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SUMMARY REPORT:

USE OF ELECTRONIC MEDICAL RECORDS TO FACILITATE COLORECTAL CANCER SCREENING IN COMMUNITY HEALTH CENTERS

Prepared for:

National Colorectal Cancer Roundtable
American Cancer Society, Inc.
National Association of Community Health Centers

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NATIONAL Colorectal Cancer ROUNDTABLE

American Cancer Society®

NATIONAL ASSOCIATION OF Community Health Centers

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EXECUTIVE SUMMARY

The purpose of this study is to gather insights from individuals who use electronic medical records (EMRs) in community health centers about the effective use of EMRs to facilitate colorectal cancer screening, including for those with a family history of the disease. To meet this goal, Aeffect conducted a series of qualitative interviews with clinicians and technical staff in community health centers (CHCs) across the country. A selection of subject matter experts and EMR superusers[1] were also interviewed to provide a perspective on best practices. More than 45 individuals participated in this project.

This study finds that providers and technical staff in CHCs are generally dissatisfied with the level of training and ongoing support that they receive from their EMR vendors. Most feel that they do not know what their EMR is really capable of—a perspective that is validated by superusers who have consulted with numerous CHCs. Many users seem to get to a minimal level of functionality with their EMR system where they are able to accomplish most of what they need, but never go on to learn more advanced functions, or optimize their use of the system for quality improvement purposes. This often results in frustration due to the perception that their system cannot assist them with more sophisticated needs or is too cumbersome and time-consuming.

When it comes to facilitating colorectal cancer screening in particular, many CHC staff do not appear to be maximizing their EMR's functionality. Due to high percentages of uninsured patients, most CHCs participating in this study rely largely on stool testing for colorectal cancer (CRC) screening. However, many report that they do not follow up after stool tests have been distributed to patients to ensure the kits are returned. Most record stool tests in their EMRs and have the capability to run reports of unreturned kits, but they typically do not do so because they lack staff to place calls or otherwise follow up on unreturned kits. While some respondents acknowledge that their system has the capability to deliver automatic reminders, most have not yet fully investigated the option. As a result, most report that return rates on FOBT and FIT kits are low. Further, while most EMRs visually differentiate or flag abnormal stool test results for providers to review, they do not automatically indicate any particular follow up. EMR systems also fail to issue any special alert if a patient has not received a colonoscopy after a positive FOBT/FIT.

For those patients that are referred for colonoscopy (typically patients with private insurance or Medicare), EMRs are used to a greater extent for tracking. However, most EMR's major weakness when it comes to colonoscopy is documentation of the results. CHC staff report a great deal of inconsistency with regard to receipt of colonoscopy reports from GIs and hospitals. When they do receive reports, only some CHC staff put the results into searchable, structured data fields. Instead, many simply attach a scanned copy of the report to the patient's record. Depending on the EMR system, this practice may result in undercounting of screened patients when reports are run from the system.

[1] Superusers were defined as individuals with a very high level of knowledge of one or more EMR systems. Most superusers were identified through NACHC's expert panel on Powering Patient Centered Medical Home through Health IT.

The capture of CRC screening activities in structured data fields is clearly a significant barrier to quality improvement and accurate tracking of results. Some providers in the CHC setting are reluctant to spend time on EMR documentation when they are already so pressed for time. Additionally, lack of professional IT and analytic support significantly hampers CHC's ability to appropriately train/motivate providers and make sense of the data coming out of the system. As a result of these limitations, superusers indicate that the reports they have seen generated by many CHC's are dramatically under-counting the number of screened patients.

Most EMR systems are also said to be ill suited to the nuances of CRC screening. Specifically, in several systems there are multiple, equally valid methods of recording screening activities, such as through lab orders, referrals, diagnostic imaging or procedures. This results in inaccurate counts if different providers record screenings in different locations. Additionally, completed screenings may not be counted if they are not "closed out" in the correct location in the EMR. Most providers and many technical staff members may not have the knowledge and programming skills to be able to reconcile these differences when running screening reports.

Despite the fact that most EMR systems discussed in this project capture family history information in structured data, none are said to be capable of taking family history and using it to determine if an individual is at higher risk of developing cancer. EMRs also do not prompt regular updates to family history, and many CHCs are only capturing family history at a patient's initial visit. As a result, even if a patient's risk for CRC increases over time, it may not be reflected in the EMR and providers may continue to screen them as average risk. Nearly all respondents say features that incorporate family history and adjust patients' risk levels would be very valuable and they would welcome clinical decision support informed by family history information. Subject matter experts add that this is particularly important for CRC given that screening recommendations and risk factors are not necessarily straightforward and easily recalled.

Despite these barriers, there are some CHCs that have addressed their EMR's limitations and dramatically elevated their screening rates. This has been accomplished through a combination of excellent IT resources that enable system customization (e.g. screening dashboards, custom alerts), purchase/development of additional software for report writing and population management, and a strong internal culture of provider accountability and quality improvement through the use of EMR data. High performers[2] tend to have access to programmers and data analysts because they are part of a large clinic system or through a health center controlled network (HCCN)[3] or similar network. As a result, they are able to take the time to optimize their EMR, properly train and re-train providers, and use provider input to customize their EMR's alert systems and reporting to meet local needs. Health centers without such resources often appear to be "learning as they go" with relatively little guidance.

[2] See page 6 for further detail on high performers.

[3] HRSA defines an HCCN as a group of safety net providers collaborating to improve access to care, enhance quality of care, and achieve cost efficiencies through the redesign of practices to integrate services, optimize patient outcomes, or negotiate managed care contracts on behalf of the participating members.

Key Barriers to Effective Use of EMRs for CRC Screening

The following items were identified as consistent barriers to more effective use of EMRs to facilitate CRC screening in community health centers.

EMR System Related Barriers

- Poor vendor training on EMR features, including alerts, templates and reporting tools; trainers not well versed in clinical needs
- Limited ongoing support from EMR provider, lack of response to questions or concerns
- High cost for consulting or onsite support
- Limited utilization of CRC screening data in the EMR/poor use of results
- Overuse of customization tools at the expense of better knowledge/use of built in tools
- EMR design is not optimized for easy tracking of CRC screening
    - Multiple ways of ordering/recording the same screening, but not all are necessarily counted toward the same outcome measure
    - Need for object oriented programming[4]
- Poor documentation of past colonoscopies conducted elsewhere
- Poor documentation of colonoscopy referral results
    - Scanned reports rather than entered into structured data
- Lack of Health Information Exchange (HIE) with local hospitals and specialists
- Family history data not accessible or searchable in structured data format
- Lack of systematic use of family history information in screening decisions

Staff or Resource Related Barriers

- Lack of resources for a single, dedicated person or team responsible for optimization of EMR system (e.g. many staff wearing multiple hats)
- Lack of resources for a single, dedicated person or team responsible for ensuring accurate reporting
- Inconsistent organizational knowledge of EMR systems due to staff turnover and lack of ongoing support from vendors
- Lack of non-provider staff time devoted to entry of information and follow up (e.g. generating/delivering patient reminders)
- Lack of time set aside for follow up training for staff, post implementation
- Lack of staff time to perform tracking or follow up on unreturned FOBT/FIT kits
- Lack of direct one-on-one “shadow” training

[4] Object oriented programming would ensure that no matter where or how a screening event was entered into the record (e.g. colonoscopy, FOBT, lab, referral, procedure), it would be equally counted as a single screening outcome.

Organizational Barriers

- CRC not a high priority relative to other concerns (diabetes, other cancers, pediatric care/immunizations, etc.)
- Lack of organizational emphasis on quality improvement through better tracking
- Provider resistance or lack of incentive (monetary or peer pressure) for correct, consistent entry of structured information
- Lack of planning or resources for follow up optimization after EMR implementation
- Provider reluctance/lack of time or incentive to address preventive screenings during acute visits
- Lack of EMR-based structured workflows aimed toward improving quality metrics
- Organizational emphasis on day-to-day patient needs (e.g. "transactional") rather than population management
- Inconsistent or non-existent use of alert functions (alert fatigue, alerts turned off)
- Transient, cost-sensitive patient population
    - Less likely that they will come in for yearly physicals where preventive screenings are more commonly addressed

Characteristics of High Performers

The following items were identified as examples of best practices and activities that were associated with more effective use of EMRs to facilitate colorectal cancer screening.

EMR System Related Best Practices

- Use EMR-generated dashboards or data summaries on the patient's "home screen" to give providers a snapshot view of each individual patient's screening status and most recent screening result
- Use EMR-generated recall lists for addressing incomplete screenings
- Record extensive information on colonoscopy referrals (date, biopsy results, number of polyps, screening interval) in structured data fields
- Differentiate in EMR between routine and high risk patients based on a combination of family history and personal health history
- Make use of standing orders for routine CRC screening and/or authorize medical assistants to initiate screening (stool cards) after receipt of an EMR alert
- "Shadow" training provided on a one-on-one basis and at multiple times throughout the first year of implementation

Staff or Resource Related Best Practices

- Follow up on unreturned FOBT/FIT with structured responses at prescribed times
- Have a dedicated person responsible for follow up of FOBT/FIT or colonoscopy referrals
- Have a staff member assigned to entering colonoscopy results into structured data
- Follow up on unreturned stool kits or incomplete colonoscopies is handled via mail or phone and reporting allows for tracking of non-compliant patients
- Have access to IT staff dedicated to optimization and process improvement, either by hiring IT staff for larger centers or joining an HCCN that can provide IT support for smaller centers
- Have access to a programmer with skills (SQL) to customize the EMR or reporting needs
- Regular dialog between clinical and IT staff ensures that customization efforts reflect clinical needs
- Providers have developed comfortable ways of incorporating use of a PC, laptop, or tablet directly during the patient encounter

Organizational Best Practices

- Culture of quality; leadership views EMR data as an asset and manages staff to maximize its value for quality improvement
- Perform regular (monthly) measurement of screening performance
- Use extensive, ongoing input from clinicians to optimize and customize their EMR
- Part of larger organization or network (e.g. HCCN, OCHIN) with access to dedicated IT staff and reporting/QI staff
- Quarterly reporting of quality metrics is run at the provider level and is shared, reviewed, or accessible by peers
- Compensation or monetary incentives are tied directly to screening rates
- Optimization retraining is conducted; feedback mechanism is available for provider questions and suggestions

BACKGROUND AND OBJECTIVES

The American Cancer Society, through the auspices of the National Colorectal Cancer Roundtable (NCCRT) is partnering with the National Association of Community Health Centers (NACHC) to assist community health centers (CHC) with improving cancer screening rates and meeting new federal requirements for reporting colorectal cancer screening rates. Over the past few years, CHC staff have been implementing new electronic medical record or health record systems (EMRs), both to facilitate more streamlined practices and in an effort to become recognized as patient centered medical homes. EMR products vary with regard to their tools for assisting practitioners with preventive screening and family history collection, as well as reporting systems. As a result, NCCRT and NACHC seek to understand how they can help CHC staff improve the functionality of EMRs to help increase the number of CHC patients who are screened for colorectal cancer and to meet reporting requirements. More specific objectives of this project are as follows:

- Understand perceptions of CHC staff regarding the need for more systematic screening practices in CHCs, including collection and use of family history data to assure risk-appropriate screening
- Gather feedback from physicians and medical directors regarding ways in which current EMR systems do or do not support systematic screening of patients in CHCs, including the role of collecting family history
- Identify and prioritize ways in which EMR systems might be modified to enhance preventive screening and reporting tools, family history collection, population management, and tracking and reporting tools

The NCCRT engaged Aeffect, Inc., a communications research and consulting firm, to conduct this project. Aeffect was chosen as a project partner based on its expertise in health care research, including EMRs, and recent experience conducting studies for the NCCRT on colorectal cancer screening.

This summary report discusses project findings from in-depth phone interviews with more than 45 individuals, conducted from July to September 2013. The report includes an executive summary, detailed discussion of findings, representative verbatim quotes from respondents, recommendations, and project materials.

METHODOLOGY

From July to September 2013, Aeffect conducted in-depth telephone interviews with more than 45 clinicians and technical staff from community health centers across the United States. Respondents represented a mix of clinicians, data analysts, EMR implementation experts and CRC subject matter experts. The vast majority of respondents are using one of the top four most commonly used EMR systems in community health centers.

Telephone interviews lasted 30–60 minutes and were based on a discussion guide covering a variety of topics and questions. Respondents were paid an honorarium of $100 for participation, or were given the option of donating it to a charity of their choice. Interviews were digitally audio recorded with respondents' permission and selected interviews were transcribed for further analysis.

Interview Content

Interviews were conducted by professionally trained Aeffect moderators who have significant experience interviewing physicians and who have conducted similar project on colorectal cancer screening for the NCCRT over the past several years. A discussion guide, developed by Aeffect with input and approval from the NCCRT, was used to facilitate these discussions. (A copy of the discussion guide is provided in the Appendix.)

Interviews covered the following topic areas:

- Overview of organization, community served and EMR vendor
- Individual's role in recommending screening to patients (for clinical respondents)
- Individual's role in extracting or analyzing clinical data from the EMR
- Perceptions of EMR in use and its utility for facilitating colorectal cancer screening
- Utilization of EMR for family history collection
- Utilization of EMR data for reporting and patient population management
- EMR features or capabilities that would enhance the colorectal cancer screening process

Limitations of the Study

This project was initiated in order to understand EMR issues impacting CRC screening in community health centers, which overwhelmingly serve lower income, uninsured and underinsured patients. As a result, the findings may not be generalizable to the broader U.S. population or to clinical settings where a higher proportion of insured patients are typically seen. Additionally, the EMR systems explored in this project represent those that are most commonly used in community health centers.[5]

[5] Note that while Epic is the most common EMR vendor in terms of market share (based on CMS and HHS data from the Office of the National Coordinator for Health Information Technology), it is not common among community health centers, due to cost and suitability for primary care settings. It is therefore not specifically addressed in this report.

RESPONDENT PROFILE

Respondents were invited to participate by a direct contact from the National Association of Community Health Centers (NACHC) or NCCRT. Interested individuals contacted Aeffect, after which they were screened for their qualifications using a questionnaire approved by the NCCRT. Respondents were classified into one of four categories:

- Clinical – Physicians, RNs, LPNs, or other clinical background; see at least 30 percent of patients over age 50; have responsibility for recommending CRC screening
- Technical – Train staff, administer, implement or otherwise manage a site's EMR, including extracting data or report writing; may also have a clinical background and see patients
- Superuser – Members of the NACHC Expert Panel on Powering Patient Centered Medical Home through Health IT; often have experience in high performing clinics, implementing EMRs at multiple sites, or providing consultation to EMR users
- Expert – NCCRT-recommended individuals with particular expertise in high quality CRC screening, including genetic predisposition

A copy of the screening questionnaire used to recruit respondents is included in the Appendix of this report.

Sample titles of clinical respondents include Medical Director, RN or LVN, Physician Assistant, and Physician. Sample titles of technical respondents include CIO, IT Manager/Director, EMR Coordinator, Director of Population Health, Clinical or Health Informatics, and Quality Improvement Risk Manager. It should also be noted that several technical respondents also had a clinical background as an RN or MD.

Respondents represent a very diverse geographic mix, ranging from clinics that serve extremely small, rural communities (e.g. farmers and Amish residents) to urban clinics serving thousands of individuals with large immigrant populations (including Mexican, Iraqi, Hmong, and others) where a majority speak English as a second language. Clinics represented in this project are in all regions of the U.S. (e.g. South Dakota, California, Wisconsin, New York, Kansas, Georgia, Illinois, North Carolina, Virginia, Michigan, and others). In nine instances, Aeffect interviewed a member of the clinical staff and a member of the technical staff from the same center.

Additionally, respondents report widely varying lengths of service in community health centers, though they tend to have shorter rather than longer tenures. Some have been with their center for only a few months, while others have been at the same center for more than a decade. Respondents confirm that there is often high turnover with regard to both clinical and IT staff in the community health center setting.

Respondent Specifications	# of Respondents
TOTAL	48*
Respondent Type	
Clinical	18
Technical	15
Superuser[6] (NACHC Expert Panel Members)	7
Experts	5
Region	
Central	13
East/Mid-Atlantic	10
South	4
West	13
EMR System Used	
eClinicalWorks	15
NextGen	12
Centricity	5
SuccessEHS	4
AllScripts	1
Epic	1
Other/Multiple Systems[7] (Superusers, Experts)	4
Community Type/Size	
Small town/rural	12
Suburban	6
City/urban	18
Varies (Superusers)	4

*Note: 45 interviews were scheduled, however in some cases multiple individuals participated in the same call, in order to provide perspective from both the clinical and technical side. In other cases, clinical and technical staff were interviewed separately.

[6] Superusers included a mix of both technical and clinical respondents.

[7] Other systems include custom-built systems and other commercial products used by expert respondents (e.g. KP HealthConnect, Partners Longitudinal Medical Record, and RPMS — Indian Health Service.)

ANALYSIS AND REPORTING

It is important to note that this study is qualitative in design, and thus should not be interpreted as necessarily reflective of the audiences studied as a whole. Findings cannot be quantified with any degree of confidence or reliability with small sample sizes. The sampling methodology also does not reflect a natural fall-out of the targeted organization types.

In the qualitative analysis, Aeffect looked for trends and patterns to help us better understand the targets' attitudes and opinions. The qualitative findings in this report provide insight into the range of opinions expressed by the various types of individuals represented in this study, and provide a general indicator of their feelings and orientation to the project topics under consideration.

To aid in analysis, Aeffect reviewed transcripts from the interview sessions to identify consistent trends or patterns in responses. In this report, we have highlighted themes and topics where consistent responses emerged and noted areas where respondents were in disagreement. We have qualified findings by indicating how many respondents—e.g., "most," "many," "some," "few," etc.—expressed these opinions. Strength of respondent conviction is reported within the findings. Differences in responses between audience segments are also reported within the findings, where they appear.

Although Aeffect is not at liberty to reveal respondent identities, we have reported verbatim comments by participant type. This practice is acceptable and in compliance with guidelines set forth by the Qualitative Research Consultants Association and other governing bodies that ensure ethical standards in research.

RECOMMENDATIONS

The following recommendations represent opportunities to positively impact effective use of EMRs in community health centers to improve colorectal cancer screening.

Vendor Improvements to Improve CRC Screening Capabilities

- Apply pressure on EMR vendors to correct the deficiencies listed below. ACS and the NCCRT could consider convening a meeting or facilitating discussion between EMR vendors, key federal partners, HCCNs, Primary Care Associations and NACHC to inform vendors of identified deficiencies that need to be addressed and coordinate requests to vendors for improvements around CRC screening. By representing buyers on a larger scale, a collaborative effort may have more influence than hearing from individual CHCs alone.
    - Make use of family history data in clinical decision support systems. Primary care providers are not necessarily aware of the nuances of screening for patients with a family history of colorectal cancer, let alone those with family histories of other conditions that make them genetically more susceptible to CRC. The next generation of EMRs should deliver screening alerts based on the entry of family history of CRC and other conditions.
    - Develop a quick, easy way to enter the results of past colonoscopy results in structured data fields. Ideally, this would be a one or two-click process with a means of differentiating between a verified colonoscopy (e.g. supported by documentation) and a self-reported one.
    - Develop a dashboard or summary page that quickly displays all preventive screening tests, the patient's current status, screening interval, and results of their last test. Ideally, providers should be able to easily edit the dashboard without clicking through to another page (e.g. change screening interval, enter self-reported tests).
    - Provide better initial training during implementation, particularly for clinical staff. This project revealed many areas where CHC staff are likely misusing their EMRs and a high level of dissatisfaction with their level of initial training, including lack of clinical expertise of the trainers. As the EMR market matures and as CHCs look to replace systems with which they are dissatisfied, vendors will have to improve their implementation training efforts or their reputations will suffer.
    - Include periodic optimization training in the EMR support package. "Refresher" training is particularly important after the release of software upgrades, but it is also critical that at least one person receives ongoing training because staff turnover in CHCs is said to be higher than in other clinical settings. As a result, some CHCs end up with system administrators who essentially learned the EMR "on the job" through trial and error. Few CHCs have the funds to invest in more training, even if it is clearly needed. However, it may be possible to put pressure on vendors to include some level of refresher training in their

contracts going forward given the level of inadequate training revealed in this project.

Leadership and Increasing Focus on the Issue

- Communicate to CHC leadership (e.g. Board of Directors, CEO and CMO/Clinical Directors) about the importance and potential payoff of investing valuable staff time on EMR optimization. Providers in CHCs are so time-pressured that it is often extremely difficult to find a staff member who has the time to invest in learning more about their EMR's capabilities, examining workflows, identifying reporting errors, using the EMR's functionality to improve performance, etc. Therefore, CHC staff often end up at a point of minimal functionality, never realizing their system's possibilities or even misusing their EMR, despite substantial investment in the EMR. CHC leadership may be encouraged to set aside time for EMR optimization by hearing success stories from peer organizations that have seen improvements in patient care, greater efficiency, or receipt of pay for performance incentives as a result of taking the time to improve their EMR use. Further, when CHC's invest in adoption of a new system, they should consider investing in staff time for EMR optimization as an integral part of the investment.

- Encourage CHCs to run more frequent reports (ideally monthly) on important quality issues (e.g. HEDIS measures, UDS measures) and report data to clinicians/teams. Reporting both group and individual data has been shown to be a strong means of demonstrating the value of the EMR for population management, reinforcing the importance of entering structured data to ensure accurate reporting, and motivating providers to focus on improvement of screening efforts.

- Consider ways to increase CHC's organizational focus on colorectal cancer through quality/process improvement initiatives, short term grants or promotion of a disease mitigation campaign around CRC, with a stated goal of 80 percent screening rates. Many CHCs emphasize other health issues (e.g. diabetes, hypertension, cervical cancer) based on reasons including patient demographics or funding streams, but CRC is typically not high on their priority list. When centers focus their efforts on a particular disease state even for a short time, workflow, attention to entry of structured data and other aspects of EMR use to optimize their performance are likely to improve even after the focus period ends. It is worth noting that most interviews were conducted before the results of the new UDS measure on CRC screening came out, which may provide additional motivation for a focus on CRC screening.

- Lobby the federal government to allocate funding for CRC quality improvement initiatives. Funding has been shown to lead to greater institutional focus on screening issues. This project also clearly demonstrates a need for funding to support on-site IT assistance in order for CHCs to make better use the significant federal investment that was made in EMR acquisition.

Training and Support

- Consider ways to offer in person assistance to CHC staff, as this has proved to be the most effective way to improve knowledge and use, including awareness of features, proper documentation/use of structured data, report generation, and use of population management features.
    - Shadowing by clinical trainers and superusers
    - Telephone or webinar EMR "optimization" training sessions
    - Superusers who provide scheduled telephone consultation
    - Negotiating additional in-person assistance from vendors with trainers well versed in clinical needs

- Encourage CHC staff to become more active in EMR user groups offered by NACHC or their respective vendors. Most respondents do not appear to be taking advantage of user groups, but those who do, find them to be a helpful way of learning how to address common problems.

- Consider developing "SWAT teams" consisting of EMR specialists to provide troubleshooting, optimization training and reporting guidance to CHCs who lack professional IT staff. Teams should specialize in each of the four EMR systems that are most prevalent in CHCs. Ideally, they would include both technical and clinical specialists who can shadow clinical users as well as staff members who are responsible for pulling data out of the EMR.

- Explore ways to systematize EMR training and optimization, such as providing ongoing technical assistance through Health Center Controlled Networks, NACHC or state Primary Care Associations. Currently, EMR utilization is highly dependent on the skills and motivation of individual staff members at each CHC. Some CHCs with highly motivated staff are able to overcome vendor difficulties and lack of training to still make the most of their EMR, but others are not. The difference appears to be simply whether or not the CHC happens to have staff members with a strong orientation toward the technology or a focus on quality improvement. One way of overcoming this limitation may be the creation of model workflows, but other opportunities should also be explored.

- Collect and distribute best practices on EMR use to facilitate cancer screening. Distribution could be accomplished through a guide or handbook, as well as ACS-sponsored learning sessions on each of the most prevalent EMR systems. Including model approaches from CHCs with varying staff sizes, budgets and levels of IT sophistication would be valuable to those who do not think they have enough resources to make significant improvements to their system.

- Develop ACS-branded patient education material on the importance of CRC screening to help address patient barriers. It is important that this material be *persuasive* in nature rather than *instructive* (e.g. not how to prepare for a colonoscopy, but why it is important). Ideally, this material could be incorporated into future EMR systems as an

automatic deliverable once a colonoscopy is ordered, but initially providers in CHCs would welcome such material even on paper. Consider enhancing distribution of, or co-branding with content from high-quality materials already developed by the CDC.

Implementation and Optimization of EMR Functionality

- Encourage CHC staff to make use of their EMR's automated patient reminder systems. Several EMR systems have the capability to deliver automated reminders for patients that are overdue for screening, have an unreturned stool test, or have not completed a colonoscopy referral. However, almost none of the CHCs in this study say they are using these reminders. Taking the time to set up practice protocols for when automated reminders are appropriate and how they should be delivered (e.g. mail, text, email) will pay off in reducing the time that staff need to spend tracking down patients and resolving incomplete tests.

- Advocate that CHC staff revisit EMR workflows on a periodic basis. Responses suggest that most CHC staff simply make do with the initial training they received and never take time to learn more about what their system is capable of once they have mastered the basics. In reality, providers need to use the EMR for a period of time before they can identify gaps in knowledge or perceived functionality, and then go back for more support or training. Unfortunately, this is not the training model in most settings. Even if vendors do not support refresher training, CHC staff should be encouraged to focus on optimization of EMR workflows on at least an annual basis, using whatever resources are available to them (e.g. HCCN, internal IT support, new budget allocations for vendor refresh training).

- Identify and promote model "add on" features or applications that high performing clinics or HCCNs have developed on their own to augment or improve their EMR's screening functionality. Most high performing clinics have developed their own screening templates, reminders, and/or reporting tools. So that users with fewer IT resources do not have to reinvent the wheel, NCCRT should consider ways to facilitate the exchange of ideas or even code between CHCs that are willing to share this information.

- Create vendor-specific model workflows that reflect best practices for colorectal cancer screening. Currently, the majority of CHCs use five to seven EMR systems. Therefore model work flows for each of the major EMR products would help CHCs make progress toward optimizing their processes. Documentation should particularly emphasize the importance of follow up and tracking in order to enable accurate reporting, as this is where this project revealed a significant lack of attention.

- Promote the best practices of CHCs who have turned their EMRs into a high performing system.
    - Pay greater attention to how their EMR fits with their existing work flow, and revisit how the EMR could be modified after installation to better complement

and support the work flow. Have vendors shadow providers to demonstrate best practices and ways to maximize the use of the system.

- Keep up with all system upgrades and seek additional online training when updates are installed.
- Dedicate technical staff to the EMR system, so they can program, access servers, or customize the software to meet their needs.
- Integrate clinical and technical staff, both at the beginning of implementation and on an ongoing basis to ensure that clinical staff is making correct use of the EMR and know about the latest updates.
- Work with new providers to go over the basics. Have them shadow another provider to understand the EMR system. Initially, audit their notes to ensure proper use of the system at the onset.
- Host monthly provider meetings to present new forms, go over system updates and answer questions. Make these efforts worth the providers' time by coaching them on how to make it easier, use less clicks, be more efficient, and be able to deliver better care.
- Motivate providers to document their activities in structured data through group and individual performance tracking, peer comparison, and/or performance incentives
- Convey to providers exactly how data for quality measures is captured (e.g. what to do to get "credit" for a task), and how it will be used to assess performance.
- Periodically identify provider concerns and barriers to effective EMR use and conduct workflow improvement to address problems.
- Make use of standing orders for routine CRC screening.
- Initiate standards for systematic follow up on unreturned stool tests, with particular use of tools that do not require significant staff time to implement (e.g. robo-calls, automatically generated postcard reminders).
- Differentiate between alerts for incomplete screenings for average risk patients and high risk patients (e.g. establishment of a "critical" alert for positive stool tests that have not been followed by a colonoscopy).
- Establish a core set of colonoscopy measures that should always be entered into structured data (e.g. normal/abnormal, number of polyps, dysplasia, or cancer, and follow up requirements).
- Have a simple "one click" way of viewing *and editing* the screening status of an individual patient.
- Join health center controlled networks where they have access to high quality IT expertise.
- Make use of facilitated opportunities to learn from other users of the same EMR (e.g. NACHC or vendor-supported user groups).

DETAILED FINDINGS

Screening and Care Environment

A majority of respondents are able to provide a rough estimate of their population's colorectal cancer screening rates — usually estimated at no more than 25 percent and sometimes as low as 5 percent. A few high performers (particularly very large systems) however report screening rates of nearly 80 percent. Most clinics say that their usual screening method is stool testing, either FOBT or FIT due to the lower cost of the test and higher rates of compliance from patients. Only a few say that they rely more on colonoscopy, but these tend to be locations that have higher rates of insured or Medicare covered patients.

> *"I think it's (our screening rate) pretty low. I thinks it's around 20 percent .. .We don't have FIT. I wish we did. So we do only use FOBT, and I think we're pretty universal with trying to do that for people who are 50 and over. But that's the weakest screening for colorectal cancer but it's the default screen because at least we can do it, that's with the DRE. As I said, many of our patients are uninsured so it's beyond their financial reach to get a colonoscopy or even a flex sig. For people who have insurance we definitely prefer the colonoscopy." (Clinical, Centricity)*

Most respondents say they treat primarily the uninsured or underinsured, as well a varying proportion of Medicaid and Medicare patients. In these settings, a wide variety of lifestyle and economic issues are said to impact patient compliance and providers' ability to effectively manage their preventive health screenings. Participating health centers commonly face the following issues in delivering patient care: frequent no shows, poor communication, low literacy/illiteracy, language barriers, cultural barriers, rural locations, long distances to other sites of care, lack of familiarity with the health care system (especially among refugees and immigrants), mental health barriers, and substance abuse.

> *"Our patient population is sort of what you'd see in a typical community health center —a lot of underserved folks, 52 percent of our patients are self-pay. They have no form of insurance … a small amount of private insurance, some Medicare and some Medicaid, but the majority of our patients don't have insurance. Most of our patients are young." (Clinical, Centricity User)*

Most clinic-based providers (many of whom participated in this project) are said to be dedicated to the unique challenges of the setting and do the best they can to address patients' preventive care given the resources and time available. Though a few frankly state that some providers come into a clinic environment planning to stay for only a couple of years (e.g. for tuition reimbursement) and then leave for a different setting. As a result, their attention to the long term health needs of their patient base is not necessarily what it should be. At the same time, this is not said to be the norm.

> *"There's frequent turnover (among providers), I'd say, probably every 2-5 years. So based on that I'm not so certain that they are that engaged. Some of them are not very much engaged. I mean, they just take the patient and do whatever. They're not looking for, the extra above and beyond in terms of wellness and prevention when*

they probably feel as though it's just a waste of their time because we have a lot of non-compliant patients. They challenge us here." (Clinical, ECW)

Most respondents say that screening colonoscopies are rarely recommended for the uninsured, and they are often not carried out if they do schedule a referral appointment. Colonoscopies are more often recommended for insured patients, but even for the insured, many describe significant barriers to compliance, including fear of the procedure, inability to take time off work, lack of transportation, and poor understanding of why it is important for their long term health.

> *"We use FOBT from Quest Lab, that's our primary way of doing that. And then when patients have insurance that cover colonoscopy, then we do colonoscopy." (Superuser, NextGen)*

> *"It's highly unlikely that our patient population is going to seek acute medical outpatient care for a colonoscopy. Buy the prep, take the prep, you know, lose the day before, take the day off, get transportation, get in and get a colonoscopy done you know, with sedation and all, have that risk assessment done by whoever the sedation provider is and then go home. That's just not going to happen with this population that we see." (Clinical, ECW)*

Others add that even if they wanted to refer a patient for a screening colonoscopy, they may have no options available to them. This is particularly true in rural areas, but urban and suburban locations also face similar problems. For example, one clinician says that the only place where uninsured patients could possibly have a screening colonoscopy in her city is said to have a two-year waiting list for that service. Others add that low income patients often do not have anyone available to take off work and drive them to a colonoscopy, making it even more inaccessible.

> *"Our resource hospital for uninsured is [a local safety net hospital] … There's no such thing as screening colonoscopy through them. It's at least two years wait. So there's no such entity, really. They're only trying to deal with diagnostic colonoscopies." (Clinical, Centricity)*

Another screening barrier noted by some respondents is the fact that their patient base is not as likely to complete an annual physical; they only tend to come in when they have an acute issue. Because of this, screening discussions can be difficult to fit in, both from the perspective of time and the patient's likelihood of engaging in the discussion.

> *"We don't have patients come back annually for physicals. They come because they don't feel well…with an urgent care visit or a sick visit … so there isn't that opportunity to review everything again in terms of wellness and preventative care treatments to these patients."(Clinical, ECW)*

Utilization of Electronic Medical Records

Most respondents say they have had an EMR in place at their health center for 2–4 years. EMR access is usually delivered through terminals in exam rooms or laptops, supplemented with terminals elsewhere in the clinic. All respondents say that providers enter patient information during the exam, but often finish charting and reviewing lab results later or at home. A few also say they have access on tablets.

> *"When we first rolled out the EMR system we went with tablets and what we found was with our particular software our providers were doing a lot more typing than what we anticipated. We thought there would be more point and click, so we gave them that tablet functionality with the pen, being able to tap the screen. Well, we discovered our providers weren't using that functionality, so since then as we're replacing these tablets we've been going with the standard laptop." (Technical, Success EHS)*

> *"[Charting) has to happen later on because you can't get all that done in the 20 minutes you have or 15 minutes you have with the patient … We have terminals in the exam rooms and the patient can sit in the chair next to us so at least there's face to face. But if you try to do all your data entry during your visit, you literally will be interacting with the computer and not the patient and that kind of defeats the purpose of medicine." (Clinical, Centricity)*

A majority of respondents—both technical and clinical—say that the EMR they are using is the only one they have ever used in their careers, unless they are recent graduates of medical school and used a different system during their training. As a result, most have little else to compare against. When asked how they feel about their EMR, most describe an average level of satisfaction. All respondents have at least a few complaints about their system, including too much clicking, poor protocol/template design, alert fatigue, cumbersome reporting, or the inability to even get the data that they need.

> *"I have mixed reviews [of our EMR]. On the one hand it is very helpful with documentation and data retrieval. On the other hand, it's more time consuming for the actual clinician … just going through the process requires too many pages to be opened. Each page takes its time so it's more time consuming." (Clinician, Centricity)*

A key component to successful implementation of an EMR appears to be the extent to which the community center spent time to document work flow *prior to installing the EMR* and then anticipate how the EMR would change or adapt to that same work flow. Problems arise when providers are unable to do something they could do previously with a paper system. Interestingly, the deadline associated with EMR incentive payments provided by the government may have inadvertently hampered this process. As a result, some CHCs may have rushed launching the system when ideally they would have had more time to evaluate their work flow and find a system that matched up with it, rather than the other way around. Similarly, some say that they did not necessarily put in enough time evaluating EMR vendors or determining the features, options or templates that would optimize their work process. After investing such a large amount of time and money in a particular system, most do not feel they can change course now, though a few superusers contend that some clinics are better off doing a "rip and replace" rather than working with a mismatched system.

"There was this blitz where everybody was out and pulled the trigger on these systems and along with that stimulus money there was some pretty aggressive timelines tied to it, so I personally think we were a bit rushed because of that. In our implementation it really didn't take enough time to … do the workflow analysis and streamline our workflows before we even implemented. I think if we had spent more time doing that it would have probably been easier—a smoother transition." (Technical, Success EHS)

Another distinction between CHCs appears to be whether or not they have dedicated IT and reporting or quality improvement staff. In particular, those with dedicated technical staff are clearly better able to utilize the EMR system, as they have staff who can program, access servers, or customize the software to meet their needs. Some centers have a server onsite that houses data, however, the vendor manages all aspects of the server whereas other centers maintain the server and thus can access and manipulate it as necessary.

"We have about four or five servers that are dedicated to the EMR system. The main database server we don't touch. Our vendor manages the whole thing. They back it up. We can't even get into the server if we wanted to." (Technical, Success EHS)

"Somewhere in the GE world, somebody is building content [forms] and releasing it and we actually don't use that. So, all of the content that we use today [we have] built because you can do content two ways. You can use the CCC forms or you can build your own forms through something else. So, we would like to say our clients are very satisfied because we've built the forms specifically for them and they're not off these off-the-shelf, clunky [forms]." (Clinical/Technical Pair, Centricity)

EMR Training and Vendor Support

Most respondents report receiving a minimal level of training from their EMR vendor, with several saying that providers might receive only two or three days of training. Some add that their IT staff received significantly more training than their clinical staff. Others say they were trained only via webinar, or that they were trained by someone with no clinical background and little understanding of the clinical environment in which these systems function. The impact of this insufficient training does not necessarily make itself clear immediately though; rather, their lack of training seems to emerge over the course of months as they become more frustrated with the system and its perceived deficiencies.

"If they've never used an electronic medical record in the past, I don't think they're getting enough training. I think the one to two day training is not enough. It should be more like a week." (Clinical, Centricity)

"When we first got ECW, the trainers for ECW, the technical people who came out from Boston, you know, they could tell you some things but they didn't really use it from day to day. And looking back, I'm kind of amazed at how clueless they were. Yeah, maybe they're smarter now, but they were very personable and helpful but man, yeah, yeah. The nuts and bolts of what we really needed to know, they knew maybe half of it." (Clinical, ECW)

"At the end of the day, there's no clinical person talking to you. There are clinical people at the vendors but they are those that sort of work with the practices to sign

on the dotted line to basically say give up you $10,000 for a license. But when that happens, most times, they disappear." (Superuser)

Most respondents are also dissatisfied with the level of ongoing support they have received from their EMR vendor. This is particularly problematic for smaller clinics where there is no dedicated IT person. Few describe EMR vendors as supportive or responsive when clinics have complaints or want things to be changed, so some say they just stopped asking for assistance. Others complain that there is no continuity in the vendor teams that respond to their questions and complaints; every time they call, they speak to a different person who does not understand clinical issues or the history of their installation. All of these issues contribute to a poor level of skill with regard to EMR functionality. Superusers confirm this perception, observing that EMR vendors do pay attention to the needs of large networks of users, such as those in HCCNs or Primary Care Associations, but tend not to spend much effort on the needs of individual CHCs.

"There were a couple of things on the Alerts Menu which did not please me and I asked them about. They did not have answers. I have not gone back in the last two and a half years to see if they've done any better, honestly." (Clinical, ECW)

"There's a couple of different [HCCN] organizations … I think they help organizations to get more of their EMR dollars spent and also for instance, [one HCCN] does a lot of eClinicalWorks. They have a lot of power with eClinicalWorks and when they go and complain to eClinicalWorks, eClinicalWorks listens to them. The individual FQHC goes to eClinicalWorks, you can't get anybody to call you back." (Superuser, Epic & ECW)

"[There are] so many pretty perfectly fine products are out there [that are] so under supported that they just become a burden instead of useful." (Expert, AllScripts)

Only one or two respondents report that they received training from their vendor that went above and beyond the initial orientation. One mentions additional online training that is provided when system updates are issued. In a couple of other cases, the vendor training was provided at additional cost to the clinic, but made a clear difference in helping providers make better use of the system — particularly being more consistent in their documentation.

"[We] brought our EMR vendors in on-site, some consultants, and they came in and literally shadowed our providers. Since we're three years into the system and we recognized that we had providers using the system differently in every clinic and so we had our vendor come in and they worked with our providers in showing them best practices or ways to maximize the use of the system. I think that helped out quite a bit within the organization. But, I do see that as part of the problem is that it had been three years since we went live with the EMR and folks just kind of went off on their own with the software…. They were just all going about it differently." (Technical, Success EHS)

"Our vendor has what they call their online university. So it's kind of a repository of online classes that the provider can access at any time really. They can access it from their computers. It's all Internet based. With our EMR system we get—I don't know if other EMR systems are this way—but we get a ton of updates." (Technical, Success EHS)

Those centers who report higher quality training efforts almost always are doing so with in-house staff, without the support of the vendor. Others have access to experts or superusers as part of a health center controlled network. High performers also describe significant integration between clinical and technical staff, both at the beginning of implementation and on an ongoing basis to ensure that they are making correct use of the EMR and know about the latest updates.

> *"[When] we get a new physician – a new provider (we do have mid levels) – and the CMO will meet with them and go over the basics. I'll meet with them for some of the non-clinical basics and then they will shadow another provider and then work on their own with some supervision. As the new clinician is starting out, our report writer will audit their notes, so that anything that's coming up early will be addressed so that they don't start with bad behavior." (Technical, ECW)*

> *"We do most of the training in-house, so we have monthly provider meetings where I present to them new forms, new things, how to use them or open up your questions, things like that … just to be able to enhance or do a transfer of knowledge so then they understand how to exactly use a form." (Technical, Centricity)*

> *"In the past it was me and another one, another person for the whole company, you know. Now we have six technical training unit members whose only responsibility is to go to the site and work with the providers to help them optimize the use of the EMR and that has proven a good initiative. So we started this past November and providers are very happy that we have somebody going to on coaching them on what else they can do to make it easier, less clicks, more efficient, be able to deliver better care." (Superuser, NextGen)*

There is a great deal of "on the job learning" taking place in these health centers, with many respondents saying they "stumble upon" features or think that their system can do something, but they haven't had the time or training to figure out how to do it. Some smaller clinics indicate that not only do they lack real IT support, the on-site administrator may be an RN or LPN who came into the position because no one else wanted to do it. They often have no IT background, but are functioning as the primary EMR administrator. Exacerbating the problem is the fact that turnover rates are above average, both among clinical and technical staff. Hence, the person who was trained by the EMR vendor may have since left the organization, taking the bulk of the system's knowledge with him or her.

> *"I learned the charting system and how to make appointments on that level through webinars and e-learning and then we had a trainer come to our facility when we went live, but unfortunately, she didn't get to spend a lot of time with the clinical side. She was with our IT people who have since left and that's why I've been moved into the IT position. So recently, I've just been doing trial by fire type training." (Clinical, NextGen)*

> *"I have some prior knowledge before I came, but I kind of learned it myself. The person who I replaced kind of quit so I didn't have a transfer of knowledge from her. I kind of just picked it up myself."(Technical, Centricity)*

> *"We still come up with new fascinating things almost on a weekly basis. Sometimes when I'll be just clicking on things, I'll be like, 'Oh, wow! We could do it four-ways'. That would be cool." (Clinical, ECW)*

Optimal Use of EMR Systems

When asked if they feel they are making full use of their EMR's capabilities, almost no one feels they are doing so. This is due to poor understanding of the EMR's functions, inconsistent use of EMR tools by providers, lack of use of reporting features, and lack of staff time and expertise to devote to exploring and learning the system. Because so much learning takes place through day to day discovery, clinics that have had an EMR for a longer period of time are more likely to say that they are making better use of their system's capabilities. Superusers who have managed EMR implementation at multiple sites agree that EMR functions are poorly understood at sites that lack skilled IT staff, in part because the EMR market is still so new and difficult to navigate.

> *"The systems are still, in my view, immature. … There are no, there is no iTunes for health care IT. There is no breakthrough product. They all are really tough to manage and implement and keep up with meaningful use and all the other requirements … they're all that way. So the question really is how do you help people get the most of what they have and limit their costs, their total cost of ownership so they can pay for actual clinicians to do the work ." (Superuser, Epic & ECW)*

> *"I understand the system, the ability to customize the system. I don't think that we're close to really leveraging its ability to really help us take care of our patients on a population level or even day to day clinically. And part of that is really a support issue. I'm sort of doing this by myself." (Clinical, Centricity)*

Structured vs. Unstructured Data. The attention paid to proper EMR documentation—the entry of structured versus unstructured data—is one of the most important differentiators between high performing and low performing clinics. While nearly all believe that the future of the industry is more and more reliance on EMRs and the data they generate, some have embraced it more than others when it comes to mandating the entry of structure data.

> *"Our feeling is if it's paper and if it's a PDF document attached to the record, nobody's going to look at it. So we put everything into a structured format in our EMR, so we're capturing it in a way that we can pull the data out in a meaningful way." (Technical, ECW)*

> *"[Providers who aren't well trained on the EMR] They'll skip by the features that they don't feel comfortable with. I just had that situation pop up this morning. So, they'll bypass like putting orders in and they'll scan them in instead and like we already discussed, scanning doesn't do anything. It doesn't capture structured data. It's just a file sitting out there that no structured data is going to a flow sheet" (Clinical, Centricity)*

According to some Superusers who have examined systematic differences in EMR generated reports versus patient charts at multiple sites, clinics may be dramatically under-reporting their screening due to improper or inconsistent documentation in the EMR—essentially generating "dirty data." They explain that when providers are not informed about how the EMR "counts" a completed screening, they may not pay enough attention to proper documentation; therefore their efforts go uncounted.

"Unfortunately, a lot of your older physicians, they don't see the importance of [structured data] … but if you're able to explain to them, 'Yeah, it's great. Yeah, you're going to have to click a button'. It's one more click, but guess what it does? That one more click will allow you to now track that for that patient … But they don't always understand that. They think 'Oh, my god. It's something that CMS is making me do. This is ridiculous.'" (Superuser, NextGen)

"Literally moving all these fecal occult blood test under this wrong LOINC[8] or having no LOINC associated because you free-handed the LOINC order for fecal occult, I'm basically getting them on to the right LOINC and then now closing out the alert saying that that order is still due. … So the vendors were doing their job and making sure the system can pull it. What they weren't doing their job to really explicitly help the provider to understand this is the only way you're going to capture this information. You need to enter it this way. And if you don't enter it this way, if you don't always satisfy that clinical decision support alert, by using this code, you will never, ever get an improvement on your report, unless you know how to go behind the EMR." (Superuser)

Motivating providers to use the EMR effectively is a key concern in many clinics. Some providers see effective EMR documentation as time-consuming and distracting from their real work of treating patients. These providers will use the system, but they often fail to document things as fully as they should, prefer to enter things in free text when given the chance, or are inconsistent in how they document the same thing with different patients. Although relatively few mention frequent use of open "text boxes," it is a problem at times, particularly in a system where there are multiple ways to record the same thing, as is the case with colorectal screening. Some say that older providers in particular are somewhat more entrenched, less comfortable with the technology, and less likely to see the value in investing time in EMR training and utilization.

"[Providers would say] 'I don't think it's my job to do this. My job is to see and treat patients. My job is not to make sure that your EMR that you purchased without my knowledge or input is now working to its most efficient level by making me more robotic in my encounter captures.'" (Superuser)

"The only challenges that I really struggle with is that when people free text because they are very hard to retrieve. You're looking at many, many different variations of something and then … it could take you hours to run because you're looking at every possible variation of something and that's the biggest thing. So, we try to train our providers to document in appropriate places for the appropriate things." (Technical, Centricity)

"Before I was here, they didn't really have a system in place to put data or patient information into structured data. So a lot of the times clinicians will just document, like for example, putting down smoking, so any of our screenings they would just put in the chart and free text it." (Technical, Centricity)

When higher performing clinics are asked how they encourage physicians to pay attention to the entry of structured data, they say that it boils down to conveying the importance of how the data will be used to assess their clinic's performance, their individual

[8] Logical Observation Identifiers Names and Codes (LOINC) is a universal code system used by EMR systems to facilitate identification of laboratory and clinical observations.

performance and better manage their patient population. Although very few say that they tie physician compensation to performance numbers, regular review of individual performance gives providers a feedback mechanism for evaluating themselves. Some describe group meetings where providers discuss their scores and ways to improve them to meet meaningful use or other quality goals. Some respondents add that it can be very motivating for a provider to see how he/she is doing compared to peers. Further, if a provider feels that the EMR reports are lower than how they *think* they are performing, they will be particularly motivated to learn how to better document their work so that it is properly "counted." One technical respondent says he often hears providers asking, "How do I make sure I get credit for this task?"

> *"I think the providers really need to understand the benefit of having an EMR. … Once they understand that that data is really useful and it can help us understand where we are, how our population is doing. I think that's really credible for you to know in a matter of seconds that 'Oh, the A1c values have gone done for my population.' It makes the provider feel good, to be honest with you, if he knows that the A1c were an average of nine and now an average of six. That makes them feel good. That means they're managing their patients really well." (Technical, Centricity)*

> *"[We would ask providers, 'Shouldn't you be the provider who's the Best Doc? And how would you be able to prove that unless you are capturing information more accurately as opposed to this crap that's coming out of your EMR? That's really not reflecting the huge service that you're providing for your patients, even in these underserved communities. You could be fabulous in an underserved community. You don't have to have the perfect patient panel, you know, and you could still do a good job.' And they bit to that. They recognized that and they said, 'You're right.'" (Superuser)*

Centers that conduct group or individual level reporting for the purpose of motivating better care appear to be in the minority however. Most appear to have no such mechanism for accountability. In these situations, providers may be encouraged and trained to document activities properly in the EMR, but little else appears to be done to encourage correct use.

Capabilities for CRC Screening. Another challenge that appears to cut across all EMR systems is that most systems are not optimized for the nuances of CRC screening. Unlike most other types of preventive screening tests, there are multiple valid ways of fulfilling the CRC screening requirement (e.g. annual FOBT or FIT, colonoscopy every 10 years, flexible sigmoidoscopy every five years). Additionally, colonoscopy referrals are not necessarily clear cut in terms of where they should be recorded; they do not fit cleanly into common EMR categories of lab test, diagnostic imaging or immunization. As a result, providers can legitimately order screenings or make referrals in different places within the system. Differences in consistent documentation of referrals and follow up on positive stool tests further complicate the development of a complete screening picture. This results in inconsistencies and the need to compile data from several places in order to achieve a complete picture of screening activities or results—something that puts a great deal of pressure on data analysts.

> *"Your choice is either to make a concise usable Alert Menu or you make a huge long Alerts Menu that allows you to put in six different ways of satisfying the same*

requirement but then it's almost unwieldy in terms of being useful … I think that was poorly thought out and I can't imagine that they had much clinical input when they made that." (Clinical, ECW)

"ECW for example, they have two different ways to get a colonoscopy done. One is by procedure and one is by diagnostic imaging. So if the provider orders the test in procedure, then they have to close the test in procedure. … The problem was they didn't explicitly define those two so they allowed you to do it in both ways. … [Providers] weren't all doing it the same way. Hence, the reporting was really dirty data." (Superuser)

"I've spent several hours if not weeks or months reworking our entire workflow [for cancer screening] and design of how that works. So being able to make it work the way you want it to work … figuring out how to make all of these complex, sort of clinical pathways work with a computer, which your brain is faster. Obviously, your doctor or medical provider could do this faster, but it's also so complex that they aren't going to be able to memorize it and do it consistently. So how do you make the computer help them how to do it?" (Clinical, Centricity)

Focus on System Optimization. Another common issue that impedes more effective use of EMR systems for screening is a lack of organizational focus and investment in optimization of their system. Most suggest that in a community health setting, the focus is on transactional, day-to-day activities rather than longer term concerns. The kind of investment of time (e.g. a dedicated staff person) and money that would be required to conduct a detailed examination of EMR use, work flow and reporting is simply outside the typical scope of the average community health center.

"Everything I've come across, except for maybe one or two organizations, they typically do not invest in someone within their organization to really explore what the functionality of the system is. They take their training; they take their implementation, and they kind of go from there and they never explore the other possibilities…. They're too busy seeing patients." (Superuser, NextGen)

"What's the best practice for optimization? I think about organizations that from the very beginning has set aside optimization as part of their implementation — that six months after the clinic goes live, they're going to come back around and spend money in them, organizational resources … .We encourage that as a part of our implementations of both on eClinicalWorks and on Epic that you need to come back around six months after you go live and you can reevaluate all your workflows and apply the areas where the docs and they're just having the biggest problems, and do workflow improvement." (Superuser, Epic & ECW)

Some superusers also add that they have seen a variety of clinics over-customize their system, to the point where they actually end up breaking some of the reporting functionality without realizing it. Inexperienced clinics may end up blaming their EMR and even doing a "rip and replace" as a result. Additionally, some say that centers often do not keep up with system upgrades (e.g. "hot fixes" from NextGen) either because of lack of attention or fear that their system will be down for a period of time during the upgrade.

"You find that they've never upgraded or they've never applied the recent fixes so no wonder it doesn't work for them … [and] they expect the system to never go down, to

never need updates, to never need repairs and they just kind of keep going status quo and it just amazes me." (Superuser, NextGen)

"It's really a skill set and lack of knowledge of the product, because again, they only get that initial education of implementation and a lot times they don't have the resources to go back and 'Hey, it's great. What else can it do?' They never think that far in the future because they are too busy running in a circle." (Superuser, NextGen)

"We had a group come to us that wanted to move from NextGen to Epic, and they said NextGen is a complete failure and I went personally and saw this implementation and it was a complete failure. Was it NextGen's fault? Hell, no. It was the clinic's fault because they didn't listen to whoever was implementing it or they didn't know what they were doing when they did implement it." (Superuser, Epic & ECW)

Prompts for Screening

Type and Use of Alerts. The ability of an EMR to issue an effective prompt or alert to providers when a patient is due for a preventive screening is an important component of the system, and all CHC respondents say that their EMRs are capable of doing so, to varying degrees of effectiveness. Respondents describe a variety of prompts for CRC screening, depending on the vendor and what features they have decided to turn on and/or customize. Some (e.g. ECW and Centricity's Alerts Menu) require the provider to navigate to a particular section to see what screenings are due for the patient. Others (e.g. NextGen) have protocol pages that summarize what the patient needs depending on their age and gender; others use pop-up windows as well.

"There's a screen that will pop-up as soon as they log in to the patient's chart that has their protocols and if they go into the screening protocols template it will show what they [patients] are due for … [but] I feel like neither of them (providers) use it all. … I put in all the information but I don't think they ever look at it. … .Either you can go into it or you can ignore it and I think that probably 98 percent of the time it gets ignored." (Clinical, NextGen)

Respondents report considerable variation in if and how they actually use their system's alerts; even if the practice has turned them on, they may not use them consistently. Additionally, respondents in different clinics using the same EMR system report different screening prompts and tracking systems. For example, some Centricity users say the system provides automatic pop-up alerts which are based on a patient's age or provider-controlled choices. Others say it does not offer such pop-ups. This suggests either customization, use of different versions, or lack of use/awareness of certain features. It may also indicate that some clinics are not keeping up with the latest versions of their software — a practice that some superusers have observed in CHCs with no professional IT staff.

"I am not aware of any alert or area where I can just simply check whether colonoscopy was done or not, and I don't think it's being tracked … other than to simply ask them or depend on their memory." (Clinical, NextGen)

"They have to click on the Alerts Menu themselves. … The chart will come up and there are several options at the top below their name and they'll click on Alert and all

the different tests will come up. Tests or alerts and their due date. And so, no, it's not prompted. It doesn't automatically come up." (Technical, Centricity)

"Within the Centricity system, there is actually a cancer screening form, which you can pull up for each visit and it really nicely documents for you — if you did it correctly — when your last Pap was, what the results were, when is the next one due, same with colonoscopy, prostate cancer screening and mammograms. So it's really nice that on one page you can basically check all four big cancer screening initiatives. … .The other thing that is helpful is there's prompts so that you haven't done a mammogram or cancer screen thing, the system prompts you at the end of every visit. If you look in the right section it prompts you that you haven't done this yet." (Clinical, Centricity)

"It also has a pop-up flagging system so that the practitioner if they had a colonoscopy, that say was abnormal, that practitioner can flag themselves with a date that that patient would be due for that colonoscopy. So, you could literally flag yourself three years from now and that pop-up is going to come up." (Clinical, Centricity)

Several respondents say that their providers do not pay attention to pop-ups if there are too many ("alert fatigue"), so they may turn them off. Some say that they prefer to use electronic sticky notes or other types of electronic notes, which can be prepared by a medical assistant who manually reviews a patient's record in advance of their appointment, or used by physicians who want to postpone a screening until a later time.

"Sometimes it will be from what we call the Alerts Menu to see what's due, to see when they last had a Pap, something like that. There's different places. Sometimes it will be in a sticky note on the top of the chart, kind of a little note in a yellow box that someone put there so that no one would forget." (Clinical, ECW)

"Maybe I ask Mr. Smith about his colonoscopy at this visit and he didn't want to talk about it because he had to get to work. He was just too busy, didn't want to deal with it. I could actually write a note in my plan that says, 'Speak to patient about colonoscopy next visit' and I could place a little check box and it will carry it forward to the next visit so it's a reminder to me. It's like a tickler to me at my next visit with the patient." (Superuser, NextGen)

Many respondents say that they are dissatisfied with the way their EMR delivers prompts or alerts for preventive screening. Some providers feel the alerts are too "in your face;" others do not like the fact that some cannot be clicked off or postponed according to the provider's judgment. Additionally, more than one EMR appears to have the problem of alert loops that are difficult or impossible to close (though it is not clear if this is a genuine deficiency or if it is a training issue). In some cases, clinics have just turned off this feature because they cannot figure out how to bypass or modify it.

"There are multiple practice alerts in eClinical Works, and we don't have them turned on because if they're on, it's hard to turn them off. There isn't anything that automatically trips it to turn it off because we really don't have a great mechanism for getting the feedback or getting the information back from the patient that they've actually had some diagnostic testing done or follow-up or consult appointments with specialists done to turn that off. So they find it a nuisance … there's no mechanism to close the loop on any of those alerts." (Clinical, ECW)

"We don't run a lot of prompts because … most people don't read pop-ups, period. You turn your pop-up blocker off. I've spent hours on the phone, 'Well, what did the pop-up say?' 'I don't know.' 'Well, what did you click?' 'I don't know. I just made it go away.' They're not really effective at communicating, so we currently don't have a pop-up system." (Clinical, Centricity)

In some clinics, respondents describe an inability to manage alerts for both FOBT and colonoscopy in their EMR. They say they their system does not distinguish between the two, so they end up tracking only one.

"Theoretically, you could put in both but if you put in both, then you'll have one outstanding. For example if you did Fecal Occult Blood Test and it was negative and you don't need a colonoscopy, so we haven't put in both alerts in there since we just screen first with the Fecal Occult Blood Test. And then, I don't think there is a place right now built into the EMR for colorectal cancer screening." (Technical, Centricity)

Only one or two high performing clinics report that they make use of standing orders for CRC screening. Those who have done so credit it with significant increases in their screening success as well as reducing the burden on physicians.

"We upgraded to a new version NextGen created and it's better protocols that brought the health maintenance to the next level. We were able to create standing orders for the whole staff to be involved on ordering colon cancer screening when it was due." (Superuser, NextGen)

Screening Prompted by Family History. None of the EMR systems used by respondents have screening prompts that were influenced by the content of a patient's family history. That is, family history of CRC does not impact automated prompts, put them into a higher risk category, or cause any flag to be raised, such as an earlier screening initiation or call for colonoscopy. When asked if clinicians would like to have their EMR make use of family history information to recommend different screening intervals, most think it would be accepted, particularly by younger physicians who come through medical school with EMRs as an integral part of their training. Older physicians are described as being more resistant to the idea. However, most do agree that this represents the future of medicine so they might as well "get used to it." A few add that with screening recommendations and standards changing so frequently, it is important to have this kind of support built into the system to take some pressure off providers.

"I think it depends on the provider. I think some of the providers would feel like it was the machine trying to tell them how to do their job … that's a comment I've heard. And then the others would appreciate it because it would be something that they wouldn't have thought of or remembered." (Clinical, NextGen)

"I guess not looking for the EMR to be all-telling, to be the cookbook for how providers need to address but there's so many screening requirements and data fields that need to be addressed for meaningful use and reimbursements and all that it's getting to be cumbersome for our providers who really keep track of everything." (Clinical, ECW)

"I think a lot of people especially now, they're used to getting so much decision making help that they really like it so I think that the wave of the future will be more that way." (Clinical, ECW)

Most respondents say their alerts are pre-populated with recommended time intervals for screening, but they do have the ability to change the interval for a specific patient or for their entire population (e.g. if their local GI globally recommends screening colonoscopy every eight years rather than every 10). Only a couple of respondents describe using features such as risk adjustments to their protocols, which are available in NextGen. In these cases, the provider can select a higher risk category for a patient if his/her history suggests it, and the higher risk protocol will deliver a shorter screening interval. However, few mention making use of this feature and there is little evidence to suggest that most users are even aware of the option.

"There is a risk adjustment pop-up. …Tthe way NextGen works is you attach a set of protocols to the patient … so once you attach it, you get a bubble that says this patient need is in a particular higher risk for mammogram, if it's a woman, be it a history of breast cancer, a history of colon cancer and when you check that, the interval changes because the protocol can be set up for a higher risk that you have full control over. And that can be done in the system. Plus there is an option that every individual provider can individually change [the] interval." (Superuser, NextGen)

"You can set protocols up. A lot of times people don't realize … they take them out of the box and they never do anything with them. But, NextGen actually allows you at a high level to implement new protocols. So, I can say, based upon these risk factors, I want this to be the protocol. So, that's something that you have to manually enter, but it's definitely doable." (Superuser, NextGen)

Automated Patient Reminders. Only a few clinics report using automated patient reminder systems for preventive screening, and only one does so for colorectal screening in particular. (The others generate reminders for cervical or breast cancer screening.) There is some support for this idea though, provided there is still opportunity for clinic-level control of when and to whom the reminders are sent. That is, respondents do not necessarily want their EMR to automatically generate emails or letters for all patients who are shown to have an expiring FOBT/FIT or colonoscopy without some level of review. Several respondents acknowledge that their system has the capability to deliver automatic reminders, but they have not fully investigated the option or have plans to do so in the future once they have more patients signing up for communication through a patient portal. Essentially, it appears that these kind of reminders are simply not a priority for most community health centers.

"Just this week I had a conversation with somebody about the reminder letters or the reminder system, but up until that point I didn't know that we even had that option. So, I have to do some research on my end to see where we're at in that process. I think that it is possible, but I don't know yet what all is involved in it or if we have that section of NextGen, because I know there's different parts of it. I don't know if we purchased that licensing for that part." (Clinical, NextGen)

"All of our breast cancer is essentially automated in lists and get the postcards this month and things like that. We haven't done that for colon cancer screening." (Clinical, ECW)

"I think has the capability of pushing things out so you can send something like that to patients but we're not using that. … I don't know how it works exactly because we haven't done it. I think it's via message via their web portal when they sign in and then they'll probably get an email to say they have a message in their web portal." (Technical, Centricity)

Customization of Alerts. Many of those with more sophisticated IT resources have customized their systems to address providers' complaints, either by programming new alerts, creating custom templates, or purchasing add-on population management or reporting software that creates custom alert bars or corners (e.g. CareSentry) which are said to be less intrusive.

"We've kind of personalized it and done our own thing. I'm not sure by itself out of the box it would very good. But I think the way we had set it up, it's excellent. … We've made some templates to kind of go with cancer screening recommendations and to go with Medicare guidelines and Medicare recommendations. We've made some orders that you can click on that have codes that will indicate what's been talked about. We have preventive medicine templates that you can just click 'Colon cancer screening up to date' and put the date in and you kind of know it's been looked at for that year and it's going to be okay." (Clinical, ECW)

"[CareSentry] creates like an alert bar, so if I had colonoscopy or Pap or whatever it might be as part of my expectations for testing and I knew that you hadn't had it done, it actually comes up red. So, it has like this little stoplight … it has this stoplight bar and if it's a red, I know that something's due. If I click on it, it will show me everything that's due or past due." (Superuser, NextGen)

Tracking of Referrals/Tests and Results

FOBT/FIT Tracking

Reported tracking of FOBT/FIT cards is inconsistent. Some clinics say that stool cards are ordered as a lab through the EMR, so they can theoretically be tracked. Others simply hand them out and may or may not mark it in the EMR, typically in a provider notes field. Additionally, different providers within the same clinic may order a stool test in different ways, making tracking particularly difficult.

"Mainly it's just their notes (FOBT distribution). There isn't a way to automatically populate that they've sent it home. They have to remember to type it in." (Clinical, NextGen)

"There's a section in the lab, in-house labs that I also like and that also is where you document your FOBTs so that's kind of nice." (Clinical, Centricity)

Despite the fact that most centers rely on stool testing rather than colonoscopy for most of their patient population, the majority of health centers interviewed say there is no particular system in place to remind patients to return FOBT/FIT cards. They acknowledge that return rates are typically poor without follow up, given that patients do not really want to do the test, but say that they do not have the staff time to follow up on unreturned

cards. In some clinics, follow up in the form of phone calls may be done by a medical assistant as time allows, but there is no structured reminder system. Some add that they make it a priority to follow up on screening tests for which they have pay for performance compensation, or if they have a grant for a particular type of screening, but CRC typically does not fall into these categories.

> *"We have a report of orders that are not fulfilled or not completed. And then as time allows, [someone] will contact those individuals. But the bottom [line], the reality is that doesn't happen as much as we wanted." (Superuser, NextGen)*

> *"We do some proactive things like diabetes management and LDLs and stuff, but honestly for returning stool cards, we tend not to run those reports. Some of it depends on who's pushing us at the moment. Right now we have a grant about cervical cancer screening where we have to do all this stuff, so if you haven't had a Pap smear, we'll be calling you and calling you and calling you and I assume if someone gave us a colon cancer grant we would [do the] same thing." (Clinical, ECW)*

> *"We use FIT testing now … but there's nothing in the EMR currently to really support our efforts in driving that or ensuring that the patients actually follow through on that." (Clinical, ECW)*

Many report that the only time follow up is conducted on an outstanding stool test is when the patient returns to the clinic for another visit, prompting the provider to look at that individual's record again. Respondents say that there may be a sticky note or a pop-up in the system to remind the provider to ask about the stool cards or give them another one, but the same cycle may repeat again if no additional reminder is given after the visit.

> *"We don't really find out if it's ever been returned because, until they come back. 'So, did you do this?' And they'll say 'no.' And then you have to tell them again to return it." (Clinical, Centricity)*

> *"If they don't know whether the test has been done, then the next time they come in, they'll push the little CDSS button to see what's still outstanding, and if that FOBT light is still red, then they'll say, 'Ho! We gave you the test and you didn't bring it back,' or 'You didn't send it back'" So it's a prompt for them." (Technical, ECW)*

> *"Let's suppose that the MA ordered or the provider ordered the colon screening at last visit. So if that has not been completed, the second pop-up the MA will get is, 'These are orders that had been placed but have not been completed.' That will give the MA an opportunity for the orders that have been placed. 'Oh, what happened? We gave you the cards a month ago.' 'Oh, I haven't forgotten,' or 'I lost them' or whatever. So then the MA can give them the cards back." (Superuser, NextGen)*

> *"When they pull up their chart, there's no pop-up to say FOBTs still are outstanding. I think that would be extremely useful, actually … but they could be in this list of labs that are still outstanding for the patient." (Technical, Centricity)*

Only one or two respondents from high performing locations describe anything like systematic follow up on outstanding stool tests. In one case, individuals automatically receive robo-calls three weeks after being given a stool card. If it is not returned after three more weeks, they will be automatically sent a reminder letter. One expert indicates that stool cards are ordered as a lab with an *expiration date*, so that if it expires without

receiving a result, a message will go to a nurse so that he/she can contact the patient. A few other clinics note that they have plans or hopes to use more population management features in conjunction with new patient portals in order to better follow up on stool tests. However, some acknowledge that these tools may be limited in usefulness because they are reliant on patients being willing to sign up for a patient portal in order to receive email or text reminders.

> *"NextGen has a new application—it's called population management—that will help make it that more automatic … then the population management will look every day for orders that are not completed and then we will, based on the logic that you put, you will then send either via text or via email or place a phone call depending on what is the preferred method that the patient wants to be contacted, a reminder about that particular test. Not only for the ones that are not completed, but the ones that are not done at all." (Superuser, NextGen)*

For tests that are completed, many centers describe being electronically linked with one of the major testing facilities (LabCorp or Quest). In these cases, FOBT/FIT lab results are electronically populated in the EMR and there is a notification to the provider so they know lab results are in. For those that process stool cards on-site, the result is still typically entered in structured, searchable data fields. In some systems, abnormal results are also highlighted or marked in some way, typically by color (e.g. a red exclamation point or text).

> *"We do have lab interfaces … anything that's done through our Quest Labs, we have an agreement with Quest Lab, if blood work or anything like that, those results get populated in automatically through an interface." (Technical, Centricity)*

> *"Usually the stool cards, the labs does them, and then they will send them to the provider to review the day that their done. So if they get brought in, the provider will have it on their list of completed labs and they have to check them off to review them. … They put the result in by hand because they do it themselves by hand in the record. And there will be a red exclamation mark next to it saying that it's abnormal." (Clinical, ECW)*

> *"Any abnormal result comes back from the lab with an exclamation point, a red exclamation point so there is a visual on that." (Technical, ECW)*

> *"All labs are coded. If they are abnormal or positive, they have either red or a pink color. If they're normal, they are black. If they are low, it's blue. So you have different colors to alert you." (Superuser, NextGen)*

No one indicates that the EMR provides any type of clinical decision support on the recommended action to take (e.g. colonoscopy referral) if a FOBT/FIT test comes back positive. Respondents suggest that this is not really necessary since the provider would certainly know that a colonoscopy would be needed. They say the only reason a provider might not refer a patient for a colonoscopy after a positive stool test is if they are not able to afford it or they refuse. Experts emphasize the importance of EMR alerts for stool tests that have not been followed up with a colonoscopy, stating emphatically that physicians should be given a *critical alert* if they have a patient who has gone a certain amount of time without a diagnostic colonoscopy after a positive stool test.

"In terms of prompting a provider to order a colonoscopy if they've had positive FIT testing, that's basic medical judgment that they would know that would be the next logical step." (Clinical, ECW)

"[The MA will] document positive or negative and they send that to us to sign off on. So we see everything. So there's no flag that says, 'Hey, this FOBT was positive.' But you have to sign it, go to the cancer screening form and input the data of the three FOBT's and you have to make a decision. Is it just going to be done next year and then tell the computer to put in for a year? Or if it's abnormal, what are you going to do about it?" (Clinical, Centricity)

Although more an issue with colonoscopy (see below), some respondents also say that their systems' protocols for closing the loop on stool testing are also difficult to understand or are poorly designed. This causes some to not have trust in the numbers reported and to modify the system or design something new if they have the IT resources to do so.

"The way NextGen designed their 79 templates was not well done because when, for example, you ordered an FOBT in the protocols and then you completed it, the system did not mark the protocol as completed. … So technically when the order was completed, the protocol flag should turn off because it was done. But the flag was not turning off." (Superuser, NextGen)

Colonoscopy Tracking

Patient compliance with colonoscopy recommendations is reported to be fairly poor among most participating CHCs. Many respondents say they do have a staff member who schedules colonoscopies and follows up to make sure patients go to their appointments or reschedule them if necessary. Respondents say that follow up on a referral may take place anywhere from three to eight weeks after it is given. This follow up may nor may not involve the EMR in a structured way, and follow up on incomplete referrals may be dependent on what the individual provider decides to do.

"There's supposed to be a way that you can pull up all patients who have had a referral done and see if their records back, but it doesn't work correctly. … It doesn't pull everybody up. … I haven't had time to sit down with NextGen and say, "Okay, here are some of the problems that we've been having.' Because I think they're not aware of some of them. We thought that they were aware of some issues and we have found out that they didn't know." (Clinical, NextGen)

"If the patient did not go, it goes to the Medical Assistant of the provider to let them know that the patient did not go and the Medical Assistant asks the provider, do they want them to call or send a letter." (Clinical, ECW)

"If we haven't heard from them in a month, then they're able to filter out the referrals by date, by appointment date and they'll start calling or faxing requests to all the specialists. This is our way of also knowing if they followed through with their referral or not. Because before I was here it wasn't being tracked. Like referrals were not being tracked at all." (Technical, Centricity)

Only one respondent in a large, high performing center reports that their EMR delivers any automatic reminders to patients to support this process. A few centers say they run

reports of all colonoscopies ordered and then send letters or place calls to remind all patients who did not follow through and comply, though use of this seems to be inconsistent.

> *"We have a referral department … They are sending flags to themselves to check appointment completion 10 days after the appointment. They call the referral specialist and if they don't get a report back, in say three weeks past the appointment, they're calling them and saying 'Did this patient show?' and then it's documented right there on that status." (Clinical, Centricity)*

Colonoscopy Reports and Structured Data. Once a patient does complete a colonoscopy, the clinic may or may not receive a colonoscopy report, either by fax or mail. If the result is normal, some clinics say they may only get the result verbally. Other clinics describe a time-consuming process to "chase down" colonoscopy reports in order to close the loop on referrals. This is a particular challenge for CHCs in smaller communities because they do not have enough staff time to devote to this process. Only a couple of respondents say that they are in the process of establishing electronic information exchange with partner GIs in order to enable direct posting of reports into patients' charts.

> *"They (GI doctors) don't have a tendency to return any reports back to us if it's a direct referral to colonoscopy. So we have to chase after those, unfortunately." (Clinical, Centricity)*

> *"We don't have great sharing in this community of other consultations or results unless we specifically look for it … .It's just hit or miss sometimes that you might get the actual follow-up that the patient did actually go to the consultation, did have, you know, like I said, an eye exam, or did have a colonoscopy." (Clinical, ECW)*

If a colonoscopy report is received on paper, it is usually scanned in, attached to the patient's record, and the provider must review and sign off on it. However, the contents of the report are not necessarily entered into any structured data fields, making it impossible to search on those results. A few respondents say they have administrative staff that are supposed to enter at least a minimal amount of information from the report into structured data fields, but this is not common, and there is little consistency in the type of information that is entered from one clinic to another.

> *"What happens is typically a report that gets faxed over. And once we receive that fax here, we actually scan it into the database and put it under patient documents so it becomes a scanned documentation into their electronic medical record. And we assign that to the provider who requested or who ordered that testing, or who is their current primary care provider, to review the results." (Clinical, ECW)*

> *"Those get scanned it into our EMR, then the providers will go into the forms and make a clinical list update – enter in the date of when it was done and whatever the results are. Just so then when the patient comes back then it will say 'satisfied' or 'it was done' or something." (Technical, Centricity)*

> *"We get the image [of the report]. And then the Medical Record staff receives and reviews all the images that are in the hard drive and then find, match the patient to the image … and then they go to the electronic medical record, pull out the order for the colonoscopy, and then type the result or the impression that is on there and completes the order." (Superuser, NextGen)*

Although only one high performing center reports this level of detail, experts indicate that ideally, the EMR would identify the outcome as normal or abnormal and capture a core set of colonoscopy measures in structured data (e.g. number of polyps, dysplasia, or cancer). Additionally, users in this HCCN have options for two different levels of data entry (basic or detailed), whether the patient should continue with a normal protocol for their screening interval, and a requirement for a follow-up notation (e.g. routine or follow up required). In discussing the barriers to entry of this type of information into structured data, respondents indicate that a colonoscopy report requires so much interpretation that a Medical Assistant would not be qualified to reliably enter all of it into an EMR. It requires the interpretation of a more trained clinician.

> *"As he/she is scanning that into the patient's chart, we're giving them the option to indicate the date the test was done, did they consider the colonoscopy to be complete or incomplete, and so that will at least start to populate some of the flow sheet items inside the EMR. So then when the provider actually goes to review that scanned in report, they will actually append that document and open up the colonoscopy form that [our programmer] has built and it will automatically pull in the date of the colonoscopy from the scanning and any of the other fields that they filled in. And then the form actually has lots of options. … There must be 15 options for colonoscopy results. There's a section for biopsy results. There's a section to capture number of polyps and the polyp location." (Clinical/Technical Pair, Centricity)*

> *"What you have to do is basically train your staff. Whoever's capturing the scan needs to post the results into a flow sheet. So, that's probably been our biggest barrier, is training staff to recognize this is a colonoscopy and this is what we need you to put into the system so that we can run our report." (Clinical, Centricity)*

Additionally, some say they only enter colonoscopy results into structured data for diagnostic colonoscopies or if the result of a screening colonoscopy is abnormal. Superusers express concern about this practice because if a colonoscopy referral is not closed out in the EMR, it may not be counted in the reporting function as a completed screening.

> *"[The colonoscopy report] will be faxed to us and it will be scanned in and assigned to the provider who ordered it and the provider will look at it and mark it as reviewed … it's entered in the Alerts Menu. I mean, it probably would be entered. If it's abnormal, it would be entered into medical history which is structured data." (Clinical, ECW)*

> *"They were always closing out mostly the diagnostic ones. They were hardly ever going back and retrieving the results for screenings. … No one ever went back and closed the order. The only way your EMR pulled the data was for that order to be closed out. … The provider got what they needed. They completed their task in terms of making sure that they didn't leave this unaddressed, but the reporting system didn't get what it needed to now say, tag, that one's accounted for." (Superuser)*

Documenting Past Screenings. Many providers state that long term colonoscopy tracking in an EMR is complicated by the fact that the systems make it cumbersome or impossible to enter the results of past screenings. This is particularly important because some clinicians report that they do not necessarily hold on to their patients for long periods of time in a clinic setting. If a patient has had a colonoscopy done by another provider

several years ago, many say that there is no way to note that in the EMR except in a free-text/notes field or by attaching scanned documents. In some cases, they say they can "order" a colonoscopy and then enter in the information and date to close out the order, but this is a cumbersome process. Only a few report that when they are able to get a copy of a past screening, they put it into structured data fields. Responses are mixed regarding whether or not the clinic accepts a patient's self-reported information on past colonoscopies. Some say they will try to track down the paperwork, but it is difficult with often transient and low-literacy populations who may not know their previous provider's name or address.

> *"You click on the order icon, then you type in 'colonoscopy'" That will show up in the dropdown menu … you click on that box for colonoscopy, so it's now ordered. You then right click on 'okay,' you then right click on the order that you just generated, click on 'completed on,' click on the dropdown menu for date, click on the date that it was done (and obviously you're just taking the patient's word for it and it's an estimate) … it does not allow you to put in result – just that it was done … and hit 'okay' and hit 'submit.' So it's about what, ten/eleven clicks." (Expert, AllScripts)*

> *"Some of the physicians have moved because it's such a long time span … that they're deceased, they're retired, they closed their practice, the patient can't remember exactly where they got it and they give me five different places." (Technical, NextGen)*

Family History

All health centers report that they gather family history at the patient's initial visit. Typically, the provider will go over the questions with the patient in the office and input the information into the EMR. Some centers have patients fill out a paper survey and then have a medical assistant input that into the system, but even in those scenarios the provider will review the answers with the patient in the exam room. In most cases, family history is input into the EMR through forms or templates (e.g. check boxes or drop down boxes with an extensive list of diseases). Only a handful of CHC staff indicate that family history is recorded only in text fields. For cancer, most indicate that the provider can select a relative (e.g. mother, sister), a condition (cancer) and then specify the type (e.g. colorectal). The specific type of cancer may be a check box or a text field, depending on the system. Usually, the date of diagnosis or date of death can also be recorded, if known. However, almost no one says that they can or do collect information about polyps.

> *"There's every condition in the world, then chances to put every second, third degree relative in the world. It's probably too much, really, but there's a huge amount that you can put in, all structured and all in little places so that it isn't just free text at all." (Clinical, ECW)*

> *"I don't know if a parent or a sibling, an adult sibling had polyps for example found — I don't know that that would be known to the patient. I think they would know that if they were being treated for colon cancer; if they died of cancer but I don't think they would know what they had irritable bowel syndrome or Crohn's colitis, polyps, anything that might be the red flag to … do some colorectal cancer screening sooner." (Clinical, ECW)*

"I think that they could have done better but I think that it's good enough. So we select family member—mother—and then we select a set of illnesses: colon cancer; and the age in which the mother was diagnosed or the mother died of it. … It's discrete so we can search the family history template and find the text that says colon cancer and then in the mother or the father or whatever, so we could create a report that says how many mothers and fathers have colon cancer, for example." (Superuser, NextGen)

"If you're check boxing your family history, colon cancer, father, it can pick that up when it does data retrieval and then you can free text in at what age was he diagnosed, at what age did he die, you know, that sort of information. And then of course putting the ICD9 code pertinent for colon cancer and family member helps too." (Clinical, Centricity)

"Family history will usually go in, not in structured data as far as I know. I think it goes in the social history. … They just type it in, so they'll have mother, dash and whatever they had and then father, dash and whatever they had." (Technical, Centricity)

Most respondents say they collect family history for parents, siblings and grandparents. There may also be an option available to enter in another relative, but this is not often done.

"I do parents, siblings, and I'll try grandparents and that's it." (Clinical, Centricity)

"Usually father, mother, sisters, brothers, aunts and uncles." (Clinical, Centricity)

In some centers, the amount of family history information collected is highly dependent on the individual provider. Particularly among those where structured data is not used, respondents say that some providers are more conscientious than others about asking for family history details.

"It's pretty random as to how much is done. Some people ask everything in the world. And some people have their Medical Assistants put in most of it, and sometimes we add extras. I guess, and some providers are much more into it than others." (Clinical, ECW)

Another barrier to effective collection of family history in CHCs is apparent in centers that serve a large immigrant population. Respondents in these settings say that some of their patients are not aware of their family history, or have a very incomplete picture (e.g. they may only know that a relative died of some type of cancer).

"Family history can be difficult to obtain. Some of it is because of the immigrant populations that we work with. Family members die with no known reason behind their deaths." (Clinical, Centricity)

"Some of the parents are not known. So the patients that we see here whether they're children, adolescents, or adults, young adults, the parent may not be known. However, there's also certain amount of ignorance here to on behalf of some of our patients. They know that somebody died of cancer but they don't know what specific type of cancer they died from and they're not really sure how old they were when they died." (Clinical, ECW)

Updates to family history are not prompted by any system currently, though a couple say that the date will change colors if it has been more than a year since it was last updated. Some respondents say that providers are "supposed" to ask for family history updates as part of their office protocol or workflow, but there is no way to track this within the system and it is unknown to what extent providers are actually doing this. Instead, most say that family history is typically only updated if a patient happens to mention that a family member had died or become ill, or if a provider asks about a specific condition after receiving a positive test result.

> *"That information (family history) is typically gathered at that new patient visit for 30 minutes. It's not asked again thereafter." (Clinical, ECW)*

> *"Mostly updates on family history are based on either the patient spontaneously telling you or new things come up in their life where it becomes of interest to learn about it. So it's not as perfect in terms of if the provider never asks anything, and no one ever asks anything, there might not be anything there." (Clinical, ECW)*

> *"It's part of the workflow. We don't have a prompt or anything. It's just part of our internal protocol thing. Every year, for example, whenever you review the medical history page, the family history posts the day. And when the day is passed a year, you'll see it in red." (Superuser, NextGen)*

> *"It does not prompt you. It's just that there's a date that shows when you last updated it and as you are reviewing things like at an annual exam, you'll see, 'Oh, we last updated this in February 2012, I need to update it today.' So that's provider-driven." (Clinical, Centricity)*

No one reports that the family history information in their EMR interacts with or informs any other part of the patient's record; it essentially sits in a silo. Providers may use the information to inform their screening decisions, but this happens outside the EMR. No one says that they run any reports based on family history information either. When probed on whether it would be helpful if family history information fed into clinical decision support systems, most providers agree that this would be a welcome addition for CRC or any other condition where standards and recommendations change frequently. No one reports that their EMRs are currently capable of delivering this level of support, but one or two respondents say they are internally developing this functionality.

> *"It does very well at allowing the end user to enter that data, but I can tell you it just sits in like a little grid and never prompts me again. … It doesn't carry over anywhere It's like it's recorded, it's structured, but it doesn't have any other functionality, really." (Superuser, NextGen)*

> *"I think it could be helpful if you had a binary decision by the EMR—average risk/above average risk. … You could maybe right click on 'above/higher risk' and have that linked to something that gave you more of the details … you have a family history of a first degree relative who had a colon polyp or colon cancer, that would kick the patient into something other than average. It doesn't tell you which risk category they're in or what you definitely need to do, but it would tell you that they're not average." (Expert, AllScripts)*

> *"It should alert me. It almost should feed what the protocol or the guideline [says]. So if my father has had colon cancer and I'm now 55 and I still haven't had a*

colonoscopy, that system should be smart enough, in theory, to realize, 'Hey, you've got a contributing factor' and you need to provide that alert, but it doesn't do that." (Superuser, NextGen)

"I think the younger—and I hate to use the word—but the younger, techy providers coming in, they love the pop-up protocols and how they can press a button and get information or it leads them to information. I think the older, less techy providers that are use to relying on the knowledge of the standards more think of it as a hindrance. You know, just another button that pops up that they have to click out." (Clinical, Centricity)

The idea of making better use of family history data is particularly welcomed by experts who note that few general practitioners will be able to keep track of all the nuances of how family history impacts screening recommendations for CRC. For example, they say that most family practitioners would be unaware of the fact that uterine cancer contributes to CRC risk, but an EMR could be programmed to alert them to this.

"There's probably some room for guidance. … There are certain kinds of less common combinations of things that might indicate an increased risk for colon cancer, like a history of brain cancer and uterine cancer, depending on the age of the family members. … People might not immediately think of colon cancer when they see that combination." (Expert)

EMR Patient Portals. Most respondents say they are in process of developing a patient portal, with some saying it will be functional within the year. Others say it is likely a year or two away. Only a couple say their patients currently have access, but few actually use it.

"It's less than 10 percent right now of our patients (who use the portal). Part of that is that many of our patients don't have computers or they don't have Internet access. We tell them how to go to the library, but it's not really effective to use the portal if you're trying to communicate to go to a store or a library to get your messages." (Technical, ECW)

"A patient portal for a lot our patients, I don't think they're going to understand what their looking at. Like, it's going to cause more confusion." (Clinical, Centricity)

Given the patient population there is some question about whether or not patients would actually use a patient portal if they were given access. A handful of respondents mention that they are considering asking patients to fill out family history information online before coming in for visits. However, when prompted with the idea, others have significant concerns about direct patient entry of information due to the nature of the patient population they serve. Specifically, they cite issues with medical literacy levels, non-English speaking populations and older populations who are not computer literate. These respondents say that patients are likely to misspell information, enter too much or too little, and that any patient-entered information would need to be carefully reviewed by a provider anyway for accuracy and clarification. Some also have concerns that their patients are not sufficiently fluent with computers to be able to enter information. One respondent says that direct patient entry of family history information might work if patients were only presented with choice boxes or drop-down options, rather than being able to free-text content.

"I don't know how well the majority of our patients are going to do with the patient portal. … Lots of them don't know that blood pressure and hypertension are the same thing or hyperlipidemia and high cholesterol are the same thing and so I think that terminology at the health care literacy part of that comes into play and I think some of our patients would be good it and I think the rest of them would have absolutely no idea what it is and how to use it. We do a lot of elderly patients that don't have computers, don't want computers, think that it's crazy that we're using computers." (Clinical, NextGen)

"I wouldn't even expect that we would get very accurate results if they try to update their med list with their meds right in front of them. So I don't know. I'd hate for it to be wrong and there's a lot of confusion there, a lot of languages. There are a lot of people who English is not their first language and we have a hard time even getting them to write correct information on the registration form. So I mean I think they could but unless I really sat down and went over it with them I'm not sure I would, I wouldn't be certain it was right." (Clinical, ECW)

"[It would work if] you could put in the family member and then put in the option of colon cancer … and then maybe a date or something. But I think the best thing to do would be to have it as a drop down menu or just structured so that they're not typing it. My fear is that it going to be misspelled or they'll just start getting creative in the text." (Technical, Centricity)

Reporting and Analytics

Current Reporting Activities. The level of detail and frequency of reporting conducted by participating CHC staff varies tremendously. Most say they run reports based on priorities set by some combination of the following: meaningful use criteria, UDS measures, PCMH designation, HEDIS measures, and site-specific grants. Decisions about which reports will be run on a regular basis are typically based entirely on these requirements, though some high performing centers may also have quality improvement initiatives that are unrelated to these reporting requirements.

"We're hoping for the PCMH designation … Patient Center Medical Home designation, and there was a grant that came through funding that effort and it also tied in colorectal screening with it as well, so I know that there's been an effort to improve that and report on it." (Technical, Success EHS)

"We look at cervical cancer screening. That's a big one we've been pushing right now. … Part of the reason regarding cervical cancer screening [reporting frequency], we have a grant so a lot of times those motivations to start doing those things and it kind of ends up, we end up continuing doing those things." (Technical, Centricity)

For colorectal cancer in particular, some CHCs run performance reports on a monthly or quarterly basis; but smaller centers may only look at their CRC rates annually. A majority say that compared to other health issues they are tracking (e.g. diabetes, immunizations, tobacco cessation, cervical cancer), CRC is not something they focus on. While some are familiar with the new CRC UDS measure, they say that they only need to report on that yearly, and have not necessarily felt it needed to be reviewed on a regular (monthly or

quarterly) basis. Given that 2013 was the first year that CHCs would have reported their CRC screening performance, their emphasis on tracking may change in 2014. Many mention that the health issues they do focus on are based on their population's particular needs, and may go through phases. For example, several mention having grants to address cervical or breast cancer, so for the period of time when that grant is in place, they will run more frequent reports and make a concerted effort to elevate their performance. Only one or two CHC staff members report doing something similar for colorectal cancer in particular.

> *"Because we belong to [a local] network, they run these dashboards for us … we get them monthly of how we're doing, our percentages and things. So that really is a nice indicator of where we are and we do have a quality committee that we go through, that we have our internal quality committee … that we look at measures." (Technical, Centricity)*

> *"Our Quality Department has a monthly report on how are we doing on all our HEDIS metrics and colorectal cancer is one of them. So every provider receives a monthly packet that says your rate of completion rate is X and these are the patients that have not completed or that part of the denominator have not received one. So that we do every month. That's the only report for colorectal cancer screening that we do." (Superuser, NextGen)*

> *"We have a limited number of resources. We have to pick and choose what we're focusing on. We always do UDS reporting. But we also sort of focus on Meaningful Use … the reality of our colon cancer screening from a population standpoint is not well developed. I can report on it. I can, within probably wouldn't take me more than a half an hour, it's less, to generate a report of all patients who are eligible 50-year-olds who've had colon cancer screening … so we can easily get that information. But in terms of do we manage it well, the answer is no." (Clinical, Centricity)*

Higher performing CHCs also report that they will run reports down to the provider level. Leadership may share these results with providers at group QI/staff meetings or only privately, with the intention of motivating better performance. In a handful of best case scenarios, physician compensation and peer review are tied directly to these numbers.

> *"Yes, they (providers) review it. The provider names are blinded so each provider only gets their own information and then they can compare it … but I'm sure when they're sitting next to each other they look over each other's shoulders 'Oh, how did you do?' And we've also moved to a pay for performance program." (Technical, ECW)*

> *"We actually issue quality reports for all of our clinicians that we publically display. We compare every doc, which is really again, particularly in colon cancer, very much a measure of your ability to enter things discretely as well as to actually do it." (Expert, AllScripts)*

Centers with high screening rates also credit clinic-level pay for performance incentives and an overall culture of high achievement. They say that clinical leadership needs to set the tone, emphasize the role of quality measures, and (if applicable) motivate providers with the promise of rewards from pay for performance incentives.

> *"We're kind of motivated to pay for performance, even if we're not getting more money, we kind of like to get A's." (Clinical, ECW)*

"Well we do have somebody in-house who can write reports to say how many of their patients actually did they press the CDSS button so we can give them feedback and say 'You know out of your X number of patients you missed pressing the button a number of times.' And we do give the providers report cards on about … 50 different elements where they are rated on their panel of patients. So, of your panel of patients who needed a FOBT what percentage are in compliance and they get this on a quarterly basis. So they see this and they can compare it to their own site and to the organization as a whole." (Technical, ECW)

"I'd have the leader of the practice call that person and I'd say 'Do you realize you know you're holding us back? You're at 40 percent and everybody else is at 60 percent. What's going on? What can we do to help?'" (Expert, AllScripts)

Very few clinics say that physicians run reports on their own, due to a lack of time as well as ability. Most say that report generation is done by administrators or technical staff. Moreover, most say that providers do not typically ask for ad hoc reports on their patients. Superusers who have observed reporting functions at multiple sites further explain that smaller CHCs (especially those who do not have professional IT staff) typically are not very competent at using their EMR's reporting system.

"They often times have no one to do reporting. … Most of these systems come with fairly competent reporting packages if you know how to use them, but you've got to be a SQL programmer to use them. And one … you can't find a SQL programmer and when you do, as soon as you train her up, she's going to go to the hospital and make more money." (Superuser, Epic & ECW)

"How many patients out there am I waiting for a mammogram on? How many patients out there need a pap smear? How many patients out there did I give something to? That's usually the questions they ask. How many patients out there do I have on this medication? That's the normal inquiries." (Clinical, Centricity)

Although very few report that they do so, a few respondents say that their EMR is capable of running population reports that would enable them to contact groups of patients who are due for screening or at higher risk of colon cancer. It appears that the reason most CHCs are not running such reports is that they do not have the staff to follow up on them.

"It … can pull up every patient that has a family history of colorectal cancer from the age of 35 – 40. You most definitely can run that report. You can do a multiple patient flagging system. So that's another thing this system is really good for is … if you wanted to contact everyone that needed a colonoscopy at a certain date of birth, you can do that. Or, everybody that has, like you said a family history of colon cancer that's age 40 … you can run that report." (Clinical, Centricity)

Reporting Deficiencies. Some respondents are frustrated with their EMR's reporting capabilities. However, due to the training issues described earlier, it is not clear whether these frustrations reflect genuine deficiencies in the products or a lack of understanding of how to access the needed information. Some respondents complain that the reports they run are incomplete or do not accurately reflect the level of screening that they think is taking place. In other cases, CHC staff say they are able to run very basic numbers, but combining information to generate a more sophisticated report requires "getting behind

the data" in a way that is beyond their abilities. A few respondents say they do not trust their reports because they know that providers are not documenting correctly or that there are too many different ways to record the same thing.

> *"If I try to pull a report of all the patients who have a colonoscopy recorded in their chart, it won't pull everybody. It doesn't give me a full list of patient names, so I'm ending up tracking that all by hand." (Clinical, NextGen)*

> *"Sometimes it's easy enough just to get the population out, but sometimes when you want to know some of that other stuff, like some of their family history pulled into it, it requires a Crystal Report development which takes a lot more time and sequel searches." (Superuser, NextGen)*

> *"Much of the reporting and paper performance or HEDIS or everything—I've kind of taken it upon myself to do because no one else seems to be doing it and I can't imagine that it couldn't be done better but so it goes. Our IT people are not very communicative. We need something clinical. It seems to be the clinical people who do it and so it's me." (Clinical, ECW)*

> *"I'm not confident at all [in the reports]. Because there's all these options [for documentation of the same thing]. Sometimes they won't even use them or they don't know they're there." (Technical, Centricity)*

> *"I think there should be a colonoscopy structured data chart that's already part of it versus having to create something because then you can also use the EMR itself versus my external software to pull it out. … Right now I have to look at all the raw data and compare everything and then create a report from that." (Technical, Centricity)*

Some respondents say that there are reports that they would like to run that their systems do not generate (or they do not know how to generate). Respondents' wish lists often include getting a list of patients to contact who are due for *any* type of screening (e.g. patients due for all preventive screenings with due dates for each). Others need to run reports based on a combination of age and screening status for one particular screening (e.g. colorectal only).

> *"If I could get … the list of patients who are in the age group who have had some type of screening done with the date of that screening, would be most beneficial to me … Who's coming due for something [and] having the dates would help, but if I could just pull a report that says, 'This list of patients are due for colonoscopies in the next 30 days' or their FOBT is going to expire – they need to have a new one done, so that I can remind my patients or my providers when I huddle with them in the morning," (Clinical, NextGen)*

CHCs with more resources and IT knowledge are able to purchase registry and reporting products (e.g. Bridge IT, Wellcentive) or even write their own code to develop templates, dashboards, and other tools to enhance their EMR's capabilities. Others who are members of health center controlled networks and have access to programming support have performed similar more sophisticated adjustments to their reporting functions.

> *"We're not using the AllScript's reporting, we basically do all of our own reporting. You know, we have a report writer. So, that's been big but it's very difficult and I'm not*

sure any of the EMRs do quality reporting in a seamless way as quickly and easily as you'd like. I think there are other products that really are more focused on that. … In fact we have purchased Wellcentive, which is a registry product, which connects to your EMR data, discrete data, and generates much nicer looking, more user friendly reports." (Expert, AllScripts)

"We have an adjunct reporting software to work off the raw data in the EMR … because of the fact that for the first, I don't know, one and a half years, they weren't using structured data. Then we can't use the registry or the report built in to the EMR to pull out all the data because it won't capture everything." (Technical, Centricity)

"With the forms development [we] did these beautiful Dashboard reports cards. … Not only [does it] summarize the data so it's quickly digested, but can also highlight in the soft light colors just do it very quick interpretation for the providers so they don't have spend a lot of time there, but it can be incorporated into the visit." (Clinical/Technical Pair, Centricity)

Clinics that have a more sophisticated or robust approach to reporting indicate that the most important hurdle that they needed to overcome in order to create accurate reports is convincing providers of the importance of proper documentation in the EMR. Most indicate that this has been a gradual process, but that once providers get used to the idea of ongoing feedback that is enabled by the EMR, they come to really value its contribution to clinical improvement.

"When we first started we were just getting used to providers typing information in and I think we realized that 'Okay, that's the first step – to be able to read the chart.' Now we want to be able to get the information out so we've moved from just writing notes to filling in structured fields so that we can actually pull the data out. I think that's been a process that's tremendously improved over the time that we've been on this EMR. And there has been some push back from providers saying 'I don't want to click here and click there, I just want to write a sentence' and in some areas we say 'That's ok' and in other areas we say 'No, you've got to follow this template because we need to be able to report on X,Y and Z..'"(Technical, ECW)

System Enhancements to Increase CRC Screening Rates

The following findings are based on respondents' comments about what they would like to see changed about their EMR—particularly improvements they feel would positively impact colorectal cancer screening rates. In many cases, respondents are not sure what is even possible, given that most only have experience with one EMR system. As a result, superusers who have observed many different systems and installations are most apt to provide concrete suggestions for system enhancements.

Transparency in Report Generation. Some respondents contend that EMR vendors need to more clearly explain how reports are generated. They say that providers who are resistant to using structured data fields may be more willing to do so if the relationship between the input fields and report output was more evident.

Similarly, because of the fact that CRC screening can be accomplished in multiple ways, respondents say that EMR vendors need to pay greater attention to the nuances of

consistent documentation of CRC activities in the EMR. One respondent says that this needs to be accomplished through object oriented programming, so that if different providers document screening in different ways, they are all equally (and uniquely) counted toward the end goal of a patient with a documented up-to-date screening.

> *"The EMR systems need to, when the reports come out it needs to give the providers the, 'This is where we obtained the information from.' Maybe it's too much information for most providers but there are some techy doctors who are saying, 'If I knew what's going into the report, into the data, I could then now see how I can change my habit a little bit better to make the reporting more fluid.'" (Superuser)*

Better Technical Support and Peer Advice. Medium and smaller sized CHCs that are not part of a larger network frequently indicate that they need more technical support and facilitated opportunities to learn from other users of their EMR. Since many are less than impressed with the level of support and clinical expertise offered by their vendors, they suggest that interaction with peer organizations that have overcome EMR challenges would be valuable. They would benefit from easy-to-access learning opportunities, exposure to models, and best practices from organizations that have similar resources and staffing challenges.

> *"I think the deficiency is getting information shared across the local, regional, even statewide and then national community health center databases to what the best practices are out there for getting compliance." (Clinical, ECW)*

> *"User group meetings are a good way of sharing ideas and finding out what other people are doing. For NextGen users we have a big meeting every year. And you know, I have shared my template without any guarantees and I cannot guarantee that it's going to work in your system … but this is what we use and it works for us." (Superuser, NextGen)*

> *"We've certainly seen forms that other people have developed—at least so that they wouldn't have to maybe reinvent things from the wheel. Some clients, not all, are willing to share their code and share their forms with other clients, because they've been there, done that." (Clinical/Technical Pair, Centricity)*

Some superusers say that smaller CHCs (e.g. less than 25 physicians) will never be able to have the kind of IT expertise and staff time they really need in order to maximize their EMR use from a quality perspective. Moreover, some argue that they should not need to have that expertise on-site. They identify high performing CHCs that are part of health center controlled networks that take care of system management, back-ups, report generation, quality improvement metrics, template development, etc. While not all centers have access to such networks, it would be beneficial to develop a regional or even national model for similar access to system management or templates and tools so that individual CHCs do not need to reinvent the wheel on a local level.

> *"You need somebody who knows what the hell they're doing around IT services. You need to work with a hoster of some kind because if you don't have the resources to maintain these kinds of things on your own, and if you do, you ought to be focusing those resources on quality improvements, on process improvements, on primary care medical home kind of workflow stuff. You shouldn't be spending $130,000 [on]*

somebody to manage your hardware because you're never going to get $130,000 worth of effectiveness out of that individual in your organization." (Superuser, Epic & ECW)

"You might actually be able to make a decent impact by working with a large group of individuals from different centers who all use the same [vendor]. … We do get user groups who will assemble and agree to build and then disperse for free forms." (Clinical/Technical Pair, Centricity)

Better Vendor Training and Ongoing Support. Respondents would like more and better support from vendors. In the design of EMR products, they would like to see more clinical input. When it comes to training, they would like to see more clinician trainers, and more time devoted to training clinicians during roll-out. After implementation is done, having time and staff set aside to observe day-to-day use of the system and provide feedback on optimization would also be extremely valuable.

"That will be a wish list that the vendor use clinicians as part of their consultants to be able to design a system that is better, provides better clinical information for cancer screening." (Superuser, NextGen)

Summary Presentation of Screening Status. Some respondents express a desire for a simpler means of viewing and editing the screening status for an individual patient. Described as a flow sheet or dashboard, a few CHCs have programmed something on their own or installed an add-on product to generate this, but prefer it to be a core part of the EMR. Key features of such an enhancement would be the ability to view all of a patient's preventive screenings on one screen, with key details such as date of most recent test, most recent result (e.g. negative/positive), and screening interval/due date. A few respondents add that for CRC in particular, it would be extremely valuable to be able to easily edit a patient's screening status in this view, so that past colonoscopies can be more efficiently recorded.

"What we really would like is something very simple. We would like an electronic flow sheet … with boxes [so] you can right click in the box and just enter the date that it was given. And that's what we would like, and that's discrete data … just a cancer screening flow sheet where you can just right click, put in the date and a result." (Expert, AllScripts)

Health Information Exchange. Given the difficulties that many health centers describe with regard to documenting colonoscopies done elsewhere, health information exchange (HIE) is named by many as a critical element of improved use of EMR systems for CRC screening. Many are working toward this goal and recognize that the time will come when it is broadly achievable, but they acknowledge that right now, it is something that clearly holds everyone back.

"I think that's [HIE] going to be very beneficial to being able to do a continuity of care and being able to have a more complete chart. I think being able to integrate things like that and have EMRs communicate with each other, I think that would be the

greatest thing, because then we can exchange information much, much quicker." (Technical, Centricity)

"We do have the potential for sending electronic referrals to other providers with EMRs but we haven't really mastered that so we haven't really rolled that out. … That would be probably the next step to be more interconnected to other providers in the community, whether they're specialists or hospitals." (Technical, ECW)

"Definitely the HIE component, but that's bigger than NextGen. I mean they have an HIE product but just the whole — and that's global, that's across the board—that we need to be able to as a nation share information in a structured format in real time. So I think that's a big goal for everybody anyway with stage two." (Superuser, NextGen)

Greater Control Over Alerts. Most respondents who have not done their own modifications or installed a registry product say that they need more control over alerts and reminders in their EMR. They say they would like to see their vendor give users the ability to turn off a particular patient's reminder/alert for a period of time. For example, if a patient is being seen for an acute issue and a discussion about screening is not appropriate during the current visit, providers want the ability to make a pop-up alert dormant for a set period of time (e.g. until the next visit, x-number of months) based on the provider's judgment.

"If there's like trigger, if there were like a six-month time-limited where they, let's just say six months for some for the screening, if we haven't gotten a result back for the next visit or we're not seeing that being satisfied then case management could pick up on it and reach out and say, 'Six months ago you were recommended for this. Is there anything we can do to help you get that test done?'" (Clinical, ECW)

Opportunity Areas for the American Cancer Society, NCCRT, and NACHC

Patient Education to Increase Compliance. Respondents express a variety of ideas regarding the best way the ACS could positively impact EMR use for colorectal cancer screening, but improving patient education for CRC comes up most frequently. Unlike breast cancer or cervical cancer, respondents say that CHC patients need a lot of convincing to follow through with any kind of CRC screening. Many patients express fear or resistance to the idea of a colonoscopy and do not fully appreciate why it is necessary.

"I think that's part of the problem with getting people to do cancer screenings in some cases is that someone doesn't really sit down to explain why. They just tell them what they're due for." (Clinical, ECW)

"I find most of the things you give to patients doesn't give them in a nutshell why this is worth doing. And usually we have to give our own spiels about things and I think in many ways that's lacking for medicine and talking to the patient on their level about the purpose of things. So if they (ACS) could work more on that, I think people would be more willing to have things done." (Clinical, ECW)

A number of respondents say that they would like to have their EMR automatically provide patient education once a colonoscopy referral is recorded. In particular, they say

that they already have patient education materials regarding how to prepare for colonoscopy. However, what they would like to have is *persuasive material* that tells patients why colonoscopy is so important and encourages them to follow through with it. Several mention that they feel the American Cancer Society would be an ideal organization to develop this material, which could be distributed on paper, but ideally would be included in future upgrades to EMR systems.

> *"If they (providers) have things that are just in front of them, it makes their job much easier and their more prone not to miss to do something versus when they have to go search for it. For example, like handouts or something. If they have to go search for them, they probably will not print them out. But, if they have like the little button that if you click on it it's going to print out your handout they will probably do it." (Technical, Centricity)*

> *"If there were free resources for FQHCs to have that they could hand patients with the importance and the recommendations … because so many times, it's amazing how patients don't even know what the test really is. 'Why do I really need this?' The Medicare patients in particular, they're thinking 'Oh, my God, I don't what them to do that. I have to pay 20 percent of it. I'm living on a fixed income already.' So, them understanding the importance of the test, what the test actually is looking for and some of that information, like some education on that would really be beneficial." (Superuser, NextGen)*

> *"I would like to see an automatic patient education handout come out of the system after a certain diagnosis. … Why do we need colorectal cancer screening at 50? … Why we need it earlier if it's a family history and then it does it automatically, not based on provider memory of, 'Oh yeah, I gotta give him this.'" (Clinical, Centricity)*

Other suggestions for the ACS to focus on include sponsoring learning sessions on each EMR system and lobbying the federal government to allocate funding for CRC quality improvement initiatives, with specific funding support for on-site IT assistance. One respondent suggests that the NCCRT could establish "cancer screening SWAT teams" of expert EMR users to help individual clinics through shadowing, training, and correcting common mistakes. Anything that could be done to help organizations that do not have on-site IT support would be particularly valued. The ACS is also in a strong position to collect and distribute best practices on EMR use to facilitate cancer screening. IT support, ongoing learning/system optimization.

> *"Maybe if you don't get someone deployed to your practice maybe you have these, visit the ECW learning session on how to improve your colorectal cancer screening rates. This is the NextGen learning session on how to improve your colorectal cancer screening rate. Maybe that could be sponsored by the ACS." (Superuser)*

> *"Anyone who has the same system should absolutely bind together and pound down the doors of these vendors to say it's your obligation to make sure we get support. And I don't quite know how to do that most effectively, and this again may be the role of the Roundtable and the chief cancer control officer of the American Cancer Society." (Expert, AllScripts)*

> *"The EMR is a journey. You are learning your entire life. The learning you do is on the job and it's from each other. So that's another thing … so that's another best practice*

I would look for. What is a way to build in EMR learning into the routine function of the practice." (Expert, AllScripts)

APPENDIX 1:

RECRUITMENT SCREENER

Yes ☐
No ☐

ACS/NCCRT Community Health Center Research
Clinical Staff Screening Questionnaire
7.11.13

AEFFECT, INC., 520 Lake Cook Road, Suite 200, Deerfield, IL 60015 (847) 267-0169 Project #1311612

DATE: _____

INTERVIEWER: _____

RESPONDENT
NAME: _____
NAME OF HEALTH CENTER:

_____

STREET
ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: _____

MAIL INCENTIVE TO: ADDRESS ABOVE ❑ ADDRESS BELOW ❑

STREET ADDRESS: _____

CITY/STATE/ZIP: _____

(Please write in scheduled date & time)
Date: _____
Time: _____

Circle Time Zone:

Pacific / Mountain / Central / Eastern

ALTERNATE PHONE (CELL – HOME – OFFICE)

_____

CHARITABLE CONTRIBUTION?

YES ❑ NO ❑

[BEGIN HERE FOR OUTBOUND CALLS]
Hello, my name is _____, and I'm calling from Aeffect, an independent research firm. We are conducting a research project on behalf of the American Cancer Society, in partnership with the National Association of Community Health Centers, on the role of electronic medical records in colorectal cancer screening. We are gathering opinions from clinicians who use EMRs and make recommendations for colorectal cancer screening, as well as EMR Support Staff from community health centers, Your input is very important. We are only interested in your opinions and I will not attempt to sell you anything. In addition, your opinions will remain completely confidential. I just need to ask you a few questions to determine if you would meet our respondent criteria. If you qualify and participate in the full study, we are offering an honorarium of $100.

[START HERE FOR INBOUND CALLS FROM INDIVIDUALS INVITED BY NACHC]
Thank you for your interest in the research project we are conducting on behalf of the American Cancer Society, in partnership with NACHC. To make sure we have an opportunity to speak with individuals from a variety of backgrounds, I would like to ask you some questions.

1. What is the name of the community health center where you currently work, and in what city is it located?*

   NAME: _____

   CITY/STATE: _____

*Attempt to recruit 10 pairs of respondents (clinical and technical) from the same health center.

2. [RECORD REGION OF U.S.] [RECRUIT A MIX]

Central: MN, WI, MI, IL, IN, OH, NE, IA, KS, MO, TX, OK, LA
East/Mid-Atlantic: ME, NH, VT, MA, RI, CT, NY, NJ, PA, WV, VA, DE, MD, DC
Southeast: KY, TN, NC, SC, GA, AL, MS, FL
Mountain/West: WA, OR, ID, MT, ND, SD, WY, UT, CO, CA, NV, AZ, AK, HI

3. Do you currently use an electronic medical record, or EMR in your community health center?

Yes	1	
No	2	THANK AND END*

*THANK AND END INSTRUCTION: "Thank you for answering my questions. I'm sorry, but we have already filled our quota for individuals with your qualifications. Thank you very much for your interest in our study."

4. What is the name of the EMR vendor or system that is used in your health center? [IF NEEDED, PROMPT WITH LIST. RECORD SYSTEM VERSION IF KNOWN]

NextGen	1	
eClinicalWorks	2	
Centricity	3	OBTAIN A MIX
SuccessEHS	4	
Vitera	5	
Epic	6	
AllScripts	7	
Other (specify _____)	8	ACCEPT NO MORE THAN 5 RESPONDENTS
Don't know	9	ARRANGE FOR FOLLOW-UP TO IDENTIFY SYSTEM NAME OR THANK AND END

5. Is your role at _____ [INSERT NAME OF CHC] primarily clinical, technical or administrative?

Clinical	1	ASK Q6 AND Q7. QUOTA = 27
Technical/Administrative	2	ASK Q6 THEN SKIP TO Q8. QUOTA = 13
Both clinical and technical	3	ASSIGN TO QUOTA AFTER ASKING Q6–Q8

6. What is your title? _____

7. a. CATEGORIZE CLINICAL RESPONDENTS BELOW. IF UNSURE, ASK: Which of the following best describes your role at _____ [INSERT NAME OF CHC]? ACCEPT MORE THAN ONE IF APPLICABLE

Registered Nurse or LVN (Licensed Vocational Nurse)	1
LVN (Licensed Vocational Nurse) or LPN	2
Nurse Practitioner	3
Physician Assistant	4
Physician	5
Medical Director	6
Medical Assistant	7
Other (specify _____)	8

b. Do you have responsibilities for recommending colorectal cancer screening to patients or tracking screening results or conducting follow-up?

Yes	1	CONTINUE
No	2	THANK AND END
In the past, but not now	3	

c. Approximately what percent of your patients are aged 50 or older? RECORD PERCENTAGE AND CIRCLE RANGE BELOW: _____ [DO NOT READ LIST]

Less than 25%	1	THANK AND END
25% to just under 30%	2	
30% to just under 40%	3	
40% to just under 50%	4	CONTINUE
50% or more	5	
[DO NOT READ] Don't know	6	THANK AND END
[DO NOT READ] Refused	7	

8. a. CATEGORIZE TECHNICAL RESPONDENTS BELOW. IF UNSURE, ASK: Which of the following best describes your role at _____ [INSERT NAME OF CHC]? ACCEPT MORE THAN ONE IF APPLICABLE

COO	1
CIO, IT Manager/Director	2
Clinical/Health Informatics	3
Data Analyst	4
Administrator or Office Manager	5
EMR Coordinator	6
Systems Analyst	7
Other (specify _____)	8

b. Do you currently have responsibilities for any of the following? [CHOOSE AS MANY AS APPLY]

EMR implementation, configuration, or training	1	CONTINUE FOR ANY
EMR maintenance	2	
EMR data extraction or analysis	3	
EMR reporting and analytics	4	
Other EMR management activities (briefly specify _____)	5	
None of these	6	THANK AND END

9. How often do you personally use or access data from your health center's EMR system?

Daily	1	CONTINUE
A few times a week	2	
A few times a month	3	THANK AND END
A few times a year	4	
Rarely/never	5	

10. Approximately how many clinicians practice at your health center and any affiliate sites that also routinely see patients over 50? Please include all physicians, physician assistants, nursing staff and other primary care givers. [IF NEEDED, SPECIFY THE RESPONDENT'S OWN SITE, NOT OTHER AFFILIATED CENTERS]

One or two	1	RECRUIT A MIX
3–10	2	
11–20	3	
More than 20	4	

11. How many sites does your health center have?

One	1	RECRUIT A MIX
2–3	2	
4 or more	3	

12. How would you describe the area served by your community health center? [READ LIST]

Small town/rural	1	RECRUIT A MIX
Suburbs	2	
City/urban	3	

INTERVIEW CELLS

[CHECK QUOTAS AND CIRCLE CELL BELOW]

Interview Cells	# of Interviews
Cell 1: Clinical Staff	27
Cell 2: IT/Medical Informatics Staff	13
Cell 3: Experts (will be recruited elsewhere)	5
TOTAL	**45**

****Attempt to recruit 10 PAIRS of Clinical/Technical respondents from the same CHC – one clinical respondent and one technical.**

INVITATION

Based on your answers to these questions, we would be interested in hearing more about your experience. We are scheduling longer phone interviews on this topic, lasting about 45 minutes. The interview would be scheduled at your convenience. Any information that you provide will remain anonymous.

13. For participating in the discussion, you will be paid $100 in appreciation of your time, or given the option to donate this amount to a charity of your choice. An independent researcher would call you at an agreed upon time that is convenient for you. Your interview can be scheduled between 7am and 8pm Central Time. Will you be able to participate?

Yes	1	CONTINUE
No	2	THANK AND END

Scheduled for:
Date and time _____
Time Zone: Pacific / Mountain / Central / Eastern

At what phone number should the interviewer contact you? _____
(work / home / cell)

Is there a secondary number where you can be reached in case the interviewer can't reach you at the primary number?

_____
(work / home / cell)

May I have the address where you would like your incentive payment mailed? [RECORD ADDRESS ON FRONT OF SCREENER]

I can send you a confirmation by fax or email. Which would you prefer? [RECORD INFORMATION BELOW]

Confirmation preference ☐ email _____

☐ fax _____

REFERRAL:

ASK FOR CLINICAL RESPONDENTS: We are also interested in scheduling interviews with individuals who act as EMR support staff in health centers. Is there someone else *in your organization* who performs EMR implementation, maintenance or data extraction that you think would be interested in participating in this research?

NAME OF REFERRAL: _____

TITLE OF REFERRAL: _____

PHONE: _____

EMAIL: _____

ASK FOR TECHNICAL RESPONDENTS: We are also interested in scheduling interviews with clinical staff who use EMRS in health centers. Is there a clinician *in your organization* who uses your EMR on a day to day basis that you think would be interested in participating in this research?

NAME OF REFERRAL: _____

TITLE OF REFERRAL: _____

PHONE: _____

EMAIL: _____

APPENDIX 2:

TELEPHONE INTERVIEW DISCUSSION GUIDE

aeffect
(ā'•fekt)

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DEERFIELD ILLINOIS 60015
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Use of EMRs in CHCs to Facilitate Colorectal Cancer Screening
Discussion Guide
(45 minute interviews)
American Cancer Society

A note about this discussion guide: The following questions will be used by the moderators as a guide to direct the conversation. The questions may not be asked verbatim or in the exact order listed. Respondents will also be free to bring up topics not listed in this guide if they are relevant to the overall objective of the research.

I. Greeting/Introduction (5 minutes)

- Thank respondent for participating. Introduce self and company—independent research firm.
- Introduce purpose - We have been engaged by the American Cancer Society to talk with clinicians/technical staff in community health centers about their use of electronic medical records to facilitate cancer screenings. Our objective is to understand how people are using EMRs for this purpose today and identify potential improvements to them to increase their effectiveness.
- Reinforce objectivity and anonymity. Your opinions will be reported along with the opinions of others, and no individual names are used in the reporting of findings.
- Indicate that discussion will be recorded for the purpose of reporting.
- Respondent introduction – Please briefly tell me about your health center, your role, and the area or population that you primarily serve (e.g. demographics, age, language, geography).

II. Utilization of EMRs (10 minutes)

- For approximately how long has an EMR been in place at your health center? For how long have you personally been using that EMR?
- Which EMR system are you using?
- Do you have experience working with other EMR systems? Which ones?
- How satisfied would you say you are with the EMR you have?
- Who typically inputs clinical information into the EMR in your health center?
    - When and where are patient records updated (e.g. exam room physician entry)?
    - Is EMR access delivered through terminals, laptops, tablets, or some other channel?

- As I mentioned, our goal with this research study is to understand how EMRs are being used to facilitate cancer screening, particularly for colorectal cancer. What is your impression of the utility your EMR system for cancer screening? PROBE: strengths and weaknesses

III. CLINICAL STAFF (20–30 minutes)

- Do you know roughly what your cancer screening rates are for your patient population? For colorectal cancer? What did you draw that figure from?
    - What is the dominant form of CRC screening in your health center? In your practice? [AS NEEDED CLARIFY: stool tests (FOBT, FIT), colonoscopy, flexible sigmoidoscopy]
- Are you familiar with new federal reporting requirements (UDS measures) for colorectal cancer screening?
    - To what extent do these requirements play a role in your efforts to improve screening rates?
- How do you know which patients are due for mammograms or pap smears? What about screening for colorectal cancer?
    - Does your EMR prompt clinicians when a patient is due for cancer screening tests? Which ones? [ASK IF NOT MENTIONED] Does it prompt you about colorectal cancer screening specifically?
    - After a cancer screening test has been recommended to a patient, how is the test recommendation recorded in the EMR?
    - Is the EMR linked to an electronic ordering system for recommended tests?
    - After a cancer screening recommendation is made to a patient, does your EMR notify you when a patient completes a cancer screening test?
        - Is this true for FOBT tests? Is this true for patients who have been referred to see a specialist for a colonoscopy?
        - Do you receive notification if testing is not completed within a specified period?
    - Do you receive notification of the results of all CRC screening tests? (FOBT result, colonoscopy report) How is this information captured in the EMR?
    - Does your EMR prompt you to follow-up on abnormal screening tests? In what way?
    - [PROBE AS NEEDED] Specifically does the EMR prompt you to refer a patient for a colonoscopy if an FOBT is positive or does it prompt you that your patient is due for a repeat colonoscopy?
- If a patient has had a colorectal screening test done somewhere else, how is that captured in your EMR, if at all?
- How is a patient's family history typically captured in your health center?

- To what extent do you currently use your EMR as part of the family history collection process?
    - Where is this information usually recorded in the EMR? (Probe: provider notes, existing family history field, others)
    - Does the EMR have a structured set of family history questions or just open text boxes?
    - Is a patient's family history information clearly evident in the EMR?
    - Does the EMR alert clinicians of the significance of the patient's family history?
- What elements are collected for family history? (cancer, heart disease, diabetes, cause of death)
- To what degree is family history captured in the EMR? (first/second degree relatives, full 3 generation family history, cause of death only)
- Are patients' family history information ever updated? If so, how often? Is updating family history prompted by the EMR?
- Is there anything in place to ensure that patients who have a family history of colorectal cancer are "flagged" or identified for early and more frequent screening recommendations or identified as needing to go directly to colonoscopy? How does it work?
- How could family history collection be more systematic or automated process?
- How effective would it be to have patients themselves answer family history questions through a patient directed portal? How could this work?

- How, if at all, is the screening and family history information in your EMR used from a population health management perspective?
    - For example, does your EMR automatically generate reminders for patients that are overdue for certain cancer screenings? Does it do this for colorectal cancer screening?
    - How are reminders delivered? (e.g. when patient comes into office, sent out to patients who have not been in office for a while, but are overdue for screening, other)
- Are you able to pull data out of the system or do you receive any type of regular analytic reports?
    - [IF YES] What types of reports do you receive?
    - How easy or difficult is it to retrieve information from your EMR?
    - What types of reports would be most helpful to get from your EMR to help you better manage your patients' screening status?
- Are you familiar with any other EMR systems that are more effective at tracking and following up on cancer screening? What about reporting?
    - What makes those systems more effective?

- Are there any vendor modifications or workarounds that you or other staff have developed to get something out of your EMR that it wasn't originally providing? What?
- Any workarounds specific to colorectal cancer screening? Please describe.

- Do you feel that the clinicians in your health center are taking full advantage of your EMR's capabilities for facilitating cancer screening? If not, why?
  - Is training on the system's capabilities an issue or barrier to more effective use?
- If you could change your EMR system to make it a more effective tool for colorectal cancer screening and reporting what would you change?
- If you could change your EMR system to improve the process of collecting and maintaining up-to-date family history information, what would you change?
- Are there any features or capabilities that you would you like to see added to your EMR that could help facilitate cancer screening, family history collections or follow up care?
- Are there any features or capabilities that you feel are a distraction that could be dropped?

IV. TECHNICAL STAFF (20–30 minutes)

[QUESTIONS MAY BE ADJUSTED DEPENDING ON RESPONDENT'S EXACT ROLE]

- What role, if any, does your EMR play in facilitating cancer screening?
  - Does your EMR prompt clinicians when a patient is due for cancer screening tests? Which ones? [ASK IF NOT MENTIONED] Does it prompt them about colorectal cancer screening specifically?
  - After a cancer screening test has been recommended to a patient, how is the test recommendation recorded in the EMR?
  - After a cancer screening recommendation is made to a patient, does your EMR notify clinicians when a patient completes a cancer screening test? Is this true for FOBT? Referral to a specialist for a colonoscopy?
  - Do clinicians receive notification if testing is not completed within a specified period?
  - Does your EMR prompt clinicians to follow-up on abnormal screening tests? In what way?
  - Specifically does your EMR prompt clinicians to refer the patient for a colonoscopy if they have a positive fecal occult blood test? What about when a patient is due for a repeat colonoscopy?
- Is there anything in place to ensure that patients who have a family history of colorectal cancer are "flagged" or identified for early and more frequent screening recommendations? What?

- To what extent do clinicians currently use your EMR as part of the family history collection process?
    - What elements are collected for family history? (cancer, heart disease, diabetes, cause of death)
    - To what degree is family history captured in the EMR (FDRs, SDRs, full 3 generation family history, cause of death only)?
    - [IF EMR USED] Where is this information usually recorded in the EMR? (Probe: provider notes, existing family history field, others)
    - Does the EMR have a structured set of family history questions or just open text boxes?
    - Does the EMR prompt clinicians to update family history information? How often?
    - How could family history collection be a more systematic or automated process?
    - Could your EMR support direct patient entry of family history information through a patient portal? How could this work?
- How, if at all, is the screening and family history information in your EMR used from a population health management perspective?
    - For example, does your EMR automatically generate reminders for patients that are overdue for cancer screenings? Does it do this for colorectal cancer screening?
    - How are reminders delivered? (When patient comes into office, sent out to patients who have not been in office for a while, but are overdue for screening, other)
- Are you familiar with new federal reporting requirements (UDS measures) for colorectal cancer screening? Are you involved in generating data from your EMR for this reporting process?
- What type of clinical data do you extract from the EMR system on a regular basis?
    - What do you do with the data?
    - Do you run any type of regular analytic reports? Are any specific to cancer screening or colorectal cancer?
    - What types of information or reporting do clinicians want from the EMR? Are they able to get that information? Why/why not?
    - Are clinicians able to extract data from the EMR on their own? For individuals/their patient panel/clinic-wide? Why/why not?
    - How easy or difficult is it to retrieve information from your EMR?
    - What types of reports would be most helpful to get from your EMR to help your center better manage your patients' screening status?
- Are you familiar with any other EMR systems that are more effective at tracking and following up on cancer screening? What about reporting?
    - What makes those systems more effective?

- Are there any vendor modifications or workarounds that you or other staff have developed to get something out of your EMR that it wasn't originally providing? What?
- Any workarounds specific to colorectal cancer screening? Please describe.

- Do you feel that the clinicians in your health center are taking full advantage of your EMR's capabilities for facilitating cancer screening? If not, why?
  - Are there some clinicians that use the system more effectively than others?
  - Is training on the system's capabilities an issue or barrier to more effective use?
- If you could change your EMR system to make it a more effective tool for cancer screening and reporting what would you change?
- If you could change your EMR system to improve the process of collecting and maintaining up-to-date family history information, what would you change?
- Are there any features or capabilities that you would you like to see added to your EMR that could help facilitate cancer screening, family history collections or follow up care? Are there any features or capabilities that you feel are a distraction that could be dropped?

Ask as time allows

- Has your health center done anything in recent years to try to improve cancer screening rates? What?
- What do you think could be done to improve screening rates for colorectal cancer at your health center?
- Relative to other concerns and priorities you have for the population you serve at your health center, how important is it to improve screening rates for colorectal cancer?

V. CLOSING (2 minutes)

- Thank respondent for participating
- [ASK IF NEEDED TO SUPPLEMENT RECRUITING EFFORTS] Do you have any colleagues in other community health centers that you think would have insights into the use of EMRs to track cancer screening and who may be willing to participate in this research?
- Confirm address for honorarium payment