When the user is not the chooser: learning from stakeholder involvement in technology adoption decisions

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Summary

Background: Health systems need efficient innovation decisions to provide maximum benefit to patients, particularly in a climate of financial constraints. Whilst evidence based innovations exist for helping to address Healthcare Associated Infections, the uptake and implementation of these is highly variable and in some cases very slow.

Aim: To investigate innovation adoption decisions and implementation processes from an organisational perspective, focussing on the implications of stakeholder involvement during the innovation process.

Methods: Thirty five technology adoption decisions and implementation processes were examined through 121 qualitative interviews in 12 NHS health care organisations across England.

Findings: Stakeholder involvement varied across organisations with decisions highly exclusive to the infection prevention & control (IPC) team, to highly inclusive of wider organisational members. The context, including organisational culture, previous experience, and logistical factors influenced the level of stakeholder engagement. The timing of stakeholder involvement impacted on: 1. the range of innovations considered; 2. innovations selected, and 3. success of implementation. Cases of non-adoption, discontinued adoption, and of successful implementation are presented to share learning. The potential benefits of stakeholder involvement for 'successful' innovation adoption are presented including a goal orientated framework for involvement.

Conclusion: Key stakeholder involvement can lead to innovation adoption decisions compatible with structural and cultural contexts, particularly when involvement crosses the phases of initiation, decision making and implementation. Involving members of the wider health care organisation can raise the profile of IPC and reinforce efforts to make IPC everybody's business.

Keywords: stakeholder involvement, technology adoption, infection control

Introduction:

Delivering quality and efficiency gains in health care is becoming increasingly important worldwide and innovation is key for any such goal. In infection control, healthcare organisations potentially face a double financial burden if unsustainable innovation decisions are made, leaving less resources for patient protection and benefit[12]. In England, the Department of Health recently completed a consultation to learn from national and international best practice to accelerate the pace and scale of innovation adoption in the NHS[3]. This latest activity builds on the drive over the last decade to encourage innovative thinking across the NHS and promote the use of evidence-based innovations[4]. Despite the development of an innovation dissemination infrastructure, the challenges of adopting novel technologies persist[5]. The Department of Health in England specifically initiated the Healthcare Associated Infection (HCAI) Technology Innovation Programme in 2008. Initiatives have included an expert panel which rates new technologies giving recommendations[6], trial and evaluation of reviewed technologies, sourcing design ideas from front-line staff and fast tracking them to development. Case studies within this environment provide opportunities for infection prevention and control (IPC) as well for healthcare systems nationally and internationally[7]. IPC has been cited as an 'early adopter' of the patient safety agenda[8] and therefore a natural candidate to lead on sustainable innovation adoption[9].With the success of IPC contingent on a range of stakeholders including patients, carers, clinicians and management, the role of these stakeholders in the innovation process also requires exploration.

Healthcare innovation literature has examined the involvement of 'users' in the innovation process, but focusses either on the development or assessment of innovations, with less attention on decision making[10 11]. In addition, decision making at the organisational level is not well understood[12 13]. Previous work does not fully explore the heterogeneity of 'users' and their degree of involvement in decision making, or the implications of this[14]. This paper makes two contributions to empirical research regards innovation adoption in IPC: first, consideration of diverse stakeholders and their involvement in innovation, including intermediate and end-users; second, the critical timing of this involvement and implications for the healthcare organisation and IPC more widely.

Methods:

The sample included eleven acute hospitals and one primary care organisation from ten regions across England, recipients of the Healthcare Associated Infection (HCAI) Technology Innovation Award (2009). In one region the £150,000 award was split equally amongst two hospitals (Trust 8 and 9) and one primary care organisation (Trust 12). The study design was a multi-level, multiple case study employing well established qualitative methods for primary data collection[15]. Seventy four individual face-to-face, semi-structured interviews, with 62 informants were conducted; group interviews with an additional 36 informants and telephone or electronic interviews with 11 informants were completed. Data collection was scheduled at the beginning, middle and end of the project at each case study site from July 2009 to August 2010. In the first visit the ongoing decision making process was captured and in the follow up visits the technology selection outcome and implementation experiences were explored. Field notes were taken from observation of meetings and by observing the selected technologies in use. Participants included clinical and non-clinical managers, members of executive boards, health professionals including nurses, doctors (within IPC) and ward staff involved in the implementation of the selected technologies, clinical biochemists, clinical microbiologists, and staff from domestic services, estates and facilities departments. Data was systematically analysed, specifically an integrated approach[16]; combining inductive development of codes as well as a deductive organising framework[15 17]. Stakeholder involvement was mapped to the various stages of the innovation process.

Results:

The organisational technology adoption decisions (or non-adoption / rejection decisions) evolved in a sequence of three main stages: 1) initiation; 2) adoption or non-adoption decision; and 3) implementation[18]. We identified involvement in this process by looking at three main groups of stakeholders; a) the IPC team; b) staff within the wider organisation c) stakeholders from outside of organisation (including patients, public and other healthcare organisations). The professional composition of the IPC team varied across the organisations. The majority of IPC teams comprised: director of infection prevention and control (DIPC), Deputy DIPC, medical microbiologist, infection doctor, infection control nurses, surveillance nurses, decontamination lead. Some teams included a pharmacist or infection control matrons. The level of involvement of the three main groups of stakeholders varied across the phases of the innovation process

identified above (initiation, adoption or non-adoption decision, implementation) and are mapped out below (Table 1). The outputs from the decision making process are also included. Details of the technologies are reported elsewhere[17].

What was considered and selected

Forty nine technologies were considered, from which thirty eight were selected. The technologies spanned a range of IPC areas: environmental hygiene; catheter care; medical devices hygiene; diagnostics; hand hygiene; information management & communication; patient hygiene; and training. The majority of technologies (20) were categorised as environmental hygiene technologies. Catheter care received least attention with one technology selection to improve urinary catheter care (Trust 1). Two of the hospitals committed all of the funds to one technology selection; Trust 1 and Trust 2.

Stakeholder involvement at ***initiation*** impacted on which technologies and IPC areas were considered, which in turn influenced technologies critiqued by organisational members involved in decision making. Those involved in the ***decision making*** influenced *how* the technologies were critiqued and what was selected. In the organisations where wider consultation occurred early, more diverse approaches to IPC were considered. The critical role of timing is described below.

Who was involved and when?

Processes across the organisations varied along a continuum from highly exclusive to the IPC team to highly inclusive of the wider organisation. Some organisations changed their strategy starting with an exclusive approach and then opening up to staff outside of the IPC team in later iterations of bids for funding. Conversely, one organisation moved from an inclusive approach to an IPC led approach:

"So I just took an executive decision to do what was worrying me..." [Medical microbiologist].

As expected the IPC team were involved most of the time across the organisations. Overall, there was low level of involvement of members outside of the IPC team at the stage of ***initiation***, with one organisation taking a consultative approach (Trust 2), six organisations

taking a targeted approach of one or two key individuals outside of IPC; the remainder taking an information giving approach:

"People were aware we'd won the award if you like and the money because it went out at … team brief and it was briefed to senior nurses and so there was an opportunity for people to say, well, I've got an idea or a thought, but we didn't actually actively canvas" [Senior IPC nurse].

The reasons for non-involvement at this stage were logistical as well as cultural. The task of consulting particularly in a larger organisation was deemed to be an administrative burden. None of the larger organisations (with sizeable IPC teams) consulted with staff outside of the IPC team to generate ideas for consideration, as they felt they had appropriate capacity and expertise to do this. Conversely, smaller organisations with small IPC teams relied on cooperation of directorate/ward staff for generation of ideas and technology implementation. In addition the 'specialist' knowledge held by the IPC team and perceived lack of knowledge of other organisational members was the rationale provided for an exclusive approach at initiation by many respondents. There were differences in perceptions across these organisations:

"...but we have got the backing of the clinicians and the Medical Director for the way that we've progressed with this, and the clinicians, general nursing and medical staff out there respect our views and we haven't felt necessary to seek any formal process really for decision making", [Medical microbiologist].

"We do get a lot of brochures through the post, and they do send them to the wrong people as far as they get to the Chief Exec and get to the Chief Nurse, and they just all look wonderful, and I think it's a real, real problem for trusts that perhaps have a DIPC who's not a microbiologist." [Director of IPC].

These are in contrast to a cultural and strategic approach which defines IPC as everybody's business:

"It was driven by the organisation, and we had the money and everybody's so involved in it [IPC] or played their part, that we invited suggestions from the organisation to say, we've got this money. It's got to be spent on innovation technology, what are your suggestions, and they came up with all their packages..." [Associate director of quality assurance].

Trust 2 adopted a highly inclusive approach which resulted in over 300 initial ideas, and 100 outline proposals generated through three iterations/calls for ideas until the monies had been spent. The resulting technologies came from four directorates and implementation of technologies in seven different departments. The technologies spanned four IPC priority areas; environmental hygiene, diagnostics, hand hygiene, and medical devices hygiene. Positive implications of this approach included the generation of cross cutting approaches to IPC through linkages with other core performance targets. The technologies were adopted and implemented within planned timelines; the most efficient innovation process was the identification, procurement, installation and routine use of endoscopy sinks by November 2009 in Trust 2. Involvement of the clinical innovations coordinator and feedback from technicians resulted in ergonomic design of the equipment. Clinicians were assured of safety standards and the endoscopy centre achieved external accreditation.

For some trusts preparatory work for technologies considered before the award informed decision making, whilst others viewed the award as a starting point. Those organisations with pre-determined decisions consequently took a less inclusive approach. For example Trust 1 took a highly 'exclusive' approach guided by previous audit work. The organisation had been in the process of locating funding for this technology and therefore did not consider other technologies or seek further ideas for the £150,000 award.

No trust involved stakeholders outside of the trust in the ***initiation*** phase of the process. So, the wider health economy (primary or social care), patients and public were excluded at this stage in the eleven acute hospitals. The primary care organisation did not involve the acute care organisation at initiation. All trusts informed the public through newsletters or other media (websites) about receipt of the award usually once a technology had been procured. Whilst views were not sought from patients, patient perceptions did feature in selection decisions:

"It'll be soft data like, well, if the ultrasonic tanks clean things better we'll get less complaints from patients because things will look less dirty even if they're not microbiologically clean or dirty. So we get less complaints so that makes everybody feel better but does that save you money? It might do. It might not." [Senior IPC nurse].

In ***implementation planning***, Trust 11 invested significantly in patient communication when introducing individual patient MRSA decolonisation packs. This resulted in involvement, better

informed patients, and as reported by staff, less patients *"blaming the hospital for catching MRSA".* In contrast, Trust 7 did not invest in patient communication activities and in retrospect realised that patients *"took the new technologies for granted"* and did not appreciate the extra effort and resources invested by the organisation for patient benefit.

Looking at the ***decision making*** phase, six of the organisations made decisions within the IPC team. Three organisations involved a few key individuals from outside of the IPC team (ward managers, nurses, research & development and procurement.), whilst three organisations involved wider staff. The reasons for wider involvement were generally linked to the specific technologies. In Trust 1, the involvement of procurement and R&D was due to the financial constraints being faced by the hospital which meant that in comparison to other organisations there was more scrutiny of all procurement. In one trust (Trust 2) final decisions were taken conjointly by the DIPC (medical director of the trust) and the associate director for clinical quality assurance. This approach was used as the medical director was described as 'one of the most credible people in the hospital' and hence decisions would be seen as fair.

table 1 here

Across the cases, support by senior management at the point of ***decision making*** facilitated implementation by mobilising resources and providing increased legitimacy to the initiatives. Within the IPC team senior involvement took various forms. The professional background of the DIPC influenced the decision making process in different ways. Our sample of DIPCs included six medical microbiologists, four directors of nursing, one consultant urologist, and one consultant radiologist. In the technology selections the DIPC did not always lead the decision making process. We found that the leadership role adopted by the DIPC provided useful insight to the process of decision making which led to technology selections. In one organisation the DIPC was clear about differentiating organisational roles from professional training as a microbiologist, whereas in another, the DIPC (also a microbiologist), took a lead role at each stage at initiation and decision making.

Early involvement of the intended technology 'users' in the decision making process helped to obtain "buy-in". Early engagement of frontline clinical staff as technology users, also led to feedback to suppliers. For example, in Trust 8 feedback from consultants resulted in appropriate

procurement of computer devices consistent with working practices as well as compliant with infection prevention guidelines. In addition, the presence of an IPC matron in the decision making team facilitated communication and smooth implementation:

"Inclusivity, that's the way we try to work,...especially with our 2 clinical matrons, because they are members of a group of 25 and so therefore they can spread the information as well, right across our organisation. It's a big organisation" [Estates & facilities manager].

An example of users being excluded at the decision making phase is that of hotel services staff. They were excluded in the design and testing of the Adenosine triphosphate hygiene monitoring system. The project lead later appreciated that earlier involvement of this group would have saved time and effort for training during the hospital-wide roll out of the technology.

Most of the organisations involved wider stakeholders at the ***implementation phase.*** Important engagement at the implementation planning phase was however missing in four of the organisations. This had a significant negative impact on implementation.

Involvement of the procurement team varied, from up front and early involvement in one trust only, and delayed involvement in six of the trusts. Where procurement links were made late, the process was protracted as important considerations had been overlooked. Late involvement was due to inexperience of IPC staff regards procuring products, or the perception that the procurement team would act as a barrier to innovation. The hospital under significant financial pressure, involved procurement earliest, and viewed this expertise as a facilitator to innovative practice. Other respondents later appreciated earlier involvement would have been beneficial for the process, as well as strategically for IPC:

"They [procurement] should have been involved from the very early stages. And I think if they were, maybe things would have gone a bit smoother, maybe it would have been a high profile thing for them [procurement]. Because this whole technologies award is a really big deal for the trust, you have such a good thing to say, you've won an award because of your turnaround of your infections…maybe communications between us would have been a bit more open and freer. So I think possibly if I could have the time over again I think possibly best to involve them in the early stage" [Senior IPC nurse].

Implications of involvement across phases of initiation, decision making and implementation:

In those organisations where involvement from members outside of the IPC team was low, technologies were not implemented within the life of the study (Trust 2, Trust 10); that is 16 months from the date of the award. Further, involvement of the IPC team *as well* as wider staff in *more than one* phase (initiation, decision, implementation) led to successful adoption decisions and implementation. Notably the organisations taking the latter approach (Trusts 7, 8, 11 and 12) had a 100% success record in terms of adoption and implementation. Trust 6 did not involve wider trust staff yet achieved successful adoption of two technologies. This was attributed to the long development history of the IT package which had input from wider staff during the course of development. Other organisations that took an exclusive approach at two stages of the innovation process, performed poorly in terms of adoption and implementation. Notably Trust 10 implemented only one out the four technologies. Stakeholder involvement in the later stages of implementation only, with little or no involvement in implementation planning, gave rise to challenges in implementation.

Early engagement of frontline clinical staff and technology users in decision making led to technology modification and adaptation to fit the local context which helped at implementation stage. Early engagement and regular steer of the process by a core group of managers, responsible for the service areas, facilitated the implementation process. Cross departmental team working, champions and endorsement from senior management were evident to varying degrees across the trusts, but all helped implementation.

Discussion

Previous studies have focussed on stakeholder engagement in the innovation process with end users in mind whereas here a broad set of stakeholders has been considered including strategic and operational managers, frontline health professionals, and patients. These findings suggest that 'who' is involved and 'when' they are involved matters, with consequences for informed adoption decisions and successful implementation[19]. In addition, involvement has important implications for raising the profile of IPC as well as helping to establish wider organisational

responsibility and ownership of IPC (Table 2). The involvement of procurement early in the process can potentially maximise budgets for maximum patient benefit, at the same time providing a better understanding of IPC for procurement teams and opportunities to identify synergies with innovation activities across the hospital or primary care organisation.

Professional backgrounds and organisational roles influence perceptions of innovativeness and perceptions of effectiveness. This study shows how involvement/non-involvement has direct implications for what is considered and selected. If stakeholder involvement is delayed to the final phase of implementation, opportunities to incorporate feedback are missed. Involvement of users can lead to modification of technology or opportunities for reinvention, for example complex innovations can be simplified[13]. Involvement of wider staff can lead to better user buy-in. Involvement of senior management can help to mobilise resources as well as raise the strategic importance of IPC. As patients are 'temporary members' of health care organisations[20] and recent literature suggests a role for patients in decision making regards IPC[21 22], earlier involvement in the technology adoption process may encourage patients and carers realise their role in co-creating a safer environment. Depending on the organisational context and wider health system, different levels and methods of involvement are appropriate and feasible.

table 2 here

The predefined sample in this study has some limitations as organisational type was not exhaustive. A strength of the sample is that the initial barrier to adoption (funding) was 'controlled' for, allowing other factors at play during decision making to be explored.

In conclusion, appropriate stakeholder involvement can lead to innovation adoption decisions compatible with structural and cultural contexts. There are potential synergies through stakeholder engagement across the phases of initiation, decision making and implementation. As IPC requires a strategic and general management approach[23], this also needs to be reflected in how adoption decisions are made, who is involved, and implications for implementation need to be considered early on. A goal orientated framework has useful application as a strategic and operational toolkit for IPC and application more widely in health care innovation adoption.

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Table 1Stakeholder involvement at initiation, adoption decision and implementation for the twelve trusts and associated outcome

Trust	Initiation	Decision making	Implementation*	Outcome		
				Successful adoption & implementation	Delayed adoption/ implementation	Incomplete implementation/ Discontinuance
1	IPC	IPC Wider staff	IPC Wider staff	1		
2	IPC Wider staff	IPC Wider staff	IPC Wider staff	5	1	
3	IPC	IPC	IPC Wider staff		1	
4	1st iteration – IPC 2nd iteration – IPC & Wider staff 3rd iteration - IPC	IPC	IPC		2	1
5	IPC Wider staff	IPC Wider staff	IPC Wider staff	2		1
6	IPC	IPC	IPC Wider staff	2		
7	IPC Wider staff	IPC Wider staff	IPC Wider staff	4		
8	IPC Wider staff	IPC Wider staff	IPC Wider staff	3		
9	IPC (& Wider staff for one of the technologies)	IPC (& Wider staff for one of the technologies)	IPC (& Wider staff for one of the technologies)	1		2
10	IPC	IPC	IPC	1		3
11	IPC Wider staff	IPC Wider staff	IPC Wider staff	4		
12	IPC Wider staff	IPC Wider staff	IPC Wider staff	4		

Table 2 Goal orientated approach to stakeholder involvement

Goal	When to involve? *(during the innovation process)*	Who to involve?		
Informed adoption decision	**Initiation**	IPC *essential*	Wider Trust *best practice*	Outside Trust *no clear benefit/logistically challenging*
	Decision making	IPC *essential*	Wider Trust *essential*	Outside Trust *no clear benefit/logistically challenging*
Successful implementation	**Implementation**			
	Implementation planning	IPC *essential*	Wider Trust *essential*	Outside Trust *best practice*
	Implementation	IPC *essential*	Wider Trust *essential*	Outside Trust *best practice/essential**
Raising profile of IPC	**Initiation**	IPC *essential*	Wider Trust *essential*	Outside Trust *best practice*
	Decision making	IPC *essential*	Wider Trust *essential*	Outside Trust *no clear benefit/logistically challenging*
	Implementation	IPC *essential*	Wider Trust *essential*	Outside Trust *best practice*