

## Colposcopy Telemedicine partnership: Strengthening cervical cancer screening in Zambia



Final project report

July 2019



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## PROPOSAL SUMMARY

<b>Project Title</b>	<b>Colposcopy Telemedicine partnership:</b> Strengthening cervical cancer screening in Zambia	
<b>Country</b>	Zambia	
<b>Goal</b>	To build capacity in cervical cancer screening and strengthening policies	
<b>Swiss institution</b>	<b>University of Bern, Institute of Social and Preventive Medicine (ISPM)</b>	
	New address: Mittelstrasse 43 3012 Bern Switzerland	Dr Julia Bohlius Head of Cancer Research Group
<b>Partner institution(s)</b>	<b>Centre for Infectious Disease Research in Zambia (CIDRZ)</b>	
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	<b>Cervical Cancer Prevention Program in Zambia (CCPPZ)</b>	
	University Teaching Hospital Nationalist Road Lusaka, Zambia	Dr Mulindi H. Mwanahamuntu Co-Director
<b>Collaborator</b>	<b>International Agency for Research on Cancer (IARC)</b>	
	World Health Organization 150 Cours Albert Thomas 69372 Lyon CEDEX 08 France	Dr Partha Basu Medical Officer Screening Group, Early Detection & Prevention Section
<b>Requested grant (CHF)</b>	<b>99'885</b>	
<b>Project Timeframe</b>	1 year	

## ABBREVIATIONS

<b>CC</b>	Cervical Cancer
<b>CCPPZ</b>	Cervical Cancer Prevention Program in Zambia
<b>CIDRZ</b>	Centre for Infectious Disease Research in Zambia
<b>DHMT</b>	District Health Medical Team
<b>HIV</b>	Human Immunodeficiency Virus
<b>HPV</b>	Human Papilloma Virus
<b>IARC</b>	International Agency for Research on Cancer
<b>IeDEA-SA</b>	International Epidemiology Databases to Evaluate AIDS Southern Africa
<b>IHP</b>	Institutional Health Partnership
<b>ISPM</b>	University of Bern, Institute of Social and Preventive Medicine
<b>MDTs</b>	Multidisciplinary team meetings
<b>MoH</b>	Ministry of Health
<b>PHOs</b>	Provincial Health Office
<b>SOPs</b>	Standard operating procedures
<b>STI</b>	Sexually Transmitted Infections
<b>VIA</b>	Visual Inspection with Acetic Acid
<b>WHO</b>	World Health Organisation



## INTRODUCTION

Efforts to address the high rate of cervical cancer (CC) in Zambia have typically combined cervical screening and HIV care because of the high prevalence of HIV. The Cervical Cancer Prevention Program in Zambia (CCPPZ) and Centre for Infectious Disease Research in Zambia (CIDRZ) have pioneered Cervical Cancer (CC) screening in Zambia, providing a regional model for integrating HIV care and CC screening. Their program is based on the simplest and least costly method of screening - Visual Inspection with Acetic Acid (VIA). Despite the implementation of a national screening program since 2006, CC still has the highest mortality rate among all types of cancers in Zambia.

In our earlier discussions with stakeholders and partners, we identified many intrinsic health system difficulties that were undermining CC screening and treatment programs in Zambia, including suboptimal diagnostic accuracy of current screening methods, lack of continued clinical education in screening, inadequate record-keeping to assist referral, and lack of specialist input, especially in rural areas.

Together with the Centre for Infectious Disease Research in Zambia (CIDRZ, [www.cidrz.org](http://www.cidrz.org)), Cervical Cancer Prevention Program in Zambia (CCPPZ) and the Institute for Social and Preventive Medicine (ISPM, [www.ispm.ch](http://www.ispm.ch)), we developed a project aiming to:

- 1) Build capacity in portable nurse-led colposcopy
- 2) Establish colposcopy telemedicine, and
- 3) Build capacity through Institutional Health Partnership (IHP) synergies and inform screening policies in Zambia

This project supports the Government of Zambia's National Cancer Control Strategic Plan (pp. 48-49). The relevant goals include: (i) developing quality improvement systems in CC screening clinics; (ii) strengthening linkages between HIV care and cervical screening clinics; (iii) strengthening telemedicine consultation in CC screening clinics; (iv) implementing a national level program on mHealth; (v) strengthening the referral system for women with complex pre-CC lesions; and (vi) strengthening early diagnosis of CC and referral services in Zambia.

## **CHANGES IN THE CONTEXT, BARRIERS ENCOUNTERED**

We encountered some challenges in the project as follows:

- (i) We had originally proposed Chelstone Clinic for our project site. However, another project was introduced to this clinic, therefore, introduction of our project would have placed too much demand on the clinical team and its services. Kanyama 1st Level Hospital was then identified as a clinic that would benefit from the proposed project. Kanyama is one of Lusaka's founding hospitals. The project is working synergistically with government to expand services and to increase capacity to tertiary level care.
- (ii) Regulatory approval to use the Gynocular in Zambia from the Zambia Medicines Regulatory Authority was only finalized on 15<sup>th</sup> February 2019. This led to some changes in our project plan and contributed to the delay in project initiation.
- (iii) There were some difficulties with obtaining the T2D software which was planned to accompany the telemedicine capacity building. The producers were unable to provide the project team access to the tool. We resorted to safely storing images in two separate devices which are then used for multidisciplinary team meetings (MDTs) and training to improve on the quality of project conduct and reporting.

Despite the aforementioned challenges, all planned activities for this stage of the project are on-going. The team understands the challenges and collectively consults with experts both within and outside the group. We successfully secured the support of the Medical Superintendent of the Kanyama 1<sup>st</sup> Level Hospital as well as the Ministry of Health, and we will continue to foster national and international collaboration and coordination.

## **ENGAGEMENT ACTIVITIES/ PARTNERSHIP BUILDING**

We have had a range of engagement activities with partners since the project initiation and last reporting period.

- (i) In October 2018, we convened a stakeholders meeting in Lusaka to discuss capacity-building plans for the hospital. Along with our colleagues from CCPZ and CIDRZ, we met with the clinic Medical Superintendent to discuss our project. Specifically, we discussed increasing capacity by: 1) introduction of nurse-led colposcopy; 2) the possibility of expanding CC screening services by adding another screening room for this nurse to work from; and 3) providing point-of-care testing for Sexually Transmitted Infections (STI) and HPV screening services. These terms were all agreed upon with mutual enthusiasm for the anticipated benefits for women in this region.
- (ii) After an assessment on training needs during our visit in October 2018, we decided to divide the planned kick-off training into two sessions in order to introduce new procedures over a longer period and allow consolidation of practical skills and knowledge. The first training, in October 2018, served as an introduction to the Gynocular and the basics of colposcopy. The second training, in March 2019, added the skills of obtaining biopsies, point of care HPV and STI testing using the GeneXpert. SOPs were developed and used in the second training. This extra training time has proven to be beneficial for increasing the theoretical and practical knowledge among nurses using the Gynocular (portable colposcope).
- (iii) Since February 2019, we have been having weekly teleconferences with the local team to discuss progress. The preparatory phase towards project implementation included additional training sessions, testing of the

electronic data capture system and the first meeting of an independent group who will overlook the safety component of the project. This group, composed of CC prevention and control experts both locally and internationally, and a statistician met on 14/03/2019 in Lusaka, Zambia and will meet again in 3 months to review any safety issues during this implementation period and provide input accordingly.

- (iv) To facilitate the training and correct practice, detailed SOPs have been established, project staff have been trained on them and they serve as reference documents for project conduct.
- (v) Prior to the initiation of client enrollment, one of the investigators from Bern conducted a site visit to meet with the project team, hospital management, and the project site itself. There was a role-play of the enrollment process from client information to screening procedures and reporting. She provided input and assessed the team's preparedness to commence enrollment. Only minor revisions on the Case Report Forms were needed for the kick-off of enrollment.
- (vi) A teleconference that included a local collaborator (Dr Mwanahamuntu) and an external collaborator was held on June 19, 2019 to discuss project progress. Enrollment commenced at a slow pace (one enrollment a day) allowing the team further time to learn the project's requirements. Three weeks into project initiation, about three clients are enrolled a day. The external expert approved of the cervical images taken by the Gynocular nurse for telemedicine. The general assessment of project progress by collaborators and investigators was very good.
- (vii) The project has been facilitated by ongoing support from the Ministry of Health, the staff and Medical Superintendent of Kanyama 1st Level Hospital, and other national and international stakeholders in the planning and initiation phases.

## ACTIVITIES AND OUTCOMES

<b>Goal 1</b>	<b>To build capacity in portable nurse-led colposcopy</b>	
<b>Objective</b>	<p><b>1.1</b> Educate and train VIA nurses in specialized portable colposcopy (<a href="http://www.gynius.se/the-gynocular">http://www.gynius.se/the-gynocular</a>)</p> <p><b>1.2</b> Facilitate nurses to train other nurses through “train the trainers course”</p> <p><b>1.3</b> Establish weekly Multidisciplinary Team meetings (MDTs) to provide ongoing training and quality assessment</p>	
	<b>Activities 1.1</b>	<p><b>1.11 Training and education in portable colposcopy</b> Completed October 2018. A training week was held in Lusaka. This included 11 clients and resulted in the certification of 7 nurses. The training included: infection control, blood taking, VIA, HPV testing, Colposcopy, use of the mobile colposcope, taking photos with the colposcope and phone, use of the T2D telemedicine system, taking biopsies.</p>
		<p><b>1.12 Improved score in Pre- and post-examination for assessment of theoretical skills</b> All of the VIA nurses participating in the teaching took pre- and post- tests. The average improvement between pre- and post-test scores was 20%.</p>
		<p><b>1.13 Certification of nurses</b> Seven nurses achieved certification in mobile colposcopy and telemedicine.</p>
	<b>Activities 1.2</b>	<p><b>1.21 Train the trainers course</b> As planned, collaborators from the World Health Organization (Dr Partha Basu and Dr Srabani Mittal) and Dr Mwanahamuntu (Zambia) held a five-day training course for trainers. Two nurses who received initial training (detailed in 1.11 above) were re-trained in colposcopy, use of the mobile colposcope (Gynocular), taking photos with the colposcope and the phone, taking biopsies and point of care HPV and STI testing. This training cycle’s main objective was to ensure mastery of skills needed to implement the project as defined while ensuring the safety of clients.</p>
		<p><b>1.2.2 Pre- and post-test scores</b> On file.</p>
	<b>Activities 1.3</b>	<p><b>1.31 Planned place, venue and dates for meetings:</b> MDTs are held in the university teaching hospitals in Lusaka every fortnight.</p>
		<p><b>1.32 Plan and enrollment for attendance</b> The MDTs were integrated into those of the university teaching by one of the local investigators, Dr Mwanahamuntu. This allowed for continuous training and quality improvement. For every MDT meeting, an invitation will be sent to project nurses. The project nurses have attended the one session organized before project initiation.</p>

	<p>1.33 Measurement of outputs In the proposal, we sought to verify this objective in the following ways:</p> <p>1. Total number of women screened and number of women screened using portable colposcope. A total of 54 women have been screened using VIA, HPV-DNA testing and the portable colposcope so far. They have also been screened for the most prevalent sexually transmitted infections. Telemedicine consultations have been conducted for all of them, and two with suspicious lesions have been referred to Dr Mwanahamuntu for further management.</p> <p>2. Total number of MDT meetings held to discuss clients' status. One MDT meeting has been held so far at the university teaching hospital. The project leader in Bern has had over 17 calls with the Gynocular nurse so far, occasionally liaising with one local expert (Dr Mwanahamuntu) and one external expert (Dr Basu).</p> <p>3. Number of correctly diagnosed pre-cancerous lesions (to be reported at the end of the project so as not to influence conduct of project staff). The monitoring and evaluation tools for the project have been finalized. A local data manager employed at CIDRZ in Lusaka, has worked on this in collaboration with the University of Bern. He also visited Bern to work closely with the team here. The finalized tool is currently used for project monitoring and quality control.</p>
<b>Additional activities achieved</b>	<ul style="list-style-type: none"> <li>• Additional colposcopy room set up at Kanyama 1<sup>st</sup> Level Hospital which includes full VIA and colposcopy facilities</li> <li>• A GeneXpert machine has been installed at the clinic to provide point-of-care HPV and STI testing, particularly important given the geographical location of the clinic.</li> <li>• A monitoring and evaluation system has been established with a local data manager further trained in this regard.</li> <li>• The protocol and tools for the cost effectiveness analysis have been developed and are under review. This component is crucial for the long-term implementation of results of this project. It will provide essential information for cervical screening costing in the national policy.</li> </ul>

<b>Goal 2</b>	<b>To establish Colposcopy telemedicine support</b>	
<b>Objective</b>	<p>2.1 Educate and train nurses in use of telemedicine (<a href="http://www.gynius.se/software">http://www.gynius.se/software</a>)</p> <p>2.2 Facilitate nurses to train other nurses through “train the trainers course”</p> <p>2.3 Establish a support system with experts (local and international)</p>	
	<b>Activities 2.1</b>	<p><b>2.11 Training and education in the use of telemedicine (1 week)</b> Certification of 3 nurses and 1 project assistant</p>
	<b>Activities 2.2</b>	<p><b>2.21 Train the trainers course</b> Certification of 1 nurse and 1 project assistant who received initial training in October 2018</p>
	<b>Activities 2.3</b>	<p><b>2.31 Support system with experts</b> Established with four specialists to start (two local and three international)</p>
	<b>Additional activities achieved:</b>	<ul style="list-style-type: none"> <li>- Client enrollment started on 08/05/2019</li> <li>- Increased number of telemedicine consultations: access to the T2D software application was not provided by the producer. However, capacity building in telemedicine is still ongoing with the MDTs.</li> <li>- Reduced time from consultation request to response: Client enrollment started on May 8, 2019 and there was a focus on quality of project conduct. As the team gains experience over time, this output will be objectively reported once more women have been enrolled.</li> <li>- Increased number of diagnoses changed due to telemedicine consultations.             <ol style="list-style-type: none"> <li>1) Number of telemedicine consultations requested and responded to;</li> <li>2) time between consultation request and response;</li> <li>3) number of diagnoses confirmed and changed after telemedicine consultations.</li> </ol> </li> </ul> <p>We are conducting telemedicine consultations by phone and all images are stored in a secure drive. So far, telemedicine consultations have been performed for all 54 enrolled clients. The data manager (CIDRZ) has</p>

		set up the monitoring and evaluation tools in collaboration with the University of Bern. Evaluation of measures as specified above will follow as soon as a larger number of women has been screened.
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<b>Goal 3</b>	<b>To build capacity through IHP synergies and inform screening policies in Zambia</b>	
<b>Objective</b>	3.1 To build on the existing partnership between CIDRZ and CCPPZ to improve CC screening services 3.2 Collaboration with CCPPZ, CIDRZ and the Zambian MoH to integrate findings into strategic frameworks for improved and sustainable CC screening and treatment services	
	<b>Activities</b>	<b>3.11 Meetings between partners and MoH</b> One stakeholder meeting including a MoH representative
		<b>3.21 Generation of a policy statement and SOPs with regard to</b> <ol style="list-style-type: none"> <li>1) Portable colposcope</li> <li>2) Telemedicine support</li> <li>3) Integration of services</li> </ol> <b>Inclusion of recommendations into guidelines for National Cervical Cancer Screening Manual and the African Centre of Excellence for Women’s Cancer Control website (<a href="http://www.acewcc.org">www.acewcc.org</a>)</b> Given the delays in the start of the project these objectives can only be addressed in a couple of months from now.
	<b>Additional activities achieved</b>	<ul style="list-style-type: none"> <li>• The MoH representative who attended our stakeholder meeting is a radiation oncologist. She will participate in the MDT meetings when we have confirmed cancer cases. She will take part in team teaching from a treatment perspective. So far, there was no confirmed cancer case.</li> </ul>

## TRAINING SESSIONS

### **First clinical training: 29<sup>th</sup> October to 2<sup>nd</sup> November 2018**

Training resources for the week were prepared by the International Agency for Research on Cancer (IARC [http://www.searo.who.int/entity/maternal\\_reproductive\\_health/documents/ccm/en](http://www.searo.who.int/entity/maternal_reproductive_health/documents/ccm/en)). Pre- and post-tests were also provided by IARC. The one week training course included both theoretical and practical components. Eleven participants were included, seven of whom were VIA nurses who achieved certification at the end of the week. Competency in mobile colposcopy, telemedicine and blood taking was achieved. Theoretical knowledge on anatomy, neoplastic changes of the cervix and signs of concern at colposcopy were also reviewed and tested. Mock cases were worked through as a group, testing both assessment and management. Test scores improved by an average of 20% for participants.

### **Training for constructing monitoring and evaluation tools for program: 25<sup>th</sup> November to 2<sup>nd</sup> December 2018**

Establishing a monitoring and evaluation program will isolate and address weaknesses. The evaluations will also help to justify further support for the project (e.g. from the MoH) beyond the funding period. A computer expert with a special interest in this was identified at CIDRZ who will assume responsibility for this part of the project. The data manager from CIDRZ worked with us to develop the assessment tools as well as the database for collecting the relevant program data in collaboration with the Clinical Trials Unit in Bern.

### **Second clinical training: 6<sup>th</sup> to 8<sup>th</sup> March 2019**

This three-day training course focused on the project standard operating procedures, as well as point-of-care HPV and STI testing. The local investigator and project leader conducted the training on the project protocol and standard operating procedures accompanied by a practical session. A representative from the GeneXpert manufacture, Cepheid, trained the nurses on point-of-care HPV and STI testing.

### **Third clinical training: 18<sup>th</sup> to 22<sup>nd</sup> March 2019**

Two collaborators from the WHO conducted a session on training for trainers. Two of the nurses who were initially trained received further training on colposcopy, use of the mobile colposcope (Gynocular), taking photos with the colposcope and the phone, taking biopsies and HPV testing. This training cycle aimed to equip participants with the skills required to implement the project whilst ensuring client safety.

The training was structured in three parts:

- (i) 3 days of practicals (in clinic) Gynocular on clients/biopsy/treatment/swabs
- (ii) 1 day theory: Swede score and identification of transformation zone
- (iii) 1 day “train the trainers”

### Impressions from the clinical trainings in 2019



## SUSTAINABILITY

This project has trained nurses in CC screening. In addition to equipping nurses with the necessary technical knowledge, this project has an important capacity-building role. Nurse-led colposcopy is a sustainable method using telemedicine which enables specialist consultation irrespective of geography. Three nurses and one Project Assistant have now been trained in this innovative diagnostic approach alongside HPV testing which is strongly recommended by WHO as preferential screening method for cervical precancerous lesions. Two nurses are now certified trainers and will be able to lead the expansion of this project to other health facilities and provinces. Although we continue to provide support, there is 'ownership' of skills for this technology ensuring the project's sustainability. Local government-hired VIA nurses and gynecologists join MDTs to provide telemedicine support to the project. At the conclusion of the project, a nurse-led training course is planned and additional support from partners may be provided, if required. We anticipate transition of direct operational oversight and support to the Physician-Hospital Organizations (PHOs) resulting from extensive collaborative planning involving the District Health Medical Team (DHMT) and this consortium.



At the conclusion of the project, the CCPPZ program via CIDRZ will have ownership of the telemedicine equipment and will expand the project locally. The Kanyama 1<sup>st</sup> Level Hospital will establish a core competency in this service. Increasing access to care for women living in rural areas is a long-term benefit of this project.

## IMPACT

At the conclusion of the project, we will generate a policy statement and SOPs on the portable colposcope, telemedicine support, and integration of services. Our project will inform recommendations published in the Zambian National Cervical Cancer Screening Manual. This has previously been used to train and implement screening policies in 13 neighboring African countries. The African Centre of Excellence for Women's Cancer Control website ([www.acewcc.org](http://www.acewcc.org)) will also be used as a platform to share recommendations.

Program impact will be measured via: (1) certifications achieved from training in portable colposcopy and telemedicine; (2) attendance at the MDTs; (3) number of telemedicine consultations made to specialists using telemedicine application; (4) the number of women living with HIV screened at Kanyama 1<sup>st</sup> Level Hospital; (5) number of correctly identified precancerous lesions (determined with histopathology) through the mobile colposcope compared with VIA; (6) successful integration of the HIV and CC screening services at Kanyama 1<sup>st</sup> Level Hospital; and (7) integration of recommendations into strategic framework and the regional CC screening manual.

The IHP includes epidemiologists from ISPM, experts in portable colposcopy screening from IARC, and experts in program implementation and evaluation in the field of cervical cancer and HIV services at CIDRZ in Lusaka, Zambia. With 16 years' experience in developing and implementing programs, CIDRZ has developed strategies and relationships that are crucial for the success of this project. We will engage with the MoH to formulate recommendations leading to policy change.

The aim of reducing morbidity and mortality associated with CC is a cross-cutting theme of SDGs. By providing more effective screening technologies and monitoring strategies for CC, our project will reduce premature mortality from non-communicable diseases (SDG 3.4). Our project supports the goal of using information technology to strengthen infrastructure and support economic development (SDG 9). Telemedicine allows specialist input where it is otherwise unavailable (SDG 9.1). By enabling a telemedicine service, and supporting the use of a mobile colposcope, an all-inclusive system that is easily transportable and can be used in rural settings without dependence on a power supply, we will promote the imperative for universal access to healthcare (SDG 3.7). Cervical cancer primarily and disproportionately affects developing countries (SDG 3b) and reducing these inequalities (SDG 10) is another theme of this work. Our project will strengthen existing initiatives to integrate reproductive health into national strategies and programs (SDG 3.7).