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Perspective

Advancing patient-centered clinical decision support in today's health care ecosystem: key themes from the Clinical Decision Support Innovation Collaborative's 2023 Annual Meeting

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Abstract

Objective: This perspective summarizes key themes that arose from stakeholder discussions at the inaugural Clinical Decision Support Innovation Collaborative (CDSiC) 2023 Annual Meeting. The CDSiC is an Agency for Healthcare Research and Quality (AHRQ)-funded innovation hub for patient-centered clinical decision support (PC CDS).

Materials and Methods: The meeting took place on May 16-17, 2023, and engaged 73 participants that represented a range of stakeholder groups including researchers, informaticians, federal representatives, clinicians, patients, and electronic health record developers. Each meeting session was recorded and had 2 notetakers. CDSiC leadership analyzed the compiled meeting notes to synthesize key themes.

Results: Participants discussed 7 key opportunities to advance PC CDS: (1) establish feedback loops between patients and clinicians; (2) develop new workflows; (3) expand the evidence base; (4) adapt the CDS Five Rights for the patient perspective; (5) advance health equity; (6) explore perceptions on the use of artificial intelligence; and (7) encourage widespread use and scalability of PC CDS.

Discussion and Conclusion: Innovative approaches are needed to ensure patients' and caregivers' voices are meaningfully included to advance PC CDS.

Lay Summary

Patient-centered clinical decision support (PC CDS) tools significantly incorporate patient-centered factors related to knowledge, data, delivery, and use and facilitate more active involvement from patients, their caregivers, and care teams in health-related decisions. The Clinical Decision Support Innovation Collaborative (CDSiC) is a stakeholder-driven initiative that aims to advance the development, testing, implementation, tracking, and measurement of PC CDS in the real world. This article summarizes themes from the inaugural CDSiC Annual Meeting in May 2023, which was attended by more than 70 diverse PC CDS stakeholders. Meeting participants discussed opportunities to deliver more patient-centered care using PC CDS by adapting traditional clinical practice, establishing more feedback loops, developing new workflows, and rethinking the right information, people, formats, channels, and timing of clinical decision support. They considered innovative approaches to collecting and acting on social service-related data and using artificial intelligence in ways that are transparent and garner patient trust. They also examined opportunities to scale and articulate the value of PC CDS by moving beyond pilot projects and expanding the evidence base on implementation best practices. These opportunities provide guidance on the future directions of PC CDS.

Key words: patient-centered care; clinical decision support systems; value-based health care.

Introduction and background

Clinical decision support (CDS) refers to the digital tools that help clinicians and patients (and their caregivers) make informed health-related decisions.[1] Patient-centered clinical decision support (PC CDS) focuses on tools directed by and for patients to empower patients and their caregivers to become active participants in their care using evidence-based (eg, patient-centered outcomes research) and patient-specific

information (eg, patient-generated health data and patient-reported outcomes).[2] PC CDS has the potential to facilitate safe, high quality care that reflects individual patient preferences, needs, and values, which achieves better outcomes and better patient satisfaction.[3,4] However, the field is still developing, and resources are needed to implement PC CDS in clinical practice.[2] A horizon scan of the literature found several barriers to developing and translating PC CDS,[2] and a framework outlines considerations for patient engagement across 8 stages of the PC CDS lifecycle.[5]

In response to the lack of development around PC CDS, the Agency for Healthcare Research and Quality (AHRQ) funded the Clinical Decision Support Innovation Collaborative (CDSiC), aiming to build the evidence base to realize the full potential of PC CDS. Since the project began in 2021, the CDSiC has served as a stakeholder hub and innovation center to advance PC CDS through the development of resources that support developing, testing, implementing, tracking, and measuring PC CDS in the real world. The CDSiC also identifies gaps and opportunities to shape the future of the field.

On May 16-17, 2023, the CDSiC hosted its first Annual Meeting to reflect on the Collaborative's activities over the initial 2 years and to discuss future opportunities to advance the field of PC CDS. In this perspective, we provide a summary of themes that emerged from the Annual Meeting discussions with representation from a wide range of clinical, patient, federal, electronic health record (EHR) developer, and academic stakeholders.

Meeting structure and purpose

We invited participants who could provide a diversity of experiences and perspectives to share and reflect on the meeting's theme: "Meeting the Moment: How can we make CDS work for today's patients, in today's health care ecosystem?" At the beginning of the meeting, participants were asked to complete a poll to indicate which stakeholder groups they represented (Table 1). In total, 64-73 participants attended day 1 of the Annual Meeting and 65-70 participants attended day 2, with approximately 90% in-person and 10% virtual on each day.

Table 2 provides a summary of the meeting sessions. Day 1 opened with a patient roundtable discussion on patient perspectives of PC CDS, setting the stage for patient input throughout the meeting. This was followed by a series of panel presentation sessions, a Keynote presentation that focused on patient engagement strategies, and remarks from the Director of AHRQ. Day 2 included additional panel presentation sessions and an interactive breakout session to

Table 1. Number of meeting participants by stakeholder group.[a]

Stakeholder group	N (%) of meeting participants
Researchers	25 (51%)
Informaticians	19 (39%)
Federal representatives/policymakers	14 (29%)
Clinicians	12 (24%)
Patients or patient advocates	9 (18%)
EHR developers	5 (10%)
Other	1 (2%)

[a] Note: Percentages are of the 49 people who responded to the opening session poll. Participants could select more than one stakeholder group option.

brainstorm ideas on how the stakeholder community can advance the field of PC CDS.

Each plenary session lasted an hour and included opportunities for interactive discussions regarding stakeholders' lived and professional experiences with PC CDS. Each session was recorded and assigned (1) a primary notetaker who was responsible for synthesizing key presentation and discussion points for the assigned session using a structured notetaking guide, and (2) a secondary notetaker who was responsible for reviewing the synthesized notes and filling in any gaps using the meeting recording for notetaking accuracy.

To analyze and summarize the notes, 2 CDSiC researchers who attended the meeting created a document compiling all session notes and key takeaways. The CDSiC researchers inductively analyzed the note contents to identify key opportunities for PC CDS that emerged from participant discussions. CDSiC leadership discussed the key themes during internal Collaborative meetings and external AHRQ meetings to reach agreement on strategies that seemed new or particularly salient for PC CDS advancement. The 2 CDSiC researchers then reviewed the meeting notes and recordings for additional details on the opportunities and summarized discussions around the current state and future challenges for each theme. They paid specific attention to breakout session notes where participant discussions were structured in a rose-thorn-bud format (ie, strengths of PC CDS, challenges of PC CDS, emerging opportunities, and solutions for PC CDS).

Key themes from stakeholder discussions

Stakeholder participants emphasized the importance of centering on the patient to ensure meaningful engagement in their care. Coupled with relevant policy initiatives, these conversations create a supportive environment for PC CDS. Even so, there are important considerations for PC CDS moving forward, which include meaningful engagement with caregivers and the assessment of appropriate clinical use cases for PC CDS. Table 3 summarizes the key facilitators and barriers to advancing PC CDS provided by stakeholder participants.

Below, we describe the 7 opportunities identified by a multi-disciplinary group of clinical, patient, federal, EHR developer, and academic stakeholder participants for activities to advance PC CDS. The opportunities were refined and summarized by the authors.

Gather patient-contributed data and create meaningful feedback loops between patients and clinicians

Participants emphasized the importance of creating meaningful feedback loops between patients and their care teams to drive patient engagement in PC CDS and continuous improvement within a Learning Health System. They acknowledged the positive impact of policy levers such as value-based care, which strives to deliver high quality care for reasonable costs and is measured by outcomes most relevant to the patient.[6] In addition, there are more digital tools available for patients to share health information outside of clinical settings. When patients provide data and/or express preferences, care teams need to view, integrate, and act on this information to ensure patients feel heard, respected, and cared for to promote trust in PC CDS.[25] The PC CDS community could undertake pilot studies assessing how to integrate PC CDS into patient lifeflows and clinician workflows

Table 2. Summary of meeting sessions.

Meeting session type and title	Description
Day 1	
Patient Roundtable: Patient Perspectives on CDS and PC CDS	Moderated roundtable discussion on PC CDS with patients and patient advocates.
Panel Presentation: Measuring PC CDS	Moderated panel presentation highlighting efforts to advance measurement for PC CDS from the Innovation Center; Scaling, Measurement and Dissemination Workgroup; and Outcomes and Objectives Workgroup. The 3 presentations were: • Measuring PC CDS Performance: A Unified Framework • Scaling, Measurement, and Dissemination of CDS Workgroup Measurement Products • Measuring Outcomes of PC CDS
Keynote Presentation	Presentation on cultivating trust between the patient and provider or system.
Presentation: Remarks from AHRQ Director	Remarks from the Director of AHRQ about the healthcare system's role in PC CDS.
Panel Presentation: Patient Preferences and PC CDS	Moderated panel presentation on describing patient preferences and how it informs PC CDS. The 3 presentations were: • Taxonomy for Patient Preferences that are Relevant to PC CDS • Current State of Standards to Support the Capture of Patient Preferences for PC CDS • United States Core Data for Interoperability Advancing Patient Preference in Health Information Technology
Panel Presentation: Innovation Center Dashboard Demonstration	Demonstrations of 2 types of dashboards, one focused on patient-generated health data and the other on visualizing PC CDS performance metrics and aggregated patient-reported outcomes. The 3 presentations were: • Charts on FHIR: Open-Source Software for Visualizing Patient-generated Health Data • Patient Health Questionnaire Dashboard and Inflammatory Bowel Disease Dashboard • PC CDS Dashboards Usability
Day 2	
Panel Presentation: The PC CDS Standards and Regulatory Landscape	Moderated panel presentation discussing the current PC CDS standards and regulatory landscape and the implications for PC CDS researchers and developers as it relates to patient facing CDS. The 3 presentations were: • Standards for PC CDS • Food and Drug Administration's Clinical Decision Support Software Guidance • Assistant Secretary for Technology Policy and Office of the National Coordinator for Health Information Technology's PC CDS Standards and Regulatory Landscape
Breakout Session: Advancing PC CDS	Moderated breakout groups discussing challenges, strengths, and opportunities for PC CDS. This session included a 10-min orientation, 60-min discussion in 5 groups, and a report-out of each group's discussions.
Panel Presentation: Trust in PC CDS: From Design to Implementation	Moderated panel presentation highlighting CDSiC work to advance trust in PC CDS. The 2 presentations were: • Improving PC CDS Source Credibility • Improving PC CDS through Co-Design

Abbreviations: AHRQ = agency for healthcare research and quality, CDS = clinical decision support, CDSiC = Clinical Decision Support Innovation Collaborative, FHIR = fast healthcare interoperability resources, PC CDS = patient-centered clinical decision support.

and assess what is needed to create and sustain these feedback loops.

Participants acknowledged the broader challenges within the current health care landscape to incentivize clinicians to close the loop on patient data, preferences, and questions, including lack of time for clinicians to use patient-contributed data in care; clinician concerns about the volume of patient-provided information; and lack of best practices for presenting patient-contributed data and preferences in a meaningful way for clinicians.[2,26] For patient-reported outcome measures that use structured surveys, some participants advocated for more free text options that capture richer contextual information on patient's lives, while others cautioned against this so that patient data can be standardized and integrated into clinician workflows. The PC CDS community could explore and develop best practices for visualizing patient-contributed data in ways that are actionable and facilitate clinician decision-making. For instance, some evaluations have shown clinicians' preferences for graphs or tables with statistical summaries; however, best practices for

summarizing qualitative data are not yet established.[27] Additionally, dashboards that incorporate patient-generated health data provide ways for clinicians to quickly review and identify patients who need attention, yet they are often accessed outside of the EHR. Finding ways to fully integrate this data into the EHR could provide efficiencies that potentially impact the care patients receive.

Develop new workflows, policies, and procedures for PC CDS

The variable volume and frequency of patient-generated health data poses a unique challenge to health care systems. Participants highlighted several areas as being high priority for new workflows, policies, and procedures, including:

• *When and how to incorporate patient preferences and goals into decision-making.* The extension of PC CDS outside of the clinic and into the patient lifeflow expands the opportunity to incorporate patient-generated health

Table 3. Summary of stakeholder perspectives of the current state and future challenges for PC CDS.

Key theme	Perspectives on the current supportive PC CDS environment	Challenges for PC CDS developers and stakeholders moving forward
Gathering patient-contributed data and creating meaningful feedback loops between patients and clinicians	• Value-based care is driving a shifting mindset amongst clinicians and health systems towards patient-centered care.[6] • There is a growing number of digital tools available to gather patient inputs inside and outside of clinical settings that can facilitate communication and care planning when shared with their clinicians.[7,8]	• Patients often contribute data via apps and other digital tools that are subsequently not reviewed by clinicians or integrated into the care process.[9] • There is a need to explore how data collected from patients can be integrated into PC CDS tools and used to create meaningful feedback loops between patients and their clinicians.
Workflows, policies, and procedures for PC CDS	• Patient data vary by frequency and volume depending on the patient's conditions and types of data they want to share (eg, health history, biometric, and health activity). • Health care systems are adopting various approaches for incorporating patient-generated health data into routine care.[10]	• Large volumes of data from digital tools are difficult to integrate into EHRs in an actionable way, and some clinicians have concerns around additional burden to review and act on patient data.[11] • Current workflows in most health systems are not set up to receive and manage patient-contributed data outside of the clinical encounter.[12]
Expand the evidence base for PC CDS tools	• PC CDS is a new and emerging field and there is excitement to build the evidence base for the successful use of these tools. • Federal efforts from AHRQ and the Assistant Secretary for Technology Policy and Office of the National Coordinator for Health Information Technology aim to build standards for evidence-based PC CDS.[13–15]	• There is limited information on best practices and guidance for implementing PC CDS. • There is a lack of validated studies and measures for PC CDS in different settings (including low-resource settings) and for a range of use cases.
CDS Five Rights for patient-centered CDS	• The CDS Five Rights (the right information, to the right person, in the right intervention format, through the right channel, at the right time in the workflow) have guided successful CDS implementation thus far.[16]	• The CDS Five Rights apply differently in the context of PC CDS when the patient or caregiver is the receiver. • There is a lack of validated frameworks and guidance on how to make PC CDS "fit for purpose," or how solutions will work for each patient given their specific needs and preferences.
Collection of SDOH and health equity data	• The Assistant Secretary for Technology Policy and Office of the National Coordinator for Health Information Technology is exploring ways to better capture SDOH data and incorporate it into patient care by establishing new standardized data elements on SDOH Goals[17] and assessing guideline recommendations that reference SDOH for standards-based CDS implementation.[18]	• There are concerns around integrating SDOH data into the clinical workflow, clinician burden, and lack of trained staff to collect and act on this information. • Some EHRs lack the capability to store SDOH data in a standardized format and transmit referrals for social services. • There are concerns around PC CDS tools leading to greater inequities in care if not developed, tested, and deployed considering diverse patient populations and low-resource settings.
Stakeholder perspectives of use of AI for PC CDS	• The emergence of AI has potential to improve patient and clinician outcomes, reduce health care costs, and impact population health.[19] • Federal efforts include the Assistant Secretary for Technology Policy and Office of the National Coordinator for Health Information Technology's new rule revising the existing CDS criterion to include AI[15] and the Food and Drug Administration's clarified guidance for AI and machine learning technologies that qualify as a medical device.[20]	• There is limited data on patient and clinician perspectives on the use of AI in health care and how to maintain trust in healthcare.[21] • More effort and guidance will be needed to minimize disparities driven by health technology and predictive algorithms.[22,23]
Encourage widespread use and scalability of PC CDS	• The federal regulatory landscape has introduced standards and harmonization that support the scalability of PC CDS. For example, the Health Level Seven International CDS Hooks, which embeds functionality within a clinician's workflow of an EHR, has a "patient-view" that triggers when a patient chart is opened and sends basic information about the patient.[24]	• While there are public repositories of CDS artifacts, local customization is often needed to support the adoption and use of CDS artifacts.[13] • There is a lack of guidance for articulating the value of PC CDS. • There are limitations with writing data to the EHR via FHIR application program interfaces. • There is a need to disseminate and scale PC CDS beyond one-time pilot studies.

Abbreviations: AI = artificial intelligence, AHRQ = agency for healthcare research and quality, CDS = clinical decision support, EHR = electronic health record, FHIR = fast healthcare interoperability resources, PC CDS = patient-centered clinical decision support, SDOH = social determinants of health.

data, patient-reported outcomes, patient preferences, and goals into the decision-making process.

- *How to monitor and manage patient-contributed data outside of routine hours of operation.* New workflows and policies will be needed to triage and act upon potentially life-threatening conditions identified through patient data received between patient visits and outside of regular office hours. Some health care systems have established their own triage teams and others have opted to work with third-party remote patient-monitoring companies that offer services for patients with connected medical devices.[10]

- *How to manage large volumes of patient-contributed data.* High volumes of patient-contributed data, especially physiologic data from remote devices, presents significant challenges for data integration and display within EHRs. Guidelines will be needed to determine the best methods and tools for visualizing patient-contributed data and how they can be effectively summarized and integrated into clinician workflows.

The PC CDS community can develop new resources and guidelines for these key areas.

Expand the evidence base for PC CDS tools

The meeting sessions highlighted several federal initiatives that aim to build standards for evidence-based PC CDS. AHRQ's PCOR CDS Initiatives such as CDS Connect,[13] the Center for Evidence and Practice Improvement Evidence Discovery and Retrieval,[14] and other demonstration projects aim to translate PCOR evidence into practice. In addition, the Assistant Secretary for Technology Policy and Office of the National Coordinator for Health Information Technology proposed a new rule that outlines criteria for CDS tools that support patient-centeredness.[15] It states that new predictive decision support interventions must be transparent about source attribution information, including patient demographics and SDOH data elements, to determine whether the predictive decision support intervention abides by FAIR principles (findable, accessible, interoperable, reusable).[28]

Despite these efforts, there is still a lack of robust evidence for successful PC CDS in practice. Participants suggested that the PC CDS community conduct demonstration projects of PC CDS tools (including the various products developed by the CDSiC) to understand barriers and opportunities for implementation, noting that resource-limited settings should be considered to ensure underserved communities benefit from PC CDS. They also discussed how the PC CDS community could design and conduct real-world PC CDS pilots exploring use cases involving, (1) prevention, as these types of interventions position PC CDS to better promote positive health outcomes, (2) advance directives, as they are an important way to respect patient preferences and can drive PC CDS, (3) symptom-based interventions, as patient-reported outcomes are increasingly being captured but are underutilized in PC CDS, and (4) wearable activity tracker interventions, which explore how data from fitness trackers or other wearable devices can be integrated into patient care.

Develop resources that adapt the CDS Five Rights for the patient perspective

Participants noted that the CDS Five Rights, while still highly applicable, need to be thought of in an expanded manner when the recipient of the PC CDS intervention is the patient and not the clinician. The five rights specify how CDS tools should communicate the right information, to the right people, in the right formats, through the right channels, and at the right times in the workflow.[29] Typically, these principles are applied for physicians in defined healthcare settings and can be aligned with their workflow, but as one stakeholder said, "healthcare should be viewed as a team sport," and PC CDS should be broadened to focus on non-physician care team members and patients. Specifically, the right information should incorporate patient-centered information like patient-generated health data. The right person may extend to caregivers as well as patients and caregivers, depending on the patient. The right format and the right channel should consider patient preferences. For example, patients may prefer receiving information via an app on their smartphone versus logging into their patient portal. Finally, the right time in the workflow should be inclusive of accounting for the patient's daily activities (ie, the patient lifeflow). The CDSiC has produced several resources advancing the development of PC CDS tools, including an infographic explaining the CDS Five Rights that could be adapted for the patient perspective.[30]

Develop resources and tools that support the collection of social determinants of health (SDOH) and health equity data to drive clinical decision-making and lessen the digital divide

Participants acknowledged that progress has been made in advancing health equity and standardization of the collection of SDOH data through the Gravity Project, United States Core Data for Interoperability, and other efforts,[31] but they considered additional ways in which SDOH data can be more effectively used in PC CDS tools. Meeting participants raised that when collecting SDOH data, it is important for clinicians and health systems to acknowledge that the patient has a need and to take appropriate action. Participants noted that there are several challenges with collecting SDOH data, including integrating this into the clinical workflow, concerns around clinician burden, and lack of trained staff to collect this information. Participants also acknowledged that, currently, there are limitations within EHRs to store SDOH data in a standardized format. In addition, participants noted that EHRs may lack the capability to transmit referrals to social service organizations and receive an acknowledgement that a service has been provided to the patient. Furthermore, clinicians are often lacking resources to refer patients to services, and there are ethical dilemmas with asking patients questions without known solutions or resources. The PC CDS community can explore the development of relevant resources and tools to support the collection and use of SDOH data in PC CDS, such as tools that focus on preventative care and upstream drivers of health.

Participants also discussed ways to design PC CDS tools for individuals with limited digital and health literacy that may be excluded from knowledge dissemination and communication efforts driven by PC CDS. Digital health literacy can be improved through user-centered design approaches to make tools more accessible and interpretable, collaborative learning models to improve self-efficacy, and learning opportunities to provide education.[32] Given that the digital divide disproportionately impacts rural populations, racial/ethnic

minorities, and those with limited English proficiency, their input in developing PC CDS tools will be critical.[33]

Explore patient and clinician perceptions on the use of artificial intelligence (AI) in decision support tools

Participants discussed potential ways AI can facilitate collection and use of patient information for PC CDS. As a few examples, large language model tools can mine free text from progress notes in EHRs and could identify a social need that would inform more personalized care.[34] AI can support chatbots and other tools that communicate with patients through patient portals or text messaging services to gather context specific patient information and send the information to their clinician to minimize delays in communication.[35] AI scribes and ambient technologies can be used to transcribe patient-clinician dialogue during appointments and generate summaries embedded in the EHR, allowing clinicians more time to spend with the patient. Predictive AI/machine learning algorithms can drive CDS by predicting health outcomes and diagnoses, such as the onset of sepsis in intensive care units[36,37] and COVID-19 induced pneumonia.[38]

Participants discussed how given their network of patient representatives and advocates, the CDSiC is uniquely positioned to explore patient perspectives on the use of decision support tools driven by AI. They also discussed ways to prevent patient mistrust in PC CDS tools that incorporate AI, such as engaging patients in the co-design and co-implementation of these tools, incorporating AI without replacing human relationships and judgements, developing tools and resources to support the adoption and use of AI in health care, and exploring new ways to request consent for access to patient information for use in AI.

Encourage widespread use and scalability of PC CDS

Participants considered ways to leverage public and private partnerships to further advance PC CDS. They believe engaging EHR vendors and application developers will be critical to solving issues related to scalability. Additionally, while many PC CDS resources exist, they are often stored in large repositories that are not searchable and require additional interpretation and customization to use them. Commercial and community stakeholders may be able to expand dissemination efforts for public use.

Participants discussed the importance of scaling PC CDS interventions, which may require articulating the value of PC CDS to clinicians and healthcare organizations. PC CDS developers need more resources such as discussion guides on how to communicate the improvements in quality of care, cost-benefit analysis, and return-on-investment due to PC CDS. To guide these conversations, there is a need to develop specific measures to objectively assess the value and impact of PC CDS interventions.[39]

To scale PC CDS using patient-generated health data, participants called for more foundational work on improving the speed at which application program interfaces access EHR data and improving write back capabilities to EHRs. Most EHRs currently lack the infrastructure needed to receive, store, and display patient-generated health data that are easily accessible and interpretable by clinicians, which prevents integration into clinician workflows.[2] The PC CDS community could design and conduct more projects using Fast Healthcare Interoperability Resources (FHIR) standards to identify gaps and develop solutions for representing patient data in EHRs.

Finally, participants discussed the difficulties of translating PC CDS interventions from pilot studies into widespread clinical adoption. Oftentimes, it is challenging to sustain projects after the pilot period, particularly if they are designed for a specific clinical use case. The field should look to implementation science to help bridge the gap between pilot implementation and scalability.

Conclusion

The inaugural CDSiC Annual Meeting prompted many thought-provoking discussions on the current state and future directions of PC CDS. The meeting highlighted 7 key opportunities that can propel PC CDS forward. Leveraging its role in engaging a broad stakeholder community of EHR developers, clinical leadership, researchers, patients, and policymakers, the CDSiC is ideally positioned to bring together multi-disciplinary expertise to examine and address the health care system's latest challenges. This includes addressing crucial opportunities like developing practical tools and guidance for articulating the value of PC CDS, gathering patients' perspectives on how AI can facilitate patient-centered care, and building off the work of the Gravity Project to operationalize SDOH data in PC CDS. The Collaborative can also assess best practices for capturing and visualizing patient-generated health data in a comprehensible and actionable way, such as for tracking and managing chronic diseases that generate large volumes of data over a patient's lifetime, and conduct more pilot studies that explore broader issues such as writing back data to EHRs. Addressing these areas is essential to cultivating patient trust in PC CDS and improving its scalability.

In the closing remarks, participants responded with optimism and strong support for more meaningful engagement in all aspects of PC CDS design, development, implementation, and use. Patient representatives emphasized the need for bold, innovative solutions to ensure that patients' and caregivers' voices are meaningfully included to further advance patient-centered care. This will require contributions from many public-private partners invested in improving the health and wellbeing of patients.

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Data availability

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