QualDash
An interactive quality dashboard

QualDash: Realist Development & Evaluation of a Quality Dashboard in the NHS

DR LYNN MCVEY & DR NATASHA ALVARADO
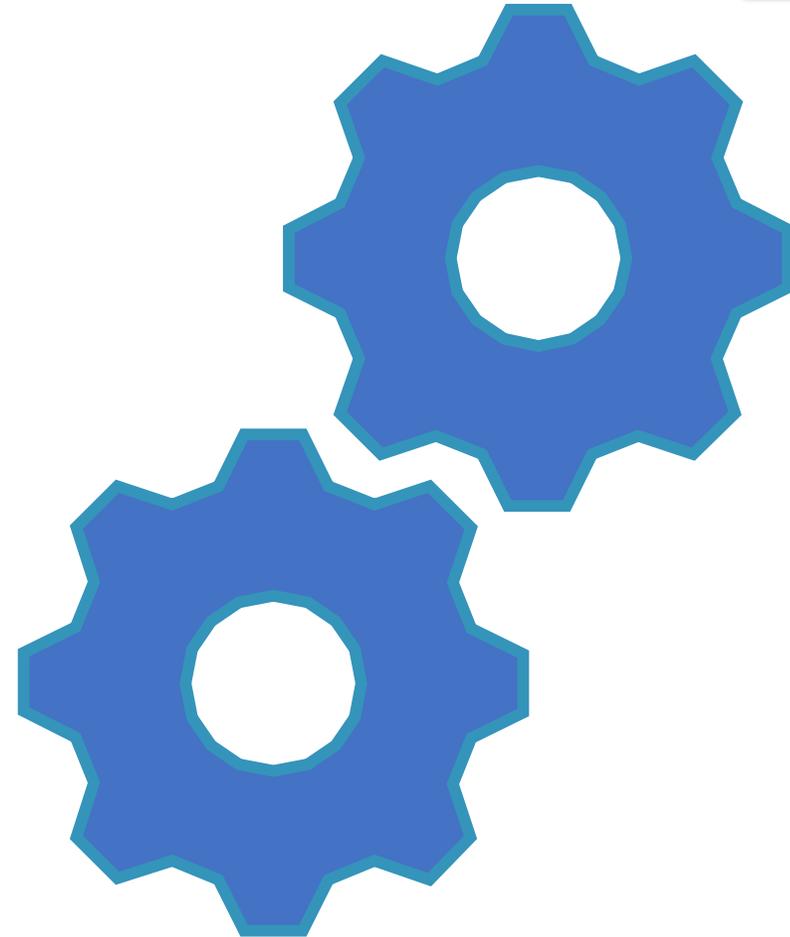
Acknowledgements

Summary

- Study background & aims

- Realist framework & structure

- Developing & refining QualDash CMOs: mechanisms that informed dashboard development & impacted on its use in practice

- Lessons learned

Background

o In the UK, NHS organisations participate in over 50 National Clinical Audits (NCAs), which provide public reports of data about patient treatments & outcomes in different clinical areas.

o NCAs are designed to facilitate measurement of care quality to support quality assurance & improvement. But there is variation in their use, especially for improvement.

o In 2016, NIHR HS&DR issued a call for research on how to improve feedback of the results of NCAs, which would test principles of effective communication of data to key audiences.

The QualDash project

- This project was funded to develop & evaluate **QualDash**, an interactive web-based quality dashboard that aimed to support hospital staff to better understand & make use of NCA data, thereby leading to improved quality of care & clinical outcomes.

- We took a **realist approach to dashboard development & evaluation**: Context analysis >> CMOs >> co-design QualDash & adoption strategy.

QualDash

An interactive quality dashboard
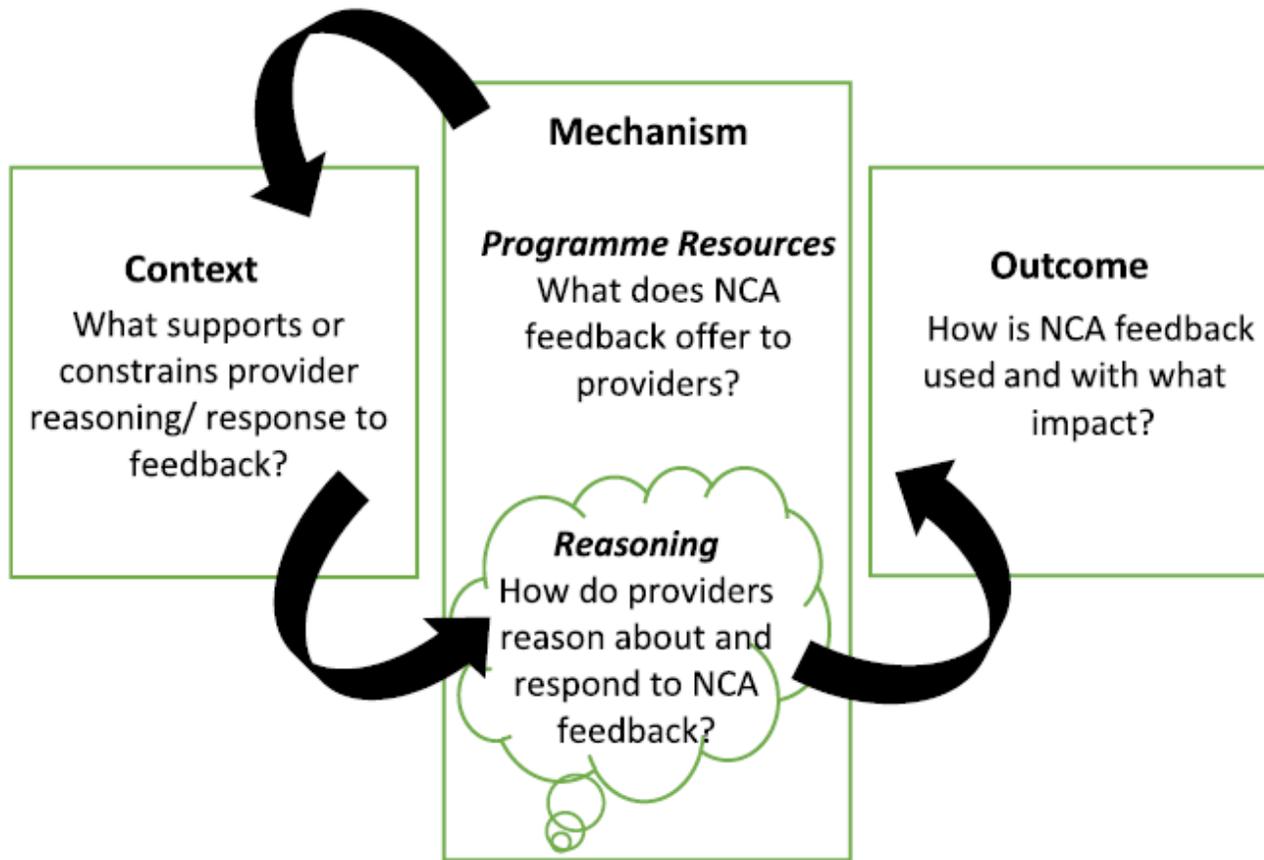
Adapted from Dalkin *et al.* (2015).

CMOs

Sample

NCAs
- MINAP (Myocardial Ischaemia National Audit Project)
- PICANet (Paediatric Intensive Care Audit Network)
- Others

Hospitals
- Three Teaching Hospitals
- Two District General Hospitals
- Eight clinical units (5 cardiology departments, 3 PICUs)

Professionals
- Clinicians
- Non-clinical support staff
- Trust Board & quality & safety committee members

Study structure

Phase 1

Context analysis to develop initial CMOs & requirements specification

Interviews with 54 NHS staff

Phase 2

Used CMOs to co-design QualDash

2 co-design workshops in one hospital, with 7 clinical & non-clinical participants in each

Phase 3

Used CMOs to co-design adoption strategy for QualDash for each unit

Focus groups with each hospital (23 participants)

Phase 4

Dashboard introduced in all hospitals

CMOs refined through ethnographic observations & informal interviews (148.5 hours)

Context Analysis

NCA feedback – two modes
- Supplier Feedback - national comparators
- Service Feedback produced from local databases – month by month

Headline figures: Unplanned extubation

What are we measuring?

Children who need help with their breathing may require a tube in their throat connected to a machine: this is called **invasive ventilation**. If the tube is accidentally dislodged, this is referred to as **unplanned extubation**. In Figure 5 and Table 5, we present the number of unplanned extubations for every thousand days of invasive ventilation that were reported in 2017 and 2018, based on country of admission. Figure 5 shows the rate of unplanned extubation by organisation for both 2017 and 2018, ranked by the 2018 rate.

What did we find?

In 2017, the number of unplanned extubations in the UK and Republic of Ireland (excluding Wales) was 255 out of a total of over 67,000 days of invasive ventilation. In 2018, this increased to 324 unplanned extubations out of a total of just over 64,000 days of invasive ventilation (excluding Wales). These figures equate to unplanned extubation rates of 3.8 (95% confidence interval: 3.3 – 4.3) and 5.1 (95% confidence interval: 4.5 – 5.6) unplanned extubations for every 1,000 days of invasive ventilation for 2017 and 2018 respectively.

Nine PICUs demonstrated a decrease in their unplanned extubation rate between 2017 and 2018, and 14 units had an increase in rate.

There were four units for which there were no unplanned extubation events reported in either 2017 or 2018. It is important to understand the reasons for these observations in terms of whether this reflects high performing units or variable standards of data reporting.

Figure 5: Unplanned extubation rates per 1,000 days of invasive ventilation by health organisation, 2017 and 2018
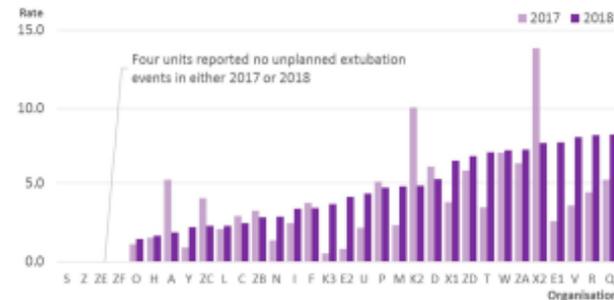
Ranked by unplanned extubations rate for 2018

Headline figures: Death in PICU

What are we measuring?

All deaths that occur after admission but prior to discharge from PICU are recorded and reported here for children under 16 who were admitted between 2016 and 2018. Deaths are presented in two ways: firstly, based on the country of admission (i.e. PICU location) and secondly based on the patient's recorded country of residence.

What did we find?

Table 3 summarises the number of deaths in PICU by country of admission and year. The percentages were calculated for each country based on the total number of admissions for that year. There was a total of 2,106 deaths over the three year period, equivalent to 965 children out of every 1,000 being discharged alive. Due to small numbers, data for non-NHS and NHS organisations in England are presented combined.

Table 4 shows the proportion of deaths in PICU, compared to all childhood deaths in the UK and Republic of Ireland, based on the country of residence. We also present the total number of deaths in the population in brackets. For children resident in the UK, PICU deaths accounted for between 15–17% of the total number of children's deaths. For children resident in the Republic of Ireland, PICU deaths accounted for between 19–23% of the total number of children's deaths.

Table 3: Proportion of deaths in PICU of all PICU admissions, by country of admission and year

Country of admission	2016	2017	2018	2016-2018
England	3.6% (n=585)	3.8% (n=604)	3.4% (n=559)	3.6% (n=1,748)
Wales	2.1% (n=11)	2.0% (n=10)	4.3% (n=22)	2.8% (n=43)
Scotland	2.4% (n=36)	2.5% (n=35)	2.4% (n=33)	2.5% (n=104)
Northern Ireland	1.6% (n=9)	3.4% (n=18)	2.4% (n=12)	2.5% (n=39)
Republic of Ireland	3.8% (n=53)	4.1% (n=60)	4.1% (n=59)	4.0% (n=172)
Total	**3.4% (n=685)**	**3.7% (n=724)**	**3.4% (n=684)**	**3.5% (n=2,106)**

Data are presented based on date of admission

Due to small numbers, data for non-NHS and NHS organisations in England are presented combined.

Table 4: Proportion of deaths in PICUs of all children's deaths in the population: UK and Republic of Ireland, 2016–2018

Country of admission	2016	2017	2018
UK	15.3% (n=641)	16.1% (n=667)	15.5% (n=626)*
Republic of Ireland	18.9% (n=53)	23.2% (n=60)*	21.1% (n=59)*

* For 2017 and 2018, the numbers of total deaths for the Republic of Ireland and Northern Ireland are provisional and subject to change

Based on country of admission
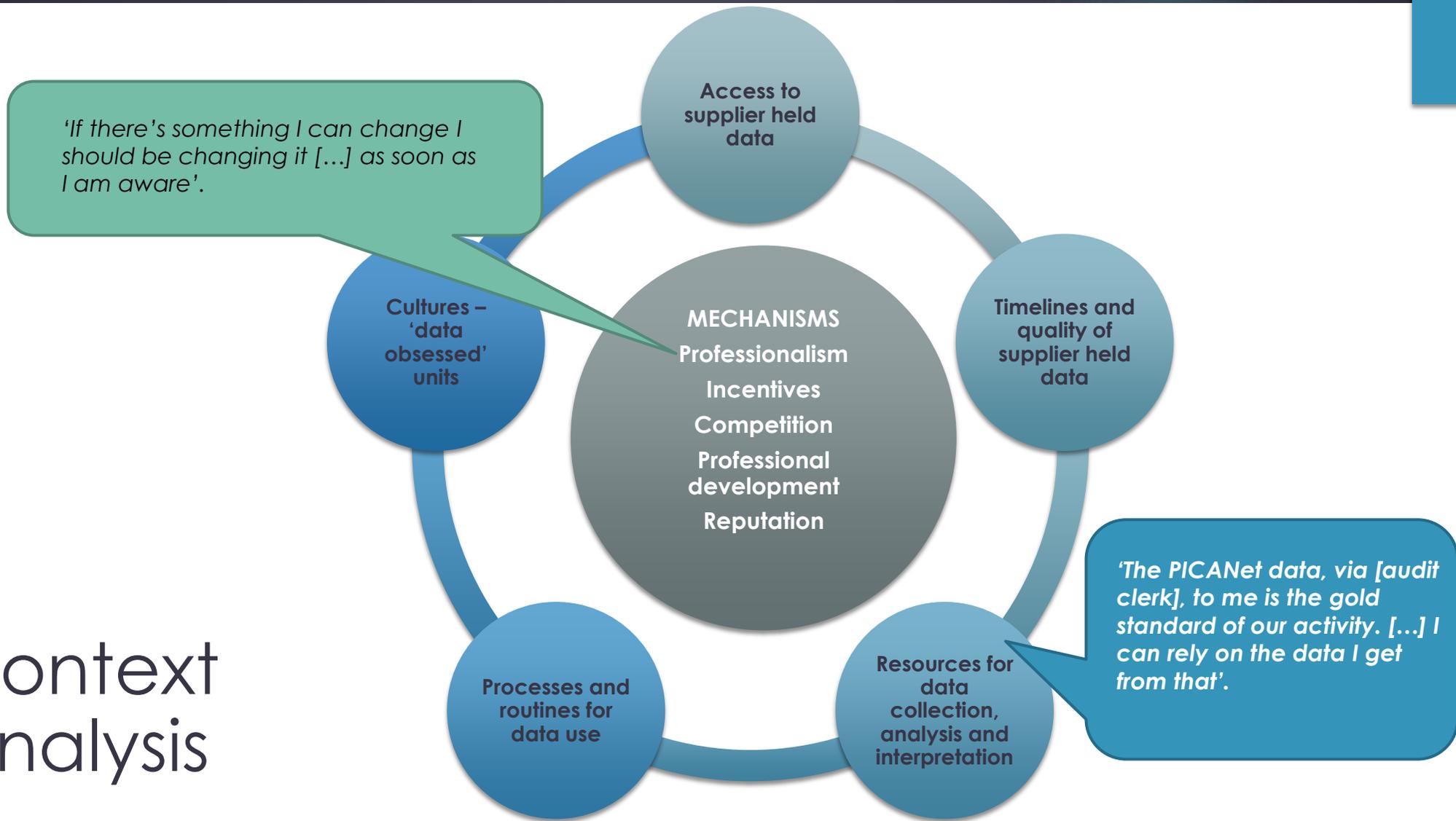
QualDash design

- QualCards
  - Mechanisms - metrics - tasks and subtasks
  - Simple visualizations
- Web-based access
- Exporting and customization functions to support reporting

Supporting Adoption

**INSTALLED ON LOCAL SERVERS**

SITE CHAMPIONS

DISSEMINATION

USER SUPPORT

Context	Mechanism		Outcome	
	Resource	Response	Within and across services	
Services resourced with audit support staff + mature reporting systems	QualDash provides access to NCA metrics *via* Google Chrome and visualisations that can be exported into reports	**Facilitation** – Audit support staff choose to use QualDash as it facilitates the performance reports they are asked to prepare by clinical staff and managers	Audit support staff save time producing performance reports / encourage clinical and managerial staff to use dashboard for data requests	Reduces variation in use of NCA data across sites

Increases opportunities for NCA data to stimulate QI |
| Services which are not resourced to utilise NCA data in routine monitoring processes | QualDash provides access to NCA metrics *via* Google Chrome and visualisations that can be exported into reports | **Professionalism + leadership** – Clinicians use QualDash to review NCA data in their routine service monitoring processes, e.g. clinical governess meetings | NCA data integrated into staff routines for monitoring service quality and performance | |

QualDash CMOs

Context: Reporting routines in place

The Audit Clerk checks the figures in the QualCard against her visualisations for the same months and they do not match. They explain that this mismatch might be because QualDash shows bed days by admission date rather than bed days across the months of admission.

'Just wanted to say Qualdash has saved me hours of work with regards to data I submit to NHS England'

- Metric config queries
- Data timeliness
- Data sources
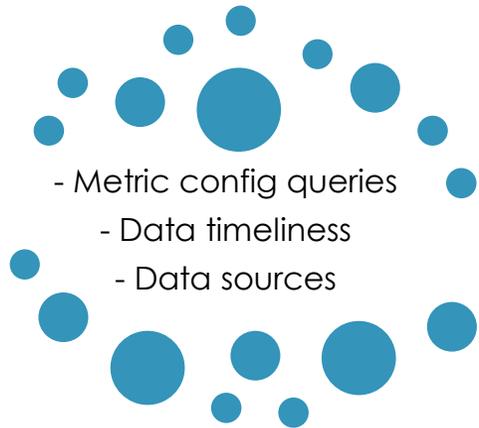
Audit Support Staff choose to continue using existing systems for reporting
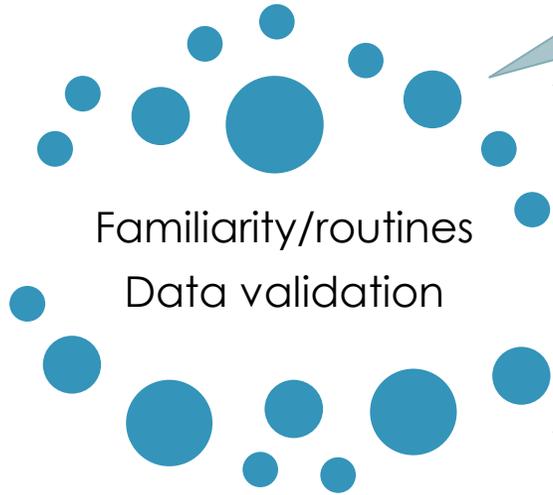
Response to QualDash

Impact

'I would really love to be able to use QualDash, but it just doesn't show me, you know, everything I need, and I would like to be able to say to you, yeah, I use it all the time [...]but it just doesn't do exactly what I need'.

What happened in practice?

REDUCING VARIATION IN USE OF NCA DATA IN QI

Context: sites not resourced with dedicated audit support staff

Consultant Cardiologists comment that they have come across this sort of thing before with new systems that are developed by people outside their unit: the data going in are correct, but it doesn't make sense, and that time is needed to check it to make sure the data are interpreted correctly.

Familiarity/routines
Data validation

Validation /interrogation of QualCards before use in practice

Response to QualDash

Impact

What happened in practice?

REDUCING VARIATION IN USE OF NCA DATA

Lessons learned – using realist approaches in software development & evaluation

- From the context analysis, we developed initial CMOs about current use of NCA data which provided a useful framework for dashboard design.

- We then developed CMOs that theorised the impact QualDash would have on care quality, but in refining them we found that the dashboard needed further development if it was to be used optimally, linked to use of 'dummy' data in co-design.

- Users were only able to see how the dashboard could work for them & tell us what developments were needed, once they saw their own data.

References

Dalkin SM, Greenhalgh J, Jones D, Cunningham B, Lhussier M. What's in a mechanism? Development of a key concept in realist evaluation. *Implement Sci*. 2015;10(1):49.

THANK YOU!