Screening for cancer in primary care by family physicians

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Abstract:

This article focuses on the role of primary care physicians in cancer screening. Due to fact that primary care physicians are in a unique position to decrease cancer morbidity and mortality by providing preventive services, including screening and counseling. We searched EMBASE, PubMed and the Cochrane databases for all articles of cancer risk assessment tools in primary care up to August 2018. Primary care is the main setting where cancer is diagnosed, or at least suspected. It is also the setting in which most pre-symptomatic risk assessment takes place including compilation of a family history, and attention to modifiable risk factors, such as smoking or obesity. Hardly a day in clinical practice passes without cancer being raised as a possibility. The evidence base behind selection of patients for referral and equally importantly behind reassuring and not investigating continues to grow. At times, the evidence runs counter to current guidelines: if so most GPs trust their clinical acumen, and are generally right to do so. Most patients with cancer receive good service from primary care. Further research will need

to explore how the minority who currently experience delays in diagnosis can be identified earlier.

Introduction:

Cancer is the second leading reason of death globally, and causes an approximated 9.6 million deaths in 2018 [1]. Globally, approximately 1 in 6 deaths is due to cancer [1]. The risk of developing cancer increases with age, with more than 75% of cancers cells diagnosed in persons aged 55 years and older [2]. Cancer is expensive, with much more than $206 billion spent in 2006 in straight and indirect costs in USA [2]. Cancer also has a major effect on an afflicted individual's lifestyle and is the second most common cause of death in the United States. One in four demises in the United States is caused by cancer; nearly 560,000 Americans are expected to pass away of cancer in 2007 [2]. As a disease entity, cancer is an important environment for patients and primary care medical professionals. Health care doctors are vital in the" war" versus cancer [3]. Research studies have revealed that having a primary care doctor is connected with a higher rate of very early breast, cervical, and colon cancer discovery [4-6]. Primary care physicians play an essential part in earlier diagnosis of cancer in symptomatic patients and in accessing treatment after the diagnosis [3]. As therapy enhances, primary care physicians also will be ever more anticipated to supply treatment for cancer survivors [1]. Primary avoidance and screening of medical care patients are seen as a core part of appropriate care in the ambulatory setup [3]. Personalized screening regimens should develop the efficiency, equity, and safety of cancer screening but will require intensive input from primary care.

This article focuses on the role of primary care physicians in cancer screening. Due to fact that primary care physicians are in a unique position to decrease cancer morbidity and mortality by providing preventive services, including screening and counseling.

Methodology:

We searched EMBASE, PubMed and the Cochrane databases for all articles of cancer risk assessment tools in primary care up to August 2018. Only studies set in primary care, with patients for cancer screening, only limited to only English language studies with human subjects.

Discussion:

- **Definition of screening**

In 1951, screening was described by the Commission on Chronic Illness as "… the presumptive recognition of unknown disease or defect by the application of tests, investigations, or various other procedures which can be applied easily to sort out apparently well persons that probably have a disease from those that most likely do not. A screening examination is not intended to be diagnostic. Individuals with positive or dubious results must absolutely be referred to their doctors for medical diagnosis and required therapy" [12]. The crucial phrases are "unrecognized disease," "quickly sort out," and "not intended to be diagnostic." Testing is not medical diagnosis

however a procedure by which individuals that may have cancer are targeted for further analysis screening to determine if they do have cancer.

Table 1-Recommendation for Cancer Screening [13],[14].

Service	Recommended Interval	Patient Group
1. Mammography	Every year	Women over age 50
2. Clinical breast examination	Every year	All women
3. Pap smear	Every year	All women
4. Digital rectal examination	Every year Every year	Women over age 40 Men over age 40
5. Fecal occult blood test	Every year	All patients over age 50
6. Sigmoidoscopy	Every 4 to 5 years	All patients over age 50
7. Chest x-ray	Every 3 years Every 3 years	All smokers All nonsmokers

- **Characteristics of a good screening program**

A range of factors should be considered prior deciding to implement a cancer screening program in the workplace (Box 1) [15,7]. The cancer screened for must be prevalent enough to approve its testing. There should be a recognizable asymptomatic phase at which early detection is possible. Making an early medical diagnosis of cancer does not justify its screening unless there is a great chance that proper treatment might improve results and perhaps even cure the cancer. Any form of testing goals not just to minimize mortality from the cancer but also to boost an individual's quality of life. Individuals that have a positive screening examination result must be willing to undergo more screening, and possible treatment, if a cancer is detected. Finally, the expenses of testing, with following medical diagnosis and treatment, have to be justified provided minimal funds.

Box 1. Considerations in establishing a cancer screening program [7],[15].

1. The cancer sought should be an important health problem.
2. The prevalence of cancer should be high enough to justify screening.
3. The natural history of the cancer, including development from latent to declared disease, should be adequately understood.

4. There should be a recognizable latent (asymptomatic) or early symptomatic stage in which detection is possible.
5. Facilities for screening, diagnosis, and treatment should be available.
6. There should be a suitable test or examination that is sufficiently sensitive to detect disease during the asymptomatic period but sufficiently specific to minimize false-positive results.
7. The test should be acceptable to patients.
8. Patients should be willing to agree to further evaluation of positive screening tests and follow through with treatment if cancer is diagnosed.
9. There should be an accepted treatment for individuals with the newly diagnosed cancer, with outcomes improved by therapy during the asymptomatic period.
10. There should be an agreed-on policy concerning whom to treat as patients.
11. The cost of screening, diagnosis, and treatment should be balanced economically in relation to possible expenditure on medical care as a whole.

- **Biases involved in cancer screening programs**

Three predispositions exist that can make first medical diagnosis appear reliable, despite when therapy is inefficient [8,9]. Volunteer bias is a sort of choice bias that occurs because individuals that volunteer for screening are often healthier than people that do not volunteer [8,9]. These volunteers might be more health aware and more likely to follow through with advice, which may boost their survival [9]. The observed boosted survival might not be a resulted of the screening intervention but by a healthier cohort. Lead-time bias happens when one does not take into an account the asymptomatic period of the cancer's nature [8]. Lead-time is the period between the diagnosis of disease at testing and when it would certainly have been identified when symptoms developed [9]. If the asymptomatic time period is not taken into consideration, it would seem that people who were screened have a much better 5-year survival rate than people that were not screened, when in reality there might be no big difference. Tested people are not living more, but only living longer with an identified medical diagnosis of cancer. A far better determinant of testing effectiveness is the cancer-specific mortality rate rather than the 5-year survival rate.

Length-time bias takes place because cancer is heterogeneous. Some tumors are hostile and rapid expanding with short asymptomatic durations and fast progression from symptoms to demise, whereas other tumors are much less aggressive and slower expanding with a far better prediction [8]. These tumors found throughout screening have a tendency to be of the latter type, which brings about a false impression of improved survival [9.]

- **Characteristics of the screening test**

To be completely executed, a screening examination ought to agree with to patients. Tests that are pricey or uncomfortable are less likely to be completed by individuals. For example, several women do not obtain annual mammograms since they do not like the breast ache they experience throughout the test. Several people do not look for colonoscopy because of unpleasantness of the bowel prep work and the subsequent checkup. The level of sensitivity of a test is the ability of that test to recognize accurately people who have the cancer. An individual with a positive testing test result that ultimately is discovered not to have cancer has a false-positive end result. False-positive final results can be dangerous since they lead to further diagnostic testing with coming with patient anxiety [8]. In contrast, the specificity of a test is the ability of that test to recognize properly individuals who do not have the cancer. An individual with an unwanted screening test result that subsequently is found to have cancer has a false-negative end result. The goal of any kind of good cancer testing program is to determine all people who have precancerous lesions or very early cancer while decreasing the number of false-positive results.

In medical practice, the ability of an examination to accurately predict the presence or absence of illness depends on the frequency of illness in the population examined and the level of sensitivity and specificity of the test [8]. The higher the prevalence, the more likely a positive test result is a true positive and an undesirable test result is a real negative. This measure, called the predictive

value, allows us to inform patients about the possibility that their positive screening test results are really caused by cancer. A good screening program applies examinations to the population that is at high threat to minimize false-positive results (Table 2). One sensible instance is testing for breast cancer in young women. Due to the fact that the risk of breast cancer raises with age, mammography performed in younger females makes even more false-positive than true-positive results. An additional important term is" number required to be tested" (NNS), which stands for the variety of patients that must be signed up in a screening program over a provided period of time to prevent one demise from the cancer in question [8,11]. The NNS depends on the frequency of illness in the populace and the efficiency of therapy and is determined as the reciprocatory of the absolute danger reduction.

Table 2. Known risk factors for cancer, by type [2]

Cancer	Known risk factors
Breast	Age, inherited mutations in the BRCA1 and BRCA2 genes, personal or family history of breast cancer, high breast tissue density, biopsy-confirmed hyperplasia, high-dose radiation to the chest, long menstrual history (menses start early before age 12 and/or end later in life after age 50), never having children, having the first child after age 30 years, recent use of oral contraceptives, combined estrogen and progestin therapy, obesity, physical inactivity, consuming one or more alcoholic drinks per day.
Cervix	Infection with human papillomavirus (types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56 and 58), sex at an early age, many sexual partners, immunosuppression, high parity, cigarette smoking, long-term use of oral contraceptives.
Colon and rectum	Age (>90% in persons aged 50 years and older), inherited genetic mutations (familial adenomatous polyposis, hereditary non-polyposis colorectal cancer), personal and/or family history of colorectal cancer and/or polyps, personal history of chronic inflammatory bowel disease, obesity, physical inactivity, smoking, heavy alcohol consumption, diet high in red or processed meat, inadequate intake of fruits and vegetables.
Lung	Cigarette smoking (risk increases with quantity and years of smoking duration), occupational or environmental exposure to secondhand smoke, radon, asbestos, certain metals (chromium, cadmium, arsenic), organic chemicals, radiation, and air pollution, personal history of tuberculosis, genetic susceptibility.
Ovary	Age (peaks in late 70s), use of estrogen alone in postmenopausal hormone therapy, personal or family history of breast or ovarian cancer, inherited mutations in the BRCA1 and BRCA2 genes, hereditary nonpolyposis colon cancer.

Prostate	Age (>65% in persons aged 65 years and older), African American men and Jamaican men of African descent, family history of prostate cancer, diet high in saturated fat.

- **Potential harms of screening**

Making an earlier medical diagnosis that will certainly upgrade the length and quality of life should be the ultimate target of any type of cancer testing program. Prospective harms exist with screening that ought to be acknowledged, nevertheless. Testing is associated with increased anxiety during the screening test, as one waits for examination results, and as one waits from the time of a positive testing examination result to the conclusive diagnostic examination [9]. More than 40% of individuals that have a false-positive testing test result describe the experience as" very scary" or the" most frightening time of my life" [11]. The procedure itself might be damaging. People might be diagnosed and dealt with for medically insignificant lesions (overdiagnosis) [9].

A patient with a false-positive testing examination result requires additionally diagnostic testing, which increases anxiousness, risks, and costs, whereas a person with a false-negative examination result may be falsely reassured and delay looking for attention for potentially worrisome symptoms [9]. Finally, the economic concern with screening is exceptional, since individuals need to take time off from work to undertake testing and evaluation of positive end results, and the costs connected with testing and diagnostic examination may or might not be completely covered by medical insurance [9].

- **Need for counseling**

In spite of the prospective harms associated with screening, most US grownups are passionate regarding early cancer discovery through testing. In a national telephone survey of 500 grownups, 87% thought that routine cancer testing is almost always an excellent suggestion, whereas two

thirds stated they would intend to be tested for a cancer even if absolutely nothing could be done [11]. This enthusiasm for testing places even more responsibility on primary care physicians, that need to sensibly advise their patients about the benefits and possible damages of screening. As a minimum, physicians need to inform patients about the value of the screening test, the dangers of prospective false-positive and false-negative results, and the need to pursue more analysis testing with positive tests.

- **When to stop screening**

Although the majority of guidelines provide guidance as to when specific cancer testing examinations ought to begin, couple of provide recommendations regarding when to quit. The lack of assistance as to what age to stop cancer screening is shown by a current national survey, wherein a considerable variety of grownups believed that an 80-year-old individual who chose not to have a mammogram or undertake colonoscopy was irresponsible [11]. To assist medical care doctors, Walter and Covinsky [16]. offered a framework for personalized choice making based on life expectancy, risk of cancer death, and screening outcomes. They noted that individuals with life expectancies of less than 5 years are not likely to obtain any type of survival benefit from cancer screening which the individual's values and choices ought to be part of notified screening choices. The ethics board of the American Geriatrics Society agrees with this approach, keeping in mind that screening amongst persons with brief life expectancies is pointless but that chronologic age alone is not enough to keep screening [17].

Conclusion:

Primary care is the main setting where cancer is diagnosed, or at least suspected. It is also the setting in which most pre-symptomatic risk assessment takes place including compilation of a family history, and attention to modifiable risk factors, such as smoking or obesity. Hardly a day in clinical practice passes without cancer being raised as a possibility. The evidence base behind selection of patients for referral and equally importantly behind reassuring and not investigating continues to grow. At times, the evidence runs counter to current guidelines: if so most GPs trust their clinical acumen, and are generally right to do so. Most patients with cancer receive good service from primary care. Further research will need to explore how the minority who currently experience delays in diagnosis can be identified earlier.

Despite the significant improvements in screening techniques and our understanding of risk and protective factors, cancer remains a major global health burden. Family physicians face a unique challenge in their capabilities and efforts to alter this phenomenon; their role in implementing screening and preventive policies is key to reducing the burden of cancer among their patients

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