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Prioritizing Guideline-Recommended Interventions

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Imagine a new patient "Bill", 62 years of age, comes to your clinic for a visit. You want to deliver guideline-recommended preventive care, and decide to use the U.S Preventive Services Task Force (USPSTF) guidelines. More than 10 separate guidelines are relevant to Bill. Following the guidelines you screen for hypertension, hyperlipidemia, colon cancer, depression, alcohol misuse, depression, diabetes, HIV, obesity, and tobacco use. You learn that Bill is obese, smokes, has high cholesterol, hypertension and diabetes. Given his risk factors, USPSTF guidelines indicate that Bill would be eligible for aspirin to prevent cardiovascular disease, management of obesity, diabetes, hypertension, and possibly counseling to promote a healthy diet and physical activity. Although the goal is to follow all of the guideline recommendations, it may simply not be possible to do everything. If that's true, which of these guideline-recommended interventions are most important? Will smoking cessation, treatment of diabetes, or weight loss improve Bill's health the most? How can we know, and what metric should we use to decide which interventions provide the most benefit?

How to prioritize what to do in the limited time of a clinical encounter is a pervasive problem in primary care. This question is the topic of a paper by Taksler and colleagues in this issue of the *Annals* (1). They address the question in the context of the benefits that accrue from delivery of preventive services and treatment for conditions identified through those services. The goal of their analysis is to identify, for Bill, and for other patients, which interventions result in the biggest increase in how long they can expect to live.

To do this, Taksler and colleagues develop a mathematical model that estimates how different interventions (e.g., treatment of diabetes, weight loss) would change Bill's life expectancy. Life expectancy is the average time a group of people would live, and it's an important measure of health benefit. Changes in life expectancy of a year or more are enormous, and even changes in life expectancy of a few days to weeks may be sufficient to justify an intervention (2). For example, biennial screening mammography from age 50 to 69 increases life expectancy by approximately 5 weeks (3). Taksler and colleagues do an

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admirable job considering all applicable preventive interventions for which the USPSTF has given an A or B recommendation (meaning they are recommended).

The first finding to note is that rather than a life expectancy of 19.1 years, which is expected for an average 62-year old white man, Bill's life expectancy is only 9.6 years (the life expectancy of an average 77-year-old white man). This dramatically shorter life expectancy drives home the seriousness of Bill's comorbid conditions. Of all the candidate interventions, the ones with most impact on life expectancy are control of diabetes (1.8 life-years gained), smoking cessation (1.5 life-years gained), and blood pressure control (1.4 life-years gained). Lowering cholesterol, use of daily aspirin, weight loss, and eating a healthier diet also provide substantial gains in life expectancy. Screening for colon cancer, HIV and abdominal aortic aneurysms provide much smaller gains. The rank order of the most important interventions change based on the comorbid conditions, ethnicity, and gender of the patient. For example, for a woman with Bill's conditions, control of diabetes dropped from the first to the fourth largest impact on life expectancy. The change is because of women's lower risk of coronary heart disease.

The value of the tool Taskler and colleagues developed is that it estimates the changes in health outcomes across many interventions, and thus enables us to understand the relative importance of different interventions for a specific patient. Although guideline development groups, such as the USPSTF, use models to help develop guidelines, by necessity, these models evaluate the effect of one intervention (e.g., mammography) on patients with different characteristics. These models can be very helpful in exploring how screening intervals and starting and stopping ages affect benefits and harms of an intervention delivered to different patient subpopulations (4). However, they are not intended to model multiple diseases or to directly prioritize across conditions and interventions.

Modeling the effect of interventions across many diseases is quite ambitious and requires numerous simplifying assumptions. As the authors note, their analysis is a proof-of-concept rather than a fully implemented tool, and there are extensions that would be valuable. They measure benefit in terms of life expectancy which only accounts for changes in mortality. Other metrics of impact could include a broader set of outcomes. Quality-adjusted life expectancy accounts for both mortality and morbidity and thus would have an advantage as a metric (5). If patients or clinicians were interested in high-value health care (6), the analysis could also account for costs, and interventions could be prioritized based on cost effectiveness. Regardless of the metric used, some interventions with high potential benefit (e.g., changing diet or lifestyle, weight loss) may be harder to realize in practice than others (e.g., blood pressure control), a factor that clinicians will likely consider. Some interventions may have synergies (or diminished benefits) when delivered together, another factor that may affect prioritization. In addition, some preventive interventions, such as screening for HIV, have a public health benefit (reduced transmission and consequent health benefits to individuals other than the patient) that is not captured in the framework. Finally, an analysis could incorporate detailed patient-specific information and preferences to provide individualized decision support (7). Although there is additional work that can be done, the study provides an important contribution.

While the present study focuses on helping clinicians prioritize which guideline-recommended prevention interventions to deliver, the goal of providing all guideline-recommended care remains very important, but challenging. Success may require multiple delivery strategies. Some interventions need not be delivered by physicians, and indeed, may best be performed by other healthcare professionals (8). While broader strategies are developed to provide all recommended care, the tool developed by Taksler and colleagues has promise to help make sure the highest impact interventions are delivered. Whether its use will improve patient outcomes is a question worthy of further study.

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