Is the Electronic Health Record the Answer to Improving Patient Compliance with Recommended Health Interventions?

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THE MORTALITY RATE FROM CERVICAL CANCER has decreased 70% since the implementation of routine screening with Papanicolaou (Pap) tests in the United States in the 1950s.^{1,2} This has been achieved through the identification and treatment of precursor lesions before the development of cancer and the identification of early stage cancer when it is still curable. Over the past few decades, we have seen the development of more sensitive tests, first with liquid-based cytology, and more recently with testing for the causative agent of cervical cancer, human papilloma-virus (HPV).

Despite these screening efforts, we have not been able to eradicate the disease. This is due to the large number of women who remain unscreened, or who do not get the proper diagnostic evaluation, treatment, or follow-up when a cervical cancer precursor is diagnosed. Given the ability of optimal screening and treatment to prevent cervical cancer, it is not surprising that cervical cancer disproportionately affects women with limited access to healthcare, namely uninsured and underinsured women, those in lower socioeconomic classes, and minorities.^{3–5} As healthcare providers, we need to continue to advocate for health coverage for all patients so that they can receive the necessary preventive healthcare and decrease their risk of life-threatening diseases.

Once women have access to cervical cancer screening, the next crucial step in decreasing cervical cancer incidence is ensuring follow-up of abnormal tests so precursor lesions can be treated before they progress to cancer. This has become increasingly complex with each new set of management guidelines, as diagnostic testing is stratified by patient age, previous test results, and current screening strategy (cytology alone, cytology + HPV cotesting, and HPV subtyping).⁶ The United States Health and Human Services Department endorses the electronic health record as a way to improve healthcare quality, safety, and efficiency.⁷ Unfortunately the capabilities of the electronic health record are often underutilized. In this issue, MacLaughlin et al.⁸ describe the effect of a clinical decision support system implemented at three Mayo Clinic-affiliated primary care clinics to electronically track abnormal Pap test results and missed patient appointments. These data are then used to prompt clinicians to generate electronic or letter patient reminders. Compared with historical controls, MacLaughlin

and colleagues report improving test completion rates more than eightfold ($p < 0.001$). Of those who presented for their delayed visits, one-third (36%) had high-grade cervical dysplasia that required excisional treatment, significantly decreasing cervical cancer risk for these four women. Furthermore, as this problem and solution are not unique to Pap testing, the clinical decision support described could be expanded to other screening tests and improve overall patient health.

Although the study authors should be congratulated for their development of an effective clinical decision support system, they acknowledge that the intervention only increased the test completion rate to 24%. Other studies testing the effect of electronic health record reminders for health maintenance tasks such as cervical, breast, and colon cancer screening have shown similar statistically significant but clinically modest improvements.^{9–11} Another study evaluating the effect of electronic health record-generated reminders with or without telephone assistance from a medical assistant and/or nurse-drive healthcare navigation showed that the effect of the automated reminders was significantly improved with increasing levels of clinical staff support.¹² These results suggest that clinical decision support is only the first step in improving patient compliance with recommended tests, but that a dedicated clinical staff is still essential to changing patient behavior.

Lastly, the dissemination of MacLaughlin and colleagues' intervention⁸ is likely to be limited. The algorithm is complex and requires natural language processing to extract the necessary results. The clinical decision support system is an external program that interfaces with the electronic health record. It is unclear whether the external clinical decision support system will be available to other health systems, or whether it will be able to interface with electronic health record systems other than that used by the clinics affiliated with the Mayo Clinic. This study provides proof of concept, and we should remain optimistic that similar clinical decision support will be available to all electronic health record systems in the future. However, even robust clinical decision support is only a portion of improving patient compliance with healthcare recommendations, and cannot completely replace personal interaction with clinic staff.

Author Disclosure Statement

No competing financial interests exist.

References

1. Christopherson WM, Lundin FE Jr, Mendez WM, Parker JE. Cervical cancer control: A study of morbidity and mortality trends over a twenty-one-year period. *Cancer* 1976; 38:1357–1366.
2. Siegel R, Naishadham D, Jemal A. Cancer statistics, 2012. *CA Cancer J Clin* 2012;62:10–29.
3. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2017. *CA Cancer J Clin* 2017;67:7–30.
4. Stanley SL, Thomas CC, King JB, Richardson LC. Predictors of never being screened for cervical cancer by metropolitan area. *J Community Health* 2014;39:400–408.
5. Froment MA, Gomez SL, Roux A, DeRouen MC, Kidd EA. Impact of socioeconomic status and ethnic enclave on cervical cancer incidence among Hispanics and Asians in California. *Gynecol Oncol* 2014;133:409–415.
6. Massad LS, Einstein MH, Huh WK, et al. 2012 updated consensus guidelines for the management of abnormal cervical cancer screening tests and cancer precursors. *Obstet Gynecol* 2013;121:829–846.
7. HealthIT.gov. Policymaking, regulation, & strategy: Health IT legislation and regulations. 2014. Available at: www.healthit.gov/policy-researchers-implementers/health-it-legislation-and-regulations Accessed December 4, 2017.
8. MacLaughlin K, Komandur Elyavilli R, Hickey B, et al. Impact of patient reminders on Papanicolaou test completion for high-risk patients identified by a clinical decision support system. *J Womens Health* 2018;27:569–574.
9. Krist AH, Woolf SH, Rothenich SF, et al. Interactive preventive health record to enhance delivery of recommended care: A randomized trial. *Ann Fam Med* 2012;10: 312–319.
10. Sequist TD, Zaslavsky AM, Colditz GA, Ayanian JZ. Electronic patient messages to promote colorectal cancer screening: A randomized controlled trial. *Arch Intern Med* 2011;171:636–641.
11. Wright A, Poon EG, Wald J, et al. Randomized controlled trial of health maintenance reminders provided directly to patients through an electronic PHR. *J Gen Intern Med* 2012; 27:85–92.
12. Green BB, Wang CY, Anderson ML, et al. An automated intervention with stepped increases in support to increase uptake of colorectal cancer screening: A randomized trial. *Ann Intern Med* 2013;158:301–311.

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