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Screening Mammography: A Continued Debate Over the Appropriate Guidelines

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Breast cancer is the second leading cause of death from cancer among American women, and approximately one out of every eight women will be diagnosed with breast cancer in her lifetime [1]. Because screening mammography (periodic mammographic examination of both breasts in asymptomatic women to detect breast cancer) has been successful at reducing mortality from breast cancer by 30 to 40% [2,3], most medical organizations in the United States, have recommended yearly mammography starting at age 40 since the 1990s.

However, there has been recent controversy regarding the appropriate age at which screening mammography should begin, as well as the frequency of screening (Table 1). In 2009, the U.S. Preventive Services Task Force (USPSTF) recommended that screening be done every other year for women aged 50 to 74 and recommended against screening in women under age 50 or over age 74 [4,5]. These recommendations were finalized in January 2016 [5,6].

Although they did find a benefit to screening women under age 50 (mammography screening reduces breast cancer mortality by 15% for women aged 39 to 49 years [5] they called that benefit "small" in their cost-benefit analysis and felt the number of lives saved did not justify the cost.

An additional set of breast screening guidelines was issued in 2015 by the American Cancer Society (ACS) to include the following [7]:

- Women with an average risk of breast cancer should undergo regular screening mammography starting at age 45 years, but women should have the opportunity to begin annual screening between the ages of 40 and 44 years
- Women aged 45 to 54 years should be screened annually
- Women 55 years and older should transition to biennial screening or have the opportunity to continue screening annually
- Women should continue screening mammography as long as their overall health is good and they have a life expectancy of 10 years or longer

The ACS concluded that even though women in their early 40s can benefit from breast cancer screening, they are more likely than older women to receive false-positive results [7]. However, for a woman aged 40 to 49, after one screening study, only approximately 98 out of 1,000 women will have a false positive result [8]. Advances in technology have been addressing this concern, including digital breast tomosynthesis (DBT). Although the Malmo Breast Tomosynthesis Screening Trial [9] in Sweden (prospective study; 7,500 participants in first half of the study population underwent one view-DBT and two view digital mammography (DM); independent double reading and scoring) showed a recall rate after arbitration of 3.8% for DBT and 2.8% for DM (with a significant increase in cancer detection), other studies have shown that DBT does actually decrease the false positive rate in addition to improving the cancer detection rate. Early trials showed up to a 40% decrease in false-positive callbacks with a stable or slightly increased cancer detection rate [10]. Data analysis from the prospective Oslo Tomosynthesis Screening Trial provides additional support for the effectiveness of DBT [11]. In this prospective trial, the participants undergo combined two-view DM plus two-view DBT. The data analysis from an initial 12,631 women have shown a statistically significant 27% decrease in false-positive callbacks and an approximately 30% increase in cancer detection. Most importantly, the improvement in the cancer detection rate is caused by a 40% increase in the detection of invasive breast cancer across all breast densities without an increase in the detection of ductal carcinoma in situ (DCIS). Other results from prospective trials in the United States have shown similar reductions in callbacks and improvements in cancer detection [12-14]. More recently, a review by McDonald et al. [15] showed recall rates using DBT were significantly reduced compared with FFDM, and importantly, are also sustainable over

Table 1: Breast cancer screening recommendations for women with an average risk of breast cancer.

American Cancer Society	USPSTF	ACR AND SBI
Informed decision-making with a health care provider ages 40-44	Informed decision-making with a health care provider ages 40-49	Every year starting at age 40, for as long as a woman is in good health
Annually starting at age 45-54	Every 2 years ages 50-74	
Every 2 years (or every year if a woman chooses) beginning at age 55, for as long as a woman is in good health		

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several years. Additionally, this study showed that interval cancer rates, which are cancers detected due to clinical findings during the interval between recommended screenings, decreased from 0.7 per 1000 women screened with the use of DM to 0.5 per 1000 screened with the use of DBT [15]. The ACS also felt women may experience anxiety over false positive results, however, an informational talk by a trained radiologist about the logistics and outcomes of screening mammography can significantly decrease patient anxiety [16].

Another factor in the ACS's change of guidelines was their concern about "over diagnosis," especially about the over diagnosis of DCIS. Over diagnosis is the finding and treating a cancer that would not have presented clinically within a patient's lifetime. Interestingly, an analysis of 5.2 million women in the United Kingdom showed that detecting and treating DCIS lowers the number of invasive breast cancers found over the ensuing three years [17]. For every three cases of DCIS detected and treated, one fewer case of invasive cancer was diagnosed than would have been without early intervention [17]. When there are fewer invasive cancers detected at an earlier stage, they can be treated less aggressively, at less cost, and with better survival rates than larger and more advanced cancers [18]. There is of course the possibility that some breast cancers may remain indolent without treatment. However, because it is not possible at this time to predict which cancers need treatment and which do not, we need to continue rigorous screening programs and treatment for all breast cancers so that treatable cancers do not become advanced-stage through lack of screening.

The American College of Radiology (ACR), Society of Breast Imaging (SBI) and American College of Obstetricians and Gynecologists continue to recommend that women with an average risk of breast cancer undergo annual screening mammography beginning at age 40. The ACR and SBI believe that the implementation of the ACS and USPSTF guidelines would result in thousands of unnecessary deaths each year, as well as more extensive and more expensive treatment protocols for cancers found by biennial screening or by palpation versus those detected by annual mammography. Studies have shown that the benefits of beginning annual screening for an average-risk patient at age 40 outweigh the concerns of false-positive results, over diagnosis, or anxiety. The ACR recently reported that "the largest (Hellquist et al.) and longest running (Tabár et al.) breast cancer screening studies in history reconfirm that regular screening cut breast cancer deaths by roughly a third in all women ages 40-and-over - including those 40-49 - and disprove the lower USPSTF estimates. According to the National Cancer Institute, since mammography screening became widespread in the mid-1980s, the U.S. breast cancer death rate, unchanged for the previous 50 years, has dropped 36 percent."

The following facts highlight the importance of annual screening beginning at age 40: [19]

- The ten-year risk for developing breast cancer in a 40-year-old woman is 1 in 69
- One in six breast cancers occur in women aged 40-49
- The number of years lost to breast cancer is greatest among women in their 40s than among any other decade
- Annual screening starting at 40 saves up to 6,500 more lives per year than biennial screening starting at age 50

Therefore, given such benefits, the ACR guidelines for screening asymptomatic women remain as follows [13]:

Women age 40 and older with an average risk for breast cancer who are asymptomatic should undergo annual mammography
There is no defined upper age limit at which mammography may not be beneficial and screening mammography should be considered as long as the patient is in good health and is willing to undergo additional testing, including biopsy, if an abnormality is detected

In conclusion, there is ongoing controversy regarding how often and when mammographic screening should occur; mostly due to concerns regarding the potential for false positives and over diagnosis. The implications of the ACS's and USPSTF's more relaxed guidelines may result in the possibility that women will withdraw from potentially life-saving screening due to confusion. Therefore, it is crucial that physicians have open and informed communication with their patients regarding risk factors, options, and the importance of mammography. Mammography has saved countless lives. It is imperative that the medical community not allow secondary economic or social concerns to override the proven life-saving benefits of screening for women beginning at age 40.

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