Feasibility of Using Patient Navigation to Improve Identification of Inherited Colorectal Cancer (CRC) Syndromes

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Abstract

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Colorectal cancer (CRC) is a major health concern in the United States (US), with a significant percentage attributed to inherited syndromes like Lynch Syndrome (LS). Despite current clinical guidelines recommending genetic testing for CRC patients many eligible patients are not accessing these services. To address this gap, we aimed to describe the feasibility of implementing patient navigation for hereditary CRC syndromes across a range of health care settings. Our qualitative study involved interviews with healthcare professional across various roles and settings in the US. Participants were purposively sampled and interviewed about current genetic services about current genetic service delivery methods, perceived barriers, and facilitators to implementing a patient navigation program within their health care organization. We identified several barriers to the feasibility of the patient navigation program, including

limited funding, staffing challenges, inadequate health information technology, and difficulties gaining administrative buy-in. Despite these barriers, participants suggested potential strategies for overcoming them, such as cross training staff and seeking external funding. However, patient navigation may not align with the rapidly evolving models of genetic services delivery. In conclusion, while the patient navigation program does address perceived barriers to genetic service uptake, its feasibility is limited by resource constraints and evolving services delivery models. Future efforts should prioritize creating standardized guidelines for hereditary cancer prevention to guide quality improvement initiatives.

INTRODUCTION

In 2024, colorectal cancer (CRC) accounted for 8% of new cancer cases in the United States (US) and 9% of cancer deaths[1]. Lynch syndrome (LS) is a genetic condition resulting from pathogenic or likely pathogenic (P/LV) variants in the DNA mismatch repair genes MLH1, MSH2, MSH6, or PMS2, or deletions of the EPCAM gene[2, 3]. LS is passed through families (dominantly inherited) and accounts for approximately 2% to 3% of CRC case[4]. Individuals with LS have increased risk for endometrial, ovarian, and other cancers, in addition to CRC[5]. Like with LS, individuals with P/LP variants in APC (familial adenomatous polyposis, FAP), CHEK2, MUTYH (MUTYH-associated polyposis, MAP), PTEN (Cowden syndrome), and TP53 (Li-Fraumeni syndrome) have substantially increased lifetime risk of colorectal and other cancers relative to the general population, though these conditions are less common[2].

Identifying inherited CRC syndromes through germline genetic testing carries substantial benefits for newly diagnosed patients, including informing the scope of their cancer treatment and need for future surveillance. Clinical guidelines from the National Comprehensive Cancer Network (NCCN) and other organizations recommend offering genetic counselling and germline genetic testing to all CRC patients diagnosed before age 50 years and to older patients with specific tumor characteristics and cancer histories. Despite these guidelines, many CRC patients who meet eligibility criteria are never offered genetic services. Further, many patients who are appropriately identified and referred to counseling ultimately never receive testing[6, 7].

In an effort to expand the portfolio of health system strategies available to improve identification of inherited CRC syndromes among newly diagnosed patients, our team developed a patient navigation program, which we are currently testing it in an academic-affiliated health care system[8]. We created the navigation program by adapting the New Hampshire Colorectal Cancer Screening Program (NHCRCSP) Patient Navigation Intervention, an existing evidence-based intervention, to focus on genetic counseling referral and attendance[9, 10]. The logic model for our patient navigation program is shown in Figure 1. On a monthly basis, a trained navigator delivers a scripted navigation protocol by phone to all eligible CRC patients who visited the health system in the prior month. Short-term program outcomes include increased referrals, genetic counseling visits, and genetic test orders. Long-term outcomes include improved access and use of appropriate cancer treatment and risk management interventions and, ultimately, improvements in CRC-related morbidity and mortality.

There is preliminary evidence from other settings that patient navigation can improve receipt of indicated genetic services. However, prior research shows that integrating research-tested interventions, including patient navigation programs, into usual care and ensuring their sustainability is notoriously challenging[11] . Thus, even if found to be highly effective, our program may not be feasible in many settings without adaption. Figure 2 shows necessary inputs for program implementation during our randomized trial. Little research has examined the extent to which these inputs are in place across US settings where CRC patients receive care.

To address this gap, we aimed to describe the feasibility of implementing patient navigation for hereditary CRC syndromes across a range of health care settings. Thus, in parallel with quantitative program evaluation activities, we conducted qualitative interviews identifying barriers to program implementation and strategies to address them in an effort inform future scale-up of an effective program.

METHODS

We conducted a qualitative study with representatives from health care organization that provided cancer-related care, mainly in the Western United States (US). Institutional ethics approval was obtained (STUDY00013911) from the University of Washington with a waiver of documentation of written consent.

Study Population

Eligible participants were English-speaking health care organization employees over the age of 18 years with specialized knowledge of CRC and/or hereditary cancer syndromes, including genetic counselors, nurse practitioners, administrators, gastroenterologists, medical oncologists, surgeons, and medical geneticists. Potential participants were identified and purposively sampled across professional roles via the research team's professional connections, snowball sampling, and database/website searches (PubMed, LinkedIn, National Society of Genetic Counselors, Google). Database/website searches included terms such as "colorectal cancer", "patient navigation", and "genetic testing". Prospective participants were invited to participate over email and offered a $50 cash card as an incentive.

Data Collection

Semi-structured interviews were conducted by one of three team members (ES, SS, SK) over Zoom and were designed to last approximately 30 minutes. Participants were provided with copies of the navigation program logic model and inputs (Figure 1, 2) via email to review prior to the interview. Interview questions explored, first, current methods for delivering genetic testing and counseling for new diagnosed CRC patients in their organization (i.e., usual care) and second, perceived barriers and facilitators implementing our patient navigation program to improve delivery of these services. The interview guide was designed to probe for barriers and facilitators known to be associated with implementation success as specified in the Consolidated Framework for Implementation Research (CFIR), including characteristics of the program (PN) and the organization's inner setting, outer setting, individuals, and implementation process[12]. Zoom recordings were professionally transcribed by Rev and checked for accuracy and deidentified by JD. Participants did not review interview transcripts.

Data Analysis

Interview transcripts were coded using the qualitative data management software Atlas.ti. The codebook was based on the interview guide and included *a priori* codes for CFIR domains (program, inner setting, outer setting, individuals, and implementation process). We used a deductive-inductive approach to code transcripts and interpret data, where emergent codes were iterative added to the codebook[13]. In a first round of coding, both ES and JD coded a subset of transcripts, which were compared. Coding discrepancies and emergent codes were discussed by a subset of the research team (ES, JD, SK). Based on this discussion, we changed from an analysis approach grounded in the CFIR (i.e., mapping barriers and facilitators to CFIR domains) to a more pragmatic approach we believed would be more accessible to potential program implementors (i.e., identifying the most frequently mentioned barriers across organizations and the strategies that participants stated they would use to address these barriers). An updated codebook was created, which ES used to code the remaining transcripts.

Once coding was complete, we generated code reports that synthesized all quotes assigned to specific code across transcripts. ES, JD, and SK each reviewed related code reports to generate initial lists of themes and subthemes with definitions and example quotations[14]. Initial lists of themes and subthemes were then synthesized by the senior author (SK) to create a coding memo which was discussed and further refined by the larger team. The refined coding memo was then used to guide data interpretation and develop the results section of the manuscript.

RESULTS

Participant Characteristics

Between July 2023 and April 2024, we invited 34 individuals to participate in an interview, of which 19 agreed (56% response rate). Most of the individuals who were invited, but did not participate, passively declined (did not respond to 2 email contacts). The health care organizations represented in our sample, including their geographic region and the number of representatives we spoke with, are shown in Table 1. We do not report other interviewee or organization characteristics to maximize participant privacy.

Usual Care Approaches to Identifying Hereditary CRC

Most organizations had a standardized approach for delivering indicated genetic services to newly diagnosed CRC patients. Almost all organizations conducted universal tumor screening and then relied on treating providers and their support staff to make appropriate referrals based on patient eligibility. As a representative of a Western comprehensive cancer center described, *"Sometimes, we need to flag them in tumor board if referrals were missed, but generally, providers see early-onset colorectal cancer patients or patients at any age with a family history and refer them. We also flag patients with high microsatellite instability or abnormal mismatch repair deficiency, and we refer them over to genetics."* The degree to which these processes were working, and patients were reliably receiving indicated genetic services, however, was variable across organizations. Many of the organizations where representatives felt provision of genetic services was going well had fully integrated genetic counseling into a standard "care pathway" for CRC and thus had quality checks in place to ensure patients received genetic services. Care pathways are mutually agreed upon frameworks for the organization of health care process for a group of patients to ensure consistent care quality[15].

In organizations where receipt of indicated genetic services was either known or perceived to be less consistent, the two most frequently mentioned challenges were provider under-referral and lack of patient follow-through on referrals. Participants typically attributed both of these challenges to poor understanding, communication, and appreciation of hereditary CRC's treatment implications and the importance of accessing testing as soon as possible. A representative from a Western critical access hospital and clinic network described, "*…someone, has to describe somewhere along line why this is even important…if they're not being told that on the front end...why it's even valuable, why would they take time out of their schedule to do* *that? Even if costs and finances and time were not an issue.*" Organizations were taking several steps to improve providers', patients', and the general public's recognition of hereditary CRC. Activities ranged from developing referral scripts to tabling at local health fairs. A representative from a Western comprehensive cancer center described, "*…we did a lot of work with question and answers and scripting on what genetics is and why it's important…having that established where you have clear scripting for whoever's talking to the patient is super helpful. Before we had that, some people were really good at getting patients to genetics, some people were not*." Finally, while testing's reduced cost and the advent of telehealth plus at-home saliva testing were frequently lauded as increasing patient access, long wait times and the need for high-speed internet for telehealth visits lowered follow-through.

Perceived Patient Navigation Program Feasibility
Below, we describe five barriers to implementing patient navigation that representatives believed would impact the feasibility of this health care system strategy for improving identification of hereditary cancer syndromes in CRC patients. For each barrier, we detail strategies addressing that barrier that were discussed during one-on-one interviews (Figure 3).

Funding to implement and sustain program
Limited funding to start any new program, particularly a program that interfaced with genetics departments, was seen as a primary barrier limiting feasibility. There were concerns about overwhelming struggling genetics departments that had appointment wait times up to six months. One representative from a Western integrated health system explained, "*I think one of the biggest concerns that we hear from our stakeholders internally is just obviously resources for testing so many individuals.*" Even in settings with more robust genetics programs or the ability to refer patients to external providers, starting a new initiative that required an influx of capitol and/or time was seen as a non-starter in almost every organization we spoke with.

Most health care organizations have become used to operating in a context of resource constraints, so our participants had many suggestions for addressing this barrier. Several participants suggested expanding the role of current staff members, particularly existing patient navigators. For example, a representative from an Eastern comprehensive cancer center, suggested, "*I think identifying the existing structure for nurse navigation, if there is one at a system, and then seeing how genetics can be built into that off of the existing structure, because then you don't have the big cost*." Other participants suggested seeking short-term internal and external funding opportunities, such as grants, to support program implementation.

Staffing and supervising the patient navigator
Differing opinions regarding qualifications and training required for the navigator was another feasibility barrier. While nurse navigators were considered ideal, their higher cost compared to lay navigators seemed impractical to many participants. However, some doubted whether lay navigators could lead this type of program with formal training in genetics. Who in the health system would supervise the navigator was also a point of contention. A representative from a Western comprehensive cancer center stated, "*I think what it boils down to is making sure we define clearly the roles and responsibilities of the whole care team and making sure that there's relevance for having a patient navigator here to support the patient and the care team and making sure that they fit within the current structure of our clinical model.*"

Despite differing views about how best to staff the navigator role and provide ongoing supervision for the program, most participants believed that, if necessary, it would be possible to convene the necessary stakeholders in their organization to answer these questions. Similar to comments about addressing general resource constraints, there was consensus that cross training the navigator and providing senior supervision in order to have the least expensive candidate operating at the top of their scope of practice—perhaps across several programs—was an ideal solution.

Program health information technology needs

The lack of health information technology tailored to genetic services delivery and the limitations of the electronic health record were also raised as barriers to navigation program feasibility, particularly in larger organizations. As a representative from a Western integrated health system explained, "*I am using an Excel spreadsheet to track these patients, which is not ideal. And, again, it's doable and the number is not so much that I can't do it on my own. But it would be so much more efficient, and I could track so much more, if this information was being pulled from a chart search rather than me going in and saying, okay, this patient saw genetics…this patient has an appointment coming up…that is all manual chart review on my end.*" Participants also mentioned issues with IT integration, generally, and of genetic test results, specifically, across departments, clinics, and systems, that would make it difficult for patient navigators to keep track of patients efficiently, or in some cases at all, within their organization.

Unlike other barriers impacting program feasibility, participants suggested few solutions that would address health IT limitations. One representative from a Western integrated health system described a colleague who was experimenting with Tableau, a business intelligence and analytics software, to visualize data about genetic service utilization in their organization as an example of a technology that could be used to support a navigation program.

Gaining administrator buy-in

Participants across organizations told us they expected having trouble gaining administrators' buy-in to implement a patient navigation program for hereditary CRC—another feasibility barrier. Getting the necessary organizational approval was seen as particularly challenging due to the navigation program's multidisciplinary nature, requiring sign off from multiple departments involved in caring for CRC patients. Participants anticipated potential overlap between this specific type of patient navigation versus services provided through existing programs in their organization as a key sticking point with administrators.

That being said, participants did have a number of ideas for how they would go about increasing program buy in among administrators based on their prior experiences. Participants described using data to demonstrate the program's alignment with the organization's mission and benefits to patient care. Highlighting current standard of care and the need to keep up with peers and competitors was another strategy. Others mentioned describing legal risks of inaction and potential cost savings or revenue gains. Other suggestions were to strategically approach administrators likely to understand the program's value, medical geneticists were used as an example, and to gather stakeholders in person.

Evolving genetic service delivery models

The last barrier limiting patient navigation's feasibility as a strategy for improving diagnosis of hereditary CRC was the rapid pace at which models for delivering genetic services are evolving. Specifically, participants did not see patient navigation, particularly delivered over the phone, as a cost-effective or sustainable solution given the movement away from in-depth pre-test genetic counseling in the context of a new cancer diagnosis and the perceived advent of population-based screening for common inherited conditions. As explained by a representative from a Western integrated health system: "*I think we're going to move towards population testing...it's going to have the same regulated guidelines that we do for other screening...and I think that will really push standardization of care.*"

Until that time, participants described alternative solutions that they would prefer over patient navigation, some which they were already preparing to implement in their own organizations. A representative from a Western integrated health system described their ideal intervention as: *"A walk-in clinic for high-risk cancers…patients can watch an educational video through the [health system EHR], decide on testing, and get a cheek swab, with the option for a full 45-minute consultation"*. Others spoke of providers ordering testing directly, without referring to counseling, often prompted by clinical decision support tools in the electronic health record or partnering with direct-to-consumer testing labs that provided testing and counseling, which were advertised in waiting rooms. Finally, some participants preferred to continue their lower-cost quality improvement efforts as opposed to investing a patient navigation, which would be more time consuming.

DISCUSSION

This study suggests that though many health care organizations could implement a patient navigation program, despite feasibility barriers, most would not prioritize this health system strategy for improving delivery of genetic services to CRC patients in their organization. Instead, alternative solutions that are more aligned with the changing landscape of genetic service delivery or that fill operational or other context-specific gaps are preferred.

Across organizations, our discussions of usual care during the interviews identified the same perceived contributors to underuse of indicated genetic services as the needs assessment we conducted to develop the original navigation program. These included poor provider and health system communication of and limited patient understanding and appreciation of genetic testing's importance for guiding near-term treatment decisions. Given the range of organizations represented in our sample, this is an important finding and speaks to the universality of this practice gap across settings. When first receiving a diagnosis, CRC patients feel overwhelmed and are primarily focused on their treatment. Patients may initially refuse genetic testing but be more open after they have time to process their diagnosis[16]. The perceived complexity of genetic services, coupled with the inconvenience of scheduling appointments is an additional deterrent. Without clear and repeated messaging from providers and support staff about the need to attend counseling and complete testing, it is not a priority. The content of our patient navigation program, which focuses on reinforcing counseling and testing's benefits in addition to providing logical assistance and reminders, thus appears to be relevant across settings.

Despite the potential relevance of the navigation program's content, our interviews identified key barriers limiting its feasibility as a quality improvement strategy. Barriers included limited funding to implement and sustain the program; challenges staffing and supervising the navigator; lack of appropriate health IT to support the program; and difficulty obtaining administrator buy in. While concerns about resources issues are ubiquitous in the current US health care climate, some facets of the feasibility barriers we identified are unique to delivery of genetic services. Many of these barriers have been previously documented, including insufficient genetics capacity in many organizations; poor integration and interoperability of genetic data in the medical record; poor role clarity given genetic medicine's multidisciplinary nature. However, confusion about how to staff the navigator role and the background and training necessary to ensure high-quality patient care has not been previously described. When testing our program, the navigator had a master's degree in public health, but no formal training in hereditary cancer or genetic counseling. Based on our interviews, this background may not be considered sufficient in some organizations. As we attempt to integrate genetic medicine into routine care and scale up delivery of recommended genetic services, additional attention to consensus building on training, credentialing, and other workforce development issues is needed.

Interview participants were quick to point out that they often implement programs in the presence of feasibility barriers. Thus, they described many strategies they would use to overcome identified barriers, if necessary. These include cross-training navigators, collecting data to demonstrate program benefit to organization administrators, and seeking out external funding. These strategies are not unique. A study that examined the logistical challenges of implementing a PN program across global care settings reported using almost identical strategies to improve feasibility[17].

Participants, however, had few suggestions for how to address the health IT issues that plague genomic medicine. Developing an IT platform to support the navigation program, including ways to easily identify the eligible denominator population, track navigator outreach, and document patient barriers would undoubtably make implementation more feasible. However, this would require resources beyond the scope of our current funding. This may explain why many IT solutions in genetic service delivery are developed using for-profit models that make them less accessible to many health care organizations, perpetuation implementation gaps.

Finally, the biggest barrier to implementing patient navigation for hereditary CRC we identified was the limited perceived value of this intervention delivery model given rapid changes in how genetic services are delivered to cancer patients. Specifically, while there was agreement that patient and provider underappreciation of genetic testing's important was driving under use, few participants thought that our navigation program, which was designed to increase salience and decrease logistical barriers to motivate adherence, was the best approach to increase testing rates. Instead, most participants felt that genetic testing should be treated like any other treatment-related test or procedure and ordered if not automatically, then with minimal steps for patients to complete. A few organizations had already implemented models where germline testing was ordered directly by the treating oncologist or counseling was provided by video or following testing in the case of a positive result. It is important to note that not all participants we spoke with were comfortable with skipping pre-test counseling for germline testing or thought that it would be acceptable to stakeholders in their organization. Our findings suggest that in the absence of a clear standard of care for delivering genetic services to CRC patients, practice variation abounds, likely contributing to differential patient outcomes across settings and making it challenging to develop improvement interventions that are transportable between settings. Understanding and addressing practice variation in genetic service delivery should be a top research and funding priority.

Our study did have limitations. We mainly interviewed representatives from health care organizations in the Western US, limiting our results' generalizability to other geographic regions. While we attempted to recruit across organizational roles, given the need for respondents to understand hereditary CRC, the sample overrepresented genetics professionals and underrepresented health care administrators, whose views on this topic are particularly important. Finally, we designed the interview guide using the CFIR to probe for specific barriers and facilitators across known domains but chose not to map identified barriers to this conceptual model during the analysis. While we believe this increases accessibility for a clinical audience, it limits the ability to compare our findings with prior implementation science literature grounded in the CFIR.

In conclusion, this study identified key barriers limiting patient navigation's feasibility as a health system strategy to address underuse of indicated genetic services in newly diagnosed CRC patients, namely perceptions that this intervention approach was inconsistent with new norms for delivering genetic services. To ensure equitable patient outcomes, consensus development around practice standards in hereditary cancer prevention is needed to inform much needed quality improvement efforts.

Figure 1. Patient Navigation for Hereditary CRC Syndromes[1]

Inputs[2]	Activities	Short-term Outcomes	Intermediate Outcomes	Long-term Outcomes
- Program infrastructure and resources -Trained navigators -Relationships with specialty providers -Patients eligible for hereditary CRC testing	-Deliver navigation protocol: 1. Why attend GC? 2. Barrier resolution, family history collection 3. GC follow-up and next steps -Track patients and document services -Monitor navigation program quality	-Improved GC referral -Reduced missed GC appointments and late cancellations -Improved preparation and engagement during GC -Improved receipt of GC -Improved receipt of GT -Improved documentation and communication of GT results	-Improved care coordination -Increased referral, GC, and GT rates -Improved diagnosis of hereditary CRC syndromes -Timely access to treatment- relevant information -Enhanced access to risk management -Improved rates of cascade testing	-Decreased CRC morbidity and mortality -Decreased incidence of non-CRC hereditary cancers -Reduced disparities in access to genetic services -Increased prevention and early detection in family members

[1] adapted from the NHCRCSP Patient Navigation Model (https://www.cdc.gov/cancer/crccp/pdf/nhcrcsp_pn_manual.pdf); [2] see detailed information on inputs on next page

Abbreviations: colorectal cancer (CRC); genetic counseling (GC); genetic testing (GT)

Figure 2. Inputs

Program infrastructure and resources	• **Method to identify CRC patients potentially eligible for GC:** We use a monthly pull of structured data from our health system's EHR. The IT infrastructure to extract EHR data EHR is maintained by the academic health system. After developing the EHR query, it has taken a programmer ~30 minutes a month to extract data. • **Method to confirm GC eligibility:** We perform manual chart review on patients identified through structured data pulls to confirm eligibility for GC. This involves finding and reviewing internal and external pathology and molecular testing reports. The chart reviewer consults a clinician for challenging cases. After training, it has taken the chart reviewer ~10 hours to review ~35 patient charts per month. • **System to track eligible patients through navigation:** We use REDCap. Could also use an EHR-integrated workbench or simple spreadsheet. Confirmation of GC and GT receipt beyond patient report requires manual chart review.
Trained navigator	• PNs serve as a bridge between patient, CRC providers, and the genetics clinic. They help patients overcome barriers to appointment adherence and tailor logistic and emotional support to each patient's needs. • PNs are trained in **motivational interviewing**, **basic hereditary cancer genetics, and financial navigation**. • PNs benefit from learning health system-specific CRC workflows, clinical contacts, and patient-support resources. • PN role should supplement, not replicate, the genetic counselor's role. • In our study, one 50% FTE PN navigated ~10 patients per month, with significant bandwidth for additional patients.
Relationships with specialty providers	• Internal or external genetics provider to refer patients for GC and GT. This could include referring patients to a reputable stand-alone laboratory (e.g., Invitae, Color) that employs providers to place test orders and provide GC.
Patients eligible for hereditary CRC testing	• **Well-defined GC eligibility criteria:** Eligibility criteria will depend on CRC tumor screening procedures in the setting. Our setting performs universal tumor screening (IHC or MSI and reflex methylation testing), so we are able to identify patients eligible for GC due to BOTH their age at CRC diagnosis (<50 years) and their molecular testing results (IHC, MSI, and methylation testing indicate inherited cancer susceptibility).

Abbreviations: colorectal cancer (CRC); genetic counseling (GC); electronic health record (EHR); information technology (IT); genetic testing (GT); patient navigators (PN); full time equivalent (FTE); immunohistochemistry (IHC); microsatellite instability (MSI)

Table 1. Organization Characteristics

Organization	Region	Type	Patient Population	Navigation Program	Genetics Program
A, N=1	West	State health department	NA	NA	NA
B, N=1	West	Non-profit regional health care system	NA	Yes: cancer treatment; social needs	Yes: X providers
C, N=1	West	Non-profit acute care hospital and clinic network	NA	No: social worker; financial advocates	Yes: 3 providers and GCs
D, N=1	West	Non-profit	NA	NA	NA
E, N=3	West	Comprehensive cancer center	NA	Yes: cancer treatment	Yes: 12 providers and GCs
F, N=1	West	Critical access hospital and clinic network	Rural/remote WA and ID	No	Yes: 1 provider/GCs
G, N=2	West	Non-profit regional health care system	NA	NA	NA
H, N=2	West	Comprehensive cancer center	NA	Yes: cancer treatment; social needs; financial advocates	Yes: 14 providers and GCs
I, N=1	East	Comprehensive cancer center	NA	Yes: for breast cancer; nurse navigators	Yes: 12 but not all are in cancer genetics
J, N=3	West	Non-profit regional health care system	NA	Yes: for gyn cancers, and more of a general tracking system	Yes: 110 for Northern CA
K, N=1	Midwest	Comprehensive cancer center	NA	Yes: Not sure what type	Yes: unsure how many
L, N=1	East	Academic medical center	NA	Yes: Social workers and “care managers”	Yes: But mostly gyn cancers.
M, N=1	West	Academic medical center	NA	NA	NA

Figure 3. Key Feasibility and Solution Themes

Feasibility Themes	Key Barriers to Feasibility	Key Strategies
Funding to implement and sustain the Program Navigation	• Insufficient staff • Lack of budget for a new role • An increase in referrals will overwhelm the genetics department	• Cross-train current navigators • Seek short-term internal and/or external funding
Staffing and supervising the patient navigator role	• Ambiguity around the role and required qualifications of PN • Varying requirements across healthcare organizations • Need for multidisciplinary education • High cost of nurse navigators compared to lay individuals	• Gather stakeholders to agree on role and qualifications • Utilize support staff and senior supervision for training
Program health information technology needs	• No platform to integrate testing, counseling for patient navigation support	• Use simple non-integrate platforms such as Excel. • Experiment with different software • Advocate for administration support to invest in the creation
Gaining administrator buy-in	• Lack of Understanding of the Patient Navigator Role • Need support from multiple department leaders • Distinction between PN and other roles	Use qualitative or quantitative data to demonstrate: • Patient Benefit • Navigation program fit with the organization's mission • Navigation program as the standard of care • Need to keep up with peers and competitors • Legal risk of inaction • Potential cost savings
Evolving genetic service delivery models	• A PN system is not the most cost-effective • Reduction in pre-test genetic counseling • Patients are not likely to answer phone calls from a PN	• Implement population screening for Tier 1 conditions • Focus Resources on Same Day Clinics • Launch mass media outreach campaigns • Improve Scripts and Education for Providers and Schedulers • Promote cascade screening

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