



NATIONAL
QUALITY FORUM

Data Needed for Systematically Improving Healthcare

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KEY THEMES

- Healthcare needs to improve, and it can. Multiple examples exist where healthcare has improved in quality and value, but such improvements have not been spread broadly enough.
- While new data sources hold great promise, their availability and usability need to be improved.
- More than data availability, a larger constraint is the ability to use and apply data toward improvement, such as integrating data with improvement on the front lines.
- Raw data alone cannot lead to systematic improvement—it has to be turned into meaningful information, institutional leadership and culture have to support improvement efforts, and clinicians and healthcare staff need the skills to analyze and apply data.

The rising costs of healthcare are stressing the budgets of the federal government, state and local governments, businesses, and families. Furthermore, the healthcare system is not meeting its potential in terms of safety, overall quality, and patient health outcomes. At the same time, there are examples where healthcare providers have made dramatic improvements and provide consistently high-quality care.¹ Interestingly, these high performing providers and organizations often give high-quality care for lower cost. These examples are too rare, and the lessons learned are not disseminated or implemented widely. Progress in healthcare can be accelerated by reducing the time it takes to spread and implement these improvement methods.

Systems improvement tools hold great promise for healthcare. Because of inefficient processes and workflows, clinicians often have to take heroic action to ensure patients are safe and delivered high-quality care. Moreover, the time and energy that clinical teams spend circumnavigating these inefficiencies is time that they could use on initiatives that improve care quality. In short, the

goal of systems improvement is to reduce waste, such as time spent working around inefficient workflows. This could generate opportunities to focus on higher value areas, such as personalizing care for an individual patient's specific needs or undertaking other improvement initiatives.

To encourage action in this area, NQF convened leaders and experts from the private and public sectors to identify the data and analytics necessary for systems approaches to improving care. This project, supported by contributions from the Peterson Center on Healthcare and the Gordon and Betty Moore Foundation, reviewed the challenges limiting widespread, large-scale systematic improvement, identified the data and data infrastructure necessary for spreading successful care models, and developed an action agenda for moving the field forward. This document summarizes discussions with stakeholders, surveys of field leaders, [public comments of the draft report](#), and in-person and web meetings, with a focus on specific actions that can be taken by healthcare organizations, technical leaders, and policymakers.

Healthcare needs to improve—and it can.

Throughout this project, participants highlighted multiple examples of high performing clinical teams, healthcare organizations, or communities. These groups used systems methods and techniques to improve healthcare safety, reliability, and effectiveness.² Systems approaches are necessary for sustained improvement because they consider clinical workflows, care processes, and the overall environment clinicians practice in, as opposed to simply adding another task to a clinician’s already heavy workload. Indeed, such approaches have become more essential as healthcare has become more complex, with larger teams needed to deliver care, increasingly complicated diagnostics and treatments, many

settings where care is delivered (hospitals, out-patient clinics, in their home and community), and new services aimed at addressing the many factors outside healthcare that impact health.

Implementing a systems approach to improvement depends on multiple factors. An important one is changing financial incentives and payment models, as the fee-for-service payment system does not reward care improvement. Other factors include ensuring that the healthcare workforce has the technical skills to implement these approaches, involving patients and consumers to drive cultural change, and integrating with communities to address the many determinants of health outcomes.

BETTER CARE THROUGH SYSTEMS APPROACHES: VIRGINIA MASON MEDICAL CENTER

Virginia Mason Medical Center in Seattle, Washington, has adopted the “Virginia Mason Production System,” adapted from the well-known Toyota Production System, to systematically improve their care processes. This has been implemented across the health system, and each unit undertakes projects to improve care and clinical operations in their area. As one example, their sterile processing facility implemented intensive monitoring to identify defects in sterile instrument processing, from missing chemical indicators to mislabeled sets. The defects are tracked and reviewed regularly, with daily defect status reports and a “visibility board” that shows the total number of different types of defects each month. These tools are used to discover the causes of defects, and staff then institute protocols to avoid future issues. For example, the team developed a checklist that guides the final review of every instrument set before it is sterilized. After the checklist’s introduction, the defect rate declined from 3 percent to 0.12 percent.³

Virginia Mason’s experience with production system methods has also highlighted the many challenges in adopting a systems approach. For example, when it redesigned its spine center to reduce wait times and improve outcomes for back-pain patients, the organization quickly lost money because it was performing fewer high-cost imaging studies and more low-cost physical therapy and telephone consultations. This underscores how financial incentives and payment models can limit systematic improvement.⁴

Data plays a critical role in systems improvement.

For systems improvement tools to achieve their potential, they require multiple types of data, which can identify opportunities, gauge progress, and help users understand what works. Project participants highlighted multiple examples where data supported improvement in different healthcare settings and at different scales of magnitude or complexity. These ranged from compliance with care bundles, such as for ventilator acquired pneumonia, predictive analytics of patients at risk, rapidly learning the most effective protocols to reduce MRSA infections, and ensuring care is consistent with patients' preferences and values. One area where data are often missing is on healthcare costs, even though these data can inform and assess efforts to

improve the affordability of healthcare.

Participants emphasized that simply providing performance feedback could drive improvement, as long as the data are timely and clinically relevant. The project participants and surveyed leaders identified multiple cases where clinicians improved their care practices once presented with trusted, accurate, and meaningfully synthesized data. This feedback leverages clinicians' intrinsic motivation as professionals to deliver high-quality care. Furthermore, data are required for the success of other incentives for better care, such as payment programs, as clinicians and healthcare organizations need timely data to understand where to improve and track their progress.

Improvements are needed to provide actionable and meaningful data.

When surveyed, field leaders outlined multiple challenges that reduce the usefulness of data, including both technical and policy issues:

- Interoperability and linking disparate data sources, given data at the community level, individual patient level, and at different levels of the healthcare system
- Leveraging data for internal improvement in broader benchmarking, and leveraging high-level performance indicator data for process improvement
- Providing feedback in a timely fashion
- Trust in the data (both from patients and providers)
- Ability to gather data directly from patients (patient surveys and patient-generated data)
- Ensuring data are meaningful and clinically relevant

- Deidentification and aggregation for generating knowledge

In terms of data availability, there has been limited digital information in healthcare until recently, as electronic health records (EHRs) have only gained traction over the past five years. While greater EHR adoption is positive, these records do not contain all of the data needed for improvement. For example, systems approaches often need operational or clinical data not captured in an EHR, such as the time a nurse spends caring for a particular patient or the time to transfer a patient from surgery to a post-operative recovery unit to a hospital room.⁵ As a result, the healthcare industry needs to use other data sources, such as administrative records, population health information, and patient surveys to understand and make needed changes. Data availability should be improved through the development and implementation of common models and tools for extraction.

Another challenge is interoperability between EHRs and clinical data sources recording patients' experiences and outcomes. A patient's data are often fragmented across multiple electronic health records, depending on their insurance and the providers they visit, and limited interoperability among those record systems prevents many providers from having a full picture of a patient's healthcare. Common data models are one approach that can identify the key data elements for quality, cost, and value and ensure that such data are exchanged across different EHR systems.

There have been multiple policy initiatives in recent years to drive interoperability. The Office of the National Coordinator for Health Information Technology (ONC) has implemented several initiatives, and the recent Medicare Access and CHIP Reauthorization Act (MACRA) makes it a national objective that EHRs are interoperable by the end of 2018. Beyond linking healthcare data, there is a need to learn from data spanning healthcare and other determinants of health, as the most significant and sustained individual and population health improvements occur

when healthcare organizations collaborate with community or public health organizations.

Several field leaders highlighted the challenge of obtaining meaningful and clinically relevant data.⁶ One individual noted that data from different sources can conflict with one another, such as between EHR and claims data, which both lowers trust in the underlying data and limits its actionability. Others noted that other factors can affect measured performance, such as documentation or coding practices, which can also erode trust in the reported data. Overall, there was a desire to move from a retrospective approach to quality metrics and analytics to one that uses real-time data to identify potential challenges and gauge progress. Some participants noted that in many industries, data are largely collected by electronic sensors, while healthcare still relies on humans for routine data collection. For example, most monitoring equipment in hospitals and used by patients outside of clinical settings does not automatically feed its data into the electronic health record.

SCALING UP AND SPREADING IMPROVEMENT ACROSS HEALTHCARE ORGANIZATIONS

One of the challenges in healthcare has been spreading successful improvement practices—many initiatives stop at the pilot stage. One approach for driving improvement at scale is through collaboratives, which can provide data, give feedback on relative performance, and share best practices on what is working. One organization that has successfully used the collaborative model is Premier, which has sponsored collaboratives on population health, data sharing, bundled payments, supply chain efficiency, and overall performance. Through this work, Premier found that data can serve as a strong incentive for change, and that data does not have to have perfect quality to be useful. However, participating organizations' progress has also been limited by technical barriers to accessing clinical data from different EHR systems and by lag times in obtaining claims data. Finally, Premier representatives stressed that organizational factors affect the success of an organization's improvement initiatives, including leadership, staff engagement, and involvement in learning communities.

Current improvement capabilities are less than current data capabilities.

One common theme was that the availability of data was less of a constraint than the ability to use and apply the data toward improvement. In many cases, the technological issues were relatively straightforward, albeit still difficult, while an organization's capability to use data depended on complex factors, ranging from workforce skills to organizational culture. Participants noted that improving efficiency can still be viewed as a threat to revenue in an environment of mixed payment models, and cautioned that without aligned incentives, there may be unintended consequences. For example, providers will understandably be balancing readmission payment penalties and potential revenue from admission volumes. This underscores the value of nonfinancial incentives, such as peer and public reporting, in improvement initiatives.

Several participants noted that improvement is a journey—when they started using systems approaches and techniques, data quality was comparatively poor, and the clinical teams were

unclear how to use it effectively. At this stage, data that are quite basic or granular, sometimes even manually collected, could be helpful for process improvement. For example, the Virginia Mason case study earlier in this paper highlighted one type of manual data collected for improvement, with individuals marking up paper boards and white boards to track progress. Manual data can allow teams to improve their abilities to analyze and apply data, and also help them to understand the strengths and limitations of the data elements collected. Such straightforward efforts have the added benefit of allowing organizations to learn exactly what data are needed before investing in more technically advanced data infrastructure. While manual data collection has these advantages, the data that the teams are recording may already be stored elsewhere, and clinicians are re-entering data so that it is available for timely analysis and feedback. In these cases, timely, clinically relevant digital data can accelerate progress.

Substantial effort is required for organizations to use data more extensively.

Changing the situation—and increasing clinicians' and healthcare organizations' capabilities to apply data—requires significant effort. The healthcare workforce needs training and practice applying process improvement tools, identifying the potential benefits and limitations of the data, and analyzing it. But training is not enough. The project participants outlined the multiple factors that affect whether individuals or organizations adopt improvement methods, which have been described as change management, sociology of change, or simply scaling up and spreading new ideas. These factors included the organization's culture, the business case, leadership commitment to

using data for improvement, and communication channels to share what works.⁷ In addition, several participants also noted that successful initiatives depend on clear priorities, and that clinicians and healthcare professionals feel pulled in too many directions to make significant improvement in any one area. One speaker noted that a barrier is the “not invented here” phenomenon, where individuals may be resistant to a concept from other organizations or areas of the country. This emphasizes the importance of getting local buy-in, such as by engaging clinicians and front line staff in data generation and use to build trust in the data.⁸

IMPLEMENTING BEST PRACTICES AT SCALE

There are specific challenges in implementing systems approaches in smaller clinical practices. Unlike larger organizations, they generally do not have the scale to have staff devoted to improvement activities or invest in specific tools or data resources.⁹ One initiative seeking to spread standardized best practices is Project ECHO (Extension for Community Healthcare Outcomes), which trains primary care clinicians to treat pressing conditions in their local community. It initially focused on Hepatitis C in New Mexico as many residents were unable to access specialty care for the disease—only 5 percent of residents with the disease were receiving treatment. To expand access to specialty care for this particular condition, the project started virtually mentoring primary care clinicians in communities across the state and trained clinicians on the current standard of care, provided feedback on patient cases by a virtual specialist team, and included opportunities to share best practices. This was coupled with data resources that tracked patient outcomes, which allowed for further quality improvement. The initial implementation in 16 community clinics and 5 prison sites showed that the model produced similar, or slightly improved outcomes, over the traditional specialty model for Hepatitis C, and the project is being expanded to other geographic regions and to other conditions.¹⁰

Patients, consumers, and the public play a critical role.

People play an important role in improvement—whether as patients or consumers in the health system or as people in the community. People provide valuable perspectives on their healthcare experience, their function, and how healthcare addressed their concerns or goals. Beyond providing data, people can encourage improvement by using data to select high-quality providers, collaborating with providers on improvement initiatives (such as through patient and family advisory councils), and participating in community and regional collaboratives. Consumers can also continue to build the demand for accessible and complete data, such as open medical records (“open notes”) or the inclusion of information about care from all providers and relevant sources in their records.¹¹

There is untapped potential in learning directly from people: today, there are few opportunities to collect patient-reported information. Rapid changes are underway as new technologies are being piloted that are easy to use, allow people to quickly provide feedback, and are timely compared to their healthcare encounter. Some of these are entirely within the health system, while others are not, such as social media. These technologies need to continue to evolve, and

further work is required to develop valid and reliable patient-reported outcome measures.

One speaker described the opportunities to learn from everyday data that people generate—such as the so-called “small data” from digital interactions in daily life or from apps that work in the background of smartphones. These technological tools could help people with Parkinson’s disease or multiple sclerosis track their fine motor control through how they type on a smart phone, or help people with Rheumatoid Arthritis let their provider know their current functioning. While this type of data is not widely available now, policymakers should be thinking ahead to a more organic but also more complex data ecosystem, such as the Internet of Things. An ongoing challenge will be analyzing the raw data to generate accurate information and alerts that consumers and clinicians can act upon.

To help people take on a greater role, the huge volumes of “big data” must be turned into meaningful information that is available at the fingertips, or at least arm’s reach, of consumers and purchasers.¹² This is an agenda for progress that will have to involve multiple stakeholders, bringing data scientists together with data users.

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STRATEGIES FOR MOVING FORWARD

The project identified several opportunities to improve data and make it more useful for systematic improvement. The following list outlines several opportunities for specific stakeholder action.

All Payers (Medicare, Medicaid, Public and Private Payers)

- Make data more broadly available in a timely manner, preferably in a format that is immediately actionable
- Where possible, contribute to data sources that integrate data across populations, such as all-payer databases

States

- Build analytic platform for Medicaid
- Use the levers at Governors' disposal to access the different sources of healthcare data across a state and use it to improve data

EHR vendors and Health IT Policymakers

- Promote true interoperability between different electronic clinical data systems
- Improve data availability by preventing high, recurring fees for data access
- Create Application Program Interfaces (APIs) and make APIs widely available for HIT systems, thereby fostering innovation in data analysis

Healthcare Organizations

- Promote culture, mindset, skills, and tools to effectively use data
- Build capabilities to more effectively develop, deploy, test, and adjust interventions in response to available data
- Develop interprofessional improvement capabilities through training programs in systems engineering, inclusion of engineers in healthcare teams, and partnerships with leaders in other industries with successful histories in systems improvement
- Ensure that internal governance processes and organizational structures allow for the integration of disparate data sources (e.g., clinical and financial)

Patients and Consumers

- Provide feedback on healthcare experiences and outcomes
- Collaborate on improvement initiatives, such as through patient and family advisory councils or community and regional collaboratives

Policy

- Focus on common metrics and improve the efficiency of measurement
- Establish standards on common data elements to collect, exchange, and report; alternatively, standardize the core set of data points for interoperability
- Ensure healthcare workforce has supports and training to utilize health data for improvement

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Data

for Systematic Improvement

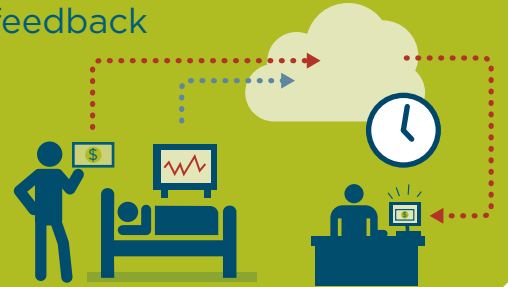
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Systems improvement requires good data

Integrate multiple data sources



Timely and clinically relevant feedback

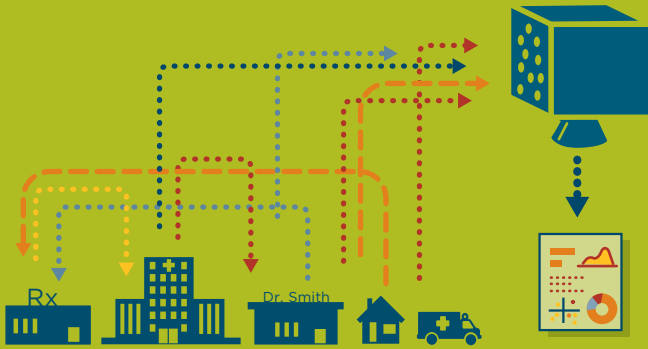


Healthcare needs to improve – and it can

Systems approaches have improved care



Systems approaches can address major healthcare challenges



Using good data to accelerate progress remains a national challenge.

Lack of interoperability



Too few tools for clinicians to use data



Difficulty scaling up what works best

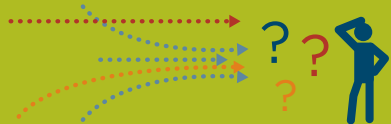


Patients are a largely untapped data resource

Expand patient-generated data



Ensure data are meaningful to patients



The NQF Data Initiative

> For more information, go to www.qualityforum.org/data/

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