

Non-Invasive Pre-Screening Approach for Early Detection of the Human Papillomavirus (HPV) to Aid in Cervical Cancer Prevention in Underrepresented Demographics

Davis, Ana-Lois (School: Academy of Aerospace and Engineering)

Cervical cancer is the fourth leading cause of death for women in the United States. According to the CDC, since the COVID 19 pandemic, the pap-smear screening rates have declined by 80%. The number of minority women lacking access to Human-Papillomavirus screenings is a burgeoning crisis. A National Cancer Institute survey confirmed minority women indicated a lack of access to HPV screenings. This study posits an alternative, non-invasive, and accessible pre-screening method for HPV detection to decrease the growing mortality rate of underprivileged women developing cervical cancer. It was hypothesized that if the swabbing of a menstrual blood samples contains koilocytotic cells with an abnormal concentration of cellular proteins, then a woman's menstrual cycle could detect the 12-15 high risk HPV strains when coated with 3-5% acetic acid with a visual inspection of white coagulations. To confirm the validity of this approach, a licensed pathologist was consulted to better understand the current method of detection, the Papanicolaou Test. The student researcher hosted a public presentation, regarding cervical cancer awareness, in which a survey was distributed and 66.7% of respondents indicated that they did not schedule regular HPV screenings (1-3 years). Using acetic acid (CH_3COOH) infused pads (5ml) to detect HPV cells in menstrual simulated-blood with varied sized 3D-printed cervixes were used to simulate BSL-2 experimentation. A prototype HPV pre-screening menstrual self-testing kit that is a non-invasive approach for all women to have access to for earlier detection of HPV strains and preventing cervical cancer from manifesting is being constructed.

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