Reviewer's report

Title: Cost effectiveness of a computer-delivered intervention to improve HIV medication adherence

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Reviewer: K. Rivet Amico

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Cost Effectiveness of a computer-delivered intervention to improve HIV medication adherence

This original manuscript presents a detailed cost benefit analysis of a computer delivered intervention to promote ART adherence deployed in clinical care (results reported elsewhere). The authors note that the effects of that intervention were estimated to provide about a 7% increase in ART adherence among those entering the study with <85% levels of adherence. Using this data, as well as data extracted from project budgets and other estimates drawn from published literature, the authors embark on the ambitious task of estimating cost, cost per user and quality of life years. The authors do a commendable job at tackling what is an overwhelming number of input and outputs. Their methods and results are compelling. Presentations of cost analyses with this level of complexity are challenging and one area that could improve the potential impact of this manuscript would be to find a way to escort the reader a bit more through the process. Possibilities for this may include providing a bulleted list of assumptions, adding a figure of input/output, and better labeling and explanation of tables and figures (noted in specific comments below). Larson (J Am Med Inform Assoc 2006) used some figures to highlight sources of costs of development of a computer intervention, but to this reviewer, a better approach would be to place in a single figure all status "quo" estimated (with no intervention, costs of medication and costs of Tx are estimated at X per person or per year) and then adding in the information specific to implementation (at low or high utilization). This would allow the reader to easily see the scenario in place for no intervention and how this picture changes when an intervention is introduced. Creating a graphic or comprehensive table that allows single-view, versus flipping through multiple tables, is no small task and would require a fair amount of innovation from the authors given that there is really very little guidance out there in terms of how to do this successfully. However, given that presently there is substantial burden on the reader, it would be worth trying to find a way to consolidate inputs and outputs more efficiently.

This manuscript offers a unique examination of cost analysis and could have a strong impact in the literature, as well as potentially on policy and intervention planning. Addressing the specific comments noted below and attending to larger issues noted above would make for a potentially more impactful contribution.
Specific comments: (major/strongly recommended revision marked with *)

ABSTRACT
Consider using past tense on results from previous study…”…but it was not clear that the benefits…”

Consider changing wording for “…a favorable cost per QALY” – Could this be stated as “cost savings”? 

BACKGROUND
In noting that effective interventions are not widely available, consider pulling in citations to support this statement. While the literature is fairly silent on overall rates of uptake and availability of behavioral interventions to promote ART adherence in the “real world” there are some data that suggest that indeed behavioral support is not commonly available [Amico (JIAPAC 2011) has a snap-shot of standard of care for a select group of respondents, as does Harmon (AIDS Care 2005)]. The authors may want to make the point here that we are not certain of this in the US [deBruin’s meta analysis looking at control arms in RCTs of behavioral interventions would actually suggest that there are ample behavioral intervention components in “SOC”]—however there is good enough reason to believe that implementation of effective behavioral interventions is not presently “common” or at least not perceived as “sufficient” among care providers.

Despite the authors noting that computer interventions are not intended to take over or replace clinicians, this is in fact a real concern- if adherence is assumed to be “covered” by the software, would we expect clinicians to completely abandon conversations about one’s adherence? We would like to say no, but the current phrasing of the argument does leave the reader wondering. It may be important here in also include the likely possibility that the ad-hoc discussions that clinicians have with patients regarding adherence are indeed pressed for time and can be derailed by the need to focus on pressing medical issues, but also that most clinicians providing care would not have the breadth of behavior-related information or motivation enhancement strategies that would be feasibly housed in a computer software. A software program has added advantages of standardized use of strategies and content that tailor and target. The time-savings is critical for implementation and cost effectiveness. Adding some foreshadowing for how it may also be advantageous in promoting quality of life would be a good opportunity here.

The sentence “Previous evaluations of interventions for ARV adherence have shown that the cost-effectiveness of interventions is highly dependent on their costs.” seems too obvious to be worth stating.

Typo: “actually reduce total net costs [9], but even with these costs savings adherence interventions may not be widely deployed because of lack of trained personnel.. Further, adherence
Consider adding to the argument on page 6/34 that computer interventions available via internet can also provide intervention support “in real time” and “as-needed” for the growing number of PLWH who have regular internet access, rather than having to wait until you return to clinic.

Consider adding mention of Fisher et al’s [AIDS and Beh 2011] LifeWindows project results to the background.

*Please clarify if the intervention was single session and provide date for reference 11.

METHOD

*Add footnote to Figure (label it as Figure 1) to inform reader of meaning of p, t and x, as well as numbers within the circles for the Health Utilities portion.

*Define in text the two levels of utilization used in analyses in first methods paragraph.

*Provide a clear definition/operationalization of ‘utilities’ and ‘health state utilities’ if that is different.

*Provide greater detail on Table 1. Not clear in table what ‘average’ is or what x refers to. If referring to the strata of CD4 and movement from that strata to next higher, this could be explained far more clearly. Provide CD4 values for each group and change situation.

*Text makes it confusing regarding cost estimates- which is in the table, estimate 1 or estimate 2? If estimate 1, it would seem more appropriate to include estimate 2 as that is what was used in subsequent analyses.

Is the 44.8% the indirects charged off the grant costs? Is there reason to believe that in practice or real world deployment that this would be as high?

*In description of utilization scenarios it seems that the intervention would be used only for new patients. If that is the case, framing the intervention as specifically for new patients entering care early in the manuscript would be important. In any case, given that “eligibility for intervention” is frequently referred to, stating who the intervention targets and who is eligible early on would add clarity to the text. Also- is it anticipated that each person would use the intervention once or is it repeatedly over the course of a year?

In determining medication costs, why was 70% adherence used as starting adherence values?

*Text states that the difference between states 1 and 2 is $14,964. Does that mean that the numbers of the circles are the savings or is this a typo and should state 2 be valued at a cost of $14,964 producing a cost savings of 33,007 – 14,964? In any case, isn’t 33,007 – 14,198 = 18,809? Please clarify.
*Define in table 1 and Figure 1 the time line for these improvements- would it be a 5% chance of moving up over the course of a year? Also, confirm in these scenarios that people are not estimated to move down- backwards in groups, or are those individuals incorporated in the odds?

*Check numbers in Table 5 and in text (eg., $323,5230 in table, and $20,542 in text vs $20.541 in table).

DISCUSSION

*Text “Even with a low probability of change in CD4 count for a small number of patients” reads awkwardly. Should this be ‘Even in scenarios where the low probability of change in CD4 count resulted in improved CD4 counts for a small number of patients..”?

Consider adding that the cost savings are at the societal level in the discussion sentence below:

“With higher probabilities of effects and wider deployment, the intervention would result in net cost savings.”

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

No conflict of interest.
No stocks/shares.
No patents.
No financial competing interests.
No competing interests- was a co-author and co-PI on the LifeWindows project (also a computer delivered intervention for adherence) but do not feel this biased my review in any way.

I declare that I have no competing interests.