Forum
Cass R. Sunstein's "nudge science"

Breast cancer screening
Ethical nudging?

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ABSTRACT. **Cass R. Sunstein's 2016 book *The Ethics of Influence: Government in the Age of Behavioral Science* provides an extremely informative introduction to the science and ethics of the exercise of "influence" over others. As a longtime physician employed in both the public and private sectors, I now recognize that most of my formal training has been in the hard sciences, with little, if any, training in the appropriate influence of the decision-making processes of my patients and/or other health care professionals in institutional settings. Breast cancer screening is an excellent example of the conflicts of modern medicine, highlighting our collective inability to effectively "nudge" others in the pursuit of health and/or organizational effectiveness and efficiency. Using the framework of Sunstein's ethical values of welfare, autonomy, dignity, and self-government, I discuss many of the conflicting issues in a nationwide breast cancer screening program and the effects of these issues on client nudging to determine whether mammography screening is ethical.**

Key words: Breast cancer screening, nudging, Sunstein, mammography

Formal training in medicine includes studying how to organize numerous medical and biological "facts" to prescribe patient treatment. My parents' generation unequivocally accepted physician advice, possibly out of respect but more likely because of culture and some ignorance. Back then, we physicians did not expect any of our patients to question our decisions, and we never admitted we were wrong. Today, we practice medicine in a very different choice architecture. The internet with readily available knowledge is ubiquitous, more than 50% of the U.S. population has some college education, physicians and hospitals battle numerous malpractice complaints, health care is expensive, and many people cannot gain access to high-quality medical care at a reasonable cost.

As a parent, physician, retired military officer, and grandparent, I had not thought much about the architecture underlying my choices in medicine and throughout life. Of course, we all have encountered these kinds of influences from various sources, with salespeople being the most obvious. Salespeople "nudge" us to make purchases that we ultimately may not need. These influences are pervasive, especially within government. Cass R. Sunstein, an acclaimed authority on nudging, provides numerous excellent examples and explanations in his 2016 book *The Ethics of Influence*.[1] Nudging is such a great term — easily understood and spot-on for influence and readily applicable within the medical community. As Sunstein points out, there are two brain functions that underlie the exercise of influence: instinctual "gut feeling" System 1 and the rational System 2. System 1 and System 2 responses to nudging are well depicted in the emotional issue of breast cancer. The medical world is full of conflicting information and therefore provides a great framework to assess influence, often in areas we surprisingly seldom question.

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Mammography screening

Because I am a radiologist, my clients are usually other health care providers, but I do nudge/influence

individual patients as well. Nowhere is this more prevalent than in mammography screening. Patients' mammograms come to my desk because of government and medical society nudging. Reading a mammogram can be difficult and tedious. Once I make a conclusion, I must make a further evaluation based on numerous mammography screening recommendations. Which recommendation should I use, and are they ethical?

Mammography screening programs are quite varied among the world medical communities as well as within the United States.[2,3] Breast cancer screening utilizes libertarian paternalism with public education nudges to entice patients to schedule a fairly uncomfortable and rather undignified procedure. These programs utilize System 1 nudges (such as "you may/will suffer breast cancer if you do not schedule your mammogram!") along with the more rational System 2 nudges (breast cancer is a leading cause of mortality and morbidity and catching cancer early is important). Unfortunately, breast cancer screening by mammography is still controversial and without a universal medical consensus.

There are many different mammography screening programs. That of the American College of Radiology (ACR) is the most conservative, recommending initial mammogram at age 40, followed by annual mammograms and supplemental studies such as tomosynthesis, ultrasound, and MRI until death.[4] The less stringent program of the U.S. Preventive Services Task Force recommends initial mammogram at age 50 and every two years thereafter until age 75.[5] The American Cancer Society (ACS) is in between the first two, recommending initial mammogram at age 45, annually until age 55, then every two years until death if the patient is in good health.[6] The American College of Obstetricians and Gynecologists and the American Society of Breast Surgeons support the same recommendations as the ACR and ACS, respectively (although the latter is a little more stringent than ACS).[7,8] The Canadian Cancer Society recommends a mammogram every two years for women aged 50–69.[9]

In addition, there is a federal mandated mammography quality program called the Mammography Quality Standards Act.[10] This was enacted in 1992 by the U.S. Congress because the Food and Drug Administration (FDA) discovered that, overall, mammography image quality throughout the United States was very inconsistent (a 1985 survey/study found 36% of mammograms to have unacceptable quality, and 15% of facilities were using general X-ray equipment for a highly specific low-voltage study). Currently, the FDA runs the program through the only nationally approved body, the ACR.

Overseas recommendations are predictably less stringent. Patients in the United Kingdom are invited to start their screening mammograms at age 50 and repeat every three years until the age of 70.[11] German patients aged 50–69 can volunteer for their mammogram every two years.[12] French patients between the ages of 50 and 74 are screened every two years.[13] In 2014, the Swiss medical board reviewed mammography epidemiology and concluded that mammography screening was harmful, but mammograms are still offered every two years for those aged 50–70.[14]

OK, enough of the numerous recommendations. The obvious question is, which one do I follow? Perhaps more importantly, can a patient or physician possess enough information to make an informed, autonomous decision? If so, how much information is necessary? Do the nudgers (government and medical societies) need nudging, and how much are nudgers and the nudged influenced by outside factors, such as grants, hospital fiscal policies, equipment vendors, etc.? I will discuss these issues in the framework of Sunstein's four values: welfare, autonomy, dignity, and self-government. In this context, to what extent is breast cancer screening ethical?

Welfare

Breast cancer is a top killer among women and has a relatively high prevalence (the lifetime risk for a woman in the United States is as high as 12%).[15,16] Almost all of us know of a close friend or family member who has suffered from this disease and its brutal medical treatment. The physical and mental pain of this disease is well known to everyone because of its prevalence as well as numerous breast disease campaigns (pink ribbons, Komen Foundation, hospital mammography campaigns). From a welfare perspective, mammography screening nudging seems to be a no-brainer, especially appealing to our System 1 responses.

However, let's look at System 2 nudges in the context of breast cancer detection, starting with the commercial side. The estimated cost of just mammography screening in 2010 for the United States was $7.8 billion.[17] Several more billion dollars were spent for treatment, advertising, legislation, corruption (anything involving this amount of money always has unintended large costs), equipment, and medication. Many stakeholder

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groups benefit from nudging women toward technology, including mammography engineers/designers, salesmen, technicians, and physicians. In short, patients are not the sole beneficiaries of mammography. What are the results? Equivocal at best. The medical societies argue that breast cancer deaths have been reduced up to 40% by breast screening,[18] whereas the U.S. Preventive Services Task Force claims the improvement is due to improved treatment.

The medical societies are made up of physicians who treat and earn a living from breast cancer; the Preventive Services Task Force is composed of epidemiologists and statisticians. Additionally, screening asymptomatic populations for any medical disease is based on the idea that if we catch cancer/disease early, then we can beat it. Unfortunately, breast cancer is a multifactorial disease, and simply catching it earlier may have much less of an effect than we would like. The mammography process has its own mortality risks, including breast radiation, high anxiety (waiting for results of further evaluation), unnecessary biopsies, and complications from surgery.

The cost of mammography is not just the initial $100 or so for a negative study. Depending on the practice, approximately 10% of patients get called back for additional imaging, and 10% of those will get a biopsy. Thirty percent of biopsies will be read positive by the pathologist. At least 70% of patients will get a biopsy for normal breast tissue. In any screening program, you will have these false positive patients. The more you have, potentially the more cancers you will find.[19] However, this cuts into a person's welfare. Fear of breast cancer is a powerful motivator. The fewer false positive patients you have, the screening program will miss more positive findings. So, our false positive patients must suffer through mental anguish ("you have a lesion") as well as get a surgical procedure that has risks of its own. Finally, breast cancer is big business. Millions of people and businesses profit from this and depend on the income. Many grants are based on women's health tied into a money maker, which is usually mammography. You take away a mammography screening program, and you may take away a women's health provider or clinic. The individual must sacrifice for the collective welfare of fellow patients.

The issues of breast cancer are complex, which leads to many competing nudges for patients. As a collective society, we want what is best for our fellow humans, and we want to produce no or the least amount of harm.[20] We know that breast cancer is a terrible disease, either from personal experience or from observations of close acquaintances/family members. Although the data are inconclusive, the most efficacious breast cancer prevention tool today is mammography. U.S. medical societies nudge us patients with a paternalistic recommendation to obtain a mammogram at a regularly scheduled interval. The mammography screening equipment manufacturers as well as many breast cancer prevention organizations also promote this nudge, often for secondary monetary gain (impure paternalism).

Interestingly, government evaluation of breast cancer screening promotes less mammography. As stated previously, mammography is not a proven science, and contradictory recommendations prevail. Through information dissemination (the volume of which is too much for most of us), we consumers can and do question the efficacy of the entire screening process. The U.S. Preventive Services Task Force and overseas medical societies and governments have certainly impacted the patient decision process. We patients get competing nudges from our government (through alternative, less stringent recommendations) and local medical societies (more stringent recommendations). We patients are also influenced by friends, family, local cancer fundraisers, and local media, most often to schedule mammograms in spite of System 2 "rational" nudges and data promoting the opposite.

Autonomy and dignity

Autonomy is a slightly more straightforward value. Mammography screening from a patient perspective is a recommendation, and the rational and competent adult patient absolutely has a choice. Of course, we physicians as the choice architects muddy the waters by having several recommendations to choose. Patients come to us asking for a definitive recommendation, and they want to make a simple yes or no decision. As a radiologist, I follow the ACR recommendation — it is the most conservative, easy to understand, and I get no patient complaints.[21] However, my practice is in western Alaska serving native populations that live in remote villages. Patients must fly into the hub hospital (Bethel, Alaska) to get their mammograms and other annual/biennial treatments. The women's health chief has nudged me to change my recommendation to every two years. I can certainly do this, but what happens if someone who had a negative mammogram two years ago turns up positive? Would we have caught that cancer a year prior?

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My patient population in Alaska is mainly Yupik women over the age of 50, with at most a high school education. Most of my patients speak Yupik and English, with many speaking only Yupik. In the medical world, our buzzword for autonomy and informed choice is "informed consent." We in the radiology department go to great lengths to inform our patients via a mammographer interview and have them sign an informed consent. Does this mean they totally understand their choice? Are we nudging the patients to get a mammogram because we feel it is in their best interest regardless of their own reservations? Some patients will refuse a mammogram, and some that do not meet the screening criteria (e.g., a patient who is under age 40 may demand a mammogram).[22] Most breast screening programs are relatively flexible and will provide almost any patient a mammogram (after risks and benefits are discussed) and not push this study on someone who declines.

Dignity and autonomy are closely related regarding breast screening choices. Both require informed decisions, and the clear majority of patients do not face humiliation in their choices. The government does not mandate breast screening, and most health plans will pay for it but do not make it mandatory. Patients want to believe they are making the right decision, without manipulation, and they look to their physicians to make the right choice. The amount of information available is overwhelming and easily accessible. The patient wants to feel confident that a negative mammogram means no cancer and that a biopsy-proven positive result is cancer and will result in a cure. Almost any patient who has had cancer caught by a screening program is a strong advocate for mammography. However, what if her physician told her that screening programs are ineffective, cost way too much money, and result in many unnecessary biopsies? What if a patient who declines a mammogram develops breast cancer? Both patients suffer humiliation for separate reasons. Of course, these are abstractions at the edge of the (normal distribution) bell curve, but they illustrate potential autonomy dilemmas.

Although mammography screening itself is controversial, the competing nudges fall in line with Sunstein's autonomy and dignity requirements for ethical behavior. Breast cancer screening is not mandated, the medical community makes every effort to inform patients, the government shares their information and recommendations, and the process is rather transparent. Of course, not all is perfect, as many stakeholders (medical equipment companies, mammographer specialists, women's health grants) are not known to the patient, and the final decision may or may not reduce harm. However, most patients and physicians do feel that the government treats them respectfully and requests a reasonable adult decision without humiliation in spite of incomplete information.

Self-government

Self-government is Sunstein's fourth value. Breast screening programs demonstrate this value well from a patient perspective, but not so much for the hospital and radiology staff. The only federally mandated program for breast screening is the Mammography Quality Standards Act.[23] This federal legislation oversees mammogram equipment and interpretation, providing a consistent framework and product (report) as well as minimizing radiation to patients. For the collective welfare of patients, this mandated program appears to be necessary and does not receive wide criticism. Every two years, a mammography program is inspected by an approved medical inspection organization (the ACR). Passing this FDA inspection is a feather in the cap, not to mention necessary to perform mammography. The states can use their own inspection team (other than the ACR), but few choose to do so. Individual radiology and hospital practices surprisingly showed little resistance to this program, as mammography was in quite disarray in the 1980s. Federal government intervention was welcome and has resulted in a relatively stringent program providing a safer, more consistent exam, as well as a standard report. Have the hospitals and radiologists given up all self-government? No, they have branched out with MRI and breast tomosynthesis, and they are constantly exploring new methods and evaluation techniques. As the only recognized ruling body regarding mammography, the ACR, made up mostly of radiologists, continues to have a huge influence in mammography legislation and issues.

Twentieth-century medicine in the United States saw numerous technological breakthroughs and the emergence of scientifically trained medical providers. Patients would visit their provider, get advice, and blindly follow it, despite many bad outcomes, mainly because of already existing horrible morbidity and mortality rates. Patients were also less educated and information was less readily available. Today, medical providers undergo many years of studying and training, and their clients (patients and other providers) demand confident

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"right" answers. This blind trust is still present, but is eroding as a result of the numerous factors described here (and many more!).

Conclusion

Issues surrounding mammography screening are enormously complex and multidimensional. Not only do physicians nudge patients, but also institutions nudge physicians, mammography salespeople nudge hospital administrations, and so on. For some issues (such as health), we patients want the "right" answer and want our government and medical community to fix us, even if mandates are required (libertarian paternalism). Since there is no definite right answer, conflicting nudges become the norm (even if there were a right answer, such as do not smoke, nudging is still necessary), and we patients accept the advice or find another provider. Universal nudges such as scare tactics, time bias, risk avoidance, order bias, and especially white coat bias are all key factors for patient influence and are utilized very well throughout the medical community. Some physicians often know their patients on a personal level as well; in this case, influence can be much easier, if good outcomes are the result. Some physicians are highly skilled nudgers, but most are not. Some physicians are easily nudged by others, but many are not. Most effective nudging results in seamless acceptance of recommendations with complete patient ignorance of any coercion or persuasion.

Breast screening, in its current form, subjugates its constituents to impure paternalism. The paternalistic medical community has multiple recommendations for patients, but they all include mammography at well-defined intervals. Third-party beneficiaries include hospitals, mammographers, radiologists, women's health grant programs (many must include mammography), equipment manufacturers, health care legislators, and many more! Many nudgers are unethical, promoting breast screening for only monetary gain or personal recognition (mammography "experts" and "centers of excellence"). However, this appears to more the exception, as most nudgers for breast cancer screening are physicians trying to follow established guidelines. Influence by System 1 or System 2 nudges are very effective and a crucial part of medical practice. As previously discussed, welfare, autonomy, dignity, and self-government do appear to form a backbone of ethical influence in current breast cancer screening. Specifically, nudging in mammography screening, while a controversial medical process, can be ethical.

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