PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

This paper was submitted to the JAMIA but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Open where it was re-reviewed and accepted.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Perceptions of Chronically Ill and Healthy Consumers about Electronic Personal Health Records: A Comparative Empirical Investigation
AUTHORS	Cocosila, Mihail; Archer, Norm

VERSION 1 - REVIEW

REVIEWER	Purcell Jackson, Gretchen

GENERAL COMMENTS	This paper describes a study of how healthcare consumers feel about personal health records and why. As the background states, there is already a lot of work in this area. Please clarify in the background section what is the new contribution of this paper. There probably should be one focused hypothesis with several secondary hypotheses. Is the main focus to test the proposed theoretical model? Even the discussion states that your results confirm something already known by an "overwhelming" body of research. The methodology is a bit underspecified for this paper to be properly peer reviewed. To accomodate a better description of the model and methods, you can cut the long introduction about self management, which seems marginally relevant. I think the follow questions/issues should be addressed: 1. How was "chronic illness" defined by the market research company for the involved consumers, and what was the threshold for ill versus not ill? 2. The criteria for including and excluding surveys should be stated clearly in the methods section, not the results. 3. Explain in detail how each of the variables (e.g, perceived usefulness, computer anxiety) was measured and provide information about the validation how each is measured. You state that MOST of the questions in the survey were adapted from previously validated instruments, so it is not clear that any of the variables are being measured by validated instruments. 4. Describe how the sample size was chosen and explicitly discuss the number chosen relatively to how many of the hypotheses would be tested and the size needed to show one or more significant results. 5. The complex statistical analysis probably warrants some

	simplication / translation for the average reader. 6. I would the authors to clarify relationship between the researchers and market research company that conducted the survey. It should be explicitly stated that the researchers have no relationship with the market research company and the terms of agreement for collection and use of the collected data should be provided.

REVIEWER	The reviewer wished to be anonymous.

GENERAL COMMENTS	This manuscript describes psychometric techniques to validate a model of the factors determining behavioral intention to adopt a PHR. The manuscript describes the constructs of the model (information seeking; computer anxiety; personal IT innovativeness; security, privacy, and trust, and perceived usefulness. Figure 1 provides the proposed relationships between these constructs and Figure 2 shows the results of the psychometric analysis. Overall, the validity of the model was confirmed, and the results generally conform to previous research, although perceived utility apparently did not differ between the "ill cohort" and the "healthy cohort". Strengths of the manuscript include the methods that provided for an outstanding response rate and the sophistication of the psychometric analytic methods. The manuscript is well organized and clearly written, and the authors are very candid about both the approach and the limitations. I found the comparisons between ill persons and well persons to be particularly interesting in two areas: (1) the impact of privacy/security concerns and (2) the impact of personal IT innovativeness. There are some major issues that should be addressed. Perhaps the most important one would be to explain how the model will be of practical use to PHR investigators. On first glance, it seems trite to propose that "perceived usefulness" will be the primary motivator for the behavioral intention to use a PHR. It is hard to imagine a motivation for PHR use other than the expectation that it might be useful, unless perhaps the motivation is based on a desire to placate a caregiver or for financial benefit (e.g. as part of a wellness program). Being more explicit about how this model will be useful for developers and researchers (as have other health behavior models such as Social Cognitive Theory) would strengthen the paper overall. Another major issue is that I found the comparison between the ill and healthy populations to be confusing. The manuscript states, "there were no significant differences between the Ill and Well sub-samples for any of the paths in Figure 2. On the surface, these outcomes appear to contradict what we had expected – that people with chronic illnesses or disabilities are more interested in PHR adoption than are well people." But aren't these two very different, and compatible, findings? That is, the model determining intention to use a PHR may apply equally well to both ill and healthy people (e.g. perceived utility is an equally important determinant for both) - but as perceived utility is greater for ill persons, so is the behavior intention to adopt a PHR. Unfortunately, it is very difficult to determine this because the manuscript doesn't appear to provide assessments of each construct alone for ill and healthy groups. Specifically, is "behavioral

	intention to adopt PHR" measured by "subject is interested in regularly maintaining records about health" in Table 1? If not, how was behavioral intention measured, what were the results in the ill and healthy groups, and was there a significant difference in these results? Perhaps this could be deduced from Table 2 and Table 3 but I found it frustrating not to be able to find this information. More minor issues: 1) It would be very helpful to include the actual questionnaire used in an appendix. 2) The authors may make too much of some limitations. First, the authors are concerned that self report may have been problematic in distinguishing between well and ill populations. As long as a standard instrument (such as SF-12 or CDC Healthy Days) was used to assess health status, I don't consider this a significant concern. Second, it was stated that limiting respondents to internet users may be a limitation. However, since the focus of the article was on the electronic use of PHRs, this framing seems quite appropriate; it is very unlikely that electronic PHRs would be relevant to those who do not use the internet at all. 3) The introductory section, particularly explicit definitions of the constructs and hypotheses relating to them, read more like a thesis proposal than a journal manuscript.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Comments to the Author

This paper describes a study of how healthcare consumers feel about personal health records and why. As the background states, there is already a lot of work in this area.

It is unclear what the new contribution of this paper is. Is the main focus to test the proposed theoretical model? Even the discussion states that your results confirm something already known by an "overwhelming" body of research.

Thank you for this important observation. We now indicate more clearly that the main contribution of the paper is to propose and validate a theoretical model of ePHR adoption and to test it for two sub-samples of ill and well consumers. This contribution is now transmitted throughout the paper, starting with the abstract.

The methodology is a bit underspecified for this paper to be properly peer reviewed. To accomodate a better description of the model and methods, you could cut the long introduction about self management, which seems marginally relevant.

We significantly trimmed down the introduction about self-management. We also provided more explanations about the PLS analysis.

The follow questions/issues should also have been addressed:
1. How was "chronic illness" defined by the market research company for the involved consumers, and what was the threshold for ill versus not ill?

Chronic illness was defined first for all participants, as follows:
Please read the following description of chronic illness carefully and respond to the question that follows.

Chronic Illness. It is possible that an individual’s interest in using an electronic personal health record system will depend on whether or not the individual suffers from a chronic disease or condition. For the purpose of this study, a chronic disease or condition is defined as an illness that tends to continue or re-occur over the course of at least six months, with medical attention being important to the management of the illness and to maintaining quality of life. Resulting physical or mental limitations due to chronic illness may include medical complications, physical disability and/or limitations on activity, reliance on medications and/or technical devices, and increased need for medical care.

1 Do you or a person for whom you provide care suffer from chronic illness?
- Yes
- No

If the participant checked “No”, the questionnaire branched to Question 3. Participants answering “Yes” were asked to check one of the three responses below to indicate the severity of their chronic illness.
2 Please check one of the following, based on the general descriptions of the severity of the chronic illness of yourself or the person for whom you provide care:

Mild (relatively easy to self manage, medication may be necessary; some caution needed with diet and/or normal activities, minor if any limitations on physical or mental activities; very little interaction needed with healthcare providers)

Moderate (regular attention to self management, medication are necessary; care needed with diet and/or normal activities, moderate limitations on physical or mental activities; regular but infrequent interactions with healthcare providers)

Severe (assistance needed to manage illness, medications are necessary; caution and/or special attention and assistance needed to manage diet and normal activities, major limitations on physical or mental activities; frequent interactions with healthcare providers, occasional emergency room visits or hospital admissions may be needed)

We now mention in “Participant recruitment and data collection” how we provided participants a description of a chronic illness condition and of its typical degrees of severity. We also show in “Theoretical model evaluation” that the self-reported degree of severity of the chronic illness or condition (i.e., mild, moderate or severe) was tested as a possible control variable for the Ill sub-sample.

2. The criteria for including and excluding surveys should be stated clearly in the methods section, not the results.

We made the necessary change.

3. Explain in detail how each of the variables (e.g, perceived usefulness, computer anxiety) was measured and provide information about the validation how each is measured. You state that MOST of the questions in the survey were adapted from previously validated instruments, so it is not clear that any of the variables are being measured by validated instruments.

We now indicate in MATERIALS AND METHODS the sources the survey questions were adapted from. In addition, we now mention in the RESULTS section “Consequently, the measurement tests of the model for both sub-samples indicated adequate reliability and construct validity for all measurement instruments, either adapted from previous research or developed by this study.”

4. Describe how the sample size was chosen and explicitly discuss the number chosen relatively to how many of the hypotheses would be tested and the size needed to show one or more significant results.

We now show in the “Theoretical model evaluation” subsection that sample size was imposed by the use of PLS tools for analysis and by the use of a complex formative construct (i.e., Security, Privacy and Trust) in the theoretical model.

5. The complex statistical analysis probably warrants some simplification / translation for the average reader.

We believe that the statistical analysis layout became clearer thanks to several small improvements brought to the manuscript.

6. The authors need to clarify the relationship between the researchers and market research company that conducted the survey. It should be explicitly stated that the researchers have no relationship with the market research company and the terms of agreement for collection and use of the collected data should be provided.

This has been clarified in the paper (see the last sentence in the first paragraph under the MATERIALS AND METHODS section, which now reads “There is no relationship between the researchers and this company, and the company was not allowed to analyze nor retain any copies of the data collected during the survey.”)

Reviewer: 2

Comments to the Author

This manuscript describes psychometric techniques to validate a model of the factors determining behavioral intention to adopt a PHR. The manuscript describes the constructs of the model (information seeking; computer anxiety; personal IT innovativeness; security, privacy, and trust, and perceived usefulness. Figure 1 provides the proposed relationships between these constructs and Figure 2 shows the results of the psychometric analysis. Overall, the validity of the model was confirmed, and the results generally conform to previous research, although perceived utility apparently did not differ between the "ill cohort" and the "healthy cohort".

Strengths of the manuscript include the methods that provided for an outstanding response rate and the sophistication of the psychometric analytic methods. The manuscript is well organized and clearly written, and the authors are very candid about both the approach and the limitations. I found the comparisons between ill persons and well persons to be particularly interesting in two areas: (1) the impact of privacy/security concerns and (2) the impact of personal IT innovativeness.

There are some major issues that should be addressed. Perhaps the most important one would be to explain how the model will be of practical use to PHR investigators. On first glance, it seems trite to propose that "perceived usefulness" will be the primary motivator for the behavioral intention to use a PHR. It is hard to imagine a motivation for PHR use other than the expectation that it might be useful, unless perhaps the motivation is based on a desire to placate a caregiver or for financial benefit (e.g. as part of a wellness program). Being more explicit about how this model will be useful for developers and researchers (as have other health behavior models such as Social Cognitive Theory) would strengthen the paper overall.

We now specify in CONCLUSIONS how the findings of this research could be useful to researchers in eHealth as well as to developers and implementers of electronic PHRs.

Another major issue is that I found the comparison between the ill and healthy populations to be confusing. The manuscript states, "there were no significant differences between the Ill and Well sub-samples for any of the paths in Figure 2. On the surface, these outcomes appear to contradict what we had expected – that people with chronic illnesses or disabilities are more interested in PHR adoption than are well people." But aren't these two very different, and compatible, findings? That is, the model determining intention to use a PHR may apply equally well to both ill and healthy people (e.g. perceived utility is an equally important determinant for both) - but as perceived utility is greater for ill persons, so is the behavior intention to adopt a PHR.

Unfortunately, it is very difficult to determine this because the manuscript doesn't appear to provide assessments of each construct alone for ill and healthy groups. Specifically, is "behavioral intention to adopt PHR" measured by "subject is interested in regularly maintaining records about health" in Table 1? If not, how was behavioral intention measured, what were the results in the ill and healthy groups, and was there a significant difference in these results? Perhaps this could be deduced from Table 2 and Table 3 but I found it frustrating not to be able to find this information.

We now show more clearly in MATERIALS AND METHODS how we measured the multi-item latent variables of the theoretical model. We also show in DISCUSSION that there were no statistically significant differences (at a level P<.05) between the two sub-samples for any of the paths in Figure 2 (despite the apparently different numbers).

More minor issues:
1) It would be very helpful to include the actual questionnaire used in an appendix.

We included measurement scales in Appendix A.

2) The authors may make too much of some limitations. First, the authors are concerned that self report may have been problematic in distinguishing between well and ill populations. As long as a standard instrument (such as SF-12 or CDC Healthy Days) was used to assess health status, I don't consider this a significant concern. Second, it was stated that limiting respondents to internet users may be a limitation. However, since the focus of the article was on the electronic use of PHRs, this framing seems quite appropriate; it is very unlikely that electronic PHRs would be relevant to those who do not use the internet at all.

Please see our response to Question 1 from Reviewer 1. Also, for clarification, since the questionnaire could be completed either by participants who had one or more chronic illnesses, or by participants who cared for persons suffering from one or more chronic illnesses, it would be possible for such an Internet application to be relevant to non-Internet users.

3) The introductory section, particularly explicit definitions of the constructs and hypotheses relating to them, read more like a thesis proposal than a journal manuscript.

Following Reviewer 1’s suggestions, we significantly trimmed down the introductory part. However, as the focus of the study is at the intersection between health research and information systems research, as well as for higher rigour and better clarity for a larger audience, we felt necessary to maintain the construct definitions and related hypotheses.

Comments from BMJ Open
Editors Comments to Authors:

Please also revise your manuscript according to the previous comments from JAMIA and provide a point-by-point response.

Please see the above responses.

Reviewer: 1

1. On p. 8, it is not clear to me what is the relationship between theory and hypotheses H5 and H6. What do you mean by 'perceptions of security, privacy and trust in PHR providers'? Do you mean that people think PHR providers place a high value on the importance of privacy and security, and that they trust the PHR providers? Also I do not see how your hypothesis of a positive effect relates to the previous discussion, which seems to imply there could be a positive or a negative effect, or even that the association is different for those with and without chronic health problems.

Thank you for this observation. We made the correction in the two hypotheses and we now show the perception is about "appropriate security and privacy of PHRs, and trust in PHR providers". This should also show that this research is considering the positive effect of the construct.

2. p. 10, ll. 6-8 'Security, Privacy and Trust, although initially sourced from relevant information systems literature, were designed and validated by this research'. I did not understand this sentence. Could you explain what it means?

We are now more precise showing that measures for Security, Privacy and Trust as separate constructs sourced from literature but this research considers they describe a single variable.

3. Tables 3 and 4 could be combined into a single table.

We think the tables should be kept separate because they have different purposes. While Table 3 describes total (i.e., all paths) effects in the model on Behavioural Intention only, Table 4 shows single path effects from their antecedents for all constructs in the model.

This is a competently executed study. Its conclusions are modest, but stated fairly and clearly. The main issue is recognised by the authors: their sample of ill people is almost certainly not representative of all ill people, in that it is probably mainly composed of 'not terribly ill' people. The fact that differences between the two samples of 'ill' and 'well' people is therefore not too surprising.

The authors should address points 1 and 2 above. This will not take them long.

Thank you for your appreciative comments.

VERSION 2 – REVIEW

REVIEWER	Stephen Ross University of Colorado School of Medicine USA
REVIEW RETURNED	19-Jun-2014

GENERAL COMMENTS	There seems to be a contradiction between the fact that no statistically significant differences in path strengths could be discerned between Ill and Well respondents (Table 4) and the fourth and fifth paragraphs of the Discussion (starting with "Study results confirm that Information Seeking..."). The fourth paragraph claims that "technical innovativeness means less for ill people than it does for well people". The fifth paragraph claims that "influence of anxiety is less apparent for the Well sub-sample compared to the Ill sub-sample." The basis for these claims is made on the relative p-values for the coefficients in the two groups. This is an inappropriate method for distinguishing the two groups, and I suggest that these two paragraphs be removed. If the authors disagree then this apparent contradiction (no statistically significant differences in direct comparison of factors, but true differences inferred by other means) needs to be explained in more depth.

VERSION 2 – AUTHOR RESPONSE

We would like to thank the reviewer(s) for the feedback provided. Following their recommendation, we deleted the second half for each of the two paragraphs indicated. We maintained the first half of both paragraphs as it is discussing overall results for Ill and Well sub-samples without addressing the differences between these categories of respondents.