Addressing Health Disparities in Belize:
Cervical Cancer Screening for High-Risk Populations

Joel Hill[1], MPAS, PA-C and Desiree Casimiro[2]
University of Wisconsin-Madison Physician Assistant Program and Rural Health Nurse, Dangriga Town, Belize

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UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

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Background

Worldwide, cervical cancer is the fourth most common cancer among women. However, 85% of cervical cancer diagnoses and related deaths occur in women living in low and middle-income countries (LMICs). The overwhelming burden of disease is now in LMICs that lack the health-care resources and infrastructure for population-based screening. Belize, the least populated country in Central America with approximately 300,000 people, has a high burden of cervical cancer, in common with the rest of this region. Cervical cancer is both the leading cancer and the leading cause of cancer deaths among women in Belize.

Due to barriers to health-care access, women in underserved populations are more vulnerable to cervical cancer than their advantaged counterparts. Few primary care clinics are situated to serve patients of lower socioeconomic status. A woman's ability and decision to receive screening may depend on her knowledge about cervical screening, health-care access, socioeconomic status, and educational level. Results from a review on barriers to cervical cancer screening in Latin America by Liebermann, et al, revealed that women themselves acknowledged that in the absence of symptoms they did not seek health care; they lacked the interest for self-care; they tended to take care of the family often ignoring their own health-care needs; and they believed that health screenings were futile if they could not afford treatment or medications.

For maximum impact to reduce cervical cancer incidence and mortality, the World Health Organization recommends that all women in LMICs, ages 30 to 49 years, should be screened at least once in their lifetime and ideally every 5 years. Countries where 50% to 69% of women receive a Pap test every 3 to 5 years show death rates of 4 per 100,000 women per year. In countries with screening rates of >70% of women, the death rate is <2 per 100,000 women per year. Belize's cervical cancer screening program has an 80% coverage goal. However, in spite of the number of women screened between ages 21-35 years increasing, from 11% to 68% in the past decade, many women still present with advanced disease.

In 2012 the University of Wisconsin-Madison Physician Assistant (PA) Program partnered with Peacework International to offer students an opportunity to travel to rural and underserved areas in the Stann Creek District of Belize to provide sustainable healthcare. Initially organized to deliver routine medical care for common illnesses found in these remote villages, in 2014 the PA Program began working with the Belize Family Life Association (BFLA) to provide community-based cervical cancer screening to high-risk populations lacking the resources needed to travel to regional healthcare clinics for these routine screening examinations.

Methods

Our physician assistant students complete women's health curricula during the fall semester of the didactic year. This is followed by a gynecological (GYN) seminar and standardized patient GYN experience during the following spring semester. At the completion of the didactic year, our self-selected PA students travel with other interdisciplinary students and programmatic PA and DNP faculty to the Stann Creek District of Belize. Through our association with BFLA, our students are paired with a GYN trained Belizean rural health nurse to conduct cervical cancer screening examinations by two methods. Visual inspection with acetic acid (VIA) examinations are performed for most premenopausal women and cytological, or Pap smear testing, for post-menopausal women and other patients that do not meet VIA criteria.

VIA is a visual examination of the uterine cervix after application of 3-5% acetic acid. If the cervical epithelium contains an abnormal load of cellular proteins, the acetic acid coagulates the proteins conferring an opaque and white aspect of the concerned area. A precancerous lesion has higher protein content when compared to normal epithelium. Therefore, it becomes white (acetowhite) and is considered to be "VIA positive." The advantage of VIA screening is the opportunity to screen and treat at the same visit, thus limiting the need for follow up visits in most cases. For VIA positive exams, cryotherapy can be accomplished during the visit to treat any areas of that are VIA positive.

Screen-positive women are eligible for cryotherapy if the entire lesion is visible, the squamocolumnar junction is visible, and the lesion does not cover more than 75% of the ectocervix. If the lesion extends beyond the cryoprobe being used, or into the endocervical canal, the patient is not eligible for cryotherapy and LEEP is the alternative option.

Pap smears are cytology based and require fixing cells to a slide to be sent for cytopathologist interpretation. These tests are higher quality and have reduced the incidence of invasive cervical cancer by as much as 90%. However, these exams require follow up to ensure patients receive their results and can also require additional testing for abnormal results.

Results

Between 2014 and 2018 the University of Wisconsin PA and other interdisciplinary students completed 370 cervical cancer screening exams in the Stann Creek District of Belize. From those screenings, 14 cytologic results returned requiring higher level biopsies.

Student travelers for this annual service-learning trip ranged from nine in 2014, to 23 in 2018. In 2016, the Belize learning experience became interdisciplinary further increasing participants, including Doctor of Nursing Practice (DNP) students.

Red Bank and Santa Rosa are small villages with largely Mayan populations. Over the five-year period we have cared for 575 Mayan patients in these two villages, completing 105 cervical screenings, with 4.8% of those requiring follow up for higher level biopsy.

During the trip, students also provide care to the Sagitun banana farm workers and their families, living onsite and in the nearby village of Santa Cruz. This population of approximately 1200 is farther from a public clinic than any other communities visited during the trip. The population is largely Hispanic, from Guatemala, Honduras and Nicaragua working as agricultural immigrants in Belize. As a result, they do not qualify to be seen in the Belize public health care system. In these two locations we have seen 809 patients overall, and 182 cervical screenings, with 1.6% requiring follow up biopsy.

Seine bight is a largely Garifuna population where we have seen 293 patients overall, with 58 cervical cancer screenings and only 1.7% returning in need of follow up biopsy.

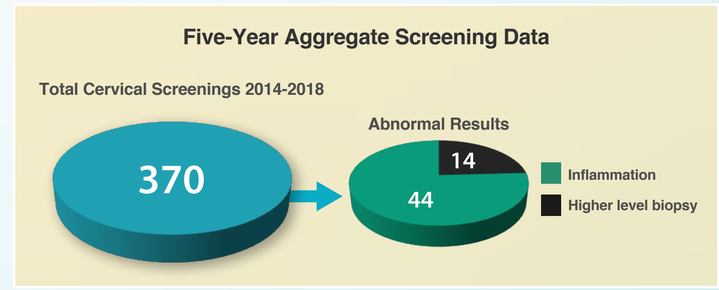
The village of Monkey River is a Creole population. Care was provided for three years, where 25 screenings were accomplished, with no abnormal results detected.

Discussion

Since beginning in 2012, we continually strive to make the Belize community-based service-learning project sustainable. We feel that if we can continue our work with the underserved, more remote villages on an annual basis, we can reach the population most in need of this secondary prevention measure. In 2015 the United Nations proposed 17 Sustainable Development Goals, which set forth aggressive goals to improve the planet and its population.

Physician assistant and nurse practitioner clinicians throughout Wisconsin are on the front lines in primary care. The interdisciplinary students that participate in this annual community-based cervical cancer screening experience in Belize are changing lives. The patients' lives for sure, but also their own in how they care for a medically underserved populations at a global or local level.

Cervical cancer disproportionately affects women in the prime of their life, and as such, has substantial economic and societal consequences. A mother's death has complex effects on the children and families she leaves behind. The impact to the communities that we provide care for can best be summed up by a 2017 comment by Ms. Joan Burke, Executive Director for Belize Family Life Association: *"We do not look at this as only 300 cervical screenings, but instead as 300 women and their families benefiting from a lifesaving screening. Thank you for the service that you have provided for the past four years."*



Five-Year Aggregate Screening Data

Village	Ethnicity	2014 Paps	2015 Paps	2016 Paps	2017 Paps	2018 Exams	Screening Total	Miles to Clinic
Red Bank	Mayan	12	30	9	30	13	**94**	14.3
Green/Gold	Hispanic	10	13	8	14	11	**56**	25
Santa Cruz	Hispanic	11	45	10	31	29	**126**	20.6
Monkey River	Creole	-	11	7	7	-	**25**	12.5
Santa Rosa	Mayan	-	-	-	-	11	**11**	16.6
Seine Bight	Garifuna	15	14	4	13	12	**58**	38.9
Exam Totals		48	113	38	95	76	370	

Next Steps

With aggressive primary (HPV vaccination) and secondary (cervical cancer screening) prevention strategies for this high-risk population, the burden of disease from cervical cancer should start to see a decline in Belize. In 2016 the Belize Ministry of Health integrated the HPV vaccination series into the national vaccine schedule. Successful completion of the HPV vaccination series is a key in the elimination of cervical cancers resulting from HPV infection.

Despite the promotion of the HPV vaccination, secondary prevention through cervical cancer screening will remain essential for the foreseeable future due to poor vaccine uptake and because the existing vaccines do not treat pre-existing HPV infections and related disease. Two to three generations of women will not benefit from the HPV vaccine as they were beyond the recommend age when the vaccines became available and/or they were already exposed to HPV. Our interdisciplinary program will continue its partnership with Peacework and BFLA to bring community-based cervical cancer screening into remote villages of the Stann Creek and Toledo Districts of Belize.

References

1. Lopez MS, Baker ES, Maza M, Fontes-Cintra G, Lopez A, Carvajal JM, Nozar F, Fiol V, Schmeler KM. Cervical cancer prevention and treatment in Latin America. *J Surg Oncol.* 2017 Apr;115(4):615-618. doi:10.1002/jso24544.
2. Liebermann EJ, VanDevanter N, Hammer MJ, Fu MR. Social and cultural barriers to women's participation in Pap smear screening programs in low- and middle-income Latin American and Caribbean countries: An integrative review. *J Transcult Nurs.* 2018 Nov;29(6):591-602. doi: 10.1177/1043659618755424
3. Cathro HP, Loya T, Dominguez F, Howe SL, Howell R, Orndorff K, Moreno J, Mendez E, Fung PC, Beer NL, Allen P, Sosa AM, Gurka KK, Stoler MH, Frierson HF. Human papillomavirus profile of women in Belize City, Belize: correlation with cervical cytopathologic findings. *Hum Pathol.* 2009 (40):942-49
4. Walwyn L, Janusz CB, Clark AD, Prieto E, Waight E, Largaespada N. Cost-effectiveness of HPV vaccination in Belize. *Vaccine.* 33S(2015) A174-A181.
5. Cervical Cancer in Developing Counties 2017. https://www.gfmer.ch/ccdc/victest.htm. Accessed March 1, 2019.
6. Ginsburg O, Bray F, Coleman MP, et al. The global burden of women's cancers: a grand challenge in global health. *Lancet.* 2017 (389):847-60.

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CONTACT INFO: Joel Hill Email: jdhill5@wisc.edu

https://www.med.wisc.edu/pa