PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Cross-sectional survey : Risk-averse French GPs use more rapid-antigen diagnostic tests in tonsillitis in children
AUTHORS	Pulcini, Céline; Michel-Lepage, Audrey; Ventelou, Bruno; Nebout, Antoine; Verger, Pierre

VERSION 1 - REVIEW

REVIEWER	Ms Sarah Tonkin-Crine Research Fellow University of Southampton UK
REVIEW RETURNED	24-Jul-2013

THE STUDY	1. It would be appropriate to specify that the data relates to treatment of tonsillitis in children only in the title and abstract. 2. The term "risk-seeking doctors" would be better replaced with an alternative as it has negative connotations. 3. I am not convinced that these data show that RADTs decrease diagnostic uncertainty, the authors are assuming a link here and it would be better to state this more tentatively if at all.
RESULTS & CONCLUSIONS	1. It is not clear why three scales are used to measure risk aversion when only one scale is relevant to the study. The other two scales should be omitted. 2. The discussion makes reference to the financial risk aversion score and financial incentives. This sentence is not explicit. 3. The discussion refers to communication strategies to help change GP antibiotic prescribing but the link to this is not clear and the paragraph seems to be unconnected to the data. 4. Again, the link to diagnostic uncertainty seems to be taken for granted here although there are no measures of GP uncertainty included in the data. The authors state that guidelines require GPs to use RADTs for all cases of tonsilitis therefore uncertainty would only apply if GPs had doubt about the outcome of the tests. The data show that almost 100% of GPs prescribed according to the result of the test. The link to uncertainty needs to be explicitly described rather than assumed. It seems more appropriate for conclusions to indicate how compliant GPs are with guidelines and results of RADTs rather than discuss how RADTs address uncertainty.
GENERAL COMMENTS	1. Additional references to should be added to the introduction at line 27 where "several studies" are refered to but not cited. 2. Volume of activity should be defined in the abstract.

REVIEWER	Michael A. Borg Mater Dei Hospital Malta No competing interests to declare
REVIEW RETURNED	04-Aug-2013

RESULTS & CONCLUSIONS	This manuscript describes a survey among French physicians to determine whether Rapid Antigen Diagnostic Tests (RADT) use impacts on antibiotic prescribing. The paper then also attempts to investigate cultural determinants, especially uncertainty avoidance, as potential drivers. To do this, the researchers scored the level of "risk aversion" in the respondents. It is in this part of the study that I have some significant misgivings. In the first instance, the authors make the common mistake of misinterpreting "uncertainty avoiding" and "risk tolerant" as being identical. However cultural anthropological models show these to be totally different. In the setting in point, the "risk" element is the adverse effects of unnecessary antibiotic use - whether to the patient as potential side effects and/or to the community from the advent of resistance. Therefore unnecessary prescribing is actually a "risk tolerant" not "risk averse" activity. Unfortunately the survey did not contain questions to establish the level of uncertainty avoidance among the respondents i.e. their unease at withholding antibiotic treatment in cases of tonsillitis for fear of it being one of the minority of cases that are bacterial in aetiology. It is in its behavioural component that I believe the paper lacks the necessary quality. The three questions that are supposed to establish "risk aversion" are extremely superficial and subjective, especially for a high uncertainty avoidance country. To achieve an objective understanding of risk tolerance and uncertainty avoidance, a more complex set of questions – possibly based on specific vignettes or scenarios – was needed.
GENERAL COMMENTS	For the reasons outlined, I believe that the paper cannot be accepted in the current format. I would suggest a major revision into a short communication focusing on the different prescribing behaviour in the context of RADT and then referring to the acknowledged uncertainty avoidance score of France as a possible driver behind this behaviour.

REVIEWER	Fátima Roque Research Unit for Inland Development, Polytechnic Institute of Guarda (UDI/IPG), Portugal No conflict of interest
REVIEW RETURNED	08-Aug-2013

THE STUDY	Does not include the number of patients with tonsillitis, that each of the general practitioners observed during the study period. The authors report that it is performed a logistic regression adjusted to the indicator 1 and 2 but it is not clear whether the confounding variables are also adjusted for indicators 3 and 4. Also in Table 2 should be referred when OR is the adjusted OR.
RESULTS & CONCLUSIONS	The results showed that the sociodemographic data also influenced

	the use and prescription of RADTs and antibiótiocos, but this fact is not well discussed in the discussion.
GENERAL COMMENTS	This is a very interesting work!

VERSION 1 – AUTHOR RESPONSE

Reviewer:Ms Sarah Tonkin-Crine
Research Fellow
University of Southampton
UK

1. It would be appropriate to specify that the data relates to treatment of tonsillitis in children only in the title and abstract.
Response: We have specified this point in the title, in the abstract and in the article summary.

2. The term "risk-seeking doctors" would be better replaced with an alternative as it has negative connotations.
Response: We have replaced this term by risk-tolerant throughout the document and we have also decided to replace « risk-aversion behaviour » by « individual risk attitudes » since it takes into account both risk-averse and risk-tolerant behaviours.

3. I am not convinced that these data show that RADTs decrease diagnostic uncertainty, the authors are assuming a link here and it would be better to state this more tentatively if at all.
Response: Our data indeed do not show that RADTs decrease diagnostic uncertainty. This point has however been strongly suggested in the literature [6-9, 12]. We have modified the text to present this point more clearly and tentatively :
• Pages 2-3 : « risk-averse general practitioners (GPs) might use more Rapid Antigen Diagnostic Tests (RADTs) in tonsillitis in children, probably to decrease their diagnostic uncertainty regarding the aetiology of the disease (viral versus due to group A Streptococcus) »
• Page 2: « Individual risk attitudes influenced GPs' practices in tonsillitis, particularly the use of RADTs and antibiotic prescriptions. »
• Page 4: « On the one hand, RADTs decrease diagnostic uncertainty, by establishing that the tonsillitis is bacterial (group A streptococcal infection). One may hypothesize that risk-averse GPs might use RADTs more often, possibly as a way to decrease their diagnostic uncertainty. On the other hand, if GPs are not using RADTs, clinical findings do not allow to reliably differentiate between viral and bacterial tonsillitis.[3] Thus, one may hypothesize that risk-averse GPs might prescribe more antibiotics when they are not using RADTs since they may be more sensitive to diagnostic uncertainty than risk-tolerant GPs. Consequently, diagnostic uncertainty might lead here to unnecessary antibiotic prescriptions.. »
• Page 9: « It is possible that the diagnostic uncertainty leading to unnecessary antibiotic prescriptions in tonsillitis leaves room for an increased use of RADTs and, as a consequence, for a decreased use of antibiotics in risk-averse GPs using a RADT. RADTs may indeed decrease diagnostic uncertainty, as suggested in the literature.[6-9, 12] RADTs allow the physician to differentiate between viral and bacterial (group A streptococcal infection) tonsillitis, whereas clinical findings do not allow a reliable distinction to be made between viral and bacterial tonsillitis.[3] »
• Page 9: « In conclusion, RADTs for tonsillitis can reduce unnecessary antibiotic prescriptions, possibly because they decrease diagnostic uncertainty regarding the aetiology of tonsillitis. »

4. It is not clear why three scales are used to measure risk aversion when only one scale is relevant to the study. The other two scales should be omitted.
Response: Risk aversion behaviour may vary in different domains of life for one individual. The three domains therefore explore different aspects of risk aversion behaviour ; the prevalence of risk-averse

GPs for these domains was indeed not the same: 40.1% for the daily life scale, 56.4% for the personal finances one and 64.5% for the medical behaviour regarding patients' health scale.
In the multivariate analysis, not only one scale was associated with the four indicators. The daily life scale was associated with indicator 4, the patients' health scale with indicators 1 and 3, and the personal finances scale with indicators 1 and 2.
Therefore, we feel that all three scales bring useful information in our study.

5. The discussion makes reference to the financial risk aversion score and financial incentives. This sentence is not explicit.
Response: We have modified the sentence : « Since the financial risk domain was associated with indicators 1 and 2, financial incentives regarding RADT use, included in a pay-for-performance programme, might have an impact on practices. » (page 9)

6. The discussion refers to communication strategies to help change GP antibiotic prescribing but the link to this is not clear and the paragraph seems to be unconnected to the data.
Response: We have deleted this paragraph.

7. Again, the link to diagnostic uncertainty seems to be taken for granted here although there are no measures of GP uncertainty included in the data. The authors state that guidelines require GPs to use RADTs for all cases of tonsilitis therefore uncertainty would only apply if GPs had doubt about the outcome of the tests. The data show that almost 100% of GPs prescribed according to the result of the test. The link to uncertainty needs to be explicitly described rather than assumed. It seems more appropriate for conclusions to indicate how compliant GPs are with guidelines and results of RADTs rather than discuss how RADTs address uncertainty.
Response: We feel that we have not been specific enough regarding the term « diagnostic uncertainty ». In tonsillitis, RADTs help diagnose the infection as bacterial (group A streptococcal infection) or viral, and therefore suppress diagnostic uncertainty regarding the aetiology of the disease ; only bacterial tonsillitis require an antibiotic therapy. Clinical findings alone are not sufficient to differenciate between viral and bacterial tonsillitis. We have made modifications (see reply to comment n°3).

8. Additional references to should be added to the introduction at line 27 where "several studies" are refered to but not cited.
Response: We have deleted this sentence, since this part of the Introduction has been modified in response to previous comments.

9. Volume of activity should be defined in the abstract.
Response: We have specified (page 2) that the volume of activity is defined by the annual number of consultations.
Reviewer: Michael A. Borg
Mater Dei Hospital
Malta

No competing interests to declare

This manuscript describes a survey among French physicians to determine whether Rapid Antigen Diagnostic Tests (RADT) use impacts on antibiotic prescribing. The paper then also attempts to investigate cultural determinants, especially uncertainty avoidance, as potential drivers. To do this, the researchers scored the level of "risk aversion" in the respondents.
It is in this part of the study that I have some significant misgivings.

In the first instance, the authors make the common mistake of misinterpreting "uncertainty avoiding"

and “risk tolerant” as being identical. However cultural anthropological models show these to be totally different. In the setting in point, the “risk” element is the adverse effects of unnecessary antibiotic use - whether to the patient as potential side effects and/or to the community from the advent of resistance. Therefore unnecessary prescribing is actually a “risk tolerant” not “risk averse” activity.
Response: We agree that uncertainty avoidance and risk aversion are different, even though they are close concepts. Risk aversion is a classic topic of research in economics.
Qualitative studies on antibiotic prescribing[8,9] showed that diagnostic uncertainty generally led to excessive antibiotic prescribing, since physicians do not want to miss any possible bacterial infection. We have then modified the introduction (page 4) : « Risk aversion slightly differs from uncertainty avoidance, but, as a close concept largely used in economics, it was interesting to know whether it might play a role in antibiotic prescribing and the use of rapid diagnostic tests in tonsillitis. On the one hand, RADTs decrease diagnostic uncertainty, by establishing that the tonsillitis is bacterial (group A streptococcal infection). One may hypothesize that risk-averse GPs might use RADTs more often, possibly as a way to decrease their diagnostic uncertainty. On the other hand, if GPs are not using RADTs, clinical findings do not allow to reliably differentiate between viral and bacterial tonsillitis.[3] Thus, one may hypothesize that risk-averse GPs might prescribe more antibiotics when they are not using RADTs since they may be more sensitive to diagnostic uncertainty than risk-tolerant GPs. Consequently, diagnostic uncertainty might lead here to unnecessary antibiotic prescriptions. »

Unfortunately the survey did not contain questions to establish the level of uncertainty avoidance among the respondents i.e. their unease at withholding antibiotic treatment in cases of tonsillitis for fear of it being one of the minority of cases that are bacterial in aetiology.
Response : We agree with the reviewer.

It is in its behavioural component that I believe the paper lacks the necessary quality. The three questions that are supposed to establish “risk aversion” are extremely superficial and subjective, especially for a high uncertainty avoidance country. To achieve an objective understanding of risk tolerance and uncertainty avoidance, a more complex set of questions – possibly based on specific vignettes or scenarios – was needed.
Response: The concept of risk aversion/tolerance is the transposition in economics of the largely used “uncertainty avoidance” (or risk fear). The three questions used in the study have been validated by the economic literature as a convenient and parsimonious technique to elicit risk attitudes at the individual level through telephone interview in panel surveys. The main reason being that it provides results that are compatible with the most sophisticated and quantitative elicitation procedures using binary lottery choices (references : Dohmen et al. ; Dmytro Hryshko & María José Luengo-Prado & Bent E. Sørensen, 2011. "Childhood determinants of risk aversion: The long shadow of compulsory education," Quantitative Economics, vol. 2(1), pages 37-72, 03).
Nevertheless, we agree that a more complex set of questions would be necessary to precisely evaluate the link between risk attitudes (as measured in the economic literature) and uncertainty avoidance. It is however noticeable that the design of our study was driven by several constraints (telephone interview, limited time to elicit risk attitudes, GPs constitute a specific and busy population, possibly reluctant to provide information about their risk attitudes) and that our paper presents a first attempt to tackle this issue.

For the reasons outlined, I believe that the paper cannot be accepted in the current format.
I would suggest a major revision into a short communication focusing on the different prescribing behaviour in the context of RADT and then referring to the acknowledged uncertainty avoidance score of France as a possible driver behind this behaviour.
Response: Only research articles exist in BMJ Open to the best of our knowledge, with no short communication/short report formats.
Thanks to the reviewer’s comment, we have indeed highlighted that France has a high uncertainty avoidance score in the Introduction (page 4: « France is a country with a high uncertainty avoidance

score.[6-7] ») and in the limitations section of the Discussion (page 9: « Finally, our results might not be generalisable to other countries, since France is known for its high uncertainty avoidance score, which could be a possible driver behind the observed behaviour.[6-7] »).
Reviewer: Fátima Roque
Research Unit for Inland Development, Polytechnic Institute of Guarda (UDI/IPG), Portugal

No conflict of interest

Does not include the number of patients with tonsillitis, that each of the general practitioners observed during the study period.
Response: We did not collect this data ; we only asked questions regarding the last paediatric patient with tonsillitis.

The authors report that it is performed a logistic regression adjusted to the indicator 1 and 2 but it is not clear whether the confounding variables are also adjusted for indicators 3 and 4.
Response: We have specified (page 7) that « All indicators were studied separately in each multivariate analysis. »
All twelve multivariate analysis (one for each indicator and for each domain of risk aversion) were adjusted on the stratification variables (age, gender, location and volume of activity).

Also in Table 2 should be referred when OR is the adjusted OR.
Response: All are adjusted OR and we have specified this point in Table 2.

The results showed that the sociodemographic data also influenced the use and prescription of RADTs and antibiótiocos, but this fact is not well discussed in the discussion.
Response: We have added the most interesting findings in the Results section (page 8). We have not discussed these findings in more details since we feel that it was not the main objective of our work.

This is a very interesting work!
Response : Many thanks for your interest in our work.

Additional comment from the authors: Missing answers were inappropriately taken into account in the previous version of the paper. We have corrected this issue and made minor changes in the Methods and Results sections, as well as in the two Tables.

VERSION 2 – REVIEW

REVIEWER	Michael Borg Mater Dei Hospital Malta
REVIEW RETURNED	19-Sep-2013

- The reviewer completed the checklist but made no further comments.