counselor and a nurse take care for HIV-infected pregnant women, HIV-exposed and HIV-positive children and their families in one site. The model project is sponsored by a Merck-for-Mothers' grant. Besides clinical care the One Stop Clinic functions as a referral clinic at the Kilombero district, offers twice yearly training for healthcare workers from other districts and does a lot of community-activities. E.g. during this years' World AIDS day an information and testing campaign was performed in two local prisons – for prisoners and staff. For more details on the One Stop Clinic of Ifakara, see Annex II.



Childrens Day December 2016

Care for HIV-infected mothers and their infants within the Kilombero District

To improve care for HIV-infected mothers and their infants within the Kilombero District we applied and successfully implemented an implementation project funded by ESTHER Switzerland. The aim of the one-year's project (July 2017 – June 2018) is to ensure Early Infant Diagnosis in the periphery and reduce turnaround time for testing and result delivery by twice weekly collection of sample, transport to the central lab and return of results to the clinician as soon as available. Also awareness campaigns for affected families, training for healthcare staff and capacity-building is part of the project.

Paperless Clinic

Since June 2013, patient data are captured within an electronic data collection system based on an Open Medical Record System (www.openmrs.org), allowing simultaneous access for all collaborators in charge of patient services (clinicians, triage, registration, pharmacy, laboratory). Also it allows a harmonized patient documentation among CDCI clinicians and is furthermore the basis for data extraction for scientific projects. A technical upgrade of the OpenMRS system to a current version has been successfully done this year in collaboration with the University Center of Computing Sciences in Dar es Salaam. Updates of the collected information is still an ongoing process. Julius Mkumbo, our statistician and quality manager was awarded a scholarship to attend OpenMRS Implementers' Conference in Malawi on 12-16 December 2017, a meeting, that gathers together all valuable members of OpenMRS community around the world.

For the National AIDS Control program, manually completed paper forms are additionally entered into the national database, and was also successfully updated this year. NACP works currently on an openMRS-based database to be implemented the coming years.

Pharmacy

Antiretroviral drugs are provided by the Government sponsored by International Partners and delivered by the governmental Medical Stores Department (MSD). Drug order and supply is organized within an electronic ordering system according consumption reports integrated into the hospital (ELMIS). Two pharmacists are working at the CDCI with support from the hospital pharmacy. During the last years almost no shortages in ARTs occurred, thanks to big efforts together with the local, regional and national authorities and institutions.

The National AIDS control program announced for next year the availability of a new class of ARTs, the integrase inhibitors, which so far has not been available, the replacement of tenofovir disoproxil fumarate with tenofovir-alafenamide, a less toxic formulation and the addition of the protease inhibitor darunavir with a high efficacy and excellent safety profile.

Implementation of a Malnutrition Project

Since the end of 2016 CDCI runs an implementation project for care of malnourished HIV-positive and negative children. The project is funded externally by AfricaViva, a Spanish Organization. Within the project, therapeutic foods are delivered to malnourished children and proper care

during hospitalization is ensured. Also information for caregivers, family members and healthcare workers is a central part. The project is now fully integrated into hospital routine. The malnutrition team consists of a nutritionist and a nurse and is supervised by one of our doctors, Dr. G. Mollel, who is also a member of a national stakeholder panel to validate National guidelines on Integrated Management of Acute Malnutrition.

VI. Laboratory activities

Monitoring of HIV-Therapy and Screening and Diagnosis of Opportunistic Infections

Laboratory screening and monitoring is done as per National AIDS Control guidelines. At baseline, full blood and CD4 counts, creatinine, transaminases, screening for syphilis (VDRL) and chronic Hepatitis B (HBsAg) is done. Additionally, patients with a CD4 cell count <150/ul receive a cryptococcal antigen test. In patients with symptoms for TB, an Xpert TB/RIF in sputum is performed. Stool is analyzed for parasites if clinically indicated. Follow-up examinations in stable patients are done once yearly (safety lab, CD4 cell count and newly HIV Viral Load). Currently, still most reagents are funded through the project, as the Government fails to deliver reagents for necessary testing countrywide. Routine Viral loads are sent to the regional laboratory in Morogoro. We expect to receive government reagents in short terms to run Viral loads on an Abbott machine in our own laboratory, which would shorten turnaround time greatly. Discussions with Stakeholders (NACP and MSD) to become a reference laboratory for the district are ongoing. Resistance testing is done in case of virological failure through project funds.



Early Infant Diagnosis

DNA PCR for early infant diagnosis has been routinely implemented at IHI lab with a 2 weeks turnaround time. Due to the inability of the company to provide reagents, we have temporarily changed to a sample transport system to Morogoro with result pickup to ensure rapid notification of newly diagnosed HIV-positive children

VII. Research activities

Projects nested within the ongoing Kilombero and Ulanga Antiretroviral Cohort (KIULARCO) allow to tackle and answer many questions regarding treatment outcome, retention in care, co-infections and other comorbidities. The aim of research is to improve patient services by improved knowledge, but also to help the national authorities to better understand the management of HIV/AIDS patient in peripheral rural areas of the country. Moreover, the research activities provide a unique opportunity for capacity building and career development of the local staff. Also we integrate regularly prospective observational and interventional studies, aiming at best patient care.

The most important research fields are:

- Antiretroviral Outcomes
- Tuberculosis-HIV Co-Infection
- Comorbidities and co-medications
- Cryptococcal infections
- Prevention of Mother to Child Transmission (PMTCT)
- Pediatric HIV

Research projects are mostly initiated by the local team – often in close collaboration with researchers from IHI, Swiss TPH and the Universities of Basel and Berne. Additionally, some projects are done within international expert networks, such as the studies on cryptococcal infections (Infectious Diseases Institute, Makerere University in Kampala, Uganda, and the University of Minnesota, USA), an immunological trial on broadly neutralizing antibodies (University of Lausanne, G. Pantaleo, Swiss TPH, C. Dauenberger) or a multisite study from the Drug for Neglected Diseases Initiative (DnDi) evaluating for Lopinavir/r Pellet formulations in children up to 3 years. These collaborations allow active participation in international research consortia, increase visibility of the project and ultimately revert in a better quality of care, training and research. A list of publications of the CDCI can be found in Annex I.

This year we were present in several national and international conferences and contributed important presentations on our work:

Presentations at the International AIDS Society's Conference in Paris, France, July 2017

- G. Sikalengo: Distinct patterns of clinical characteristics and helminth coinfections in adult tuberculosis patients from urban compared to rural Tanzania (Poster)
- G. Mbwani: Implementing CRAG Screening in HIV Patients Initiating ART in Rural HIV Clinics with Regular Absence of CD4 Testing Services in Rural Tanzania (oral presentation)

Presentations at the European AIDS Conference in Milan, Italy; October 2017

- H. Mapesi: Prevalence and evolution of renal impairment in people living with HIV in rural Tanzania (Poster)
- R. Ndege: Sonographic signs of extrapulmonary tuberculosis in HIV-positive and HIV-negative patients (Poster)
- E. Luoga: HIV transmission from mothers on antiretroviral therapy to their infants during breastfeeding in rural Tanzania (oral presentation)
- F. Franzeck: Comorbidities and Mortality in an aging HIV population in rural Tanzania: A prospective cohort study (Poster)
- L. van Essen: Characterization of Advanced HIV Disease at the Time of Presentation to HIV care in a Cohort of People Living with HIV in Rural Sub-Saharan Africa (Poster)

Oral presentations at MUHAS National Conference, Dar es Salaam, June 2017

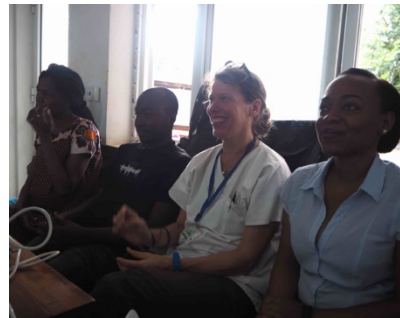
- R. Ndege: Sonographic signs of extrapulmonary tuberculosis in HIV-positive and HIV-negative patients
- A.V. Kalinjuma: Rates of and factors associated with loss to follow-up of HIV-infected persons in rural Tanzania

In addition to core funding, conference participation was made possible for several doctors of the CDCI through ongoing collaboration with the Division of Infectious Diseases and Hospital Epidemiology at the University Hospital Basel and thanks to generous support of Gilead and ViiV.

VIII. Training activities

The first working hour every day is reserved for education and training of staff including clinical case discussions, state of the art lectures on HIV and associated diseases, resistance committee and journal clubs. Each session is coordinated by a team member on a rotational basis, thereby contributing to a continuous medical education and fostering clinical discussion among the members of the team.

This year, 2 medical doctors from CDCI successfully completed a training abroad: Dr. Herry Mapesi did a MSc in Epidemiology at the Swiss TPH and Dr. Lameck B. Luwanda a master program in Oxford, UK. Currently Namvua Kimera, a laboratory scientist is at the University of Manchester for a master in bacteriology by an Equity & Merit Scholarship.



IX. Conclusions

The excellent collaboration between SwissTPH, IHI and the SFRH are the key to the sustainability of this project, together with the ongoing financial commitment of the Canton Basel-Stadt, which allows to run the clinic long-term and to establish functioning structures. Plans for a long-term financial sustainability are being developed together with the Tanzanian governmental and non-governmental institutions.

Besides serving a large number of patients from the Ifakara area, CDCI is also a referral center for smaller CTCs in the Kilombero/Ulanga districts. Teaching and training of staff including capacity building are integrated into daily routine, and research is crucial for motivation and commitment to improve healthcare of patients.

The unique conjunction of clinical care for more than 10'000 patients, good training and research possibilities in a rural African setting, together with the strong links with national and international partners providing expertise in different key areas for success, makes the CDCI/KIULARCO project an ideal platform to generate evidence tackling the real challenges of HIV in Africa, which may be extrapolated to similar settings in Tanzania and abroad.



ANNEX I. LIST OF PUBLICATIONS of the CDCI (last 5 years)

1. Franzeck FC, Ngwale R, Msongole B, Hamisi M, Abdul O, Henning L, Letang E, Mwaigomole G, Battegay M, Hatz C, Tanner M. **Viral hepatitis and rapid diagnostic test based screening for HBsAg in HIV-infected patients in rural Tanzania.** *PLoS One.* 2013;8(3):e58468
2. Masimba P, Kituma E, Klimkait T, Horvath E, Stoeckle M, Hatz C, Mossdorf E, Mwaigomole E, Khamis S, Jullu B, Abdulla S, Tanner M, Felger I. **Prevalence of drug resistance mutations and HIV type 1 subtypes in an HIV type 1-infected cohort in rural Tanzania.** *AIDS Res Hum Retroviruses.* 2013 Sep;29(9):1229-36.
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ANNEX II. REPORT OF THE ONE STOP CLINIC

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