

Systems consultation for opioid prescribing in primary care: a qualitative study of adaptation

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ABSTRACT

Background In order to promote guideline-concordant opioid prescribing practices, a blended implementation strategy called systems consultation was pilot tested in four primary care clinics in one US health system.

Objectives To describe (1) how systems consultation worked during the pilot test and (2) the modifications necessary to adapt this implementation strategy to primary care.

Methods A team of investigators conducted observations (n=24), focus groups (n=4) and interviews (n=2). The team kept contact logs documenting all interactions with the intervention clinics and preserved all work products resulting from the intervention. Initial analysis was concurrent with data collection and findings were used to modify the intervention in real time. At the conclusion of the pilot test, a pragmatic descriptive analysis of all data was performed to explore key modifications.

Results Time constraints, entrenched hierarchical structures and a lack of quality improvement skills among clinical staff were the main barriers to implementing systems consultation. Modifications made to address these conditions included creating a consulting team, giving change teams more direction, revising process improvement tools, supporting the use of electronic health record (EHR) functionalities and providing opportunities for shared learning among clinics.

Discussion and conclusion With the lessons of this research in mind, our goal in future iterations of systems consultation is to give clinics a combination of clinical, organisational change and EHR expertise optimised according to their needs. We believe a streamlined process for assessing the key characteristics identified in this study can be used to develop a plan for this kind of optimisation, or tailoring, and we will be developing such a process as part of an upcoming clinical trial.

INTRODUCTION

Clinical practices lag behind evidence in healthcare.¹ This gap produces an especially urgent problem for opioid prescribing. In the USA since 1999, the number of opioid overdose deaths and the amount of prescription opioids dispensed have both quadrupled.² Prescription opioids accounted for more than half of overdose deaths,³ and about half of opioid

prescriptions were written in primary care.⁴ Clinical guidelines for opioid prescribing⁵ include such evidence-based practices as requiring treatment agreements, urine drug screening, and mental health screening, but the uptake of these practices varies widely.⁶ Implementation strategies ‘are the “how to” component of changing healthcare practice’; they are ‘the methods and techniques used to enhance the adoption, implementation, and sustainability of a clinical programme or practice.’⁷ The literature has not identified which implementation strategies are effective for getting complex evidence-based practices into use in primary care.^{8,9} Strategies targeted at the organisational (rather than individual provider) level are particularly needed.⁸

As its name suggests, systems consultation has its roots in systems engineering. It is a blend of implementation strategies derived from the Network for the Improvement of Addiction Treatment (NIATx) model, an evidence-based approach to promoting organisational change, designed for and widely used in addiction treatment agencies.^{10–12} Systems consultation retains some strategies used in NIATx and modifies others. It retains the use of coaches (outside experts in process improvement who help organisations make changes) as well as specific tools, such as the use of change teams (small groups of clinic staff members who work with the coach to implement changes), walk-throughs and flowcharts (in which staff members experience a clinic process as a patient does and record the results in a diagram), Nominal Group Technique (NGT) (a process for group decision making), the collection and use of data in rapid-cycle tests (or Plan-Do-Study-Act (PDSA) cycles) and on-site training and regular support of

staff.¹³ Systems consultation modifies NIATx by using a physician as coach, and adding audit and feedback (providing clinic performance data to clinics). Additional modifications—those found during the pilot test to be necessary to adapt systems consultation to the primary care setting—are the subject of this paper.

Although the blend of strategies that constitute systems consultation has not been tested before, the component strategies in the systems consultation model have established roots in implementation science. (See online supplementary appendix A, which maps component strategies to those identified in the Expert Recommendations for Implementing Change (ERIC) project.¹⁴) Some of these component strategies, such as audit and feedback, educational meetings and educational outreach, have demonstrated a modest effect at the level of individual providers.⁸ Yet most implementation strategies—like systems consultation—are multifaceted and multilevel,¹⁵ and such interventions have shown mixed results, with little evidence for interventions that target organisations or a wider environment.⁸

We conducted a mixed methods pilot test of systems consultation designed to assess the feasibility, acceptability, and preliminary effectiveness of this implementation strategy in promoting the adoption of guideline-concordant opioid prescribing practices in primary care clinics. The main quantitative results, reported separately, found a 19% reduction in morphine-milligram equivalents in intervention versus control clinics.¹⁶ The purpose of this paper, which focuses on the qualitative results, is to describe (1) how systems consultation worked in primary care and (2) the modifications necessary to adapt systems consultation to this setting.

METHODS

The intervention

The clinical content of the opioid prescribing implementation strategy was developed by a group of pain medicine, family medicine and systems engineering experts who engaged in an integrated group process, a systematic method for facilitating consensus among groups of experts¹⁷ to translate opioid prescribing guidelines⁵ into a simplified checklist of recommended practices to be implemented using the tools from the NIATx model (described above) that are part of systems consultation (eg, a walk-through).¹⁶

In the pilot test, each of four intervention clinics was randomly assigned one of two coaches. The coaches, who also served as coinvestigators on the research team, were university faculty physicians certified in both family medicine and addiction medicine. Medical directors at the intervention clinics were asked to form change teams composed of prescribers and other staff, such as nurses, medical assistants, laboratory technicians and receptionists. Each change team selected a team leader to organise the work of the team and

act as the point of contact between the clinic and the researchers.

Change teams began the intervention by conducting a walk-through exercise¹⁸ in which a researcher helped the team experience the clinic's workflow processes for refilling an opioid prescription, which were then diagrammed in a flowchart intended to help change teams identify obstacles to implementing the checklist. The coach and other researchers later travelled to each clinic for an initial site visit. During this visit, the coach spoke to the change team about the latest research on balancing the benefits and risks of long-term opioid use. The coach also presented the clinic's opioid prescribing performance data, gathered from the electronic health record (EHR), relative to other clinics in the same health system. The coach reviewed the information gathered during the walkthrough and flowcharting exercise and facilitated a brainstorming session using NGT,¹⁹ in which the team identified and prioritised the opioid prescribing issues they wanted to address. Finally, the coach introduced the concept of PDSA change cycles,²⁰ small-scale, incremental changes intended to enable the team to implement their ideas.

In the months that followed, the change teams adjusted their workflows to make their opioid prescribing practices consistent with guideline care and improve their performance on key indicators. Monthly meetings with the coach and other researchers gave the change team opportunities to get expert advice on implementing workflow changes, assessing their impact and planning for additional changes.

The setting

The four participating family medicine clinics were affiliated with a university health system in the Midwestern USA. Characteristics of the four clinics and the communities they serve (as of February 2015, during the planning phase of the study) are shown in [table 1](#). Systems consultation was introduced to the intervention clinics on staggered start dates between February and May 2016, ending in each clinic 6 months later. Just before systems consultation was introduced, the health system announced a new policy related to opioid prescribing, but provided little guidance to clinics about how to implement it.

Study design

This qualitative analysis was conducted as part of the pilot study, which used a randomised matched-pair design with eight primary care clinics, four intervention and four control, to assess the preliminary effectiveness of systems consultation. The qualitative component focused on the feasibility and acceptability of systems consultation and also explored the modifications necessary to adapt it to the primary care setting, given that systems consultation was derived from a model used in the specialty addiction treatment system. The

Table 1 Characteristics of intervention clinics

Characteristics	Clinic 1	Clinic 2	Clinic 3	Clinic 4
Clinic				
Providers*	3	2	12	7
Total provider FTE†	2.6	1.25	8.63	6.36
Active panel‡	5320	3263	16 819	13 361
Providers who prescribe opioids	2	1	12	5
Patients with any opioid orders§	537	561	1945	1341
Patients with 3–9 opioid orders§	134	166	417	294
Patients with 10+opioid orders§	67	106	250	120
Community				
Population	9970	14 301	28 487	26 294
Median age	41.1	39.0	30.9	34.6
Race (% non-white)	1.7	6.2	26.7	11.7
Median household income (US\$)	67 250	80 965	87 892	70 127
Percentage of population below federal poverty level	5.3	7.2	12.4	9.1

*Provider, anyone who can prescribe (medical doctor, nurse practitioner, physician assistant, doctor of osteopathic medicine).

†FTE, Full-Time Equivalent (1.00=40 hours per week).

‡Active panel, number of adult patients with a primary care provider in the specified clinic who have had any type of healthcare visit in the health system in the past 3 years.

§Prescriptions within the previous 12 months.

intervention clinics were randomly selected from a pool of 13 family medicine clinics. The two physician coaches approached the medical directors of seven clinics to recruit four clinics. Details about recruitment, study procedures, quantitative data collection, analysis and findings are detailed elsewhere.^{16 21} The study was approved by the Health Sciences Institutional Review Board (IRB) at the University of Wisconsin - Madison. All change team members at the intervention clinics provided written informed consent.

Qualitative data collection and analysis

Because this study was the first use of systems consultation in primary care, extensive resources were devoted to qualitative data collection using a number of methods, including observation, focus groups, interviews and document review. A project ethnographer (EA—a doctoral-level qualitative researcher) attended all 6 monthly coaching sessions in all four intervention clinics (n=24, a total observation time of approximately 24 hours) and wrote field notes. Two other researchers (BD—a masters-prepared study coordinator and AQ—a systems engineer and the study multiple-PI) also attended all meetings and provided additional observations.

After the intervention period in each of the four clinics, all change team members were invited to participate in a site-specific focus group (n=28 across a total of n=4 focus groups, one in each intervention clinic). Online supplementary appendix B shows the size of the teams and the demographic characteristics of members, including focus group participants.) The 60 min focus groups were conducted by a researcher (RJ—a masters-level researcher and scientific editor)

who was unknown to participants. The focus groups explored the change team's opinions about the implementation strategy components and their perceptions of what supported or hindered their team's ability to make changes. The same researcher (RJ) also conducted semistructured interviews (n=2) with the two coaches. These 60 min interviews, held after all work with the clinics had concluded, invited the coaches to reflect on their coaching experiences and on each component of the implementation strategy. (Question guides for the focus groups and interviews appear in online supplementary appendixes C and D.) All focus groups and interviews were audio-recorded and transcribed verbatim. In addition to these data, the study coordinator (BD) kept detailed logs of all contacts with the clinics and preserved all products resulting from the change teams' work.

While the intervention was ongoing, the qualitative working group (NJ—a doctoral-level qualitative research consultant; BD; EA and AQ; joined by RJ towards the end of the project) met regularly to review field notes and other observations of the coaching meetings. The group inductively identified and wrote memos about patterns in the data. These emergent patterns were then used to shape ongoing data collection. Because the intervention was unfolding concurrently, the qualitative component also functioned as a formative evaluation: discussions during these meetings led to real-time modifications to systems consultation.

For this pragmatic descriptive analysis, the lead author (NJ) constructed case files for each of the intervention clinics, including field notes, focus group and interview transcripts, and the clinic's work products and contact logs. Using the memos resulting from

the qualitative working group's collaborative analysis sessions and with the aim of exploring modifications necessary to adapt systems consultation to the primary care setting, she coded all data in the case files for further insights about patterns identified in the earlier stage of the analysis, employing both within-case and across-case comparison to better describe these patterns. The coded material was summarised, and these summaries shared with other members of the qualitative working group, whose comments were integrated into the final analysis.

Importantly, some investigators played multiple roles in this project. The physician coaches simultaneously functioned as components of the intervention, research participants and members of the research team. BD and AQ were part of the qualitative working group and also active participants in designing and delivering the implementation strategy, including interacting with the coaches and change team members and providing hands-on assistance to them. These multiple roles risked raising conflicts of interest for the researchers (who were tasked with honestly reflecting on faulty assumptions and shortcomings in their own work) and confusing clinic participants, one of whom expressed uncertainty about whether the researchers were there to 'study us or help us'. The doubling and tripling of perspectives led to important insights, however, and the concentration of responsibilities speeded the use of feedback, allowing modifications of systems consultation to be made and assessed quickly.

RESULTS

Table 2 summarises elements of systems consultation as originally planned and modifications made to the implementation strategy as a result of the pilot test.

Recruitment

Although clinic recruitment was not conceived as an element of systems consultation, an important lesson from the pilot test of systems consultation was that despite the timeliness of the topic, recruitment required multiple email and in-person contacts and also collegial relationships between physician consultants and clinic medical directors to recruit four intervention clinics. While full or half day kick-off sessions are common in the NIATx model, it soon became clear that in primary care 60 min was a hard time limit for the kick-off and all meetings. The best way to boost attendance at the monthly sessions was to schedule them over the noon hour and provide lunch.

Coaching

The first modification to the implementation strategy was a semantic one: the terms *coach* and *coaching* were changed to *consultant* and *consulting* because primary care physicians explained to researchers that 'doctors don't like to be coached'.

The two physician consultants had very different styles. Consultant 1 was directive, providing advice and explicit instructions. Consultant 2 offered options and resources, but rarely told clinics what to do. Before the pilot study began, the assumption was the less directive approach would be more effective because it had been in addiction treatment organisations. In fact, clinic change teams had neither the time nor the skills to do the open-ended work required by systems consultation and often expressed a desire for more direction. As one change team member said, '[the consultant's] role was not to give us guidance [in identifying a problem], we were supposed to come up with that alone...[I]f they had come in...with an idea, instead of us doing it, that would have been more satisfying'.

Table 2 Summary of systems consultation elements and modifications

Original systems consultation model	Modifications made during pilot test
Physician coach provides both expert advice on opioid prescribing and guidance on organisational change.	The term <i>coach</i> was changed to <i>consultant</i> . The physician consultant was joined by a facilitator to form a consulting team, with the physician offering academic detailing (expert advice on opioid prescribing) and the facilitator guiding organisational change and handling logistics.
Clinic change teams lead changes in opioid prescribing practices and processes.	Change teams required more direction than planned and made slower progress than when changes were led by individual prescribers. More intraclinic communication was needed to spread improvements to other staff members in the medium and large clinics.
Change teams use tools: walk-throughs and flowcharts, Nominal Group Technique, performance data, PDSA change cycles, a checklist for safe opioid prescribing.	Flowcharts were not referred to after the initial meeting. PDSA change cycles were introduced but not used, and informal feedback rather than data was used to evaluate changes. The checklist was superseded by a new health-system opioid prescribing policy. Two tools were added: a script to help prescribers initiate conversations with patients about opioid use and electronic health record training.
Provision of on-site training	Half of the 6 monthly consulting sessions were on-site, as planned. The rest were held using distance technology.
Initial 2-hour site visit	All site visits and monthly meetings were limited to 1 hour at lunchtime with lunch provided.
Use PDSA cycles to make workflow changes	Change was made in response to emerging trends and circumstances, not through PDSA cycles.
No provision for clinics to learn from one another	Added a teleconference for the four intervention clinics, at their request.

PDSA, Plan-Do-Study-Act.

The two consultants brought different backgrounds to the project. Consultant 1, although certified in addiction medicine, maintained a practice at another university-affiliated family medicine clinic. She was familiar with the types of patients seen in the clinics she was consulting with, with clinic workflows and, very importantly, with clinics' EHR (Epic Systems). She presented information in ways that made sense to the teams—likening the way they should approach chronic pain, for example, to the way they approached other chronic conditions such as diabetes. One change team member described this consultant as 'Boots on the ground. Practices what she preaches'. Consultant 2 practiced addiction medicine exclusively, but in hospitals and other settings as well as primary care and thus lacked such intimate familiarity with the clinics. Although the teams respected both consultants' expertise in addiction medicine, they seemed also to resist its relevance. Of Consultant 1, a team member opined that she appreciated her 'family med side', but her 'addiction med side' was not as useful, because 'our patients are not addicts'.

Systems consultation assumed that the physician consultants would provide expertise in opioid prescribing and guide organisational change. The two consultants received several hours of training from experienced NIATx coaches, but in the field it became clear that the consultants lacked many of the skills needed to help clinic teams analyse their workflows, identify process improvements and run test cycles. As one consultant noted, this role 'was really unfamiliar. It was a steep learning curve'. (They also did not have time to handle the many logistical details involved in the implementation strategy.) Another researcher stepped in as a facilitator to take over these tasks. When later clinics started the intervention, it had been reconceived as a team consulting model, with the physician consultants doing something akin to academic detailing and the facilitator handling process improvement and logistics.

This team consulting approach addressed another challenge. From recruitment onwards, the researchers noted that the primary care setting was more hierarchical than the addiction treatment setting: physicians possessed much more authority (and responsibility) than other staff members, while in addiction treatment, staff tend to be on more equal footing. The physician consultants established good rapport with the clinic medical directors and physician change team members, but the non-physician change team members often were not active participants in their conversations. Physicians were empowered to make some changes in their own workflows and to direct changes in the work of others, but non-physician members were not. When physician change team members were tardy or absent at consulting sessions, non-physician members often seemed reluctant or unable to discuss the status of changes the team was making. Once the

team consulting model was in place, the facilitator, who was not a physician, was able to encourage and support non-physician change team members, who became more active.

The pilot test revealed the importance of conveying to clinics clear expectations about the consultant role. Consultant 2 described a 'tension' around being asked for clinical consultation on 'difficult cases and challenging patients'. Consultant 1 often provided technical support in using the EHR (eg, demonstrating which button to click to get to a specific screen). Clinical consultation and EHR support were related to the clinics' management of opioid prescribing, but they were time consuming and tangential to the organisational change aims of the consulting sessions. Clearly, however, clinics needed these services, suggesting enhancements to future iterations of the implementation strategy.

Change teams

Clinics were asked to form multidisciplinary change teams that included at least one prescriber. Some clinics solicited volunteers; in others, managers assigned people to the team. Teams chose their own leaders. The composition of each team is shown in online supplementary appendix B.

Multidisciplinary representation on the team was important. In the focus groups, team members noted that changing a workflow requires understanding the tasks performed by staff members in all occupations involved and securing their cooperation to make the change. The change process would not have worked without a multidisciplinary team, one team member explained, because 'we all see healthcare from a different perspective'. Assigning leadership of the teams to non-prescribers was not as effective. While non-prescribers successfully handled logistics, they were not able to demand accountability from other team members. Given the hierarchy of the setting—reinforced by structural constraints such as scope-of-practice regulations—only prescribers could make final decisions about changes and implementation depended on their actions. Clinics that progressed quickly and easily towards improving their opioid prescribing practices relied less on change team-based processes and more on individual prescribers deciding to change their practices, thus eliciting shifts in the workflows of their support staff.

Researchers assumed that clinic change teams would have a basic proficiency in the theory and practice of quality improvement. At the initial consulting sessions, change teams completed the NGT exercise and voted to prioritise the issues raised. The researchers then issued hurried instructions to begin a PDSA cycle on the issue of highest priority. However, teams lacked the skills to do this work. For the first clinics in the pilot test, teams floundered for several months. By the fourth clinic, the team was given more direction;

this clinic had a much smoother path from identifying problems to solving them.

The planned intervention did not address communication between the change team and other clinic staff. This did not cause any difficulty in the small clinic, where the change team constituted nearly the entire staff, but it did pose a problem in the one medium and two larger clinics, when staff members affected by workflow changes were not informed about the reason for the changes and quickly became resentful. From this, the researchers learnt the importance of encouraging intraclinic communication about the intervention from the beginning. Relatedly, the researchers assumed that in the larger clinics, workflow changes implemented by change teams would at some point be rolled out to the entire clinic, although teams were not given specific instructions for how this should be done. Postintervention, teams were contacted informally to find out how things were going. Some change teams were still meeting regularly, but it did not appear that most had taken steps towards expanding changes clinic-wide. Building frequent intraclinic communication into the intervention might be important to sustainability.

Change tools

The tools included in the systems consultation intervention had varying degrees of utility. The *walk-through exercise* was described as ‘eye-opening’ and ‘beneficial...for understand(ing) people’s roles’ by change team members who participated in it, and the *flowchart* that resulted from it prompted useful conversations at the initial consulting sessions. However, only one member of one team referred to her clinic’s flowchart after the initial meeting. Participants were enthusiastic about the *NGT exercise*, which they found effective for focusing on clinic practices and building change team cohesion. The *checklist* was presented to the change teams early in the intervention, but at the focus groups few participants remembered seeing it and none of the teams used it. Instead, the guidance offered by the checklist came from the new system-wide opioid prescribing policy. (Because both were based on extant clinical guidelines, the checklist and the policy were consistent.) Change teams took great interest in the performance data and were curious about how they compared with other clinics in the sample. However, the data proved problematic in several ways: first, because the teams were not presented with benchmarks, they could not discern how they were doing in an absolute (rather than relative) sense; second, the data always lagged a month or two behind and were subject to some imprecision. As one change team member noted, ‘[the data] had a lot of flaws. And so it was difficult to tell if we were making progress or not.’ and third, the teams did not use the PDSA approach, which involves using data to assess changes being made. Teams lacked the analytic skills to conceptualise

their workflows as a series of steps and to identify and implement small-bore solutions. The new prescribing policy created anxiety, and teams felt pressured to implement all aspects of the policy at once, rather than, as one change team member said, ‘piecemealing it’. Although the teams did make workflow changes, they almost never collected data to test the changes, instead relying on informal feedback from colleagues and patients. The PDSA approach included a form for recording teams’ test cycles. A change team member described this form as ‘confusing’ and ‘overwhelming’. Change teams never independently completed the forms, relying instead on the facilitator to do it.

During the intervention, the researchers and the change teams worked together to develop new tools to respond to clinics’ needs: a script for initiating conversations with patients about opioid use; training related to a new EHR workbench, created independently of the project, designed to monitor and prompt guideline-concordant opioid prescribing and a teleconference for all four clinics’ change teams, held in response to change teams expressing an interest in other clinics’ challenges and solutions. (A similar learning collaborative structure is part of the NIATx model, but was not originally included in systems consultation.)

DISCUSSION

The systems consultation approach assumes organisational change is made incrementally, by an empowered team, supported by outside experts, who use data to identify problems and plan and test workflow modifications. This pilot test of systems consultation applied to opioid prescribing in primary care challenged some of these assumptions and suggests lessons for others seeking to implement evidence-based practices in primary care using systems consultation or a similar suite of implementation strategies. While the strong external emphasis on opioid prescribing from the health system and the news probably helped motivate clinics to participate in the pilot study, the pressure of the new system-wide opioid prescribing policy also made it difficult for clinic staff to conceptualise change as incremental and, as a result, to see the PDSA approach as a way to accomplish their goals. The hierarchy in primary care constrained the ability of non-physicians to make workflow changes. Decisions about changes were made not by multidisciplinary teams of equals, but rather by individual prescribers, then implemented with the help of other staff members. The hierarchical environment also limited the ability of physician consultants to motivate non-physician members of the change team. Rogers’ concept of *homophily*²²—the degree to which external change agents resemble the internal actors whose behaviour they are trying to influence—helps explain this observation. It also suggests why the physician consultant whose professional experience most closely matched that of the

teams with whom she was working appears to have been more effective at providing guidance.

As conceived, systems consultation assumed that the physician consultants would be skilled in promoting organisational change. In fact, while the physician consultants possessed clinical expertise about opioid prescribing—which clinicians were very eager to access, especially when grappling with challenging patients—they were not as adept at guiding process improvement. Similarly, the change teams lacked quality improvement skills and appreciated being given explicit direction. The researchers initially underestimated how central the EHR is in the primary care setting. It became clear that clinical staff depended on the EHR not just for patient history, but also to monitor and structure their work. Building EHR functionalities to support change and supporting clinic team members as they learnt to use these functionalities, proved essential to organisational improvement. With all these lessons in mind, our goal in future iterations of systems consultation is to give clinics a combination of clinical, organisational change and EHR expertise optimised according to their needs.

This study has notable limitations and strengths. Investigators evaluated an intervention of their own design; they are not disinterested assessors. Clinics were self-selected; barriers to implementation might be higher or different in clinics that were not motivated to participate in the pilot test. Patient populations were predominantly white and fairly high income; 26 of 28 participating clinic staff were white. We cannot speculate how systems consultation might work in clinics with greater ethnocultural and economic diversity. The coincident introduction of the health system's opioid prescribing policy was very motivating to prescribers and other clinic staff. We do not know what might have supported or hindered systems consultation if the policy had not been in place. On the other hand, as noted earlier, the dual roles played by investigators was a strength as well as a limitation. The phased design of the study was a strength, since it enabled the researchers to observe and analyse what was working and not working and make modifications that could be tested in another clinic. The pilot study was small enough that investigators could observe all intervention interactions and conduct a focus group or interview with all participants, without sampling bias. Finally, the multidisciplinary qualitative working group allowed for multiple perspectives in interpreting the data.

CONCLUSION

The qualitative component of our pilot study taught us important lessons about adapting systems consultation to primary care. Although the resource intensiveness of qualitative data collection and analysis makes it infeasible to replicate this qualitative study in larger scale implementation efforts, we believe that

a streamlined process for assessing the key contextual characteristics identified in this study (such as a clinic's experience with quality improvement efforts) as well as other factors reported in the literature^{23–25} can be used to guide tailoring, and we will be developing such a process as part of an upcoming clinical trial of systems consultation focused on optimisation and cost effectiveness.

Contributors All authors provided substantial contribution to the conception and design of the study and interpretation of the data. All authors contributed to the acquisition of data and provided substantial contribution to drafting and revising the manuscript. NJ and BD contributed to the analysis of the data. All authors read and approved the final manuscript.

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Competing interests AQ has a shareholder interest in CHES Health, a public benefit corporation that disseminates software to the specialty addiction treatment system. The relationship between the author and CHES Health is managed by the University of Wisconsin–Madison's Conflict of Interest Committee.

Patient consent Not required.

Ethics approval The study protocol was reviewed and approved by the University of Wisconsin - Madison's Health Sciences Institutional Review Board, submission 2015-0280-CR002.

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