

TRACKING ABNORMAL CERVICAL CANCER SCREENING FOLLOW-UP

Good Samaritan Health Center

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Fay Stephens

Breanna Lathrop

Jocelyn McKenzie



Good Samaritan
Health Center

EXECUTIVE SUMMARY

Background:

Screening for abnormal cervical cells through the use of Pap tests has contributed to a reduction in the death rate due to cervical cancer in recent years as it allows for detection and action to be taken against early signs of the disease. However, failure to follow-up with detected abnormalities remains a substantial barrier to further reducing the burden of cervical cancer in the United States, especially among low-income and minority populations.

The Challenge:

The Good Samaritan Health Center provides holistic health services to the medically underserved of Atlanta, Georgia. One aspect of the comprehensive care provided by the clinic is cervical cancer screening with Pap tests for all women within the age range at risk of cervical cancer. The clinic uses an electronic medical record (EMR) system for all of its record keeping, which enables efficient entry and storage of all details regarding patient care and follow-up. However, this system lacks a comprehensive way to track all details regarding follow-up with patients after receiving an abnormal cervical cancer screening. Using the EMR system alone to track follow-up with these patients leaves critical gaps in information flow that create the potential for failure to ensure each patient with an abnormal Pap test receives the appropriate follow-up care.

The Solution:

Patient and practice-level barriers to appropriate follow-up exist. The practice-level barriers to improved follow-up treatment rates can be addressed by designing a comprehensive and interactive tracking system for all abnormal pap test results. The Good Samaritan Health Clinic here proposes a solution that operates independently of the EMR in use at a clinic that can be adopted by any facility with access to Microsoft Excel software.

The Abnormal Pap Tracking System was designed to track all information regarding patient care following an abnormal Pap test. It includes all relevant follow-up care details, from the initial abnormal screening result through the patient's return to routine screening. The system not only tracks this information but additionally uses a color-coding scheme to visually identify patients in need of immediate follow-up action in the case of a severe abnormality, a missed follow-up appointment, or procedure results remaining unviewed in the EMR. The system records information from every necessary area of follow-up care, including receipt of initial abnormal pap test results from the laboratory, notification of the patient, scheduling and completion of the initial follow-up visit, and scheduling and completion of all relevant continuing care according to clinical guidelines for the patient's grade of abnormality.

This system can be integrated into clinic workflow with minimal additional administrative burden. Once successfully in-place, the Abnormal Pap Tracking System ensures that Good Samaritan patients with abnormal cervical cancer screening results receive the appropriate follow-up care, allowing providers to proceed confidently and promoting high quality, evidence based care.

INTRODUCTION

Papanicolaou (Pap) tests possess life-saving power to detect and prevent the development of cervical cancer in women. However, they are only as effective as the rate of follow-up for abnormal results. According to The American Cancer Society, the death rate of cervical cancer has dropped by more than 50% over the last 30 years, due largely to the increased use of Pap tests to screen for early signs of the disease¹. However, it is also predicted that in 2016, there will be almost 13,000 new cases and over 4,000 deaths due to invasive cervical cancer¹. Great improvements have been made in detecting and preventing cases of cervical cancer, but failure to follow-up with all detected abnormalities remains a barrier to reducing the burden of this disease on women in the United States, especially among low-income and minority populations². Improving follow-up among women with abnormal Pap tests requires a coordinated and comprehensive tracking program. Good Samaritan Health Center developed an abnormal tracking system to promote appropriate follow up among low-income women presenting with cytology and/or HPV abnormalities on Pap tests. The goal of the program was to increase the detection and appropriate management of precancerous and cancerous cervical lesions. This paper outlines the development and use of the tracking system for abnormal Pap test results and follow-up in place at Good Samaritan.

Good Samaritan's Patient Population

The Good Samaritan Health Center provides comprehensive, holistic health care to medically underserved patients in Atlanta, Georgia. The clinic provides a full range of services, including medical, dental, mental health, nutritional, specialty, and health education services to individuals and families at or below 200% of the federal poverty level. The majority of the clinic's population are Hispanic and African American patients, many of whom have little to no access to health insurance and very few options for affordable health care. Cervical cancer screenings are one of the many services the clinic offers women as part of their comprehensive care.

According to the American Cancer society, cervical cancer is most prevalent among racial minorities in America, who also tend to have the least access to preventative health care¹. The age adjusted incidence rate of cervical cancer for Hispanic (10.2 per 100,000) and African American (10 per 100,000) women in the United States from 2008-2012 was significantly higher than that of non-Hispanic whites (7.1 per 100,000)³. Additionally, the death

rate of cervical cancer among African American women was twice that of non-Hispanic white women from 2008-2012³.

Despite their higher rates of disease and mortality due to cervical cancer, minority populations face reduced access to preventative health care and treatment, deepening the disparity in the burden of disease among minority populations in the United States. According to the U.S. Department of Health and Human Services, African Americans and Hispanics were less likely than whites to have health insurance. Approximately 12% of non-elderly African American populations in the United States and 17% of Hispanic populations were uninsured in 2015, compared with 8% of white populations⁴. This disparity is even larger in the state of Georgia, where approximately 16% of African American populations and 30% of Hispanic populations lacked health insurance coverage in 2015⁴. In addition to lack of health insurance as a barrier to care, many patients who speak Spanish at home face an additional language barrier when seeking care with providers who do not speak Spanish or provide translation services for patients⁵.

Lack of health insurance coverage and access to care among minority and low-income populations contribute to an increased risk of inadequate follow-up for an abnormal cervical cancer screening. Data from a cohort of predominantly urban minority women in Boston, MA with abnormal cervical cytology from 1999 to 2000 found that the overall rate of inadequate follow-up for abnormal Pap tests was approximately 38%². This patient population indicated significant associations between inadequate abnormal Pap follow up and several risk factors, including lack of insurance or having public insurance and younger age². The study population is similar to Good Samaritan's patient population in several important ways, including the proportion of minority and uninsured or publicly insured patients. Data from a large (N= 3,713,531) retrospective cohort study conducted in Ontario, Canada, from 2008-2010 indicated that the rate of follow-up after a high-grade lesion on a Pap test was approximately 30% lower among women in the lowest income quintile compared to those in the highest income quintile⁶. A significant additional body of literature exists supporting the conclusion that minority populations are at an increased risk for inadequate follow-up for abnormal Pap tests⁷. Innovative strategies are critical to improve rates of follow-up for abnormal cervical cancer screenings and reduce the burden of cervical cancer among medically underserved racial minority and low-income populations.

Cervical Cancer Screenings and Electronic Medical Records

In a health clinic that provides such a wide variety of services as the Good Samaritan Health Center, a comprehensive system in which all details of patient interactions, from appointment scheduling through communication and follow-up with results, is critical to providing quality care. The development of Electronic Medical Record (EMR) systems has changed the landscape of health care for the better. The benefits of the use of EMR's are extensive, including increased quality of care, improvements in efficiency, improved financial

and operational performance, and increased capacity for research and improvements in population-level health⁸. However, these systems are not perfect. Despite the benefits they provide, EMR's can also have unintended negative consequences on health care delivery, including the potential for increased medical errors and disruption of work flow for medical staff and providers⁸.

Screening and follow-up for cervical cancer has both benefitted from and been affected by the unintended consequences of an EMR. The Good Samaritan clinic's EMR system allows for much of the data regarding abnormal Pap follow-up to be completed and recorded in an efficient manner. For example, the receipt, labelling, and matching to patient charts of Pap test results is much quicker and less labor-intensive with the help of the EMR. However, the automatization of this record-keeping process leaves room for error in labeling and movement of documents that can cause results to be lost in the system and remain uncommunicated to patients for extended periods of time. In addition, incomplete records of all relevant information in a patient's abnormal screening history (for example, lack of permanent record of missed appointments) can cause loss to follow-up of patients, even after they are notified of abnormal results. The EMR does not prompt providers or staff when an abnormal lab result or missed appointment slips through the cracks, leaving potentially life-altering information hanging in the balance without guarantee of discovery.

The complexity and automatization of the EMR system increases the efficiency of care at Good Samaritan, but it also provides opportunities for abnormal cervical cancer screening results to go unseen by the relevant provider and therefore uncommunicated to the patient. In the face of these barriers to complete patient follow-up after an abnormal Pap test, a need exists for a comprehensive system that enables detailed record-keeping of all relevant information to patient follow-up after receiving an abnormal Pap test result through completion of care for the abnormality.

THE CHALLENGE

Tracking Follow-Up for Abnormal Pap Tests

Lack of adequate abnormal Pap test follow-up is influenced by multiple factors. Some of these factors exist at the patient-level, including various reasons for failure to schedule or make follow-up appointments such as the prioritization of other life events, and limited understanding of the significance of the abnormality⁷. There are also practice-level factors that influence abnormal Pap test follow-up rates. Examples of such factors include results lost in the EMR system and failure to follow-up with patients after missed appointments for further testing and care⁷. The practice-level factors can be addressed through the development of a systematic tracking system for abnormal Pap test result follow-up.

The most ideal tracking system for follow-up for abnormal cervical cancer screenings would be integrated within the EMR system that is already in use at a health center. Good Samaritan's EMR system, however, currently lacks the capacity to fully track all relevant details and close all potential gaps regarding patient follow-up. One published model for tracking follow-up operates entirely within the clinic's EMR through a combination of reports and an embedded Pap test tracking table⁷. While this system is efficient and desirable in its full integration with the EMR system, it is unfortunately not applicable to clinics with EMRs which do not use similarly flexible reporting processes or features. With over 400 EMR system options on the market⁹, designing a solution for tracking abnormal cervical cancer screening follow up exclusively within individual clinics' EMR poses a significant challenge.

Despite a multitude of acknowledgements of the increased risk of loss to follow-up among minority and low-income populations and the publication of individual-level approaches to this problem, the need remains for a system that can be widely used to fill the potential gaps left by EMR systems in patient follow-up while remaining compatible with clinic work flow and coordinating smoothly with different EMR systems.

Opportunities for Loss to Follow-Up

When Good Samaritan receives an abnormal Pap test result through the EMR system, there are several opportunities for loss to follow-up without a detailed tracking system for these abnormal results. After the lab returns Pap test results, the first step in the follow-up process is electronic results review by the provider and communication of results to the patient. This step typically occurs without difficulty, but it is critical to document when and how the patient was notified of the initial results and that any necessary follow-up care steps were communicated to the patient. Tracking this initial step allows for the identification of Pap tests that were not processed by the lab and promotes accurate documentation of review and notification.

Next, patients with abnormal results need to be scheduled for the appropriate follow up visit. Multiple opportunities exist for missed follow up visits when relying on the EMR system alone. Many patients will call and make an appointment for a repeat pap test or a colposcopy as a result of their provider's explanation of their initial abnormal result. However, relying solely on patients to make their own appointments results in a significant proportion of women failing to schedule follow-up and receive the necessary care. Additionally, the current recommended testing protocol from the American Society for Colposcopy and Cervical Pathology (ASCCP) of a one-year follow-up for most low-grade abnormalities with negative HPV results or HPV positive results without cervical abnormality increases the importance of ensuring patients schedule and attend these critical repeat testing visits after a year passes¹⁰. It is important to track not only the scheduling of a follow-up appointment but also to record that this appointment was met by the patient. Without this step in a separate tracking system,

missed appointments disappear from the schedule in the EMR system, creating the potential for significant delays in critical follow-up care.

Once the patients have successfully scheduled and met their follow-up appointment after an abnormal Pap, it is important to make sure that all results of subsequent testings are received by the clinic, reviewed by providers, and communicated to the patient. At the Good Samaritan Health Center, colposcopies are completed by volunteer gynecologists one or two days each month. Volunteer gynecologists typically have time to perform three to four colposcopies per day; hence it is critical in this setting to make sure patients are aware of and attend their appointment, as space is so limited. In addition, because the volunteer gynecologists attend the clinic only once per month, there is significant risk of loss to follow-up if the receipt of the results from their ordered labs is not tracked by Good Samaritan staff. Once results have been received and reviewed, it is then critical to record communication with patients of both follow-up Pap test and colposcopy results. Finally, any subsequent co-testing according to American Society for Colposcopy and Cervical Pathology guidelines needs to be tracked through the patient's return to routine screening. For many women, this involves three normal Pap tests after the initial follow-up testing requiring a detailed record to be kept over an extended period of time to ensure co-testing is met before patients are released to routine screening¹⁰. Finally, it is necessary to keep a record of each patient's history of abnormality even after returning to routine testing for future reference.

As detailed above, there are many opportunities for loss to follow up for women who receive an abnormal Pap test result, especially in a low-resource setting. A detailed tracking system maintained outside of the EMR system allows for records to be kept at each step in the process after a woman's initial abnormal cervical cancer screening. This provides protection of the practice through record of patient communication after each screening result, but most importantly, it allows for improved patient care by enabling busy providers to quickly track whether their patients are receiving the follow-up care critical to their health.

THE SOLUTION

To address this potential for failure in patient follow-up and ensure the best women's health care possible, an abnormal Pap tracking system was designed in Excel that functions independently of the medical record system. Given the challenges of Good Samaritan's specific EMR and the goal of developing a widely-usable format for tracking patient follow-up after an abnormal Pap test, the tracking system was designed in Excel in order to enable providers and support staff to quickly identify gaps in patient follow-up. This system tracks all details of patient follow-up after the initial abnormal Pap test result through their return to routine

screening, per current guidelines. This system utilizes conditional formatting in Excel to bring attention to the most time-sensitive test results and scheduling needs. It provides a visual aid, separate from the EMR, to ensure that no women are lost to follow-up at any point in the process.

The Excel Abnormal Pap Tracking System

The Abnormal Pap Tracking System, built in Excel, was designed by a Masters of Public Health student and is now maintained by the clinic staff. As such, it was designed to be as streamlined and user-friendly as possible, enabling ease of use and integration into the daily workflow of the clinic. It would be most ideal to track all details regarding cervical cancer screening follow-up in the electronic medical record system. However, the EMR utilized at Good Samaritan does not provide a comprehensive way to store all relevant information to women's follow-up care after receiving an initial abnormal Pap test. Excel was chosen as a platform for this tracking system because of its multiple functions that allow for data storage and manipulation in a user-friendly interface. Relevant patient data was abstracted from the EMR database and stored in the excel document. No patient data is included in the Excel tracking system that is not listed somewhere in the patient's EMR chart. However, the Excel sheet re-arranges this information into one easy row of data, whereas the corresponding information in the patient's electronic chart is spread out over multiple locations in their medical record and appointment history. The Excel tracking system is saved on the clinic's public drive which is accessible only by authorized users who are logged into a clinic computer.

The system was designed to include all relevant information to each patient's abnormal cervical cancer screening follow-up treatment and results in one convenient location. As such, several categories of key information are included for every patient, including basic demographics (name, patient ID, and date of birth) for identification, details regarding the nature of the patient's initial abnormal cervical cancer screening (the date, cytology result, and HPV result), record of notification of the initial abnormal result, whether a follow-up appointment has been scheduled and met with the appropriate provider, and any subsequent results and next steps based on follow-up screening results. Information is also included for any referrals for care beyond the scope of Good Samaritan Health Center's capacity, such as gynecological surgery referrals, as well as details of any patient communication that occurs regarding scheduling and follow-up after their initial abnormal screening.

This information is organized onto five main spread sheets in the Excel document. The first sheet keeps records of all patients awaiting follow-up from an initial abnormal result through the scheduling, appointment, and result-processing of the initial follow-up appointment or procedure following the abnormal Pap test result. The second sheet in the workbook keeps record of patients who have received an initial follow-up screening and need

to be followed through three more normal results before release back into routine screening. The third sheet details “closed cases”, where all patients’ records are moved once follow up is complete and their case is closed. This sheet is intended to contain both records of patients who were followed through three follow-up visits, or patients whose case was closed earlier and were only tracked on the initial follow-up page. An example of an early-closing case would be a patient whose initial abnormality was an unsatisfactory result on their initial pap test. Once they return to the clinic and receive a normal pap result, their case is closed out and they are returned to normal screening, as guidelines do not suggest following these patients yearly for three years. This feature allows for flexibility in the way each patient is tracked after their initial abnormal result. This is important because of the diverse range of recommended timing for repeat testing from the American Society for Colposcopy and Cervical Pathology, depending on the severity of the cervical abnormality and the presence or absence of HPV infection.

There is an additional fourth sheet in the workbook that retains all data collected from the “initial follow-up” sheet, when these patients are moved from initial to continued follow-up. The purpose of this sheet is to retain all data collected for the initial follow-up of the patient, as the continued follow-up sheet contains fewer categories of data for each visit to increase simplicity of the tracking system. After a patient receives their initial follow-up result, their row is completed in the “Initial Abnormal” sheet, the patient’s name and relevant data is added to the “Continued Follow-Up” sheet, and all data from the “Initial Abnormal” sheet for that patient is moved to the fourth sheet, “Moved to Continued Follow Up” for preservation of that record.

The final sheet in the workbook contains data on patients who are unresponsive to follow-up efforts by clinic staff. Occasionally, after every effort is made by clinic staff to contact and schedule patients for follow-up, patients fail to schedule or make their follow-up appointments. This sheet provides a detailed record of all attempts to contact patients to notify them of their abnormal results and the importance of follow-up care. In the rare event of a lack of response by the patient, it is important to document that every possible effort was made by clinic staff to arrange for the recommended follow-up procedures and responsibility is now in the patient’s hands for their care. This information is also recorded in the patient’s electronic medical record. This sheet includes both patients who are not able to be contacted by phone or mail and patients who repeatedly schedule but fail to attend clinic visits.

Color Coding to Facilitate Follow-Up

Conditional formatting in Excel was used to create a color coding system that alerts users to patients with the most pressing follow-up needs (Figure 1). The workbook is formatted so that key words typed into specific cells turn that patient’s row a pre-set color to quickly alert users to their next step in follow-up care (Figure 2). A key is provided on each page of the worksheet to facilitate interpretation of the colors (Figure 3). The color coding scheme was

designed to avoid patient loss to follow up at each step in follow-up care after an abnormal Pap test result, where risk of failure to achieve adequate follow-up exists through use of the EMR system alone.

Within the color coding scheme, darker colors indicate a more pressing patient follow-up need. This allows busy staff to quickly identify patients to call first and how to prioritize time spent scheduling follow-up visits. For example, the rows of patients who are scheduled for their necessary follow-up appointment are coded green. Patients who need to be scheduled for a repeat Pap test are coded a light yellow. When guest services or other clinic staff members schedule a repeat Pap according to the opening of the clinic's schedule (in Good Samaritan's case, three months in advance), typing "yes" into the column labeled "Follow-Up Scheduled?" on the abnormal Pap tracking spreadsheet will cause that patients row to turn green, indicating they are scheduled for a follow-up visit.

In the case of more serious abnormalities for which a colposcopy is required as soon as possible, the patient's row turns dark orange when the word "colposcopy" is entered into the column of the spreadsheet titled "Next Step". This allows clinic staff to easily scan the spreadsheet for more severe abnormalities that need to be scheduled as soon as possible. In the case of Good Samaritan, volunteer gynecologists see patients one day per month, so efficient scheduling is critical to ensure appropriate follow-up procedures are scheduled for more severe abnormalities. In addition, all darker colors override lighter colors in the coding scheme. This design feature was added to ensure that even after a patient is scheduled for their colposcopy, the row remains orange so that staff can easily remember to ensure the colposcopy appointment was met, results were received, results were reviewed by the appropriate provider, and the patient was notified of the results and any necessary next steps.

If a patient fails to attend an appointment, their row on the spreadsheet turns dark pink when the words "no show" are entered into the column titled "Appointment Met?". This visual alerts staff to the urgent need to reschedule this patient so that she is not lost to follow-up. Once she is rescheduled, the words "no show" must be removed from the cell in order for her row to turn green indicating she is scheduled, because all darker colors are coded to override the lighter colors above them. Finally, in order to avoid the possibility of lab results lost in the wrong section or provider inbox within the EMR system, patients' rows turn dark red when their follow-up appointments are still in review and have not been processed. When clinic staff update the patient's row after they meet a follow-up appointment, entering the word "review" in the column labeled "Next Step" turns the row red, indicating that patient is awaiting notification of their results. When providers review the results and notify the patient, they update the next step column accordingly and the red color is removed.

Conditional formatting of the Excel spreadsheet allows the abnormal Pap follow-up tracker to visually display all patients with an urgent need for follow-up and those at risk for being lost within the EMR system through an unscheduled or missed appointment, lab results

stuck in the review process, or any other error that can disrupt the follow-up process. This system does require a certain amount of time to maintain, but this resource investment is minimal when weighed against the benefits of ensuring that all women with an abnormal Pap test result receive the appropriate care.

Maintaining the System to Track Patient Follow-Up

When providers receive an abnormal Pap test result, their first step is to enter the patient's information into the first sheet, Initial Abnormality, of the abnormal Pap tracking spreadsheet in Excel. Providers can enter as much information as their time allows, but the most critical step is simply adding the patient to the list to ensure complete follow-up after an abnormal result. Once basic patient demographics and initial results have been entered, the provider or quality management staff enters the date the patient will be due for the necessary follow-up. In a case of an HPV-positive result without cervical abnormality, for example, the recommended follow up is a repeat Pap with HPV testing in one year. The date can be entered as one year from the original Pap test, and that patient's row in Excel will turn a light yellow, reminding staff to schedule that appointment when the schedule opens for that month. This allows for reminders to be kept for repeat visits at extended time intervals, which is a critical component in appropriately following up on lower-grade cervical abnormalities or the presence of HPV alone. Colposcopies require more immediate follow-up, so "ASAP" is entered into the cell for the date of follow-up alerting schedulers to attend to that patient more immediately.

Case Study A: Avoiding Loss to Follow-Up through Missed Appointments:

Clinical Situation: Patient A’s routine Pap test in November 2015 indicated negative PAP cytology with HPV infection. Her provider added her to the Initial Abnormal sheet of the abnormal pap tracker, and clinic staff scheduled her for a repeat Pap test with HPV co-testing in November 2016 and noted the date of the appointment in the tracker.

Use of the Abnormal Pap Tracker:

- On the date of her repeat Pap appointment, Patient A forgets about her scheduled appointment and fails to attend the clinic visit. Good Samaritan clinic staff notice the missed appointment, and note from her record in the EMR that the visit was scheduled for a repeat Pap smear following an abnormal result.
 - They therefore update Patient A’s record in the abnormal Pap tracker by entering “No Show” in the “Appointment Met?” column.
 - This changes her row color to light red (Figure A.1).

Figure A.1. Highlighting a Missed Follow-Up Appointment

Abnormal Pap Tracker		
Provider	Specialist	Appointment Met?
blathrop	n/a	No show
cstump	n/a	Yes

Final Resolution:

- Because Patient A’s row is now red in the tracker, clinic staff notice she needs to be re-scheduled for a repeat Pap test when they conduct their monthly scheduling in January 2016.
- Clinic staff call and schedule her for an appointment later that month and update her appointment information in the tracker accordingly.
 - If she misses the next appointment, the same process will capture this information and appropriate follow-up steps can be taken to ensure she receives the necessary care.

Once the appointment for a repeat Pap or colposcopy is scheduled, the worksheet can be sorted by the date of scheduled follow-up appointment. This facilitates ease in upkeep of the tracker because it allows staff to quickly see what appointments are due to be scheduled in the upcoming months. It also provides a quick visual of all appointments that were recently scheduled to occur so that staff can check whether or not the patient attended. The tracker is then updated accordingly, and if the patient did not come to the appointment, the dark pink color of the row alerts users to that patient’s need for rescheduling and follow-up. If the patient did come to the appointment, clinic staff make note of this in the appropriate column and indicate to which provider the lab results were sent within the EMR system.

If the results of either the initial abnormal screening test or any follow-up procedures have not yet been reviewed, this should also be noted in the “Next Step” column, flagging the patient to be notified as soon as possible of their results. This step ensures that no patient has a procedure completed without processing and notification of their test results. In a clinic like Good Samaritan with multiple visiting providers who attend the clinic monthly or less frequently and a high patient-volume for full-time providers, it is critical for the tracking system to visually identify patients whose results have been received within the EMR system but have not yet been communicated to the patient. The clinic’s current EMR delivers results from the lab to the appropriate provider’s inbox. However, mistakes are occasionally made in this automated results-delivery system, allowing critical information to end up in the wrong provider inbox and creating the potential for these results to go unseen for extended periods of time. The tracking system accounts for this potential area of patient loss to follow-up through use of the darkest color, dark red, to indicate when results are in review but have not yet been communicated to patients.

Case Study B: Abnormal Screening Results Stuck “In Review”:

Clinical Situation: Patient B attended a visit with Dr. M at Good Samaritan for a colposcopy in April 2014, following a high-grade abnormal result of her routine Pap test in February of that year. As of May 2014, she has not yet received a call from Good Samaritan staff with her results, but her life is very busy with her children out of school for the summer, and she forgets to call the clinic to check back in regarding the biopsy results.

Use of the Abnormal Pap Tracker:

- Patient B’s initial abnormal record was maintained by clinic staff previously, so her row is orange, indicating a colposcopy is her next step even though her appointment was successfully scheduled.
- When QA staff conduct monthly maintenance of the tracker in May, they notice Patient B was scheduled for and attended her colposcopy appointment in April, but the results have not been added and the “Next Step” column is not updated.

Ultimate Solution:

- QA staff reference Patient B’s record within the EMR and notice the result of her biopsy has been returned to the wrong provider’s box. They note that the result of the biopsy is negative on the tracker, send the result to the appropriate provider’s inbox within the EMR, and enter “Review” in the “Next Step” column, turning Patient B’s row dark red.
 - This dark red color remains as a reminder, until the provider reviews her results, notifies her of her negative biopsy, and changes the next step to “Repeat Pap test in one year”.
- During their monthly system review in June, QA staff notice this change has been made to Patient B’s record, and they move her data to the continued follow-up sheet for tracking through return to routine screening.

**Note: the same process of ensuring results are reviewed and patients are notified in a timely fashion is possible through the tracking system for the initial abnormal result, not just follow-up visits.*

Once a patient has been notified of their initial follow-up screening results, they are moved from the “Initial Abnormal” worksheet to the “Continued Follow-Up” worksheet if follow-up screenings indicate normal results. Here their record will be tracked through three normal Pap tests before their return to routine follow-up. If a patient’s initial screening indicates an abnormality that requires more intensive testing or a procedure for treatment, this recommendation is noted in the “Next Step” column and their record is kept on the “Initial Abnormal” page until confirmation of their completion of the procedure.

Case study C: High-grade Cervical Abnormality:

Clinical Situation: Patient C visits Good Samaritan for her routine Pap test in May 2014. The result of this Pap test returns to the clinic in June, indicating HSIL and HPV infection.

Use of the Abnormal Pap Tracker:

- When Patient C’s provider sees this high-grade abnormal result in her clinical inbox within the EMR system, she immediately adds Patient C’s name and initial abnormality information to the first sheet of the tracker in Excel.
 - The patient’s row turns dark orange as “colposcopy” is added to the “Next Step” column, and “ASAP” is entered as the date of follow-up, highlighting the importance of scheduling a colposcopy as soon as possible.
- The provider calls the patient to notify her of the high-grade abnormality and the importance of performing a colposcopy as soon as possible. Patient C answers the phone, and understands that clinic staff will be calling her back to schedule a colposcopy.
- When the clinic staff member calls to schedule her appointment, she answers and indicates she is available to attend a visit at the first available appointment in July.
 - The staff member adds “yes” and the date of the visit to the corresponding columns for follow-up scheduling on the spreadsheet. However, this patient’s row remains orange to visually remind clinic staff to ensure Patient C meets her appointment when they maintain the spreadsheet the following month.

Final Resolution:

- Patient C attends her scheduled colposcopy with visiting gynecologist, Dr. M, in July, and the biopsy results are negative. Patient C’s provider notifies her of these results when she sees them within the EMR, and she updates the tracker to indicate the colposcopy appointment was met, the results of the biopsy were negative, and that the next step is a repeat Pap test in one year.
 - When the “Next Step” column is changed from colposcopy to repeat Pap at one year, the patient’s row turns green.
- QA staff, during monthly maintenance, notice Patient C has met her initial follow-up appointment, add her information to the “continued follow-up page”, and cut and paste her original record to the “Patients Moved to Continued Follow-Up” sheet.
 - Here, Patient C’s record will be followed through scheduling and meeting three follow-up Pap tests, until her return to routine screening.

If initial follow-up screenings indicate a need for a procedure beyond the scope of Good Samaritan's services, such as a loop electrosurgical excision procedure (LEEP), the provider refers the patient to an appropriate specialist and documents this referral as their next step. The patient is then kept on the "Initial Abnormal" page until Good Samaritan receives confirmation of the referred procedure from the patient and has a copy of the corresponding results. At this point, next steps required for care are noted, and the patient is moved to the "Continued Follow-Up" page of tracker to follow through three more normal Pap results before return to routine screening.

Case study D: Required Follow-Up Care Beyond the Scope of Clinic Services:

Clinical Situation: Patient D has a very similar situation to Patient C. Her routine Pap test indicated a high-grade abnormality, and she was scheduled for and attended a colposcopy appointment at Good Samaritan. However, the result of her biopsy indicated the presence of CIN 2 cells, and Dr. M recommended a LEEP procedure as quickly as possible to remove the possibly cancerous lesion. This service, however, is beyond the scope of care provided by the Good Samaritan Health Center.

Use of the Abnormal Pap Tracker:

- Patient D's provider calls to inform her of the results and to provide referral options for care in the community.
 - She then enters "LEEP" as her next step, and her row remains dark orange, highlighting the importance of continued follow-up.

Final Resolution:

- Patient D informs the clinic when she has the LEEP procedure conducted at a local hospital the next month.
 - Patient D's provider notes where and when the LEEP procedure was completed in the additional comments column of the tracker.
 - She has a busy day seeing patients, however, and must move on to her next appointment directly after making this note.
- During monthly maintenance of the tracker, QA staff notice Patient D completed her LEEP procedure, and they move her information to the continued follow-up sheet of the tracking system to ensure Patient D is followed for three more Pap tests before returning to routine screening.

*Note: Had Patient D failed to notify the clinic of completion of a LEEP procedure, the dark orange color of her row would flag QM and/or scheduling staff to follow up with the patient during monthly maintenance of the tracking system.

When a patient completes all recommended follow-up care, their case is closed. This action is noted in the abnormal Pap tracker by moving their corresponding line of data from the "Initial Abnormal" or "Continued Follow-Up" sheet (whichever is applicable) to the "Closed"

sheet of the Excel document. This ensures that patients are removed from the list requiring active follow-up as appropriate without losing record of their follow-up history.

Unresponsive Patients

Occasionally, a patient is unable to be successfully contacted in this tracking process. In these cases, documentation of all contact attempts is kept in the EMR, including at least three attempts at calling the patient and sending a letter. If the patient remains unresponsive, a certified letter is sent to the most updated address on file for the patient. If all of these attempts to contact the patient fail and no other action can be taken, the patient's case is closed out and considered lost to follow-up/care. However, this can be done through the abnormal Pap tracking system without losing the patient's follow-up data by copying the corresponding patient row from the "Initial Abnormal" Excel sheet and pasting this information into the "Unresponsive Patients" sheet. This allows for the removal of patients from the tracker who are unable to be contacted without losing record of all contact attempts and

Case study E: Tracking Contact Attempts with Unresponsive Patients:

Clinical situation: Patient E attended a clinic visit on 1/10/2015. Her Pap test indicated no abnormal cervical lesions, but the presence of HPV infection was detected.

Use of the Abnormal Pap Tracker:

- Per guidelines, her record is updated to indicate a repeat Pap needs to be conducted in one year's time. Clinic staff entered a date of follow-up of 1/10/2016 and "No" in the column, "Scheduled?", causing the patient's row to turn yellow.
- When clinic staff schedule appointments in November 2015, they can easily spot patients with yellow rows which need to be scheduled for an appointment. The tracking sheet, sorted by the date the patient is due for follow-up, indicates Patient E is due for a repeat Pap test in January 2016. Clinic staff call and leave her a voicemail and add a note of this call in the column for scheduling notes.
 - If Patient E calls to make an appointment, clinic staff will update the tracker, listing the date of her scheduled appointment, and enter "yes" in the scheduled column, turning her row on the spreadsheet green.
- However, she does not call to make an appointment, so clinic staff leave her another voicemail in early December 2015 and note this second call in the "Additional Comments" column. The patient does not schedule an appointment after this second call.
- A third reminder call is made in January 2016, with no response from the patient. This third call is noted in the "Additional Comments" column.
- When staff reference the spreadsheet for scheduling in February 2016, they notice Patient E is overdue for an appointment by one month, and she has received three reminder calls. Per Good Samaritan guidelines, the staff mail a certified letter to notify her she is overdue for a repeat Pap test. Note of this certified letter is made in the "Additional Comments" column.

Final Resolution:

- When the clinic receives notice that the certified letter was delivered, but Patient E does not respond to the letter, the staff note this in the comments column and move Patient E's record from the "Initial Abnormality" sheet to the "Unresponsive Patients" sheet. Her case is closed and follow-up is stopped, and a record is maintained of all contact attempts.

other data regarding follow-up with that patient.

Identifying Patients with Previous Abnormalities

A series of different reports were created through the report-building function of the clinic's EMR system to retrospectively find all patients with a history of an abnormal pap test. This task required multiple repeated iterations of different criteria within the report, as many different order names exist to identify pap tests when submitted by providers, and these order names often change over time. A series of reports was therefore designed using different combinations of old and new lab order names and different date ranges in order to identify all previous abnormal Pap results. As an additional measure, adult preventative care quality management reports identifying all patients in the system as "satisfied" or "unsatisfied" for cervical cancer co-testing guidelines were reviewed one patient at a time in order to find any patients with an abnormal pap test that failed to be identified through the EMR reporting tool. This was a time-consuming process, but it was essential to ensure no abnormality was missed by the report and failed to be included in the abnormal Pap tracking system.

Abnormal Pap Result Finding Moving Forward

Once the tracking system includes all patients with a history of an abnormal cervical cancer screening, maintaining the list as new abnormal results arise is a simpler process. A two-tiered system was designed to ensure that no new abnormal results failed to be entered into the tracker. First, providers were given access to the tracking system through a shared Excel file on a public hard drive and underwent training regarding the use and updating of the system. Moving forward, when a provider receives an abnormal pap result through the EMR system, they enter the patient as a new line in the tracking document. Adding the patient to the tracking system ensures that the patient is not lost to follow-up within the EMR system, even if more details need to be added to the record by quality management staff in the future.

As a second tier of the abnormal result-finding process, a report will be run each month through the EMR system by quality management staff to identify all abnormal Pap results received by the clinic that month. This report will be reconciled with the Excel tracking document to make sure all patients with new abnormalities for the month are entered into the tracker. Collaboration with providers occurred in order to ensure uniform labelling of all orders for Pap tests is in use. This step increased the sensitivity of this report in identifying all cases of abnormal Pap tests and ensured the report will serve as a reliable back-up indicator of abnormal screening results.

Integration into the Clinic Work Flow

User-friendliness and ease of use were primary goals in the design process of this system. These qualities are critically important to allow for easy integration of a new system

into the daily work flow of a busy health center. The tracker exists as a shared Excel document on a public drive accessible to all clinic staff, enabling all relevant parties to access and edit the document at the same time as necessary. This enables a sharing of the responsibility involved in upkeep of the tracker so that no one staff member is burdened with its maintenance alone. In the case of Good Samaritan, the tracker was handed off to a member of the Quality Assurance (QA) team for oversight and maintenance after the initial creation. However, it would be possible to divide duties amongst other departments in a setting where QA staff might not be available to oversee the system.

The first step in tracking an abnormal cervical cancer screening is entering the patient into the tracker after this initial lab result is received. In this case, providers chose to take on the responsibility of entering any patients with abnormal results into the spreadsheet initially. They enter a small number of details, including patient demographics, initial test results, patient notification, and the date they should seek follow-up care. From there, the QA staff member records any missing data and compiles a list of patients each month that need to be scheduled for repeat Pap tests. Guest Services then contact patients on the list and schedule follow-up appointments, and the QA staff member updates the Excel tracker to reflect new appointments. For patients requiring more immediate follow-up, such as in the case of scheduling colposcopies, the medical assistant in charge of the volunteer gynecologists' schedules monitors the tracker and schedules patients accordingly. Because of the importance of swift follow-up with these patients, a separate system of patient cases within the EMR system exists to make sure that patients who need a colposcopy are scheduled as quickly as possible.

Once initial follow-up appointments are scheduled, guest services or QA staff check that appointments were met and update the tracker accordingly. This allows for all patients who miss follow-up appointments to be contacted and re-scheduled as soon as possible. Once the follow-up appointment is met, the results of testing and recommended next steps are entered into the system by providers. Guest services is then able to schedule all visits for required repeat Pap tests through three normal results until the patient's return to routine screening. Again, at Good Samaritan, this process is facilitated by QA staff oversight, but it could be done without this extra step if no such resources were available. The QA staff person, in addition, oversees the movement of patients between sheets in the Excel document, from initial to continued follow-up to closed cases, or in the cases of unresponsive patients to the appropriate fifth worksheet.

CHALLENGES AND LIMITATIONS

There are many challenges involved in creating a comprehensive system to track all follow-up measures after an abnormal cervical cancer screening. While this system overcomes many barriers to tracking abnormal Pap follow-up, it is not without its limitations. Creating an Excel sheet of a manageable size which also had the capability to maintain years' worth of data regarding patient follow-up was a constant challenge in the design phase. While the end-product system is fairly stream-lined, it also contains a significant amount of data for each patient and can appear overwhelming to new users. Guidelines for cervical cancer co-testing after an abnormality can range from an immediate follow-up visit to a repeat Pap test in as long as three years from the original abnormality. This poses a challenge because patients might need to be followed for multiple years before their return to routine screening, creating the potential for a lengthy spreadsheet that is difficult to manage. Retrospective case-finding for all abnormalities through a complex EMR reporting system took a significant amount of time and was not entirely reliable for finding all cases. However, the extra time taken to look through all patient charts from quality management reports allowed for confidence that the system, once updated, contained all patients with abnormal Pap results in their history since the integration of use of the EMR at the clinic. Case finding moving forward remains a challenge, as well, given very busy provider schedules in a clinic that serves a wide variety of needs for a large number of patients. However, the combined use of provider-entered abnormalities as they occur and routine use of EMR reports should minimize failure to find all incident abnormalities moving forward. The use of standardized orders for all Pap tests by providers has also increased the reliability of EMR reports.

Once the system was designed, it had to be integrated into the daily workflow of the clinic. This required a series of training and trouble-shooting meetings for staff newly learning the system, as well as constant modifications of the division of responsibilities as the best division of labor for upkeep was determined. Because the system is based in Excel and separate from the EMR system, it requires investment of some staff time to maintain and update the database. Its basis outside the EMR, however, allows for easier adoption of this system if found to be effective by a wide variety of health centers with different EMR systems. The system was also designed to be a comprehensive source of details regarding each case of abnormality and follow-up, so the spreadsheet is large and requires basic Excel proficiency to navigate effectively. However, once staff are comfortable with the system and a rhythm of upkeep is reached, it is expected to be minimally burdensome on staff resources and well worth the investment in the improved reliability of patient follow-up after an abnormal cervical cancer screening result.

CONCLUSION

Pap tests are an effective tool for reducing the burden of cervical cancer in the United States. However, inadequate follow-up after an abnormal cervical cancer screening remains a barrier for many women to receiving the necessary continued care. The burden of cervical cancer remains the highest among underserved patient populations with the least access to preventative health care services and the highest risk for loss to follow-up. A comprehensive tracking system based outside of an EMR system allows providers to follow all abnormal cervical cancer screenings through the patient's return to routine screening and full health in this important area of women's health.

References

1. The American Cancer Society. What Are the Key Statistics About Cervical Cancer? <http://www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-key-statistics>. Accessed May 3, 2016.
2. Peterson NB, Han J, Freund KM. Inadequate follow-up for abnormal Pap tests in an urban population. *J Natl Med Assoc.* 2003;95(9):825– 32.
3. The American Cancer Society. Cancer Statistics Center. https://cancerstatisticscenter.cancer.org/?_ga=1.111418756.1631726216.1462286336#/cancer-site/Cervix. Accessed May 3, 2016.
4. The Henry J. Kaiser Family Foundation. State Health Facts: Uninsured Rates for the Nonelderly by Race/Ethnicity. <http://kff.org/uninsured/state-indicator/rate-by-raceethnicity/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>. Accessed December 19, 2016.
5. U.S. Department of Health & Human Services. Disparities in Healthcare Quality Among Racial and Ethnic Groups. <http://archive.ahrq.gov/research/findings/nhqrdr/nhqrdr11/minority.html>. Accessed December 19, 2016.
6. Elit, L., Saskin, R., Raut, R., Elliott, L., Murphy, J., & Marrett, L. (2013). Sociodemographic factors associated with cervical cancer screening coverage and follow-up of high grade abnormal results in a population-based cohort. *Gynecologic Oncology*, 128(1), 95-100.
7. Dupuis EA, White HF, Newman D, Sobieraj JE, Gokhale M, Freund KM. Tracking abnormal cervical cancer screening: evaluation of an EMR-based intervention. *J Gen Intern Med.* 2010;25:575–580.
8. Menachemi, N., & Collum, T. H. (2011). Benefits and drawbacks of electronic health record systems. *Risk Management and Healthcare Policy*, 4, 47–55. <http://doi.org/10.2147/RMHP.S12985>
9. Healthcare IT News. Market for EMRs still strong. <http://www.healthcareitnews.com/news/market-emr-still-strong>. Accessed May 3, 2016.
10. Massad, L. Stewart. 2012 Updated Consensus Guidelines for the Management of Abnormal Cervical Cancer Screening Tests and Cancer Precursors. American Society for Colposcopy and Cervical Pathology. *Journal of Lower Genital Tract Disease*, Volume 17, Number 5, 2013, S1-S27.

Appendix

Figure 1. Select data from the abnormal Pap tracking system in Excel.

Initial Screening			Patient Notification		Follow Up	
DOS	PAP	HPV	Date	Notifier	Scheduled?	Date of F/Up
11/4/2015	ASCUS	Pos	11/17/2015	pdelgado3	Yes	2/23/2016
1/14/2016	HSIL	Pos	1/21/2016	llevine	Yes	2/23/2016
4/12/2014	U	?	4/7/2014	emedicalstudents	Yes	2/24/2016
3/31/2015	ASCUS	Pos	5/21/2015	pdelgado3	No	3/1/2016
10/14/2015	LGSIL	Pos	11/3/2015	pdelgado3	Yes	3/22/2016
12/8/2014, 12/10/2015	Negative	Pos (x2)	1/4/2016	blathrop	Yes	3/22/2016
6/16/2015	ASCUS	Pos	6/26/2015	blathrop	Yes	4/7/2016

Figure 2. Conditional formatting key words.

Code words for color changes:	
Green	*"YES" in Scheduled? (Column I)
Yellow	*"NO" in Scheduled? (Column I)
Orange	*"COLPO" in Next Step (Column R)-*This will override Yellow for not scheduled
Red	*"NO SHOW" in Appointment Met? (Column O) *"NOTIFY" (in any phrase, indicating results need to be reviewed/patient needs to be notified of results) in Next Step (Column R)
	*Both red codes will override any other color codes in cells.
Bold Red	*"REVIEW" in Next Step? (Column R)
	**These codes are listed in order of override... any codes that call for darker colors at the bottom of the list will override all lighter colors above

Figure 3. Color Key used to identify patient follow-up needs in the Pap tracking system.

Color Key
Patient Scheduled-Enter Screening Results
Schedule Follow-Up PAP
Schedule Colposcopy
Patient No-Show or Un-notified
Results in Review for Provider

Figure 4. Abnormal Pap follow-up list sorted by recommended date of follow-up to facilitate scheduling.

Initial Screening			Patient Notification		Follow Up	
DOS	PAP	HPV	Date	Notifier	Scheduled?	Date of F/Up
9/8/2015	ASCUS	Neg	10/13/2015	blathrop	Yes	6/27/2016
7/15/2015	Negative	Pos	7/31/2015	cstamp	No	7/1/2016
7/28/2015	Negative	Pos	9/8/2015	rbarnett9	No	7/1/2016
7/29/2015	Abnormal, ASCUS	Neg	8/14/2015	blathrop	No	7/1/2016
7/30/2015	Negative	Pos	8/11/2015	cstamp	No	7/1/2016
5/7/2015, 4/25/2016	Neg, U	Pos (x2)	5/19/2015	cstamp	Yes	7/28/2016
8/14/2015	Normal	Pos	8/22/2015	tsmith	No	8/1/2016
8/17/2015	Abnormal, ASCUS	Neg	8/26/2015	llevine	No	8/1/2016