Peer influence as a driver of technological innovation in the UK National Health Service: a qualitative study of clinicians' experiences and attitudes

Corresponding author
Dr Claire Greszczuk (CG)
Public Health Specialty Trainee
South London Health Protection Team, Public Health England, Skipton House, 80 London Road, London SE1 6LH
clairegreszczuk@gmail.com

Co-author details
Dr Faraz Mughal (FM)
Warwick Primary Care, University of Warwick, Coventry CV4 7AL, UK

Dr Rammya Mathew (RM)
Royal College of Physicians, Care Quality Improvement Department, 11 St Andrews Place, London NW1 4LE, UK

Dr Ahmed Rashid (AR)
UCL Medical School, Room GF/664, Royal Free Hospital, Hampstead, London NW3 2PR, UK. Email: ahmed.rashid@ucl.ac.uk

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ABSTRACT

Background

Accelerating innovation to improve quality is a key policy target for healthcare systems around the world. Effectively influencing individuals' behaviour is crucial to the success of innovation initiatives.

This study explores United Kingdom (UK) clinicians' lived experiences of, and attitudes towards, clinical peers endorsing healthcare innovations.

Methods

Qualitative interviews with UK-based clinicians in one of two groups: (i) clinicians working in 'front-line' service provision and (ii) clinicians in strategic leadership roles within health institutions. Participants were identified through purposive sampling, and participated in semi-structured telephone interviews. Thematic analysis was used to identify and analyse themes in the data.

Results

17 participants were recruited: eight clinicians from front-line UK healthcare settings and nine clinicians in leadership roles. Two major themes were identified from the interviews: power and trust. Participants recognised and valued peers' powerful influence, exerted in-person via social networks and routine work-related activities. Peers were implicitly trusted, although often on condition of their credibility and deservingness of respect, supporting evidence, and absence of conflict of interest. While the groups shared similar views, they diverged on the subject of institutions, felt to be powerful by strategic leaders yet scarcely mentioned by front-line clinicians.

Conclusions

UK clinicians view peers as a powerful and trustworthy source to promote innovative technologies. Policies that aim to support this process should seek to control the wider conditions that nurture peer-to-peer influence. Further research into interpersonal influence in health settings may improve implementation of change initiatives.

INTRODUCTION

Background

Amid a climate of financial scarcity, changing public expectations, and emerging technologies, health systems internationally are focussed on improving healthcare quality and cost efficiency.[1] The United Kingdom (UK) Department of Health (DH) has included innovation as a key policy target, defining it as "*an idea, service or product, new to the [National Health Service (NHS)] or applied in a way that is new to the NHS, which significantly improves the quality of health and care*".[2]

English institutions, including the National Institute for Health and Care Excellence (NICE),[3] NHS England (NHSE)[4] and Academic Health Science Networks (AHSNs),[5] have devolved responsibility for system innovation in England, and employ senior clinicians as leaders of change. Despite their central position, these agencies promote a 'bottom-up' approach to innovation, recognising system change requires engagement and action of individuals though local channels.[6]

Although the macro environment is important in health system innovation, adoption and dissemination are contingent on organisational and individual-level change.[7] For individuals, interpersonal interaction is the fundamental driver of their innovation decision-making.[8] Interactions between clinicians occur in a variety of settings, including the workplace, conferences and educational events,[9, 10] and behaviours spread though social networks.[11] Conversations lead to exchange and construction of ideas, beliefs and feelings towards innovations and subsequently adoption choices.[7] In the NHS, clinicians' technology adoption decisions depend on subjective and value-laden notions about the product, termed 'technology identities', which are constructed and perpetuated through social interactions.[10]

'Opinion leaders' (OL) are individuals particularly effective in influencing others' attitudes or behaviour.[8] Clinicians who share characteristics, clinical backgrounds and social networks, and those who display expertise and competence, are especially influential.[8, 12] Industry strategically use OL to increase adoption of their products, a practice shown to be effective in influencing doctors' behaviour despite widespread criticism.[13, 14] Industry's influence in today's NHS includes extensive contact with clinicians and active contribution to construction of favourable technology identities.[10]

The place of interpersonal influence in driving innovation may be questioned in today's evidence-based medicine (EBM) era.[7] Indeed, individuals will only adopt a technology if they perceive it to have relative advantage over alternatives,[8] implying

objective evidence of innovations' effectiveness should be a powerful driver of change.[15] Early EBM proponents predicted a new age of research rationally translated into practice,[16] but this has not become a reality.[7] The innovation adoption process is complex, and scientific evidence does not predict behaviour change.[17] In the NHS, much practice is non-evidenced, and much evidence never translates into practice.[18] To explain this evidence-practice gap, it is essential to note 'relative advantage' is not an objective technology attribute, but a subjective perception of potential adopters.[8] Scientific evidence, often ambiguous, debated and contested, is just one of many factors that shape clinicians' beliefs about technologies and subsequent adoption decisions.[7, 10]

UK health policy explicitly welcomes peer influence, promoting local clinical leadership of innovation.[6] In contrast, the EBM tradition condemns practice based on non-systematic evidence,[15] such as personal anecdote and opinion. No studies have specifically explored clinician's attitudes to peers influencing their decisions.

Interpersonal influence is a key driver of clinicians' behaviour,[7, 8, 10] yet it remains unclear how NHS clinicians perceive peer endorsement of innovations. Given its importance in professional decision-making, and the policy context of accelerating innovation, this study sought to understand NHS clinicians' lived experiences of, and attitudes towards, the endorsement of innovative technologies by clinical peers. For this study, 'clinical peer' was defined as a fellow clinician.

METHODS

Study design

We performed a qualitative study using semi-structured interviews and thematic analysis to explore clinicians' experiences of, and attitudes towards, peer clinicians endorsing innovative medical technologies.

Terminology

The terms 'innovation', 'technology', 'peer' and 'industry' were used frequently. Their definitions, summarised in Table 1, were agreed by the research team and transmitted to the participants during data collection.

Table 1: terminology	
Innovation	As defined by DH: "*an idea, service or product, new to the NHS or applied in a way that is new to the NHS, which significantly improves the quality of health and care wherever it is applied*".[2]

Technology	Drugs, devices and diagnostic tools; NICE considers these 'technologies' in its technology appraisal process.[3]
Peer	A fellow clinician. This definition was deliberately broad to enable participants to interpret the term and respond based on their personal experiences and perceptions of their own peers.
Industry	Profit-making companies that manufacture and/ or supply health technologies.

Sampling

CG and AR conducted purposive sampling, using their clinical experience and knowledge of prominent NHS institutions to generate a list of potential participants from their professional networks. Participants were chosen to represent two distinct groups:

1. 'Front-line' clinicians who primarily work in service provision
2. 'Strategic leaders' employed in leadership positions within institutions tasked with NHS innovation.

Participants were sought from a range of clinical specialties and NHS institutions to obtain a breadth of experiences and views reflecting the characteristics of UK clinicians. The strategic leaders were selected to provide insight into prominent English institutions, and may or may not have been actively practicing alongside their leadership role. The sample was limited to mostly doctors to provide a degree of consistency.

Invitations to participate in a confidential telephone interview were emailed over several weeks; this allowed flexibility to ensure a range of specialties and institutions were represented in the final sample. Recruitment continued until data saturation was reached.

Data collection and analysis

Semi-structured telephone interviews, using an interview guide (see Appendix 1), were used to allow detailed and flexible exploration of participants' perspectives. Telephone interviews are a valid method and were chosen due to participants' dispersed locations and busy schedules.[19] Interviews were conducted during October and November 2015 by two researchers (FM and RM). A definition of medical technology was provided to ensure participants did not misinterpret the term. Interviews were audio-recorded, then transcribed and anonymised. Interviews were transcribed and analysed iteratively. After 17 interviews, all four researchers felt data saturation had been reached because no new themes were being identified.

CG, with input from the study team, conducted an inductive thematic analysis of the transcripts. Initial codes were generated representing all interesting features of the data. Related codes and accompanying extracts were collated into potential themes in Microsoft Word. Themes were subsequently reviewed, discussed and refined by the study team to generate the final themes and identify relationships between them.[20]

RESULTS

Participants

17 participants were recruited, each participating in one interview. On average interviews lasted 16 minutes, and the range was eight to 34 minutes. Participant characteristics are summarised in Table 2.

Table 2: Participant characteristics				
Category	**Detail**	**Front-line**	**Strategic leaders**	**Total**
Number		8	9	**17**
Level	Medical consultant	6	8	**14**
	Senior specialist nurse	0	1	**1**
	Medical trainee	2 *GPST2 x1* *ST5 surg. x1*	0	**2**
Speciality	General practice	3	2	**5**
	Surgical	2	2	**4**
	Medical	0	3	**3**
	Anaesthetics	2	1	**3**
	Paediatrics	1	1	**2**
NHS commissioning region	London	3	3	**6**
	South	3	4	**7**
	Midlands & East	2	2	**4**
Type of institution*	NHS arms-length body	-	5	**5**
	Medical royal college	-	3	**3**
	AHSN	-	2	**2**
	Think tank	-	1	**1**
	Clinical commissioning group	-	1	**1**

*Some participants held more than one position

Themes

Two major themes were identified: power and trust. Participants recognised and explained peers' powerful influence on behaviour, and identified channels through which it is exerted. Peers were described as trustworthy, although often on condition of their credibility, a supporting evidence-base and absence of conflict of interest (COI). Most themes were equally distributed between front-line and strategic leader groups, with one exception, the role of institutions, which arose predominantly amongst strategic leaders. The themes are considered in turn below. Participants are referred to as [front-line xx] or [strategic leader xx], where 'xx' relates to a unique participant code.

Power

All participants described peers' powerful influence and offered explanations for why and how it occurs.

Recognised power

All participants expressly recognised their behaviour is influenced by clinical peers. Several believed peer endorsement is an absolute necessity for adoption:

> [Strategic leader B2] *"I'm not sure I can think of examples where peer endorsement and support has not been a factor."*

Three participants noted peers may use their influence to stifle rather than foster innovation, and several others commented on potential for harm if clinicians promote ineffective or non-cost effective technologies. In contrast, a small number added peers are not *necessarily* influential:

> [Front-line A1] *"I have seen TV Doctors speak [at conferences]. I often think, "Why are they invited?" (...) They don't have anything meaningful to say."*

Explaining peers' power

Professional value

Most participants explained peers are influential because the clinical community values professionalism and perceives clinicians to understand clinical need:

> [Front-line A6] *"if not clinical professionals then who? Would you rather hear it from a clinician or someone who has developed the device? I would, for one, hear it from a clinician."*

Interpersonal contact

Almost all felt the face-to-face element of peer influence rendered it more impactful than other communication modes:

> [Strategic leader B9] *"if you are looking to change practice there is nothing like face-to-face. (…) for me, face-to-face communication remains the most powerful."*

Two participants noted interpersonal interactions also offer an efficient means of information exchange in a time-pressured environment.

Channels of influence

Spread through social networks

Many participants expressed a sense of peer influence spreading powerfully through speciality-specific social networks, with endorsements communicated word-of-mouth at meetings and among colleagues:

> [Front-line A3] *"[The laryngeal mask airway] was endorsed within a very few years from China to New Zealand, by every anaesthetic community in every country."*

Regular and routine contact

Routine encounters, in the course of day-to-day work and professional development activities, were identified as another pervasive and powerful source of peer influence:

> [Front-line A2] *"My practice has been led by a consultant-led GP education evening, where the ENT consultant (…) presented the data and said, "This is the product I recommend"."*

A role for institutions

Most strategic leader participants demonstrated faith in institutions' role in facilitating peer endorsement of innovations:

> [Strategic leader B3] *"I suspect the only other route is through the innovation portals of AHSNs. That's the other organisation that should be coordinating local level endorsement, and clinicians should be doing so through their AHSN."*

In sharp contrast, only one front-line doctor mentioned an institution: a noteworthy discrepancy between the groups.

Trust

Trust was central to all participants' accounts of peer influence. Peers were deemed trustworthy on condition of credibility and deservingness of respect, a supporting evidence-base, and no COI.

Credibility and respect

Most participants implied peers are a more trustworthy source of information than non-clinicians due to their clinical credentials:

> [Front-line A2] *"as a GP, most of the clinical updates I attend are led by clinicians (...) I perceive that to be more trustworthy than a non-clinical person doing it."*

'Local' or 'known' peers were viewed as particularly credible, as were prominent figures with authority or prestige. Some described different 'criteria' for credibility between specialties:

> [Strategic leader B1] *"To be credible as a physician, it is often about the titles after your name and your academic weight in publication. (…) If you want to get a surgical innovation into the market, you get someone who is the guy, when you have your gallbladder [out] you would go and see."*

One participant recognised the likelihood of cognitive bias in favour of an innovation if it were endorsed by a well-known figure, and several others acknowledged they were more likely to trust a skilful orator.

Evidence-base

All participants believed endorsement should ideally be evidence-based, but views concerning the weight of science in relation to peer influence varied. Several felt an evidence-base is an absolute necessity to trust a clinician endorsing a novel technology, and disapproved of peers endorsing without robust evidence:

> [Strategic leader B8] *"There is no point in a clinician standing up and saying "I think this is bloody marvellous". It has got to stand up robust evaluation."*

Four participants highlighted how useful peer opinion can be when the evidence-base is limited, and over half the group believed peer influence, including opinion and anecdote, can be more powerful than evidence for influencing adoption:

> *[Strategic leader B1] "the profession is far more influenced by anecdote and our friends talking enthusiastically about a new piece of kit than a large multi-centred trial."*

Conflict of interest

All but one participant raised the issue of COI, most implying their trust in a peer would be damaged if COI were present or transparency lacking. In addition, most expressed mistrust of industry and disapproval of company-employed clinicians:

> *[Front-line A8] "improving the health of the nation (…) is not [industry's] primary interest. Their primary interest is selling a product."*

In contrast, four participants felt COI is not necessarily a reason to mistrust a clinician endorsing a technology, especially where they have been involved in its evaluation:

> *[Strategic leader B2] "I think [COI] is grossly overplayed. Then you end up with the opposite, you have people with no conflict of interest but haven't got a clue what they're talking about."*

Figure one is a thematic map, displaying the themes and subthemes describe above. *[Insert Fig one here]*

DISCUSSION

This study found clinical peers are considered a powerful and trustworthy influence on adoption behaviour, although trust is often conditional on perceived credibility, evidence-base, and absence of COI. Peer endorsement is encountered regularly and valued as an appropriate and useful influence. Front-line and strategic leader clinicians shared strikingly similar views, diverging only on the role of institutions, with strategic leaders placing greater emphasis on institutions' power. Inconsistencies and contradictions throughout the data highlight the complexity of individuals' decision-making processes.

All participants recognised peer endorsement has a powerful influence, spreading through social networks and face-to-face interactions, and occurring regularly during daily work and professional development. Although this acknowledgement contrasts with psychological literature describing how people typically underestimate the impact of others' influence on their own behaviour,[21] UK general practitioners have previously been shown to cite specialist recommendation as an important determinant of their prescribing choices.[22] The active promotion of peer-to-peer learning in UK medical practice may

explain why participants so clearly recognised peer influence and commonly experience it.[23]

Interpersonal interaction with peers was considered more powerful than distant, impersonal communication, aligning with classical innovation adoption models, which state interpersonal influence is the fundamental driver of adoption, especially for complex innovations.[8] Additionally, participants cited overwhelming NHS time-pressures, an acknowledged barrier to innovation,[24] as further explanation for the powerful impact of interpersonal contact, whereby peer-to-peer recommendations represent an efficient and trusted information source.

On trust, while peers were typically viewed as trustworthy individuals, this often depended on their perceived credibility, resembling previous work on OL in the NHS, which recognised two distinct groups of influential leader: 'peer-like' and 'expert'.[25] Participants implied credibility 'criteria' vary between specialties, consistent with research suggesting opinion leadership depends on the audience and stage of innovation: prestigious or specialised clinicians may be influential at an early stage of invention whereas local and trusted peers represent a powerful influence for front-line implementation.[25]

Robust supporting evidence was another prominent proviso for trust. The prevailing EBM paradigm, which prioritises scientific knowledge and trains clinicians to practice accordingly may explain this.[15, 16] While clinicians have been shown to use evidence inconsistently and subjectively to construct and perpetuate beliefs about technologies,[7, 10] the findings imply consideration and interpretation of evidence is nonetheless a valued pillar of clinical decision-making. That said, many participants acknowledged interpersonal influence can outweigh research evidence, consistent with the evidence-practice gap seen in the NHS.[7, 17]

COI was another major barrier to trust. Mistrust of industry and scepticism towards peers with COI was notable, aligning with the backdrop of widespread cynicism towards industry,[13] and extensive marketing targeted at NHS clinicians.[10] A small minority felt COI is expected and acceptable however, arguing it is uncommon to find a credible OL *without* COI, indicating a nuanced picture exists in which perception of trustworthiness may be more powerful than objective truths.

The single noteworthy divergence between the front-line and strategic leader clinicians was on institutions as powerful facilitators of peer endorsement. While the strategic leaders may have simply been displaying greater awareness of institutions and their roles, it nonetheless suggests institutions hold a distinct lack of relevance for front-line clinicians. UK doctors have previously been found to place little importance on formal organisational position or authority of OL, favouring those with clinical or academic credibility.[25] This view may be deep-rooted in medical professionalism, in which clinical nous is prized and doctors

feel their practice is hampered by health system politics and culture.[26, 27] Furthermore, while institutions may facilitate innovation by controlling the contextual and organisational environment,[28] they are weak in affecting complex social processes at an individual level.[7, 29]. Considering the current policy focus on locally-led innovation,[6] the strategic leaders may have overestimated institutions' power to influence peer-led change.

Participants clearly approved of peer influence, recognising the importance of involving expert stakeholders in organisational change,[30] and valuing the autonomy and expertise reserved for, and increasingly defended by, the medical profession.[26, 27]

In contrast, unfavourable attitudes towards peer endorsement were also evident. The participants' disapproval of peers using anecdotal evidence highlighted how the EBM paradigm has permeated clinicians' value system.[15, 16, 24] Regarding COI, negative attitudes towards sales and marketing were expressed with great consistency and clarity, illuminating mistrust of industry among the medical community.[13] Several participants acknowledged peer influence could be detrimental if it caused inefficient NHS resource allocation.[1, 6]

Study strengths and limitations

Strengths
The diverse range of participants in this study provided a variety of opinions from across the medical profession. The qualitative design suited exploration of complex social processes, and the use of robust methodology ensured a high quality dataset and analysis were achieved.

Limitations
The research team exclusively comprised clinicians and may have had a more detailed theoretical basis if it included social scientists. However, this meant the study adopted a 'real-world' focus. As the research team come from NHS clinical backgrounds this may have influenced their perspectives in recognising themes. Furthermore, participants did not review and comment on the final themes due to resource limitations. However, the team members independently reviewed the data, discussed areas of disagreement and came to a consensus on the final themes to mitigate these issues. The study examined practices within three NHS England regions. While the findings provide valuable insights from a small number of clinicians, they may not represent the rest of England or other health systems around the world.

What this study adds

This study adds a novel insight into NHS clinicians' experiences and views of peer influence, and a unique comparison between front-line and strategic leader clinicians, two distinct groups, both instrumental in the success of NHS innovation ambitions.

Implications for policy

Our findings suggest policies to drive NHS innovation should support professional networking opportunities in order to foster peer-to-peer learning, recognising central institutions are poorly equipped to directly manipulate individuals' behaviours. Policy-makers may also develop and uphold professional and ethical frameworks that regulate innovation through setting the boundaries within which clinicians, organisations and industry operate.

Implications for research

This study offers broad, multi-specialty insights; future research may more deeply explore peer influence within individual specialties. Larger studies may investigate how peer influence can be encouraged and harnessed to support system-wide change, and what benefits, risks and ethical implications this presents.

ETHICAL APPROVAL

The study was approved by The University of Sheffield School of Health and Related Research (ScHARR) Research Ethics Committee (ref: NICE008) and informed consent was given verbally by all participants.

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