Author's response to reviews

Title: The Impact of Interventions on Appointment and Clinical Outcomes for Individuals with Diabetes: A Systematic Review

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Author's response to reviews: see over
AUTHORS’ RESPONSE TO REVIEWERS COMMENTS

We would like to thank all three reviewers for their detailed comments about our review paper. We revised the manuscript according to the reviewers’ comments and provided our responses to each individual comment in this document.

REVIEWER #1 (Jennifer Raymond):

Specify Type 1 or Type 2 or both?

In our literature review, 4 studies consider Type 1, 42 studies consider Type 2, and 10 studies consider both Type 1 and Type 2. Five studies provided the ICD-9 codes used to identify individuals with diabetes, which we used to determine the diabetes types considered in the study. Sixteen studies did not provide which diabetes type is considered. We added the diabetes type considered in each study in Table 1. We also added the following sentence to the abstract to provide the number of studies that consider Type 1 and/or Type 2 diabetes:

“Forty-two studies considered only Type 2 diabetes, 4 studies considered only Type 1 diabetes, 15 studies considered both Type 1 and Type 2 diabetes, and 16 studies did not mention the diabetes type.” – lines 46-48 in revised manuscript

Before Paragraph on Line 75: Consider adding an outline of care guidelines as specified by ADA (and/or other professional organizations) to review what is expected prior to describing what is completed.

An outline of ADA care guidelines (the following paragraph) is added as the second paragraph of “Background” section. – lines 76-86 in the revised manuscript

“According to ADA guidelines, which may vary from year to year based on evidence, people with diabetes should receive diabetes self-management education (DSME) at the time their diabetes is diagnosed and as needed thereafter. HbA1c blood test should be performed at least 2 times a year. The fasting lipid profile (total cholesterol, LDL, HDL, triglycerides) should be measured at least annually. Annual routine urinalysis and microalbuminuria test should be performed to assess nephropathy. An annual comprehensive foot exam should be performed to identify risk factors for ulcers and amputations. A dilated eye exam is recommended every year for patients with diabetes. Flu vaccines should be provided annually to all patients with diabetes. Pneumococcal pneumonia vaccines are recommended for all patients over 2 years old. Self-monitoring of blood glucose (SMBG) should be performed three or more times a day for patients using multiple insulin injections or insulin pump therapy.”

Line 89: Consider adding that visits are now often scheduled electronically. Not only by phone.

The sentence is changed as: “The patient can be scheduled for the next visit immediately after a provider visit or at a later time when the patient requests an appointment electronically or by phone.” – line 101 in revised manuscript
Line 90: What does timely decision making mean? Patient decision-making?

It means “timely decision making about patient’s treatment by the provider”. We changed “timely decision making” to “timely treatment decisions” in the text. – lines 102-103 in the revised manuscript

Line 140-141: Reword. “Articles were limited to those involving adults (19+ per PubMed), written in English, and containing an abstract, which further…”

Changed. – lines 154-155 in revised manuscript

Line 147: Do not start a sentence with a number. Change to text (e.g. one hundred…) or reword.

Changed. – line 164 in revised manuscript

Line 155-156: What does “bulk” mean? Include the number or percent.

The number (46 studies) is included in abstract and main text. – lines 45 and 171 in revised manuscript

Line 174: Did all interventions have A1c 12 months after the intervention? I would not think all included studies had the same post-intervention data collection time line.

The included studies do not have the same post-intervention data collection timeline. Table 1 provides detailed information about study period and the time intervals the measurements were made. The sentence in the main text was just an example. In order to reduce the confusion, we replaced 12 months with m months. – line 192 in the revised manuscript

In regards to tables, the “other” columns need to be described. I am guessing these items indicate additional data collection, but they are difficult to discern/read in a several of the tables.

In previous version of Table 1, “other” column included additional information about the intervention and/or the surveys/questionnaires used to measure behavioral outcomes such as patient satisfaction, quality of life, self-efficacy, diabetes distress, etc. In the revised manuscript, we divided Table 1 into two. The information about diabetes type considered in each study, study population, methodology, and intervention summary are kept in Table 1. Detailed information about the interventions is moved to appendix as Table A.1. In the revised manuscript, “other” column in Table A.1 includes additional information about the intervention.

In revised manuscript, we moved Tables 3 and 4 to appendix as Tables A.2 and A.3, and “other” column includes other clinical and behavioral outcomes, respectively.
Line 182: ADA guidelines need to be specified. These vary based on the year of the intervention, and they also need to be explained to the reader of this manuscript.

ADA guidelines are provided in Background section. However, in Table 4 (Table A.3 in the revised manuscript), we report only annual foot exam, annual eye exam, and processes of care (a combination of multiple measures such as number/percentage of patients with all more than one test). The other measures (such as having a HbA1c test every 3-6 months, having an LDL test annually, having flu vaccines, etc.) are already reported under “Increased outpatient care services” in the same table.

We specified the ADA guidelines reported in Table A.3 in the main text. – lines 198-199 in the revised manuscript
We added a sentence that the ADA guidelines might vary from year to year based on evidence to Background section. – line 76 in the revised manuscript

In regards to tables, specify what p-value is considered significant. This could be included at the bottom of the table.

We consider p-value less than or equal to 0.05 as significant. This is included at the bottom of the Tables.

Line 221: “rates” not “rate”

Changed. – line 242 in revised manuscript

Line 224: Does “HbA1c levels” mean improved glycemic control (A1c actually dropped)? If yes, please specify as that is pertinent information.

Yes, it means improved glycemic control. We added that information in main text. – lines 245-246 in revised manuscript

Line 233: I would change this from “the literature review” to “one literature review” because this makes it confusing in regards to whether you are referencing your study or another study. This study you are referencing focused on “reminders to the provider”? Weren’t other interventions focused on the patients, not the providers? Likely needs rewording/clarification. Maybe add a sentence describing that this approach was different or reword if that is not the case.

The study cited in that sentence is not a literature review paper. We were referring to our study when we used “the literature review”. The paragraph is rewritten to reduce the confusion about the cited study:
“Different than the studies that consider reminders to patients only, one study combined reminders to the patient with reminders to the provider [20]. In a RCT, faxed reminders were sent to the provider for patient overdue laboratory tests and letter reminders were sent to the patients with a warning of overdue laboratory tests. Even though the decrease in HbA1c and LDL of the intervention group when compared to control group was not significant, the
emergency visits and hospital admissions were reduced significantly [20].” – lines 257-262 in the revised manuscript

**Line 250-251:** Was this just an association? It is difficult to think the process of having open accessed scheduling actually increased BP, etc.

**Line 253:** Should you also indicate that the clinic’s input to ensure meeting ADA, etc. guidelines may be more cumbersome because scheduling is totally open? It just seems there should be an additional sentence/comment in regards to how this system would impact clinics.

The following sentence is added to explain how open access scheduling would impact clinics: “If the patient forgets the timing of laboratory tests and provider visits, and the clinic does not send reminders to the patient for scheduling their appointments, open access scheduling might reduce compliance to diabetes management guidelines.” – lines 275-278 in the revised manuscript

The sentences related to the results are rewritten as follows:

“One retrospective cohort study showed that open access scheduling was associated with significant decrease in HbA1c and urine microalbumin testing [23]. Even though HbA1c levels, and the number ED visits and hospitalizations did not change significantly with open access scheduling, this study suggested that scheduling process should be adjusted for patients with diabetes to improve diabetes processes of care (HbA1c, LDL, urine microalbumin testing) [23].” – lines 278-283 in the revised manuscript

**Line 278:** “was” should be “were” (two studies)

Changed. – line 312 in the revised manuscript

**Line 283:** Frequency of A1c tests? Specify. I would recommend this throughout the text. Just stating increased A1c, etc. could be confusing in regards to the test itself or in regards to the frequency of completion (this holds true for all other outcomes, too). Please address throughout manuscript.

The outcomes including HbA1c tests, vaccinations, foot exam, ED visits, hospitalizations, etc. are specified throughout the text. For example, we included whether the outcome is number of patients with HbA1c tests or percentage of patients with HbA1c tests, number of ED visits or percentage of patients with at least one ED visit, etc.

**Line 291-292:** No comma after email. Move to after (SMS).

**Line 291-295:** Far too much information in one sentence. Break into 2-3 sentences. It is currently too difficult to read.

Sentence in the initial manuscript: “Web-based reminders, using email, combined with short message service (SMS) prompted intervention group patients one week before their scheduled follow-up visit and for scheduled HbA1c tests that were more than three months overdue, resulting in significantly decreased HbA1c and total cholesterol in the intervention group when compared to the control group.”
Sentences in the revised manuscript: “A RCT used a web-based system to improve self-management education, and used emails combined with short message service (SMS) to send reminders one week before the follow-up visit, and to remind the time of the HbA1c test if it is more than three months overdue. The web-based education management system combined with reminders using emails and SMSs resulted in significantly decreased HbA1c and total cholesterol in the intervention group compared to control group.” – lines 327-332 in the revised manuscript

**Line 297:** Change to “to scheduled visits or needed lab tests. In one study, a gas card was offered...”

Changed. – line 334 in the revised manuscript

**Line 297-298:** Was this an exchange? If lab tests were completed, they received a gas card? Specify.

Yes, it was an exchange. The patients received the gas card after the lab tests were completed. The sentence in the main text is changed as:

“In a quasi-experimental study, a reminder letter was sent to patients for the completion of lab tests, and were offered and provided a gas card when the tests were completed [24]. The study showed that the reminder letter combined with a financial incentive increased the number of HbA1c tests significantly [24].” – lines 334-337 in the revised manuscript

**Line 298-300:** Is this really an intervention focused on getting patients to clinic? It seems to be a change in clinical care. Maybe explain the intervention and how it was attempting to improve getting patients to visits.

In this study, the main intervention was not the financial incentive. The intervention was using structured group visits facilitated by a diabetes educator. However, a $10-incentive was provided to increase the attendance to group visits.

The sentences related to this intervention are revised as follows:

“In another study, structured group visits facilitated by a diabetes educator were used as the main intervention [34]. A $10-incentive was provided to the patients for each group visit they attended [34]. Group visits combined with financial incentive achieved an overall attendance of 78.4% to group visits, and significantly reduced SBP levels and ED visit rates [34].” – lines 337-341 in the revised manuscript

**Line 302-304:** This should likely be in reference to more than one manuscript. Likely need to cite more than reference 4.

We added two more references to that sentence. – lines 343-346 in the revised manuscript

**Line 305:** Change to “patient in communicating important...”

Changed. – line 346 in the revised manuscript
**Line 311: Specify EHR abbreviation.**

EHR abbreviation is specified in the main text. – line 353 in the revised manuscript

**Line 313-319: Far too long. Needs to be broken into separate sentences. Actually most sentences in this paragraph are far too long. It makes it difficult for the reader.**

Paragraph in the initial manuscript: “The literature review identified multiple studies using web-based diabetes management interventions with care manager feedback. In one study, patients entered SMBG readings, exercise amounts, weight changes, blood pressure, and medication data via a web portal and a nurse monitored self-management changes, initiated instant messaging or chat with patients regarding changes and made recommendations, which resulted in significantly decreased HbA1c, systolic blood pressure and total cholesterol in the intervention group as compared to the control group who visited their provider for usual care [35]. In another study, a nurse contacted patients biweekly for a 30 minute video conference to review biometric data uploaded to the web-based self-management module and discussed patients’ problems in managing the disease resulting in significantly decreased HbA1c levels in the intervention group [36]. Another study evaluated a web-based program with decision support, self-management support, care manager review of SMBG readings and guided health behavior, ongoing tracking and documentation of patients’ needs and care, and interactive EHR with clinical reminders for patient and provider resulting in significant decreases in HbA1c levels [37]. Seven studies combined web-based diabetes management program with SMS and were associated with significantly decreased HbA1c levels for the intervention group after implementation [38-44]. In six of those studies conducted by the same research group, the nurse researcher reviewed uploaded patient data on the website, integrated patient clinical information into the patients’ EHRs, provided education for self-management and sent weekly medication adjustment advice to the patient via SMS and internet [38-43].”

Paragraph in the revised manuscript: “This literature review identified multiple studies using web-based diabetes management interventions with care manager feedback. In a RCT study, patients entered SMBG readings, exercise amounts, weight changes, blood pressure, and medication data via a web portal [36]. The study nurse monitored self-management changes, and contacted patients using email or chat to make recommendations [36]. The intervention resulted in significantly decreased HbA1c, systolic blood pressure and total cholesterol levels in the intervention group as compared to the control group who visited their provider for usual care [36]. In another RCT study, a nurse contacted patients biweekly for a 30 minute video conference to review biometric data uploaded to the web-based self-management module and discuss patients’ problems in managing the disease [37]. The intervention significantly decreased HbA1c levels in the intervention group [37]. Another study, which used randomized, single-centered, controlled trial with parallel group design, evaluated a web-based program used by patients to review their online medical records, upload their SMBG levels, enter information about their exercise, diet and medication, and send secure emails to the care manager [38]. The care manager reviewed SMBG readings, guided health behavior, adjusted medications, and responded to patients’ messages [38]. This web-based program, which provided ongoing tracking and documentation of patients’ needs and care, decreased HbA1c levels significantly
Seven studies combined web-based diabetes management program with SMS and were associated with significantly decreased HbA1c levels for the intervention group after implementation [39-45]. In six of those studies using quasi-experimental pretest/posttest method conducted by the same research group, the nurse researcher reviewed uploaded patient data on the website, integrated patient clinical information into the patients’ EHRs, provided education for self-management and sent weekly medication adjustment advice to the patient via SMS and internet [39-44].” – lines 355-377 in the revised manuscript

**Line 340: Should this be “one” versus “the”. Again, this is confusing in regards to your current review or a previous review.**

The literature review was referring to our current review. In order to reduce confusion, the sentence is written as:

“This literature review showed that the tools enabling decision support at the time of patient contact could improve compliance with preventive care services. A disease management application, which displayed trended electronic laboratory data linked to evidence-based treatment recommendations, resulted in significantly increased the average number of HbA1c and LDL tests per year in a RCT study [49].”

**Line 346: Is it “the patient’s” diabetic flow chart? This should be clarified.**

In the cited study, the “diabetic flow chart” provides a central location in patient’s chart for documenting preventive care services such as dates of HbA1c and LDL tests, and eye exam. To clarify the meaning of diabetic flow chart, the sentence is revised as follows:

“The Diabetes Questionnaire and Reminder sheet, which is completed by the patient at check-in and reminded providers to check feet and update diabetes care flow chart used to document dates of preventive services in patient’s chart, increased the number of HbAc1 tests, and compliance to eye and foot exams [51].”

**Line 353-357: Again, far too much information for one sentence. Difficult for the reader.**

Sentence in the initial manuscript: “In another study, a system with both decision support and a laboratory-based registry that provided faxed laboratory results flow sheets to providers, mailed quarterly population reports for peer comparisons, and mailed alerts for elevated test findings resulted in significantly decreased acute care utilization, but did not show significantly decreased HbA1c.”

Sentences in the revised manuscript: “In a RCT study, a laboratory-based registry was used to fax and/or mail laboratory results, reminders of overdue laboratory tests, and quarterly population reports to providers, and to mail reminders for overdue tests and alerts for elevated test results to patients [20]. The integration of registry with patient and provider decision support decreased acute care utilization significantly, but did not decrease HbA1c level significantly [20].” – lines 402-406 in the revised manuscript

**Line 357: Is it “a” registry? This is confusing.**

**Line 359: Comma after 7.0%. What does “processes of care” mean?**
To reduce the confusion about the registry and include what processes of care mean, the sentence is revised as follows:

“A diabetes registry can be used to generate provider performance audits or provider patient panel reports to provide feedback regarding achievement of diabetes care guidelines including HbA1c < 7.0%. In three studies, these reports were shown to be associated with significantly improved diabetes processes of care (percentage of patients who had HbA1c test in the last six months, annual LDL cholesterol test, annual dilated eye exam, annual foot exam, and annual influenza vaccine) [26, 52, 53].” – lines 406-411 in the revised manuscript

**Line 368: What does “routine” mean?**

We replaced “routine medical care” with “routine laboratory tests and provider visits at regular intervals”. – lines 420-421

**Line 381: Is it “this” literature review versus “the”? I am confused by the way you use this term throughout the manuscript because you sometimes refer to “the literature review” when I think you are discussing previous studies.**

It should be “this literature review”. We rewrote the sentence as follows:

“This literature review showed that routine visits are either scheduled in advance or reminders are sent to patients to schedule their next appointment. When appointments are scheduled in advance, the attendance to scheduled visits might decrease as the lead time between the time the appointment is scheduled and the actual appointment time increases [56].” – lines 434-437 in the revised manuscript

**Line 383: Add “the” before “...appointment is scheduled”.**

Added. – line 437 in the revised manuscript

**Line 395-400: Sentence is too long. Break into several sentences.**

Sentence in the initial manuscript: “Web-based interventions range in complexity from simple downloading of patient SMBG readings with care manager feedback to also downloading patient medication use, blood pressure, weight and nutrition or daily caloric intake with on-line coaching and peer support, structured counseling from diabetes specialist nurse or nurse practitioner, diabetes education, integration of laboratory testing and clinical information into the patient’s EHR resulted in improved patient health outcomes.”

Sentences in the revised manuscript: “The continuously monitored patient information might include SMBG readings, patient medication use, blood pressure, weight, and nutrition or daily calorie intake. The degree of interaction with patients might range from providing feedback about SMBG readings by care manager to online coaching and structured counseling by diabetes specialist or nurse practitioner. The web-based systems can also be used to integrate laboratory testing and clinical information into patient’s EHR.” – lines 449-454 in the revised manuscript
Discussion section: Consider elaborating more on the impact of technology in regards to future interventions. Many patients don’t answer phone calls, but respond to texts. Many patients don’t routinely check regular mail, etc. Just mention that future interventions may need to address changes in technology and patient preferences in regard to communication/contact.

The following text is added to the discussion section:
“...The patients who have cellphones may not answer phone calls, but respond to SMSs. With the increasing use of smartphones, the patients might have regular access to email. However, underserved populations may not even have a regular phone or minutes to answer phone calls/SMSs in their cellphones. Changing technology and patient preferences with regard to contact/communication should be considered when determining the future interventions to improve usage and effectiveness.” – lines 476-481 in the revised manuscript

Conclusion section: Include what these interventions might cost. Although intensive intermediate care manager direction of diabetes care might be one avenue for addressing diabetes needs, it is likely cost prohibitive for many clinics. You mention it earlier, but I would readdress the concern of cost in the conclusion section, too.

The following paragraph is added to the Conclusion section:
“...While the overall results from this review suggest that interventions associated with appointment management and preparation result in better patient outcomes, an overwhelming absence of financial information in the reviewed studies may inhibit implementation. Indeed, practices may see an increase in costs associated with dedicated care managers and information technology support. Patients, and their insurers, may see an overall decrease in the costs of care when proper disease management is practiced. Unfortunately, these cost offsets may not be within the same cost center, and therefore, the providers paying for the interventions may not realize the cost benefits of enhanced patient well being. Future research must address these cost concerns and new policies may be necessary to ensure that interventions are beneficial for patients and providers.” – lines 535-544 in the revised manuscript
REVIEWER #2 (Ines Guttman-Bauman):

1. The authors reviewed significant articles published between 1987 and 2013, and state that the “bulk” of those articles was published after 2006 (line 156). This statement needs to be more specific.

46 of the 77 studies are published after 2006. We changed the sentence as “The articles included in this review were published between 1987 and 2013, with 46 of them published after 2006.” – lines 45-46 in the revised manuscript

2. The choice of articles: based on my review of the Methods section and Table 1, it is the major weakness of this review. Authors did not describe the articles selection process in detail, only stating there were two reviewers who evaluated articles independently and that 134 articles were excluded because they did not relate to the three main focus areas (line 145-149). The process of communication and coordination between the reviewers was not described. Review of Table 1 reveals the following issues:
   a) The choice of interventions varies widely, including RCT’s (35/77 studies reviewed), cohort studies, pilot studies, quasi-experimental design etc,
   b) There is no comment on the soundness of methodology for individual studies,
   c) Number of patients included in different interventions varies from 6 to several thousand,
   d) After-intervention follow up is on average closest to 3-6 months, with a few interventions looking at outcomes over 1 year,
   e) There is no consistency with the patient population choice – some studies include patients with Type 1, some with Type 2 diabetes and some include patients defined as having “diabetes”

3. The results section does not address the methodology, strength and validity of individual studies when discussing their outcomes. It is my impression that authors’ conclusions are not adequately supported by their data choice and analysis.

The process of communication and coordination between reviewers is as follows:
“Two reviewers reviewed the abstracts independently. All possible articles that could not be excluded were recorded in a table. Each study was marked as “relevant”, “not relevant”, or “maybe” based on the provided information in the paper and the goals for this systematic review. Once the reviewers prepared the tables independently, the decisions were compared and discussed in a meeting. Disagreement regarding inclusion of the article was reconciled through discussion with all other authors.” – lines 155-160 in the revised manuscript

The methodology used in individual studies is provided in Results section when each individual study is discussed.

The following paragraph is added to the Discussion section in order to provide information about strength and validity of the methodologies:
“The methodologies used in the reviewed papers vary widely (including RCTs, quasi-experimental, pretest-posttest, retrospective cohort, non-randomized controlled trial, nested randomized trial, etc.). Even though RCT is considered as the best method in terms of strength
and validity of the results, the reviewed studies that use other methods usually consider an intervention that can easily be implemented in large patient populations. These interventions include phone, letter/mail and SMS reminders to schedule an appointment or remind a scheduled appointment, and diabetes registries, and decision support systems to improve compliance to diabetes management guidelines. Since these interventions use large sample sizes, the included studies prove the applicability and impact of these interventions. For the studies that consider using a web-based system with care coordinator feedback, RCTs are used with smaller sample sizes. Even though RCTs show the positive impact of such kind of an intervention, the small sample size might be an indicator of the difficulty of implementation due to the cost of the intervention.” – lines 495-507 in the revised manuscript

Major Compulsory Revisions:

1. Include less, but more relevant articles into the review. A good approach may be to limit this review to RCT’s, and to exclude RCT’s whose methodology is not adequate. Please do comment on the methodology of individual studies you include in the review.

When we performed the literature review, our aim was to identify all the studies that use an intervention in one of the three focus areas. That is why we did not define any exclusion criteria based on the methodology used in the reviewed papers.

If the review is limited to RCTs (as suggested by the reviewer), even though only one intervention (“open access scheduling”) is removed from Tables 5, 6, and 7, the number of studies that are in “on the schedule” and “to the visit” will decrease significantly. Only 5 studies will be left (9 removed) in “on the schedule” intervention in Table 5 (Table 3 in the revised manuscript), and only 8 studies will be left (5 removed) in “to the visit” intervention in Table 6 (Table 4 in the revised manuscript). Since the interventions in these two focus areas include phone, letter/mail and SMS reminders that can easily be implemented for larger groups of patients, the methodologies used in these papers vary widely (including quasi-experimental, pretest-posttest, retrospective cohort, non-randomized controlled trial, nested randomized trial, etc.). Even though these studies are not RCTs, since they use large sample sizes, they show the applicability and impact of these interventions in large groups. We observe a similar trend in terms of sample sizes in “with patient information” intervention. When the intervention includes a care coordinator who provides feedback to the patients, the sample sizes are small. Even though a RCT shows the impact of such kind of an intervention, the sample size is an indicator of the difficulty of implementation due to the cost of the intervention. When the interventions include registry or decision support system, then the RCTs have large sample sizes.

We believe regardless of the methodology, all studies included in our literature review show the impact and applicability of the interventions. That’s why we decided not to restrict the review to RCTs.

We added the methodology information for all individual studies discussed in Results section. We added additional information about the strength and validity of the methodologies in Discussion section. – lines 495-507 in the revised manuscript
2. If needed, narrow down the focus areas from 3 to one or two (if not enough relevant studies are identified),

We believe all focus areas are important for better management of individuals with diabetes. As it can be seen in Figure 2 (Diabetes Outpatient Care Delivery Process), the interventions identified in this literature review are used in every step of the care delivery process (from lab tests and provider appointments to monitoring of patients, providing feedback and sending reminders between visits). That is why we keep all three focus areas in the review.

3. Narrow down the relevant outcomes to the ones related to diabetes (e.g. change in A1c, change in number of hospitalizations or ED visits, diabetes clinic attendance); there is clearly not enough information on other metabolic outcomes in most papers that have been reviewed.

In the initial manuscript:
Table 2 included changes in HbA1c. Table 3 included changes in LDL, SBP, total cholesterol, and triglycerides. The table also included all other significant and non-significant clinical outcomes that are reported in those studies in the “other” column. Table 4 included changes in behavioral outcomes related to self-management, outpatient care, acute care utilization, and adherence to ADA guidelines. Even though Tables 3 and 4 included all diabetes-related outcomes reported in the reviewed papers, we provided a summary of interventions and selected important outcomes in Tables 5, 6, and 7. We used Tables 1, 2, 3, and 4 to prepare Tables 5, 6, and 7.

In the revised manuscript:
We made some changes in the location of the tables. Due to the importance of HbA1c measure in diabetes management, the table that provides information about changes in HbA1c is kept in the main text as Table 2. The tables that provide information about other clinical outcomes (Table 3) and behavioral outcomes (Table 4) are moved to appendix as Tables A.2 and A.3, respectively. The other tables (Table 5, 6, 7), which provide a summary of interventions and their impact on outcomes, are kept in the main text as Tables 3, 4, and 5, respectively. This relocation of tables will help the reader focus on important information while reading the main text. If the reader is interested in learning more about the other performance measures, they can look at the tables in the Appendix.

We provide information about hospitalizations, ED visits and primary care visits in Table A.3. We just report whether the intervention significantly reduced ED visits, hospital admissions, and primary care provider visits. The main problem with reporting the changes in ED visits, hospitalizations, and primary care provider visits in a separate table was lack of consistency in the reported measures. Some studies report percentages (percentage of patients with a PCP visit, with hospital admission, or with an ED visit), and other studies report the number of visits (number of visits to a primary care provider, number of ED visits, number of hospital admissions) or hospital days. Due to this inconsistency, we could not provide a separate table for these outcomes.

4. Avoid creating overwhelming Tables – e.g. Table 1 spans over 30 pages. It should be redesigned so that only the most relevant information is displayed.
We divided Table 1 into two. The information about diabetes type, study population, methodology, and intervention summary are kept in Table 1. Detailed information about the interventions is moved to appendix as Table A.1.
REVIEWER #3 (Danny Duke):

Major: None

Minor:

1. The title includes the term “Diabetic.” There has been a general movement away from the use of such a defining label. In general, newer literature has moved toward the use of less defining terminology, such as “Individuals with Diabetes.”

We replaced “Diabetic Patients” with “Individuals with Diabetes” in the title.

2. On page 7, last paragraph, bottom of the page: The authors state that a meta-analysis of the data was not possible due to lack of uniform statistical analysis. This is a broad statement that is not, by itself, adequate reason for not conducting a meta-analysis. Rarely do studies within meta-analyses adopt a uniform methodology. It seems more likely that related issues made a meta-analysis impractical. Such as studies reporting insufficient information, such as mean changes, sample size, or not using a pre post design or control group? Maybe there were inadequate controlled studies representing each topic area? Please elaborate by providing the specifics, so the reader can better understand the author’s choice and interpret the findings. A meta-analysis would be the preferred method of analyzing and interpreting the results, if possible. The qualitative review left me uncertain regarding the effect sizes of interventions and thus uncertain how to best interpret the author’s recommendations. This is not a critical point, but a notable limitation of the study design that should be included in the “Limitations” section.

One limitation of this literature review is that a meta-analysis was not performed. The included studies report a wide range of outcomes. Especially, the outcome measures in Table 4 (Table A.3 in the revised manuscript) are not consistent. The measures related to self-management use different survey tools to assess patient satisfaction, quality of life, self-efficacy, etc. Other measures such as lab tests completed, vaccinations, provider visits, hospitalizations, and ED visits, are reported as either percentages or numbers (i.e. “percentage of patients who had ED visits” vs. “number of ED visits”). For clinical outcomes, the studies might report time effect, group effect, or time×group effect, which is again not consistent from study to study. Some studies did not use a control group or did not provide enough information before or after the intervention. This inconsistent reporting of wide variety of outcomes, and limited number of studies representing each outcome made the meta-analysis impractical. This limitation is added to the Limitations section. – lines 516-526 in the revised manuscript

3. Conclusions, Page 21, first paragraph: The authors refer to a “...fissured health care delivery system.” Please elaborate, as this is an important aspect of modern U.S. care delivery that is intertwined with the focus of the manuscript and will be relevant to most readers. Issues may include reimbursement, time pressures, unbillable hours, etc. Who pays for the care manager included in the recommendations? Should the system be further changed/improved? How?

We included the following paragraph to Conclusion section:
“Such strategies must include technical innovation that moves beyond the clinic visit, including continuous monitoring and risk assessment using emerging sensor technologies and smart algorithms, (semi) automated selection, execution, and tracking of interventions, learning algorithms to customize patient care plans, and gamification strategies to motivate and engage patient behaviors. Further, comprehensive cost-benefit analysis must become more widely accepted and practiced. The short and long term costs of interventions (capital, operational, maintenance, cyber-infrastructure, etc.) must be balanced against expected benefits from all stakeholder perspectives including patient access, outcomes, and satisfaction, clinic performance and provider utilization, inpatient usage patterns, reimbursement policies, and overall sustainability of the healthcare system. These strategies must be part of the larger, on-going efforts to transform healthcare delivery from being an uncoordinated assortment of specialties and special interests, supported by fee for service, to an integrated and holistic system that provides value to patients through prevention, early diagnosis, avoidance of chronic complications, and excellent therapy.” – lines 557-570 in the revised manuscript

Discretionary:

1. The Background section is adequate, but could be expanded to more strongly set up a rationale and the context of the study. As is, the introduction seems rather short and simplified. This is largely an editorial decision so I will not elaborate.

Based on Reviewer #1’s comment, we included the ADA guidelines to the Background section (lines 76-86). We believe the inclusion of ADA guidelines to Background section shows the importance of attendance to provider appointments and having lab tests. We did not make any other changes in that section.

2. Overall, the writing is acceptable, but could use sharpening throughout. For example, page 5, 3rd paragraph: the authors state “However, accomplishment of diabetes management objectives can be challenging for a primary care providers during fifteen to twenty minute patient appointments.” This could be more clearly stated by reorganizing and using simpler language: For example, “Accomplishing diabetes care objectives during fifteen to twenty minute appointments can be challenging for primary care providers.” This is likely not the best example, but the purpose should be evident. Again, the writing is not a major flaw, but given the otherwise high quality of the article, editing for clarity and conciseness would benefit the manuscript.

Reviewer #1 also pointed out several sentences that were long and difficult to follow. We have made several edits in the main text to simplify the language.

3. I appreciate the authors were thorough in describing the methodology of their review.

Thank you.

4. The Tables were nicely constructed and become the primary avenue for interpreting the study results.

Thank you. Based on Reviewer #2’s comments, we made small changes in the tables and their location in the manuscript. We divided Table 1 into two. In the revised manuscript, Table 1
includes diabetes type, study design, methodology and summary of the intervention. Table A.1 includes detailed information about the interventions according to their focus areas. We also moved Tables 3 and 4 to appendix as Tables A.2 and A.3, respectively. We did not change the content of these tables.