Supplementary Appendix A Representative quotes about facilitators

Facilitator	Theme	Representative quotes
A. Operational issues		
	1) Technical feasibility and EHR experience; patient entered data	Technical feasibility • So that's a quick type request versus something very large and complex like a care paths. • So feasibly, I think it's very feasible. • So, for something like to implement these questions, it wouldn't be very difficult at all. • One of the strong points of (our system) is they gave us keys to the kingdom. And if you have the resources, you can set it up to make it bark and rollover and whatever you want it to, right?
		Patient-entered data • So, that would not be hard. We create [electronic] questionnaires all the time so it would be very easy to create a questionnaire. The difficulty would be the education as always. • I think patients should be able to put it in themselves. • We started a process our electronic method to collect patient reported data electronically and systematically at the point of care. • So, to me, that echoes it's real time. It's with the patient in the exam room. Because obviously your job can change between the time you visit. So, you're going to have a real-time query that when Mr. Smith presents, you're either going to have to capture it up front when he's in the waiting room. So, we have a lot of patient entered data. • We think it's going to be huge to have the patients actually type in why they are there. • I think the best way would be for the patients to fill it either by questionnaire or tablet. • So, that would be kind of nice if the patient enters the data. So, I don't think it's a question of how reliable it is … it's just as reliable as anything else you're going to get from a patient.
	2) Work patterns and variability in roles involved; the PCMH model	Work patterns and user roles • Patient service representatives. I still call them clerical support team … they've been retrained to go and get capture this information. • And I can see this may be something that our care coordinators, our behavior health unit, integrated behavioral health, something that they ask and as a barrier to certain to compliance as you know maybe even a cause or something exacerbates different symptoms, though the community health worker, so that information is readily available to the providers when they go into say you know, I've noticed that you maybe lost your job, lost your occupation. • Nurse practitioners, right. licensed clinical social worker's (LCSW's), licensed master social worker's (LMSW's), dental, you know optometrist. Yeah, we have dental and optometry. We have a psychiatrist you know. We have a full cadre. • So, the more this could be done on the front end by the front staff or by the board clinical staff, nursing or whatever before it gets into the provider exam room when they're doing the document and charting I think the better it'll be. • Primary care coordinators that are attached to our physicians …. The MA's do not have a licensure. They can take a test if they want and become a certified medical assistant but they don't require that right now for hire at the clinic. • So yes, the MAs are awesome … everyone really has stepped up to the plate. Because I think if we're truly going to have a working interdisciplinary and interprofessional clinical team, you have to empower your folks. Work patterns and informatics-related roles • I'm the QI assistant, quality control. So, a lot of my responsibilities are based around kind of designing reports off clinical measures. • So, she (an IT person with a clinical background] really bridges that gap around just making sure because when IT folks talk directly to the front line, sometimes there's just the language barrier there. • I am in charge of the National Committee for Quality Assurance (NCQA) patient-centered medical home applications for all of our primary care practices …. I work very closely with our business analytics and reporting colleagues so that we have the data and the registries and the information that we need so our sites can do quality improvement and population health and care coordination.
		The PCMH model • (It is) kind of the one-stop shop, you know where you can make sure that all of your healthcare needs are integrated … (becoming a) PCMH has been pretty labor intensive. • There really is not a template for doing this kind of work. You know, the research is thin on integrated health … There's not a book that says this is how you do it. • If they're really high-risk patients we try to touch base once a week or maybe once biweekly with the patient. See how things are going and if they have any needs to be addressed. If they went up on blood pressure values, blood sugar values. And there's a lot of teaching involved. It's we consider care coordination a group effort or a team approach to health care. So, we try to get our diabetes educator involved when we can, or our Pharm Ds who we have here on site. • So, I think that patients develop relationships with our whole team as opposed to just one particular physician. So I think that s just how primary care is changing. There's a lot of focus on team-based care and the importance of having continuity with the team.

Supplementary Appendix A (*Continued*)

Facilitator	Theme	Representative quotes
B. Usefulness of proposed CDS		
	1) User's need for awareness, reminders, and evidence	Need for occupation information • And we've also got this situation out there in the Gulf, you know, the flesh-eating bacteria that's in the Gulf. And those are things that we really have to watch out for. • We have some heavy industry down here that definitely could lead to some occupational risk for sure. I mean, we have petrol oil and refineries and ship-building, you know? We have exposures of all kinds. • But I think that that's a really important area for us to be aware of just, you know, air pollution, cockroach infestation, I mean all these issues. • I think we have a lot of painters, a lot of house cleaners and so you know, just those two things are pretty clear as to putting people in high-risk categories for certain things. And so I feel like just getting their occupation would be a significant benefit in doing that. • So, but it was kind of never on my radar. I think about, oh at home, what allergens do you have? What vermin are in the shelter you're at, whatever? And I would kind of maybe not delve into the workplace as much. So it seems like it would be helpful to have just a prompt to remind you to look at that.
		Need for the proposed CDS • Those are important things to know about and be aware of… this person's a school bus driver and they're, you know, am I going to control them (diabetics) more closely? Less closely? Does that have an impact on their overall risk to school children? • We'll tell people, yeah, they should be off work. Or they can't lift. And when someone wants something more specific, I think we're pulling stuff out of our pocket. • Because I have no idea how to write those letters. I have no idea how to gauge how many pounds someone can lift, other than, I mean, just common sense. Like, I just don't know. • (I would prioritize) the return to work (CDS) I think. Because you know really, the decision about the return to work is one of the very hardest ones. • I think that is definitely valuable to have especially in our patient population here where jobs change frequently, to be prompted to ask questions. I think that would be helpful. • I'm always concerned that we are quick to give the diagnosis of asthma and not question why it's starting in someone who did not have it in childhood. So yes, it (the CDS) would be very helpful.
		Stories and examples • I actually know somebody who was fired from their job for getting confused with low blood sugar. • So I have one patient that completely fits this scenario in which he has type-I diabetes. He worked as a chef and in a very hot, intensive environment where he wasn't allowed to, or he didn't have time for breaks. • [I was puzzled about] this guy who did competitive biking who was really starting to have asthma problems … he builds bikes. It's what he does … they were spray painting …. it was not designed right. And that was a very aha moment for me. • I was thinking I have a patient with diabetes who is a policewoman … and I was like, "Why couldn't you take your diabetes medicine?" And she's like, "It's because I can't eat while I'm working." • I had a patient, he's a TV, he holds the camera for TV. And with his diabetes and peripheral neuropathy, he could no longer be outside doing that. (He said) "I'm going to go back even though I don't know how I'm going to do my job. But I'm just going to suck it up and do it." • As a matter of fact, two days ago we had a new anticoagulant patient who works in a sheet metal cutting facility. • I have a factory worker who stuffs, she stuffs, like, little stuffed animals that kids, you know, like getting for Christmas. So she's around those fibers all day long. • I had a bakery worker and all the flour drove her eyes, nose and bronchi crazy.
		Need for evidence • And I don't know if there's even, what kind of evidence base there is behind it to sort of say, what's appropriate for somebody with back pain? • So the decision support in that case should link to things like the resources that are available. • Any standards in general around work and the linkages between work situations and diseases like, you know, and situations like hypoglycemia for example. Those are important things to know about and be aware of. • If you could tell me that, "lately the evidence shows that this is the best prescription for returning to work" that could be very (good) for me …. Yet in other words, that would be very powerful if you said to a doctor, "I'm giving you evidence based suggestions here." • I think that's needed and if we have a specific template for what has, you know, evidence base … would definitely be amazing.
	2) The CDS is relevant in these settings	Relevant • We're community health, this is an area, diabetes is just part of the daily life here. • So we do have a high population of diabetics, asthmatics, hypertensive patients. And of course you know, a lack of occupation, around here you know, a lack of jobs, losing jobs, uninsured populations. You know, that of course has a huge impact on overall health. • So just community health, I think it's just a bit of the culture of some of the folks that we deal

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Supplementary Appendix A (*Continued*)

Facilitator	Theme	Representative quotes
		with. So I think that there are some other obstacles compared with maybe other practices. • Majority of the patients don't work. • More than half of our patient population speaks a first language other than English so … we translate almost every patient material into our three most common languages … although there are hundreds of languages that our patients speak. • So I mean, I think we have a working-class population here and that would be the most important thing, work-related situations. And they are not necessarily going to get to employee health and a lot of our patients are the health safety net population and they're not covered in occupational medicine, unless the work-related situation that their employer is paying for. • I mean for us, there are a lot more cultural barriers around refractory diabetes, language barriers, cognitive barriers. • Many of my patients don't even live consistently in the United States. • There's many working homeless, as well as those who are disabled or unemployed. • We have people who are undocumented, which means that they don't necessarily want to report anything going on at work.
	3) Population health and registries	Population health • Once they found out they could run reports on everybody that had a hemoglobin on everyone seen in the last 90 days, and what those result ranges were, they're happy. • It is a population analytics system. And you know, you can write all kinds of different reports for it. We get our registries from (a separate system and not the EHR we use that information and go into (the EHR), look at the clinical record to see how the patient is doing. • We're building registries today, so that physicians can run queries and pull registries in (the EHR) that says, show me all my diabetics that live in this area. • But you know, both the quality of the data and the skills of the people that have to get the data out are both problematic. So it's just a process that, you know, you can get a dataset. You don't really trust it. You have to validate it. • So population health is, of course, the biggest big time thing we're thinking about. • So we have very, very extensive dashboard for all of our accountable care organization (ACO) metrics, for all sort of readmission and patient experiences. I mean, we have, we are very, very tech savvy in terms of report capability. • So I think that it would be nice to be able to see for every patient that comes in, what are their occupations every time they register? And then you could do actually some data analytics to say okay, you're presenting at your, at the ED for a COPD exacerbation. What changed? And is one of the things that changed your employment location?

Abbreviations: COPD, chronic obstructive pulmonary disease ED, emergency department; EHR, electronic health record; IT, information technology; PCMH, patient-centered medical home.

Supplementary Appendix B Representative quotes about barriers

Barrier	Theme	Representative quotes
A. Effort-related issues		
	1) Additional time this might take	Time • So, if you, you know, start asking these questions in addition to what they already do, it's more clicks. That's a factor. • I don't think, not going to get support from providers if you're adding more on. I think you're going to have to eliminate something to bring this on board. • You know with respect to occupational health, I think you're going to have a hard sell. So, the more this could be done on the front end by the front staff or by the board clinical staff, nursing or whatever before it gets into the provider exam room when they're doing the document and charting I think the better it'll be. • They don't like pop-ups. They get pop-up fatigue. You start throwing too many things up in front of them they just hit them and go away. Go away. • The only thing is, about the front desk asking these types of questions, is are they going to have time to ask these types of questions? • Each one of them seems like a simple question but that question might take five minutes of explanation of, you know, tangents, of emotion. And all those things are not bad necessarily but in 15 minutes to see a patient, you can't usually deal with them. So this kind of thing particularly is an area that I think we should be leaning toward and that's decision support for patients. • Like, nobody will use something if it slows them down even if it makes them more accurate. • Hands down, I think if you give a clinician a support tool that makes them ask all of these questions, I think it's going to be very frustrating and take a lot of time. • It's like lobster at dinner. And I refuse to crack and the reward is good but I won't order it in a restaurant because of how much work it takes to get there.
	2) There are other pressing priorities	More pressing priorities • So much happening so quickly with our providers, with the new system and with us on ICD-10 and with all these different areas you know. I think PCMH, meaningful use, we have to do this too? We have to do that too? • We have to prioritize based on first of all what our federal funders are going to require. • Money. It would have to help us generate more revenue. • Well first priority is how it's affecting billing. • You know, we're trying to figure out how not to overwhelm the patients with the amount of information we want to collect from them. • So, population health is, of course, the biggest big time thing we're thinking about. • Well, we prioritize based on funding, regulatory requirements, and clinical need.
B. Topic-specific issues		
	1) Sensitivities about health and work	Sensitivities • Just the thought process, you know, for some patients would be, so since you've addressed this, and this is part of my medical record, I want to apply for disability, and it may send them down a different path than they had originally arrived to see the provider for. • Some of the patients come in with back pain, we get back pain because we got a lot of drug seekers coming in, and that's why we become very defensive with them. Things like that start popping up because the more you ask, the more they're going to, now they can't even get out of the chair, even though they were running down the hall before they got to us. And the more you ask questions like that, it's almost like you're leading them. That's what they're looking for, and then, so we have to play that, I hate to say it, like a game, with you trying to figure out whose legit and who's not legit. • Because we're trying to avoid getting into that. Because what happens is the next thing we know, now we got a workers' comp case. • But I also think a lot of patients could be concerned about their employment, you know? And I mean, there was a patient, for example, who, you know, he was a truck driver I think. And ODOT has this rule that you can't be on insulin when you're on a truck. You know, driving a commercial vehicle. And he was on that verge. They were getting ready to start him on insulin and he's like, "No, I won't." • But you know, it's one thing to highlight their problems and what the contributions are but what does the patient do with it? And what does the physician do with it? So the decision support in that case should link to things like the resources that are available for the patients to access some kind of assistance with how the patient manages those situations. You know, you don't want to have a situation where they run in with this thing and they get fired. Or you know, you want to set up dynamics that are counterproductive and some patients will do that. • So how do we put it with the employer if the employer knows that the patient's in danger because they haven't had their break and haven't measured their blood sugar or whatever. And there's no recourse except firing the patient. Then that doesn't help anybody. • A lot of times again we have immigrant workers who can't take-off of work because they need their paycheck. But yet I feel like their environment is worsening things. • Your occupational history can be a very private thing you have to protect. • Our immigrant population I think very much do not want to say they are unemployed. I think it's very hard for them to be unemployed.

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Supplementary Appendix B (*Continued*)

		• Culturally they very much will work. In fact, they'll work three jobs. So, they do not say that until they are really down to zero. So, if they're working you know, in a restaurant in the off-season you know doing bussing they'll just leave it as construction because they are still working and then they're going back to their construction work. • Language, cultural as well as fear of divulging information about their work. So you know like the under the table work and that type of stuff is, there's lots of resistance to try to share that information. • So, certainly there is obviously like an opiate epidemic right now. So, a lot of people that are very cautious of using needles to inject insulin at work because they're worried about the way that that would be perceived. • The other thing that I would say there is some sensitivity around the workplace, right? • She doesn't want to put her job at risk. I think people are understandably scared, you know? • I'm going to go back (to work) even though I don't know how I'm going to do my job. But I'm just going to suck it up and do it. • But a lot of times the patient will say, "No. I can't change the ventilation. No. I can't change the chemicals I'm working with. • A lot of folks that fall into this category may be using some of the meds for pain in an unhealthy manner. The most politically correct way I can say it.
	2) Complexities of occupational information	Complexities of occupational information • We verify everything when that patient actually comes in for the appointment. And at that time, they're putting in the rest, the income, employment history, all that kind of stuff is put in at that time. • There's a question on an employer but I don't think it goes into any more detail that just place of employment. But we've got a place on the history that talks about occupation. • That's one of the sections within the subtemplate. Like employee, how many hours a week you work, if you don't work, what is the reason? • Well, right now (the EHR) already offers a portion for occupation. We just aren't using it. • They're only putting the occupation and that's it, listing the occupation. That's a new PCMH requirement. • I think the kind of work they're engaged in would be important, you know, for their low blood sugar. So I don't know if employer, as per say, would make a difference. • So, it would be the HPI section of my note. • I generally ask an occupational question to patients for two reasons. One is it breaks social ice. So, I'll often do that at the beginning when I'm chatting with them. So I say, "What kind of work do you do?" Now, I don't always document it. And two, it helps me know whether I need to worry about whether their job is playing any kind of role in their health. • I feel very strongly that within the electronic medical record, we need to have a field that could be coded so you could actually do some research that would give the person's job and also a secondarily I guess industry but I know how hard it is to get things in and I think that if we had at least job, it could trigger a meaningful use. For example, you have a patient with asthma and their job is construction. If you knew that, that would precipitate we would hope a whole series of questions. • And so, it would be, the way in (the EHR) that you chart people's occupational stuff is kind of off in this other little module called history and it's not very friendly to saying things in a structured way like this person was a baker for forty years. • Or you are working and we just never updated it. I mean it's just totally bogus. There's a lot of bogus data. • We already know that a lot of this occupational health information gets submitted to the government anyway from a variety of sources whether it's employers reporting information, whether it's hospitals or insurance companies billing for it or any number of that so that's probably going to be more reliable than even what the patient themselves can remember so if you have a federally created system that just tracks for most patients for health-related reasons, their occupational history and exposure from all these different sources and have that linked to an EMR, that's going to probably be the best way to get the information. • Yeah, so there's a history section. Most of us put the occupation in the history section. You can go in and do free text and put that information in there. There's not structured fields for it. • It's not like you can say, pull up all your patients who are teachers or pull up all your patients who are painters. It's a free text, free entry field. • You go into histories. And you have to go down and open it up. It's a very clumsy system. It switches depending on what template you're working in. So most of the time it's in free text. • Some patients get laid off frequently so I feel like if this were to be a part of our system, that it should be a part of an intake procedure like maybe every year. • So, I'm, like, free texting it and look back in my notes and, you know, it isn't the most efficient way. If it's something like health care worker, I'll put that in the discrete field. I think I looked up nurse once and they didn't have nurse. • There's got to be a good way to put the employment data in the EHR. I think that's one barrier because it's just sort of an optional field with their social history.

Abbreviations: EHR, electronic health record; PCMH, patient-centered medical home.