



UniversitätsKlinikum Heidelberg

Heidelberg Institute of Global Health, Universitätsklinikum Heidelberg INF 130.3 69120 Heidelberg

Prof. Imti Choonara,  
Editor in Chief, *BMJ Paediatrics Open*

Sep 24<sup>th</sup>, 2021

Dear Prof. Choonara,

Thank you very much for giving us the opportunity to resubmit our manuscript in revised form. We also want to express our gratitude to you and the reviewers for the constructive, encouraging, and swift feedback which in our eyes led to substantial improvements in terms of clarity and utility of the manuscript.

Please see below a detailed point-by-point response to all comments made by you and the reviewers. We greatly appreciate your permission for us to exceed the word limit as it allowed us to address all comments in the appropriate detail. We hope that the changes we have made meet your and the reviewers' expectations and look forward to your feedback.

Sincerely yours,

Jonas Wachinger  
Maximilian Schirmer  
Dr Nicole Täuber  
Dr Shannon A. McMahon  
Prof Claudia M. Denking

Mob. +49 (0)1575 5561795

Jonas.wachinger@uni-heidelberg.de

Editor-in-Chief	
Title amend to "Implementation experiences with opt-in, at-home screening for SARS-CoV-2 at a primary school in Germany: a qualitative study"	We had initially decided against using the term 'qualitative study' as we also do include quantitative data (albeit not being the focus of this work). We would therefore suggest <i>"Experiences with opt-in, at-home screening for SARS-CoV-2 at a primary school in Germany: an implementation study"</i>
Methods need expanding : the text in Supplementary file 1 needs to be in the main paper as Methods.	We shifted the text from the supplemental file 1 to the main manuscript. Additionally, we strengthened the methods section as outlined in our response to Reviewer 2.
The semi-structured interview questions needs to be added as an appendix.	We added the semi-structured interview guides as used in our study as supplemental file 3.
Results : need to state number of interviews with each group	In addition to the information included in Figure 3, we have included the following in the 'study participants' sub-section:  <i>"Interviews were conducted with six school stakeholders and staff, 10 pupils, and 10 parents (nine mothers and one father)."</i>
Were tests carried out weekly?	As highlighted in Figure 2, tests were recommended to be performed three times per week (Mondays, Wednesdays, Fridays). To further emphasize this, we included the following in the 'Intervention-design' sub-section:  <i>"For each week of screening, pupils and staff members, who voluntarily decided to participate in the study, received three Ag-RDTs to be performed independently at home on Mondays, Wednesdays, and Fridays."</i>
Happy for you to exceed the word limit	Thank you very much, we appreciate this as it allowed us to address all comments of the reviewers with the appropriate detail.
Discussion Delete the 1st sentence in paragraph 2 ("To the best of our knowledge, this study is among the first to explore perceptions of test-based screening in a school setting"). Journal policy to avoid use of the term "First" in describing the study	We have deleted this sentence.
Reviewer 1	
I really like the idea,	Thank you for this positive feedback. We give detailed responses and clarifications to your points below.
however I really dont understand the results. -how many did it?	Sample sizes are reported in Figure 3 and in the study-participants sub-section, which we have amended to increase clarity. It now reads:  <i>"A majority of school staff decided to participate in the voluntary screening (n=21 out of 34, 62%), as well as a majority of pupils and their</i>

	<p>parents (n=109 out of 186; 59%). After the introduction of the state-wide compulsory screening, n=15 (14%) participating pupils did not collect their additional third weekly study-based RDT, indicating that they were screening the state-mandated two times per week. Interviews were conducted with six school stakeholders and staff, 10 pupils, and 10 parents (nine mothers and one father)."</p>
- during which time period?	<p>The timeline of this study is included in Figure 1: The study-based screening was performed between March 22 and May 22, 2021, also marking the time-period for quantitative data collection. Qualitative data was collected between March 31 and June 7, 2021. We have also edited the according sentence in the 'study participants' sub-section:</p> <p><i>"The study lasted nine weeks (March 22 to May 22, 2021)"</i></p>
-did you lost cases?	<p>Due to the voluntary nature of the study and the sensibility of the topic we were not able to track adherence to the recommended schedule among study participants over the duration of the study. No participant formally discontinued their participation over the course of the study. However, following the introduction of state-wide compulsory screening (at which point study participation only included one additional test per week), a total of 15 participants stopped collecting their test-kits, indicating them only performing the 2 compulsory tests per week, without the additional third study-related test. We have included this information in the 'study participants' sub-section:</p> <p><i>"After the introduction of the state-wide compulsory screening, n=15 (14%) participating pupils did not collect their additional third weekly study-based RDT, indicating that they were screening the state-mandated two times per week."</i></p>
- how objectivate the family perspectives?	<p>This study was designed as a qualitative study on screening implementation experiences. As is the nature of qualitative studies, we do not presume that our findings are generalizable to all populations or settings. When conducting our interviews, however, we did reach saturation of themes, which is one core guiding principle for qualitative data collection to ensure that a study depicts a holistic picture of study participants' opinions and experiences. This is highlighted in the 'data collection and analysis' sub-section.</p>

<p>- you have no control with PCR? why? how can you address this?</p>	<p>This study was not designed for evaluating the diagnostic accuracy of the test which has been done previously, including by our own team (see <a href="https://www.medrxiv.org/content/10.1101/2020.10.01.20203836v1">https://www.medrxiv.org/content/10.1101/2020.10.01.20203836v1</a>, this reference is also included in the manuscript). Instead, we aimed at conducting a study which assesses the feasibility and acceptability of a realistic scenario for implementing RDT-based SARS-CoV-2 screening at schools in a real-life setting. This also includes that PCR testing is not being performed routinely to assess test performance, but only as confirmatory testing in case of a positive RDT result. This is also the approach the state ultimately used for their implementation of compulsory screening. We clarified this point in the limitations section of the discussion:</p> <p><i>“Additionally, we designed the screening approach in this study as a realistic scenario for large-scale rollout, which included PCR-based confirmatory testing only in cases where a positive RDT result was reported.”</i></p>
<p>- how was the test performed?</p>	<p>The RDT was performed at a place of the participant's choosing, usually at home, following the procedures outlined in the step-by-step guide and training as outlined in Figure 2 and the intervention design sub-section. To clarify exact testing procedures, we included the step-by-step guide given to participants as supplemental file 1.</p>
<p><b>Reviewer 2</b></p>	
<p>Dear authors,</p> <p>Thank you for the opportunity to review this interesting manuscript examining experiences of implementing opt-in at home SARS-CoV-2 screening in a primary school in southwest Germany. Overall, the paper is well-written and highlights important findings and considerations for COVID-19 screening in school settings. I would like to congratulate the research team on the rapid and timely nature of this study.</p>	<p>Thank you very much for your kind and constructive feedback. We provide detailed point-by-point responses below.</p>
<p>Overall, the paper would be strengthened by more clearly describing the methods employed, particularly the data collection and analysis approach.</p>	<p>Following the editor-in-chiefs confirmation that we can exceed the word limit for this study, we have made edits and provided further detail throughout the methods section (see also below).</p>
<p>Feedback on each section of the manuscript is provided below.</p>	<p>We respond in detail to each of your comments below.</p>

<p>Abstract</p> <p>Background: consider reframing the sentence “this study presents” into a research aim.</p>	<p>We have rephrased the sentence accordingly:</p> <p><i>“This study aims to assess implementation experiences, acceptability, and feasibility of opt-in, at-home SARS-CoV-2 screening using rapid diagnostic tests (RDTs) to facilitate safe face-to-face teaching during a pandemic.”</i></p>
<p>Methods: Please consider describing the quantitative data collected as well as the interview data.</p>	<p>Thank you for pointing this out. The sentence in the abstract now reads:</p> <p><i>“In addition to quantitative data collected to assess screening diagnostic yield (tests handed out to study participants, positive RDT results reported, results of confirmatory PCR tests), we conducted qualitative in-depth interviews with participating pupils, parents, and school stakeholders to elicit implementation experiences and screening perceptions.”</i></p>
<p>Results: Please clarify which respondent groups wanted “more positive consequences of screening participation” – parents, children, school staff?</p>	<p>This was voiced by all three respondent groups, including school staff. We clarified this by rephrasing the sentence:</p> <p><i>“Self-testing at home before coming to school was feasible, but more positive consequences of screening participation (e.g., easing of mask mandates) besides a personal feeling of safety would have been appreciated across respondent groups.”</i></p>
<p>Conclusion: can a broader conclusion be made regarding the wider implementation of school testing in relation to safe school reopening? A clearer research aim may help produce a conclusion with wider applicability.</p>	<p>We refined this statement to offer a broader conclusion:</p> <p><i>“Ag-RDT-based SARS-CoV-2 screening programs relying on self-testing at home are a feasible and acceptable supplement to the public health toolbox to facilitate a safe return to face-to-face teaching at schools”</i></p>
<p>Introduction</p> <p>The first sentence suggests that schools were closed to all children. In the UK at least schools remained open to some children including those of key workers. Please clarify.</p>	<p>Thank you for highlighting this. We edited the sentence to improve clarity:</p> <p><i>“To curb infection rates in the context of the COVID-19 pandemic, many countries suspended routine, face-to-face teaching in primary and secondary schools, and -- where possible -- schoolchildren were shifted to remote learning.[1, 2]”</i></p>
<p>Please consider whether the statement “children’s limited impact on viral transmission dynamics” reflects the most recent evidence. I’m not an expert on the epidemiological data, I wonder whether this article could help clarify the role children play in viral transmission: <a href="https://jamanetwork.com/journals/jamapediatrics/fullarticle/2780964">https://jamanetwork.com/journals/jamapediatrics/fullarticle/2780964</a></p>	<p>Thank you very much for highlighting this reference. We agree that the sentence might not have been ideally formulated – we wanted to highlight that, despite frequent assumptions at the outset of the pandemic, schools and children in general so far have not been identified as key drivers of the pandemic, which is also highlighted in the JAMA pediatrics reference.</p>

	<p>This being said, we do not want to suggest that children cannot contract SARS-CoV-2 or face severe disease progression. To clarify this, we have edited this sentence and included the reference you kindly suggested:</p> <p><i>“However, as studies outlined the negative effects of school closures on children’s education and mental health [3, 4], and as evidence mounted regarding children’s reduced risk of severe disease progression [5, 6], schools began reopening.”</i></p>
<p>I am a co-author in the study cited from the UK (ref 7). Please can I suggest tempering the language around the protective measures being ‘highly accepted’ to ‘broadly accepted’ as concerns were raised around the impact of such measures on student behaviour, learning and pastoral care etc. It might be worth highlighting that COVID-19 testing was welcomed in our study as this aligns with your research.</p>	<p>Congratulations on your study which was a great inspiration! We rephrased the sentence following your suggestion:</p> <p><i>“On the other hand, a study from Great Britain suggested that SARS-CoV-2 protective measures in schools were broadly accepted among schoolchildren and parents, and expansion of routine SARS-CoV-2 testing would be welcomed.[10]”</i></p>
<p>As in the abstract, I think the aim of the research could be made clearer. Were you specifically interested in the acceptability and feasibility of home-based testing or how it was implemented?</p>	<p>Thank you for you feedback. We rephrased the last sentence of the introduction section to further clarify the aim of our research:</p> <p><i>“This study fills a gap in the literature by providing insights regarding how RDTs for home-based screening of primary schoolchildren can be implemented, and whether such screening approaches can be a feasible and accepted addendum to the pandemic response toolbox in Germany.”</i></p>
<p>Methods Line 75 – please describe how the school was chosen (e.g. pragmatic considerations).</p>	<p>We have included a sentence on how the school was selected at the beginning of the ‘intervention design’ sub-section:</p> <p><i>“Several schools in the region expressed interest to participate in pilot-projects for SARS-CoV-2 screening. We selected one school suited to fill key gaps in the discourse, particularly with regards to setting (peri-urban) and age of schoolchildren (primary school).”</i></p>
<p>Line 81 – ‘Responding to calls’ – can you say from who? E.g. policymakers? It would be good to report whether the findings of this study fed into/supported the state wider rollout of testing.</p>	<p>We have included this information in the main text which now reads:</p> <p><i>“Responding to calls from policymakers for pilot projects testing the feasibility and acceptability of such screening efforts, our study-based screening was initiated in March 2021. Statewide compulsory screening was introduced for schools in April 2021, informed by findings</i></p>



	<i>from several pilot projects testing different approaches, including our own study.”</i>
Quantitative data – were participants asked to report the result of all test results or only positive tests? If not, does this mean the study did not assess how many tests were performed in total? As well as positive test results were participants asked to report COVID symptoms for the study? Please consider reflecting on this in the strengths and limitations section.	<p>Yes, it's correct that participants were not asked to report all test results, but only positive ones. This was a decision made together with school stakeholders and parent representatives to minimize screening-associated strain on already heavily burdened parents and therefore increase buy-in. As suggested, we reflect on this in the strengths and limitations section:</p> <p><i>“To minimize screening-associated burden and to bolster participation, the research team together with school stakeholders also decided against asking participants to systematically report negative test results or the emergence of COVID-associated symptoms. No cluster of cases emerged in the study setting, suggesting that the screening did not systematically miss infections, but the biased collection of test result data inhibits broad statements regarding screening accuracy.”</i></p>
Analysis – I suspect the authors are trying to keep within the word limit, but I feel it's important to include more detail on the qualitative analysis in the main text please.	<p>Yes, we indeed were concerned regarding exceeding the journal word limit. However, now that the editor-in-chief kindly waived the word limit for this article, we have shifted the text previously included as a supplementary file to the main text of the manuscript, and provided additional detail in Figure 3 and throughout the methods section, including the points raised below.</p>
Was a particular approach followed?	<p>We included this information in the methods section:</p> <p><i>“Qualitative data were analyzed drawing on thematic analysis,[18] combining inductive (themes emerging from the data) and deductive (concepts derived from the literature) approaches (Figure 3).”</i></p>
Were the interviews transcribed or were the summaries used to code the data?	<p>We decided to rely on in-depth summaries for data analysis to expedite the process, therefore not all interviews were transcribed and translated verbatim but only key sections identified via interviewer notes and repeated relistening. We clarified the information provided in Figure 3 by adding the following to the main manuscript:</p> <p><i>“JW and MS prepared detailed summaries of each interview, key sections were transcribed verbatim and translated into English.”</i></p> <p>And</p> <p><i>“JW iteratively applied the resulting codebook to the entire set of interview summaries”</i></p>

Were interviews conducted in German and translated into English?	<p>Interviews were conducted in German and those key section transcribed verbatim were translated into English. We have included this information in the manuscript:</p> <p><i>“Interviews were scheduled via email and conducted in German on a videocall platform of the participant’s choosing.”</i></p> <p>And</p> <p><i>“JW and MS prepared detailed summaries of each interview, key sections were transcribed verbatim and translated into English.”</i></p>
How were data from each respondent group compared (i.e. triangulation)?	<p>Given the comparatively small number of respondents in each group and that all interviews were conducted by the same interviewer, triangulation was performed as part of systematic debriefings with the senior authors. We have clarified this in the methods section:</p> <p><i>“JW iteratively applied the resulting codebook to the entire set of interview summaries, discussing emerging similarities and differences across respondent groups with SAM and CMD.”</i></p>
Although the analysis was described as inductive, Table 1 suggests a combination of inductive and deductive approaches as findings are categorised using the implementation framework constructs	<p>We agree that the way it was formulated in Figure 3 was not clear. We used an inductive approach to derive the main themes emerging from the data but also were deductively informed by the literature. We only drew on the framework to arrange our findings once analysis was complete. We clarified this in Figure 3 as well as in the data collection and analysis sub-section:</p> <p><i>“Qualitative data were analyzed drawing on thematic analysis,[18] combining inductive (themes emerging from the data) and deductive (concepts derived from the literature) approaches (Figure 3).”</i></p>
<p>Results</p> <p>Table 1 is a nice way of presenting the main themes and quotes. Please add unique identifiers next to the quotes so the reader gets a sense of the different people being quoted (e.g. mother 1).</p>	<p>Thank you for your positive feedback regarding the table. We included unique identifiers for each quote, both in the table and in the main manuscript text.</p>
Line 193 – please provide an example of ‘mistakes’ made during training. Please also include here the finding that the train the trainer wasn’t implemented as intended in some cases.	<p>We included examples of mistakes and moved the finding on unintended training approaches to this section:</p> <p><i>“Most participants appreciated the implemented train-the-trainer system and reported their interactions during the training as reassuring and empowering for when they performed the first RDT with their children, particularly when mistakes emerged during training (e.g., moving the test kit around, placing it on an uneven</i></p>



	<i>surface, wrong usage of buffer fluid). In a few instances, however, the snowball training system did not work as envisioned, with information only being relayed verbally.”</i>
Discussion Please consider inserting ‘interviewed’ in front of ‘participants’ on line 230 as a reflection that those who didn’t take part and were not interviewed may not share this experience / view.	Thank you, we completely agree with your comment and have revised the sentences in this paragraph accordingly.
Similarly, lines 249-252 could be tempered a little as a sizeable proportion of parents, children and staff (~40%) did not agree to implement testing suggesting it may not be as ‘easily implemented’ as indicated. How does this compare to the wider state rollout or elsewhere?	<p>We clarified that stakeholder buy-in and ownership allows for the intervention to be acceptable to a majority of potential participants:</p> <p><i>“Our findings highlight that an emotionally charged intervention can be generally acceptable to a target population if stakeholder buy-in and ownership is achieved through repeated explanations and demonstrations of the intervention.”</i></p> <p>We are not aware of any other qualitative studies that assessed acceptability of RDT-based screening in schools, especially with regards to the difference between at-home and in-school testing. The state regulations in our case allowed for primary schools to choose whether they wanted to test at home or on site, while for secondary schools (the common setting of pilot projects) on-site testing was compulsory. The school considered in this study continued with at-home testing, therefore a meaningful comparison is not possible.</p>
Figure 1 This study was conducted with impressive speed. Well done!	Thank you for your feedback!
Please add the year into this figure for clarity.	We revised the Figure accordingly
Figure 2 Please clarify in the figure, main text or Supplementary file 1, how participants were purposefully selected? I.e. based on what criteria. It appears from Supplementary file 1 that all parents were contacted suggesting this was not purposeful.	<p>We have included explanation of our selection process in the data collection and analysis sub-section:</p> <p><i>“For the qualitative interviews, we chose among 60 parents of 65 pupils who had signaled an openness to participate in an interview, contacting 25 of them via e-mail (and purposefully including them based on residence in larger or smaller villages, and being parents to children from grades one to four). Half of these emails received a response and we ultimately</i></p>

	<i>interviewed 10 parents (stopping early due to data saturation)."</i>
Please report number of mothers, fathers, care givers interviewed.	<p>We have included this information in the study participants sub-section of the main manuscript file:</p> <p><i>"Interviews were conducted with six school stakeholders and staff, 10 pupils, and 10 parents (nine mothers and one father)."</i></p>
<p>Supplementary file 1.</p> <p>Please add a description of how children and school staff were recruited and clarify whether interviews were conducted with parents and children together.</p>	<p>We have added further information on participant recruitment in the data collection and analysis sub-section of the main manuscript file:</p> <p><i>"For the qualitative interviews, we chose among 60 parents of 65 pupils who had signaled an openness to participate in an interview, contacting 25 of them via e-mail (and purposefully including them based on residence in larger or smaller villages, and being parents to children from grades one to four). Half of these emails received a response and we ultimately interviewed 10 parents (stopping early due to data saturation). Reasons for not participating among those who responded to our email invitation but declined or postponed an interview (n=3) included scheduling difficulties, and the high workload of managing homeschooling for pupils while working from home oneself. Parents agreeing to be interviewed were asked whether their child would also be open to being interviewed, with 10 children from nine parents agreeing to participate. School staff and stakeholders were contacted through designated school channels."</i></p> <p>Additionally, we have included the following:</p> <p><i>"Parents and pupils were interviewed together, with the pupil sometimes not being present for the entire duration of the interview."</i></p>