

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Can a three-hour educational workshop and the provision of practical tools encourage family physicians to prescribe physical activity as medicine? A pre-post study.
AUTHORS	Windt, Johann; Windt, Adriaan; Davis, Jennifer; Petrella, Rob; Khan, Karim

VERSION 1 - REVIEW

REVIEWER	Patti-Jean Naylor University of Victoria, BC, Canada
REVIEW RETURNED	08-Apr-2015

GENERAL COMMENTS	<p>Thanks for the opportunity to review this manuscript it is very well written and clear. As general practice/family practice is a critical setting for the prescription of physical activity the study is highly relevant and important. In addition, the implementation science literature points to the importance of training as one of the factors that affects implementation of innovations by delivery agents.</p> <p>Although the limitations of the single sample design are clear and explicated by the authors I believe it is important to evaluate and publish these pragmatic 'real world' intervention strategies as a start to understanding how to address the problem of low levels of exercise prescription by family physicians/general practitioners.</p> <p>There are some minor revisions needed which are outlined following. The authors are very clear about the limitations of the design. I believe the conclusions in the abstract could be 'softened'. "... appear to be a promising method for facilitating the prescription of physical activity ... and ADD...over the short term.</p> <p>In addition in the Article Summary Page 4/24 Line 30-32 - you need to add the words physical activity to this sentence as I am sure it isn't the first study to show prescription changes after a workshop.</p> <p>I think there should be a stronger commentary on the 'participants'. For instance, they may be more motivated to prescribe because they selected to go to a workshop but they also had low levels of knowledge about the guidelines. Thus... your workshop attracted those that were in need of education. I think the paper would also be strengthened by including the data about their own baseline physical activity levels in the descriptives (Results section page 11/24 Lines 18-35). Did all of the physicians meet the PA guidelines? Did you have active or non-active workshop participants? This would be important to discuss on page 18/24 line 46 along with the potential</p>
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	<p>motivation of the participants.</p> <p>Page 15/24 Line 13-14 The sentence is awkward. Replace "receiving a lack of incentive" with "receiving no incentive" for physical activity prescription. Line 16-18 start sentence with "The number of physicians ranking lack of education, as important ADD "all appeared to decrease", though none of these decreases were significant.</p> <p>In addition to the discussion of the biased sample in the limitations you should also comment on the limited sample size as the power calculations showed you needed 29 physicians and you have less. You should comment on this as a limitation. If it is possible to calculate effect sizes this may give you an indication of whether the issue was sample size.</p> <p>I would enhance the statement on Page 16-24 Line 23-24 to be very specific - 'a brief clinician targeted training workshop'.</p> <p>You may want to put this strategy to enhance 'adoption and implementation' in the context of other dissemination strategies like that used in 10,000 steps Eakin et al Am J Prev Med. 2004 Nov;27(4):297-303.</p> <p>I might also recommend including reference to some of the work with the Green Prescription - Swinburn et al. For instance they also found physicians preferred a prescription pad over verbal advice only (supporting your findings that the tool is important).</p> <p>Finally in the conclusions on Page 19/24. I think you should add a future recommendation for researchers to the conclusions. It is obvious but... Future studies with increased sample size and comparison designs are needed.</p>
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REVIEWER	Christos Lionis University of Crete, Faculty of Medicine, Greece
REVIEW RETURNED	15-Apr-2015

GENERAL COMMENTS	<p>However, there are visible short comings mostly due to the small size of the sample. I see that the authors claim the novelty of the paper based on the changes in family physicians' reported written prescription behaviors following an educational workshop. However, I am missing any theoretical framework or relevant insights from any cognitive or behavioral theory that guided the study and that could offer some explanatory evidence in its findings.</p> <p>It is a major issue to my view that together with the small size of the study sample raise important concerns in the terms of the findings interpretations.</p> <p>There are also additional issues that require further attention from the authors of the study and more particularly:</p> <p>In the methods section: A clear description of the target population is lacking and as well as</p>
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	<p>a comparison of the eligible population with that that attended in the workshop. It would facilitate to see to what extent those populations differ in certain variables.</p> <p>In the data analysis:</p> <p>In regards to Table 1, reporting odds ratios 1.1 -355 or 1.7-00 is incorrect; it is recommended to delete all odd ratios.</p> <p>Tables 2-3, it is recommended to merge categories from 5 to 2. Performingn Mc-Nemar into 5 categories before to 5 categories after intervention in a sample of 25 persons and computing p-values is not correct. Merging categories and to repeat the analysis with bar charts with before and after with p-values is also welcomed.</p> <p>Based on above, I am recommending a major revision and a new evaluation upon its re-submission.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer 1: Patti-Jean Naylor

REVIEWER COMMENT 1: Thanks for the opportunity to review this manuscript it is very well written and clear. As general practice/family practice is a critical setting for the prescription of physical activity the study is highly relevant and important. In addition, the implementation science literature points to the importance of training as one of the factors that affects implementation of innovations by delivery agents. Although the limitations of the single sample design are clear and explicated by the authors I believe it is important to evaluate and publish these pragmatic 'real world' intervention strategies as a start to understanding how to address the problem of low levels of exercise prescription by family physicians/general practitioners.

There are some minor revisions needed which are outlined following. The authors are very clear about the limitations of the design. I believe the conclusions in the abstract could be 'softened'. "... appear to be a promising method for facilitating the prescription of physical activity ... and ADD...over the short term.

AUTHOR RESPONSE – We thank Dr. Naylor for her favourable comments regarding the relevance of the current study. Though we acknowledge the limitations of the study, we concur in the importance of these real world interventions to begin better implementing physical activity prescription into the routine clinical practice of family physicians. In terms of adjusting the abstract, we have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 4, Lines 13-19): “Educational workshops combined with practical tools appear to be a promising method to encourage the use of written physical activity prescriptions among family physicians in this setting, over the short term”

REVIEWER COMMENT 2- In addition in the Article Summary
Page 4/24 Line 30-32 - you need to add the words physical activity to this sentence as I am sure it isn't the first study to show prescription changes after a workshop.

AUTHOR RESPONSE – We have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 4, Lines 27-38): "Its novelty, as this is the first study to document changes in family physicians' reported written physical activity prescription behaviours following an educational workshop."

REVIEWER COMMENT 3: I think there should be a stronger commentary on the 'participants'. For instance, they may be more motivated to prescribe because they selected to go to a workshop but they also had low levels of knowledge about the guidelines. Thus... your workshop attracted those that were in need of education. I think the paper would also be strengthened by including the data about their own baseline physical activity levels in the descriptives (Results section page 11/24 Lines 18-35). Did all of the physicians meet the PA guidelines? Did you have active or non-active workshop participants? This would be important to discuss on page 18/24 line 46 along with the potential motivation of the participants.

AUTHOR COMMENT AND MANUSCRIPT CHANGES: We thank the reviewer for this helpful comment. We have modified our manuscript accordingly in a number of ways.

First, we have re-written the "self-reported physical activity" section in the results section of the paper. It now reads:

(Page 17, Line 51-Page 18, Line 11) "The median MET-minutes per week for physicians based on their IPAQ responses was 1624 before, and 1704 MET-minutes/week one month after the intervention - this difference was not significant. At baseline, 19 of the physicians (79%) were at least in the "Moderate" category of the IPAQ scoring system, meaning they reached the recommended levels of physical activity set forth by the Canadian Physical Activity Guidelines. At follow up, 21 (84%) of the physicians obtained at least this level of activity."

This section now also includes "Table 4: Family physicians' self-reported physical activity levels" (Page 18, Lines 13-28) which categorize participants' PA levels according to IPAQ protocol, allowing for easy interpretability of the proportion of family physicians meeting recommended guidelines.

Second, as per your suggestion, we have included a statement in the beginning of the results under 'responder characteristics' that details baseline PA levels. It reads "At baseline, 19 family physicians met the Canadian Physical Activity Guidelines."

Third, in our discussion we have made two changes. First, we have added to our discussion the following paragraph:

(Page 21, Lines 13-26) "Family physicians' physical activity prescription behaviours are also associated with their own personal physical activity levels.

In our study, the majority of physicians, 79% at baseline and 84% at follow up were at least minimally active, accumulating the recommended levels of physical activity. This may help to explain why the baseline levels of all the physical activity prescription behaviours were higher than in previous cross sectional studies."

Finally, in our limitations section – we have revised the discussion regarding the participants' motivation in the limitations section of the paper, specifically in regards to self-selection bias, to include discussion of their PA levels by including the following sentences:

(Page 22, Lines 43-51) "The physicians who attended the workshop demonstrated a lack of baseline knowledge regarding physical activity guidelines, but most were physically active themselves. It may be that the workshop attracted those who were in need of further education, but were personally invested in the area of physical activity."

REVIEWER COMMENT 4: The sentence is awkward. Replace "receiving a lack of incentive" with

"receiving no incentive" for physical activity prescription.

AUTHOR COMMENT – We have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 17, Line 11-14): “There was also a significant increase in the perceived importance of receiving no incentive ($p < 0.05$) for physical activity prescription”.

REVIEWER COMMENT 5: Line 16-18 start sentence with "The number of physicians ranking lack of education, as important ADD "all appeared to decrease", though none of these decreases were significant.

AUTHOR COMMENT – We have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 17, Lines 16-21): “The number of physicians ranking lack of education, lack of knowledge, lack of continuing education, and lack of guidelines all appeared to decrease, though none of these changes were significant.”

REVIEWER COMMENT 6: In addition to the discussion of the biased sample in the limitations you should also comment on the limited sample size as the power calculations showed you needed 29 physicians and you have less. You should comment on this as a limitation. If it is possible to calculate effect sizes this may give you an indication of whether the issue was sample size.

AUTHOR COMMENT: We have modified the manuscript as suggested.

In regards to effect sizes, the statistical tests utilized in this study do not allow for readily interpretable effect sizes. Though odds ratios are sometimes used as effect size calculations for McNemar's test under certain circumstances, we have removed them from this current study under the recommendation of Reviewer 2, Comment 3.

MANUSCRIPT CHANGE (Page 22, Lines 14-17): “The present study has some limitations, including its single-group, pre-post study design, and relatively small sample size of 25, below the power calculation requirement of 29.”

REVIEWER COMMENT 7: I would enhance the statement on Page 16-24 Line 23-24 to be very specific - 'a brief clinician targeted training workshop'.

AUTHOR COMMENT – We have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 21, Line 48-51): “To our knowledge, only one other study has recorded changes in physical activity prescription behaviour after a brief clinician-targeted training workshop”.

REVIEWER COMMENT 8: You may want to put this strategy to enhance 'adoption and implementation' in the context of other dissemination strategies like that used in 10,000 steps Eakin et al Am J Prev Med. 2004 Nov;27(4):297-303.

AUTHOR COMMENT: We greatly appreciate the insightful suggestion to frame our investigation strategy in the context of other dissemination strategies such as Eakin and colleagues' 2004 paper on the 10,000 Steps Rockhampton. In their large scale public health intervention, their use of RE-AIM

defined reach as patient changes in physical activity, and interpreted physician changes as the adoption and implementation of the intervention organization level. However, though we have framed the paper in a similar manner, we have focused the investigation at the physician level. Therefore, we thought it would be more appropriate that the reach and effectiveness be evaluated in terms of physician involvement and behaviour change. In this context, we discuss implementation as the level of fidelity of intervention delivery with our original plan, and acknowledge a lack of data to evaluate adoption, and an inability to evaluate maintenance with our short term follow up. In light of this, we have rewritten significant portions of our manuscript to evaluate it through the reach and effectiveness indicators of RE-AIM, thereby helping to inform future dissemination studies that are able to evaluate all indicators and multiple levels.

MANUSCRIPT CHANGES:

1– The introduction to the manuscript has undergone significant revision to frame the study in such a way as to highlight the need for dissemination of physical activity prescription in family practice, the introduction of the RE-AIM framework, and a mention of reach, effectiveness and implementation.

2 (Page 11)– The methods section includes a new section on “RE-AIM Evaluation”, which is copied below:

“Reach is defined as the percentage and representativeness of eligible individuals that agree to participate. In this study, it was simply the % of registered, eligible physicians who attended the training workshop.

In the RE-AIM framework, “E” can stand for either efficacy or effectiveness. Since our intervention was delivered in a real-world setting for family physicians, effectiveness is more appropriate. This was the primary indicator evaluated in this study, as it examines the degree to which the intervention had its desired effect of changing physicians’ behaviours. We used the results of the pre-post survey to describe the effectiveness of our intervention.

Adoption refers to the level and representativeness of uptake at an organizational level, which we did not evaluate in our current investigation, focusing instead on individual physician behaviour.

Implementation is the degree to which an intervention was delivered as originally intended, and is usually evaluated at the organizational level. In our current investigation, implementation was described as the level to which the training workshop was delivered as planned.

Finally, maintenance refers to long term change in behaviour, both in patients and providers. Due to the short duration of follow up, maintenance was not evaluated in this present study.”

3- The Results section now presents the outcomes in sub-sections entitled Reach and Effectives as two primary subheadings, as well as the addition of a Implementation section at the end of the results section.

4- Finally, the discussion has been subsequently revised to incorporate proper discussion of Eakin et. al’s paper, aspects of the RE-AIM Framework, and recommendations for future research directions.

REVIEWER COMMENT 9: I might also recommend including reference to some of the work with the Green Prescription - Swinburn et al. For instance they also found physicians preferred a prescription pad over verbal advice only (supporting your findings that the tool is important).

AUTHOR COMMENT: We have modified our manuscript as suggested.

MANUSCRIPT CHANGES:

Introduction (Page 5, Lines 27-30): “Tailored interventions including a written component may have a

greater effect on patient behaviour than brief advice alone, and have been preferred by physicians compared to verbal advice”

Discussion (Page 20, Lines 20-26): “Further, the preference of physicians for tailored written prescriptions over verbal advice alone in New Zealand’s successful Green Prescription program further supports the use of tools to facilitate physician behaviour change”

REVIEWER COMMENT 10: Finally, in the conclusions on Page 19/24. I think you should add a future recommendation for researchers to the conclusions. It is obvious but... Future studies with increased sample size and comparison designs are needed.

AUTHOR COMMENT – We have modified our manuscript as suggested.

MANUSCRIPT CHANGE (Page 23, Lines 3-26):

“Dissemination investigations with increased sample size and comparison designs are needed. It is recommended that more objective measurements to assess clinician behaviour, such as direct observation or audio recordings should be utilized.. Ideally, long-term (>2 year) trials should investigate whether clinician-targeted interventions lead to patient behaviour and health outcome change, in addition to physician behaviour change, allowing all parameters of the RE-AIM framework to be evaluated, and the public health impact of such interventions to be effectively quantified. The results of this study indicate that providing family physicians with training and tools may be an important component in effectively implementing physical activity prescription into routine clinical practice, and should be considered in future large scale dissemination trials.”

Reviewer 2: Christos Lionis

REVIEWER COMMENT 1: Many thanks for inviting me to review this interesting manuscript. It conveys certain interesting messages with an impact on both vocational training and continuous professional development.

However, there are visible short comings mostly due to the small size of the sample. I see that the authors claim the novelty of the paper based on the changes in family physicians’ reported written prescription behaviors following an educational workshop. However, I am missing any theoretical framework or relevant insights from any cognitive or behavioral theory that guided the study and that could offer some explanatory evidence in its findings.

It is a major issue to my view that together with the small size of the study sample raise important concerns in the terms of the findings interpretations.

AUTHOR COMMENT: We thank Dr. Lionis for his time and effort in reviewing our manuscript. We acknowledge that the theoretical framework for the study should have been better explicated throughout the manuscript and believe that we have amended that in a number of ways.

First, we have more effectively depicted that this trial serves as a real-world investigation that serves to inform future dissemination trials in the area of physical activity prescription. As suggested by our other reviewer, we have re-structured the paper in the context of Glasgow’s RE-AIM Framework similar to Eakin and colleagues’ 2004 paper on the 10,000 steps project. Specifically, we focus on the reach, effectiveness, and implementation components of the model as described by our investigation.

Secondly, we agree that there are some limitations for the findings interpretations, but that our investigation answers an important initial question in the dissemination of physical activity prescription in primary care. That is, can family physician PA prescription behaviour be changed through brief

training interventions? We believe we have seen that, at least in the short term, we can accomplish that in a group of Canadian family physicians. The limitations of our current study's interpretations invite further dissemination research that can investigate training interventions in other settings, controlled trials with non-intervention sights, and maintenance of behaviour change over time, to name a few.

MANUSCRIPT CHANGES:

1– The introduction to the manuscript has undergone significant revision to frame the study in such a way as to highlight the need for dissemination of physical activity prescription in family practice, the introduction of the RE-AIM framework, and a mention of reach, effectiveness and implementation.

2 (Page 11)– The methods section includes a new section on “RE-AIM Evaluation”, which is copied below:

“Reach is defined as the percentage and representativeness of eligible individuals that agree to participate. In this study, it was simply the % of registered, eligible physicians who attended the training workshop.

In the RE-AIM framework, “E” can stand for either efficacy or effectiveness. Since our intervention was delivered in a real-world setting for family physicians, effectiveness is more appropriate. This was the primary indicator evaluated in this study, as it examines the degree to which the intervention had its desired effect of changing physicians' behaviours. We used the results of the pre-post survey to describe the effectiveness of our intervention.

Adoption refers to the level and representativeness of uptake at an organizational level, which we did not evaluate in our current investigation, focusing instead on individual physician behaviour.

Implementation is the degree to which an intervention was delivered as originally intended, and is usually evaluated at the organizational level. In our current investigation, implementation was described as the level to which the training workshop was delivered as planned.

Finally, maintenance refers to long term change in behaviour, both in patients and providers. Due to the short duration of follow up, maintenance was not evaluated in this present study.”

3- The Results section now presents the outcomes in sub-sections entitled Reach and Effectives as two primary subheadings, as well as the addition of a Implementation section at the end of the results section.

4- Finally, the discussion has been subsequently revised to incorporate proper discussion of Eakin et. al's paper, aspects of the RE-AIM Framework, and recommendations for future research directions.

REVIEWER COMMENT 2: There are also additional issues that require further attention from the authors of the study and more particularly:

In the methods section: A clear description of the target population is lacking and as well as a comparison of the eligible population with that that attended in the workshop. It would facilitate to see to what extent those populations differ in certain variables.

AUTHOR COMMENT: We agree with Dr. Lionis that a further discussion of our target population and comparison to eligible participants would benefit the manuscript. In addition to the increased commentary we have included on participants in response to Reviewer 1, comment 2, we have added further information about our sample communities.

Unfortunately, we were restricted by the Research Ethics Board to obtain data for the rest of the eligible population who did not return the questionnaire and consent to the study. We have added this as a limitation of this study.

However, in order to compare the attendees with the rest of Canada's family physician population, we used data from the most recent (2014) Canadian Family Physician survey, and have compared our study sample with those data and incorporated it into our results section.

MANUSCRIPT CHANGES:

Methods (Page 7, Lines 27-32): "Our study sample included family physicians practicing in the municipalities of Abbotsford (124,000 residents) and Mission (38,000 residents), neighbouring cities in southern British Columbia, Canada."

Results (Page 13, lines 25-37): "Data for those who did not complete the baseline questionnaire and attend the workshop was not available, so representativeness of the attendees in relation to our specific study population could not be evaluated. Compared to the 2014 National Physician Survey, the mean age of our study sample (51.3) was similar to the national average (50.9), while the % of male physicians (86%) was higher than the national average (56%) of male family physicians."

Discussion (Page 22, Lines 23-26): "Further, the lack of data on non-responders prevented a full examination of adoption in the representativeness of participating physicians with the local population"

REVIEWER COMMENT 3: In the data analysis:

In regards to Table 1, reporting odds ratios 1.1-355 or 1.7-00 is incorrect; it is recommended to delete all odd ratios.

AUTHOR COMMENT: In regards to Table 1, we have removed odds ratios from the table as suggested. We have also removed the mention to Odds Ratios in the abstract and results section text.

REVIEWER COMMENT 4: Tables 2-3, it is recommended to merge categories from 5 to 2. Performing Mc-Nemar into 5 categories before to 5 categories after intervention in a sample of 25 persons and computing p-values is not correct. Merging categories and to repeat the analysis with bar charts with before and after with p-values is also welcomed.

AUTHOR COMMENT:

We would like to thank you for recommending the presentation of our data in bar charts and calculation of p-values. We have subsequently opted to translate information from Table 1 into a visual representation in what is now Figure 1.

We also thank you for the opportunity to clarify our analysis for Tables 2 and 3.

First, your comment inferred our use of McNemar for 5 categories before and after the intervention. We concur that using McNemar's test in this context would be incorrect. However, we would like to clarify that the data in these tables were analyzed using Wilcoxon signed-rank tests. We have clarified our methods section so that the analyses are more clearly described.

However, given that both Table 2 and Table 3 are ordinal scales in terms of frequency or importance, respectively, the non-parametric Wilcoxon signed-rank test for paired data is appropriate for evaluating changes in these scales.

Secondly, as five point scales, they do not have an ideal midpoint at which they can be collapsed into two equal categories. For Table 3, we may combine “Important, Very Important, and Extremely Important”, as we did for descriptive purposes in the table, and combine “Not Important and Somewhat Important” in order to create two categories for which McNemar could be conducted. However, table 2 would be create difficulty in interpretation, as there is not an intuitive collapse of frequency such as would be the case if we could divide into <50% and >50% of patients.

Finally, by collapsing the categories we would fail to capture all the changes that occurred and lower the sensitivity of the test. To test this, we collapsed Table 3 into 2 categories as suggested (CATEGORY 1 = Not important & somewhat important; CATEGORY 2 = Important + Very Important + Extremely Important), and then performed McNemar’s test to evaluate the significance of changes. Compared to Wilcoxon signed rank tests, all p-values were higher, with one exception). Lack of tools still significantly decreased in perceived importance, although lack of incentive no longer significantly changed as in our original analysis. The primary problem with the collapse is it biases the test for changes that occur across the middle category, in this case between categories 2 and 3 (Somewhat Important and Important), and McNemar can’t take into account any changes within the other categories. For example, “Lack of guidelines” had 4 physicians change their perceived importance from somewhat important (2) to not important (1), and four physicians change their ratings between the top 3 categories, none of which would be contribute to the statistical evaluation by McNemar test.

Therefore, the Wilcoxon test finds a p-value of 0.12, and McNemar with collapsed categories a p-value of 1.0. Though neither of these is significant, we believe that more information is available if 5 categories are included, and Wilcoxon is used as appropriate non-parametric test that can detect these changes.

Finally, we concur with the reviewer that sample size is an issue for the power of our investigation. Therefore, we have outlined the data contained in tables 2-3 in our methods section as “exploratory” outcomes, and made sure to specify it as a limitation to the investigation.

In conclusion, although we understand our sample size places a limitation on power for group analysis, we ask that you consider allowing Tables 2 and 3 to remain as 5 category tables for the reasons we proposed above.

MANUSCRIPT CHANGES (Page 12, Lines 34-51):

Our investigation also investigated a number of exploratory outcomes. McNemar’s test evaluated the changes in binomial data before and after the intervention. Wilcoxon signed-rank tests assessed changes in paired five-point Likert data before and after the workshop, including the frequency of prescription behaviours as well as changes in perceived barriers. They were also used to measure changes in self-reported physical activity levels before and after the intervention. Finally, paired t-tests assessed changes in self-reported knowledge and confidence (26). All analyses were performed with a significance level of .05.

VERSION 2 – REVIEW

REVIEWER	Patti-Jean Naylor School of Exercise Science, Physical and Health Education, University of Victoria, CANADA
REVIEW RETURNED	29-May-2015

GENERAL COMMENTS	The changes to the paper that were made during the revision have enhanced it. Just one small editing issue that I have identified is on Page 22 Line 21 - I believe you mean 'targeting' not 'targeted'.
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