GETTING PRESCRIPTION MEDICATIONS RIGHT AT HOME, IN HOSPITAL & HOSPICE: AN ACTIVITY THEORY ANALYSIS TO IMPROVE PATIENT SAFETY AND CONFIDENCE IN PALLIATIVE CARE

(Activity Theory Analysis of Palliative Medications)

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STUDY DESIGN

Theoretical orientation

The conceptual tools of AT offer insights into effort (work/activity) as situated practice, influenced by contextual norms. The concept of activity describes 'the fundamental interaction between humans and the world - humans behave actively toward the world (fragments of it), change it (them), and change themselves in this process. Humans as active subjects make fragments of the world objects (goals) of their activity and the same time are affected by the world (fragments of it)'.[48] Definitions of other AT concepts are in Table 1. Further explanatory Figures/Legends are also provided in Figures 1-3.

AT is a sociocultural theory focusing on reciprocal interactions between (1) theory and practice (process) and (2) systems and people (community). It provides a framework to analyse how interactions between people, within systems contextualised in time, space and place can reach a common goal. It acknowledges intended process descriptions differ from actual execution because processes are only partially scripted strings of actions, influenced and interacting with other parallel processes.[41,54] This is important in palliative care since prescribing and medication use occur within and across complex contexts, encompassing multiple providers and communities.

We will draw on AT's five guiding principles (Figure 1, see appendices).[55]
1. It is necessary to understand processes as dialogues between interacting systems: symptom control at home must be understood in relation to hospital and hospice. In/between each different divisions of labour (who does what and why) and different rules of how things are done apply (Figure 3, see appendices)
2. Within an activity system there are multiple perspectives (multivoicedness). Interactions between people in practices create challenges and potential for change.[47,56] Achieving an object (goal) requires collective activity, but individuals or groups may act according to differing priorities
3. Activities take shape over time and considering historicity (what has led to current practices) is necessary to contextualise how processes occur
4. Contradictions between the intended and the experienced are sources of potential change and development. Disturbances may alter quality, efficiency or achievability. Disturbances are more likely in unstable, poorly designed systems or when there is a lack of shared knowledge. Disturbances are potential drivers for change through multivoiced research to bring about learning for improvement.[41,47,57,58] This is achieved by analysing how people (individuals and communities) interact with each other and inanimate objects (artefacts/instruments) according to understanding of who should do what work (division of labour) and accepted norms/practices (rules) to achieve an outcome (goal/object)
5. Novel practices or improvements produce a mix of resistance and embracing depending on whether people anticipate more meaningful effective outcomes, additional work and/or greater demands.[45]

Table 1: Activity Theory Concepts and Definitions

Key concept	Definition	**Application in prescribing and medication use**	**Explanatory notes**
Activity	The processes, work and effort undertaken by people to achieve an object (see below). Always collective, activities include ambiguity, surprise and sensemaking, all of which are considered to generate the potential for change, i.e. expansion of the object, and/or new ways of achieving it.	Processes, work, and efforts undertaken by patients, informal carers and healthcare professionals in prescribing and medication use for symptom control.	At its very simplest the task of getting the right medication to the right patient at the right time requires six broad steps: 1. Recognition of need, clinical assessment and decision-making 2. Agreeing a prescription (choice of medication, formulation, route of administration) and ensuring this is completed by an appropriately qualified and competent professional 3. Transfer of the prescription to a pharmacy for dispensing of medication 4. Delivery of the medication back to the patient 5. Administration either by the patient or by an appropriate person according to prescribing instructions 6. Monitoring for clinical effects and side-effects as well as levels of supply and repeat requests and the disposal of medications no longer required A commonly overlooked additional step when patients die at home is the management of medications during the post-death bereavement period. These steps demonstrate that to view prescribing and medication use as the activity of an individual is a flawed approach[22] and greater understanding is needed of how each is achieved, by whom if we are to understand the sources of frustration in prescribing and medication use for patients, carers and professionals then identify potential improvement targets that are meaningful to them.
Activity System	Historically evolving systems within organisations/contexts where activities take place.	For this study we have centred our focus on the patient. Therefore, our unit of analysis is patients' activity system incorporating the whole multi-step task of getting the right medication at the right time, and we will consider how their activity system has interacted with each context in their	Increasingly in healthcare the boundaries between activity systems are blurred. With respect to prescribing and medication use, each context of home, hospice and hospital might each be considered as a separate activity system. However, the object of prescribing and medication use within each activity system can also be conceptualised as shared activities, within any setting in a local health economy where people with palliative care needs might be found.

		narratives of experiences at home, in hospice and in hospital and when moving between these.	This is because the whole multi-step task of prescribing and medication use encompasses everything from identifying a palliative care need that requires medication to deciding what to prescribe, prescribing, dispensing and delivering supply to patients and administration in the context of providing holistic symptom control for people according to need, and regardless of diagnosis or location.
Community	People around the subject who are engaged in activities to achieve the object.	Achieving the object requires collective action of a large community of professionals together with patients and their informal network of carers (such as family and friends).	Multiple relations should be analysed while seeking to also analyse the systemic whole. Further complexities arise from societal myths and misconceptions about the purpose of palliative care and intended outcomes of using medications. The emotionally charged nature of interactions within palliative care may place particular demands on patients, those significant to them and professionals, with implications for their wellbeing.
Contradictions	Contradictions occur within and between activity systems on several levels: Primary contradictions occur when there are internal contradictions within the elements of the activity system, e.g. use value vs. exchange value in the object. Secondary contradictions occur between different elements of the system e.g. subject vs rules. Tertiary contradictions occur when there is difference between the object of the prevailing activity and a new	We will explore contradictions as a cause of disturbances in the study. Contradictions and disturbances in activity processes do create problems – such as the daily hassles of prescribing and medication use reported by patients, carers and healthcare staff alike – but also offer targets for new collectively generated solutions: "*The distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the*	Examples of each type will be sought. These might include things such as who should be prescribing and following up medication use, how different contexts permit different levels of patient choice in medication use or when an expert may choose to deviate from usual practice for specific reasons but this is not clearly communicated to others. Equally from a patient perspective, contradictions may arise between different priorities e.g. achieving good pain control versus beliefs about the use of strong analgesia such as opioids. Contradictions may also arise in different perceptions and assumptions about whose role or responsibility it is to contribute what activity within and when a patient moves between settings. Rather than viewing contradictions negatively within activity theory these will be viewed as sources of disturbance that hold the key to change and potential for improvement and learning.

	activity through resistance to change. Quaternary contradictions arise in parallel with the generalization of the new activity between the new activity and its neighboring activities (conflicts with others).	*double bind potentially embedded in everyday actions"*[49]	
Disturbances/ Deviations (used interchangeably in Activity Theory literature)	These are: *"deviations from the normal scripted course of events in the work process, normal being defined by plans, explicit rules and instructions, or tacitly assumed traditions. A disturbance may occur between people and their instruments, or between two or more people. Disturbances appear in the form of an obstacle, difficulty, failure, disagreement, or conflict"*[47]	The concept of disturbance will be used to explore prescribing and medication use processes, presented as chronological patient experiences and in our study, are treated as important tools for rethinking and developing healthcare processes.	Activity systems (of patients, carers and professionals within and during transitions between home, hospital and hospice) are interdependent and at the same time potentially tension-laden relationships with each other, generating disturbances. Disturbances in care processes and may hinder holistic management of patient care. However, instead of being viewed as error-causing phenomena, we view disturbances as an inherent feature of work processes and as drivers for change and development.[41,50, 51, 52] Deviations may occur because of competing pressures or priorities. For example, while effective symptom control may be the intended object of activity competing objects such as the desire to please or avoid confrontation may cause disturbances in the process as may system failures or guidelines/protocols that are not practical to apply.
Divisions of labour	The divisions of labour describe how different individuals / roles act on the object of the activity.	Who is responsible to enact and ensure safety in each step of the process describes the division of labour. In reality this may not be clear or straightforward in all situations.	Divisions of labour tend to occur through use of implicit as well as explicitly developed norms (i.e. how we do things around here as well as officially promoted ways of how things should be done). Power is an important consideration in divisions of labour as inequalities in power will alter how divisions occur and are understood. Divisions may also evolve over time but will be influenced by what has historically been in place.
Expansive learning	In activity theory positive evolution and development of practice is framed as	In order to understand how this can be achieved and where system breakdowns,	This type of learning can often start as in-situ 'work-arounds' that people develop informally. Research attempts to capture this so that it can be

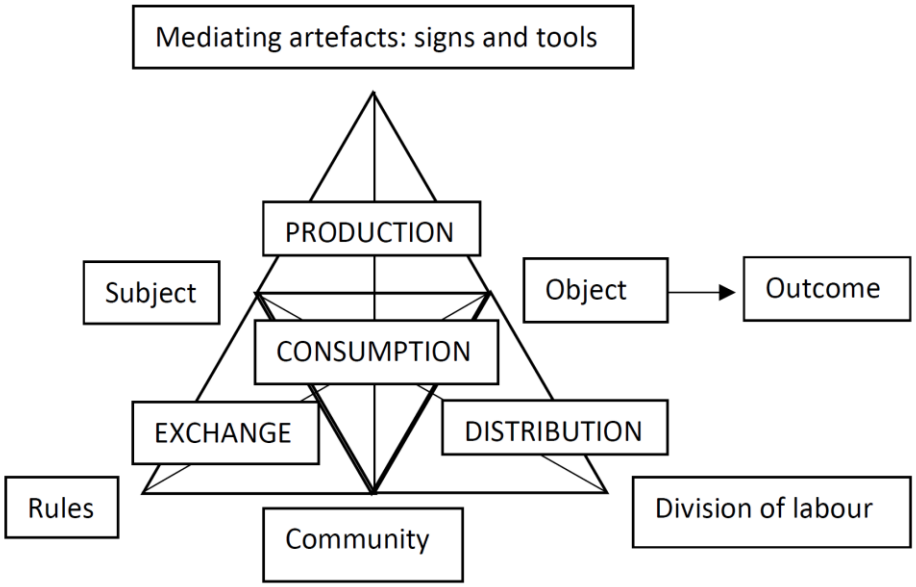
	'expansive learning' – that is learning which occurs through people interacting each other and co-producing new ways of working that better suit the goal to which they are working.	barriers and facilitators or problems lie study of the existing practice and workplace context in which a particular goal, such as prescribing safety and effectively, is needed. In doing so it is important to pay attention to anything that creates a disturbance from ideal/intended/what happens on paper practice.	utilised further, bringing frontline innovations and initiatives into improvement strategies.
Mediating artefacts	The use of artefacts (tools and instruments) ideally driven by collective object-related motives to mediate actions between subjects and objects in the context of work.	Examples include: Using pathway protocols to standardize care procedures Medication administration / Drug charts Prescriptions (known as FP10s) Equipment for medication use	People both use inanimate mediating artefacts in their interactions with each other and assign these artefacts a place in the system. Understanding when an artefact has 'taken on a life of its own' i.e. is being used beyond its original intent or in novel ways to achieve / disrupt achievement of an object is important in understanding the dynamics of the community.
Object (goal)	Essentially what the subject needs and what the system and community should be trying to achieve. The object includes a collective motive (goal/outcome) and connects actions of individuals to larger systems.	The object of prescribing and medication use in palliative and end-of-life care is to achieve the best possible symptom control by delivering the right medication to the right person in a timely manner.	The sense and meaning of actions are attached to the object of an activity. Best possible symptom control is a collective object which enables a wider understanding of patient care and 'patient centredness' than the various specific potentially competing objects held by the many people involved in the process (i.e. professionals and carers as well as patients may also have other objects they pursue simultaneously, for example seeking to contain risks from potential side effects, or seeking to either share in or opt-out of prescribing decisions) The concept of ***object*** can potentially widen our understanding of why disturbances take place. The existence of the multiple, specific and sometimes competing objects typically causes disturbances in care processes. The flexible aligning of the different and competing objects calls

			for the collective reflection, negotiation and reconceptualization of the object to enhance collaboration in the provision of patient care.[53]
Rules	The parameters within which activities take place.	These can be implicit (how things work around here) or explicit (e.g. legal regulations).	Due to the medications used there are complex and variable systems for prescribing, dispensing and administering in different settings and perspectives on division of labour to achieve this vary. The rules by which different people in the system are guided and constrained also vary and members of the community of professionals may or may not be party to understanding the context and capabilities of others.
Subject	The person who the object should serve.	In this case the patient.	
While we note that objects, rules, community and division of labour can be unclear, implicit and/or fluctuating this table provides an overview of these and other key concepts in Activity Theory. Understanding different perspectives on the specifics of the listed concepts is an essential part of using Activity Theory as a guiding framework for research. We have given a brief definition for each, followed by its potential application in our study of prescribing and medication use, and provided further explanatory notes to help those unfamiliar with this sociocultural theoretical approach. These have been modified from previous work studying antibiotic prescribing by members of the research team.[15]			

Visual representations in Activity Theory

Figure 1: Generic representation of Activity Theory concepts[74]

Typically, the overarching concepts of Activity Theory are represented diagrammatically. Engeström modelled human activity as an activity system that consists of the subject focusing on an object of collective activity that is mediated by signs and tools, rules and division of labour in a community.[49,70] This demonstrates the interactive nature of each element and the broad social processes (production, consumption, exchange and distribution) that occur as a result of dynamic interactions (shaped by the rules and division of labour in the subject's community) between the people and artefacts involved in a system centred on how the object is achieved for the subject with the desired consequential outcome. Hence activity is experienced by people as actions, work and effort connected to a collective object and directed by the circumstances and tools at hand.[75] It is important to understand that the outcome of achieving the object (even the assessment of whether it is achieved or achievable) is dependent on the sense and meaning constructed during the activities and processes which occur.



There are five guiding principles of Activity Theory.[51]

(1) Each activity system, has to be understood in relation to other activity systems with shared purposes

(2) Within an activity system there are multiple perspectives (multivoicedness) not simply because of different roles or positions of people within the system but also because of wider sociocultural influences such as the influences of history and tradition on belief. Interactions between people coming from different perspectives create both challenges and the potential for change.

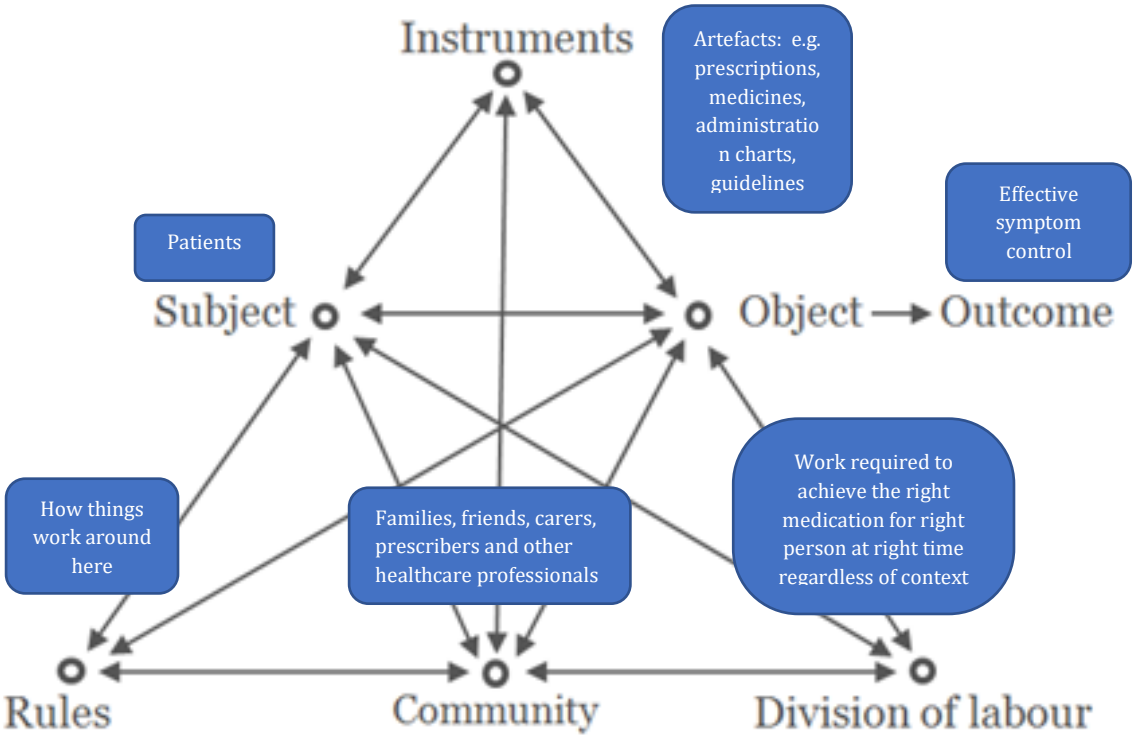
(3) The system itself takes shape over time and considering the history of each system (historicity) is necessary to contextualise how activity and processes occur within it.

(4) Contradictions, between 'what should happen on paper' and practice are sources of potential change and development.

(5) The introduction of novel practices or improvement ideas will produce a mix of resistance and embracing from people within the system, balanced according to whether they anticipate additional work or demands in greater measure than more meaningful and effective outcomes or not.[6]

Figure 2: Applied representation for this study

We will apply Activity Theory as our methodological framework for understanding the processes occurring from point of clinical decision that medication is needed to patient administration.



As illustrated if the desired outcome is effective symptom control then using this framework we can place the patient and prescriber as subjects within a wider community of families, friends, carers and healthcare professionals between whom interactions will occur and the work of achieving this goal through provision of the right medication at the right time regardless of setting requires a functional division of labour that meets everyone's understanding of the rules of 'how things work around here'.

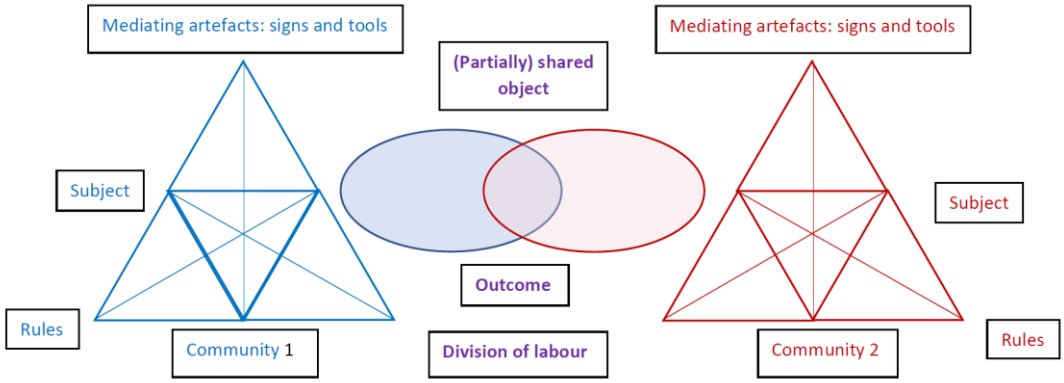
The upper part of the diagram represents individual and group actions embedded in a collective system. The subject is whoever the activity (work, effort) is designed to benefit, for example patients. The instruments (tools, signs, artefacts) are the things used to achieve the benefit (for example a written prescription). The object is the goal of the activity (for example, medication for pain control) and the outcome is both the impact of the activity (does the patient get the medication when they need it and does it relieve them of pain) and the sense or meaning created by the patient and others about the activity.

The bottom part of the diagram provides a collective focus on the patient's environment, relationships and context. The community represents others around them (for example informal carers, healthcare professionals). The rules describe how formal systems and informal practices shape the activity – these may be written in policies (for example prescribing guidelines) or

unwritten accepted norms (for example local preferences for one sort of medication over another for pain). The division of labour represents the differing roles and responsibilities of everyone involved in the activity. Divisions of labour are commonly characterised by ambiguity, interpretation and potential for change in complex systems involving many different people.

Figure 3: Multiple activity systems

Activity Theory research is particularly powerful when looking at interactions between two or more systems as it seeks to analyse disturbances in working practices that arise because of changes or challenges within and across systems that have a shared practice, such as the use of prescription medications as a patient moves between home, hospital and / or hospice. AT recognises that in many situations there are multiple activity systems as illustrated here.[41,46,47]



Taking the example of a patient who needs medications for palliative care symptom control. They are likely during the course of their illness to find themselves moving between hospital and home, and in many cases hospice as well. Each of these settings can be considered as its own activity system interacting (well or otherwise) with the other settings. How potentially shared objects such as continuity of symptom control through judicious prescribing and medication use are produced depends on the local history of activity between these systems. Similarly, the division of labour in each of these systems will depend on historical evolution of roles and responsibilities, for example between specialist palliative care services and other healthcare professionals. Overall there are multiple actors within a local health economy who are engaged in choices and behaviours that shape activities systems with the goal of right medication at the right time. This includes changes in divisions of labour (e.g. with changed role responsibilities in prescribing) or working practices (for example, the implementation of electronic prescribing).

Future studies information on Change Laboratory submitted to the funder

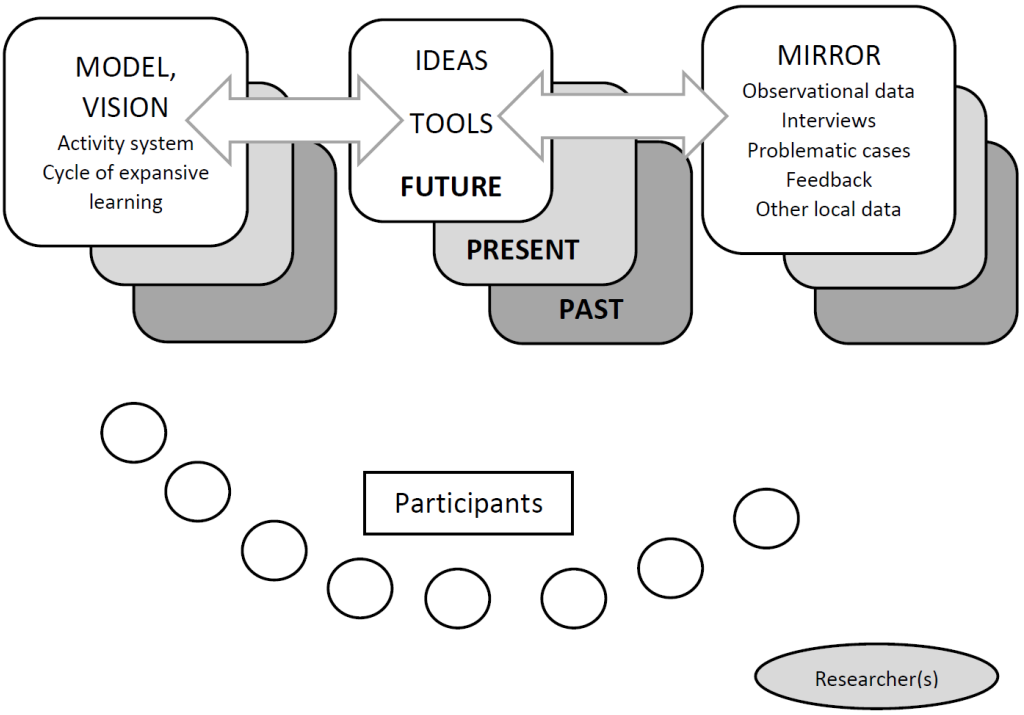
Further research: An additional guide to using Change Laboratories for interventional Activity Theory studies

Figure 4: The Change Laboratory

Our study is essential foundational work (i.e. systematically developing a coherent theoretical basis and modelling experienced as well as intended processes) to inform the design of any interventions for improvement.

Activity Theory also offers a method, The Change Laboratory, for translating the results of theoretical and empirical modelling into interventional studies.[1,2] We plan to use Change Laboratories in further research bids following this study to allow us to move from the MRC complex intervention development phase to piloting and feasibility (with process and outcome evaluation) and ultimately a full intervention cluster randomised controlled trial if our feasibility work is successful as described in our research proposal and impact plans. Change Laboratory interventions are a new idea in Palliative Care, and this approach has not been used extensively in activity systems centred on the patient as they move between different settings and contexts that share the object of good symptom control. As an innovative model of work transformation, it needs to be tested in this scenario if its potential as a means of advancing quality and safety in patient care that remains sensitive to individual choices, values and priorities is to be understood.

The central tenet of the CL is the creation of a 3 X 3 matrix of viewpoints for participants to reflect on their working practices as shown in Figure 4.



[1] Virkkunen J, Newnham D S. The Change Laboratory. 2013. Switzerland, Springer Nature. doi:10.1007/978-94-6209-326-3.
[2] Engeström, Y.,Virkkunen, J., Helle, M., Pihlaja, J. and Poikela, R. 1996. The Change Laboratory as a tool for transforming work. Life Long Learning in Europe 2:10–17.

In the vertical plane, participants explore their working practice in the past, present and future. In the horizontal plane, they do this at three levels of abstraction. At the most concrete, they work with an item that mirrors their working practice and illustrates the problems and disturbances of their work. We would be able to use our model and the current study results as this starting point alongside other items chosen by participants. At the other end of the abstraction spectrum, participants develop and own locally sensitive theoretical models based on activity system theory that help them conceptualizes their work activity and make sense theoretically of the built-in contradictions generating the troubles and disturbances depicted in the mirror. This allows each local site/context to choose its own priorities for change and learning while maintaining overall coherence with the method. Activity theory describes learning, in the broadest sense of making sense and constructing meaning as well as acquiring knowledge, skills and behaviours, as 'expansive'. The vertical and horizontal planes interact to create a third and middle plane representing the ideas that surface during discussions between participants as solutions/innovations to the contradictions they have uncovered. They then explore these in a cyclical and iterative manner with regard to their potential capabilities in transforming current working practices. A stepwise implementation of their new vision is then planned and monitored.[1,3]

The Change Laboratory offers an alternative to common employed and standardised tools for improvement interventions that require standardisation of collaborative practice. This method has been used successfully and extensively by researchers internationally to transform working practices in a range of countries[4,5,6] with an extensive list of products and work transformations arising from them (e.g. new adaptations of care pathways, new forms of service delivery).[4,5,6]

We anticipate using our current study findings to design a feasibility study of professional behaviour interventions in 2-3 different healthcare economies with different demographics (e.g. rural/urban, varied socioeconomics with/without rapid response, specialist palliative care) as a follow-on pilot feasibility study. Each site would test 2-3 cycles of intervention using 'Change Laboratory' methodology with data collection focused on essential elements for success and measures for effectiveness.

Following a baseline assessment with the model from this study, identification of best processes for ensuring transfer of learning between subjects and communities within each site would be used to (1) create examples of ground-up generated approaches to best practice in prescribing and use of prescription medications and (2) provide a clearer sense of the potential value and limits of Change Laboratory methodology as a research intervention that can support sustainable transformation of working practices. This feasibility study will be used to develop a Change Laboratory approach to sustainable transformation of working practices to be evaluated via cluster RCTs.

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