The Role of Clinical Care Pathways
in Diabetes Management

A Guide to Designing a Clinical Care Pathway at Your Institution

Benefits

Expert Insights

Roadmap

Checklist

A **clinical care pathway**, also known as a care pathway or integrated care pathway, is designed to guide clinicians regarding the optimal approach to treatment selection for a patient with a specific condition or disease, with the primary goals of improving quality of care, reducing variations in clinical practice, and promoting efficient use of health care resources.[1] Based on evidence-based clinical practice guidelines, clinical care pathways include recommendations for screening, diagnosis, monitoring, treatment goals, and interventions over the course of a disease or continuum of care, and thus have the potential to influence quality of care and patient outcomes.[1] Clinical care pathways for chronic conditions such as type 2 diabetes are designed to provide different levels of support across multidisciplinary teams throughout the disease continuum, from precursor risk to advanced disease.[2]

Benefits of Clinical Care Pathways

Reflecting the best clinical evidence available, clinical care pathways can provide health systems with a roadmap for providing the most appropriate treatment based on the latest clinical evidence and current guidelines, delivered in a timely manner and without unnecessary variation.[2] Outcome metrics that show optimization of delivery of care may include: clinical outcomes, patient knowledge and self-management, implementation of evidence-based practices, and level of multidisciplinary teamwork.[2]

Standardized clinical care pathways that reduce variation in treatment and improve adherence to evidence-based guidelines among providers in a health care system may in turn reduce cumulative incidence of diabetes-related complications and all-cause mortality, reduce cardiovascular risk,[3] and result in health care savings.[4]

According to 2017-2018 CDC data on adults diagnosed with diabetes in the United States, target goals for A_{1c} (< 8%), blood pressure (< 140/90 mm Hg), and cholesterol levels (non–high-density lipoprotein < 130 mg/dL) were met by 75%, 70%, and 56% of patients, respectively.[5] However, just 26% met all 3 care goals and were nonsmokers, highlighting the potential to increase the proportion of patients who achieve multiple target goals for diabetes management.

Although numerous interventions to improve adherence have been implemented, a highly fragmented care delivery system that lacks clinical information capabilities, duplicates services, and is poorly designed to coordinate delivery of chronic care remains a major barrier.[6] The implementation in health care systems of standardized clinical care pathways based on guideline-recommended targets and goals of diabetes care may help bridge this gap to delivering optimal care for patients. Well-developed multidisciplinary clinical care pathways provide structure when choosing an individual's care plan, while keeping important considerations at the forefront.

Developing Clinical Care Pathways in Diabetes

The primary goal for management and treatment of diabetes is to prevent or delay complications and maximize quality of life.[6] Evidence-based guidelines from leading organizations such as the American Diabetes Association (ADA), the American Association of Clinical Endocrinology (AACE), and the American College of Endocrinology (ACE) provide a framework for developing clinical care pathways for populations with diabetes. In 2015, AACE and ACE published joint guidelines for developing a comprehensive care plan for diabetes.[7] In 2020, as a supplement to the 2015 guidelines, AACE and ACE jointly published an algorithm for the comprehensive management of patients with type 2 diabetes.[8] This algorithm provides clinicians with a practical guide to comprehensive management of the entire patient and uses evidence-based approaches to treatment that take into account individual risks and complications.

The latest ADA guidelines (2021) suggest a patient-centered approach to the management of diabetes, using a chronic care model that involves close working relationships between patients and clinicians. The chronic nature of diabetes and its multiple associated comorbidities warrant a multidisciplinary approach to management, which may include physicians, nurse practitioners, physician assistants, nurses, dietitians, exercise specialists, pharmacists, dentists, podiatrists, and mental health professionals.[6]

Although health systems create clinical care pathways for diabetes management based on information from the ADA and AACE/ACE guidelines and cost-benefit analyses of treatment, variability in following best practices may depend on several influences. These include health system formularies, differences in stated goals, composition of multidisciplinary teams, patient characteristics, number of patients, and treatment settings. This variability can occur even among clinical care pathways considered to reflect "good practice."[9] Therefore, considering variances in clinical care pathways and working toward a standardized approach to care may be beneficial.[9] The availability of treatment options may be limited by an approved formulary, value-based agreements with the manufacturer, or the limitation of treatment options to those available on the electronic health record, introducing variability into management pathways among health systems. Moreover, affordability of diabetes medications can be a substantial barrier to achieving glycemic goals. Therefore, considering variances in pathways and working toward a standardized approach to care may be beneficial.
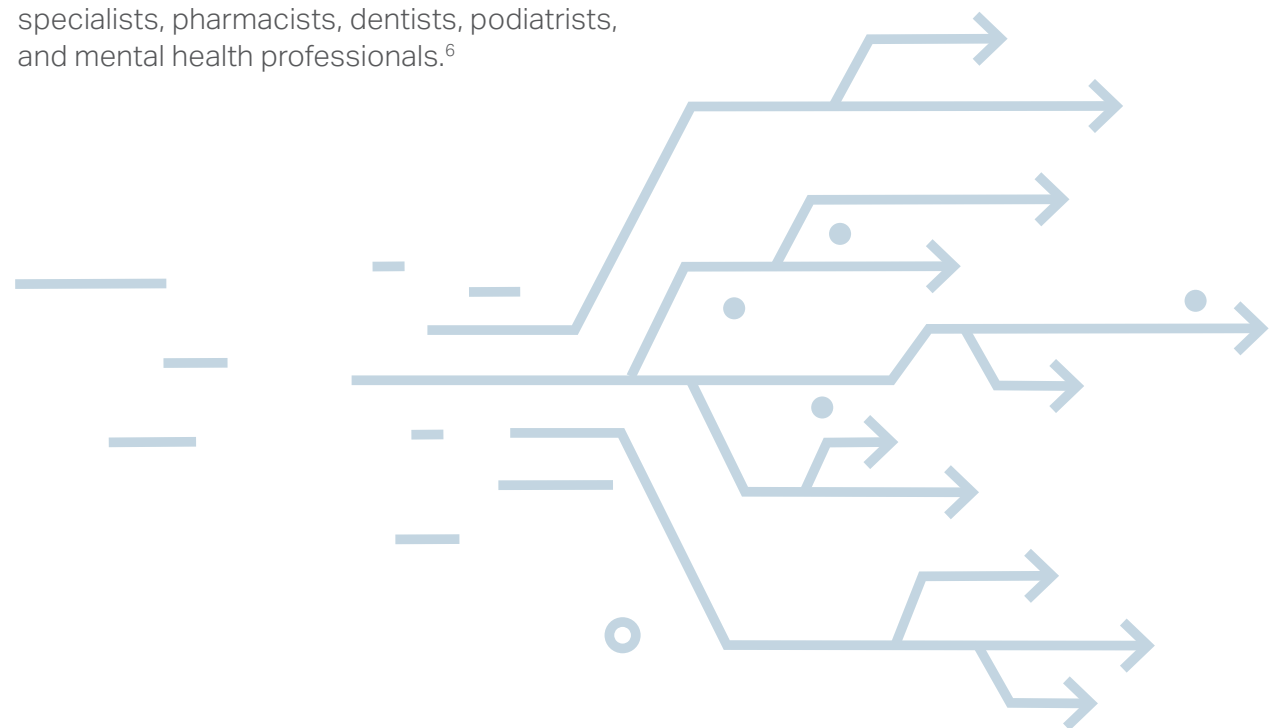
Implementing Clinical Care Pathways in Diabetes

Clinical care pathways include evidence- and expert-driven recommendations and are evidence-driven, multidisciplinary and collaborative, electronically-integrated, outcome-oriented, and reflective (see **Table**).[9] As an agreed-upon plan for clinical management of a group of patients with a particular medical problem, a clinical care pathway provides a multidisciplinary template of the plan of care for leading each patient through the health care system to a desired outcome. In diabetes, this includes monitoring of complications,

escalation of glycemic-control treatment, dietary management, and achievement of identified treatment goals.[2] Although treatment guidelines, which are embedded into the clinical care pathway itself, are usually developed in a top-down fashion, clinical care pathways are more often developed from the bottom up so they closely fit the configuration of the particular health care organization. Adaptations for particular institutional cultures can be accommodated by including local teams in the creation and implementation of the clinical care pathway.[10]

Table. Key Features of Clinical Care Pathways[9]

Feature	Explanation
Evidence-driven	The best evidence available are utilized to develop the clinical care pathway in the content of the local institution and to define the roles, tasks, responsibilities, indicators, and targets.
Multidisciplinary and collaborative	Input from different medical disciplines across the health system, public stakeholders, and patients are elicited, considered, and incorporated.
Electronically-integrated	A computerized system for process monitoring should be utilized to assess disease dynamics, the application of the clinical care pathway, management costs, and objective achievement.
Outcome-oriented	Quantitative and qualitative information including patient-reported outcomes should be identified and measurable so that the health system can assess its progress and identify areas of needed improvement.
Reflective	Organizational, financial, and technological needs should be assessed to determine areas of improvement. Education programs for health care providers, public stakeholders, and patients should be developed and ongoing.

The Importance of Multidisciplinary Involvement

Multidisciplinary involvement is essential to the development and launch of a successful clinical care pathway, since implementation depends on both clinical service providers and managers. Engagement of staff in all areas is necessary at each stage, from adoption to implementation to maintenance.[10] A review of 32 studies of integrated care interventions for type 2 diabetes, published in 2016, found that most facilitators to the implementation process were found at the social context level, including staff involvement in decision-making and planning, the ability to recruit committed staff and ensure buy-in, good leadership, and intra- and inter-practice cooperation and sharing of resources.[11]

These findings align with those of the ADA, which lists delivery system design in which medical visits are coordinated with a team-based approach, decision support based on evidence-based guidelines, clinical information systems that can provide both patient-specific and population-based information, and a quality-oriented culture among the core elements of its Chronic Care Model. Expanding the role of teams in implementing more intensive disease-management strategies, implementing electronic health records, and tracking medication history at a systems level are key to improving the quality of diabetes care overall.[6]

Addressing Barriers to Successful Implementation of Clinical Care Pathways

Barriers impeding adoption of clinical care pathways may occur at the level of staff (clinician or management) or health care organization (management, resources, or institutional structure). They may also be influenced by external factors, such as social policies or patient characteristics.[10] Analyses of situations in which guideline implementation failed to achieve the desired outcomes concluded that factors such as patient education and

communication, doubts among physicians about the validity of the recommendations, overly complex algorithms for diagnosis and treatment determination, excessive workload for physicians, and demands for unnecessary tests by patients need to be considered when developing clinical care pathways.[12] Furthermore, diabetes has multiple potential comorbidities and related complications; effective management of patients requires a collaborative care approach with providers from multiple specialties, including diabetes care and education specialists, physicians, nurse practitioners, physician assistants, nurses, dieticians, exercise specialists, pharmacists, dentists, podiatrists, and mental health professionals.[6] Therefore, a clinical care pathway for diabetes needs to address these complexities of care and encourage all stakeholders to buy into it.

In the following text, experts from **Cleveland Clinic, Geisinger**, and **Primary PartnerCare**, discuss how they implemented clinical care pathways for diabetes treatment at their institutions. Guidance on implementing clinical care pathways into the electronic health record system is provided by experts from the **Cerner Corporation** and **Epic Systems Corporation.**

Primary PartnerCare found similar results when looking at their data, according to **Marion Davis, MBA**, chief executive officer, "The physician leadership was clearly surprised that some patients with diabetes were only getting one A_{1c} [measurement] per year. What the physicians think they are doing is not always what they are [actually] doing. Having population-level data really helps change behavior and focus their attention."

> **We are seeing literally an explosion in [new] diabetes medications.**
> Harry Jacob, MD

Assess Your Populations

The experts agreed that the first step in establishing a clinical care pathway in diabetes is to focus on primary care physicians (PCPs). "Primary care manages 90% of the patients with type 2 diabetes," said **Kevin Pantalone, DO, ECNU, FACE,** director of diabetes initiatives, and staff endocrinologist in the department of endocrinology at **Cleveland Clinic.** Clinical care pathways are designed to help guide treatment decisions, particularly at a time where multiple treatments are available to meet different needs. "We are seeing literally an explosion in [new] diabetes medications," **Harry Jacob, MD**, chief medical officer at **Primary PartnerCare** explained. "It is becoming increasingly difficult for PCPs to know which treatments to prescribe.

Developing a clinical care pathway that meets the needs of a specific institution's patient population is important and may require combining recommendations from multiple guidelines. The diabetes clinical care pathway at Cleveland Clinic combines the ADA, the American College of Cardiology (ACC), and the AACE/ACE guidelines to aid PCPs in sifting through the recommendations and making a decision that is right for their patients.

"Compared with when they were first introduced, now the guidelines are similar," said Pantalone. "But then you add in the American College of Physician's (ACP) guidelines, which suggest A_{1c} targets of 8%,[13] which was against what the ADA

was saying, and I think you can appreciate if you are a [PCP] and you are hearing different things from different organizations, you say, 'What's the right thing to do?' Overall, that was leading to a lot of the therapeutic inertia."

> **Therapeutic inertia** refers to the point at which providers fail to intensify therapy in a patient even though it is indicated by an elevated A_{1c}.[14]

"[At Cleveland Clinic,] we found a very high rate of therapeutic inertia, where patients were being seen [by providers] and their A_{1c} was above target, yet when we looked [at data] 6 months after the visit, we did not see any evidence of an intervention," Pantalone explained.

He went on to explain that there is a tendency for patients and providers to feel that they are providing better care than they are. Moreover, patients and providers will often talk themselves out of intensifying treatment. "For example, the patient may say, 'Dr Smith, it was the holidays. I'm really going to try, give me a second chance. I don't want any more meds,'" Pantalone explained. "However, when you look back, the patient's A_{1c} has been above goal for 2 years." He went on to say, "Generally speaking, when an A_{1c} is above target, without an intervention being performed, it will either remain elevated or slowly worsen; it's not magically going to get better."

Assemble All Stakeholders

"Collaboration between specialty and primary care in developing and implementing these clinical care pathways is a must," said **Christopher Babiuch, MD,** medical director of specialty integration at **Cleveland Clinic**. "Each group brings certain perspectives and needs to the table. Understanding these allows for a better end product. For example, hypertension control is key to improved cardiovascular outcomes. Multiple touch points to manage this improve the likelihood of good control. When a patient is identified as having uncontrolled hypertension in the endocrinology office, communication between teams ensures faster medication titration and follow-up than if we were not working as a team."

Anita D. Misra-Hebert, MD, MPH, associate professor of medicine at the **Cleveland Clinic** Lerner College of Medicine of Case Western Reserve University and center director of the Healthcare Delivery and Implementation Science Center, also at Cleveland Clinic, echoed Babiuch's comments. "Collaboration between primary care and endocrinology is critical to achieve optimal diabetes care outcomes," she explained. "We are fortunate that, within our integrated health system [we have] a shared electronic medical record; communication can occur seamlessly." Although the primary care and endocrinology departments have the same goals of optimizing diabetes care, she said, clinical workflows may differ significantly between the 2 specialties. "Through close

collaboration, workflows can be optimized [to] both settings with coordinated and appropriate management."

Ensuring pharmacists are also part of the care plan can aid in maintaining an optimal standard of care. According to **Diana Isaacs, PharmD, BCPS, BC-ADM, BCACP, CDCES,** a clinical pharmacy specialist and the continuous glucose monitoring program coordinator at **Cleveland Clinic**, "It is easy [for a provider] to become complacent when a patient has their A_{1c} close to goal. But what we know now is that when patients have heart failure, high cardiovascular risk, or already established cardiovascular or kidney disease, irrespective of their A_{1c}, we should be putting them on [different treatments]."

Create Committees

Engaging stakeholders involved in initiating the clinical care pathway in teams can ensure all stakeholders' goals are met. One way to do this is to establish committees, said **Juliann Molecavage, DHA, MHA, BSHCM**, associate vice president, quality & primary care services at **Geisinger**. "Our diabetes transformation committee includes endocrinologists and a quality medical director, nurses, pharmacists, and dieticians, all working together utilizing their content expertise and to develop the pathway." The committee meets monthly to review analytics and ensure the clinical care pathway is having a positive impact, she added.

Emily Barey, MSN, vice president at **Epic**, agreed that it is important to gather all stakeholders and work to achieve consensus. "Like any good process improvement work, it starts with an executive sponsor, a physician champion pulling in key stakeholders," she said, adding that project management support is also important. After workflows have been analyzed and clinical best practices have been established, "operationalizing [the clinical care pathway] takes project management to coordinate all the stakeholders and the decisions, not just regarding the handoffs but also for coordinating the care. Oftentimes, that is a big paradigm shift for many organizations to make.

Determine Electronic Health Record Capabilities

Implementation of clinical care pathways into the electronic health record system is key to ensuring decisions can be made in real-time at the point of care. For this reason, the team at Geisinger ensures that information technology (IT) staff are involved in development meetings. "We include an IT member in the actual meetings to help us understand what [our electronic health record vendor] allowed for," Molecavage explained. It is important to ensure that point-of-care tools, such as best practice alerts (BPAs) and health maintenance topics, definitions of patient population, and testing intervals are all aligned in the electronic health record, she said.

The electronic health record system is also important for ensuring the adaptability of the care plan across multiple encounters in the organization. "One of our most important learnings from our initial implementation of an electronic medical record tool to improve diabetes management was the need to adapt our educational tools to be available asynchronous to the actual office visit," said Misra-Hebert. For example, she explained that because diabetes management decisions often are made in response to a subsequent A_{1c} result and reconsidered at the time when a refill on a current medication is being requested, or when a patient may be communicating blood sugar results through the electronic record, having an integrated clinical support tool available at those times, as well as during an office visit, may substantially affect provider uptake and improve diabetes management overall.

A number of electronic health record systems have been developed to be able to handle clinical care pathway integration. "Our care pathway framework allows us to build, or the client or third-party companies to build algorithms, questions, answers, prompts, recommendations, and treatments into the Cerner environment natively, to cover not just diabetes, but other chronic conditions," said **Jeffrey Wall, MD**, senior director, clinical innovation, at **Cerner Corporation**, a health information technology company.

Development of the clinical care pathway in the electronic health record also necessitates a strong relationship with an electronic health record vendor, as well as physician leaders who will meet with the vendor. "Your ability to alter your electronic health record is somewhat limited to what [your] vendor can allow you to do," Pantalone explained. "It may sound silly, but an extra click can be a huge barrier if you do not have the ability to make the adjustments. It is very important for organizations to have a good relationship with their electronic vendor and have a vendor that continuously tries to improve its products. With continued dialogue with [our vendor] and using our physician leaders who oversee leading our enterprise-wide electronic health record, we have been able to slowly but surely make the changes necessary to help improve care."

"Frequently, the hardest part is putting your providers in the room and getting them to agree," according to Wall. "[But] that's what you must do; that governance is important."

Health information technology organizations work to have meaningful conversations with their physician clients to understand the adjustments that are needed in the electronic health record to best meet the needs of the provider and patient populations. "We will ask the physician if the issue stems from a compliance problem or a care variance problem," explained **David Nill, MD**, vice president and chief medical officer at **Cerner Corporation**. "From there, we can then drill down and say, 'Okay, what do we need to standardize for the providers? Where are they tripping up?' Notably, it is at that point where care pathways can help nudge providers in the right direction."

Determine Funding Sources

Cost can also be a barrier to the implementation of clinical care pathways. Some organizations may have the opportunity to apply for grants or other philanthropic sources to fund their clinical care pathway. "Our intensification tool project was funded by a grant through a pharma company," Pantalone said. "They were very concerned about the high rates of therapeutic inertia. In addition, [Cleveland Clinic] has a very strong philanthropy base. I can appreciate where smaller organizations may struggle to try to develop these types of system-wide intervention simply because of the resources being more limited."

The implementation of clinical care pathways at an organization requires buy-in from several different stakeholders, which can be a challenge; however, bringing in the right individuals early in the process can help stave off a number of issues. "The sooner you get started on [development], the better," Pantalone explained. "There is a lot of red tape, there are a lot of stakeholders, and it takes time to slowly move through the bureaucratic process. With billing, nursing, etc, there are a lot of resources that need to be allocated."

Molecavage agreed that many organizations do not implement clinical care pathways because they have limited resources. "You must spend money to make money sometimes," she said. "However, [that can be] difficult for organizations that are smaller or that do not have a structure in place. We're lucky; Geisinger's a large system, so we can tap into resources that not all areas have." She suggests that smaller health care systems incorporate discussions on implementing clinical care pathways into existing physician meetings. "We would also start with the leaders. The leadership in community medicine would be sort of the stakeholders. We would present it to them and help them understand the importance of it and what the workflow is, so they're the ones who are helping to support it with the frontline physicians, getting it to the department meetings."

Build the Clinical Care Pathway

One of the first steps in building a clinical care pathway is focusing on a few key goals. "Most of our customers who have started down the path of using a clinical [care] pathway have done so with quality, cost, and patient experience in mind," said Barey. "Nonetheless, [it is advisable] to usually start with 1 or 2 [goals] to get a template approach to understanding how to solve the process problem, and then reaffirm that all departments are on the same page. Then determine how to use technology to make it highly reliable, measurable, and as efficient as possible."

One of the main goals of the clinical care pathway program at Cleveland Clinic was to overcome therapeutic inertia by making sure that elevated A1c levels were brought to the attention of each health care professional the patients encountered. "If we only make a change when a patient is in front of us [specialists] in the office, we are not going to make much progress because most patients may only see

us 2 or 3 times a year at most," said Pantelone. For that reason, alerts were implemented in the electronic health record system to ensure each person seeing the patient is aware of an elevated A1c. "Whether it's the PCP, me, or the pharmacist, if someone sees that the control is not good, even if [we] do not have time to deal with it that day during the visit for back pain, [we ensure] that we refer the patient or do something to ensure that they are intervened upon by another means within the next couple of weeks to months." For example, if a patient has had an A1c of 8% or higher for 6 months, a BPA will pop up in the electronic health record. The provider can then consult an endocrinologist, nutritionist, diabetes educator, or pharmacist, and place medication orders directly from the electronic health record.

The overall goal of the clinical care pathway is to make prescribing easier for PCPs, who can sometimes be overwhelmed by the number of medications available for diabetes. "Embedded in our electronic health record, we have 5 goals of care from which a provider can select which goals are most important for that particular patient," Pantelone explained. When a provider chooses 1 of the goals of care—A1c reduction, weight loss, hypoglycemia, costs (medication costs), and cardiovascular risk—the intensification tool lists the drug classes (in descending order, based on recommendation) that will help the patient attain that goal. If a provider chooses multiple goals (eg, weight loss and A1c reduction), the tool lists medication choices that would help attain all of the goals selected.

Geisinger has followed a similar approach, according to Molecavage. "We worked with both endocrinologists and our PCPs to come up with a pathway for first-line and second-line medication and treatment for our patients with diabetes, as well as the right time to refer [to an endocrinologist] and then transition the care back to primary care. They were able to do so in a way where the PCPs had a good feel for what that care plan is, and they could then go

ahead with the treatment." For example, BPAs were added to the electronic health record that would alert the user that a patient had not had their A1c checked in the last 6 months, or that a prescribed medication was not on the active list. "If the patient was not on a [recommended] medication, the alert would prompt an order set, which would go through the first-line and second-line medications," she explained.

The creation of patient registries is also a key goal for monitoring high-risk patients and ensuring an organization remains in contact with them. "[Through our] diabetes registry we were able to identify those patients with an A1c above 9%, for example," Pantalone said. "About 10% of patients had A1c above 9%, which translated to about 7000 patients. [That is] a tremendous opportunity to engage with patients."

Another goal making sure that Cleveland Clinic had ambulatory care pharmacists embedded at most of its family health centers. "[They] were well-versed in diabetes and hypertension management," Pantalone explained. "Embedding them in the community family health centers was very important as this would be a means for PCPs to help refer their patients and to help assist with diabetes management as well as blood pressure control."

Determine Referral Pathways

Part of the clinical care pathway at Cleveland Clinic is identifying patients who are newly diagnosed and referring them to a specialist, then being very aggressive in terms of a structured follow-up program for 6 to 9 months to get the patient's A1c under control before transitioning them back to primary care. Pantalone explained that the goal is to have specialists returning to acting as a consultant, which can only be achieved by referring the patients early on, intervening where necessary in treatment, and then transitioning back to primary care. "These pathways and processes must be developed through a strong collaboration with primary care to ensure their effectiveness and compliance by all parties involved," he said. "This strong collaboration at Cleveland Clinic is referred to as the 'Diabetes Neighborhood,' and leaders from pharmacy, primary care, endocrinology,

etc, meet weekly to review the progress and implementation of the various initiatives being developed. This helps to ensure the early referral of patients with uncontrolled type 2 diabetes to the specialists, followed by a smooth and clear transition back to their primary provider once the goals of care have been met."

"One of the biggest things we've noticed in developing a registry is we've been able to identify patients and a pathway for referral," he said. "[For example,] a patient with an A1c above 9% for 6 months would be referred to an endocrinologist. After that appointment, the patient will follow up with a pharmacist or nurse practitioner within a month, then follow up with a mid-level provider in 3 months, and then ultimately come back to see the physician at 6 months. The goal is to then have the patient's A1c be at target and to transition them back to primary care. We are trying to get patients referred early in the [course of the] disease where we feel we can have the biggest impact as a specialist team and then get them back to their PCP for ongoing management."

Isaacs explained that the collaborative practice agreements among pharmacists in Ohio enables them to serve as mid-level providers who are able to adjust medications. Thus, pharmacists can interact with patients in between their usual care visits and provide medication intensification support, as needed, an important part of Cleveland Clinic's diabetes clinical care pathway.

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> Juliann Molecavage, DHA, MHA, BSHCM

The value of having a pharmacist as part of the clinical care pathway is that pharmacists have specialized knowledge of medications, she explained, which can help providers save time in looking up information about drug interactions, adverse effects, and more. "Combined with the ability to be able to adjust the medications, [the availability of a pharmacist] helps to overcome therapeutic inertia and helps to get patients to their glucose targets more quickly," she said.

Determine How Success Will Be Measured

The determinants of success should be decided before implementing the clinical care pathway and agreed upon by all stakeholders. Consistent metrics are important, advised Barey. "That process can be a challenge; oftentimes groups use different metrics as a baseline for what a successful diabetes care looks like," she said. Different plans, payers, and contracts specify different numerators and denominators for success, and the more these can be standardized into a single metric, the easier it is to gain support among staff. "It is hard to receive 4 different report cards on diabetes care, or any chronic disease," she explained. "In my experience, the groups that completed that normalization [upfront] have been more successful in bringing people along."

"Everything we do, we try to incorporate analytics with it because you cannot improve what you cannot measure," added Molecavage. It is important to identify groups of individuals who

are doing well and those have opportunities for improvement. "We will work with them to understand: Is it that they are not following the process, or that they are not [completing] the workflows? Do their populations have the resources they need? Understanding that compounding factors come into play is important, and a lot of that goes back to the leaders being responsible and holding them accountable."

The team at Geisinger has implemented analytics at the regional, site, and provider levels to find deviations from the clinical care pathway. It is then the responsibility of the respective medical director or clinical leader to follow up and determine why the deviation is occurring. National Committee for Quality Assurance benchmarks are employed to ensure the program is paying off. "For A1c levels greater than 9%, our benchmark is 14%, meaning 86% of our patients should be at less than 9%. If it's neuropathy screening, we should have 90% of our population living with diabetes [passing] that. Geisinger's not coming up with what we think we should be doing; we are relying on the regulations and the national bodies to do that," Molecavage added.

Develop Educational Materials Needed for Rollout

Education initiatives that meet the needs of the institution must be developed and put in place in time for rollout. "I think it is very important that when you develop care pathways, you pay attention to how you implement [them] so that you can learn the best approach. Oftentimes, the biggest driver of whether something is used or not is how it is implemented rather than how great it is or how it is designed," Pantalone said.

"We will implement trainings and department meetings and identify key stakeholders and super users," Molecavage explained. "A lot of times we designate champions in each location who are passionate about the pathway, and who can answer questions as they come up throughout the day or throughout what we're doing." Training related to aspects of the program that impact workflows is especially important. "Everyone enjoys efficient workflows and doing what they are used to doing," she said. "If you make a change, it always adds more time." Health care

providers may not have been trained in using analytics tools and applications with dashboards, so Geisinger ensured training was provided.

All trainings at Geisinger are followed up by a 1-page document providers can refer to going forward. "We supplement all our training with a step-by-step document that is disseminated down to all the people it relates to, so they have

a resource to look back on," Molecavage said. Trainees are also assigned a contact person on the appropriate committee. "When they see an issue, they know they have someone to talk to about it," she said, and the contact people gain valuable information for improving the program. "We are constantly fed that [information] back and forth to one another."

Test the Clinical Care Pathway in the Electronic Health Record

Convenience is key to ensuring providers utilize any type of clinical care pathway in the electronic health record. "You need to have something that is very simple, easy, and convenient for the clinician to act on," Pantalone explained. "A BPA sounds nice, but PCPs get inundated with 10 different BPAs, [leading to] BPA fatigue." To circumvent this issue, the teams at Geisinger and Cleveland Clinic implemented functionalities that save providers time. For example, A1c BPAs link with a Smartset with orders for diabetes-related supplies and type 2 diabetes medications prepopulated in both 30- and 90-day supplies. In addition, if a patient has not had a foot exam or an eye exam, for example, the provider can choose an option to populate an order to fulfill that gap in care directly from the patients' health maintenance summary section. "That closes the loop directly by eliminating the 3 steps in between (putting in an order, associating it with a diagnosis, and filing it)," he said. "This can have a tremendous impact on increasing the number of patients becoming compliant. The take-home learning point is that simple is better because it is more efficient."

Barey agreed that convenience is important and smart utilization of alerts or pop-ups can affect usability and avert BPA fatigue. "The Epic care pathway is a step-by-step workflow process that was seen as much more helpful than pop-ups. And a reference tool is embedded in the workflow; the provider does not have to go anyplace else [within the electronic health record]. Furthermore, the visual workflow component ensures that [providers] do not get distracted by it," she explained. Decision-support alerts are used as a

safety net; the provider sees a pop-up only if the right decision was not made or an opportunity was missed. "In terms of key performance indicators or data-driven improvement, we can track how often decision support is utilized, and with who and where, and then what [the provider] did with the decision support," she added. "You would want to absolutely bake the review of decision support utilization and usability in as best practice for implementing [the clinical care pathway] in an electronic health record."

Electronic health records are also available to patients, and so consideration of their needs and actions in the clinical care pathway is also important to consider. "When we identify these gaps in care, we also develop technology that [utilizes] the same analytic and performance measures that are being presented to the provider," explained **Ray Herschman, MS**, vice president and general manager of Value Based Care and Risk Solutions at **Cerner Corporation**. "The most important message that a [patient] receives is a personalized one [from their provider] that tells them there is an opportunity for them and their care. We have seen incredible results [by] going directly to [the patient] about gaps in care, follow-up visits, and closure of those gaps."

Pilot the Program Among Select Providers

Geisinger took 6 months to plan its clinical care pathway implementation, and then piloted the program at a few of its sites. "We always do a pilot because everything in theory seems like it's going to work until you get to implementing it and you find areas for improvement or areas

that just are not working," shared Molecavage. "During that pilot phase, we are focused on [learning] what works, what does not work, and what needs to change. Once we feel comfortable with that, we put the educational pieces in place." The educational pieces, in turn, offer feedback for fine-tuning the program before launch. "Often it will be a physician champion in each location who is passionate about what we are doing who can answer questions as they come up throughout the day," she explained. "Then we are constantly feeding that back to the larger group to make sure we're improving what we can and what we need to."

Pilot testing to ensure the clinical care pathway is working as designed in the electronic health record prior to launch is also very important. According to **Eric Boose, MD**, associate chief medical information officer at Cleveland Clinic, the multidisciplinary steering committee worked together from the beginning to test and refine the tool at Cleveland Clinic. "It was interesting because it was done at rapid iterations," he explained. "[We had] almost weekly meetings and the IT teams would build [the tool] and come back. From there, we kept refining it and refining it, and at the end we came to this consensus. With the functionality changing, we've been optimizing it more and more."

> **Initial education is important when rolling out any new process, but reinforcing it is probably more important. Regular touch points with the providers to assess usage and obtain feedback for improvement is key.**
> Christopher Babiuch, MD

Rollout the Clinical Care Pathway

Once the clinical care pathway is functioning appropriately in the electronic health record and education materials and trainings are in place, the clinical care pathway is ready for rollout; however, encouraging providers to use it can be challenging due to time constraints. "This is a very useful tool," Pantalone said, "But, what we found was it is challenging to get providers to deviate from their normal workflow, because many providers are very busy, and they tend to keep doing whatever they're doing just to get through their busy schedule. We are currently working on ways where we can help increase the utilization of this tool by simplifying it and optimizing its incorporation into provider workflows." For example, he said, use of the tool to intensify therapy in patients with uncontrolled type 2 diabetes may need to be positioned asynchronous to the office visits (ie, in telephone and refill encounters that do not have the same time constraints as office-based encounters) in order to facilitate more consistent utilization.

Providers also may be hesitant to utilize the tool because they do not see the value it will add to their practice. Understanding the providers who will be using it, as well as their needs and concerns, can be key to ensuring its uptake. "Adoption is always a concern with any [clinical] care pathway," Wall explained. "There are doctors who have been in practice for 30 years, and may say, 'I know how to take care of patients living with diabetes. I do not need your pathway.' However, you may look at the patient record and notice they are using a medication that is [no longer recommended in first line for that patient]." Providers need to be shown that the clinical care pathway will simplify their work by prepopulating notes, teeing up orders, and so on, he said. "[The clinical care pathway] can be an easier way or a quicker way to see the patient, which allows the provider to get a lunch break or see more patients."

Meeting regularly after a clinical care pathway has been implemented is important. "Before COVID-19, we had a lot of meetings," explained Jacob of Primary PartnerCare. "We [held] community physician groups run by regional medical directors, and broke those into smaller panels of 10 to 15 physicians [who met] either monthly or bi-monthly to review all the projects, the data, the issues, etc."

"Initial education is important when rolling out any new process, but reinforcing it is probably more important," agreed Babiuch of Cleveland Clinic. "Regular touch points with the providers to assess usage and obtain feedback for improvement is key." Assessing impact and providing that information to the providers is also important for reinforcing the value of the clinical care pathway," he added. "We are all used to seeing reports showing how many of our patients with diabetes are uncontrolled. Although that is good to know, having a ready-made tool to help improve that care is powerful."

Quality reporting also can ensure accountability and uptake of the clinical care pathway. "Under the Medicare Shared Savings Program, we must report quality, and diabetes care is a major quality parameter focus that we complete through our physician portal," said Jacob. "By using the quality reporting tools relating to diabetes and sharing that data with the doctors and their peers in the ACO [accountable care organization], we can drive high quality care."

Transparency in provider data across the institution increases provider accountability and can aid in ensuring adherence to the clinical care pathway. "One thing that has really helped move the needle [at Cleveland Clinic] is the transparency," Pantalone explained. "When we get reports and see the providers in the department, and [for example] if I see that my name is near the bottom of the list for percentage of patients with A1c less than 7%... I don't want to be down there! That type of accountability is very important. We have seen that that really helps to move the needle. No one wants to be at the bottom of the list."

Data should be analyzed further to determine why providers may not be hitting goals, as differences in practice sites and patient populations can have an impact, Pantalone cautioned. "You must take [the data] with a grain of salt," he said. "[For example,] a provider in our department who always has the best A1c data was the one who cared for all the pregnant patients [which is a different patient population compared with] other providers who may be in the inner city and seeing patients with a low socioeconomic status. It is important to do those sorts of exercises from a department level so that organizations can identify the 'positive deviants' that are doing a good job and find out what it is they are doing so that you can determine if that is something you can implement across your department."

Tackling Updates

Because new evidence is published frequently, care should be taken to ensure the clinical care pathway can be updated easily. "Updating [clinical care pathways] is a challenge because new evidence becomes available quickly," Isaacs of Cleveland Clinic explained. "For example, when a new drug gets a new labeled indication, then you must reevaluate it. Overall, ensuring [the clinical care pathway] is as current as possible is important. Collecting feedback on an ongoing basis can help."

Good governance is key to keeping the electronic health record tool in line with current guidelines, said Boose. "There's always supposed to be an expert group for each functionality," he added. "They're the ones who are supposed to watch it over time." An expert group for each functionality conducts a regular review to make sure the tools are consistent with current guidelines.

Formularies are updated on a monthly schedule. "Regarding ADA standards and others, even though the big update is annually, there are more updates [online]," said Isaacs. "I think that ideally [clinical care pathway tools] should be reviewed quarterly or every 6 months to stay relevant."
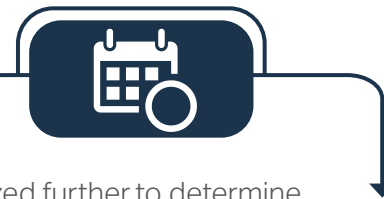
Conclusions

> However daunting, the developing and launching of a clinical care pathway is not impossible. "The key is that you must break it down into very small parts and do 1 thing at a time," Pantalone said.

> "Even if you just tackle 1 condition out of the gate and develop confidence, that is the best way to go," said Nill. "Start with your easiest condition first to get your physicians on board and saying, 'Okay. This is making my life easier.'"

> "From conceptualization, meeting, and receiving the sign-off from physician leadership and Accountable Care Organization Board, to launching the first step took less than a month," shared Davis. "The harder part was educating the physicians that [this clinical care pathway] mattered and what was included in the data analysis. Because doctors are scientists, they wanted to understand the full data from what we were including. After that, it was easy to get the doctors on board. Doctors want to provide good care, and population data and analyses are powerful tools in helping them achieve this goal."

> "Multidisciplinary collaboration is key," Babiuch said. "Having all the stakeholders pushing toward the same goal is where this will be successful."
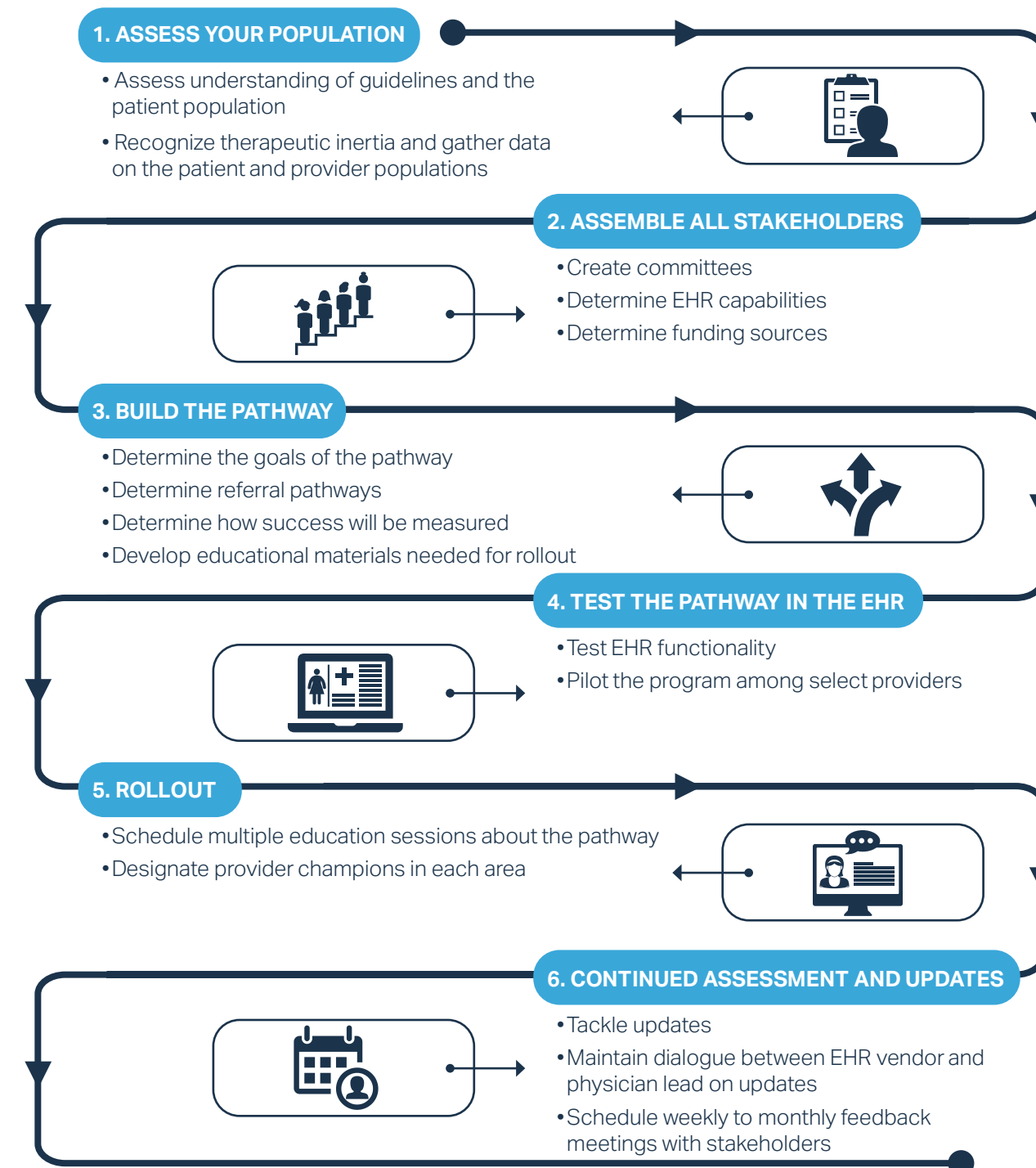
> "Start small," Molecavage agreed. "Start with 1 [objective], which could be as easy as identifying the population and the measure you want to start with—A$_{1c}$ or retinopathy or nephropathy. Find key stakeholders who are passionate, and don't overcomplicate it."

Key Learnings

- Use the latest guidelines to create a clinical care pathway that focuses on PCPs; they manage 90% of patients with type 2 diabetes and may be overwhelmed by the number of new diabetes medications available.
- Start small with 1 or 2 goals and develop a template approach to expanding capabilities.
- Aim to seamlessly integrate the clinical care pathway into the existing electronic health record to enable all medical professionals who see the patient to make real-time decisions by employing minimal, action-oriented best practice alerts.
- Test and reassess; use data-driven metrics and make them fully transparent. Maintain expert committees to keep electronic tools updated per association guidelines.

Example Roadmap of Clinical Care Pathway Development in Diabetes*

1. ASSESS YOUR POPULATION
- Assess understanding of guidelines and the patient population
- Recognize therapeutic inertia and gather data on the patient and provider populations

2. ASSEMBLE ALL STAKEHOLDERS
- Create committees
- Determine EHR capabilities
- Determine funding sources

3. BUILD THE PATHWAY
- Determine the goals of the pathway
- Determine referral pathways
- Determine how success will be measured
- Develop educational materials needed for rollout

4. TEST THE PATHWAY IN THE EHR
- Test EHR functionality
- Pilot the program among select providers

5. ROLLOUT
- Schedule multiple education sessions about the pathway
- Designate provider champions in each area

6. CONTINUED ASSESSMENT AND UPDATES
- Tackle updates
- Maintain dialogue between EHR vendor and physician lead on updates
- Schedule weekly to monthly feedback meetings with stakeholders

EHR, electronic health record; IT, information technology.
*Based on expert interview feedback included in this publication (March 2021).

Example Checklist for
Clinical Care Pathway Development in Diabetes*

Key Component	Complete
Population assessment • Complete provider practice pattern analysis (treatment variation, therapeutic inertia, % of patients at A1c goal) • Determine baseline patient population assessment (eg, average A1c, hypertension and lipid control)	◯
Multidisciplinary stakeholder assembly (Primary Care, Endocrinology, Nursing, Pharmacy, and IT) • Create specialty subcommittees • Schedule regular meetings • Designate provider champions	◯
Funding sources review	◯
Electronic health record capabilities assessment	◯
Program goals • Evidence-based guidelines • Treatment algorithm • Referral pathways • Determinants of success • Educational materials for rollout	◯
Testing the pathway • Select-provider pilot	◯
Roll out plan	◯
Continued assessment • Plan for updates • Feedback meetings	◯
Regularly scheduled updates	◯
Feedback meetings	◯

*Based on expert interview feedback included in this publication (March 2021).

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