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Using the SAMScore Questionnaire to Increase Skin Cancer Risk Screenings at Adult Patient Annual Exams

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Using the SAMScore Questionnaire to Increase Skin Cancer Risk Screenings at Adult Patient Annual Exams

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing Practice at the University of Kentucky

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Abstract

Background: Malignant melanoma has become an increasingly prevalent problem in the United States. The earlier a skin cancer is identified, the better the outcome. There are conflicting recommendations about screening for skin cancer but in general identifying high risk patients is important and it is not being achieved in primary care.

Purpose: The purpose of this study is to evaluate use of the SAMScore Questionnaire to determine high risk patients at adult annual visits.

Methods: This was a multi-phased study with a quasi-experimental design that took take place at a family and community primary care clinic in central Kentucky. Baseline assessment of skin cancer screening frequency and education during annual exams was obtained with a medical record review. Providers were then educated on the use of the SAMScore and asked to start using with adult patients during annual exams. After a period of 3 weeks, a post-intervention review of medical records was completed to assess provider documentation related to skin cancer screening risk using SAMScore and education. Inclusion criteria involved patients aged 18-64 years old of all genders, races, and ethnicities.

Results: The phase one chart audit included 30 patient charts and the phase three chart audit included 48 patient charts. There was a significant increase in screening completion from pre- to post-intervention. None of the participants were screened pre-intervention, and more than half (56%) were screened post ($p<.001$). Of the 27 patients screened, 14 (52%) were documented as being at high risk and of those patients, (100%) received education on skin protection.

Conclusion: One hundred percent of the patients identified as high risk at this clinic were educated on skin protection, but only about half of the eligible patients were indeed screened.

Further research should be done to address barriers to screening and continued efforts should be made to ensure our primary care providers are identifying those at high risk for skin cancer.

Dedication

I would like to dedicate my work to my husband, brothers, parents, and my snug bug.

To my husband, Andrew, I never would have made it through the last four years without you. Thank you for never allowing me to question myself, never allowing me to give up, and for continuously taking my stress when it would get too heavy for me to carry alone. Thank you for being my rock, my best friend, and my lover. I promise to always work to make you proud.

To my twin brother, Tylo, thank you for always making me laugh. You have an incredible ability to lighten my mood no matter how tired or overwhelmed I am. Even when I don't want to, you can make me smile. I needed you to do that for me frequently throughout this process. Thank you for being my sunshine when the sun doesn't seem like its shining.

To my older brother, Atlee, thank you for leading the way for me in this crazy world of nursing. Not many people understand this aspect of my life and I love that I am able to share something so special with you. I will always look up to you in every part of life. You're next!

To my parents, thank you for teaching me to follow my dreams. Thank you for teaching me that no matter how difficult something may feel, God always has it all under control. Thank you for your never-ending support, for your endless encouragement, and for the comfort you will *always* provide me. I can't thank God enough for blessing me with you as my parents.

Finally, to my sweet prince, Mowgli, thank you for your unconditional love. Thank you for never being able to get close enough to me, thank you for your infinite kisses, and thank you for you always listening when I need someone to listen. Thank you for being right by my side during every exam, every paper, and every hour that I studied. You make everything better, always.

Table of Contents

List of Tables

List of Appendices

<center>**Background and Significance**</center>

Problem Statement

Malignant melanoma has become an increasingly prevalent problem in the United States in the 21st century (CDC, 2015). According to the CDC, rates of malignant melanoma doubled from 1982 to 2011. Melanoma is the deadliest form of skin cancer and claims about 9,000 lives each year (CDC, 2015). Prevention and early detection are key to decreasing rates of malignant melanoma in the United States and decreasing the number of deaths associated with it each year. Primary care providers need to identify patients who are at higher risk for developing malignant melanoma (fair skin, first degree relatives with Melanoma, etc.) to provide them with the best care. Currently, there is a lack of skin cancer risk screenings completed by primary care providers at adult annual exams.

Context, Scope, and Consequences of the Problem

Malignant melanoma is a form of skin cancer that can travel to other parts of the body and cause high rates of death. Ninety percent of all melanomas are caused by exposure to ultraviolet light radiation, which can be due to excessive sun exposure or the use of indoor tanning facilities (CDC, 2015). This radiation causes mutations to occur at the cellular level which can form cancerous growths or tumors. Along with exposure to UV light, other risk factors include having fair skin, having numerous moles, and a family history of melanoma (Skin Cancer Foundation, 2019).

It is estimated that there will be 30,370 new cases of Melanoma in Kentucky in 2022, with an estimated death rate of 9,740 (American Cancer Society, 2022). The annual cost of treating skin cancers in the U.S. is estimated at $8.1 billion (AAD, 2021). Survival rates of

<center>9</center>

malignant melanoma decrease from 99%, when identified early in stage 1 or 2, to 63% when it has spread to the lymph nodes in stage 3, and to 20% survival rates when it metastasizes to other organs in stage 4 (Skin Cancer Foundation, 2019). The earlier a skin cancer is identified, the better the outcome. Ideally, primary care providers would routinely screen patients at annual exams to determine their risk. Providers need to identify patients who are at higher risk for developing malignant melanoma to provide them with the best care.

<div align="center">**Current Evidence-Based Recommendations**</div>

Three main organizations have different recommendations regarding skin cancer screening. The Skin Cancer Foundation recommends using sunscreen with SPF 15 or higher, avoiding the use of tanning beds or getting sun burned, examining your skin head-to-toe every month, and having a professional skin examination every year (Skin Cancer Foundation, 2019). The USPSTF states that current evidence is insufficient to assess the risks versus benefits of annual skin exams in asymptomatic patients, but this does not address those that are considered to be at high risk (HHS, 2016). According to Memorial Sloan Kettering Cancer Center (2022), although it is not recommended for asymptomatic patients to be screened annually, they do recommend that individuals identified as high risk (a family history of melanoma in two or more blood relatives, the presence of multiple atypical moles, the presence of numerous actinic keratoses, etc.) be evaluated once a year for a head-to-toe skin cancer assessment. Further, the USPSTF does recommend behavioral counseling for skin protective behaviors for specific populations at higher risk (HHS, 2016). The USPSTF states that "behavioral counseling" is aimed at reducing ultraviolet radiation exposure. Sun-protective behaviors the patient should be counseled on include the use of a broad-spectrum sunscreen with a sun protection factor ≥15, wearing hats or other shade-protective clothing, avoiding the outdoors during midday hours (10

a.m. to 3 p.m.), and avoiding the use of indoor tanning. They state that effective counseling

interventions can be generally of low intensity and accomplished within a primary care visit

(USPSTF, 2018). Although this is their recommendation, a survey found that only 48% of

primary care providers (PCPs) regularly educate patients on skin protection regardless of patient

risk (Holman et al, 2019). This illustrates the disconnect between current practice and specific

recommendations for patients at high risk, as well as providing education on skin protection.

The SAMScore Questionnaire (Quéreux et al., 2011) is an evidence-based tool that lists

seven risk factors for the patient to select as they apply to them (see Appendix 1). This tool is

used to identify patients that are at higher risk for developing Melanoma. Providers are

responsible for evaluating the patients risk based on their answers on the questionnaire. A patient

is considered at elevated risk for melanoma if at least one of these three criteria is verified:

Presence of at least 3 risk factors (phototype I or ii, freckling tendency, number of naevi >20 on

both arms, severe sunburn during childhood or teenage years, life in a country of low latitude, a

history of previous melanoma, a history of melanoma in a first-degree relative), a subject under

60 years of age and a number of melanocytic naevi >20 on both arms, and a subject 60 years old

or older with a freckling tendency. This tool can be used to identify patients at high risk for skin

cancer and help bridge this gap between recommendations and actual practice for those at high

risk for developing skin cancer.

Purpose/Objectives

The purpose of this study is the evaluate use of the SAMScore Questionnaire to determine high

risk patients at adult annual visits. With the implementation of this screening tool among primary

care providers at primary care annual exams, the objectives of this study are to:

1. Evaluate the number of skin cancer risk screenings and actual risk charted by providers at annual exams before and after implementation of the screening tool

2. Evaluate skin protection education offered to patients after screening

Theoretical Framework

Lewin's Theory of Change was used to guide the change implemented in this project. The theory was developed by Kurt Lewin in 1947 and involves three steps: unfreezing, changing, and refreezing. According to Lewin, the process of change involves developing a perception that a change is needed, then directing interventions toward the new desired behavior and then making that behavior the new norm. The first step is *unfreezing*. This is the process which involves developing methods that make it possible for people to understand the need for change or new behaviors. The next step is the *change* step, which is also called the "movement" step. This involves a process of change in thoughts, feelings, and behaviors, that is aimed at reaching a certain goal. Finally, the *refreezing* stage is instituting the change as the new standard behavior. so that it now becomes the "standard operating procedure" (Lewin, 1947). During the first stage, unfreeze, the current process for screening patients for skin cancer risk was evaluated at the clinic, and the SAMScore Questionnaire was appraised to improve this process. During the movement stage, the SAMScore Questionnaire at annual exams was implemented through one PDSA cycle. The refreezing stage comes after there has been a successful process to change.

Review of Literature

A literature review was conducted to determine the effectiveness of risk assessments in primary care to identify patients at higher risk for skin cancer and the evidence surrounding skin protection education. Specifically, the question guiding the review is: "Does providing SAMScore Questionnaires to adult patients at annual exams increase provider documentation of

skin cancer risk and skin protection education provided to those at high risk for skin cancer?"
This literature search was conducted using CINAHL and PubMed, and included articles
published from 2000-2020. The list of search terms for population used in this literature search
included: "adult patients OR adult population," and "primary care OR primary care providers,"
"malignant melanoma OR skin cancer AND risk," "skin cancer AND risk screening," "skin
cancer screening OR skin exam OR skin assessment," "skin protection education OR skin cancer
prevention education AND primary care," and "skin cancer risk AND tool," "skin cancer risk
AND questionnaire." Inclusion criteria involved studies that had free full text options, were
published in English, and were peer reviewed primary studies. The review excluded articles that
were in a language other than English, studies from unreliable sources or studies that did not
directly relate to skin cancer in the primary care setting. Nineteen articles were found that meet
the inclusion and exclusion criteria and 13 were chosen to be analyzed based on quality of
evidence and themes.

Review, Analysis, and Synthesis of Evidence

Based on the 13 studies gathered involving skin cancer screening in primary care, three
themes were revealed: low rates of skin cancer screenings, the importance of skin protection
education and the discussion involving risk assessment tools.

The disconnect between evidence and practice of screening rates is illustrated by a study
which found that skin cancer prevention and screening activities in the primary care setting were
much less frequently occurring than other cancer screening and prevention activities. Skin
examination was reported at only 15.8% of all visits (Oliveria et al, 2011). This evidence was
further maintained by a National Health Interview Survey (NHIS) that found that 16% of men
and 13% of women reported having a skin examination in the past year (Coups et al, 2010). It is

interesting to note that previous NHISs reported the percentage of the U.S. adult population that reported having a skin examination conducted by a provider was 20.6% in 1992, 20.9% in 1998, and 14.5% in 2000 (Saraiya et al, 2004). The figures indicate that skin cancer screening rates have been consistently low and are decreasing over the last few decades.

The USPSTF recommends behavioral counseling for skin protective behaviors for specific populations at higher risk (HHS, 2016), but in 2019 a survey found that only about 48.5% of all providers reported regularly counseling on sun protection regardless of patient risk level (Holman et al, 2019). A systematic evidence review for USPSTF found that the current fair-to-good evidence base suggests that behavioral interventions can increase sun protection behavior in both pediatric and adult populations (Henrikson et al, 2018). A study from 2018 concluded that to have sufficient primary prevention of skin cancer, it is essential that patients are provided counseling and education on protective behaviors (Vasicek, Szpunar, & Manz-Dulac, 2018). Another study evaluated the impact that skin protection counseling had on patients' knowledge base and found that although individuals were able to identify skin cancer as an area of concern, few were able to identify ways to prevent skin cancer or the risks for skin cancer before being provided the related education (Nickasch et al, 2020). As a result, these authors claimed, as this study made evident, that simple skin cancer counseling can provide great benefit in increasing knowledge among those educated.

The third theme found during this review of literature revolved around risk screening tools for developing skin cancer. There is not much research available on many of the screening tools discovered throughout this review. One tool identified was The Melanoma Risk Assessment Tool (Fears et al, 2006) which is a risk calculator which was developed to estimate a patient's absolute risk of developing invasive melanoma. The absolute risk identified with this

tool estimates the likelihood that a person will develop melanoma over the next 5 years. According to the developers of this tool, it has not been tested in large populations and thus it has not been "validated" (Oshyvalova, 2019). The SAMScore Questionnaire is a validated screening tool that provides a skin cancer risk assessment that categorizes patients as having normal or high risk and this risk stratification can be used to make recommendations and tailor education (Quéreux et al., 2012). It is made up of seven questions and is completed by the patients themselves. The provider then evaluates their results and determines if the patient is of normal or high risk. The efficiency of the SAMScore risk assessment tool as a targeted screening for high-risk individuals has been documented through many studies (Quéreux et al., 2012; Davies et al., 2015; Rat et al., 2014). The efficiency assessed was equal to 11.54 (P=0.0016). This means that it is necessary to screen 11 times fewer patients when using the SAMScore Questionnaire than with a nontargeted screening tool (Quéreux et al., 2012), and thus it can help identify those who may need more focus on skin cancer prevention (Davies et a., 2015). The combination of use of the SAMScore and general practitioner examination and counseling during consultations is an efficient way to promote patient behaviors that may reduce melanoma risk. Further, a study from 2014 found that the combination of SAMScore, skin assessments and education was the most efficient way to promote patient behaviors that may reduce melanoma risk (Rat et al., 2014).

Summary of the Evidence

This literature review shed light on the current practices surrounding skin cancer screening and skin protection education/ behavioral counseling in primary care. Evidence supports that there is a disconnect between recommendations for skin cancer screening and current practice.

There is limited research to support specific recommendations for skin cancer risk assessment, frequency of skin cancer risk screening in primary care and risk assessment tools. The available research supports the recommendation to provide skin protection education for patients to prevent skin cancer, especially for those at high risk. These gaps could be addressed by the implementation of the SAMScore skin cancer screening tool at adult annual exams by providing a tool to help guide primary care providers in evaluating risk assessments on their patients, as well as identifying those patients that need education on skin protection.

Methods

Design

This was a multi-phased study with a quasi-experimental design aimed at gathering information on the outcomes of using the SAMScore Questionnaire to identify high risk adult patients at adult annual visits in a primary care setting. This study consisted of three different phases: There was a baseline chart audit completed. Primary care providers that agreed to participate were then educated on the SAMScore Questionnaire and asked to include it in their standard workflow at annual visits. Finally, a post-intervention chart audit was completed to determine the effect the tool had on skin cancer risk assessments being completed.

Setting

Agency Description

This project took take place at a family and community primary care clinic in central Kentucky. The office provides care to a racially and economically diverse population of all ages. There are six providers at this office, two APRNs, and four MDs, all of which specialize in

family medicine. Prior to implementation of this study, skin cancer risk screening was not a part of the providers' standard workflow at annual patient exams.

Agency Mission Statement

This office is part of a large university-based health system, whose mission statement is, "Through our DIReCT values, in support of our mission and commitment to patient care, education and research, our 2025 vision will inspire us toward an achievable future." Their mission is centered around five values. The first is *diversity;* they state that their employees should foster an inclusive and people-centered environment. Next is *innovation*; their employees are encouraged to strive to consistently seek better ways to perform at work, find creative solutions, and drive positive change. Third is *respect*, "We value our patients and families, our community, our co-workers, ourselves, and the resources entrusted to us". The fourth value is *compassion.* This value supports empathy for the needs, thoughts and feelings of fellow employees and patients. Finally, *teamwork;* this has a focus on "cultivating and maintaining meaningful relationships to create positive outcomes" (UKHealthcare, 2020). This project fits their mission, as it was designed with a focus on innovation, teamwork, compassion with the patients' best interest in mind with a goal of identifying patients at high risk for skin cancer.

Stakeholders

The key stakeholders in this project include the office's primary care providers who implemented the use of the SAMScore Questionnaire and provide subsequent patient care based on results. Other staff such as medical assistants that were part of the patient care at the visits are also key stakeholders, as well as the patients who filled out the questionnaire and finally the office's administrators who approved the project.

Facilitators and Barriers to Implementation

There are many facilitators to implementing this project, specifically at this location. The main facilitator is the large number of patients seen per day at this office. This allows for a higher number of annual exam visits and thus, possible study participants. Another facilitator is that the SAMScore Questionnaire is short, with only seven questions and takes less than 5 minutes for the patient to complete. This is less time consuming than some other screening tools, making it more convenient for the patient. Further, because of the simplicity of the questionnaire, only a small amount of education is needed for providers to understand and interpret the results. Because the patient completes the questionnaire, time is saved for the provider since they do not have to be involved with asking the questions and filling out the form for the patient. The most important facilitator was that the primary care providers that participated in this study were very receptive to the education provided to them and voiced how motivated they are to providing their patients with the best care that they can.

Although there are many facilitators, there are also some barriers to implementation. One barrier is introducing something new to an already established routine. Change is something that is sometimes not welcomed, so implementing a new questionnaire at all annual exams could receive some resistance from the primary care providers. Another barrier could be the extra time and effort required of the provider to complete the interpretation of the questionnaire filled out by the patient and the subsequent patient care involved based on those results. Providers already have many tasks to complete at annual visits, adding another thing to their list may receive some resistance. By using the PDSA Model to address these barriers, providing proper education to the providers on the short time it takes for the patient to complete the survey, as well as the purpose

and importance of the screening tool, it may decrease their hesitancy to implement the tool into their workflow and encourage them to embrace the change.

Sample

The study population for the first phase of this project included 30 patient charts. Inclusion criteria involved patients aged 18-64 years old of all genders, races and ethnicities who had an adult annual wellness exam scheduled in December of 2021. Exclusion criteria involved that outside of the age range and those previously diagnosed with Melanoma.

Phase two focused on the clinics primary care providers. There are four MDs and two APRNs with varying degrees of experience, both male and female, varying ethnicities, and ages. Inclusion criteria involved being a primary care provider and the ability to agree to participate in the study and provide informed consent. One APRN and one MD participated in the study.

The third phase of the project included 48 patient charts to evaluate screening practices after implementation. Inclusion criteria involved patients aged 18-64 years old of all races and ethnicities who had an adult annual wellness exam scheduled in January of 2022. Exclusion criteria involved those outside the age range and those previously diagnosed with Melanoma.

Procedure

IRB Submission Process

A proposal was submitted for expedited review to the University of Kentucky's Institutional Review Board (IRB) for this project and was approved on October 16, 2021.

Evidence-based Intervention

  The Plan, Do, Study, Act (PDSA) model for improvement is the improvement framework used to guide the implementation of the SAMScore skin cancer screening tool at adult annual exams (Deming, 1993). This is an improvement framework that is made up of many continuous cycles of evaluation, change/acceptance, and re-implementation until it is determined that the goal has been reached, and it is ready to be implemented systemwide.

Plan

  The first of the four stages in this model was the "Plan" stage; this involves identifying a goal or purpose, formulating a theory, and defining success metrics and putting a plan into action. For this study, planning included auditing patient charts to get a baseline assessment of how often skin cancer risk screenings are being documented. It also included meeting with providers to determine participants for the study and collecting signed consent forms. Providers were educated by the PI face-to-face at the clinic. Primary care providers were educated on what the SAMScore Questionnaire is, how it is used, how it is interpreted and the aims of the project; see Appendix 2 for an outline of the education provided to the PCPs. The education took around 15 minutes to provide. A date was then selected for implementation of the plan.

Do

  The next stage is the "Do" phase, or implementation phase. The questionnaire was provided to the patient to fill out at the beginning of their annual appointment and providers evaluated and documented their risk for skin cancer and provided appropriate education based on their risk. This was then documented by the providers.

Study

The third phase, "Study", is where outcomes are monitored to test the validity of the plan for signs of progress and success, or problems and areas for improvement. This was the phase in which charts were re-audited.

Act

Based on the results, the "Act" phase determined if the use of the SAMScore Questionnaire at annual exams would be modified, accepted, or rejected. The original plan for the study was to complete multiple PDSA cycles, but due to time constraints, only one full cycle was possible. The next cycle would have included a survey and focus group with providers to identify perceived barriers and explore strategies to address those barriers.

Measures and Instruments

The measures for this study included whether providers documented that their patients were screened using the SAMScore Questionnaire, the patient risk based on screening and whether they provided education on skin protection at their annual exam. The instruments that were used included the SAMScore Questionnaire and the audit tool (see Appendix 1). The efficiency of the SAMScore risk assessment tool as a targeted screening for high-risk individuals has been documented through many studies (Quéreux et al., 2012) and thus help identify those who may need more focus on skin cancer prevention and/or early detection (Davies et a., 2015). This tool has a reported sensitivity of 63.2% and specificity of 68.8% (Quéreux et al., 2011). As mentioned in the literature review, it is necessary to screen 11 times fewer patients when using the SAMScore Questionnaire than with a nontargeted screening (Quéreux et al., 2012).

Data Collection and Analysis

In phase one, medical records of 30 patients were evaluated to determine the patients age, gender, race, whether a skin cancer screening was completed, what their risk was and if education was provided using a chart audit tool (see Appendix 3). Every third chart that fit the inclusion criteria was included in the review. The charts were manually reviewed by the PI. After implementation in phase three, the same review of medical records was completed with 48 charts to gather data on the patients that completed the SAMScore Questionnaire. All applicable charts were included in the phase three review. Again, the charts were manually reviewed by the PI. Study variables were summarized using means and standard deviations or frequency distributions, as appropriate. Differences in demographic characteristics and screening practices were evaluated using the two-sample t-test, chi-square test of association or Fisher's Exact test. Significance was set at $p < .05$. All analyses were conducted in SPSS, version 25 with an alpha of .05.

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Results

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The results from this study include data from the pre-intervention period (n=30) and post-intervention (n=48) chart review. The mean sample age pre-intervention (39.5) was very similar to the sample age post-intervention (41.1; p=0.62; see Table 1). Of the 30 patient charts audited in the pre-intervention phase, about two thirds (73.3%; n=22) were female, and about one third (26.7%; n=8; see Table 1) were male. Post-intervention, of the 48 patient charts audited, females (58.3%; n=28), and males (41.7%; n=20) were more equally distributed, but the difference was not statistically significant (p=0.329; see Table 1). When looking at the patients' race/ethnicity of

charts audited pre-intervention and post-intervention, the majority of both samples were Caucasian, but there was no statistically significant difference (p=0.99; see Table 1).

There was a significant increase in skin cancer screening completion from pre- to post-intervention. None of the participants were screened pre-intervention, and more than half (56%) were screened post (p<.001; see Table 2). Of the 27 patients screened, 14 (52%) were documented as being at high risk and of those patients, all 14 of those patients (100%) received education on skin protection. Among those not documented as high risk (n= 34), 13 (38%) received education on skin protection. Only about half of the patients at normal risk were provided education and all patients at high risk were provided education (see Table 3). There was no statistically significant difference in rates of screening among those patients who were screened across age, gender, or race/ethnicity (see Table 4). The results from this study show that the use of the SAMScore Questionnaire increased documented skin cancer risk screenings for patients seen for annual visits, and increased skin protection education for all patients, especially those at high risk.

Discussion

The results from this project provide insight into several aspects of the topic of skin cancer risk screening among the providers at the primary care clinic evaluated in this study. First, there is a need for increased skin cancer risk screenings for all patients, and a need for increased skin cancer prevention education provided to patients at high risk. Primary care providers should be following the MSKCC recommendation. They should be identifying patients at high risk for developing skin cancer using the SAMScore Questionnaire and those patients at high risk should receive an annual skin assessment. At this clinic, the rate of skin cancer risk screening went from 0% to 58%. Based on these results, it seems that the PCPs that participated in this project saw the

value in using the SAMScore Questionnaire to identify their high-risk patients and provide them with skin protection education. With that said, even though there was an increase in screening rates, there is still room for improvement.

The USPSTF recommends behavioral counseling for skin protective behaviors for specific populations at higher risk (HHS, 2016), but does not recommend skin cancer risk assessment. Without a valid and reliable skin cancer risk assessment, it is likely that many high-risk patients will be missed. Therefore, at minimum, all patients should receive a skin cancer risk assessment once a year. Once a patient is identified as high risk, they can then be provided with evidence-based recommendation such as targeted educated, completion of or referral head to toe skin assessment. Further investigation into why there was not 100% documentation rate of risk screening at annual visits is warranted. Providing a survey to providers at this clinic to identify barriers and facilitators of screening, then conducting a focus group to discuss the facilitators and barriers and brainstorm ideas for improvement would likely help identify what needs to be adjusted prior to the next cycle of implementation, with the goal of achieving 100% skin cancer screening rates using the SAMScore Questionnaire.

Practice Recommendations

This study revealed many possibilities for primary care providers regarding skin cancer risk screening. As mentioned above, PCPs should be informed of all the screening guidelines and could be guided to the MSKCC recommendation because it specifically addresses patients at high risk and provides a guideline that has a proactive approach to identifying skin cancer early in these patients. First, they should identify patients at high risk for developing skin cancer using the SAMScore Questionnaire and then they should complete or refer annual skin assessments on

those patients at high risk. From here, PCPs may need to be further educated on current recommendations, available risk screening tools, as well as the importance of doing so. Educating other staff, such as nursing assistants, on the importance of the screening tool and to use them to streamline the screening process at all annual visits, should also be considered. Implementing or creating a pre-made template built into the EHR system at the clinic for providers to make their own template, may allow for a smoother and more efficient integration of skin cancer risk screenings, as well. As mentioned previously, the research shows that although it is proven that early detection in primary care improves outcomes for patients with malignant melanoma, providers may not be properly screening their patients on their risk level, thus missing patients at high-risk and providing them with proper education on how to keep themselves safe.

Policy Recommendations

Although unlikely, the ideal policy recommendation would be for all cancer societies to come together and agree on one recommendation when it comes to skin cancer screenings. A more obtainable recommendation would be a policy change within each clinic where they decide on one recommendation to follow and adopt this as standard practice, so all providers practice the same way. Finally, Medicare does not currently cover annual skin exams, regardless of patient risk (West, 2020). There is also no national quality metric attached to skin cancer screenings endorsed by the Centers for Medicare and Medicaid Services. If this was a practice that was measured and covered by insurance, there would be more incentive for PCPs to perform skin cancer risk screenings and skin cancer screening on their patients.

Research Recommendations

There are several research implications of this study. Identifying barriers and facilitators of implementing the use of the SAMScore Questionnaire, or any other risk screening tool, into the normal process by a provider at an annual visit will allow those barriers to be addressed, with the hopes of achieving 100% screening rates. Further investigation of the type of education provided to patients regarding skin protection and skin cancer prevention, as well as how the education is being provided is also warranted. In this study providers were given instructions to provide skin protection education to high-risk patients; it was not specified what education they provided or how the education was provided. Evaluating whether reminders or prompts within the EHR or physically placed around the clinic increase screening rates would also be interesting for future research. Finally, conducting future research on subsequent care being provided among those that have been classified as high-risk, such as a completed skin assessment or dermatology referral, could identify additional opportunities for improvement.

Limitations

The project had many limitations related to sample size, design, and data collection. One limitation was that only two of seven providers at this clinic participated in this project for multiple reasons including only working part-time, being on vacation during the implementation timeframe, personal choice etc. Because of this, there was a smaller number of patients that could be included in the sample. According to providers at this practice, the population seen at this clinic can be somewhat nonadherent when it comes to well visits and they have frequent "no shows". The limitations caused by COVID, such as fears of office visits related to potential exposure, may have also hurt the number of patients that the providers were seeing for annual exams, thus lowering the sample size for this project. Additionally, providers are seeing upwards

of 20 patients per 8-hour day at this clinic and time per visit is always an issue. Providers already have many points they need to screen and counsel patients about at annual visits, on top of management of chronic issues. Because of this, providers may have chosen to spend their time on other, more pertinent screening/counseling for a specific patient and the SAMscore Questionnaire may have been lower on the list of priorities and for that reason, it may not have been completed.

Conclusion

The recommendation by Memorial Sloan Kettering Cancer Center (2022), states that individuals identified as high risk should be evaluated once a year for skin cancer assessment. The USPSTF recommends behavioral counseling for skin protective behaviors for specific populations at higher risk (HHS, 2016). As mentioned previously, the annual cost of treating skin cancers in the U.S. is estimated at $8.1 billion (AAD, 2021). By educating on skin protection behaviors, the U.S. could save an estimated $250 million a year in health care costs by preventing an estimated 21,000 cases of melanoma by 2030 (CDC, 2021). Though data gathered from this study indicates that the study was successful regarding using the SAMScore Questionnaire to increase identification of high-risk patients, there is still room for improvement when it comes to skin cancer risk screening and skin protection education in primary care, as less than 60% of patients were screened. Further research should address barriers to screening and continued efforts should be made to ensure our primary care providers are identifying those at high risk to decrease unnecessary deaths and interventions and decrease cost to the health care system.

References

Altman, J. F., Oliveria, S. A., Christos, P. J., & Halpern, A. C. (2000). A survey of skin cancer screening in the primary care setting: a comparison with other cancer screenings. Arch Fam Med, 9(10), 1022-1027. doi:10.1001/archfami.9.10.1022

American Academy of Dermatology (AAD). (2021, June 1). *Skin cancer*. American Academy of Dermatology. Retrieved March 14, 2022, from https://www.aad.org/media/stats-skin-cancer#:~:text=The%20annual%20cost%20of%20treating,is%20estimated%20at%20%243.3%20billion.

American Cancer Society: Cancer Facts & Statistics. American Cancer Society | Cancer Facts & Statistics. (2022). Retrieved April 1, 2022, from https://cancerstatisticscenter.cancer.org/#!/state/Kentucky

Buller, D. B., Andersen, P. A., Walkosz, B. J., Scott, M. D., Beck, L., & Cutter, G. R. (2016). Rationale, design, samples, and baseline sun protection in a randomized trial on a skin cancer prevention intervention in resort environments. Contemp Clin Trials, 46, 67-76. doi:10.1016/j.cct.2015.11.015

Carr, S., Smith, C., & Wernberg, J. (2020). Epidemiology and Risk Factors of Melanoma. Surg Clin North Am, 100(1), 1-12. doi:10.1016/j.suc.2019.09.005

Centers for Disease Control and Prevention (CDC). (2015, June 2). Rates of new melanomas – deadly skin cancers – have doubled over last three decades. Retrieved from https://www.cdc.gov/media/releases/2015/p0602-melanoma-cancer.html

Centers for Disease Control and Prevention (CDC). (2021, August 18). *Cost-effectiveness of skin cancer interventions*. Centers for Disease Control and Prevention. Retrieved March 14, 2022, from https://www.cdc.gov/chronicdisease/programs-impact/pop/skin-cancer.htm

Costanza, M. E., Hoople, N. E., Gaw, V. P., & Stoddard, A. M. (1993). Cancer prevention
    practices and continuing education needs of primary care physicians. Am J Prev Med,
    9(2), 107-112.

Coups, E. J., Geller, A. C., Weinstock, M. A., Heckman, C. J., & Manne, S. L. (2010).
    Prevalence and correlates of skin cancer screening among middle-aged and older white
    adults in the United States. *The American journal of medicine*, *123*(5), 439–445.
    https://doi.org/10.1016/j.amjmed.2009.10.014

Davies, J. R., Chang, Y. M., Bishop, D. T., Armstrong, B. K., Bataille, V., Bergman, W., . . .
    Newton-Bishop, J. (2015). Development and validation of a melanoma risk score based
    on pooled data from 16 case-control studies. Cancer Epidemiol Biomarkers Prev, 24(5),
    817-824. doi:10.1158/1055-9965.Epi-14-1062

Deming, W. E. (1993). In *The New Economics: For Industry, Government, education* (p. 35).
    Massachusetts Institute of Technology Press.

The Deming Institute. (2021). PDSA cycle. Retrieved February 10, 2021, from
    https://deming.org/explore/pdsa/#:~:text=The%20PDSA%20Cycle%20(Plan%2DDo,was
    %20first%20introduced%20to%20Dr.

Diao, D. Y., & Lee, T. K. (2013). Sun-protective behaviors in populations at high risk for skin
    cancer. Psychol Res Behav Manag, 7, 9-18. doi:10.2147/prbm.S40457

Fears, T. R., Guerry, D. t., Pfeiffer, R. M., Sagebiel, R. W., Elder, D. E., Halpern, A., . . . Tucker,
    M. A. (2006). Identifying individuals at high risk of melanoma: a practical predictor of
    absolute risk. J Clin Oncol, 24(22), 3590-3596. doi:10.1200/jco.2005.04.1277

Federman, D. G., Concato, J., Caralis, P. V., Hunkele, G. E., & Kirsner, R. S. (1997). Screening

    for Skin Cancer in Primary Care Settings. Archives of Dermatology, 133(11), 1423-1425.

    doi:10.1001/archderm.1997.03890470101016

Federman, D. G., Shelling, M. L., & Kirsner, R. S. (2010). Prevalence and correlates of skin

    cancer screening among middle-aged and older white adults in the United States. Am J

    Med, 123(12), e11; author reply e13-e14. doi:10.1016/j.amjmed.2010.06.020

Gordon, L. G., & Rowell, D. (2015). Health system costs of skin cancer and cost-effectiveness of

    skin cancer prevention and screening: a systematic review. Eur J Cancer Prev, 24(2), 141-

    149. doi:10.1097/cej.0000000000000056

Henrikson, N. B., Morrison, C. C., Blasi, P. R., Nguyen, M., Shibuya, K. C., & Patnode, C. D.

    (2018). Behavioral Counseling for Skin Cancer Prevention: Evidence Report and

    Systematic Review for the US Preventive Services Task Force. Jama, 319(11), 1143-

    1157. doi:10.1001/jama.2017.21630

Holman, D. M., Qin, J., Gottschlich, E. A., & Balk, S. J. (2019). Clinical counseling on sun

    protection and indoor tanning avoidance: A survey of current practices among U.S. health

    care providers. *Preventive medicine*, *126*, 105783.

    https://doi.org/10.1016/j.ypmed.2019.105783

Janssen, E., van Osch, L., de Vries, H., & Lechner, L. (2011). Measuring risk perceptions of skin

    cancer: reliability and validity of different operationalizations. Br J Health Psychol, 16(Pt

    1), 92-112. doi:10.1348/135910710x514120

Kiviniemi, M. T., & Ellis, E. M. (2014). Worry about skin cancer mediates the relation of

    perceived cancer risk and sunscreen use. J Behav Med, 37(6), 1069-1074.

    doi:10.1007/s10865-013-9538-1

Lewin, K. (1947). Frontiers in Group Dynamics: II. Channels of Group Life; Social Planning and

Action Research. *Human Relations*, *1*(2), 143–

153. https://doi.org/10.1177/001872674700100201

Linos, E., Katz, K. A., & Colditz, G. A. (2016). Skin Cancer-The Importance of Prevention.

JAMA Intern Med, 176(10), 1435-1436. doi:10.1001/jamainternmed.2016.5008

Mission, vision and values. UK HealthCare. (2020). Retrieved February 1, 2022, from

https://ukhealthcare.uky.edu/strategic-plan-2025/mission-vision-values

Moscarella, E., Lallas, A., Longo, C., Alfano, R., & Argenziano, G. (2019). Five-point checklist

for skin cancer detection in primary care. G Ital Dermatol Venereol, 154(5), 523-528.

doi:10.23736/s0392-0488.17.05565-1

Nickasch, B. L., Sauer, T., & Lehr, M. (2020). The Impact of Increasing Sun Protection

Counseling and Skin Cancer Screening. *Journal of doctoral nursing practice*, *13*(3), 249–

253. https://doi.org/10.1891/JDNP-D-19-00012

Oliveria, S. A., Heneghan, M. K., Cushman, L. F., Ughetta, E. A., & Halpern, A. C. (2011). Skin

cancer screening by dermatologists, family practitioners, and internists: barriers and

facilitating factors. Arch Dermatol, 147(1), 39-44. doi:10.1001/archdermatol.2010.414

Oliveria, S.A., Christos, P.J., Marghoob, A.A. *et al.* Skin cancer screening and prevention in the

primary care setting. *J GEN INTERN MED* 16, 297–301 (2001).

https://doi.org/10.1046/j.1525-1497.2001.00526.x

Quéreux, G., Moyse, D., Lequeux, Y., Jumbou, O., Brocard, A., Antonioli, D., . . . Nguyen, J. M.

(2011). Development of an individual score for melanoma risk. Eur J Cancer Prev, 20(3),

217-224. doi:10.1097/CEJ.0b013e32834474ae

Quéreux, G., N'Guyen J, M., Cary, M., Jumbou, O., Lequeux, Y., & Dréno, B. (2012).

    Validation of the Self-Assessment of Melanoma Risk Score for a melanoma-targeted

    screening. Eur J Cancer Prev, 21(6), 588-595. doi:10.1097/CEJ.0b013e328353ed68

Rat, C., Grimault, C., Quereux, G., Dagorne, M., Gaultier, A., Khammari, A., . . . Nguyen, J. M.

    (2015). Proposal for an annual skin examination by a general practitioner for patients at

    high risk for melanoma: a French cohort study. BMJ Open, 5(7), e007471.

    doi:10.1136/bmjopen-2014-007471

Rat, C., Quereux, G., Riviere, C., Clouet, S., Senand, R., Volteau, C., . . . Nguyen, J. M. (2014).

    Targeted melanoma prevention intervention: a cluster randomized controlled trial. Annals

    of family medicine, 12(1), 21-28. doi:10.1370/afm.1600

Saraiya, M., Hall, H. I., Thompson, T., Hartman, A., Glanz, K., Rimer, B., & Rose, D. (2004).

    Skin cancer screening among U.S. adults from 1992, 1998, and 2000 National Health

    Interview Surveys. *Preventive medicine*, *39*(2), 308–314.

    https://doi.org/10.1016/j.ypmed.2004.04.022

Skin Cancer Foundation. (2019). Melanoma. Retrieved from https://www.skincancer.org/skin-

    cancer-information/melanoma

Skin cancer screening: Studies and guidelines. Memorial Sloan Kettering Cancer Center

    (MSKCC). (2022). Retrieved February 1, 2022, from https://www.mskcc.org/cancer-

    care/types/skin/screening-guidelines-skin

United States Department of Health and Human Services (HHS). (2016). United States

    Preventive Services Task Force (USPSTF): Skin Cancer Screening. Retrieved from

    https://www.uspreventiveservicestaskforce.org/uspstf/document/evidence-summary/skin-

    cancer-screening2

United States Preventive Services Task Force (USPSTF), Grossman, D. C., Curry, S. J., Owens, D. K., Barry, M. J., Caughey, A. B., Davidson, K. W., Doubeni, C. A., Epling, J. W., Jr, Kemper, A. R., Krist, A. H., Kubik, M., Landefeld, S., Mangione, C. M., Silverstein, M., Simon, M. A., & Tseng, C. W. (2018). Behavioral Counseling to Prevent Skin Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA*, *319*(11), 1134–1142. https://doi.org/10.1001/jama.2018.1623

Vasicek, B. E., Szpunar, S. M., & Manz-Dulac, L. A. (2018). Patient Knowledge of Sunscreen Guidelines and Frequency of Physician Counseling: A Cross-sectional Study. J Clin Aesthet Dermatol, 11(1), 35-40.

West, M. (2020). *Does medicare cover skin cancer care? screening and more*. Medical News Today. Retrieved March 10, 2022, from https://www.medicalnewstoday.com/articles/does-medicare-provide-skin-cancer#treatment

Oshyvalova, O. O., Ziukov, O. L., & Gurianov, V. G. (2019). Prognostic model of skin cancer risk assessment. *Wiadomosci lekarskie (Warsaw, Poland : 1960)*, *72*(5 cz 1), 817–822.

Tables

Table 1. Summary of Demographic of Patients Pre- and Post-Intervention

	Pre (n = 30) Mean (SD) or n (%)	Post (n = 48) Mean (SD) or n (%)	*p*
Age	39.5 (13.3)	41.1 (13.5)	.62
Sex			.179
Male	8 (26.7%)	20 (41.7%)	
Female	22 (73.3%)	28 (58.3%)	
Race/ethnicity			.99
Caucasian	23 (76.7%)	36 (75%)	
African American	2 (6.7%)	4 (8.3%)	
Hispanic/Latino	5 (16.7%)	8 (16.7%)	

* p < .05

Table 2. Summary of Screening Characteristics of Patients Pre- and Post-Intervention

Skin cancer risk screening	Pre (n = 30) Mean (SD) or n (%)	Post (n = 48) Mean (SD) or n (%)	*p*
			<.001
Yes	0 (0%)	27 (56%)	
No	30 (100%)	21 (43.8%)	

* p < .05

Table 3. Summary of Skin Protection Education Provided Based on Risk

Skin protection education	Not High Risk (n = 34) Mean (SD) or n (%)	High Risk (n = 14) Mean (SD) or n (%)
Yes	13 (38%)	14 (100%)
No	21 (62%)	0 (0%)

Table 4. Summary of Differences in Screening by Demographics Post-Intervention

	Screened (n = 27) Mean (SD) or n (%)	Not screened (n = 21) Mean (SD) or n (%)	p
Age	27 (14.6)	21 (11.9)	.344
Sex			.329
Male	10 (50%)	10 (50%)	
Female	17 (60.7%)	11(39.3%)	
Race/ethnicity			.096
Caucasian	19 (52.8%)	17 (47.2%)	
African American	1 (25%)	3 (75%)	
Hispanic/Latino	7 (87.5%)	1 (12.5%)	

* p < .05

Appendices

Appendix 1. Self-assessment of Melanoma Risk (SAMScore) Questionnaire

Answer each question by checking the appropriate square:

1. What skin type do you have?
   - Skin-type I: very fair skin, blond or red hair, light eyes (blue or green), never tan and always sunburn after sun exposure
   - Skin-type II: fair skin, blond or light brown hair, light eyes (blue or green), usually sunburn
   - Skin-type III: dark skin, brown hair, light to medium eye color
   - Skin-type IV: olive skin, dark brown hair, brown eyes
   - Skin-type V: brown skin, black hair, black eyes
   - Skin-type VI: black skin, black hair, black eyes

2. Do you have freckles?
   - Yes
   - No

3. How many moles do you approximately have on both arms?
   - Fewer than 20
   - More than 20

4. Have you had one or more episodes of severe blistering sunburn during childhood or teenage years?
   - Yes
   - No

5. Did you live more than 1 year in a country where sunshine is high (Africa, French West Indies, South of United States, Australia…)?
   - Yes
   - No

6. Have you been diagnosed with melanoma in the past?
   - Yes
   - No

7. Has any first-degree relatives (parents, siblings, children) ever had melanoma?
   - Yes
   - No
   - Don't know

According to the SAMScore, a patient is considered at elevated risk for melanoma if at least one of these three criteria is verified:

- First criterion: Presence of at least 3 risk factors (phototype I or ii, freckling tendency, number of naevi >20 on both arms, sever sunburn during childhood or teenage years, life in a country of low latitude, a history of pervious melanoma, a history of melanoma in a first-degree relative)

- Second criterion: A subject under 60 years of age and a number of melanocytic naevi >20 on both arms.

- Third criterion: A subject 60 years old or older with a freckling tendency.

Appendix 2. Provider Education Outline

- Description of project
    - Background and problem statement
    - Goals/Aims

- Description of SAMScore Questionnaire
    - Designed to determine whether a patient is at "normal" risk or "high" risk of developing Melanoma in their lifetime
    - Seven questions
    - Completed by patient
    - Validated, evidence-based tool

- Educated on how to interpret results of SAMScore Questionnaire

- Expectations from providers
    - Implement use of SAMScore Questionnaire into standard workflow at annual exams
    - Provide to patients aged 18-64 who have never been diagnosed with skin cancer
    - Provide skin protection education to patients identified as "high-risk"
    - Document that SAMScore was provided
    - Document patient risk
    - Document whether skin protection education was provided

Appendix 3. Chart Audit Tool

Unique ID	Age	Gender	Race/Ethnicity	Received skin cancer risk screening Yes/No	High Risk? Yes/No	Received skin cancer prevention education Yes/No
1						