

ORIGINAL ARTICLE

Evidence-based practice project to increase hospital-based cervical cancer screening compliance among registration staff

Lynn Richards-McDonald^{*a}, Laundette P. Jones^b, Cornelia L. Trimble^c



Lynn Richards-McDonald

a Department of Gynecology/Obstetrics, Johns Hopkins Hospital.

b Assistant Professor, Department of Pharmacology, University of Maryland School of Medicine.

c Associate Professor, Departments of Gynecology/Obstetrics, Oncology and Pathology, Johns Hopkins Hospital.

ABSTRACT

Background: High-quality Papanicolaou testing was developed in the 1940s, and when used for early detection of cervical cancer, has been shown to significantly reduce cervical cancer related deaths world-wide. Legislation, passed by many states in the United States, aims to maximize cervical cancer screening. One Academic Medical Center (AMC) in Maryland initiated a cervical cancer screening program in 1977. A pilot, developed to assess cervical cancer screening compliance, found the screening rate at this AMC to be 51%. **Objective:** This project aimed to improve the knowledge of the Patient Service Coordinators in order to increase cervical cancer screening compliance. **Population:** Patient service coordinator, who conducts registration and screening when a patient is admitted to the AMC

Methods: Effectiveness of the education was measured by three assessments: 1) A pre and post knowledge survey of the patient service coordinator measuring facts about cervical cancer, the screening process, and the State of Maryland cervical cancer screening mandate; 2) a calculation of screening rates comparing the number of women screened to the number of women admitted; and 3) an assessment of the completeness of each screening form.

Results: A two-tailed paired samples t-test revealed that the PSCs scored higher on the post-survey compared to the pre-survey ($p < 0.000$). A chi-square test was used to compare categorical variables. During the four weeks before the educational intervention, 34% (543 of 1602) of women were screened; 51% (279/543) screening forms were completed. For the four weeks after the educational intervention, 54% (N=735 of 1,373) of eligible women were screened; 89% (656/735) forms were completed ($p < 0.000$).

Conclusion: There was a significant improvement of the PSC's knowledge, 20% increase in the number of women screened, and completeness of the form increased by 38%. These findings suggest that an educational intervention for registration staff can increase cervical cancer screening compliance, and positively impact staff ability to screen inpatient women.

Keywords: Cervical cancer; screening; cervical cancer knowledge and awareness education; evidence-based practice; cervical cancer screening compliance; hospital-based

***Corresponding Author**

600 N. Wolfe Street Halsted 200, Baltimore, MD 21287. e-mail: lmcdona7@jhmi.edu

© 2015 International Journal of Nursing

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

Implementation of an EBP project to increase hospital-based cervical cancer screening compliance

Cervical cancer is the third most common cancer in women world-wide, and in the 1940s was the leading cause of death in women within the United States (WHO/ICO Information Centre, 2010). It is currently ranked 14th overall in frequency among US women (National Cancer Institute, 2010). The reduction in morbidity and mortality from cervical cancer is due primarily to the development of the Papanicolaou (Pap) test in the 1940s and its subsequent acceptance and use. The Pap test is considered the frontline test to detect pre-invasive lesions and cellular changes caused by the Human Papilloma Virus [HPV] (Centers for Disease Control and Prevention, 2012). However, women continue to succumb to the disease due to the combination of exposure to, and acquisition of, oncogenic HPV, coupled with infrequent screening (Eversole et al., 2010).

Sexually-oriented behavioral risk factors increase exposure to oncogenic HPV (Eversole et al., 2010). In addition, perceived and logistical barriers including knowledge deficit, fear, cultural and religious beliefs, cost of screening, resources and lack of transportation may lead to screening avoidance (Daley et al., 2011). Underserved, less educated, poor minority women are also less likely to be screened at regular intervals (Trimble et al., 2004).

Background

Cervical Cancer screening programs provide the opportunity to capture women at high risk for cervical cancer (Sasieni, Castanon, & Cusick, 2009; Straton, Sutherland, & Hyndman, 1995). In 1977, the State of Maryland ratified a law that required all hospitals to offer Pap testing to adult females admitted as inpatients (Md. Code Ann. Health Gen. Law § 19-348, 2012). Maryland is one of several states (Ohio, Hawaii, and New York) that have enacted legislation requiring hospitals to offer inpatient Pap screening (Fisher & Donohoe, 1988). An Academic Medical Center (AMC) in Maryland developed a Cervical Cancer Screening Program (CCSP) in 1977 to comply with the mandate. Women of varying cultures, socio-economic status and ethnicities are eligible to use the CCSP; however, the majority of women screened are underserved.

The CCSP is a resource to this AMC and its patients. It provides screening opportunities to identify developing abnormalities which can decrease costly interventions (Han et al.; 2011; Richards & Klemm, 2000; Subbramanian et al.; 2010). The CCSP's value was demonstrated when the incidence of High Grade

Squamous Intraepithelial Lesion (HSIL) was 5 fold higher (3%), compared to all outpatient clinical setting combined the same AMC [0.7%] (Trimble et al., 2004). The 5-fold difference underscores the strength of having a hospital-based program to detect critical lesions in at-risk populations that are less likely to receive adequate screening (Trimble et al., 2004). Eversole et al. (2010) reported the national HSIL median prevalence to be 0.5%.

An Assessment of the Cervical Cancer Screening Team

The multifaceted structure of the CCSP involves several disciplines, each with a goal to provide safe and efficient, and contemporary care while meeting the state mandate.

Roles and Responsibilities Within the CCSP

Several disparate roles are necessary to assure the success of the CCSP. Each role within the CCSP is integral to ensure optimal patient care in the cervical cancer screening process. The CCSP begins when a female patient is admitted to the AMC.

The Patient Service Coordinator.

A registration staff member, titled Patient Service Coordinator (PSC), initiates the CCSP Pap screening for most adult (>18 years) female patients. Screening is defined as asking the patient if she would like to have a Pap performed during her hospital stay. PSCs are responsible for screening all female adults during their admission to the AMC. Approximately 60 PSCs have admitting responsibilities at the AMC and provide services at several points of entry (admitting office, emergency department, pediatric admitting and the pre-surgical areas). Each screened woman is asked to read and sign a cervical cancer screening form. PSCs have the responsibility to explain the program to the patient, ascertain the patient's desire to participate, obtain the patient's signature, and assure all information on the form is complete. The CCSP screening form is one of eight forms PSCs review with patients prior to admission.

The Cervical Cancer Screening Nurse Coordinator.

The majority portion of the program is the responsibility of the Cervical Cancer Screening Nurse Coordinator (CCSC). The CCSC retrieves the CCSP forms from the main admitting area, and completes or

reconciles an automated electronic order for admitted patients who have requested a Pap. The CCSC also enters a brief note into the electronic medical record of patients that decline screening.

Review of the medical record is necessary to assess the appropriateness of Pap testing for those patients that request services. For example, patients are ineligible for Pap services through the CCSP if they have had a Pap within the preceding year (MD. Code Ann. Health Gen. Law § 19-348, 2012). Pap testing is performed by the CCSC at the bedside, as long as the patient's condition is stable, and the admitting physician has not discontinued the automated order. The CCSC reviews the Pap result of the patient, creates and sends a form letter with the results to the patient as well as to the admitting physician within a two week period. The CCSC maintains patient records in a password protected database. The form letter sent to the patient is also kept as a permanent entry in the patient's electronic chart. If the Pap test result is abnormal, the CCSC contacts the patient and, usually via telephone, and schedules a follow-up appointment in the colposcopy clinic at the AMC's outpatient center.

Medical Director of the CCSP.

A medical director reviews all Pap testing performed under the auspices of the CCSP. This physician and the CCSC collaborate to determine appropriate recommendations when Pap results indicate further medical intervention is warranted. The results and recommendations are shared with the patient's admitting provider by letter.

One Strategy to Improve Screening Rates

In an effort to increase screening compliance within the CCSP, we decided to evaluate the roles and responsibilities of the team, and implement changes or strategies for improvement. Each role in the CCSP was reviewed to assure that educational requirements were up-to-date, and that compliance with the Maryland state law was met. Discussions between numerous health-care professionals (nursing, medicine, risk management/legal, AMC Administration and Admissions) facilitated consensus building and assured that the CCSP policy was well vetted. The procedures initiated at the entry points for female admissions were viewed as the first step of the screening process.

The existing structure used senior PSCs to train newly-hired PSCs on how to explain the program and complete the cervical cancer screening form with patients. A random chart audit was performed at the AMC to assess cervical cancer screening compliance

among all PSCs. During this pilot review (November 2012), it was determined that only 51% of the eligible patients admitted during the month had been screened. The screening was counted as having been done if the cervical cancer screening form was present in the patient's medical record. Moreover, the majority of these screening forms were not complete. The screening form is considered incomplete if all questions are not answered. Information that is incomplete or absent may contribute to eligible women not receiving Pap testing. Figure 1 lists the questions asked by the PSCs during the initial screening process.

Questions were reviewed in November 2012 to assure they reflected the Maryland state-mandated requirements and were revised if needed a collaborative Inter-professional collaborative team from the AMC.

Current literature identifies knowledge and awareness gaps concerning cervical cancer with both licensed and unlicensed clinical staff. Cook et al. (2011) reported that a lack of cancer awareness and knowledge could negatively impact early prevention and diagnosis in the general population, and suggested that an educational intervention could eliminate knowledge gaps and increase cancer awareness. The literature also revealed unfavorable attitudes and practices among licensed and unlicensed clinical staff have negatively impacted impact cervical cancer screening (Gharoro & Ikeanyi, 2006; Mutyaba et al., 2006; Oranratanaphan et al., 2010). Crucial information was also obtained from the meta-analysis by Stone et al. (2002). The findings from this analysis concluded that education alone may not always be effective to increase cancer awareness and knowledge. Teamwork and collaboration were identified as valuable attributes to promote effective cervical cancer screening.

A strategy was implemented to enhance the PSC knowledge of basic facts about cervical cancer, screening processes, and the Maryland cervical cancer screening mandate. An educational intervention for the PSCs was designed and provided by a licensed healthcare professional, and supported through a validated Cervical Cancer Awareness Measure (CCAM). This tool was used to assess cervical cancer knowledge, screening and the Maryland mandate. Our hypothesis was that use of an Inter-professional collaborative effort with education would complement the current processes of the CCSP, and would improve cervical cancer screening rates at the AMC. Here we present our data, the effectiveness of an educational intervention for PSCs on cervical cancer screening rates within an inpatient setting at an AMC.

Method

Figure 1
Cervical Cancer Screening and Mammography Education

For addressograph/label

The State of Maryland requires hospitals to offer to each adult female inpatient of the hospital a Papanicolaou (Pap test) for the detection of cervical cancer.

1. Have you had a Pap test within the last 12 months? No Yes
If you have had a Pap test within the last 12 months, this screening is NOT offered during this hospitalization
2. Have you had a hysterectomy? No Yes
 - a. Women who have had a total hysterectomy (removal of the uterus and cervix) or cervical cancer or pre-cancer should continue to have Pap tests.
 - b. Women who have had a total hysterectomy (removal of the uterus and cervix) for any other reason may reasonably choose to stop having Pap tests
 - c. Women who have had a hysterectomy without removal of the cervix should continue to have Pap tests.
3. Do you want to have a Pap test during this hospitalization? No Yes
4. The State of Maryland requires hospitals to provide mammography educational materials.
 - I have received educational materials describing mammography testing
 - I did NOT receive educational materials describing mammography testing

Patient/Authorized Representative Signature	Date	Time
<input type="checkbox"/> Patient unable to complete form due to medical condition		
Admitting Department Employee or Other Hospital Representative	Date	Time

Permission to use from: GYN/OB Johns Hopkins Hospital

Institutional Review Board and Educational Intervention Process

This project was introduced to the CCSP medical director, as well as the administrative heads of the department of Gynecology and Obstetrics (GYN/OB) and Admissions. In addition, meeting with the supervisory staff of each PSC specialty were scheduled to increase their familiarity with the project. Each department verbally agreed to actively participate. Each department head verbally agreed to participate. The Assistant Director of Admissions provided a written agreement that expressed an interest to work in tandem with GYN/OB. This agreement was submitted with the Institutional Review Board (IRB) application. The educational intervention, patient admission reports, and permission to review cervical cancer forms received IRB exempt approval.

Baseline Measures.

The first measure recorded the number of women screened during a four week period. The number of women admitted to the AMC was compared to the number of forms received. The second data point was the number of screening forms completed by the PSCs. Form completion was defined as documentation of the four screening questions answered and the presence of the patient’s name, medical record number and the signatures of the patient and PSC. Data was measured over a four week period and no Protected Health Information (PHI) was retained. All retained was de-identified and

entered into a password protected file.

Pre and Post – Survey.

Before each educational intervention began, PSCs were given the option to complete a survey sent to them via their individual e-mail accounts. One week after the educational intervention was presented, PSCs received an email instructing them to complete an attached modified CCAM post-survey. Correct answers on pre-and post-survey questions 1, 4, 5, 9, and 10 earned one point (See Annexure). Participants had one week to complete the survey and email reminder emails were sent to the PSCs every three days to ensure a strong response rate.

One-Hour Intervention.

Ten one-hour educational interventions were scheduled during week five. Each PSC was required to attend one of the ten interventions. Each educational session provided repetitive information with five components.

The education provided in each intervention was composed of five components. The first component was the review of the pre-survey questions and answers including the Maryland cervical cancer screening mandate, symptoms of cervical cancer symptoms, risk factors and information about HPV vaccines. The second component reviewed the AMC’s cervical cancer screening form. PSCs practiced interviewing skills during the third component. The fourth component presented the PSCs with case studies from unidentified women whose CCSP Pap results had detected HSIL or early stage of cervical or endometrial cancer. The fifth and final component included information about referrals of the patients to the AMC’s Women’s Health Outpatient Center, a short summary and time for questions and answers. The educational intervention took a total time of approximately 60 minutes to complete.

Post Intervention Measures.

A post-intervention measure was conducted over four consecutive weeks upon completion of the educational intervention and was similar to the measure performed prior to the educational intervention. The number of women admitted to the AMC was compared to the number of woman screened for cervical cancer, and the completeness of each form was determined. Only forms completed by PSCs that had attended the educational intervention were reviewed for completeness.

Cervical Cancer Screening Awareness Measure.

Survey questions from the CCAM were used in this project. The CCAM is a derivative of the Cancer Awareness Measure (CAM). Both measures were determined to be effective tools to measure knowledge and awareness of cancer (Simon et al., 2011). Both survey instruments were created by the UCL Health Behaviour Centre (Centre). The Centre did not have a scoring recommendation for the CCAM. Permission to use the CCAM was sought and granted.

A modified version of the CCAM was used for this evidence-based project. Certain questions were modified to address the cancer risk to women within the United States. The validity and reliability of the CCAM instrument was compromised because some questions were altered and eliminated. Questions from the CCAM that pertained to the purpose of this evidence-based project were used (See Annexure). Each correct response in the pre-test survey that corresponded to the knowledge-based questions received one point. The CCAM survey kit provided answers and each survey contained four questions of different formats (expository, fill in the blank, multiple-choice, knowledge-based questions). The same questions were evaluated in the pre and post surveys and a total of 14 points could be earned on each. The pre and post-survey scores were tabulated and reviewed by the project implementer. Forty-eight PSCs attended one of the ten educational interventions. One hundred percent (n=48) of the participants completed the pre-survey and 69% (n=33) completed the post-survey. Only those PSCs that completed both the pre and post survey were included in the analysis.

Results

The project demonstrated an increase in cervical cancer screening compliance by increasing: (a) the knowledge of the PSCs; (b) the completeness of the cervical cancer screening forms; and (c) the rate of cervical cancer screening compliance. Three assessments were used to measure the effectiveness of the project. Pap screening is an identified asset for at-risk women and it was essential to review and evaluate the screening process within the CCSP to ensure continued efficiency and effectiveness.

Pre and Post-Test Analysis

Pre and Post Survey Results

The statistical analysis used to measure knowledge in this project was the repeated measures/paired-samples t-test utilizing the Statistical Package for the Social Sciences (SPSS) 21.0. SPSS was used to compare the means between the same group of participants on two separate occasions (pre and post-survey).

PSCs were tested with the same questions before and after the educational intervention.

Each individual PSC's pre-survey was compared to the post-survey. A two-tailed paired samples t-test revealed that the PSCs scored higher on the post-survey compared to the pre-survey ($p < 0.000$) therefore, the cervical cancer educational intervention improved the knowledge of the PSCs. This conclusion was based on the number of participants that completed the pre and post-survey.

Number of Women Screened

Using SPSS version 21.0, a chi-square test was used to compare categorical variables. During the four weeks before the educational intervention, 34% (N= 543 of 1,602) of eligible women were screened. For the four weeks after the educational intervention, 54% (N=735 of 1,373) of eligible women were screened. Women admitted after the educational intervention were significantly more likely to be screened for cervical cancer ($\chi^2 (1) = 116.35, p < .0000$). Screening forms completed by PSCs that did not attend the educational intervention were removed from this percentage score. When compared to the percentage of eligible women screened immediately prior to the educational intervention, there was a screening rate increase of 20%.

Review of Forms Completed

During the four weeks before the educational intervention, 51% (N= 279 of 543) cervical cancer screening forms were completed. For the four weeks after the educational intervention, 89% (N=656/735) cervical cancer screening forms were completed. Cervical cancer screening forms were completed significantly more after the educational intervention ($\chi^2 (1) = 228.094, p < .0000$). Screening forms completed by PSCs that did not attend the educational intervention were removed from this percentage score. This increase demonstrates an improvement of 38% when compared to the completed forms prior to the educational intervention. Each form question was also individually graphed to represent the information reviewed before and after the educational intervention (See Figure 2). The review of the screening forms before and after the educational intervention was based on the 48 educational intervention participants.

Case Studies Presented During Educational Intervention

During the post-survey, PSCs were asked if the case studies presented in the educational intervention were beneficial. Another question asked was if the PSCs

felt that the case studies were an incentive to encourage Pap screening (See Annexure). Eighty-eight percent of the participants reported that they strongly agree that the case studies were beneficial while the remaining 12% felt reported that they somewhat agreed. Eighty-eight percent of the participants reported that they strongly agree that the case studies were incentive to encourage Pap screening while the remaining 12% felt reported that they somewhat agreed.

Discussion

This project demonstrated that an educational intervention for PSCs at an AMC improved cervical cancer screening rates for eligible adult women. There was a 20% increase in the number of women screened and a 38% increase in the completeness of the screening forms. The increase in the number of women screened suggests that the educational intervention demonstrated a favorable impact on the ability of PSCs to screen inpatient women. This Inter-professional collaborative educational effort supports the current structure of the CCSP, and increases the effectiveness of the screening process.

Original assessment of the program identified that cervical cancer screening compliance was below expectations. Items that could have impacted the compliance

rate include: 1) Screening completed but completed forms did not reach the CCSC in a timely manner or did not reach the CCSC at all; and 2) the cervical cancer screening form was overlooked by the PSC due to the many other forms needing completion. Certain areas within the AMC had a higher screening compliance than did other areas. Screening in the pediatric department reflected the lowest percentage of eligible women screened but also had the fewest number of adult women admitted. National screening guidelines are discussed with all adult women who requesting Pap testing, particularly those patients admitted to the pediatric department (American College of Obstetricians and Gynecologists, 2012; Saslow, et al, 2012). The pediatric department was relatively new to the CCSP (< two years) and typically, healthy adult women under the age of 21 admitted to the pediatric department decline Pap testing after becoming fully informed of the national screening guideline age requirements.

Several studies have stressed the need and importance of educating healthcare workers in order to improve cervical cancer screening (Cook et al., 2011; Gharoro & Ikeanyi, 2006; Mutyaba et al., 2006; Oran-ratanaphan et al., 2010). The results of this project cannot easily be compared to other cervical cancer intervention programs because this project specifically addressed education of unlicensed registration staff as a

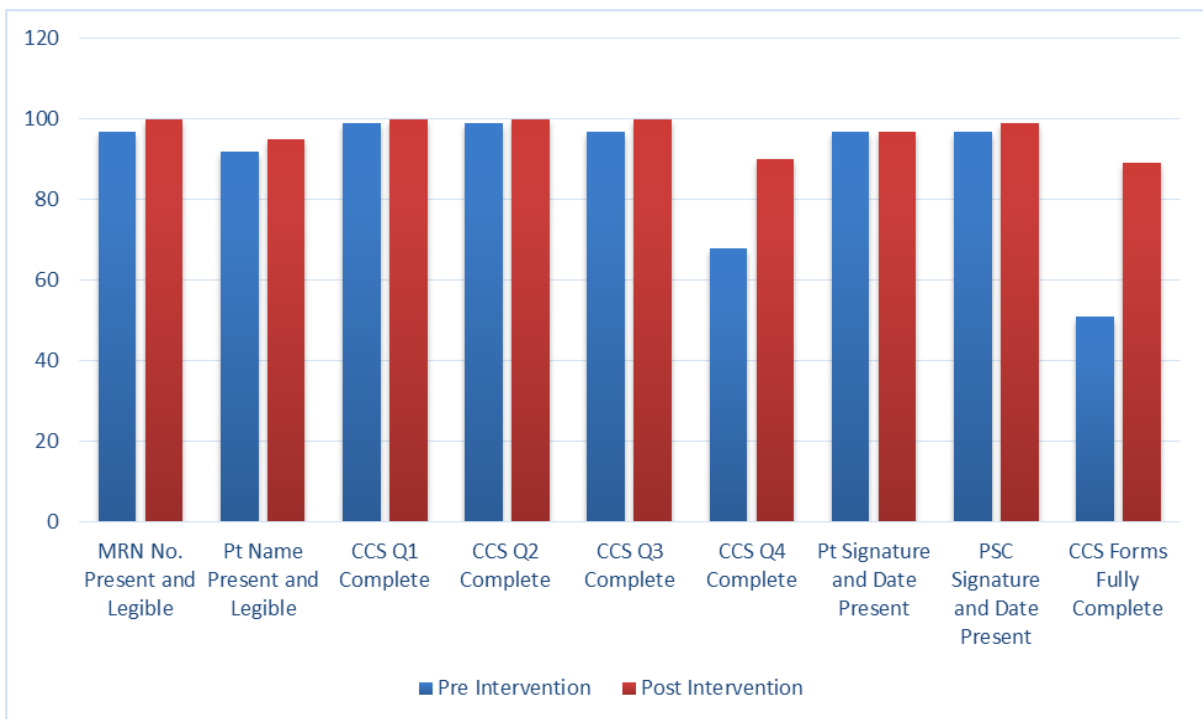


Figure 2. Item Responses to CCAM questions before and after the educational intervention (n=65)

Note. MRN = Medical Record Number. CCS = Cervical Cancer Screening. Q= Question. PSC = Patient Service Coordinator.

strategy to improve screening compliance at AMCs. However, several studies that stressed the importance of educating Lay Health Workers (LHW) to effectively screen women in community setting. Both providers and researchers have used utilized LHWs to improve health promotion and disease prevention in diverse community populations. LHWs support the value of cultural competence and cultural sensitivity efforts through education. The use of LHWs has been shown to provide an effective public health approach to bring early detection services and necessary resources to patients (English, Merzel, & Moon-Howard, 2010; Gwede et al., 2013; Moore-Monroy et al., 2013; Spencer et al., 2011).

Stone et al. (2002) suggested that using incentives with education would enhance performance, collaboration and teamwork. The two case studies presented during the educational intervention of women admitted to non-gynecological units with subsequent diagnoses of gynecological malignancies after receiving screening through the CCSP most likely solidified the importance of screening for the PSCs. Education and incentive strategies will be used to sustain the current CCSP compliance rate, and improve the percentage, and the rate of screening compliance.

(Methodological Issues) limitations

One limitation of this work occurred in the random audit performed in November, 2012 because the gynecology department was not included in this data and bias could have potentially contributed to the calculated percentage. The data was based upon a convenience sample because all 60 PSCs were not available to participate in the educational intervention. The PSCs that participated may not reflect the knowledge and awareness of all members of the PSC cadre. Attrition over time also led to a change in PSC numbers. Screening percentage results that occurred immediately prior to the implementation of the evidence-based project reflect more rigorous results when compared to screening results conducted during the random November audit.

Recommendations to Improve This Program

The information supplied during the educational intervention, along with the incentive educational strategy, will be used to sustain the current rate of compliance, and hopefully improve the compliance percentage. These strategies will be used during orientation for new employees, and will become an integral part of annual skill reviews in an e-learning format. Educating super-users or champions would benefit new and existing employees. Ogrinc et al. (2012) reported that innovators are responders who possess a passion for the information or change presented. PSCs that are innova-

tors should be identified and offered the super-user/champion role with responsibility to work with resistant team members or those needing education. This will ultimately promote an increase in cervical cancer screening compliance. The CCSC will work with the Admissions Department to determine if variables beyond a lack of education exist or develop that impede screening. An anonymous survey will be administered to all PSCs to review variables (unfavorable attitudes, work-load etc) that may prohibit cervical cancer screening from completion.

The departments of Admissions and Gynecology and Obstetrics are working in tandem to convert the current screening paper screening form into an electric format. This will not only improve efficiency but will also contribute to accuracy because a hard stop will be placed on each item to prevent the PSC from advancing without entering data. The electronic format will require adjustments to support the pediatric department because this department has few eligible patients for screening. One option is the creation of an automated 'trigger' or 'flag' to alert the pediatric PSC to screen all female patients over the age of 18 to assure compliance with the Maryland mandate. An Inter-professional team (information technology, risk management, the CCSP nurse, and admission staff) will review changes to the screening form or process to contemporize the program.

Public health specialists around the world concur cervical cancer screening is not at a desired level. Inpatient cervical cancer screening programs can provide an organized approach to reach underserved women (Boyce et al., 1981; Duncan and Parker, 1981; Du Toit and Van Niekerk, 1978; Foley, 1987; Hudson, Hewerston, Jansz, & Gordon, 1983; Straton et al., 1995; Trimble et al., 2004). Several risk factors: immunosuppression, Chlamydia, age, low-socio-economic status, smoking, and sexually activity predispose women to cervical cancer. High-risk HPV types are considered the most important risk factor that leads to cervical cancer (American Cancer Society, 2014). The CCSP described in this document is comprised of a team of licensed health care professionals (nurses and physicians) and unlicensed (registration staff) and demonstrates an effective approach to screen at-risk women.

Future Project

While this pioneer cervical cancer screening inpatient program is exclusive to the Maryland area, it can serve as a model for other hospitals that want to implement a similar inpatient service. The authors recognize that there was an increase in screening compliance; however, there is room for screening improvement. The results from this project demonstrated a

screening compliance percentage increase of 20%, which suggests a need for a follow-up study to evaluate screening adherence. One strategy that can be used to evaluate this trend would be through an audit of admission rates with screening forms. The CCSC could facilitate continued collaboration with admissions to ensure reports are accessible.

Conclusion

This project demonstrated that an educational intervention for registration staff at an AMC increased in screening compliance, knowledge of cervical cancer and the Maryland mandate. The educational intervention provided new knowledge and led to a deeper level of familiarity with cervical cancer, screening, and the Maryland mandate, in addition to expansion of the comprehensive role of the PSC within the CCSP. This project should be viewed as one opportunity to increase Inter-professional collaboration, and ultimately to promote preventive care in the hospital setting.

Acknowledgements

The authors thank Jeanne Ten Broeck, Marida Twilley, Lindsey MacNeil and Jennifer Day for their enthusiastic assistance with the editorial review, data analysis, and diagram configuration.

Reference:

- American Cancer Society 2014 What are the risk factors for cervical cancer? American Cancer Society (2014). What are the risk factors for cervical cancer? Retrieved from <http://www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-risk-factors> 20140810155816230614066
- American College of Obstetricians and Gynecologists (2012). Practice Bulletin Number 131 - Screening for Cervical Cancer. *Obstetrics & Gynecology*, 120(5), 1222-1238. doi: <http://10.1097/AOG.0b013e318277c92a>
- Boyce, J., Fruchter, R., Thompson, M., Conly, C., Jones, M., Maloney, J., & Bloomfield, R. (1981). Cervical cancer screening: Need among hospital inpatients. *NY State Journal of Medicine*, 81(3), 331-333.
- Centers For Disease Control And Prevention 2012 Cervical cancer screening Centers for Disease Control and Prevention. (2012). Cervical cancer screening. Retrieved February 3, 2013, from http://www.cdc.gov/cancer/cervical/basic_info/screening.htm
- Cook N Hart A Nuttall K Simpson K Turnill N Grant-Pearce C Dey P 2011 telephone survey of cancer awareness among frontline staff. Informing training needs. Cook, N., Hart, A., Nuttall, K., Simpson, K., Turnill, N., Grant-Pearce, C.,... Dey, P. (2011). A telephone survey of cancer awareness among frontline staff. Informing training needs. *British Journal of Cancer*, 105(4), 340-345. doi:10.138/bjc.2011.258
- Daley E Alio A Anstey E H Chandler R Dyer K Helmy H 2011 Examining barriers to cervical cancer screening and treatment in Florida through a social-ecological lens. Daley, E., Alio, A., Anstey, E. H., Chandler, R., Dyer, K., & Helmy, H. (2011). Examining barriers to cervical cancer screening and treatment in Florida through a social-ecological lens. *Journal of Community Health*, 36(1), 121-131. doi:10.1007/s10900.010-9289-7
- Du Toit J P Van Niekerk W A 1978 Cervical cytologic screening among females with nongynecologic hospital admissions. Du Toit, J. P., & van Niekerk, W. A. (1978). Cervical cytologic screening among females with nongynecologic hospital admissions. *Obstetrics and Gynecology*, 51(3), 342-346. doi:10.1097/00006250-197803000-00019 201405082042371265300512
- Duncan G R Parker R E 1981 Cervical cytology screening among females of non-gynaecological hospital inpatients. Duncan, G. R., & Parker, R. E. (1981). Cervical cytology screening among females of non-gynaecological hospital inpatients. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 21(2), 113-115. doi:10.1111/j.1479-828x.1981.tb00794.x 201405081859471750533343
- English K C Merzel C Moon-Howard J 2010 Translating public health knowledge into practice: Development of a lay health advisor perinatal tobacco cessation program. English, K. C., Merzel, C., & Moon-Howard, J. (2010). Translating public health knowledge into practice: Development of a lay health advisor perinatal tobacco cessation program. *Journal Public Health Management and Practice*, 16(3), E9-E19. doi:10.1097/PHH.0b013e3181af6387 2014061120225772441458
- Eversole G M Moriarity A T Schwartz M R Clayton A C Souers R Fatheree L A Wilbur D C 2010 Practices of participants in the colleges of American Pathologists interlaboratory comparison program in cervicovaginal cytology, 2006. Eversole, G. M., Moriarity, A. T., Schwartz, M. R., Clayton, A. C., Souers, R., & Fatheree, L. A.,... Wilbur, D. C. (2010). Practices of participants in the Colleges of American Pathologists Interlaboratory comparison program in cervicovaginal cytology, 2006. *Archives of Pathology & Laboratory Medicine*, 134(3), 331-335. doi:10.431/543-2145-134.3.331
- Fisher R Donohoe E 1988 Emerging trends in clinical preventive services: State health care coverage laws and employees wellness benefits. Fisher, R., & Donohoe, E. (1988). Emerging trends in clinical preventive services: State health care coverage laws and employees wellness benefits. Washington, DC: Intergovernmental Health Project, George Washington University.
- Foley S F 1987 Preventive gynecologic nursing in an inpatient setting. Foley, S. F. (1987). Preventive gynecologic nursing in an inpatient setting. *JOGNN*, 16(3), 160-166. doi:10.1111/j.1552-6909.1987.tb01452.x 201405082034561255049586
- Gharoro E P Ikeanyi E N 2006 appraisal of the level of awareness and utilization of the Pap smear as a cervical cancer screening test among female health workers in a tertiary health institution. Gharoro, E. P., & Ikeanyi, E. N. (2006). An appraisal of the level of awareness and utilization of the Pap smear as a cervical cancer screening test among female health workers in a tertiary health institution. *International Journal of Gynecological Cancer*, 16(3), 1063-1068.
- Gwede, C. K., Ashley, A. A., McGinnis, K., Montiel-Ishino, A., Standifer, M., Baldwin, J.,... Green, B. L. (2013). Designing a community-based lay health advisors training curriculum to address cancer health disparities. *Health Promotion Prac-*

- tice, 14(3), 415-424. doi:10.1177/1524839912458675
- Han H R Kim J Lee J E Hedlin H K Song Y Kim M T 2011 Interventions that increase use of Pap tests among ethnic minority women: a meta-analysis. Han, H. R., Kim, J., Lee, J. E., Hedlin, H. K., Song, Y., & Kim, M. T. (2011). Interventions that increase use of Pap tests among ethnic minority women: a meta-analysis. *Psychooncology*, 20(4), 341-351. doi:10.1002/pon.1754
- Hudson S Hewerston S Jansz C Gordon H 1983 Screening hospital patients for uterine cervical cancer. Hudson, S., Hewerston, S., Jansz, C., & Gordon, H. (1983). Screening hospital patients for uterine cervical cancer. *Journal of Clinical Pathology*, 36(6), 611-615. doi:10.1136/jcp.36.6.611 20140508190254940195680
- MD. Code Ann. Health Gen. Law § 19-348 (2012). Examination for cervical cancer; mammography materials. Retrieved from <http://www.lexisnexis.com/hottopics/mdcode/>
- Moore-Monroy, M., Wilkinson-Lee, A. M., Verdugo, L., Paez, L., Rodriguez, D., Wilhelm, M., & Garcia, F. (2013). Addressing the information gap: Developing and implementing a cervical cancer prevention education campaign grounded in principles of community-based participating action. *Health Promotion Practice*, 14(2), 274-283. doi:10.1177/1524839912454141
- Mutyaba T Mmiro F A Weiderpass E 2006 Knowledge, attitudes and practices in cervical cancer screening among the medical workers of Mulaga Hospital, Uganda. Mutyaba, T., Mmiro, F. A., & Weiderpass, E. (2006). Knowledge, attitudes and practices in cervical cancer screening among the medical workers of Mulaga Hospital, Uganda. *Bio Med Central Medical Education*, 6(13), 1-4. doi:10.1186/1472-6920-6-13
- National Cancer Institute 2010 Cancer advances in focus- Cervical cancer. National Cancer Institute. (2010). Cancer advances in focus- Cervical cancer. Retrieved February 3, 2013, from <http://www.cancer.gov/cancertopics/factsheet/cancer-advances-in-focus/cervical>
- Oranratanaphan S Amatyakul P Iramaneera T K Srithipayawan S 2007 Knowledge, attitudes and practices about the Pap smear among medical workers in Naresuan University Hospital. Oranratanaphan, S., Amatyakul, P., Iramaneera, T. K., & Srithipayawan, S. (2010). Knowledge, attitudes and practices about the Pap smear among medical workers in Naresuan University Hospital. *Asian Pacific Journal of Cancer Prevention*, 11(6), 1727-1730.
- Richards L A Klemm P 2000 inpatient cervical cancer screening program to reach underserved women. Richards, L. A., & Klemm, P. (2000). An inpatient cervical cancer screening program to reach underserved women. *Journal of Obstetrics Gynecologic and Neonatal Nursing*, 29(5), 465-473. doi:10.1111/j.1552-6909.2000.tb02767.x
- Sasieni P Castanon A Cusick J 2009 Effectiveness of cervical cancer screening with age, population based case control of prospectively recorded data. Sasieni, P., Castanon, A., & Cusick, J. (2009). Effectiveness of cervical cancer screening with age, population based case control of prospectively recorded data. *British Medical Journal*, 339(b2968), 1-7. doi:10.1136/bmj.b2968
- Saslow D Solomon D Lawson H W Killackey M Kulasingam S L Cain J The ACS-ASCCP-ASCP Cervical Cancer Guideline Committee 2012 American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology Screening guidelines for the prevention and early detection of cervical cancer. Saslow, D., Solomon, D., Lawson, H. W., Killackey, M., Kulasingam, S. L., Cain, J., ... The ACS-ASCCP-ASCP Cervical Cancer Guideline Committee (2012). American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology Screening guidelines for the prevention and early detection of cervical cancer. *CA: A Cancer Journal for Clinicians*, 62(3), 147-172. doi:10.1309/AJCPTGD94EVR5JCG
- Sargeant, E. J., Qizilbash, A. H., & Johnson, F. L. (1977). Cervical cytology: Experience of a general hospital. *Canadian Medical Association Journal*, 117(9), 1026-1027.
- Spencer M S Rosland A Kieffer E C Sinco B R Valerio M Palmisano G Heisler M 2011 Effectiveness of a community health worker intervention among African American and Latino adults with type 2 diabetes: A randomized control trial. Spencer, M. S., Rosland, A., Kieffer, E. C., Sinco, B. R., Valerio, M., Palmisano, G., ... Heisler, M. (2011). Effectiveness of a community health worker intervention among African American and Latino adults with type 2 diabetes: A randomized control trial. *American Public Health Association*, 101(2), 2253-2260. doi:10.2105/AJPH.2010.300106 2014061120303411458635
- Stone E G Morton S C Hulscher M E Maglione M A Roth E A Grimshaw J 2002 Interventions that increase use of adult immunization and cancer screening services. Stone, E. G., Morton, S. C., Hulscher, M. E., Maglione, M. A., Roth, E. A., & Grimshaw, J. (2002). Interventions that increase use of adult immunization and cancer screening services. *Annals of Internal Medicine*, 7(136), 641-651.
- Straton J A Sutherland G J Hyndman J C 1995 Cervical cancer screening for hospital inpatients: Report of an intervention study. Straton, J. A., Sutherland, G. J., & Hyndman, J. C. (1995). Cervical cancer screening for hospital inpatients: Report of an intervention study. *Australian Journal of Public Health*, 19(3), 288-293. doi:10.1111/j.1753-6405.1995.tb0045.x 20140508185707758629203
- Subramanian S Trogdon J Ekwueme D U Gardner J G Whitmire J T Rao C 2010 Cost of cervical cancer treatment: Implications for providing coverage to low-income women under the Medicaid expansion for cancer care. Subramanian, S., Trogdon, J., Ekwueme, D. U., Gardner, J. G., Whitmire, J. T., & Rao, C. (2010). Cost of cervical cancer treatment: Implications for providing coverage to low-income women under the Medicaid expansion for cancer care. *Womens Health Issues*, 20(6), 400-405. doi:10.1016/j.whi.2010.07.002
- Trimble C L Richards L A Wigus-Wegweiser B Plowden K Rosenthal D Klassen A 2004 Effectiveness of screening for cervical cancer in the inpatient hospital setting. Trimble, C. L., Richards, L. A., Wigus-Wegweiser, B., Plowden, K., Rosenthal, D., & Klassen, A. (2004). Effectiveness of screening for cervical cancer in the inpatient hospital setting. *Obstetrics and Gynecology*, 103(2), 310-316. doi:10.1097/01.AOG.0000109209
- WHO/ICO Information Centre 2010 Human papillomavirus and related cancers in world. Summary report 2010. WHO/ICO Information Centre (2010). Human papillomavirus and related cancers in world. Summary report 2010. Retrieved February 3, 2013, from <http://who.int/hpvcentre>

Annexure

Disclaimer

This survey instrument (the Cervical CAM) was developed by the UCL Health Behaviour Research Centre, in collaboration with the Department of Health Cancer Team and The Eve Appeal, with funding from The Eve Appeal. It forms part of the Cervical Cancer Awareness and Symptoms Initiative (CCASI). It is based on a generic CAM developed by Cancer Research UK, University College London, King’s College London and Oxford University

Cervical Cancer Awareness Measure Questions

Question 1

There are many warning signs and symptoms of cervical cancer. Please name as many as you can think of.....”

Question 2

The following may or may not be warning signs of cervical cancer. We are interested in your opinion...”

	YES	NO	Don’t Know
Do you think vaginal bleeding between periods could be a sign of cervical cancer?			
Do you think persistent lower back pain could be a sign of cervical cancer?			
Do you think a persistent vaginal discharge that smells unpleasant could be a sign of cervical cancer?			
Do you think menstrual periods that are heavier or longer than usual could be a sign of cervical cancer?			
Do you think persistent diarrhea could be a sign of cervical cancer?			
Do you think vaginal bleeding after menopause could be a sign of cervical cancer?			
Do you think persistent pelvic pain could be a sign of cervical cancer?			
Do you think vaginal bleeding during or after sex could be a sign of cervical cancer?			
Do you think blood in the stool or urine could be a sign of cervical cancer?			
Do you think unexplained weight loss could be a sign of cervical cancer?			

Question 3

If you had a symptom that you thought might be a sign of cervical cancer how soon would you contact your doctor to make an appointment to discuss it? (Leave blank if you are a male)

Question 4

In the next year, who is most likely to develop cervical cancer in the US?	
A woman aged 20-29 years	<input type="checkbox"/>
A woman aged 30 to 49 years	<input type="checkbox"/>
A woman aged 50-69 years	<input type="checkbox"/>
A woman aged 70 years or over	<input type="checkbox"/>
Cervical cancer is unrelated to age	<input type="checkbox"/>

Question 5

What things do you think affect a woman's chance of developing cervical cancer? (Risk Factors)

Question 6

The following may or may not increase a woman's chance of developing cervical cancer. How much do you agree that each of these can increase a woman's chance of developing cervical cancer	Strongly disagree	Disagree	Not sure	Agree	Strongly Agree
Infection with HPV (human papillomavirus)					
Smoking cigarettes at all					
Having a weakened immune system (e.g. because of HIV/AIDS immunosuppressant drugs or having a transplant)					
Long term use of the contraceptive pill					
Infection with Chlamydia (a sexually transmitted infection)					
Having a sexual partner who is uncircumcised					
Starting to have sex at a young age (before age 17)					
Having many sexual partners					
Having many children					
Having a sexual partner with many previous partners					
Not going for regular (Pap) tests					

Question 7

How confident are you that you would notice a cervical cancer symptom	Not at all confident	Not very confident	Fairly confident	Very confident
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question 8

How important is cervical cancer screening to you	Not at all important	Not very important	Fairly important	Very important
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Question 9

Define the Maryland cervical cancer mandate

Question 10

	Yes	No	Don't know
As far as you are aware, is there a vaccination to protect against cervical cancer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, at what age is this offered?	_____		<input type="checkbox"/>

Additional Post Test Questions

Were the stories heard during the educational inservice beneficial to you?	
Strongly agree	<input type="checkbox"/>
Somewhat agree	<input type="checkbox"/>
Neither agree or disagree	<input type="checkbox"/>
Somewhat disagree	<input type="checkbox"/>
Strongly disagree	<input type="checkbox"/>

Are the stories presented in the educational inservice an incentive for you to encourage Pap testing when you screen patients?	
Strongly agree	<input type="checkbox"/>
Somewhat agree	<input type="checkbox"/>
Neither agree or disagree	<input type="checkbox"/>
Somewhat disagree	<input type="checkbox"/>
Strongly disagree	<input type="checkbox"/>