There is ample evidence that palliative interventions, including palliative care consultations, advance care planning, or goals of care conversations, have the potential to improve care for patients who are nearing the end of life. Professional organizations in most fields of medicine recommend the integration of a palliative approach for patients with advanced or incurable illness. Despite this, studies continue to show that many patients, especially those with noncancer illnesses, do not receive palliative care prior to death or receive it only in the final days or weeks of life.1

One of the biggest obstacles to initiating a timely palliative approach is clinicians’ inability to reliably identify people who could benefit from it. Once a patient is identified as having unmet palliative needs, they can have their specific needs assessed and managed. However, clinicians cannot perform comprehensive assessments on every patient they see; they must be selective and focus their attention on those who are most at risk. Thus, there is a need for tools that help clinicians identify the patients who most need help. Ideally, these tools would be accurate, reliable, low-cost, and integrate seamlessly into the existing workflow. The study by Ouchi et al2 presents one possible tool, the so-called surprise question, worded as “Would you be surprised if your patient died in the next one month?” in the context of emergency department visits that lead to admission to the hospital.

Clinician-dependent tools, such as the surprise question, are low-cost and have been advocated for many years as part of identification systems, such as the Gold Standards Framework3 and the Supportive and Palliative Care Indicators Tool.4 However, more recent data, including from the study by Ouchi et al,5 have highlighted some important limitations in the use of the surprise question and clinician-dependent approaches in general. The surprise question is not particularly accurate for identifying patients nearing the end of life; the study by Ouchi et al2 reported an area under the receiver operating curve of 0.73, which is lower than most other studies of the surprise question. The surprise question may miss many people who are nearing the end of life and instead focus attention on patients who are more than a year from death. While these patients could still benefit from a palliative approach, they are likely not the highest priority for clinicians who have limited time and energy to focus on palliative needs. Beyond accuracy, a study by Elliott and Nicholson6 found that the uptake of the surprise question could be poor when used in multisite studies involving many physicians, particularly those involved in primary care for noncancer illness. And while a single-item question like the surprise question might seem easy to integrate, the Gold Standards Framework3 can involve assessing up to 74 specific parameters for each patient.

Clinician-dependent tools, such as the surprise question, must be given credit for much of the early identification work that has been completed to date. They allowed clinicians to take the first steps in an important area of work. As studies by Downar et al5 and Elliot and Nicholson6 have highlighted the limitations of these tools, we also need to look for other options. If a timely palliative approach is a fundamental component of quality patient care, then tools are needed that allow a more systematic and rigorous quality improvement approach and can be used to prospectively identify cohorts of patients at the end of life to measure key indices of care or drive the use of proven interventions.
Big Data—An Opportunity to Improve Prediction

*Big data* refers to the collection, processing, and analysis of data that are often too large to be handled by more traditional software, hardware, and statistical techniques. In the internet of things, companies like Google (Alphabet), Amazon.com, and Netflix use big data to make personalized product recommendations for their users. In health care, big data can be used to personalize care delivery based on the individual. The characteristics of the individual are used to predict the risks of outcomes, such as death, and then activate interventions (e.g., a palliative approach) customized for these predicted, individualized outcomes.

Big data use in health care is increasing as health and social data, often linked at the individual level, continue to expand. In the acute care setting, administrative databases are increasingly available, including charts abstracted to inform funding and drive quality improvement efforts. Such data can also be used to generate predictive algorithms that in turn can bolster prognostic tools. For example, the mHOMR tool\(^7\) accurately predicts survival among hospitalized individuals (area under the receiver operating curve, 0.89) using data that are collected during admission. It can systematically and automatically identify patients with an elevated risk of mortality without clinician input and prompt clinicians to screen for unmet palliative needs.

In the community setting, data are also increasingly available. For example, the interRAI suite of tools\(^8\) is used internationally to assess the needs of individuals in home care and residential long-term care settings. In Ontario, Canada, where the interRAI suite of tools is used for all home care and long-term care recipients, it has been used to generate the Risk Evaluation for Support: Predictions for Elder-life in the Community Tool (RESPPECT) algorithm, which is being translated into a tool that predicts survival.\(^9\) The RESPPECT can be applied in the community to identify individuals who have an increased risk of death. Since the questions in interRAI and RESPPECT can be self-administered, a patient-facing tool can also be completed in real-time by clinicians, patients, and family members. In both the mHOMR and RESPPECT examples, prediction can be integrated into existing data systems, be completed independent of the busy clinician, and incorporate large amounts of data that are often difficult to incorporate into clinical judgement or gestalt. The thresholds for notification in both tools can be customized for the resources available, and the tool could activate any appropriate palliative intervention or simply be used to identify a cohort of patients for assessing the quality of care provided.

Implementation Considerations

The success of any new tool for timely patient identification will be driven by implementation factors. The tool must fill a need, fit into existing workflows, be supported by adequate resources, and be backed by evidence and data, and it must be deployed in a setting that is ready to use it and has the capacity to do so.\(^10\) Any prediction model could fill a need for earlier identification, but every tool will fail if it is inaccurate, fails to direct clinicians to the patients in greatest need, and does not fit with existing workflows; if the clinical staff are not inclined or lack the time to use them; or if there are no resources to deploy in response to identified needs. The surprise question, while filling a need, is liable to poor accuracy, and its implementation relies on substantial clinical readiness and inclination, since only the clinician tasked with using the surprise question can initiate a response to a positive result. While the study by Ouchi et al\(^2\) was able to improve reliability by integrating the surprise question into the electronic health record, the accuracy is still poor.

Automated big data tools, such as mHOMR and RESPPECT, are an improvement on clinician-dependent tools because they are accurate, transparent, and fit easily into existing workflows. They also require very little in terms of readiness, capacity, and resources on the part of the clinical staff. To be sure, no identification tool can overcome some of the other barriers to the provision of palliative care.
care, including a lack of palliative resources or a lack of skill and comfort among nonspecialist clinicians, but overcoming the challenge of timely identification would represent a substantial achievement in the struggle to provide a palliative approach to care for individuals who would benefit from it.

REFERENCES