Author's response to reviews

Title: Health information technology capacity at federally qualified health centers: a mechanism for improving quality of care

Authors:

Jemima A. Frimpong (jf2584@columbia.edu)
Sejong Bae (bsejong@uab.edu)
Bradford Jackson (bjackson@live.unthsc.edu)
LaShonda M. Stewart (lms10@siu.edu)
Karan P. Singh (kpsingh@uab.edu)
Patrick A. Rivers (privers@siu.edu)

Version: 5 Date: 1 November 2012

Author's response to reviews: see over
Dear Editor,

Thank you very much for the thorough reviews of our paper and the opportunity to revise the paper based on the insightful comments from the reviewers. We have revised the paper and have tried to systematically integrate and comprehensively respond to the reviewers' comments. Our responses to the points that were raised by the reviewers are enclosed in this letter. Our answers appear in italic and present a point-by-point description of the changes made to the paper. We believe our paper is much improved thanks to the detailed reviews that were provided.

If further information or materials are required, please contact me through the following address:

Jemima A. Frimpong, Ph.D., MPH
Heilbrunn Department of Population and Family Health
Mailman School of Public Health
Columbia University
60 Haven Avenue, B2
New York, New York 10031
Tel: 212-304-5208

Alternatively, you can reach me via email: jf2584@columbia.edu

Thank you in advance for the opportunity to revise and resubmit our manuscript.

We look forward to your assessment of the revised manuscript.

Sincerely,

Jemima A. Frimpong
Reviewer 1

All of these comments should be considered major and compulsory.

1. This paper addresses a very interesting and timely topic, and has the potential to be a very useful addition to the literature. However, it is poorly written and full of typographical errors, misspellings, and inappropriate punctuation. This made it frustrating to read; moreover, it led me to question the care with which the paper was written and by extension the care with which the analyses were conducted. My overall suggestion is that this paper be heavily edited. I would be glad to read it again after this has been done.

Thank you for your positive response to our paper and for noting the potential of our paper to be a very useful addition to the literature. We greatly appreciate your constructive feedback and have comprehensively incorporated your comments into our revised paper.

In addition to addressing your specific comments, we have done a close reading of the paper and have carefully revised the paper to address the broader issues that you raised. The paper has therefore been revised to ensure that it is clear and does not include the spelling and other grammatical errors found in the original submission.

I'll give a few examples of these errors, but there are many more.

Abstract: There is a semicolon where there should be a comma, and ‘FQHCs HIT capacity’ should be in the possessive: ‘FQHCs’ HIT capacity’. The phrase “examined the homogeneity between basic and advanced capacity of health information technology” is totally unclear.

The phrase has been corrected and now reads: “We examined the extent of HIT use in FQHCs, and tested the hypothesis that level of HIT capacity, i.e., low, medium, or high, is associated with quality of care.”

Background spelling errors: Inpatient mortality, not inpatient morally. Availability, not availably.

We have corrected the spelling mistakes in the abstract and the main text of the paper. In addition to addressing the specific mistakes that you highlighted, we have corrected similar mistakes in the abstract and the body of the paper.

2. There are also a number of places where the text is very unclear or imprecise. Again, I’ll just give a few examples – there are many more.

Abstract conclusion: “Our findings indicate that while the adoption of health information technology may be important to service delivery, the capacity of health information technology is central to improving quality of care.” … does not precisely agree with findings stated immediately beforehand: FQHCs’ use of a patient notification system for preventive and follow-up care WAS associated with improved care quality, but “… capacity, either basic or advanced was not associated with receipt of discharge summaries or timely appointment for specialty care.” … Please edit to more precisely reflect the findings.
The conclusion section of the abstract has been revised and precisely reflects the findings. The conclusion now reads: “Our findings highlight the promise of HIT in improving quality of care, particularly for vulnerable populations who seek care at FQHCs. The results also show that FQHCs may not be maximizing the benefits of HIT. Efforts to implement HIT must include strategies that facilitate the implementation of comprehensive and advanced functionalities, as well as promote meaningful use of these systems. Further examination of the role of health information systems in clinical decision-making and improvements in patient outcomes are needed to better understand the benefits of HIT in improving overall quality of care.”

Background:

“The goal of HIT is to establish information” … No, the goal of the federal policies is to promote the use of HIT-based information in a meaningful way. HIT doesn’t have a goal. Please edit for precision.

We have edited this sentence. The sentence now reads: “The goal of these federal policies is to promote the use of HIT-based information in a way that improves care delivery and health outcomes (i.e., meaningful use).[2, 4, 5] Meaningful use of HIT includes improving coordination and quality of care and engaging patients and families in the care delivery process.[6-8].” (pg. 2, paragraph 1).

“Leveraging HIT to improve service delivery and outcomes in smaller organizations, especially at FQHCs is important to assessing their capacity to absorb the expected increase in demand whilst improving quality of care.[2, 25]” More precise would be, ‘important to increasing [or enabling] their capacity … ’ Or, if what you meant was ‘Leveraging HIT to evaluate service delivery, then say that.

The sentence now reads: “In order for FQHCs’ to absorb the expected increase in demand and improve quality of care, they must leverage HIT as a tool for improving service delivery and patient outcomes. [2, 22]” (pg. 4, paragraph 1)

“… strategies that improve access to quality of care.[27]” You either mean, improve access to care, or, improve care quality, or, improve access to high quality care. But as currently phrased this sentence is imprecise.

The sentence has been corrected and now reads as: “The essential role of health centers in providing health care to millions of Americans[23] underscores the need for technologies and strategies that improve access to high quality care.[24].” (pg. 4, paragraph 1)

Methods: “In all cases the strength of association reduced.” This sentence needs clarification.

This sentence has been removed from the text.
3. Many of the references cited in the Background are out of date; #s 10 and 12, for example, are from 1994 and 1996. Suggest remove any references that are more than 10 years old because the nature of HIT has changed so much in the last decade.

Consider the following more recent papers:


We appreciate your recommendation that we reference more recent studies. We have therefore cited the two papers that you suggested. Additionally, we have removed references that are more than 10 years old. We reference more recent studies that provide empirical evidence and support for the points that we make in the paper.
Reviewer 2

1. While the documentation about the survey available at the Commonwealth fund does not say this was a stratified sample, there is a lot there that would suggest it is. It does not say it is a simple random sample, it is weighted, and the documentation reports percentages by several variables that would be logical stratification variables. If the sample is truly a simple random sample, it would be nice if the authors would say it. This might require a double check with the data provider.

Thank you for your question regarding the sampling methodology used for the survey. We contacted the data provider, the Commonwealth Fund, to get a better understanding of the sampling methodology used for the survey. We were informed that the survey was sent to all FQHCs. The response rate was based on the number of health centers that completed the survey (795) divided by the number of FQHCs (1007), minus the two post office returns.

2. It took some re-reading and looking at the tables to figure out the categorical nature of the DVs. I would be useful if the exact questions and the available categories were reproduced verbatim. It would help illustrate some of the subjective nature of the questions. The exact distributions of responses should be reported also before they authors grouped them into binary responses.

We appreciate your comments and have made significant changes to the paper in response to your comments. The exact questions used to measure the dependent variables and the available response categories have been provided verbatim in the paper. (pg. 4, paragraph 1)

We have also updated our table 2 to include the raw distribution of the response variables.

3. There are a lot of questions about the IV:
1. If the authors created a clearly categorical variable describing HIT adoption (none, base, advanced) why are there two separate regressions? For the HIT as the DV model a multinomial or ordinal logistic model seems a lot more appropriate. The IV models why not just have it as a categorical variable?
2. Having an EMR is probably completely redundant (or at least in the causal pathway) for the basic/advance measure.
3. While the use basic/advanced definition is useful, it is pre-MU and conceptually some of these capabilities are much more important to the outcomes than others. For example having a process to track reminders or alert / prompts for services seems to be related to reminders. However, none of those things should really matter to being able to receive a discharge summary. Using the definition is supportable, but it might not show all the real key important relationships.
4. Also the authors set up a definition of basic and advanced (table 1) but then allow FQHCs to meet the definitions without hitting those thresholds. With that variation (without defining capabilities that “have to be there”) it creates a lot of within category variation and a harder to exactly say what each FQHC can do with their EHR.
5. In Table 4 it is very difficult to tell what factors are actually adjusted for in the full models. The authors report some variables in the text that were adjustment factors, but the inclusion of all factors in the table looks like everything was adjusted for (like EMR). Is that the case?
Thank you kindly for your time in identifying these points and helping us strengthen our paper. Items 1, 2, 4, and 5 are all similarly related so we will address them together.

To address comment 1 and 2, we have removed EMR from the causal pathway and have now just included it as an item indicative of HIT capacity. An ordinal logistic regression model would be more meaningful and appropriate. Based off the 16 items for HIT capacity, we have categorized FQHCs into ‘Low’, ‘Medium’ and ‘High’. If an FQHC met less than four of seven “minimum required” or “must-have” functionalities for an electronic health record system (see table 1), they were classified as ‘Low’. If they had between 5 and 10 items from the full list then they were classified as ‘Medium’. Finally, if their score was between 10 and 16 then they were considered as having a ‘High’ HIT capacity. All “minimum requirement” items are nested within the full list of items. The main difference between Low and High HIT capacity were the lack of certain decision-support functionalities for providers (i.e., prompts) and or tracking of tests. With these three ordered categories of increasing HIT capacity (i.e., low, medium, high), ordinal Logistic regression was performed and the proportional odds assumptions were verified for all models.

We greatly appreciate your insight on the very important point raised in comment 3. We have addressed your comment in the limitations section of the paper. We note that while the list of functionalities used to categorize level of HIT capacity (low, medium, high) in FQHCs is useful, some of the functionalities may be more relevant to some of the dependent variables than other. As you indicated, having a system in place that supports alerts and prompts for might be more related to patient reminders than receipt of discharge summary. This limitation of the paper has been added to the paper.

In response to comment 4, we have modified our approach and criteria for classifying HIT capacity. The functionalities listed in table 1 serve as guidelines rather than as definition for the measures of HIT capacity. Our response to comment four relates back to the previous paragraph on the revised definition of HIT capacity. Specifically, we have categorized FQHCs into ‘Low’, ‘Medium’ and ‘High’. Federally qualified health centers that met less than 4 of the “minimum required” or “must-have” functionalities for an electronic health record system were categorized as ‘Low’. Those that had between 5 and 10 items from the advanced criteria were classified as ‘Medium’. Lastly, FQHCs with a score between 10 and 16 were categorized as having a ‘High’ HIT capacity. All basic HIT capacity items are within the Advanced Capacity items. The classification of having less than 4 basic items was to identify FQHCs that do not meet the lowest threshold of what we consider as minimum functionalities for an EMR system.

With regards to comment 5, a footnote has been placed at the bottom of the table explaining what variables were adjusted for in the analysis. Since EMR has been included as an item for HIT capacity, it was excluded from the multivariate analysis and it is no longer on the table.
The following would be Discretionary Revisions

Introduction

The research question is reasonable, but not exactly for the reasons the authors provide in the Background section (2nd paragraph - the copy does not have page numbers). For one the authors state "However, studies that have examined the effects of HIT on service delivery and quality of care have revealed mixed results", but in the same paragraph cite a recent review that "overwhelmingly" found HIT was positive. It is hard to be in both places. Part of the difficulty is the citation of studies conducted in hospitals and with several different technologies. The authors may make a stronger case by focusing on and expanding the issues they raise on the next page: little knowledge about this in the FQHC setting, the importance of getting this work in FQHCs for an important part of the population, and maybe even the historical IT challenges in FQHCs.

As you point out, the original paper did not adequately focus the objective of the manuscript on the sparse knowledge on the adoption and use of health information technology in federally qualified health centers. We agree with the importance of framing the background literature and the research question so that they address this gap in the literature. The “background” section of the paper now focuses on the potential benefits of HIT in quality improvement and patient outcomes, and emphasizes the need to examine the adoption and use of HIT in FQHCs. The importance of the FQHC setting is informed by the vulnerable populations served by FQHCs and how HIT may serve as a possible pathway for improving service delivery and outcomes for this population group. (pg. 3 - 5)

Method

Examining the structural factors for EHR adoption or extent of HIT usage does not add a lot to the paper. On one hand organizational characteristics are fairly fixed (so little policy & practice issues) and on the other, since (almost) everyone will want MU dollars adoption seems to be fairly inevitable.

We agree with your assessment on the anticipated increase in EHR adoption in response to the meaningful use incentive program for electronic health records. With the recent finalization of the phase two rules for meaningful use and final requirements for certification of EHR, health care providers must position themselves to earn bonus payments from Medicare, Medicaid or both for MU. Health care providers that have adopted EHR, particularly those with higher capacity may be better positioned to meet the certification requirement, thus earn MU bonus payments. That is, those organizations with higher HIT capacity may have more of the necessary systems already in place to facilitate or extend the use of health information, adopt more standardized data formats, and generally make their EHR systems more capable than in the current stage one. We have updated the background section of the paper to note the recent finalization of the stage two rules and certification for meaningful use, as well as its’ implication for the adoption and use of EHR.
Limitations

The authors mention the length of implementation, but not that they can't establish temporal sequence. They also have selection bias - it may be that the better FQHCs went out and got EHRs.

We have extended the limitations section of the paper to address the issue of selection bias and temporal sequence of adoption. The limitation section now reads as: “Previous research shows that phase of HIT, particularly earlier phases of implementation are associated with declines in quality of care,[41] and that the benefits of new technology may take up to fifteen years to be realized.[12, 42] Although due to data limitations we could not determine the length of time for which HIT had been in place, the phase of implementation, or establish temporal sequence, the HIT revolution is still in its early stages, thus, the full benefit of HIT is likely to be observed in the future.[43] Additionally, previous studies have suggested that functionalities of HIT, extent to which IT is used, specifically the capacity of HIT, may be more relevant than the length of time that the HIT system has been in place.[21, 44] It may be that FQHCs with better quality of care had more favorable operating environments whether financial or otherwise, and were better positioned to adopt EHR and implement advanced functionalities.”(Pg. 11, paragraph 1)