Medical Xpress

Stanford researchers suggest ways for physicians to individualize cost-effectiveness of treatments

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In an era of skyrocketing health-care costs and finite financial resources, health economists are increasingly called upon to determine which medical treatments are the most cost-effective. To do so, they compare the price of an intervention with the improvement it is expected to deliver. For example, a highly advanced cold medicine that costs $5,000 to deliver just one additional symptom-free day to the average patient would appear to be a less-wise investment than a new chemotherapy that costs $10,000 but delivers a year or more of life to most patients.

The problem is, of course, that none of us is completely average. That $5,000 cold medicine might be a life-saving intervention for a patient with a severely compromised immune system, and the new chemotherapy may cause a rare, but deadly, allergic reaction in a minority of recipients.

Now two researchers at the Stanford University School of Medicine suggest a way to tailor this cost-benefit analysis (more accurately known as an incremental cost-effectiveness ratio, or ICER) more precisely to individuals by assessing the outcome of each treatment on smaller subgroups of patients.

"Physicians need to think about what a particular intervention will offer for each patient, and how much it will cost," said John Ioannidis, MD, DSc, chief of the Stanford Prevention Research Center. "What is at

stake, and how might this patient's needs and expectations vary from the norm?"

Ioannidis is the lead author of a paper describing the research, which will be published in *PLoS Medicine* on July 12. He co-wrote the paper with health economist Alan Garber, MD, PhD, who directs the Center for Health Policy at Stanford.

Individualizing ICER analysis would give physicians the tools they need to effectively tailor treatment to each patient, while also streamlining the decision-making process and keeping overall expenditures as low as possible.

"Most physicians practice medicine intuitively without giving much thought to the evidence and the economic implications of their decisions," said Ioannidis, who is also the C.F. Rehnborg Professor in Disease Prevention at Stanford. "The information flow and decision-making process is often chaotic and not entirely rational. This is scary."

According to Ioannidis and Garber, the power of the ICER analysis — that of using large groups of patients to assess the overall effectiveness of particular treatments — can also make it difficult to apply the outcomes to individual patients. Some people are more risk-adverse than others, for example, making them more likely to shy away from possibly effective medications that bear a small, but not inconsequential, risk of severe side effects. Others with life-limiting conditions may place greater value on a treatment that is likely to keep them alive for a particular event, such as a wedding or a graduation, regardless of the financial cost or side effects.

One way to individualize ICER analyses is simply to present the findings in a "per-person" format, the researchers suggest. For example, rather than stating (after analyzing the outcomes of 1 million patients) that a

particular intervention costs $10,000 per quality-adjusted life year, instead think of it as spending $5 per person to gain about 0.2 days—the average benefit that any one patient could expect to experience as a result of the treatment. It's also important, when possible, for researchers to work to recalculate ICERs using subcategories of people who might reasonably be expected to differ in their response to certain interventions.

"ICER is useful is giving an overall picture about how a treatment can be expected to work," said Ioannidis. "However, if we have the information to dissect different patient experiences — and, to a large extent, we often do — we should use it."

The authors acknowledge that individualized cost-effectiveness analysis is not always appropriate. It's not possible to do at the level of population-wide interventions, such as the allocation of funds to specific health programs. It is also not useful when the intervention, such as vaccination, has the potential to significantly impact the health of many others. Still, they conclude, "Cost-effectiveness analysis offers a foundation for rational decision-making and can be very helpful in making health care more efficient and effective at the population level. Such analyses can often be more useful for clinicians and for individual patients as well, when they individualize the cost-utility information they present. Individual-tailored information can complement the ICER."

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