

AI AND CLINICAL CARE

Measuring the Return on Investment for Clinician-Facing Artificial Intelligence Technologies

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Artificial intelligence (AI) is proliferating, and many clinician-facing AI technologies are being adopted in health care. Examples of these include AI-powered scribes, AI-drafted replies to patients' electronic health record (EHR) messages, AI electronic medical record summarization, AI tools that read radiographs, and AI-enabled clinical decision support tools. Important aims of these technologies include decreasing administrative burdens, improving clinician workflows, and enhancing clinician decision-making.

Early evaluations of these technologies have largely assessed the accuracy of their outputs and their impact on clinician time, experience, and decision-making, with mixed results.¹⁻⁴ These results have left health care system leaders unmoored as they struggle to determine which tools are worth the cost—in money, time, and political capital. These trade-offs are often framed in terms of return on investment (ROI).

However, the approach for assessing the ROI of clinician-facing AI technologies differs from other approaches to measuring ROI.¹⁻³ First, traditional ROI calculations emphasize financial returns that are straightforward to estimate. Given the early nature of many AI products, quantifiable, current evidence regarding their benefits and costs are limited. Quantitative evidence may take even longer to generate for the more difficult-to-quantify costs and benefits that are nevertheless critical in health care, such as enhanced patient experience, reduced risk of malpractice, or benefits to the reputation of an institution. Second, in contrast to many technologies for which ROI calculations are conducted, AI technologies are constantly evolving. As they do, their benefits and costs may change. Finally, while traditional ROI frameworks assume that benefits and costs accrue to the same party, in health care, there may be disconnects between payer and beneficiary. For example, while benefits may accrue to multiple parties (health care system, clinicians, and patients) due to implementation of a clinician-facing AI technology, the health care system will solely bear the costs. Given these considerations, we describe how health system leaders can approach determining the ROI of clinician-facing AI tools.

A Tailored Approach for Estimating the ROI of AI Tools

We suggest a tailored approach that includes measurements of benefit and cost from the perspective of the purchaser and their stakeholders. Our approach considers benefits and costs that are readily estimated and those that are not, although these 2 categories raise different issues. Examples of readily quantifiable benefits include increased revenue related to efficiency gains from use of AI technologies, enhanced incentive payments due to improved quality of care, and reduced clinician turnover owing to

enhanced physician experience. Examples of benefits that are more difficult to estimate include those impacting patient outcomes or reputational benefits. For example, better clinician-patient communication may lead to a lower risk of malpractice lawsuits, improved patient satisfaction with message response times could enhance patient retention, and improved physician decision-making could lead to improved clinical outcomes. Moreover, institutions may be seen as more advanced for having adopted AI technologies when peers have not yet done so.

Costs can be divided into one-time costs, recurring costs, and costs with an uncertain time horizon. One-time costs include those associated with the implementation of the technology (eg, EHR integration costs, training costs). Examples of recurring costs include the cost of the AI technology itself, as well as ongoing maintenance and license costs. Longer-term costs, which may be difficult to quantify, could include clinician deskilling with use of AI, future technology upgrades, ongoing monitoring, and new work or inefficiencies generated by the technology. From a patient perspective, privacy breaches associated with use of AI tools could reduce patient trust in a physician or health system, reducing patient retention and likelihood to recommend the system.

Applications of the Approach for Estimating the ROI of AI Tools

One can imagine applying this approach to many of the clinician-facing AI technologies currently being tested. For example, a 2020 study assessed an AI-based software that triaged certain mammograms.⁴ It concluded that the system could halve radiologists' workload while potentially detecting many cancers earlier. These are the obvious benefits, but organizations might also want to weigh factors like improved retention of radiologists and the risk of missing a tumor diagnosis without this technology.

The proposed approach could also be adopted when considering the ROI of AI technologies that seek to reduce clinicians' administrative burden, such as the increasingly popular use of AI scribes. Early studies have shown modest time savings but have also suggested increases in clinician productivity, which could result in additional revenue. Simultaneously, given the rapidly falling costs of AI scribes, clinicians' growing expectations of their availability, evidence that scribes are associated with less clinician burnout, and a tight market for ambulatory physicians, enhanced clinician recruitment and retention should factor into ROI calculations. This is particularly salient given estimates that the cost of replacing a single primary care physician exceeds \$500 000.⁵ An estimate of ROI would need to weigh these benefits against costs

that are both readily estimable and those that are more difficult to quantify.

Other considerations may influence the perceived ROI for clinician-facing AI technologies. First, a health care system receiving predominantly value-based payments may prioritize a tool that helps decrease unnecessary health care utilization, while one operating in a dominant fee-for-service environment might emphasize patient access and throughput. Second, health systems may take a long view of ROI; even if early AI tools, like scribes or prior authorization drafting, yield minimal financial returns, gaining clinician buy-in for AI adoption may pave the way for later adoption of tools with better ROI, such as those aiding in diagnosis or clinician decision-making. Third, health care organizations will need to factor in a variety of associated costs and potential benefits related to creating the infrastructure and governance to evaluate tools over time, meet evolving regulatory requirements, and effectively engage in change management.⁶

While this discussion has focused on clinician-facing tools, many other AI tools are being evaluated in health systems. Examples include tools for adverse event detection via the EHR, medical record abstraction for quality reporting, call center functions, revenue cycle enhancements, and population health risk stratification. Similar ROI analyses will apply to these technologies, although benefits may come in the form of nonclinician labor savings, enhanced collections, or avoidance of malpractice cases.

Notably, a key assumption of this approach is that credible data will be available to fuel assessments of benefits and costs. At present, however, the rapidly evolving nature of the field and pressure for adoption often limits rigorous assessment. While it may be difficult for individual institutions to conduct randomized trials comparing new clinician-facing AI tools with a control group, they should seek to develop or review the strongest evidence possible to inform decisions. This evidence may be generated through large multi-institutional efforts to assess the effectiveness of AI tools or by using quasi-experimental study designs at their own institutions. They can also consider the relative improvements in decision-making associated with acquiring more complete information.⁷ Given that AI technologies are constantly evolving, health systems may want to re-evaluate benefits and costs at key inflection points, for example, when large-scale deployments have occurred after initial pilots, or when new models of a particular technology are introduced.

We believe that AI offers many opportunities to improve care delivery and enhance clinicians' daily work. However, health systems will need to make difficult choices regarding which tools to invest in and adopt. In doing so, they should systematically consider benefits and costs and the time frame over which these can be realized. Vendors that can help health systems assess ROI with credible data and examples are likely to be advantaged in an increasingly competitive market.

ARTICLE INFORMATION

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