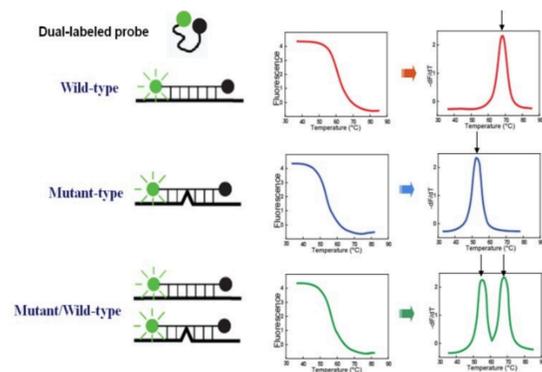


Abstract and Background

Honduras has a high incidence of cervical cancer linked to infection with one or more high-risk human papilloma virus (HPV) types, coupled without the necessary resources for effective cancer screening. The detection of HPV has become increasingly important in cervical cancer screening and the treatment of cancer precursors. Furthermore, significant differences in the oncogenicity of HPV genotypes have been noted, and the distribution of these genotypes varies geographically. Notably, our lab has demonstrated that the most common high-risk HPV genotypes detected from cervical cancer screenings differed from those routinely found in the United States.¹ This study aims to build on this analysis by investigating the prevalence and distribution of HPV genotypes of cervical cancer tumor tissues in Honduras. As the causative agent of cervical cancer, detection of high-risk HPV types has the potential to improve health outcomes relative to the less-sensitive visual and cytological tests.

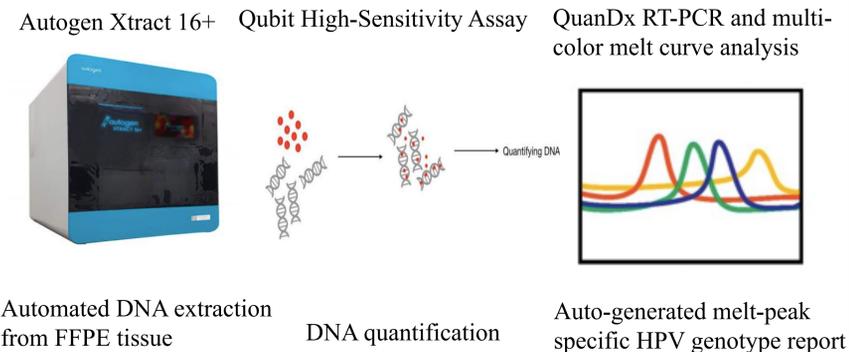


Objectives and Importance

1. HPV genotype prevalence noted during cervical cancer screenings in Honduras varied from the U.S. distribution. An estimated 95-100% of cervical cancers are the result of infection by one or more of the 14 known high-risk types.
 - ❖ Compare the prevalence of HPV genotypes of cervical cancer screenings to those found in cervical cancer tissue. Generate a dynamic picture of HPV epidemiology to track genotypic shifts over time.
2. Disparities in cervical cancer rates reflect low access to effective cervical cancer screening program, follow-up care, and screening technologies to segment high-risk populations.
 - ❖ Continue to evaluate the utility of HPV genotyping analysis as an effective and inexpensive method for cervical cancer screening.
3. The current HPV vaccine in Honduras primarily protects against types 16 and 18, but the HPV type distribution indicates that the bivalent vaccine would only provide partial protection.
 - ❖ Consider the importance of developing HPV vaccines that are geographically specific.

Methods

Procedure schematic for HPV genotyping of cervical cancer tumor tissue



HPV High-Risk Melting Curve Analysis

High-Risk Reference Melting Temperatures

Channel	HPV Genotype	TM Values (° C)
ROX	HPV-31	49 ≤ Tm < 54
	HPV-33	54 ≤ Tm < 59
	HPV-16	59 ≤ Tm < 64
	HPV-35	64 ≤ Tm < 68
	HPV-68	68 ≤ Tm < 73
	HPV-18	73 ≤ Tm < 78
	HPV-56	47 ≤ Tm < 52
CYS	HPV-52	52 ≤ Tm < 59
	HPV-45	59 ≤ Tm < 63
	HPV-39	63 ≤ Tm < 70
FAM	HPV-59	44 ≤ Tm < 49
	HPV-66	49 ≤ Tm < 54
	HPV-58	54 ≤ Tm < 60
	HPV-51	60 ≤ Tm < 74
HEX	Internal Control	50 ≤ Tm < 70

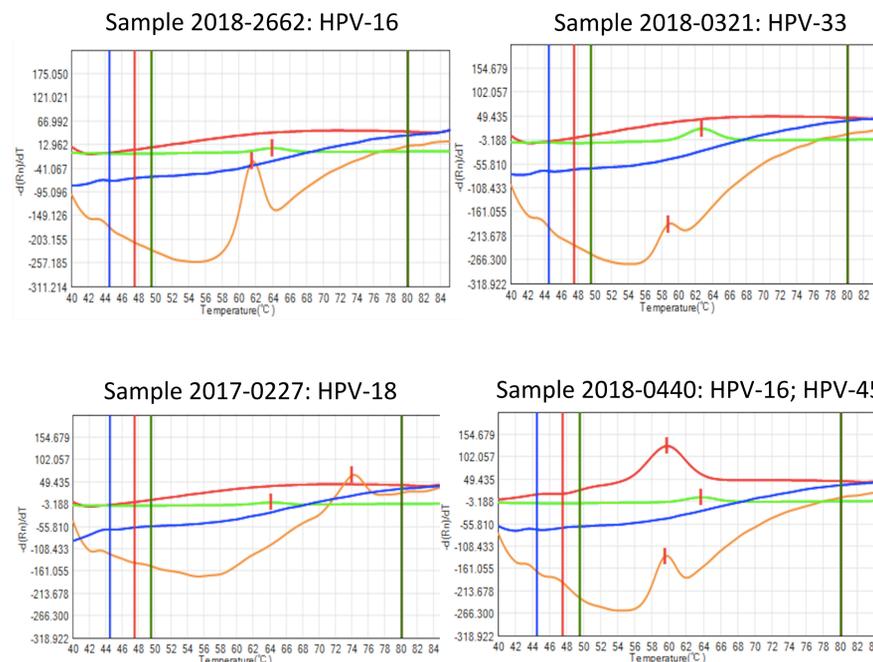
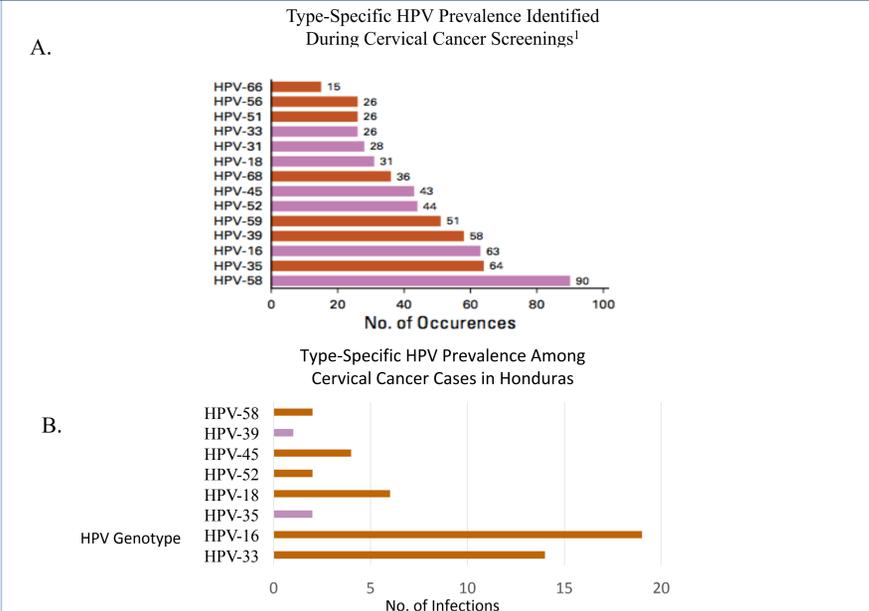


Figure 1. Examples of melt peaks on the MeltPro High-Risk Genotyping assay (QuanDx). Marked peaks specify high-risk melting temperatures for their corresponding HPV genotype. Double peaks indicate multiple HPV infections.

Genotype-Specific HPV Prevalence



The (A) genotype distribution among 480 HPV-positive samples in San Pedro Sula, Honduras. The (B) number of infections identified within 43 cervical cancer tissues collected in partnership with La Liga Contra el Cancer. Genotypes present in the nonavalent vaccine are shown in pink, whereas those strains not included in the vaccine are shown in orange. 8 of the total 43 samples listed in B were infected with more than one high-risk HPV genotype; each genotype was accounted for separately.

Conclusions

Findings:

- The most prevalent high-risk HPV genotype found in cervical cancer tissues was type 16, followed by types 33 and 18.
- 18.6% of the total 43 cervical tumor samples were doubly infected by high-risk HPV genotypes.
- Given the distributions of HPV genotypes identified in both the cervical cancer screenings and those found in cervical cancer tissues, the current Honduran bivalent vaccine for HPV 16 and 18 would provide only partial protect, and the nonavalent vaccine would be also be insufficient.

Conclusions:

This study continues a preliminary investigation to map the genotype-specific high-risk HPV prevalence within Honduras. The varying distributions of HPV genotypes highlights the utility of this analysis within distinct geographic areas, particularly within the era of HPV vaccination. As the causative agent of cervical cancer, detection of high-risk HPV types has the potential to improve health outcomes relative to the less-sensitive visual and cytological tests. In future work, we will continue expand this database and verify HPV genotypic trends with larger subsets of the population.

References

1. Atkinson, A., Studwell, C., Bejarano, S., Castellón, A.M.Z., Espinal, J.A.P., Deharvengt, S., LaRochelle, E.P.M., Kennedy, L.S., Tsongalis, G.J., 2018. Rural distribution of human papilloma virus in low- and middle-income countries. *Exp. Mol. Pathol.* 104, 146.

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