Peer Community In Infections

The benefits of HIV self-testing in West Africa: quantified.

Jessie Abbate *based on peer reviews by 3 anonymous reviewers*

Kra Djuhe Arsene Kouassi, Arlette Simo Fotso, Nicolas Rouveau, Mathieu Maheu-Giroux, Marie-Claude Boily, Romain Silhol, Marc d'Elbee, Anthony Vautier, Joseph Larmarange, ATLAS Team (2024) HIV self-testing positivity rate and linkage to confirmatory testing and care: a telephone survey in Côte d'Ivoire, Mali and Senegal. MEDRXIV, ver. 5, peer-reviewed and recommended by Peer Community in Infections.
https://doi.org/10.1101/2023.06.10.23291206

Submitted: 19 June 2023, Recommended: 28 May 2024

Cite this recommendation as:
Abbate, J. (2024) The benefits of HIV self-testing in West Africa: quantified.. *Peer Community in Infections*, 100090. 10.24072/pci.infections.100090

Published: 28 May 2024

Despite decades of advances and understanding of the indiscriminate nature of human immunodeficiency virus (HIV), it remains shrouded in stigma that makes it difficult to reach some key populations at risk of transmission. The advent of self-testing technology for HIV (HIVST) has opened much-needed potential for bringing privacy to prevention that is crucial for curtailing its continued spread (Johnson et al., 2014). The HIV Self-Testing in Africa (STAR) Initiative (https://www.psi.org/fr/project/star/), carried out in Eastern and Southern Africa between 2015 and 2020 (Simwinga et al., 2022), demonstrated the market and public health operational potential of HIVST of different distribution methods. From 2019 to 2022, the "AutoTest de dépistage du VIH : Libre d'Accéder à la connaissance de son Statut" (ATLAS, translating to "HIVST: Freedom to know your status") program built on these findings to quantify the public health value of HIVST for reaching key populations in West Africa (specifically, Mali, Senegal and Côte d'Ivoire) (Ky-Zerbo et al., 2022).

The innovative secondary distribution methods these studies employed, where the primary targeted populations were also encouraged to take and provide tests to their contacts, helped widen the reach of HIVST within key population networks beyond those relying on access to HIV testing facilities.

The tricky part of the self-testing model lies in assessing its reach and impact while maintaining the privacy of self-testers that is central to its success. Following voluntary phone survey methods that previously were able to show expanded reach of HIVST to first-time testers in key populations in West Africa and high rates of confirmatory testing and treatment seeking (Kra et al., 2022), Kra et al. (Kra et al., 2024) quantified how many

of these self-tests led to a positive result – allowing wider assessment of follow-up behaviors and positivity rates among the hard-to-reach populations the program had targeted.

While the numbers were low, the results were informative. Among respondents who reported a positive ("reactive") HIVST, just 44% proceeded to confirmatory testing. This is lower than in other populations where HIVST follow-up has been assessed (Thirumurthy et al., 2016). The main reasons given for not confirming a reactive self-test was misinterpretation of HIVST results and not understanding that confirmatory testing was needed. The result thus highlighted a need for improved communication on how to correctly interpret HIVST results, and the authors provided ranges for how this misinterpretation could have affected their positivity estimates. However, the majority of those who sought confirmatory testing did so within 3 months, and nearly all of those with confirmed infection started on treatment. HIV positivity rates in the three countries were all higher than other published HIV positivity estimates (Giguère et al., 2021; Maheu-Giroux et al., 2019), suggesting that HIVST methods were highly effective at reaching the targeted communities.

Finally, while the authors demonstrated their methods as an effective way of assessing the utility of HIVST campaigns and identifying ways to improve them, the follow-up surveys are likely too costly to replace current passive surveillance methods for assessing community disease burden. That said, these precious data should be taken as validation of the public health value of HIV self-testing in key populations across communities in West Africa. With improvements in communicating instructions for use and follow-up, there is little doubt that the innovation of HIVST primary and secondary distribution could become a widely useful addition to the fight against HIV.

References:

Giguère, K., Eaton, J. W., Marsh, K., Johnson, L. F., Johnson, C. C., Ehui, E., Jahn, A., Wanyeki, I., Mbofana, F., Bakiono, F., Mahy, M., & Maheu-Giroux, M. (2021). Trends in knowledge of HIV status and efficiency of HIV testing services in sub-Saharan Africa, 2000–20: a modelling study using survey and HIV testing programme data. The Lancet HIV, 8(5), e284–e293. https://doi.org/10.1016/S2352-3018(20)30315-5

Johnson, C., Baggaley, R., Forsythe, S., Van Rooyen, H., Ford, N., Napierala Mavedzenge, S., Corbett, E., Natarajan, P., & Taegtmeyer, M. (2014). Realizing the potential for HIV self-testing. In AIDS and Behavior (Vol. 18, Issue SUPPL. 4). Springer New York LLC. https://doi.org/10.1007/s10461-014-0832-x

Kra, A. K., Fosto, A. S., N'guessan, K. N., Geoffroy, O., Younoussa, S., Kabemba, O. K., Gueye, P. A., Ndeye, P. D., Rouveau, N., Boily, M. C., Silhol, R., d'Elbée, M., Maheu-Giroux, M., Vautier, A., & Larmarange, J. (2022). Can HIV self-testing reach first-time testers? A telephone survey among self-test end users in Côte d'Ivoire, Mali, and Senegal. BMC Infectious Diseases, 22. https://doi.org/10.1186/s12879-023-08626-w

Kra, A. K., Fotso, A. S., Rouveau, N., Maheu-Giroux, M., Boily, M.-C., Silhol, R., d'Elbée, M., Vautier, A., Lamarange, J., & the Atlas team. (2024). HIV self-testing positivity rate and linkage to confirmatory testing and care: a telephone survey in Côte d'Ivoire, Mali, and Senegal. MedRxiv, Ver. 4 Peer-Reviewed and Recommended by Peer Community in Infections, 2023.06.10.23291206. https://doi.org/10.1101/2023.06.10.23291206

Ky-Zerbo, O., Desclaux, A., Boye, S., Maheu-Giroux, M., Rouveau, N., Vautier, A., Camara, C. S., Kouadio, B. A., Sow, S., Doumenc-Aidara, C., Gueye, P. A., Geoffroy, O., Kamemba, O. K., Ehui, E., Ndour, C. T., Keita, A., & Larmarange, J. (2022). "I take it and give it to my partners who will give it to their partners": Secondary distribution of HIV self-tests by key populations in Côte d'Ivoire, Mali, and Senegal. BMC Infectious Diseases, 22. https://doi.org/10.1186/s12879-023-08319-4

Maheu-Giroux, M., Marsh, K., Doyle, C. M., Godin, A., Lanièce Delaunay, C., Johnson, L. F., Jahn, A., Abo, K., Mbofana, F., Boily, M. C., Buckeridge, D. L., Hankins, C. A., & Eaton, J. W. (2019). National HIV testing and diagnosis coverage in sub-Saharan Africa: A new modeling tool for estimating the "first 90" from program and survey data. AIDS, 33, S255–S269. https://doi.org/10.1097/QAD.0000000000002386

Simwinga, M., Gwanu, L., Hensen, B., Sigande, L., Mainga, M., Phiri, T., Mwanza, E., Kabumbu, M., Mulubwa, C., Mwenge, L., Bwalya, C., Kumwenda, M., Mubanga, E., Mee, P., Johnson, C. C., Corbett, E. L., Hatzold, K., Neuman, M., Ayles, H., & Taegtmeyer, M. (2022). Lessons learned from implementation of four HIV self-testing (HIVST) distribution models in Zambia: applying the Consolidated Framework for Implementation Research to understand impact of contextual factors on implementation. BMC Infectious Diseases, 22(Suppl 1). https://doi.org/10.1186/s12879-024-09168-5

Thirumurthy, H., Masters, S. H., Mavedzenge, S. N., Maman, S., Omanga, E., & Agot, K. (2016). Promoting male partner HIV testing and safer sexual decision making through secondary distribution of self-tests by HIV-negative female sex workers and women receiving antenatal and post-partum care in Kenya: a cohort study. The Lancet HIV, 3(6), e266–e274. https://doi.org/10.1016/S2352-3018(16)00041-2

Reviews

Evaluation round #4

DOI or URL of the preprint: https://doi.org/10.1101/2023.06.10.23291206
Version of the preprint: 4

Authors' reply, 13 May 2024

Download author's reply
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Decision by Jessie Abbate, posted 11 May 2024, validated 13 May 2024

Ready to recommend, following typo correction

PCI Infections Article #90 Decision Round 4

Title: HIV self-testing positivity rate and linkage to confirmatory testing and care: a telephone survey in Côte d'Ivoire, Mali and Senegal

Arsène Kouassi Kra et al. doi: https://doi.org/10.1101/2023.06.10.23291206

Dear Authors,

I commend the work you have put into this important manuscript. I am ready to recommend it, but there is one typo I think the authors will want to fix before I send that out.

(1) The authors have accidentally deleted a sentence in the discussion (Line 410):

"For instance, in 2020 an estimated 1.9% of all HIV tests performed were found to be positive in the region (95% credible intervals: 1.3 to 2.7%) [42]. "

There are also some additional minor issues, if they wish to take the time to adjust (but not required):

(2) Table 1: "Based on self-interpreted test results" section : High possible rate —> Highest possible rate

(3) There are still issues with references. For instance, Reference 45 is still incomplete. What publication or website is this from? Again a search pulls up a conference poster. Here is an example guideline for citing a

poster: https://libguides.ecu.edu/c.php?g=982594&p=7463681 If the authors plan to publish in PCI Journal (which is a great option, since it will be immediately accepted), the references must include the doi where available.

(4) Re: 1,000 vs 1 000 : Word of advice: Don't ever "please" reviewers if you can support a decision and are consistent. I live in France and work with WHO AFRO, I am aware of the convention. My issue was that I thought it was inconsistent and the authors had chosen "comma" rather than "space" separators. I was following the tracked-changes version and thought the commas were input rather than deleted (eg, in the first paragraph of the results). Please revert to "spaces" if the authors wish to take the opportunity to do so! Otherwise, it seems consistent now.

Great work.

Evaluation round #3

DOI or URL of the preprint: https://doi.org/10.1101/2023.06.10.23291206
Version of the preprint: 3

Authors' reply, 29 April 2024

Download author's reply
Download tracked changes file

Decision by Jessie Abbate, posted 09 January 2024, validated 10 January 2024

Revisions requested for PCI Infections Article #90 version 3

Please find my decision and suggestions in the attached PDF. I hope everything is clear and that the authors can easily address these final concerns.

Sincerely,
Jessie **Download recommender's annotations**

Evaluation round #2

DOI or URL of the preprint: https://doi.org/10.1101/2023.06.10.23291206
Version of the preprint: 2

Authors' reply, 11 December 2023

Download author's reply
Download tracked changes file

Decision by Jessie Abbate, posted 02 October 2023, validated 03 October 2023

Revisions requested for PCI Infections Article #90 version 2

Dear authors,

Thank you for your work on this manuscript, and please find additional comments and concerns raised during this first revision cycle. I hope you will find them clear and useful - if not too terribly detailed.

Sincerely,
Jessica Abbate **Download recommender's annotations**

Evaluation round #1

DOI or URL of the preprint: https://doi.org/10.1101/2023.06.10.23291206
Version of the preprint: 1

Authors' reply, 11 September 2023

Download author's reply
Download tracked changes file

Decision by Jessie Abbate, posted 14 August 2023, validated 15 August 2023

Revisions requested for PCI Infections Article #90 version 1

Decision on PCI Infections Article ID # 90 version 1

HIV self-testing positivity rate and linkage to confirmatory testing and care: a telephone survey in Côte d'Ivoire, Mali and Senegal

Kra Djuhe Arsene Kouassi, Arlette Simo Fotso, Nicolas Rouveau, Mathieu Maheu-Giroux, Marie-Claude Boily, Romain Silhol, Marc d'Elbee, Anthony Vautier, Joseph Larmarange, ATLAS Team

https://doi.org/10.1101/2023.06.10.23291206

I am pleased to be able to provide the authors with feedback on this important study which details how HIV self-testing can help to better reach targeted populations, and which also provides the details of a non-invasive method to help determine the results of that testing. This work is important not just for managing a public health issue, but for tracking the epidemiology of this disease which carries so much stigma and can evade traditional testing methods. While there are some major issues that need to be addressed (see below), I strongly believe these issues are addressable, that the data support the conclusions, and that this article deserves recommendation. I look forward to seeing their revised manuscript.

Sincerely,

Jessie Abbate

In addition to the three reviewer comments you will find attached to this decision, I have made some observations myself that need to be addressed. The two main "major" issues I have are as follow:

Major Issue 1: Article structure and scholarship

The article needs to be structured in proper format – with methods in the methods section, results in the results section, and discussion in the discussion. References need to be complete, and the authors should give it more careful review for typos before resubmitting. I would also like to see a bit more scholarship, with previous self-testing methods and studies cited – and those cited explained a bit more. Specific comments to help with this are found below, but also among the other reviewer's comments.

Major Issue 2: Statistical methods are not clearly stated (i.e., line 201 "explored" how?), and results could use a figure. If I understand correctly, the respondent's answers to the two phases were linkable despite being anonymous. Thus, it seems Table S1, for instance, should have been done using a repeated measures ANOVA, since results from phase 1 and phase 2 were not independent? I could be wrong about this, but the authors should be more explicit and justify the statistical tests used. It's not clear what the Chi-sq tests are really testing here. I also agree that clear presentation of analysis related to age groups is needed.

I also agree with reviewers that a figure showing results would be useful. Figures, such as bar charts with bars for standard error of proportion or tukey test results would help the reader understand also what tests were used and how the results grouped (or didn't).

As Reviewer 1 mentions describing the use of R, the convention is that the functions and packages used for each statistical test (aside from basic summary statistics) should be explicitly written in the methods.

Specific comments:

Lines 30-42: Parroting one reviewer's comment, I think this part of the methods can be less detailed in the abstract, to be more succinctly presented.

Line 65-66: explain what is 95-95-95 targets.

Seems like the Rouveau etal 2021 paper (ref 23) should be introduced in line 77. Perhaps also ref 41 (Ki-Zerbo et al).

Please review reference formats, including in-line reference norms, as well as links and accession dates for online materials, such as those published by WHO.

Lines 81-119 should be part of the methods : study design, etc.

Lines 130-135 should be part of the discussion.

Line 178: The data management plan, if approved in French by the appropriate authorities, does not need to be translated, but I agree that it should be stated that it is to be found in French.

Lines 187-190: These two sentences can be combined by simply putting the extra information contained in the second parenthetically into the first. i.e. the low hypothesis considered DK-R as non-reactive (one line), …

Line 203: they type of facility "where" (not "was") confirmatory testing was performed

Lines 295-297: I think here, the authors should state the fact of suboptimal linkage/care without the negative "however". Instead, I would write it as a positive "however" on the second sentence:

"Linkage to ….. years of implementation. However, among participants who…"

Line 332: "assumption" => "estimate" (It's an estimate, based on conservative assumptions)

Lines 331-343: Here, please clarify that the results reported are from the referenced study, and provide more information on that study. How are these lower estimates usually gathered?

Line 349: closer (not close – close would require reporting the confindence intervals for both figures)

Table S2: "I didn't know WE should get…" not "I didn't know HE should get…" ?

Table S5: organize the table from shortest time to longest time, rather than alphabetically.

The Discussion needs reorganization. Here are my suggestions, which echo those made by other reviewers:

I would move paragraphs 322-343 up as the first paragraph of the discussion. I would also re-organize, as the second paragraph repeats the assertion while adding more data from other studies. For instance, move lines 337-341 up together with the other conventional estimates listed above. Then finish with lines 324-330 and finally the sentence 341-343.

I would move the paragraph Lines 306-321 to just before the paragraph beginning on line 344 (so, discuss positivity, then interpretation, then confirmatory testing linkage).

Lines 301-305: This should come closer to the end of the discussion, and maybe a bit more detail about the cost should be included. For instance, the fact that phase 2 respondents were not aware of the reward could mean that the cost could potentially be reduced by excluding this reward. I think the authors would do well to say that the alternative methods (explained more: what are the "modeling" methods??) should be compared, including phone surveys without financial incentives.

Lines 294-300 should then be moved to the very end, as a conclusion, to be married with the text currently in the paragraph starting with line 365.

Reviewed by anonymous reviewer 3, 03 July 2023

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Reviewed by anonymous reviewer 2, 02 August 2023

Summary

This is an interesting paper showing the results from a 2-phase anonymous telephone survey aiming to address the positivity rates and linkage to confirmatory testing of participants of the ATLAS programme, in Côte d'Ivoire, Mali and Senegal.

Positivity rates depending on the different ways that participants may interpret the results from the HIVST kit, as well as the proportion of participants engaging in confirmatory testing are shown and discussed. The code for reproducing the results is available in a public repository.

Below, I write some comments (mostly minor) that might help improving the manuscript.Comments

[l. 25–57] I found the Abstract was somehow long and would recommend to further summarize it, as well as reducing the number of keywords.

[l. 69 - "*(...)* innovative tool"] It might be helpful to shortly say when was it first launched in the region or other regions for comparison.

[l. 74] In line with the previous comment, a very short timeline of the STAR project may help the reader place the ATLAS programme in a regional context.

[l. 83-84] Please state when did these pilot studies had place.

[Introduction] I wonder if it would be pertinent to cite existing studies on the acceptability of HIV self-testing (if any) here.

[l. 131 - "secondary distribution was feasible and acceptable"] I recommend to move this conclusion to the Discussion section.

[l. 143] Do you have an idea of the period of time where the participants received the kit?

[l.149 - "Participation in the survey was rewarded"] Is this a common choice in the field/region? Please cite literature discussing further on this choice.

[l. 168] Could you please explain the choice of time between the first and the second phases?

[l. 178] It might be useful for the reader to explicitly state the management plan is written in French here.

[l. 205 - Code] The code is clear and easy to navigate thanks to the html output. I however think that the code itself may benefit from more comments on the main procedures.

[Table 1] Please consider putting the participants' notation ((C*i, P*i)) and the formulas for the positivity rates in a separate column (column #2) to facilitate readability.

[l. 237–239] I would recommend to move up the clarification in parentheses, for clarification: "Positivity rates (central hypothesis *(...)*) were higher...".

[l. 243–244] It might be interesting to mention the percentage of consistent interpretations (two lines + reactive) here.

[l. 253] Please considering summarize here the results by country.

[Table 2] The gray shade calls for attention while it is used for low numbers; you could maybe use superscripts to identify them, instead. Also, please consider adding highlights (boldface, extra horizontal lines or gray shade,

etc.) to help navigate this large table. For instance, to ease the identification of the Overall results (maybe using boldface?) and the results using the central hypothesis (maybe using the gray shade?).

[l. 266] Please consider adding the term "eligible for" between "participants" and "phase 2", for emphasis.

[l. 283 – "Among 34 linked to confirmatory testing, 19 *(…)* were confirmed"] Could you please comment further on this result in the Discussion section? Were there additional recommendations for the HIV-negative participants? (For instance, to testing again after a period of time?).

[l. 284] Please consider mentioning the period of time between HIVST and confirmatory test for these 18 participants.

[l. 294–300] I would move these lines to the end of the Discussion, in the form of a conclusion paragraph. Indeed, I would expect to read the numbers and results summarized in the paragraph of lines 322–336 before or along these conclusions. I would recommend to start the Discussion section with a brief summary of the study.

[l. 312–313 "it is essential to have received information on its use *(…)*"] Is there relevant literature that might be cited here to support this statement and/or to help the reader reflect further on this issue?

Also, is there a risk of not receiving the supporting information (brochures, videos, etc.) when getting the kit through secondary distribution to be considered and commented here?

[l. 347–348] Please consider moving or adding this result to the Results section (cf. my previous comment, on line 283).

[References] Please correct the following:

- Check Ref [7] and consider adding a link and date of access.
- Correct Ref [12]: putting World Health Organization as author.
- Consider adding a link and date of access for Refs. [14] and [22].
- Check first author for Ref [26]
- Could you please provide the information on the Conference Abstract book for Ref [25] instead?

Reviewed by anonymous reviewer 1, 02 August 2023

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