

FINAL REPORT



The Amazon Community-Based
Participation Cervical Cancer
Screen and Treat *(ABCS) Project*



**DINING FOR WOMEN PROGRAM GRANT
OCTOBER 2015 – FEBRUARY 2017**

Organization Name	DB Peru
Organization Mailing Address	9737 Old Patina Way, Orlando, Florida 32832, United States New address: 1918 Hillcrest St., Orlando, FL 32803 United States
Organization Website Address	New website: dbperu.org
Organization Mission Statement	<i>Partnering with local communities to provide access to healthcare knowledge and delivery, and improving living conditions for the people of Perú.</i>

Project Title	The Amazon Community Based Participation Cervical Cancer Screen-and-Treat “ABCS” Program
Grant Amount	\$49, 162 USD
Purpose of Grant	To provide resources to deliver an innovative cervical cancer screen-and-treat program in the remote, low-resource setting of the Lower Napo River of the Peruvian Amazon jungle, a project that involves data collection, education, investment in the training of local service providers, and clinical cervical cancer screening and treatment.
Project Geographic Location	Lower Napo River, Loreto, Peru

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Community members take shelter during a heavy rain shower

Program Recap

DFW Request: *Recap briefly what outcomes the program was designed to achieve*

Introduction

The DB Peru ABCS Project aims to reduce the burden of cervical cancer in the Lower Napo River through community education, vaccination, and collaboration with local health providers.

The project was conceived in 2013 to address the observed high rates of cervical cancer occurring in the region. We were concerned that a combination of lack of education, poverty, and lack of access to medical services was leading to many women never having the opportunity to learn about or prevent this deadly disease. We were also concerned that the existing pap-smear program in the Lower Napo run by DB Peru encountered many shortfalls including inefficiency of specimen processing, time delays delivering results, loss to follow-up, and resource-intensive transport of women to Iquitos.

Cervical cancer has been identified as a major issue affecting communities in this region. Not only have community members themselves identified this problem, but also evidence suggests that it is the leading cause of cancer-related death in women in Peru. (Arbyn, M. et al, 2012) Worldwide, cervical cancer is the third most common female cancer after breast and colorectal cancers, and it is widely recognized that there is an imperative to make new methods of cervical cancer prevention in low resource settings available through organized programs such as the ABCS Project. (Arbyn, M. et al, 2012) In addition, the impact of cervical cancer has "...devastating effects with a very high human, social, and economic cost, affecting women in their prime:"(IARC, 2013) travelling away for treatment and lost days of productivity as a worker or mother mean cervical cancer places a significant burden on everyone. What makes cervical cancer unique is that it is, largely, *avoidable*. (IARC, 2013)

Based on current guidelines in the prevention of cervical cancer, and influenced by a community needs assessment performed in 2013 by DB Peru, we proposed a single visit screen and treat program which incorporates education, human papillomavirus (HPV) DNA testing, visual inspection of the cervix with acetic acid (VIA) as a triage tool, followed by cryotherapy (freezing of the cervical tissue) where necessary, as well as vaccination for eligible girls. With programs like ours, these conditions will improve.

With this project model, we successfully secured a grant from Dining for Women (DFW) that enabled us to complete a Pilot Project in 2015 and extend our work into 2017.

This report explains the background to the ABCS Project, the aims and anticipated outcomes, the original methodology, the Pilot Program implementation and the progression to the current program in 2017. It explores the challenges we faced, how we addressed these challenges, the unanticipated events that occurred during the program so far, and future strategies to improve upon our work.

Program Goals

Based on current guidelines in the prevention of cervical cancer and in light of findings from the community needs assessment, DB Peru proposed a single visit screen and treat program which incorporates education, HPV DNA testing and visual inspection of the cervix with acetic acid (VIA) as a triage tool, followed by cryotherapy where necessary and complimented by HPV vaccination.

The overall goal of the DB Peru ABCS Project is to reduce death and disability from cervical cancer for women in the Lower Napo River community.

Targeted goals of the program are to:

- a) **Collaborate with local community** members to design a cervical cancer education and prevention program;
- b) Accurately **quantify** the burden of disease of cervical cancer in the region;
- c) **Educate** local women regarding the natural history, risk factors, and prevention strategies for cervical cancer;
- d) **Design and deliver** a sustainable cervical cancer screen and treat program that is community-led; and
- e) **Vaccinate** eligible girls, through working collaboratively with the Peruvian Government, Iquitos Hospital and Mazan Community Health Centre.



A small child waits patiently with his mother during women's health education

Program Impact

DFW Request: *What was accomplished in connection with this project? Please address each stated objective.*

Goals and Objectives

Targeted goals of the ABCS program are to:

- a) **Collaborate with local community** members to design a cervical cancer education and prevention program;
- b) Accurately **quantify** the burden of disease of cervical cancer in the region;
- c) **Educate** local women regarding the natural history, risk factors, and prevention strategies for cervical cancer;
- d) **Design and deliver** a sustainable cervical cancer screen and treat program that is community-led; and
- e) **Vaccinate** eligible girls, through working collaboratively with the Peruvian Government, Iquitos Hospital and Mazan Community Health Centre.

This multi-pronged approach will ultimately lead to **reduction of cervical cancer mortality and morbidity** in communities of the Lower Napo River and serve as a **blueprint for broader action** in the region.

The SMART objectives, revised midway through the project (and as detailed in the Dining for Women Mid-term Report), included the following:

1. Community involvement and consultation to help align the program goals with local community members, improve cultural relevance, and increase acceptance of cervical cancer screening:
 - a. Hold at least six community consultation meetings annually,
 - b. Review community needs assessment from 2013 and plan and execute data collection project in 2015,
 - c. Create culturally-specific education material with local expertise and deliver these for the community in June 2015,
 - d. For every component of our project, work with local health staff including obstetras (nurse midwives), doctors, parteras (lay midwives) and promoters (lay health workers) wherever possible,
 - e. When possible, encourage local staff capacitation and training.
2. Data collection around women's health concerns and cervical cancer risks, to serve as some of the first broadly published data on women's health issues in this region.
 - a. DB Peru dataset creation:
 - i. Create an excel spread-sheet with baseline community data following data collection by the end of 2015,
 - ii. Collect data on the impact of community education using pre- and post-test summaries by the end of 2015,
 - iii. Create a clinical dataset for audit and patient follow-up: creation of dataset by September 2016 and ongoing data entry and patient management.
 - b. Communication of results
 - i. Create annual Board Meeting Report,
 - ii. Complete grant Progress Reports July 2016 and February 2017
 - iii. Plan and write academic journal articles, by February 2017

- Baseline women’s health data
 - Impact of education on screening knowledge and uptake
 - Program delivery
 - Working with government and health services
3. Implement community education to increase community participation, knowledge, acceptance and uptake of screening:
 - a. Create culturally-appropriate education material creation using local expertise by end of 2015,
 - b. Implement bi-annual education programs explain cervical cancer screening and prevention from 2015 onwards,
 - c. Improve levels of knowledge by 100% and screening-uptake in each community by 80% by October 2016.
 4. Establish clinics that perform screening for high-risk HPV, provide clinical examinations including VIA, and treatment *in the community* using cryotherapy for women who screen positive to pre-cancerous cervical changes by October 2015:
 - a. Perform Pilot Program in October 2015
 - b. Upscale screen-and-treat clinical programs to bi-annual community outreach in 2016
 - c. Provide HPV testing to all eligible women with an uptake rate of over 70%
 - d. Perform gynaecological examination and VIA for eligible women with an uptake rate of over 70%
 - e. Provide cryotherapy for women who test positive for pre-cancerous cervical changes with an uptake rate of 100%
 - f. Follow-up positive or high-risk patients with a 100% follow-up rate
 5. HPV Vaccination to provide cover to young girls between the ages of 9-13 years who are at risk of contracting hrHPV and reduce the burden of HPV in the future:
 - a. Work with local health services to ensure all eligible girls in our target region are vaccinated by the end of 2016,
 - b. Source vaccinations from local healthcare services and deliver these to the community if existing government services fail to do so in 2016 and beyond,
 - c. Establish clear record-keeping and guidelines around HPV vaccination by the end of 2016.
 6. Transition the ABCS project into existing healthcare services by 2020.
 - a. Perform annual education and project appraisal with at least 15 *promotors* from the region,
 - b. Work with and train one *obstetra* annually in the skills of VIA and cryotherapy,
 - c. Submit and have approved a *convenio* by the Diressa de Salud Loreto by May 2016 outlining the collaboration of DB Peru with the government health system,
 - d. Identify and work with at least two partners in the public healthcare system annually.

DB Peru ABCS Program Impact

Objective One

Community involvement and consultation to help align the program goals with local community members, improve cultural relevance, and increase acceptance of cervical cancer screening:

- a. Hold at least six community consultation meetings annually*
- b. Review community needs assessment from 2013 and plan and execute data collection project in 2015*
- c. Create culturally-specific education material with local expertise and deliver these for the community in June 2015*
- d. For every component of our project, work with local health staff including obstetras (nurse midwives), doctors, parteras (lay midwives) and promotores (lay health workers) wherever possible*
- e. When possible, encourage local staff capacitation and training.*

DB Peru held a series of community consultation meetings in the lead-up and implementation of the pilot project. We discussed the program via community consultation in the following ways:

1. Structured formal meetings with community health volunteers (CHVs): DB Peru held three large meeting with 25 CHVs at the planning, commencement, and evaluation phases of the program Pilot.
2. Every community we visited (n=23), we were able to meet with those who were interested, including community leaders, to discuss the project and seek ideas and feedback.
3. We also participated in an ongoing, informal feedback cycle where we met one-on-one with women, healthcare providers, and CHVs to ensure our work was responsive to local needs.

The ABCS project was conceived following a community needs assessment in 2013. Hearing the specific women's health needs expressed by interview participants, we were able to shape a project focusing on their priorities. The comprehensive needs assessment was completed and the report published in 2014. This involved qualitative and quantitative data from the LNR communities. The program design was discussed locally and planned using DB Peru's existing knowledge of the health system. This directly reflected the needs identified by the community for the community.

The education package was created to be culturally specific to the river communities. Initially, health professionals Mariana Boley and Michael Farrier drafted a page of simple sexual health education that covered anatomy, HPV transmission, and some information around cervical cancer prevention. This was developed with direct feedback from local nurse-midwives. Following this, we enlisted the help of a Lima-based cartoon artist to draw a comic strip that told a story around two women's experience with screening. This used graphics adapted to suit the local river community environment. We also used information a Government Education Rotafolio that provides information around cervical cancer screening and prevention

The main focus of our work is to support and capacitate local staff. This started with community consultation and is continuing via education and capacity building. With the *promotores*, we commenced education in March 2015. This was run in response to the needs that were identified between the *promotor* group. We collected feedback and ideas around the

program and actively encouraged *promotor* participation. DB Peru also works closely with *parteras* to provide needs-based education in reproductive health and uses this key group of healthcare providers to help educate and encourage women.

As the program progressed, it became more and more apparent how important local capacity building was for the future of cervical cancer prevention. Through the Loreto Diresa (government health service), we recruited and up-skilled four *obstetras* and one pharmacist. Each *obstetra* came on at least one jungle outreach and worked beside volunteer medical staff to perform HPV testing, VIA, colposcopy and cryotherapy. These *obstetras* report more confidence, a great sense of autonomy, and general enjoyment of the work. This has led to the evolution of our program to focus on transition into the local healthcare service sooner than anticipated, as we discuss further below.

Objective Two

Data collection around women's health concerns and cervical cancer risks, to serve as some of the first broadly published data on women's health issues in this region.

a. *DB Peru dataset creation:*

- i. *Create an excel spread-sheet with baseline community data following data collection by the end of 2015,*
- ii. *Collect data on the impact of community education using pre- and post-test summaries by the end of 2015,*
- iii. *Create a clinical dataset for audit and patient follow-up: creation of dataset by September 2016 and ongoing data entry and patient management.*

The following data components are now successfully in place:

1. A standardised patient information and clinical examination sheet that is printed on two sides of A4 paper and is completed by volunteers during the clinics. This clinical summary sheet acts as the template for data collection.
2. An excel data collection pro-forma was created following the first ABCS river trip in October 2015, from the original patient data collection form.
3. After each trip, this excel data collection pro-forma was completed in real-time (within 24 hours of the clinic). This means that we now have a comprehensive dataset that details patient demographic and clinical data for 16 communities. This was done from river trips in October 2015, May 2016, and September 2016. This spread sheet also provides a dataset for audit and patient follow-up.
4. In addition to the spread sheet, each clinical case was audited with a Gynaecologist with colposcopy experience in Australia using photographs of each colposcopy (with permission and consent).

In April 2015, a team of ten volunteers completed a comprehensive investigation into the situation of women's health in the communities DB Peru serves. This was designed to collect information in a formal manner around women's health and demographic data, the first survey to do so in this region. Ethics approval for this survey was secured through the Universidad Peruana Cayatano Heredia, Lima. We collected 119 surveys and visited six communities. The participation rate varied between 55 and 82% of women estimated to be present on the day of the survey. We collected the following numbers of surveys from the following communities:

- San Pedro = 29 women,
- Mangua = 33 women,
- Acu Cocha = 13 women,

Puinahua = 22 women,
San Juan de Floresta = 7 women,
Centro Unido = 15 women

For the majority of women, this was their first experience of ever participating in a 'survey.' This posed challenges where many women had difficulty in articulating their opinion. The team did an excellent job at explaining the survey and providing education to each woman as needed. We also infused health education, opened-up discussion around breast and cervical cancer, performed all interviews in a safe and culturally-appropriate manner, and maintained dialogue and communication with all community members.

DB Peru now has a complete excel dataset of this survey and will use this to further shape our community programs. We collected data on the impact of community education, detailed below. We have also created a clinical dataset of all patients who have entered our program since 2015.

b. Communication of results

- i. Create annual Board Meeting Report,*
- ii. Complete grant Progress Reports July 2016 and February 2017*
- iii. Plan and write academic journal articles, by February 2017*
 - Baseline women's health data*
 - Impact of education on screening knowledge and uptake*
 - Program delivery*
 - Working with government and health services*

An annual Board report has been created using summary statistics from field data. This has been circulated with DB Peru board members, other DB Peru staff, and key volunteers. Grant progress reports have now both been completed. The following journal articles have been planned with drafted abstracts:

- Cross-sectional survey on the health situation of women in the Low Napo River: comparison again Demographic and Health Survey data.
- Impact of education on individual knowledge and the uptake of cervical screening services

Furthermore, in the planning phase of our project, Geordan Shannon was asked to speak at two international conferences to present our work and gather information around how to best deliver our program. The first conference, The Eurogin International Conference on Cervical Cancer was held in February 2015 in Seville, Spain. The second conference, 2015 International Cancer Screening Network, sponsored by the National Institutes of Health, was held in Rotterdam, Holland in June 2015. These conferences were an excellent opportunity to gather information, to identify future donors, to link to key academic institutions and to receive feedback on our strategy.

Objective Three

Implement community education to increase community participation, knowledge, acceptance and uptake of screening:

- a. Create culturally-appropriate education material creation using local expertise by end of 2015*
- b. Implement bi-annual education programs to explain cervical cancer screening and*

- prevention from 2015 onwards*
- c. *Improve levels of knowledge by 100% and screening-uptake in each community by 80% by October 2016.*

The education package was created to be culturally specific to the river communities. Initially, health professionals Mariana Boley and Michael Farrier drafted a page of simple sexual health education that covered anatomy, HPV transmission, and some information around cervical cancer prevention. This was developed with direct feedback from local nurse-midwives. Following this, we enlisted the help of a Lima-based cartoon artist to draw a comic strip that told a story around two women's experience with screening. This used graphics adapted to suit the local river community environment. We also used information a Government Education Rotafolio that provides information around cervical cancer screening and prevention

Since the inception of the ABCS project in 2014, DB Peru has organised at a total of four promotor education sessions, an additional three river education outreach trips, and has held open community education in twenty communities.

The delivery of the first community education package was in July 2015, with two Spanish-speaking volunteers and an obstetra (local nurse-midwife). A copy of the comic book was given to each woman, with space for recording future screening and education. The education was delivered by the volunteers and obstetra who told the comic book story with more medical input from the obstetra throughout. It seemed that most of the community enjoyed the story and remained interested and engaged. During this we managed to provide a total of 7 sessions over 5 days, reaching around 200 people (although we formally surveyed n=136 participants).

We performed a 9 question before and after knowledge and attitude test to explore the impact of our education sessions. In those surveyed, knowledge about cervical cancer (ever heard, definition, symptoms, prevention, treatment) increased between 294% and 870% from baseline (Table 1). Additionally, 72.4% people felt that DB Peru helped them better understand cervical cancer, 81.2% felt they learned something new about cancer, and 71.3% felt confident they would return for HPV screening. This translated into an actual HPV screening participation rate of between 60 and 90% in the targeted communities.

Table 1: Impact of tailored community education on cervical cancer knowledge and attitudes

QUESTIONS	BEFORE (%)	AFTER (%)	CHANGE (%)
Have you heard of cervical cancer?	31.5	92.9	+294.9
Do you feel confident explaining what cervical cancer is?	6.7	43.3	+646.3
Do you feel confident to explain the symptoms of cervical cancer?	7.5	40.6	+541.3
Can you name the symptoms of cervical cancer?	4.7	34.3	+729.7
Do you know how to prevent cervical cancer?	7.1	53.4	+752.1
Do you know how cervical cancer is treated?	4.7	40.9	+870.2
Do you have any fear around cervical cancer?	17.3	76	+439.3
Do you think DB Peru has helped you understand cervical cancer?	-	72.4	-
Have you learnt anything in this session?	-	81.2	-
Will you return to be tested for HPV after this talk?	-	71.3	-

Objective Four

Establish clinics that perform screening for high-risk HPV, provide clinical examinations including VIA, and treatment in the community using cryotherapy for women who screen positive to pre-cancerous cervical changes by October 2015:

- a. Perform Pilot Program in October 2015*
- b. Upscale screen-and-treat clinical programs to bi-annual community outreach in 2016*
- c. Provide HPV testing to all eligible women with an uptake rate of over 70%*
- d. Perform gynaecological examination and VIA for eligible women with an uptake rate of over 70%*
- e. Provide cryotherapy for women who test positive for pre-cancerous cervical changes with an uptake rate of 100%*
- f. Follow-up positive or high-risk patients with a 100% follow-up rate*

During our pilot project in October 2015, we visited 6 villages in this region by boat, saw 129 women, did 72 gynaecological exams (69.2% uptake), performed 69 pap smears (95.8% uptake), performed HPV self-sampling on 66 women (51.2% uptake), and performed cryotherapy on 21 women who had abnormal changes on their cervix (100% uptake). For our clinics, we would set up in the village school where we would transform a large room into separate private clinical areas, using bed sheets. Patients were registered, performed their HPV self-sample after education on how to use the device then underwent a gynaecological exam, visual inspection with acetic acid (VIA) using colposcopy and treatment if they required it. As part of this team, we also taught women how to do a self-breast exam and we gave out bras too.

The HPV tests were collected and a structured feedback on the HPV testing process was collected. Overall, women's attitudes and opinions around this new test were very positive. The majority of women screened stated that they preferred the HPV test to be performed as a self-test. The uptake of HPV testing was higher than the gynaecological examination because some women did not want an internal exam.

In May and October 2016 we completed another ten clinical outreach clinics involving twelve new communities in the Lower Napo River. These were supported by two additional educational outreach programs to encourage women to participate in the screening and examination process. In May 2016, with a team of ten volunteers, two obstetras, and three medical doctors, we delivered education sessions, collected registration data, saw 95 women, and performed 70 gynaecology exams and 64 HPV tests in five new communities. In addition we saw 200 further community members for general medical concerns. In October 2016, with a team of sixteen volunteers, an obstetra and local nurse/pharmacist, a local health technician, and three doctors, we performed five clinics and reached seven new communities. We saw 77 women, performed 65 gynaecological exams, and collected 71 HPV tests. We saw an additional 140 general medical patients on the side of our gynaecology program.

Of the 301 women we saw, we performed 201 HPV tests. This equates to an overall uptake rate of 67%. The reasons that women did not complete the test were because they either did not have their DNI/SIS (health card identification ensuring they were eligible), or because they had their period or were pregnant. Less than ten women declined the testing due to personal feelings such as embarrassment or fear.

Of the 301 women we saw, we performed 207 gynaecology examinations including VIA. This

equates to an uptake rate of 69%. The reasons people declined the examination included having a male doctor, having their period, being too old or too young, and being embarrassed or scared. In this situation, we provided more information to the woman, explained the importance of cervical cancer screening, and suggested that she could return on future trips to have a follow-up examination if she wanted.

Of the 207 women we examined, we found 33 women with positive VIA. All women were offered and 100% of women commenced the procedure. Of these women, we had to cease the procedure prematurely due to pain in three cases. These are being followed-up in 6 months time to check the progress of the cervical lesion.

The gynaecology component of our trip involved intensive examinations, and a high rate of positive VIA results. There were a number of women with suspected or actual cancer who we identified. Therefore, we saw an exceptionally high burden of pre-cancerous disease and cancer. Following our program, we found 2 women with advanced pelvic cancer, and made two further referrals for suspected early invasive carcinoma of the cervix. Of the two women with advanced cancer, one woman (only 38 years old) unfortunately had a tumour at such an advanced stage it was inoperable. She needed palliative care and we were able to provide a new mattress, analgesics and family support. This sad experience further reaffirmed the importance of our project in preventing such a debilitating disease. One woman was referred via Iquitos to Lima with heavy bleeding from her cervical cancer. Although she has an advanced stage of cancer, she was able to receive palliative radiation to improve her symptoms and quality of life. She is living back in her community at present and reports an improvement in her quality of life and symptoms. She may get further brachytherapy in the future in Lima. Another woman was referred with a suspicion of early-stage cervical cancer to Iquitos. It was reported that she just had an operation for this and that she is now back in her community.

Objective Five

HPV Vaccination to provide cover to young girls between the ages of 9-13 years who are at risk of contracting hrHPV and reduce the burden of HPV in the future:

- a. Work with local health services to ensure all eligible girls in our target region are vaccinated by the end of 2016,*
- b. Source vaccinations from local healthcare services and deliver these to the community if existing government services fail to do so in 2016 and beyond,*
- c. Establish clear record-keeping and guidelines around HPV vaccination by the end of 2016.*

DB Peru has now partnered with the local government health services to provide HPV vaccination for all eligible girls in the Lower Napo River Region. For some time DB Peru has been aware that the government has committed on paper to providing HPV vaccines for all girls between the ages of 9 and 13 nationally. However, we have never witnessed this being delivered in the regions we serve. This year, we were able to liaise with the coordinator of the region who assured us that all girls would receive their vaccination in the 'Month of May' campaigns. DB Peru assisted in the staffing, transportation and clinical aspect of providing HPV vaccinations in the region we serve. This is another example of how we are striving to work as sustainably as we can with government healthcare services.

Objective Six

Transition the ABCS project into existing healthcare services by 2020.

- d. Perform annual education and project appraisal with at least 15 promoters from the region,*
- e. Work with and train one obstetra annually in the skills of VIA and cryotherapy,*
- f. Submit and have approved a convenio by the Diressa de Salud Loreto by May 2016 outlining the collaboration of DB Peru with the government health system,*
- g. Identify and work with at least two partners in the public healthcare system annually.*

DB Peru's strategy has been to work with existing government healthcare services and ultimately to transition our program into mainstream government services within five years time. The ABCS program therefore will serve as a blueprint for broader action in the region.

Annual promotor (community health worker) education sessions have been organised since the project inception in 2015. Nineteen promoters were present in our 2015 education and 28 in our 2016 education sessions. In their feedback, promoters expressed a desire to be more active in this project and to take on more education and outreach roles. With this information, DB Peru has facilitated a stronger promotor role: we have up skilled promoters to provide better education and patient management in their communities and will continue to work with them to improve their input and responsibilities.

DB Peru has worked with four *obstetras* (nurse midwives) since our program began. We have provided training to two obstetras in VIA and cryotherapy. We hope to be able to do this annually for at least one if not more junior obstetras. We have been working with the director of women's health services and she has agreed to provide the services of two obstetras annually for our program. We are also working with an Australian Gynaecologist who has kindly agreed to provide intensive up-skilling training to local *obstetras* who can then perform the procedures independently.

The *Convenio* was drafted with the oversight of the *Diressa de Salud* and we successfully have the agreement formalised in May 2016. This enables us to process our HPV testing through the Hospital Regional Iquitos and Hospital dos de Mayo Lima for those patients who have SIS social security cards (the majority of our community). This is the first time that we are aware of this occurring in the entire region and paves the way for future opportunities to work collaboratively with the government.

Our work has enabled us to collaborate with numerous leaders, administrators and clinicians in the local system. We have identified a number of strong supporters within the government system. First, we are working with the director of women's health services in Loreto. She used to be a volunteer obstetra with DB Peru many years ago, and so knows the importance of our work and has much trust in us, too. Secondly, we have formed a partnership with the Oncology Unit in Iquitos through mutual work and focus on cervical cancer prevention. Prior to our departure to the Napo River for the clinical arm of our project, Dr Shannon completed a week of up-skilling experience with them, making valuable professional connections between DB Peru and the Hospital Oncology Services. Thirdly, we have the support of the Hospital Regional through our connection with the director of communications and public relations.

Ultimately, we aim to transition the HPV screening with VIA and cryotherapy back into the government health service. Achieving this is closer than we originally anticipated. By the end of 2017, we will have two fully trained *obstetras* as well as the formal support of the local health system. DB Peru is in discussions with Mazan Hospital around how we can lend our cryotherapy equipment to facilitate VIA and cryotherapy on a regular basis by local staff.

Program Objectives and Challenges

If any project objectives were changed, please also explain the circumstances leading to the modification of the objective(s). What challenges did you face in connection with this project? How did you address these challenges?

Objectives

No objectives have changed since the initial revision to our work, as reported in the Midterm report.

Challenges

Through an extremely interesting and productive year, DB Peru faced challenges to our program delivery. Some of these meant we adjusted aspects of our program in unexpected ways. Other challenges meant we were forced to think laterally and resulted in us finding creative solutions. In both scenarios, we have found adjustments and solutions that have ultimately enhanced our program and enabled us to provide better quality, more efficient healthcare to the community.

Equipment

One of the most challenging aspects of our program was procuring the appropriate equipment either via donations or at an acceptable low cost. We purchased at a discounted rate a portable colposcopy unit (from Gynocular) and Cryotherapy unit (from MedGyn), as detailed in our budget. We also had a donation of 200 HPV self-collection units from Eve Medical, 1000 Silver Nitrate Sticks from Bray healthcare, 25 beta-HCG pregnancy-testing kits from EKF Diagnostics, surgical equipment from Edinburgh General Hospital, and 600 clinical examination sheets from Ramsay Health Australia.

Our original plan was to provide point-of-care testing for HPV in the community on the day of the clinical program. This would have been facilitated by a new product on the market, available via Qiagen, which would have facilitated testing within the space of 3-4 hours. Although we were originally offered a donation on behalf of Qiagen's international women's health coordinator, when we were put in contact with the South American representative the cost of this unit increased dramatically to over \$20,000, with requirements of up to \$5,000 annually for consumable parts. This cost in our minds was excessive and not compatible with our project budget. We therefore had to search for alternative solutions. The solutions we identified are detailed in the section below titled 'HPV testing.'

On purchasing the cryotherapy unit, we found one of the challenges was in knowing what type of gas we would be using. The type of gas influenced the parts of the cryotherapy unit we ordered. We decided to ask for fittings consistent with CO₂ gas after identifying a provider of CO₂ gas locally in Iquitos.

Another unanticipated challenge in our equipment procurement was issues with customs and transport. To avoid lengthy delays that we anticipated via the Peruvian system, we ordered our equipment to be sent to volunteers in the USA or Europe. These volunteers then travelled with the equipment on their person. The equipment needed a letter declaring that these were not for commercial use and we also needed to budget-in payments around customs processing. Furthermore, the cryotherapy gun was confused with an actual gun, and a bit of explanation was needed! Because we got some of the equipment sent to other countries, there was a risk of delay in delivery. The only product that did not reach us in time for our work was that BHCG kits. These have since made their way to Peru and will be used this year.

Peruvian Healthcare System

In order to secure our HPV tests in Lima, we had to navigate the complex Peruvian Healthcare system. We had to forge a pathway for these tests to travel from the river communities to Lima and be processed under the SIS system. Aside from many meetings, copious paperwork, and coordinating with a number of organisations, we also had to navigate the following problems:

1. Holidays and strikes. During key events in our coordination of HPV tests, we were faced with multiple holidays and large strikes. This meant that all services were completely ceased for well over two weeks during the time windows we needed most. The other issue that also concerned us was that many services remained shut-down for up to a month after our clinical program, so that when we referred our patients to Iquitos, they were not seen at all and had to return to their communities without immediate healthcare. We ensured these women returned at a later date to get the care they needed.
2. Politics and power. During our meetings we faced significant resistance from the Head of Diressa, Iquitos. He was unavailable to meet, and avoided our attempts to communicate. We finally managed to meet with him after many calls and use of our extended network, and he directed us to write a Convenio, or healthcare agreement, which we have now done; this has secured our work with the government healthcare system.
3. Healthcare agreement. The Convenio was drafted with the oversight of the Diressa and we successfully have the agreement formalised. This enables us to process our HPV testing through Iquitos and Lima for those patients who have SIS social security. This is the first time that we are aware of this occurring in the entire region.
4. Difficulties in coordination with a key healthcare outpost Mazan. Last year, given many changes of leadership in Mazan, along with staffing shortages and some resistance from obstetras, we were unable to coordinate with Mazan as we had originally planned. We continued to visit and meet with Mazan, but our communication was lost due to staff turnover, as well as lost due to some perceived staff apathy. We overcame this through working with the director of Women's Health Programs, who was able to coordinate the staff and communication in a more effective manner.
5. Coordination of Obstetras (nurse midwives). The final challenge around the healthcare system was to coordinate work with obstetras from Mazan. We had been working with local obstetras for the entire project. However, we could not work with an obstetra for a period of two weeks as planned because of a failure in boat transport on the river. This meant that our work with clinical paperwork processing was delayed and we missed an opportunity to train a junior obstetra in cryotherapy. Because of this mistake, we were able to rectify our communication and planning with Mazan this year and compensate by working with two obstetras in 2016.

Clinical Program

The clinical arm of the ABCS program faced many challenges. Firstly, before the trip Diana our President experienced an acute illness that meant she could not attend the trip. Renzo, the Vice-President, and Geordan, the Medical Director, therefore took on the majority of organization and oversight. Fortunately Diana recovered and was able to communicate with us from Lima throughout.

We were originally planning on working with two gynaecologists from the USA and Lima. This would have facilitated greater clinical oversight and would have provided direct speciality advice around colposcopy and cryotherapy procedures. Because neither

gynaecologist was able to attend this trip, we instead had to use local medical expertise plus ensure our work was audited from afar. We secured a donation of an Australian Gynaecologist's time for review of photographs of all colposcopies. We are now working with a second Australian Gynaecologist who will provide hands-on clinical expertise and education for our local staff.

Post-cryotherapy symptoms and patient feedback

Despite a detailed consent and post-cryotherapy information pack, many women reported they were concerned about the symptoms they experienced afterwards. This consisted of a watery vaginal discharge.

The cryotherapy procedure is regarded as being very safe. Less than 1% of women experience severe or serious complications, such as infection or cervical stenosis. However, a high number of women do experience a profuse watery discharge that is benign. We gave out information to this effect along with some sanitary pads and ibuprofen. We also advised women not to engage in sexual intercourse for at least a month.

This year, following this feedback, we have introduced a more detailed education session prior to the gynaecological examination. We have also used visual aids in our consent process. We encouraged native language speaking obstetras to perform the entire consent, and we provided each woman with a post cryotherapy information pack with ibuprofen and additional sanitary pads.

Patient referral and follow-up

Two advanced cases of pelvic cancer, one woman with early-stage cancer and one more woman with suspected early invasive cancer were referred to Iquitos for review and treatment. This is an exceptionally high rate of cancer in a small population of screened women and has driven us to provide more extensive services, detailed below. However, the referral process had some unanticipated costs and challenges. These included:

1. Costs of patient transport. This included river transport, 'moto' transport and accommodation in Iquitos and/or Lima. We had not originally budgeted this into our initial proposal. However, we now realise that this will be a significant area of our program that will require specific funding.
2. Delay in clinics due to strikes/holidays. As mentioned above, some patients were unable to be seen on arrival to Iquitos, and had to return home. This situation risked patient loss to follow-up. Luckily all of our patients who needed to be seen were able to make appointments eventually.
3. Discrimination and apathy. We observed that many Rivereños were looked down upon within the healthcare system. We saw first hand that challenges of navigating a complex medical system in addition to understanding a complex health problem. On top of this, we observed some patients were told 'you're too old, why bother?' and 'you're not actively bleeding so it is not a priority.' This shows that even within the healthcare system there are attitudinal challenges we will need to address.
4. Long-term care of patients and families sent to Iquitos or Lima. This challenge arose when a woman required an extended hospital admission and treatment for cervical cancer with Radiotherapy in Lima. Her husband attended with her yet struggled to afford costs of living. Aside from providing initial financial support, DB Peru has decided to set clear time guidelines around how long we will support family and encourage those who can to seek temporary employment to support themselves and their family.

Communication and patient follow-up arose as another issue we will need to work further on in the area of patient referrals. We ensured that each patient has some point of contact with DB Peru and a telephone number that we can access her on at a regular basis. We may also consider a hospital liaison officer, such as Social Services, who can help us understand where the patient is at with their clinical pathway, and to help the patients understand the clinical pathway too. In the Napo River we have created a list of promotores (lay community health workers) and their phone numbers. This will mean we can make contact locally to follow-up our women.

Patient death

One woman who we found to have advanced pelvic cancer died in January this year. She was in her late thirties with four children. This has galvanised our efforts to provide better cancer prevention in this region.

Pap Smear and HPV Results

As we have experienced in the past, our pap-smear results were delayed. They were successfully processed within a few months of delivery, yet the results were misplaced. We finally found the results had been sent to the health posts. This delay in results meant many women were worried about not receiving their results and they expressed this in their feedback to us earlier this year. We have rectified this through hand-delivering all results and discussing the reasons for delay.

A second challenge with the HPV screening is that many patients, when they received their results, were confused by whether the result represented HPV or HIV. This required much more intense counselling and explanation by the medical team involved to ensure that all women understood their diagnosis and its implications. The transient nature of HPV infection and the risk of pre-cancerous cervical changes was explained in detail to all women with positive results.

Vaccination

Because we were not able to find donors for our HPV vaccines in 2015, we had to think creatively and found another opportunity to deliver the HPV via the public system in 2016.

For some time DB Peru has been aware that the government has committed on paper to providing HPV vaccines for all girls between the ages of 9 and 13 nationally. However, we have never witnessed this being delivered in the regions we serve. This year, we were able to liaise with the coordinator of the region who assured us that all girls will be receiving their vaccination in the 'Month of May' campaigns. In September a nurse from Mazan accompanied us to provide 40 vaccinations of HPV in select villages. DB Peru has helped with this process in the region we serve. This is another example of how we are striving to work as sustainably as we can with government healthcare services. We have followed this partnership through this year to ensure all girls get their vaccine.



DB Peru's team of volunteers, October 2015

Lessons Learned

DFW Request: *What were the most important lessons learned?*

The most important lessons learned through this program include: the importance of local communication and collaboration; the value of supporting local health services; and the way an NGO can navigate health systems in order to pave the way for the future.

Communication was critical to the success of our work. First, the concept of cervical cancer prevention was new to the communities, so we needed to focus on communication of this in a non-threatening and understandable way. It was extremely important to use locally relevant communication material to explain the concept of HPV and cervical cancer, and this was reflected by our use of storytelling using a comic strip with local images. Although we realized the importance of pre- and post-test counseling before HPV testing and any gynaecological examination, this was reinforced by some scenarios which required more time, slower explanations, or an additional unplanned follow-up visit. All in all, we realized the values of slowing down and communicating thoroughly to improve understanding of and trust in the process.

Local collaboration was reinforced as a strength of DB Peru's ABCS project. We learnt about the value of working alongside community health volunteers, teachers, and other community leaders to achieve our goals. The *promotores* became the most important contact point in each community, assisting with community coordination, education, triage, follow-up and logistics. We are planning on supporting *promotores* to better support their community in 2017 through more education, training, and logistical supports.

DB Peru has also worked successfully with local and national health services in staff training, HPV testing, and transition of the program to a local government facility. We have been thrilled to see the local interest in education and capacitation in cervical cancer prevention. We have also learnt a lot about navigating the government health system in order to secure HPV testing. This has involved the successful *convenio* with Loreto Diresa de Salud and the secure passage of HPV testing kits from Iquitos to Lima to be processed by the Dos de Mayo Hospital. We now plan to up-skill two *obstetras* in Mazan to provide all VIA and cryotherapy services so that we transition our program back into the government system over 2017.

Strategy, Change and Unexpected benefits

DFW Request: *Describe the unexpected events and outcomes, including unexpected benefits. Did you change your strategy as a result of obstacles you encountered? How will you address these challenges in the future?*

1. Transitioning program to government health services sooner than anticipated

Although we set a long-term program objective to transition the ABCS project back to government services in five years, we may be able to transition sooner than expected. DB Peru has always worked alongside local staff and capacitated the local service providers as much as possible. After working alongside some key contacts in the local healthcare system this year, we have realised that there is the potential to work with the Loreto health system to provide training and capacitation of *obstetras* to facilitate the provision of VIA and cryotherapy locally in Mazan Hospital year-round.

We are, at present, discussing how to best take this forward with Mazan Hospital and the Diresa de Salud Loreto. The most likely course of action in 2017 is that DB Peru would up-skill two *obstetras* from Mazan in VIA, colposcopy and cryotherapy, and either purchase another cryotherapy unit and/or lend the existing unit to Mazan Hospital. The government health system would then cover all consumables such as CO2 gas, and DB Peru would help facilitate HPV testing and local transportation. This will significantly alter our existing approach, but will be ultimately a more sustainable, long-term solution.

2. HPV Testing via the government system

We were unable to deliver Qiagen's point of care HPV testing as originally planned. Therefore, we had to investigate alternative means of HPV testing. The 'Plan B' model of testing would mean that HPV testing would occur simultaneously to our clinical program rather than prior to our clinical examinations as a triage tool as originally thought. We hoped to provide testing on the day, but instead needed to provide delayed testing where samples would be collected in the jungle, sent to Iquitos or Lima, processed, and the results returned to the community.

We searched for providers who could provide this service for us at a low cost. We identified one laboratory in Lima that processes these tests privately. However, after many days of negotiations and delayed communication, we were offered prices that were once again prohibitively high at \$50-\$70 per test.

In our search for alternative providers, it emerged that one hospital in the whole of Peru actually performed these tests through the public system using the Seguridad Integral de Salud (SIS), the national social security healthcare program. This meant that potentially members of our community who had SIS cover could access the HPV tests for free in Lima. This, if successful, would not only save our organisation and donors' money and encourage the public health system to perform such tests, but also open up a completely new pathway of laboratory testing in the healthcare system for other women in Iquitos and Loreto for the very first time. Thus, we identified a cost effective solution that also aligns with one of our organisational objectives: to work in collaboration with Government healthcare systems and transition our program to the public healthcare system within 5 years.

We performed a huge amount of groundwork in order to arrange this. We held multiple meetings with Hospital Dos de Mayo in Lima, including the director, the head of the Laboratory, and laboratory technicians. We also met with the Director of Seguridad Intergral de Salud, the Director of 'Diressa de Salud' (Directorate of Health) in Iquitos, and the Regional Hospital, Loreto. Despite some pushback and bureaucracy, we have secured our first HPV tests from the jungle.

We successfully drafted a 'Convenio,' a formal government agreement, which defines our work with the public healthcare system in Loreto and how this HPV testing will progress through the system, which is a huge success. We have gained support from Hospital Dos de Mayo Lima, Hospital Regional Loreto, and the Diressa de Salud Loreto, to name a few key bodies. We also have identified allies in the healthcare system, including working with the director of Women's Health Programs, the coordinator of Cancer Services, the public relations officer of Iquitos Regional Hospital, and local doctors and midwives.

3. Systems of patient consent and follow-up

One of the challenges we faced this last year has been to ensure all women feel comfortable during the gynaecological examination, and, if they have treatment, be prepared to participate in post-clinic follow-up. Following feedback from women in 2015, we have adjusted our project to build in more education, greater visual aids, and a slower, more detailed consent process using Spanish-speaking local staff. We will aim to achieve 100% patient satisfaction and follow-up after each clinical program.

4. Promotor involvement

DB Peru identified that promoters were not only key community stakeholders in the project but also very keen to extend their current involvement. Because they know the community so well, they are best positioned to provide on going and targeted services. It will take continued effort on behalf of DB Peru to reach our target of up-skilling promoters to ensure they can look at taking on a greater on going workload.

Program Outcomes

DFW Request: *Approximately how many lives have been touched, both directly and indirectly, by the program? What are the measurements used to monitor success and how was this information measured (e.g., surveys, observation)? Be specific and include measurable results.*

Lives that have been touched

Estimated number of lives touched by the ABCS program:

- 301 women directly contacted
- Over 300 additional patients seen
- Education to over 400 community members
- Total of over 1000 people affected by the program in the last 1 year

Measures of Success

Success measures, as outlined in our SMART objectives above, are listed below. Below each objective, we have detailed how we have measured our success and the results of our activities:

- *To hold at least six community consultation meetings annually*
 - **Measurement:** number of community consultation meetings
 - **Outcome:** a total of 23 community consultation meetings were held in the last year of the project
- *Review community needs assessment from 2013 and plan and execute data collection project in 2015*
 - **Measurement:** completion of community needs assessment, and the availability of data from specific data collection project
 - **Outcome:** We collected 119 surveys and visited six communities. The participation rate varied between 55 and 82% of women estimated to be present on the day of the survey in each community. We collected the following numbers of surveys from the following communities:
 - San Pedro = 29 women,
 - Mangua = 33 women,
 - Acu Cocha = 13 women,
 - Puinahua = 22 women,
 - San Juan de Floresta = 7 women,
 - Centro Unido = 15 women
- *Work alongside and up-skill local staff wherever possible*
 - **Measurement:** number of local health workers and staff DB Peru has worked with, educated, or up-skilled
 - **Outcome:** Nineteen promotors were present in our 2015 education and 28 in our 2016 education sessions. DB Peru has worked with four *obstetras* (nurse midwives), one pharmacist, two health technicians and the Iquitos Oncology Unit since our program began. We have provided training to two obstetras in VIA and cryotherapy and plan to continue this into 2017.
- *Create a clinical dataset for audit and patient follow-up*
 - **Measurement:** creation of dataset by September 2016 and ongoing

- data entry and patient management.
 - **Outcome:** Dataset creation and use as a clinical audit tool for over 300 women
- *Implement bi-annual education programs explain cervical cancer screening and prevention from 2015 onwards*
 - **Measurement:** creation and delivery of education material
 - **Outcome:** education package delivered to over 20 communities in the last year
- *Improve levels of knowledge by 100% and screening-uptake in each community by 80% by October 2016.*
 - **Measurement:** A specific survey instrument that measures the impact of the education on knowledge and uptake of screening. These questions included:
 - BEFORE + AFTER
 - Have you heard of cervical cancer?
 - Can you explain what it is?
 - Do you know the symptoms?
 - Can you explain the symptoms?
 - Do you know how to prevent it?
 - Do you know how to treat it?
 - Do you have fear around cervical cancer?
 - AFTER
 - Do you think DB Peru has helped you?
 - Have you learnt anything from this session?
 - After this session will you return for screening?
 - **Outcome:** In those surveyed, knowledge about cervical cancer (ever heard, definition, symptoms, prevention, treatment) increased between 294% and 870% from baseline (Table 1). Additionally, 72.4% people felt that DB Peru helped them better understand cervical cancer, 81.2% felt they learned something new about cancer, and 71.3% felt confident they would return for HPV screening. This translated into an actual HPV screening participation rate of between 60 and 90% in the targeted communities.
- *Perform Pilot Program in October 2015*
 - **Measurement:** number of patients seen and participation/uptake rate.
 - **Outcome:** During our pilot project in October 2015, we visited 6 villages in this region by boat, saw 129 women, did 72 gynaecological exams (69.2% uptake), performed 69 pap smears (95.8% uptake), performed HPV self-sampling on 66 women (51.2% uptake), and performed cryotherapy on 21 women who had abnormal changes on their cervix (100% uptake).
- *Upscale screen-and-treat clinical programs to bi-annual community outreach in 2016*
 - **Measurement:** number of additional communities screened beyond pilot program
 - **Outcome:** a total of 17 more communities were contacted and screened through the ABCS project
- *Provide HPV testing to all eligible women with an uptake rate of over 70%*
 - **Measurement:** number of HPV tests performed and uptake rate

- **Outcome:** Of the 301 women we saw, we performed 201 HPV tests. This equates to an overall uptake rate of 67%. The reasons that women did not complete the test were because they either did not have their DNI/SIS (health card identification ensuring they were eligible), or because they had their period or were pregnant. Less than ten women declined the testing due to personal feelings such as embarrassment or fear.
- *Perform gynaecological examination and VIA for eligible women with an uptake rate of over 70%*
 - **Measurement:** number of gynaecology exams and uptake rate
 - **Outcome:** Of the 301 women we saw, we performed 207 gynaecology examinations including VIA. This equates to an uptake rate of 69%. The reasons people declined the examination included having a male doctor, having their period, being too old or too young, and being embarrassed or scared. In this situation, we provided more information to the woman, explained the importance of cervical cancer screening, and suggested that she could return on future trips to have a follow-up examination if she wanted.
- *Provide cryotherapy for women who test positive for pre-cancerous cervical changes with an uptake rate of 100%*
 - **Measurement:** number of cryotherapies performed and uptake rate
 - **Outcome:** Of the 207 women we examined, we found 33 women with positive VIA. All women were offered and 100% of women commenced the procedure. Of these women, we had to cease the procedure prematurely due to pain in three cases. These are being followed-up in 6 months time to check the progress of the cervical lesion.
- *Follow-up positive or high-risk patients with a 100% follow-up rate*
 - **Measurement:** number of women followed-up and contact rate
 - **Outcome:** 100% follow-up of high risk cases were contacted and reviewed within one year
- *Work with local health services to ensure all eligible girls in our target region are vaccinated by the end of 2016*
 - **Measurement:** coverage of HPV vaccination for eligible girls
 - **Outcome:** all girls in communities were either already vaccinated and/or received their first HPV vaccination, via the hospital pharmacist at Mazan Hospital
- *Perform annual education and project appraisal with at least 15 promotores from the region*
 - **Measurement:** number of *promotores* participating in the education and project feedback and appraisal.
 - **Outcome:** Over 20 *promotores* involved in the education and feedback.
- *Work with and train one obstetra annually in the skills of VIA and cryotherapy*
 - **Measurement:** number of *obstetras* trained in VIA and cryotherapy
 - **Outcome:** a total of 4 *obstetras* worked with DB Peru and received up-skilling in VIA and cryotherapy

- *Submit and have approved a convenio by the Diressa de Salud Loreto by May 2016 outlining the collaboration of DB Peru with the government health system*
 - **Measurement:** submission and approval of *convenio*
 - **Outcome:** *Convenio* approved in May 2016

Future Plans

DFW Request: *If the program is ongoing, provide plans and expected results, including projected timeframe.*

Aside from reaching 301 women and affecting the lives of over 1000 community members, the success of the ABCS program is in the rapid transition of the program into local healthcare services. In 2017, we plan to continue the current screen-and-treat model whilst focusing on capacitation and education of local healthcare providers in Mazan.

In the continuation of our current screen-and-treat, we plan to visit another five communities in September 2017. We anticipate providing education for over 300 people, and performing gynaecology examinations and HPV tests on over 70 women. We will also perform two more education and feedback sessions for over fifteen community *promotores*.

By the end of 2017 and into 2018, we will be able to focus our efforts on the formal transition of the program into Mazan Hospital. This will include formal education and training days for local staff, oversight of the capacitation, and the drafting and trial of a formal agreement between DB Peru and Mazan Hospital. This process has commenced and will extend over the course of this year.

Funding Overview

DFW Request: *Provide a detailed list of all expenses incurred during the grant cycle which have been paid for with the Dining for Women grant. Did this grant and relationship with DFW assist your organization in obtaining other funding, partnerships with other organizations, or public recognition in some capacity?*

TBC

Beyond the program itself, we identified through the Pilot Program (detailed below) a funding need to support women who are referred into Iquitos and Lima for treatment following our outreach clinics in the jungle. This was not covered by our original project proposal or grant budget, so we sought funding from the US Embassy, who awarded us a small grant of \$2,000 USD to support our needs. Aside from this, DB Peru can confirm that there have been no major changes to sources for the ABCS Program itself. The success of our program has been entirely facilitated by the generous grant from Dining For Women.

Because some of our program delivery has been refined to enable greater collaboration with local and government health services, DB Peru has made significant cost savings in the area of medical equipment and supplies. This has freed some money that was originally attributed to this area. We hope to be able to continue our important work and, with DFW's approval, channel this money into future clinical outreach and provide assistance for women who need referral to Iquitos or Lima.

SEP



Access to flooded village often requires the use of a small canoe



Obstetrica Silvia teaches about HPV and cervical cancer using a rotfolio from local clinic and demonstrates the plastic speculum