Author’s response to reviews

Title: The cost-effectiveness of the WINGS intervention: A program to prevent HIV and sexually transmitted diseases in high-risk urban women

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PDF covering letter
Dear Editor:

Thank you for the opportunity to revise our manuscript, “The cost-effectiveness of the WINGS intervention: A program to prevent HIV and sexually transmitted diseases in high-risk urban women,” (manuscript ID 2964921882552585).

The reviewer’s suggestions were quite helpful. Below I have listed item-by-item our response to these suggestions.

Thanks again for your attention to our manuscript.

Sincerely,
Harrell Chesson

Response to the reviewer’s suggestions:

1. **Switch the order of Results and Methods in the abstract**
The order has been corrected.

2. **Page 4, line 10: the function of “Although” is unclear in the sentence, please rewrite sentence.**

We have rewritten this paragraph as follows (page 5, bottom):

“This analysis focussed on the cost-effectiveness of the intervention. We evaluated the cost-effectiveness of the complete six-session intervention and the two sessions of the intervention that addressed condom use skills. For brevity, we refer to the complete, six-session WINGS intervention as the “complete intervention” and we refer to the two sessions that addressed condom skills training as the “condom use skills component” of the intervention. The condom use skills component was part of (not an alternative to) the complete intervention. To evaluate the cost-effectiveness of the condom use skills component of the intervention, we estimated the increase in condom usage attributable to the condom use skills component.”

3. **Page 5: a societal perspective is not in line with only focussing on direct costs, typical for societal would be to include indirect.**

Our base case analysis now includes the indirect costs of HIV. As described in detail below in response to item 7, we now present a wider range of results: first with the indirect costs of HIV included and second with only the direct costs of HIV included.

4. **Page 5: clarify “based on survey responses from principal investigators”, is this reliable anyhow?**

We have clarified the explanation of the cost survey (page 7, top):
“Cost estimates (in 1996 dollars) were based primarily on cost information provided by the WINGS principal investigators, who estimated the various resources required to deliver the intervention. We obtained additional information from budget proposals and from cost estimates of an earlier intervention of similar duration and intensity [13].”

We also noted this limitation in the discussion (p 17, bottom):

“A fourth limitation is that we collected cost information retrospectively from the WINGS intervention principal investigators. The cost estimates they provided, however, were reasonably consistent with the detailed budget proposals they submitted prior to the delivery of the intervention. Furthermore, the estimated cost of the WINGS intervention ($456 per participant) is consistent with that of other small-group HIV prevention interventions for women ($450 per participant in a seven-session intervention [35] and $300 per participant in a five-session intervention [13]).”

5. Page 6: please explain a bit on nature of non-condom use interventions, can they be assumed without any effect on condom use (I know you mention it in the discussion, but some info here would be helpful).

We have added more information on non-condom use interventions in the introduction (page 4, second paragraph of Background section):

“HIV prevention interventions can reduce risky sexual behaviour of women [2], and numerous studies have documented the effectiveness of various cognitive-behavioral group intervention models [3-10]. For example, persons who participated in a 30-minute condom use skills educational session in a Los Angeles waiting room were less likely to return to the STD clinic with a new STD than those who did not participate in the educational session [11].

Many interventions have been successful in increasing condom usage by supplementing condom use education and/or general HIV/AIDS education with training in other areas, such as negotiation skills (how to suggest condom use with a new partner), assertiveness skills (how to resist unwanted sexual advances) and cognitive coping skills (such as sexual self-control) and by improving self-esteem [7-10,12]. Policy- and decision-makers who plan HIV prevention programs need information about the cost-effectiveness of these programs in order to maximize the benefits of limited HIV prevention resources [4,13].”

6. Page 7: give rationale for variation chosen in scenarios.

We have added an explanation of how the ranges were selected (page 12, near top).

“Ranges (upper and lower bounds) of all of the parameters (except condom use, condom effectiveness, and the number of QALYs saved per HIV case averted) were chosen as ± 50% of the parameter’s base case value to allow for a wide variance in the values we applied in our sensitivity analyses. The selection of ranges for condom usage among intervention participants is described in the appendix. An analysis of HIV seroconversion studies indicated that condom usage decrease the per-act risk of HIV infection by 90% to 95% [25]. We applied a slightly wider range (85% to 98%) of possible values for condom effectiveness.
The range for the number of QALYs saved per HIV case averted was obtained from a previously published study [26].

Furthermore, we have changed the sensitivity analysis so that it is both clearer and more informative. For the multivariate sensitivity analysis, we now use a “Monte Carlo” simulation in order to provide a distribution of the estimated cost-effectiveness ratios (page 11, bottom):

“We conducted univariate and multivariate sensitivity analyses. In the univariate analysis, we examined how the estimated cost per case averted changed when we varied one parameter at a time, holding other parameters at their base case values. The parameters we varied were the cost of the intervention, the effectiveness of the intervention (as measured by condom usage after the intervention), condom efficacy, the annual probability of acquiring HIV, the duration of the effectiveness of the intervention, and the cost per case of HIV.

In the multivariate analysis we varied all of the parameters listed above simultaneously. Specifically, we chose values for each parameter under the assumption that these values were uniformly distributed between their respective lower and upper bounds. We then estimated the cost per case averted gained using these random values. We repeated this procedure 20,000 times (a “Monte Carlo” simulation [33]) to obtain a distribution of the estimated cost-effectiveness ratios.”

7. **Page 11: why were figures not formally re-calculated in per QALY gained? It would be clearer.**

As mentioned above, we have now included indirect costs in the base case analysis. We also present the original results which only include direct costs of HIV. For these results (using direct costs) we calculated the cost per QALY gained. We agree that this is a clearer way to present the results. The methods, results, and discussion were changed as necessary to reflect this change in the methodology. The analysis now includes two scenarios: the base case (which includes indirect costs) and the “direct cost only” scenario.

We did not, however, calculate QALYs when including the indirect costs of HIV in the analysis. This would lead to double-counting, as we describe on page 10:

“Our baseline estimate of the societal cost of HIV was $337,000 per case, which includes the lifetime medical care costs ($195,000, with future costs discounted at 3% annually) and indirect costs ($142,000) such as lost economic productivity [27,28]. This estimate of the indirect costs per case of HIV was based on a recent report that indirect costs of HIV in England comprised between 45% to 102% of the direct treatment costs of HIV [28]. We used the midpoint of this range and assumed that indirect costs would be 73% of the direct medical costs ($195,000 x 73% = $142,000). This estimate of the indirect costs is quite conservative compared to other studies which suggest the indirect costs of HIV exceed the direct medical care costs [29,30].

We did not calculate the cost per quality-adjusted life year (QALY) gained when indirect costs of HIV were included in the cost per case of HIV, because these indirect costs might be "double counted" if included in the numerator (as averted HIV costs) and the
denominator (as part of the QALY measure) [31,32]. For completeness, we repeated the analysis excluding the indirect costs of HIV from the numerator, focussing solely on the direct medical care costs ($195,000). The cost per QALY saved was calculated as the net cost of the intervention (the intervention's cost minus the direct medical care costs of HIV averted) divided by the number of QALYs saved. The number of QALYs saved was calculated by multiplying the estimated number of averted HIV cases by published estimates of the number of QALYs saved per HIV case averted [27].”

8. Page 14: “our estimates will understate the incremental cost effectiveness”

As the reviewer noted, we should have said “incremental cost effectiveness” rather than “cost effectiveness.” We have made this correction (now on page 16).

9. I could not find the reference in the text to the figure.
The figure should be referenced in the appendix.