Improving Quality by Doing Less: Overtreatment

JESSICA HERZSTEIN, MD, MPH
Environmental Health Resources, Washington, District of Columbia

MARK EBELL, MD, MS, *University of Georgia College of Public Health, Athens, Georgia*

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In the first two editorials in this series, we discussed the potential harms of overscreening (use of screening tests too often or outside of recommended age ranges or populations) and overdiagnosis (detection of disease that never would have harmed the patient). In the last editorial in this series, we discuss overtreatment, which is defined as treatment initiated when there is little or no reliable evidence of a clinically meaningful net benefit, where net benefit equals benefit minus harm. Possible causes of overtreatment include changes in technology, arbitrary changes in disease definitions, and "indication creep." Overtreatment is an important harm that commonly follows overscreening and overdiagnosis. Examples of overtreatment are provided in *Table 1*.[1-11]

One cause of overtreatment is the development of more sensitive laboratory and imaging technology, which leads to the detection of more abnormalities (not all of which are or will ever be diseases that harm the patient) and at earlier times in their natural history. For example, the increasing resolution of computed tomographic pulmonary angiograms has led to a doubling in the number of persons treated for pulmonary embolism since 1998, but no reduction in mortality.[1] Although small subsegmental pulmonary emboli have a low risk of recurrence (0.7%), treatment with anticoagulants still carries a substantial risk of major bleeding (5.3%).[12] Yet, this balance of benefits and harms is rarely discussed with patients, and most patients receive anticoagulation therapy.

Overtreatment may also occur as we change the arbitrary threshold that, in some conditions, defines what is "abnormal." For example, cutoffs for normal blood pressure and stages of hypertension have changed over time. Hypertension was originally defined as a sustained blood pressure of greater than 140/90 mm Hg. However, observational studies found an association between even lower blood pressures and improved outcomes. As a result, the Seventh Report of the Joint National Committee created a new category of prehypertension (120 to 139/80 to 89 mm Hg), and physicians increasingly overtreated patients to achieve a target below 140/90 mm Hg.[13] However, the benefits of treating persons to a lower blood pressure target have not been proven, and even in higher-risk groups (e.g., patients with diabetes mellitus), there is no benefit to achieving a target systolic blood pressure of 120 mm Hg compared with 140 mm Hg.[14]

For any intervention, potential harms, such as the risk of bleeding with anticoagulants, accrue to some extent in anyone exposed to the treatment. However, the amount of benefit depends on the risk of the clinical event that we are trying to prevent (e.g., death, stroke, recurrent embolism), with high-risk patients having more to gain than low-risk patients. Thus, the net benefit is generally greater in higher-risk patients. As we lower the bar for who gets treated, the number needed to treat may increase dramatically. For example, the number needed to treat for five years is 20 to prevent one stroke in a patient with severe hypertension and 120 for a patient with moderate hypertension.[15] Although many patients with mild hypertension (140 to 159/90 to 99 mm Hg) are currently treated, randomized trials have not yet demonstrated a benefit.[8]

Indication creep occurs when physicians apply recommendations that may be appropriate for high-risk patients to all of their patients. For example, some physicians use low-density lipoprotein targets of 100 mg per dL (2.59 mmol per L), or even 70 mg

Table 1. Examples of Overtreatment

Example	*Evidence*
Anticoagulation for a small, subsegmental pulmonary emboli	Risk is likely to outweigh potential benefit for many patients[1]
Arthroscopic surgery for knee osteoarthritis	Arthroscopic surgery was no more effective than sham surgery in a well-designed randomized controlled trial[2]
A1C targets below 7.0%, especially for middle-aged and older patients	Three large trials found no benefit or increased mortality with more aggressive A1C targets[3-5]
Medical therapy for moderately elevated triglyceride levels	No evidence of additional benefit once low-density lipoprotein cholesterol goals are met[6]
Surgical treatment of low-grade prostate cancer	PIVOT (Prostate Cancer Intervention versus Observation Trial) found no survival benefit for surgery compared with watchful waiting[7]
Treatment of prehypertension and mild hypertension	A Cochrane review found no reduction in cardiovascular events for treatment of mild hypertension[8]
Using the same low-density lipoprotein targets for low-risk patients as for high- and very high-risk patients	Benefit of more aggressive therapy for primary prevention in low-risk patients is unproven and not recommended by old or new lipid guidelines[6,9,10]
Vertebroplasty for painful vertebral compression fracture	Two high-quality randomized controlled trials found no benefit compared with saline injection[11]

Information from references 1 through 11.

per dL (1.81 mmol per L), for all of their patients with hyperlipidemia, regardless of risk or the fact that these targets are lower than those recommended by the previous National Cholesterol Education Program guidelines.[6] Recently, the American Heart Association expanded the use of statins to the prevention of stroke and coronary heart disease, and used a new risk calculator that is reported to overestimate risk.[9,16,17] Overtreatment of early stage breast cancer and ductal carcinoma in situ is another growing concern. Recent studies found that contralateral prophylactic mastectomy was chosen by 8% to 14% of women with breast cancer, of whom most had no risk factors for contralateral disease,[18,19] and despite the fact that evidence of benefit for contralateral prophylactic mastectomy is lacking. This was even true for more than 20% of women with ductal carcinoma in situ, and may be related to increasing use of magnetic resonance imaging that finds small lesions of questionable significance.[20]

The physical, emotional, and financial costs of overtreatment are high. How can we decrease overtreatment? Reducing the use of screening or diagnostic testing that relays more information than requested, increasing the use of surveillance or watchful waiting when small or lower-risk abnormalities are detected, and performing studies to determine the extent of benefit (if any) of treating abnormalities such as subsegmental pulmonary emboli are important. These situations are also an opportunity for shared decision making between patients and their physicians about individualized benefits and harms and their respective value to patients. The risk of overtreatment can also be reduced by targeting treatments to persons at higher risk of disease progression because of age and other risk factors, and avoiding "one size fits all" care that overtreats lower-risk patients. Another way to minimize harm from treatment is to avoid aggressive and potentially harmful treatments in persons with limited life expectancy and little chance of benefit. Also, because overdiagnosis is the major driver for overtreatment, it is important to focus screening on populations or high-risk subgroups in whom benefit of early intervention has been demonstrated.

It is also important to educate patients and provide balanced information about both harms and benefits, allowing patient values and preferences to help guide decisions about screening, diagnostic testing, and treatment. Overdiagnosis adds complexity to this process, in part because foregoing treatment is a difficult decision, even when data suggest no advantage over watchful waiting, as with low-grade, clinically localized prostate cancer. We are all wired for an "optimistic bias" that makes it easy to overlook the harms of treatment interventions when evaluating the potential benefits, and we are inclined to embrace the traditional, widely held view that treatment must be delivered as early as possible to be effective.[21,22] Finally, family physicians must support efforts, like the Choosing Wisely campaign (http://www.choosingwisely.org), that seek to reduce overtreatment, and incorporate these recommendations into practice guidelines, local best practices, and decision support systems.[23]

EDITOR'S NOTE: Dr. Ebell is deputy editor for evidence-based medicine for *AFP*. Drs. Ebell and Herzstein are members of the USPSTF. This article is their own work and does not necessarily represent the views or policies of the USPSTF.

Address correspondence to Mark Ebell, MD, MS, at ebell@uga.edu. Reprints are not available from the authors.

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