Questions and Answers from discussions held during the NEQOS webinar on 27th November 2019

Note: The text within this document was initially transcribed from the webinar, but has then been edited for sense where required. Additional responses have also been provided where questions had not been answered during the webinar.

1. *Were any of the clinician requirements for graphics produced different from what was expected?*

I think in large part they were on the topic areas that we expected, but the emphasis was a little bit different. So I think we had thought that static reports would disappear as we made the move to interactive dashboards, but it was really clear from the feedback that people wanted to also be able to keep the reports that they are used to, so that was a little bit different than expected.

The issue about the timeliness of the data was much more strongly expressed than we expected, and I think since we have done this work, we have realised that what people most want are data coming out of EPRs (Electronic Patient Records) and systems of that sort. So that is really, really live data which is a bit different to the work that we normally do in NEQOS, where we are generally aggregating benchmarked data. But the clinicians said "what I really want to see is the data that is coming out of my practice immediately" so that was another key issue.

One of the points that came across very strongly in the drop-in events was that we, in NEQOS, often use National Audit data because we are looking, for example, at how the detail of how a particular NICE guideline has been operationalised or has been delivered; and you often need National Audit data to actually be able to get to this level of detail. One of the things that came across from the clinicians was that, for their relevant National Audit(s), even though they are the most relevant to their practice, there were still issue about timeliness. This included how long the cycle is from contributing data to getting your reports, and for us getting the benchmarked data to be able to use it. So, it's just to emphasise that really strong message coming out from clinicians, to our colleagues across the country. Also, because clinicians know that they are submitting data to the audit, they are able to see their own data before submission. However, they can only see benchmarked data when it is presented, alongside the nationally released data, so the timescale challenge is a really interesting issue.

When we went out originally, we had expected a strong demand for the tools to be made available on tablets or mobile phones, and we were surprised that this was not a requirement. People did not believe that they would be able to get the detail that they wanted on a mobile phone screen or even on tablets, and most people were happy with a format that worked on laptops.

2. *Did clinicians have a view on the use of statistical tests or differences?*

There was little discussion on this throughout the project. However, through the orthopaedics work and the mortality work particularly, we use funnel plots and statistical process control charts through time, of the "making data count" type. These are charts that people will be familiar with and so there is that element of statistical analysis going on and people are keen on that and take that as read from NEQOS reports. But requests of the "let's have a t-test for difference" are not high on a clinician's list of the things that they want.

3. *Have you any thoughts on how to assure quality of the data if you use live data from EPRs? National clinical audits provide validated data.*

This is an absolutely key issue, often the data that is most real-time isn't validated and it might be telling you something completely wrong and so it is a difficult problem to solve. I understand why clinicians want very timely data and also why analysts might think that that is not an entirely brilliant idea. All we can tell you is that this is what clinicians say and we need to think of ways to solve it.

Different audits do this in different ways so the NELA audit (the National Emergency Laparotomy Audit) for example have locked cases and unlocked cases, so that you can have a choice about which ones you are seeing, that sort of facility. You could also do something about putting warnings on the data stating that "it is provisional data and you can use it to help you check that the data is accurate but don't assume that it is correct before you start. If you want the finalised, checked data you will have to wait until the national outputs are available".

4. *Did you consider accessibility (i.e. screen readers) as part of your design principles?*

This wasn't something we considered at the start of the project. We have tried to make things as clear as possible and, as alluded to, we have had some involvement from an external digital design company who have given us feedback on things like font sizes. As this was designed for clinicians, there was a degree of assumption about the lack of need for screen readers and similar tools. This is something that we could look at in the future.

[It should be noted that these design principles are overarching principles and should not be taken to be detailed guidelines.]

5. *Do you think you could use your ten points as a way to audit or assess a range of existing visualisations used across the NHS? Examples of good/bad practice might be interesting.*

One of the clear issues for us is impact of the work we have done, and how we try to disseminate the impact, and this might be one way of doing that.

I think that this is a really good idea and you could turn these into, I am not sure whether an audit tool would be the right term, but certainly a self-assessment tool. You could make a self-assessment tool that gives a score, and I guess you could be unkind and do it to them and audit it in that way, but I think that it is a really good suggestion. It's not something that we have done so far, but we could think about that, so good idea.

We could also think about it more than we are currently doing in our NEQOS products. This has obviously raised awareness amongst the team and we are trying to incorporate some of the principles into products as we go forward.

Part of our team learning, local learning, is making sure that this applies to all the work that we do. An additional quick thing to say is that we are aware that the draft design principles are quite a high level and what we haven't tried to do is to make them more detailed and into a guideline. What I mean is, as was highlighted earlier about accessibility, we haven't then said it has to be a specific font size. We weren't intending to do that, but if something like this was to be built into a tool, we might want to take it further to some degree, because then you would have more specific criteria that people can then actually use. So there is something about how you would take it forward to that level and we are aware that we are at a rather high level at the moment.

I also think that one of the things we learnt in trying to apply the design principles to our three examples, maternity, mortality and orthopaedics, was related how feasible it is to be very specific for some of the design principles. For example, even though we tried to achieve a certain amount of design consistency between the visualisations, actually, because of the nature of the data, it was really difficult to have a single way of doing it. I think that orthopaedics and mortality were the closest, because they both have funnel plots and trend lines and bar charts. I think that the maternity was pretty different; in the way that the data was set-up and the kind of output it produced, so it was pretty difficult to make that visually similar. So I think that it would be difficult to be really specific. I think that you would have to stay at principles level because it depends quite a lot on the data that you are trying to present as to how you actually do it.

6. *When will the draft maternity dashboard be available?*

The only reason we didn't provide a link to the draft maternity dashboard in advance was a) we thought that the two dashboards that we made available were enough to illustrate all of the points that we wanted to talk about today and b) there were a number of things that we were just trying to sort out on the maternity dashboard. We hope to have the maternity dashboard completed by the end of our project in January. However, if anyone wants any further information about any of the dashboards and their future after the project is completed, please email us directly (neqos@cntw.nhs.uk).

7. *Of the design principles did anyone find a requirement that they felt was particularly key or is particularly changing the way that you look at things going forward?*

I feel that interpretive text is particularly important. It's clearly absolutely key to find ways of building this into our interactive tools, as well as continuing to consider the need for static reports.

I think the hardest one to solve is about data being up-to-date. I think it is a key one from the clinicians, I think it is a key one for their engagement, but for some of the reasons we have already talked about (the trade-off of data quality with time) it is the hardest one to solve, I think.

8. *What visualisation tool did you use? PowerBi? Tableau?*

We used Tableau. We spent quite a bit of time trying to find out which tool to use. [See next question].

9. *What were the considerations around the different tools available; PowerBi? Qlikview? Tableau? What were the deciding factors and what was the chosen product?*

We conducted quite a detailed option appraisal when we first started the work. Ultimately, we chose Tableau.

10. What do you think are the advantages of PowerBi over Tableau or vice versa?

I would make a couple of points here, but the first is how difficult it is to compare them. I don't know if it is deliberately the case or not, but figuring out the difference in cost is difficult; the difference in functionality is also not straightforward. One of the reasons, just going back to cost for a second, is that PowerBi is a Microsoft tool so it depends on which other Microsoft tools you have in your organisation. We sit hosted between two NHS Foundation Trusts, so that makes a difference to the charging structure and so forth. It is not just the licence costs and the software, are you going to have to run it on a server? We managed to crack this because Imperial College Health Partnership were already doing it and had solved some of these problems, and we were able to piggyback on their server (thank you again to Imperial College Health Partnership!). But it is a key decision and it's really difficult to do and, although we engaged with people selling both of the products, it was still really difficult to make a clear judgement about which was best. So at some point you have to make a decision, "this one is going to be best at this point" and go with it. The other key element is that you have no idea, really, how the development is going to go, so one might be better than the other at a particular point in time; but they both claim to be developing at a fair rate of knots and changing, so how much do you want to try and future-proof yourself? It is a key problem and a particularly difficult one to solve.

We found that the pricing from Tableau was more transparent than from PowerBi. A lot of the functionality we needed, in terms of types of charts, seemed be integrated more in Tableau, whereas in PowerBi, they said that was a 'custom visual' and there may be a cost to that. We had a set budget and therefore a need to know the costs upfront, and did not want to find them escalating throughout the project, having to then pay for custom visuals that we thought were within PowerBi. I know that in the year since we chose Tableau, PowerBi has been developing so that our reasons for discounting PowerBi may have now disappeared.

11. Why did you not use Python?

At the time, we did not have the in-house technical capability to write the dashboards in Python.

(In response to a number of the questions about which tool we used) the principles of data visualisation that we are presenting are intended to be generic, and should work for whatever data visualisation tool you are using and when you are thinking about interactive data visualisation.

12. If you could start all over again would you have picked R or another open source option?

Yes. However, when we started the project, because we did not have the experience, it wasn't appropriate. Since then, through self-study and the NHS-R Community, I can see the benefits of and the advantages of R. So, we would probably consider R Shiny in future.

13. You noted that you are processing in R. Are you doing that using the integrated function within Tableau or externally processing in R and then importing?

We are processing in R externally and then exporting as a .csv file. This is imported into Tableau as the data visualisation tool.

14. Do you not think that by processing in R and outside Tableau that you are losing the interactive element?

The interactivity is still retained within Tableau. All of the base data is retained so you can still select questions and time periods, so you don't lose this functionality.

15. In terms of the whole process of data visualization, is there a need to build in expectation management? By focusing on users' questions and designing dashboards around their specific needs, is there a risk of their over reliance on data, when often it is only part of the solution?

We recognise that the data in our dashboards are only "indicators", and that local knowledge is needed to help interpret them fully, which may lead to further questions. The metrics in the dashboards have had considerable clinical engagement within their development so that we hope that the most pertinent aspects of quality are being measured. However, we recognise that this needs to be kept under review and revisions considered as new data sources become available. We also add narrative to our reports, which is a recognition that data is only part of the story. As we have discussed, we are trying to address the challenge of including some narrative text in our interactive dashboards as well as continuing with static reports where we think they are necessary.