Author's response to reviews

Title: Understanding Type 2 Diabetes Mellitus Screening Practices Among Primary Care Physicians: A Qualitative Chart-Stimulated Recall Study

Authors:

Dina Hafez (dhafez@med.umich.edu)

Daniel Nelson (dannel@med.umich.edu)

Evan Martin (marteva@med.umich.edu)

Alicia Cohen (calicia@med.umich.edu)

Rebecca Northway (rnorthwa@med.umich.edu)

Jeffrey Kullgren (jkullgre@med.umich.edu)

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Author's response to reviews:

Reviewer 1:

1. This paper addresses an important topic, T2DM screening practices among primary care physicians, in a large health system. The authors are extremely clear in their presentation of the rationale for conducting this study, the methodology, and results. These findings provide insights into physician decision making and inform potential areas for future practice-based interventions (e.g. EMR reminders) and/or PCP education programs.

Thank you for your positive feedback.

2. Did patient characteristics differ by T2DM screening status? It would be interesting to see the Table 1 patient characteristics also stratified by screening status. For example, the authors state that "older age" was cited as reason for screening in over one-third of the encounters. Though all patients were old enough to be screened, were the patients screened on average older than those not screened? Insurance type (i.e. private, public, military) could also be interesting to include.

We revised Table 1 to show patient characteristics stratified by whether they were screened for T2DM. In our sample, the mean age was lower among patients who were screened for T2DM compared with patients who were not screened. This may reflect the fact that screening for T2DM occurred more often during health maintenance examinations than return visits and, in our sample, the mean age of patients presenting for health maintenance examinations was lower than the mean age of patients presenting for return visits. Patients who were screened also had a higher BMI than those who were not screened, and there were more patients with a history of prediabetes among those who were screened compared to those who were not screened. We agree that it would be interesting to compare insurance status among those screened and those not screened, but unfortunately we do not have these data.

The revised Table 1 is shown in the Results (lines 195 to 210).

We also include the following information in the Discussion (lines 308 to 310):

"Further, in our sample the mean age was actually lower among patients who were screened for T2DM compared with patients who were not screened (58 years versus 61 years)."

3. If possible, it would be good to describe the PCPs interviewed beyond internal medicine/family medicine (e.g. sex, time since graduation from medical school). Despite a relatively small sample size, did it appear that there were any differences in the factors that influence PCPs' decisions by PCP characteristics? Or were all responses relatively uniform?

We agree that it would be interesting to report physician-level characteristics, but regrettably we did not collect this data at the time of the interview and are unable to do so now. While we are unable to report this data, we do not suspect that such an analysis would reveal any major PCP-level differences in the factors that influence T2DM screening decisions because we observed relative homogeneity in T2DM screening practices among the physicians in this study; most physicians performed T2DM screening on patients with certain risk factors (e.g. obesity) and at certain visit types (e.g. health maintenance examinations).

4. Key recommendations after a positive screening test would be referral to a DPP program and/or use of metformin. In this study, the authors reported that PCPs recommended weight loss and increased physical activity but never participation in a DPP program or use of metformin. They further describe that at least some PCPs prefer not to prescribe metformin because they don't want to add medications unless necessary or they wait for a threshold to be met (e.g. HbA1c level). From the interviews, was it possible to get a sense of why the PCPs did not recommend a DPP program? Do PCPs know how to refer to a DPP?

We were surprised to find that physicians in our study never provided a Diabetes Prevention Program referral, especially since some of our institution's primary care clinics began offering the DPP around the time of this study. Since this was an unanticipated finding, our interview guide was not designed to specifically explore this topic. Thus we are unfortunately not able to comment on why physicians did not recommend a DPP to patients with prediabetes. We are very interested in understanding specific barriers to DPP referral among primary care physicians, and hope to explore this important issue in future qualitative work.

Reviewer 2:

5. This is a qualitative research to identify factors that influence PCPs' decisions to screen patients for T2DM and to characterize their interpretation and communication of screening test results to patients. This study is done among University of Michigan Health System primary care physicians. The introduction was well written in giving an overall understanding of the problem of diabetes, the recommendation of screening and intervention in the country and the rationale of this study.

We appreciate these positive comments.

6. Clarification is needed in the method section about this issue: As stated in the method, "During the CSR interviews, physicians were first asked whether they screened each patient for T2DM and what factors influenced this decision. Our questions about reasons for the physician's decision were guided by whether the physician stated they had or had not screened the patient for

T2DM, rather than how the patient had been classified in our purposive sampling." But it was stated that "Physicians had access to their EHR documentation during the interview." - How would the interviewers/researchers ensure that the physicians are blinded to the decision about screening/ not screening in their earlier actual management when they can access their EHR previous documentation? Please clarify.

We apologize that the original reporting of our methods was confusing. The physicians had access to the EHR throughout the entire interview and were encouraged by the interviewers to use data within the EHR to answer specific questions. This is because these fulltime clinicians with busy primary care practices may not have been able to recall specific details of clinical encounters that occurred up to 2 weeks before the interview without having EHR access during the interview. Such medical record access during interviews is a central feature of the chart-stimulated recall approach which, as we note on lines 84-89, permits examination of a physician's own recent clinical decisions and provides more insight into physicians' decision-making processes than might be captured through their responses to hypothetical clinical scenarios.

Nevertheless, the reviewer makes an important point that such physician access to the EHR could also be a potential source of bias. We now include this as a potential limitation in the Discussion (lines 345 to 348):

"Further, although physician access to the EHR at the time of the interview was intended to prompt recall of the encounter, it is possible that some physicians may have used EHR data to justify their decisions to screen or not screen a patient for T2DM."

Suggestions for improvement of the methods and results to include clearer description and using the standard criteria of reporting a qualitative research. This include:

7. What were the researcher's credentials?

Please see our affiliations and professional degrees, which are listed on the title page.

8. What was their occupation at the time of the study? What experience or training did the researcher have?

Our team consisted of 3 primary care physician health services researchers, 1 fulltime primary care clinician, and 2 preclinical medical students.

We have added this information in the Methods (lines 74 to 75):

"Our team, which consisted of 3 primary care physician health services researchers, 1 fulltime primary care clinician, and 2 preclinical medical students…"

9. What did the participants know about the researcher? e.g. personal goals, reasons for doing the research

The study recruitment letter informed potential participants that the goal of this study was to understand T2DM screening practices among primary care providers.

We now include this information in the Methods (lines 79 to 81):

"Study invitation letters were sent by email, and informed providers that the primary aim of this study was to explore the factors that influence providers' decisions to screen for T2DM."

10. Was a relationship established prior to study commencement?

A relationship was not established between the interviewer and the physician prior to the study. To the contrary, we intentionally opted to have preclinical medical students conduct the

interviews rather than clinical medical students. This was to minimize the risk of introducing social desirability bias into the interviews, because preclinical medical students would be less likely than clinical medical students to have had prior contact with the interviewee. For example, a physician may be reluctant to provide a familiar trainee with an honest response if it revealed a perceived clinical weakness.

We address this issue in the Discussion (lines 343 to 345):

"…physicians' responses could have been influenced by recall or social desirability biases, though physician use of the EHR during interviews and our inquiries about recent visits by preclinical medical students aimed to mitigate the potential for such biases."

11. How were participants approached? e.g. face-to-face, telephone, mail, email

We used e-mail to recruit providers for the study. We include this information in lines 79 to 81.

"Study invitation letters were sent by email, and informed providers that the primary aim of this study was to explore the factors that influence providers' decisions to screen for T2DM."

12. "Two nurse practitioners and 5 physician assistants were invited to participate in the study, but none responded to our invitation" What was the reasons?

Unfortunately, we do not have information on reasons for non-participation.

13. How many physicians refused to participate or dropped out? Reasons?

We invited 50 Internal Medicine physicians and 39 Family Medicine physicians to participate in our study. Twenty-five physicians responded to our recruitment e-mail and indicated that they wished to participate in our study. A total of 20 physicians were interviewed. We reached data saturation (described below in the response to question #10) by the time these interviews were completed and therefore we did not conduct any additional interviews.

We include information on the number of providers invited to participate in this study in the Methods (lines 75 to 78):

"…invited Internal Medicine physicians (n=50), Family Medicine physicians (n=39), nurse practitioners (n=2), and physician assistants (n=5) from 14 UMHS primary care practices to participate in a study about T2DM screening practices."

We also include information regarding the total number of respondents in the Methods (lines 92 to 93):

"Twenty-five physicians responded to our recruitment e-mail and agreed to participate in our study."

Because physicians ended study participation after their interview, there was no opportunity for them to drop out of the study.

14. Was anyone else present besides the participants and researchers?

Only the interviewer and the participant were present at the time of the interview.

15. Was data saturation being considered in the sampling and recruitment?

We planned to conduct a minimum of 20 interviews and to conduct additional interviews if we had not reached data saturation after the 20th interview. Because we reached data saturation after 20 interviews no additional interviews were needed.

This information was added to the Methods (lines 93 to 94):

"We planned to conduct a minimum of 20 interviews, with additional interviews to be conducted only if data saturation was not achieved."

We also added the following text in lines 169 to 171:

"Few new themes emerged after coding 12 transcripts and no new themes emerged after coding 16 transcripts. Given that we reached data saturation, we did not conduct additional interviews following the 20 interviews."

16. How was the questionnaires being developed? Was this questionnaire pilot tested?

We used the interview guides from other published chart-stimulated recall studies to develop our interview guide. Given that similar interview guides had been successfully used in other studies, we did not pilot test our guide.

We acknowledge our use of previously used interview guides in the Methods section (lines 153 to 154):

"The interview guide was derived from previous CSR studies [14], [15] and is provided in the Appendix."

17. Were field notes made during and/or after the interview?

All interviews were audio recorded and transcribed verbatim; there were no field notes made during the interview.

18. What was the duration of the interviews?

Each interview lasted approximately 30 minutes. This information was added to the Methods (lines 135 to 136):

"Interviews were conducted by trained preclinical medical students (DN, EM) and lasted approximately 30 minutes in duration."

19. Were transcripts returned to participants for comment and/or correction?

The transcripts were not returned to participants for comments or corrections, as this could have introduced bias. For example, a provider may have reviewed the T2DM guidelines following the interview and then changed their responses upon review of the transcript.

20. Are the researchers involved in the analysis primary care physicians? How did the researchers avoid influence of their roles in the interpretation of the data?

Two primary care physician researchers (JK, DH) and one preclinical medical student (DN) were directly involved in data analysis and interpretation. The transcripts were de-identified prior to data analysis to avoid any influence of their roles in the interpretation of the data.

This is now noted in the Methods (lines 160 to 161):

"The transcripts were de-identified prior to data analysis to minimize the potential for biased interpretation of the data…"

21. More detail description of the coding tree is needed.

We used directed content analysis to develop our coding scheme. We now include more detail regarding our coding process and provide two citations to support this approach in the Methods (lines 162 to 167):

"Codes and definitions were generated during consensus conferences using directed content analysis [25]. Specifically, initial codes were created to reflect the main topics in the interview guide (e.g., decision to screen or not screen patients for T2DM), and additional codes were subsequently generated to reflect the patterns and themes that emerged from the data [26]. Codes and definitions were generated during consensus conferences, and the coding scheme was revised when new themes were encountered."

22. Were themes identified in advance or derived from the data?

Consistent with directed content analysis, we identified major themes in advance and then derived additional themes from the data. This process is described in the above response to reviewer comment 21.

23. Each quotation were not identified. Would be good to provide some information about the physicians' specialty (Inter med/family Med), and years of experience in each quotation.

We agree that this information could enrich our paper, but unfortunately we do not have information regarding each physicians' years of experience. While we have information regarding physicians' specialty, we did not include this information in the manuscript because clinical leadership of our health system asked that we avoid making between-specialty comparisons of T2DM screening practices.

24. Did participants provide feedback on the findings?

To date, we have not provided the participants with direct feedback on the findings of this study. However, we are hopeful that our findings once published will inform ongoing initiatives within our institution to improve rates of DPP referrals by primary care physicians.

25. Please illustrate more detail about ' patient-centered medical home model' for wider audiences that are not familiar with the US healthcare system.

We apologize for the lack of clarity regarding patient-centered medical homes. The practice innovations we envision could be implemented in a variety of clinical settings beyond patient-centered medical homes. To minimize confusion and to make our recommendation accessible to a wider audience we made the following change to the Discussion (lines 319 to 321):

"…practice innovations could offer opportunities for other members of primary care teams to share responsibility for screening patients for T2DM when they seek primary care for a broader range of reasons."