


BMJ Open What types of dissemination of information occurred between researchers, providers and clinical staff while implementing an asthma shared decision-making intervention: a directed content analysis

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To cite: Ludden T, Shade L, Welch M, *et al.* What types of dissemination of information occurred between researchers, providers and clinical staff while implementing an asthma shared decision-making intervention: a directed content analysis. *BMJ Open* 2020;**10**:e030883. doi:10.1136/bmjopen-2019-030883

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2019-030883>).

Received 04 April 2019
Revised 21 January 2020
Accepted 04 February 2020



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ABSTRACT

Objective To qualitatively analyse different types of dissemination of information during monthly group calls between researchers, providers and clinical staff used to establish best practices for implementing an asthma shared decision-making (SDM) intervention. Evaluating dissemination of information can provide a better understanding of how best practices are shared, informing implementation approaches to improve the uptake of new evidence and overcome barriers.

Setting 10 primary care practices in North Carolina.

Participants Providers and clinical staff participated in monthly group phone calls with researchers to share best practices during implementation of a SDM intervention for asthma patients.

Design The research team transcribed and coded statements using content analysis into three different knowledge types: Knowledge Position, Knowledge Form and Knowledge Object. Knowledge Objects were further classified using directed content analysis where the research team interpreted the content objects through a classification process of identifying themes or patterns to describe three different types of dissemination of information: (A) Confirmation of Existing Knowledge, (B) Generation of New Knowledge and (C) Spreading of New Knowledge.

Results Across the 8 transcripts, 4 Knowledge Positions, 7 Knowledge Forms and 18 types of Knowledge Objects were identified. From the Knowledge Objects, Confirmation of Existing Knowledge occurred during the training of participating practices. The review also identified Generation of New Knowledge by providers and clinical staff raised in these calls. This Generation of New Knowledge was later documented being used by other practices with the identification of Spreading of New Knowledge.

Conclusion The research team described the types of dissemination of information that occurred between researchers, providers and clinical staff during implementation of an asthma SDM intervention. Both Confirmation of Existing Knowledge and Generation of

Strengths and limitations of this study

- In this study, directed content analysis of monthly group calls was used to differentiate types of dissemination of information over time.
- In terms of limitations, dissemination of information could not be correlated by practice to the outcomes data since only Medicaid data was collected for patients at each practice.
- The generalisation of the results is limited and does not apply to all 10 of the practices involved in the study since we did not always have full participation from all practices on every call.

New Knowledge in response to barriers occurred. These exploratory dissemination of information results provide additional mechanisms for evaluating implementation science.

Trial registration number NCT02047929; Post-results

INTRODUCTION

Uptake of many evidence-based, best practices such as shared decision-making (SDM) with asthma patients^{1,2} can be slow due to gaps in understanding of how best to disseminate this evidence into everyday practice resulting in suboptimal use of evidence-based guidelines and barriers to uptake.³⁻⁶ Through communication, new ideas can emerge and provide an opportunity for consensus that contributes to intervention success. Many communications processes resulting in action are invisible throughout the daily work process unless specifically captured and analysed for their meaningful outcomes. By having a better understanding of how to share best practices,⁷ new implementation approaches

can improve the use of guidelines and overcome barriers to uptake.^{8,9}

Dissemination of knowledge has been highlighted as a key national priority by the Agency for Healthcare Research and Quality and the Institute of Medicine.^{10,11} Terms to describe dissemination of knowledge, knowledge translation or knowledge transfer methods vary across the literature.^{12–15} For this paper, we are using the term ‘dissemination of information’ to represent the successful transfer of knowledge from one person or party to another. The most commonly used dissemination of information technique is passive diffusion, which includes exposure to academic detailing by subject matter experts, journal publications, didactic presentations and educational material distributed in paper and online formats.^{9,16} However, passive diffusion does not adequately overcome all of the barriers detailed above.¹⁷ Previous research suggests that successful dissemination of an implementation is maximised when there are coordinated efforts to encourage participation, adapt the implementation, promote action, create supportive systems, monitor and provide feedback on progress.^{9,16}

While randomised controlled trials evaluate outcomes, little is known about how dissemination of information makes interventions successful.^{16,17} There is a need for more robust study designs to evaluate dissemination of information in interventions¹⁸ to include the concept of shared understanding when describing communications during the intervention.⁷

Evaluating dissemination of information of evidence-based implementations is a complex process that involves understanding the implementation of the project, the participants involved and how they interact with each other.¹⁷ While some literature on the dissemination of information of evidence-based implementations exists, on a more granular level little is known about how to differentiate and evaluate different types of dissemination of information for implementation effectiveness.^{18–23} More real world examples are needed to demonstrate^{24–28} and explore barriers and facilitators.²⁰

Qualitative studies such as case studies and mixed methods approaches provide further insights into types of dissemination of information used during an implementation.^{18–23} By examining the thematic content of conversations using qualitative analysis, information can be compiled to identify types of dissemination of information made between different participants, such as researchers and clinical staff, during the implementation of an evidence-based intervention.

Here we describe a qualitative analysis of dissemination of information occurring within monthly group calls discussing implementation of an asthma SDM intervention. Previously published results showed that the patients from the practices that received the facilitator-led dissemination of the intervention had significantly higher perceptions of SDM occurring during asthma visits compared with patients from practices that received a traditional lunch-and-learn approach (75% vs 66%, $p=0.001$).^{29,30}

For this study, the research team examined dissemination of information between researchers including the practice facilitators (PFs), practice providers and clinical staff from each practice during the facilitator-led dissemination intervention. Our research question is as follows: What types of dissemination of information occurred between researchers, providers and clinical staff when implementing an asthma SDM facilitator-led dissemination intervention?

METHODS

Participants, setting and data collection

The data collection for this study revolved around recording monthly group calls to discuss a 12-week roll-out to implement the asthma SDM intervention into 10 primary care practices across North Carolina as part of the Asthma Dissemination Around Patient-centered Treatments in North Carolina Study using PFs.^{1,29,31,32} The research team invited providers and clinical staff from 10 primary care practices across the state (figure 1) to participate in a monthly group call with their PFs beginning in August 2014. These monthly calls served as a time to share best practices and discuss implementation related to SDM intervention for asthma patients.

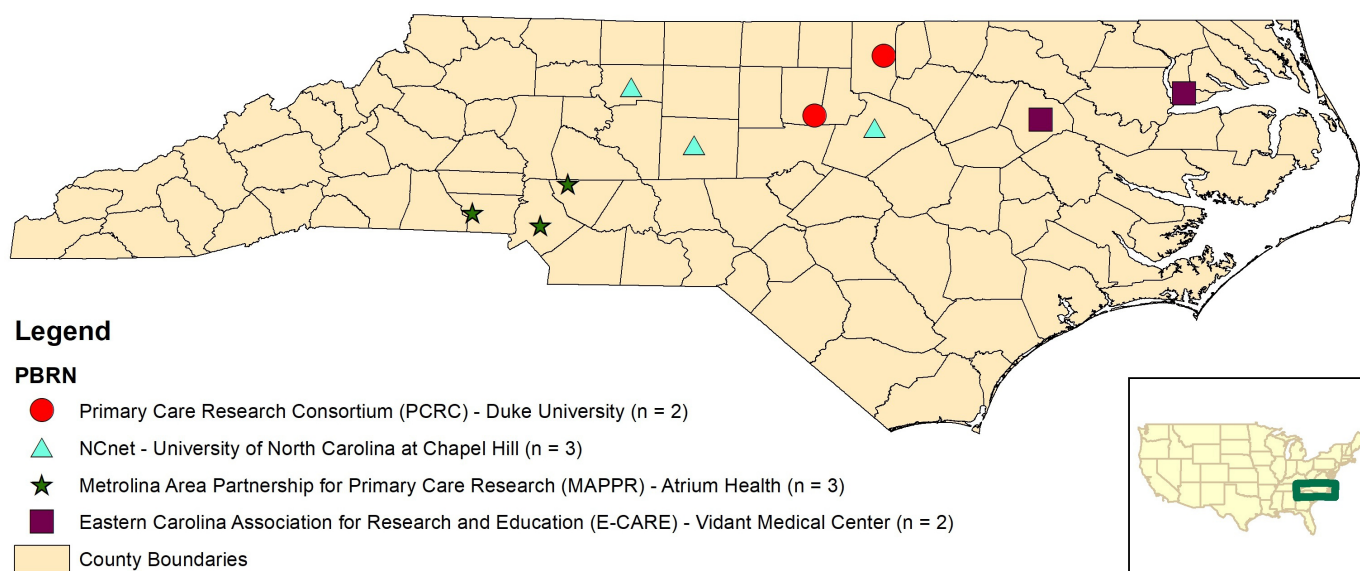
Each call centred around a theme to guide the discussion. The call themes were felt to be crucial to the success of SDM and included topics such as the ‘five essential elements of SDM’ defined as (1: patient perception of control, 2: medication adherence, 3: treatment goals and medication preferences, 4: asthma education and 5: negotiation of several treatment options), new staff training for SDM, SDM for influenza shots, the SDM survey, asthma patient recruitment, documentation of asthma patient visits, billing, scheduling and medication options for asthma patients. SDM itself was not always discussed during the calls as this information was previously covered during in-person trainings prior to the beginning of the monthly calls. Institutional Review Board (IRB) approval was obtained for research purposes, enabling the conversations to be recorded after the consent was read, then later transcribed and de-identified for analysis.

The monthly group calls were recorded for qualitative analysis of the conversation transcripts. The recording of the monthly group calls began in November 2014 following IRB approval. The taped calls were transcribed verbatim by an administrative assistant who was not directly involved in the project. MW checked the transcripts for accuracy by comparing transcribed sections with the taped calls when the assistant could not decipher who was speaking. Data collection ended when the monthly group calls related to the implementation process ended in December 2015.

Study design: coding analysis for knowledge position, form and content

Using content analysis, we coded statements transcribed from discussions about implementation of the SDM

Facilitator-Led Practices Recruited for ADAPT-NC



Legend

PBRN

- Primary Care Research Consortium (PCRC) - Duke University (n = 2)
- ▲ NCnet - University of North Carolina at Chapel Hill (n = 3)
- ★ Metrolina Area Partnership for Primary Care Research (MAPPR) - Atrium Health (n = 3)
- Eastern Carolina Association for Research and Education (E-CARE) - Vidant Medical Center (n = 2)
- County Boundaries

Figure 1 Primary care practices receiving a shared decision-making intervention as part of the ADAPT-NC study (AsthmaDissemination Around Patient-centered Treatments in North Carolina).

intervention into three different types using an inductive approach based on a previous coding template: Knowledge Position, Knowledge Form and Knowledge Object.^{33–36} A Knowledge Position is defined by the point of view of the people involved in the communication of the information and was used to identify who was speaking and who was receiving the information. A Knowledge Form is defined by how the information is organised and was used to classify the statement into a question, story, update/report or affirmation/confirmation. A Knowledge Object is defined as a piece of content presented by someone wanting to communicate information and was used to identify the content or theme of the statement (table 1). Eight research team members (TL, LS, MW, PB, KD, MM, JH and TCB) coded the eight transcripts. Pairs of team members were used to code two transcripts each. TL compared the transcripts based on the distinct number of content statements identified and calculated agreement between 70% to 100% across the pairs based on this metric.

Dissemination of information theme analysis

Once the content analysis was completed using the inductive approach, Knowledge Objects were filtered based on relevant Knowledge Positions and Knowledge Forms, such as clinicians answering a question. The resulting Knowledge Objects were further coded using a directed content analysis.^{33 37} The research team then used a deductive approach to interpret the content of the objects through a classification process. The directed content analysis identified themes or patterns to describe three different aspects of dissemination of information: Confirmation of Existing Knowledge, Generation of New Knowledge and Spreading of New Knowledge. The coded Knowledge Objects are defined: (A) Confirmation of Existing Knowledge: when providers/clinical staff indicated that they implemented the information presented by the research team into their own practice, (B) Generation of New Knowledge: when providers/clinical staff indicated that they developed their own information and implemented

Table 1 Excerpt of dissemination of information coding

Page	Line number start	Line number end	Words	Knowledge position: FROM	Knowledge position: TO	Knowledge form	Knowledge object
1	17	18	19	CS - clinical staff	MO - moderator	Update/report	Site update
1	20	20	4	CS - clinical staff	MO - moderator	Affirm/confirmation	Site update
1	22	23	32	CS - clinical staff	E - everyone	Affirm/confirmation	Clinic flow
1	26	29	74	CS - clinical staff	MO - moderator	Answer	Clinic flow
1	31	31	7	CS - clinical staff	MO - moderator	Answer	Clinic flow

Knowledge Position FROM, Who is speaking; Knowledge Form, form of Knowledge Transfer; Knowledge Object, content or theme of Knowledge Transfer; Knowledge Position TO, Who is receiving the information; Words, number of words in statement.

it into their own practice and (C) Spreading of New Knowledge: when providers/clinical staff indicated that they implemented the Generation of New Knowledge presented by another provider/clinical staff into their own practice.

Three research associates (TL, LS and MW) separately coded the knowledge objects in the eight transcripts by hand. The codebook of the directed content analysis was agreed on by TL, LS and MW after discussing the codes for each Knowledge Object.^{38–41} Reflexivity was maintained by the research team through the analysis and writing by openly discussing the roles of those who were involved in the monthly group calls. LS moderated all the monthly group calls. She was not known to most the participants of this research prior to the study but provided feedback to any questions posed that were not answered by other non-research participants. As researchers, HT, JH, KD and PB participated in the calls to provide updates on the project when necessary and contribute to the overall discussion after non-research participants provided their contribution. TL and MW provided administrative support around logistics and taping of monthly group calls. While analysing the quotes, all members of the research team

were careful to exclude any quotes influenced by research team members.⁴²

Patient involvement

A patient caregiver participated in the monthly group calls to provide the patient's perspective on the barriers and ideas being discussed. The patient caregiver also participated in the weekly research team meeting after the monthly group call to provide perspective on the overall project.

RESULTS

Of the 11 monthly group calls conducted, 3 were conducted before the IRB approved the research and were not recorded. Across the remaining 8 transcripts, the research team identified 4 Knowledge Positions, 7 Knowledge Forms and 18 types of Knowledge Objects. Two Knowledge Positions; Practice Facilitator and Provider/Clinical Staff, along with four Knowledge Forms; Answer, Story, Suggestion and Update/Report were used to filter Knowledge Objects for the directed content analysis. The research team further classified the 18 Knowledge Objects into three different types of dissemination of information

Table 2 Identified dissemination of information types from dissemination of information coding and directed content analysis

Dissemination of information types			
Knowledge position	Knowledge form	Knowledge object	Directed content analysis
Moderator	Affirmation/confirmation	Billing/coding	Confirmation of Existing Knowledge*
Researcher	Answer*	Reimbursement	
Practice facilitator*	Other	Documentation	Generation of New Knowledge*
Provider/clinical staff*	Question	Patient satisfaction	
	Story*	Recruitment	
	Suggestion*	Scheduling	
	Update/report*	Sustainability	
		Training	
		Usefulness of group call	
		Usefulness of SDM clinic	
		Application of SDM	
		Documentation	
		Dissemination	
		Health coach certification	
		Patient education	
		PCMH	
		Pre-visit planning	
		Productivity	
		Recruitment	
		Scheduling	
		Shared resources	
		Team based care	
		Training	
		Application of SDM	Spreading of New Knowledge*
		Health coach certification	
		PCMH	
		Pre-visit planning	
		Recruitment	
		Scheduling	

*Knowledge Positions and Knowledge Forms used in directed content analysis. PCMH, Patient-Centred Medical Home; SDM, shared decision-making.

Table 3 Example quotes of knowledge objects: recruitment and scheduling

Knowledge objects	Example quotes
Confirmation of Existing Knowledge	
Recruitment	"We used the posters that you provided for us. We have those in the (exam) rooms and out in the waiting area." (December 2014)
Scheduling	"I think in the next quarter we're going try to expand to more providers having those types of days and (asthma) visits in the afternoon, that way it just becomes ingrained in everybody's mind." (December 2014)
Generation of New Knowledge	
Recruitment	"I am getting ready to send out a campaign call. Within our... system we can create our own campaigns. Asthma flares this time of year are pretty high so we're sending out a little asthma reminder to folks that we are doing the shared decision-making clinic... It's a group call. Like a reminder call you can do. We can send it out to all our patients or a select group of patients. So I can send it out to all asthma coded patients." (November 2014)
Scheduling	"We have (a) parallel schedule where I'll have basically standard afternoon schedule. We only do our asthma clinics in the afternoon... Additionally, if a patient no-shows for the asthma visit, it doesn't affect me. If I have a no-show on my regular schedule, it just may mean I spend more time with my asthma patients. We've found that works very, very well in a productivity model." (January 2015)
Spreading of New Knowledge	
Recruitment	"I'm anxious to see the video that X did. I think that will be a great recruitment video to share with all when it's up and ready." (June 2015)
Scheduling	"They are looking to, in this fall, start with the parallel scheduling that X has so successfully implemented." (June 2015)

X, de-identified names.

related to the SDM: Confirmation of Existing Knowledge, Generation of New Knowledge and Spreading of New Knowledge (table 2).

This analysis identified Confirmation of Existing Knowledge that occurred during the training of providers and clinical staff in the participating practices. The review also identified Generation of New Knowledge that providers and clinical staff raised in these calls. This Generation of New knowledge was later documented to be spread to other practices with the identification of Spreading of New Knowledge. Directed content analysis of the calls showed the Confirmation of Existing Knowledge, Generation of New Knowledge and Spreading of New Knowledge occurred throughout this project.

In some cases, the practices reviewed what they learnt in the initial training by their PF around a monthly group call topic such as recruitment, an example of Confirmation of Existing Knowledge. Then the practice would pose questions to the group on the call about barriers they were having with recruiting patients. The question would prompt another practice to offer up a solution that worked for their practice but was not part of the original training indicating the Generation of New Knowledge. In a subsequent call, a third practice would mention having also implemented the proposed solution from another practice. Table 3 gives examples of quotes highlighting scheduling and recruitment Knowledge Objects. Quotes have been edited for length and clarity. All coded statements in the directed content analysis have been uploaded as supplementary information in online supplementary additional File 1.

Scheduling

Confirmation of Existing Knowledge transferred to practices was successfully seen with regards to scheduling of asthma SDM visits. As part of the training, the practices were encouraged to create 'parallel schedules' for the implementation: separate schedules for asthma SDM visit patients that ran parallel to the providers' regular continuity clinic schedules. One provider said:

...we're going try to expand to more providers having those types of days and SDM visits in the afternoon, that way it just becomes ingrained in everybody's mind.

Another provider commented:

We have the parallel schedule where I'll have basically a standard afternoon schedule in addition to seeing asthma SDM patients...

Providers and clinical staff provided new solutions to work around the obstacle of patients not showing up for their asthma SDM visits, which was coded under Generation of New Knowledge. A provider commented:

If they don't show up for the asthma clinic, we're actually able to automatically let everyone know and open that slot at the end of the hour... So (there) may be zero impact on my day if patients were no-showing (for asthma SDM visits) because we'll just move work-in (patients) into those positions.

Recruitment

The research team identified the Confirmation of Existing Knowledge transferred from researchers to

practices around recruitment for asthma SDM visits. A provider shared:

I'm pretty diligent about trying to pick up asthma patients a month ahead of time and refer them to asthma SDM clinic the following month...

Another provider added the following regarding asthma SDM visit recruitment:

I was thinking about signage for the influenza clinic might be a great idea... (to recruit from)... and make sure the clinical assistants... who are giving the immunizations will know what to do if they (a patient or parent) say, 'hey what's that asthma clinic thing.'

Generation of New Knowledge for recruitment was also identified with mention of a 'campaign call', a call or mailing specifically targeting patients with asthma. This type of recruitment strategy was not originally planned within the training. A clinical staff practice manager commented:

...Within our system we can create our own campaigns. Asthma flares this time of year are pretty high so we're sending out a little asthma reminder to folks that we are doing the shared decision-making clinic... Like a reminder call you can do.

Spreading of New Knowledge around recruitment was evident in subsequent monthly group calls. One practice developed a video around asthma SDM for recruitment and began playing it in their waiting room to inform their patients of the opportunity. This video, which was not part of the original training, was a Generation of New Knowledge within a monthly group call, then in a later call, Spreading of New Knowledge was seen when another practice commented on their desire to implement a similar video for recruitment purposes, stating:

I'm anxious to see the video that another practice did. I think that will be a great recruitment video to share with all when it's up and ready.

The research team identified Generation of New Knowledge in one call and then another practice would reference the Generation of New Knowledge in the same call or in a future call indicating a Spreading of New Knowledge for both pre-visit planning and health coaching certification (table 4).

Pre-visit planning

Generation of New Knowledge was identified with regards to pre-visit planning for the asthma SDM visits. A provider/clinical staff member reported:

We have been able to have our care coordinators call before and... they're... documenting in... our EHR (Electronic Health Record), how the things are going, what the parents or the patients feel their goals for this year would be, and how their medications are going.

Table 4 Example quotes of knowledge objects: from generation to spreading of new knowledge

Knowledge objects	Example quotes
Generation of New Knowledge	
Pre-visit planning	"We have been able to have our care coordinators call before and in anticipation of their upcoming asthma visit... and they're asking them beforehand and documenting in... our EHR, how the things are going, what the parents or the patients feel their goals for this year would be, and how their medications are going and... if they're having any difficulties or any adherence issues with their medications... So they're having that conversation out front ahead of your visit so it's there when they come in for their asthma visit." (August 2015)
Health coach certification	"Our nurse practitioner is set up for health coaching. She's going to be certified as a health coach within the next couple months... Our clinical coordinator CMA also wanted to get certified in health coaching so maybe that will happen next year." (October 2015)
Spreading of New Knowledge	
Pre-visit planning	"I love the idea... of having the triage nurses call ahead and do the little pre-screening... We were definitely taking notes about that." (August 2015)
Health coach certification	"I think others might be interested to know about that (health) coaching programme... I'd seen some things on the internet about that, but if there's a specific link in case other practices are interested in having some of their staff certified and more formally trained... maybe we can share that with the group?" (October 2015)
CMA, Certified Medical Assistant; EHR, Electronic Health Record; X, de-identified names.	

Later on in the call, a provider followed up with an indication of Spreading of New Knowledge:

I love the idea... of having the triage nurses call ahead and do the little pre-screening.

Health coach certification

The research team identified a practice with Generation of New Knowledge around health coach certification in one call and then another practice referenced the Generation of New Knowledge of health coach certification in a future call indicating a Spreading of New Knowledge.

Generation of New Knowledge: Our nurse practitioner is set up for health coaching. She's going to be certified as a health coach within the next couple months.

Spreading of New Knowledge: I think others might be interested to know about that health coaching programme... X if you think that's okay maybe we can share that with the group?

DISCUSSION

Statement of principal findings

The dissemination of an evidence-based intervention into practice, such as a SDM asthma intervention, provides opportunities to improve implementation methods.^{1 2} The exploratory results of this study show that different types of dissemination of information occurred as part of a SDM asthma intervention. While the research team expected to see Confirmation of Existing Knowledge, additionally a substantial amount of Generation of New Knowledge by providers and clinical staff was also brought to the monthly group calls. The calls were designed to allow the practices to share best practices for implementation. We observed that practices that encountered barriers to implementing the intervention provided much of the Generation of New Knowledge.

The identification of Generation of New Knowledge such as the example around pre-visit planning mentioned previously offers additional mechanisms to further explore group communication dynamics that enhance our knowledge of finding best practice implementation methods. These exploratory results provide further understanding around dissemination of information for multisite complex interventions and document several instances of Generation of New Knowledge being shared that were not a part of the original training for the intervention.

Strengths and weaknesses of the study

The linear nature of this project with the primary care practices receiving a 12 week rolling training programme, and the monthly group calls they participated in, allowed for the research team to document dissemination of information from the training. When requesting help around a specific problem with the implementation or presenting new ideas, the call provided a platform to indicate what they had already begun implementing based on a previous training. These results suggest that different types of dissemination of information can be collected and documented through qualitative methods.

The analysis was based on those who called in each month from approximately 55 invited participants from the 10 participating practices. Not all providers and clinical staff were able to attend, nor did they consistently participate every month. Unfortunately, some practices were never able to join in for the discussions due to scheduling challenges and competing clinical demands, so it was not possible to determine whether there was a difference between those who participated and those who did not. Since the recording and consenting of calls began after the third monthly group call, not all information about the different types of dissemination of information could be captured from all calls. While the design of our trial compared different dissemination methods,^{29 31} dissemination of information could not be correlated by practice to the outcomes data since Medicaid data was only collected for patients at each practice in the study.

Strength and weakness in relation to other studies

Previous studies have confirmed dissemination of information under circumstances around a specific site-based project, but this study was the first state-wide practice facilitation study to evaluate and explore different types of dissemination of information occurring.^{24–28 43} Our results differed from other dissemination of information research in this field. One study, providing the framework to identify Knowledge Forms, Knowledge Positions and Knowledge Objects,³⁵ did not establish a design to analyse dissemination of information over time, rather, they examined the conversation between researcher and clinician within a single transcript. Their results focus on the dissemination of information between researchers and clinicians as they discuss statistical knowledge and its transfer into clinically useful knowledge.

Other studies related to dissemination of information have focussed their research on identifying the barriers and facilitators to dissemination of information.^{5 6} While this information is useful, the evidence evaluating the types of dissemination of information from a large scale SDM intervention provides an example showing that implementation information was successfully documented among participants.

The meaning of the story: possible explanations and implications for clinicians and policymakers

The exploratory results show that different types of dissemination of information occurred in a SDM intervention and can be documented with qualitative methods. These methods and analysis provide a mechanism to document dissemination of information necessary to support adoption and implementation of evidence-based interventions within a SDM intervention.

Unanswered questions and future research

The research presented leaves several unanswered questions. While the research team collected and documented different types of dissemination of information using qualitative methods, it remains unknown how dissemination of information relates to the outcomes within a SDM intervention at the practice level. This evidence gap provides an opportunity to examine health outcomes by specific practices in relation to dissemination of information in a dissemination project.

CONCLUSIONS

The research team described the types of dissemination of information that occurred between researchers, providers and clinical staff during implementation of an asthma SDM intervention. Both Confirmation of Existing Knowledge and Generation of New Knowledge in response to barriers occurred. These exploratory dissemination of information results provide additional mechanisms for evaluating implementation science.

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Acknowledgements We extend our gratitude to all the participating practices, patients, providers, clinical staff and members of the North Carolina Network Consortium and all PBRNs involved.

Contributors TL, LS, MW, KD, JH, TCB and PB coded the first round of transcripts. TL, MW and LS further analysed the codes to identify final classifications of quotes. TL, MW, LS and HT drafted the manuscript. KD, JH and TCB provided critical feedback in the final drafting of the paper.

Funding Research reported in this publication was funded through a Patient-Centered Outcomes Research Institute Award (CD-12-11-4276). The opinions in this publication are solely the responsibility of the authors and do not necessarily 'represent the views of PCORI, its Board of Governors or Methodology Committee'. This publication was supported by Grant Number UL1TR001111 from the National Center for Advancing Translational Sciences at the National Institutes of Health.

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Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information. All coded statements in the directed content analysis have been uploaded as supplementary information.

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