Reviewer's report

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

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Reviewer: Omar Galarraga

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The topic is essential. The authors correctly point out that high adherence is key for full therapeutic effect and also to prevent further infections. Cost effective alternatives to improve adherence are sorely needed. The paper provides an estimation of the cost effectiveness for a computer based intervention. However, there are several issues that need to be better explained and further addressed.

Major Compulsory Revisions

1. “The intervention’s effects were assessed using an electronic pill bottle that automatically recorded the date and time of each opening.” What is the correlation between MEMS and actually taking the pills? What is the correlation between MEMS and changes in viral load? This information needs to be documented.

2. “providing an evaluation of adherence for the month before and the month after participants completed the intervention.” // “making the assumption that the effect of the intervention persisted for one year.” It appears that the intervention was a one-time only, one-hour sitting at the computer at a clinician’s office, and the effect was measured for only month after the intervention. Thus, extrapolating to one year seems a stretch. What happens to the cost effectiveness results when the effects are valid for a month only? (as there seems to be evidence of effectiveness only for that period)

3. “Results based on 118 participants who completed the intervention and follow-up visits (of a total of 124 who entered the study....).... Showed that participants with less than 85% adherence at baseline improved their adherence an average of 7%.” What was the mean/median adherence rate of those with less than 85% adherence? Was the effectiveness measure 7% of that unmentioned average baseline? Or was it a 7-percentage-point reduction from that baseline? The distinction is very important as the results hinge on that number. If it is 7% of 85% mean adherence, then that would be a 5.95 percentage point difference. The details may be in the parent study, but the present paper should stand on its own. Also, what was the effectiveness when attrition was taken into account? Effectiveness rather than efficacy in an RCT may be the relevant number to use.

4. “Costs were calculated as a portion of the total project costs, as the total expenditures under the grant were larger than those that would have otherwise been required due to its research purpose. Some costs in this second estimate
are reduced to more accurately reflect real-world development costs, and this estimate of total development costs was used in subsequent calculations.” The authors need to be more specific about how exactly the total costs were reduced. Also, it would be informative the estimate the cost effectiveness leaving the research costs in. Would the computer program have been developed in the absence of the research aims (and costs)? What is meant by “real world”? From an economic point of view, who would produce this type of computer program? Presumably agents that could accrue the savings in avoided medical expenses…. Insurance companies?

5. “The costs of deploying the intervention on the Internet were calculated using the same estimates of staff, server hosting advertising, and technical support provided by Page et al [21] for a web-based adherence intervention.” Do we know anything about online program uptake and effectiveness? The authors seem to be extrapolating from an in-office intervention and assuming that the uptake and effectiveness will be the same. More evidence should be presented for that assumption.

6. “potential variations in development and deployment costs were also evaluated in sensitivity analyses by assessing the effect of a 50% increase or decrease in development and deployment cost. As these analyses did not materially affect our conclusions, they are not presented here.” Actually, it would be useful to see those results to see how the conclusions may change. In fact, I would suggest modeling a threshold effect: at what % increase in costs does the decision change?

7. “For the same number of users as in the high utilization scenario in a clinician’s office (1,125 users annually), the cost per user for Internet delivery is $50.” This volume of non-repeat patients may only be sustained in large urban centers with relatively high prevalence of HIV. It would be useful to have the results for clinics with lower volume of clients; especially since the authors suggest in the discussion that this computer programs may be useful in rural areas (where the volume of patients will be considerably lower).

8. There is an important selection and effectiveness interaction issue that has not been addressed: those patients with the most severe adherence problems usually also have drug, alcohol, mental health and/or housing issues, thus, it seems unlikely that they will have the ability and inclination to sit for an hour in front of a computer without receiving the participant incentive provided in the parent study (even assuming that the program is engaging, and that they have high speed Internet connection).

Minor essential revisions:
1. Need to add page numbers.
2. Section details on CD4 cell count levels and cutoff points on “Costs and utilities related to change in adherence” does not seem to correspond to figure.
3. “cost of $22 per sq feet” Please provide source.
4. “advertising costs increased by ten times” why? Based on what?
5. The % efficacy scenarios were based on any literature or empirical evidence?

6. “analyses presented here show that even under the most pessimistic projections…” The most pessimistic projection assumptions do not really seem to have been considered.

7. “did not attempt to calculate the economic benefit of returning ill persons to the workforce…” Note that a non negligible portion of non-adherent patients are often unemployed, underemployed or earning less than minimum wage.

8. “This may be particularly relevant in delivery of services to persons in rural areas” Again please consider patient volume and age. Older patients may be reluctant to use the computers. Do we know what the most common use for Internet is? Retail? Increased risk behaviors? (i.e., pornography and search of sex partners)?

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.