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# **‘Our surgeons want this to be short and simple’: practices of in-hospital medication review as coordinated sociomaterial actions**

**Ursula Reichenpfader, Anette Wickström, Madeleine Abrandt Dahlgren, Per Nilsen and Siw Carljörd**

## **ABSTRACT**

Medication review, a systematic assessment of a patient’s medicines by a health care professional, is intended to prevent medication-related harms. A critical element of medication review concerns whether medication review is conducted in a coordinated way. This article draws from a case example of implementing medication review in two surgical wards of a Swedish regional hospital and aims to analyse how medication review is being accomplished with respect to the coordination of its actions. Using a practice-based ethnographic approach, we present several coordination mechanisms by illustrating how practices are connected to materials involved in medication review. Also, we show how common orientations, ends and understandings expressed in different medication review practices contribute to the coordination of the practices. In conclusion, this article highlights the complexity of establishing and sustaining medication review as a coordinated practice in routine health care. By closely examining sociomaterial connections, this article sheds new light on the neglected issue of artifacts and arrangements in constituting and transforming a highly complex medication practice.

**Keywords:** Ethnography; practice theory; sociomateriality, coordination; medication safety; implementation

## **Introduction**

This article explores the coordination of medication review work practices when implemented in hospital-based routine care. Medication review is a systematic assessment of an individual patient’s medicines by a health care professional to detect medication-related problems and to improve medication therapy and safety (Christensen & Lundh, 2016). It involves a variety of medication-related activities, often across a range of health care settings, and therefore requires effective communication and coordination (Liu, Manias, & Gerdtz, 2011). The dynamic nature and complexity of medication practices have been emphasised as well as the critical importance

of interprofessional collaboration in accomplishing medication safety (Wilson, Palmer, Levett-Jones, Gilligan, & Outram, 2016). Several factors, such as differences in attitudes towards medications and medication problems (Foppe van Mil et al., 2016), and a constraining or disruptive physical ward environment (Liu, Manias, & Gerdtz, 2014a) have been identified as potentially impeding coordination and collaboration in medication management. Further, power struggles when challenging physician medication orders by nurses (Manias & Street, 2001), little recognition of pharmacists' and nurses' medication documentation (Liu, Manias, & Gerdtz, 2014b) point to the complexity of coordination and the entanglement of social and material aspects in medication practices.

As a strategy to reduce avoidable medication-related harms, medication review programmes have been widely established in various countries (Bulajeva et al., 2014). This article draws from a case example of implementing medication review at the local level at a Swedish regional hospital. In Sweden, medication review was introduced as a mandatory service for all health care settings in 2012 with national regulations focusing on patients aged 75 years and older and prescribed five or more medications (Socialstyrelsen, 2012, 2013). Respective guidelines in the study region, though, require in-hospital medication review to be conducted for all patients admitted. It is considered critical for patient safety to provide accurate information on the patient's ongoing medication and make this information accessible to other health care providers (Hammar, Ekedahl, & Petersson, 2014). Therefore, current guidelines emphasize that any potential medication-related problems be identified and all medication changes made during hospitalisation be documented in the patient record. Further, a discharge summary along with an updated discharge medication list must be discussed and given to the patient at discharge. While the ultimate responsibility for medication review lies with the physician in charge, physicians

shall collaborate with other physicians, pharmacists, nurses or other health care personnel when needed.

Implementing and integrating medication review into routine care has been described as challenging and issues of fragmented systems and insufficient task clarity were found to be important barriers (Vogelsmeier, Pepper, Oderda, & Weir, 2013; Lee, Hartridge, Corbett, Vittinghoff, & Auerbach, 2015). There is evidence that close contact between pharmacists and physicians (Christensen & Lundh, 2016), pharmacists' integration in health care teams and the effective enactment of pharmacists' recommendations during in-hospital medication therapy result in favourable process outcomes (Hohl et al., 2015). These findings underscore the crucial significance of effective coordination of medication review, particularly when several health care practitioners are involved.

The concept of interprofessional collaboration in health care practice has stimulated the development of novel approaches of *doing* health care (Green & Johnson, 2015), yet, there is also a need for different approaches to *studying* health care practices (McMurtry, 2013). Current health care practice is characterised by the pervasiveness of medical technology and artifacts, such as electronic medical record (EMR) systems, checklists, or protocols which all form 'an archaeology of layer upon layer of technologies' (Timmermans & Berg, 2003, p. 98). Yet, common approaches for studying health care practice tend to treat 'the material' as inactive means or neutral surroundings of health care activities not recognising the organising and coordinating role of technology (Allen, 2013). Thus, there is concern that the entangled relationship of material matters – objects, artifacts, bodies, texts – with front-line clinical practices and the potential of materials to actively configure knowing and medical practice have not sufficiently acknowledged (Fenwick, 2014a).

It has been argued that sociomaterial approaches can support professional practice and learning by paying attention to the role of material entities involved in everyday work, thereby broadening the perspective of how to theorise practice (Fenwick, Nerland, & Jensen, 2012). Such approaches can be helpful to trace material-practice relationships in professional work and identify loose ends and gaps within complex practice constellations, or foreground tensions, mismatches and contradictions between practices embedded or inscribed in material entities and the practices as enacted (Berg, 1997). Insight can be gained into how materials are involved in stabilising, transforming, limiting, or challenging particular practices, in short, how various (and sometime mundane) materials can shape everyday practice (Shove, Pantzar, & Watson, 2012). Not taking material entities for granted but, instead, viewing them as implicated in the conduct of a practice can, thus, contribute to a deeper understanding of the practice to be implemented, an essential prerequisite for implementing a new practice in everyday clinical work (May et al., 2007).

We argue here that in order to understand the integration of medication review into routine hospital work it is necessary to pay more attention to what health care practitioners actually do and to examine the social and material entanglements of health care professionals' practices. Although a range of technical artifacts, tools, objects and texts are involved in medication review, the sociomaterial dimension of its conduct has not been adequately recognised. A sociomaterial lens, then, adds a novel perspective not only because it theorises the practice to be implemented differently but it also better takes into account the ongoing and mutually constitutive relationship of the material entities involved in implementation activities and the practice to be implemented (Leonardi, 2009). This article examines from a sociomaterial perspective how medication review is being enacted in everyday work when implemented in a

surgical ward setting. Particularly, our aim is to analyse how medication review is being accomplished with respect to coordination of its actions. We chose to focus on coordination as a crucial aspect given the complexity of medication review, being composed of various interdependent actions and conducted by multiple practitioners. Practice-theoretical conceptions of coordination emphasize its situated, unfolding and collective character and view mutual intelligibility as key to carry forward a shared practice (Faraj & Xiao, 2006; Schatzki, 2010b; Constantinides & Barrett, 2012). To make sense of and respond to other participants' doings and sayings, including material entities, is considered central to the integration of interdependent and collective work activities (Okhuysen & Bechky, 2009). In summary, this article wants to contribute to the fields of professional practice research and implementation science by providing a more nuanced understanding of how coordination of medication review is being achieved.

### **Theoretical approach**

In this article we draw upon Schatzki's (1996, 2002) approach to practice theory; he defines a practice as 'organized, open-ended spatial-temporal manifold of actions' (2005, p. 471).

According to this practice conceptualization are actions, the doings and sayings, organised or structured by practical understandings of how to do things, but also by rules (explicitly formulated directives, guidelines, regulations), a so-called teleoaffective structure, and general understandings. Teleoaffective structure is the combination of ends, projects, tasks and allied affects that are acceptable in a given practice, expressed in the doings and sayings of 'multiple workers over time' (Schatzki, 2002, p. 80). Actions are further organised by general understandings which can be understood as reflexive, more abstract understandings of concepts with which people are engaging (Nicolini, 2012), such as a sense of the value of patient safety.

Common to practice theory approaches is the contention that essential features of human life – for example, meaning, organisational change, or learning – have to be understood as forms of human activity rooted not in actions or mental states of *individuals* but in practices (Schatzki, 2012).

To explore medication review coordination we found Schatzki's (2010a, 2012) notion of practice-arrangement bundles useful. Schatzki subsumes 'humans, artifacts, organisms, and things of nature' (Schatzki, 2010a, p. 129) as entities linked in material arrangements and with the proposed bundle metaphor he holds that practices are intimately bound with material arrangements. As Schatzki conceives of such practice-arrangement bundles as fundamental to examining social phenomena, practices can only be studied in close connection to the material entities. Further, coordinated action is understood as a feature of interconnected practice-arrangement bundles resting on the hanging together of actions, practices and arrangements through 'commonality and sharing' (Schatzki, 2009, p. 42).

Practices and material arrangements are bound up with each other dynamically where relations work both ways. Material arrangements can uphold or change practices, and in turn can activities and practices sustain or alter material arrangements. In this analysis, we are particularly interested in exploring the practice-arrangement relationships of prefiguration and in what ways they contribute to the coordination of medication review actions.

Schatzki (2010a) construes prefiguration as the ways material arrangements shape practices, such as making a particular action more or less easy (or more or less worthwhile, feasible, promising etc.) to carry out. Prefiguration, in short, relates to the possibilities or constraints for actions that are offered by material arrangements. Closely tied to the notion of prefiguration is the relationship of intelligibility, referring to the ways practices make specific

material entities meaningful to participants. Intelligibility reflects the teleological and affective attachments and the collective views that participants hold towards material entities or actions when engaging in a specific practice (Schatzki, 2002). Put simply, materials, for example a medical record, acquire meaning within a certain practice. An analysis of how medication review is being performed, thus, has to pay attention to how materials and practices are entangled with each other.

### **The empirical study**

As part of a comprehensive qualitative study to examine the implementation and integration of medication review, this ethnographic study was conducted in the two main wards of the surgical department of a regional teaching hospital in the Swedish county council of Östergötland. Ethical approval was granted by the Regional Ethics Board (Dnr 2015/194-31). As a local organisational measure to facilitate integration of medication review, the surgical department contracted the hospital's pharmacy service to support medication review. Initiated in 2013, this service has been expanded and is now staffed by three clinical pharmacists for 6 hours every weekday at the wards. These pharmacists currently provide general pharmaceutical advice and are responsible for initiating medication review within 24 hours of a patient's admission.

### ***Data collection***

Between February 2016 and January 2017, the first author conducted fieldwork involving about 130 hours of participant observation in two wards on 27 different weekdays. This included informal discussions with staff and 17 semi-structured interviews with physician specialists, residents, nurses, nurse practitioners, and clinical pharmacists. After the morning briefing, the first author approached the specialist responsible for the ward if observation was possible on that

day. Observation sessions were alternated to cover the four different ward teams in two wards in the best way possible. Brief handwritten notes on observations and informal discussions were taken on the ward and further expanded on the same and the following day. Data collection proceeded iteratively, zooming in (Nicolini, 2009) on material entities, particularly artifacts, and the activities involved. Thus, the first author conducted more focused observations, including tracking particular artifacts and their trajectories. Participants for interviews were approached to reflect the full range of professional groups involved in medication work and different levels of work experience. Semi-structured interviews, utilising a topic guide with open-ended questions, were conducted and explored participants' practical understandings of their overall work tasks, of doing medication review, and issues of medication risks and medication management.

Interviews were conducted in a room chosen by the interviewee located on hospital premises. All interviews were digitally recorded and transcribed by the first author.

### *Data analysis*

All data were anonymised and after several readings to identify ideas and concepts, initial coding was done using QSR International's NVivo 10 Software (QSR International Pty Ltd., 2012).

Data analysis was conducted by the first author, with regular discussions among the co-authors on methodological issues and preliminary findings. An interpretative approach focusing on actions and how participants understood the meaning of their actions was used (Hammersley & Atkinson, 2007) thereby drawing upon a practice-theoretical orientation that understands medication practices not as actions of individuals, but instead as human activity (Schatzki, 2012).

Data analysis was enhanced using mapping and graphical displays of concepts, material entities, activities, people, places, and trajectories. At the final stage of the analysis, selected concepts of Schatzki's practice theory (2002, 2009, 2010) were used as analytic tools for exploring

sociomaterial practice dynamics of medication review. While in practice we do not view practices and the material as completely separate entities, we dealt with them as distinct entities for analytical purposes. Thus, we first identified the activities within the practices of medication review and the material entities associated with these activities. This was based on observation and interview data and relied on practitioners' use of language as 'activity words' or 'words for activities and practices' (Schatzki, 2012, p. 24) that can provide access to practices and practice-arrangement bundles. Finally we applied the theoretical concepts to examine the interconnections between material arrangements and practice components.

Although the analysis was based on the entire data in the study, we have primarily used field note extracts to illustrate the findings discussed in this article. Due to space limitations we can only present a few of these extracts but they represent characteristic or typical accounts of the medication review practices at the site and situations encountered during the time in the field.

### **Findings: Disentangling the medication review bundle**

In this section we will describe and analyse the two distinct inpatient medication review practices identified as well as the material entities they are connected to at the study site: one concerned with comparing and evaluating medicines and one with choosing and keeping track of medications.

#### ***Medication reconciliation practice: comparing and evaluating medicines***

The following field note extracts, recorded during a single observation session (October 5, 2016), illustrate various activities of medication reconciliation as they characteristically occurred in everyday work at the two wards. Each of these extracts is then followed by a theoretical analysis of how the material entities are related to and configure work practices.

### *Engaging with materials as basic infrastructure – Prefiguration of sequence and focus*

The practice starts with verifying a patient's medication therapy and assembling the pieces of the puzzle. Already, the pervasive role of material entities become apparent in providing an infrastructure for organising the practice and prefiguring certain actions:

Sitting at a computer desk in the nurses' station, a room centrally located at the ward, Anne, the clinical pharmacist, accesses the EMR system and gets an overview: "Nine patients to review today, that's doable". She prints out the pre-admission medication list, switches between the printed list and the patient's medical record on the screen. "I can do this just superficially, this is not primary care where I do have 30 minutes per patient. I basically look at previous notes, major health problems, and why the patient has come in....I always take a quick look at the lab results...renal function, electrolytes and such".

As the above account illustrates, the pre-admission medication list and the medical record prefigure the sequence of steps and also the focus of particular actions: before meeting the patient, pharmacists' doings are shaped by the way information is structured in the EMR, such as how priority is given to recording certain clinical events. It also shows how actions of this practice are linked to ends and purposes underlying another practice, that of medical documentation and record keeping, thus extending back in time of the patient's trajectory. But actions are also more mundanely prefigured by the current arrangement affording only limited time to review each patient on a given day, requiring a focus on things that matter most.

### *Interrogating material entities – Prefiguration of change of actions*

Simply put, longer or more complex medication lists as well as certain conditions recorded in the EMR, prefigure more thorough assessments. Certain high-risk medications, such as blood-thinners, but also combinations medicines pose higher risks for potential medication-related harms and reviewing such lists often need repeated and deeper digging into the electronic record.

Here, deviance from an expected finding calls for additional checking:

Anne makes cursory handwritten notes on the print-out: “I know this looks messy, but I have a system: here I noted heart failure and atrial fibrillation and I was wondering why he doesn’t have a particular heart failure medication”. So she reviews older record entries from specialists and finds out that the cardiologist deemed this medication no longer necessary, “now this is ok with me”. She then checks for drug-drug interactions, it takes a while since this patient takes a lot of different medications.

Importantly, the above extract shows that while actions that compose the medication reconciliation practice are clearly prefigured in its sequence and clinical focus, the doings and sayings are not yet fixed until they are accomplished. There is an ‘open-endedness’ of the practice as both, the medication list and the record entry, are tied to practical intelligibility, or to what it makes sense to do for a clinical pharmacist in this context. This is not so much forced by the record’s text or form but rather guided by the ends underlying the practice. Thus, how this pharmacist’s carried forward the practice is shaped by the practice’s directedness towards ‘identifying medication-related problems’. But such directedness does not stop there.

#### *Ongoing medication work through further linking artifacts and the ‘real’ patient*

In practice, pharmacists encounter a wide range of medication problems; for example, difficulties swallowing medications, drug side effects, or problems taking a medication because of a particular health condition. Most of these problems can only be identified when articulated by the patient. Here, too, materials matter:

Anne then visits the patient in his room – “it’s so important to sit down and talk” – taking the list with her. “I’d like to discuss with you how you take your medications – but first I want to know: is your pain medication still working?” Then she continues with the whole medication list, letting the patient come up with the meds he regularly takes; since he cannot remember

all of the medicines listed Anne uses a variety of probing questions where she has him describe medicines by colour, size, shape, herself offering different brand names of the drug in question, then carefully writing down details.

Further connections *within* the practice are established tying up material entities such as the printed medication list, the pharmacist's notes informed by the medical record, and the patient with the pharmacist sitting close to him. Again, how these material entities matter or are meaningful is only determined in performing the practice meaning that the list has no pre-given materiality. The list is meaningful, or intelligible, to pharmacists as the 'best possible' source of medication information; this also includes making sense of the list's limitations as this artifact is connected to previous medication documentation practices and possible lapses or errors which are attempted to be 'fixed' by engaging in the current practice. As the above extract illustrates, the structured medication list prefigures a field of possibilities where artifacts can be used with flexibility where actions are responsive to the emergent conditions or events. Again, what makes sense to do and how to go on is determined in the course of the ongoing practice, here adapting to the situation by using a variety of probing techniques with the list as a trigger of the patient's memory.

*Embodied and materialized understandings - The pharmacist recommendation as a coordinating arrangement*

Based on the clinical and medication information and complemented by the patient's own account of medication use, a concluding note, the pharmacist recommendation, has to be composed:

Anne then returns to the nurses' station to write up her notes – the pharmacist recommendations – summarizing the actions undertaken, the problems identified, and the

proposed remedial measures. “Our surgeons want this to be short and simple”. She enters her notes in a specific EMR section but also needs to print it out and deliver it to the physicians’ office. Later in the day, when she is done with reviewing patients on this part of the ward, she will contact the ward physician about some of the patients needing follow-up.

The above extract illustrates the entanglements between a newly created material arrangement – the pharmacist recommendation – and other practice components. The pharmacist recommendation is a crucial coordinating artifact as it has the potential’ to connect medication review practice components performed after admission to subsequent steps of medication therapy as well as activities related to discharge planning *within* a single health care episode. Thus, it is not only closely tied to the EMR and the medication list, connecting several activities within the medication reconciliation practice; but, it also occupies a central position as it connects with activities that compose the in-hospital medication management practices. Yet, what is more, it also coordinates practices between multiple health care settings by specifying medication problems that should be taken care of by health care practitioners beyond the local site.

***Inpatient medication management practice: choosing and keeping track of medications***

In the surgical department, pre-ward round briefings and bedside rounds are conducted in the morning. The surgeon specialist in charge of the ward usually leads these rounds with residents, nurses, and nurse practitioners, but not the hospital pharmacists, participating. In the following two field note extracts, recorded during a single observation session (February 9, 2016), we will illustrate medication review activities related to discharge planning, a central element of in-hospital medication review. The practice components shown, such as the clinician’s use of artifacts when preparing discharge information invariably occurred as part of the practice in that

ward. The account's specific situational context, although not untypical for work at a surgical ward, was chosen to illustrate the role of human activity and contingent factors in routine work.

*Prefiguration of discharge medication information through wider material-practice connections*

The following extracts illustrate how the sociomaterial arrangements – how work during and after rounds is structured and the artifacts involved in everyday work – shape the practices in the surgical ward:

After bedside rounds – about ten minutes only since this is a Tuesday, a day fully booked with operations – most of the specialists and some residents leave for the operating theatre, except for Adam, the resident, and David, the intern. Both return to the doctors' office to follow up on the rounds. Adam has to prepare discharge papers for a female patient; she has been admitted with acute abdominal pain but did not require surgical intervention. He reads through the admission and progress notes, also the medication list. Writing up the care received and the planned management, he tries to use lay language, as recommended. He prints the discharge summary form and the medication list and goes to see this patient in her room. They have a very brief discussion where she reminds him to write a prescription for a newly started antibiotic replacing the old one that she had been taking for some days for her urinary infection. Adam looks at the discharge papers and seems a little confused now, he needs to check what this is about with the new antibiotic.

Here, the contingencies of the ward arrangement prefigures the use of the medication list for discharge planning. A busy day mostly dedicated to operations facilitates the observed course of action, simply viewing this list as a ready-at-hand object and not comparing it with the pre-admission list when preparing the discharge papers. The surgery department's physicians are aware of the importance of thorough medication documentation stressed in regulations and guidelines and the requirement to include details of medication changes in the discharge summary. Communicating such information, both to the patient and to other health care

providers, is deemed to ensure continuity of care and, ultimately, patient safety. But formal rules do not hold complete sway over clinicians' doings. The list and the actions composing the practice are meaningful to this resident as a 'correct list', one that has already been reconciled on admission. Some medication lists, though, do never get reconciled, for instance on weekdays with higher admission volumes or when patients were admitted on busy weekends. Yet, with the arrangement of pharmacists primarily responsible for admission medication reconciliation in place, surgical ward staff seldom engage in this practice. Thus, the above account illustrates how actions of a practice are not only tied to the intelligibility of an artefact involved in this practice, the reconciled medication list, but also is connected to wider organizational arrangements at the side. Not double-checking a patient's medication list prior to discharge – thus not integrating or interconnecting central actions in both medication practices – can have consequences for the coordination of medication review, potentially compromising medication safety.

#### *Chains of actions as coordinating mechanisms*

Resuming the episode above with the resident, the next extract illustrates the unfolding character of a practice where the understandings and the clinician's practice activities emerge within the interactions between the resident and the patient

"See, it's good to talk to the patient", he comments, back at the doctors' office; he scrolls through the medication list on admission, then checks again with the current inpatient medication list. "But, look, she has already had the same antibiotic, she must have come in with it", he insists. Now the intern turns to him and corrects: "No, a new antibiotic had to be ordered, the previous one did not have an effect...it's supposed to be noted somewhere". Adam, who has never met this patient before – he was working on the other ward the previous days – now begins rewriting the discharge summary and also has to comment on the reason for changing the antibiotic. But soon after he is being paged and has to rush to the operating theatre. "This needs to wait – I'll check again later if she can be discharged".

With Adam's remark that 'it's good to talk to the patient' a further relationship through which actions hang together in a practice, chains of action, comes to the fore. Although the resident approached the patient pursuing to *inform* her about discharge planning, the patient put forward her concern, hereby holding up the resident's flow of actions. Adam's comments while trying to make sense in turn made the intern come up with explanations about the changes to the medication therapy. Schatzki (2002) conceives chains of actions as coordination mechanisms that act through links between elements of practices, such as teleoaffective structure and rules. This leads to sequences of actions where each responds to its predecessor, a responsiveness that also can result in actions deviating from an expected course of action, introducing possibilities for changing habitual action.

Yet, the above example also shows that, ends and rules that govern actions as components of practices compete. Here, the objective of pursuing quality of care is challenged by the need to efficiently process discharge *and* surgical operations. That the resident learned about the patient's concerns and could not make sense of the medication changes documented led him to alter the plan, then becoming more attuned to the pursuit of patient involvement, itself an important element of medication safety. Coordination of medication review, therefore, also is affected how well practices cohere (or compete) with practices and other practice-arrangement bundles integration at the clinical site.

## **Discussion**

This article explored how medication review is being accomplished with respect to the coordination of its actions when implemented in a surgical department. Before we discuss the aspect of coordination, we start with considering the role of materiality in the two medication review practices identified. Both practices, medication reconciliation and inpatient medication

management, were found to be fundamentally constituted by several material entities: actions within these practices were deeply interwoven with artifacts, such as the medication list, the medical record, the pharmacist recommendation, and the discharge information. Thus, medication review can only be conducted in a meaningful way when these artefacts are at hand. This does not mean, though, that practices change as intended by implementers simply by making these artifacts available at a clinical site. The artifacts, as well as tools such as the electronic medication order service or the drug interaction checker, are not neutral objects that merely passively await handling. While these material entities enabled or constrained certain actions, that is, prefigured medication review practices, they did themselves not determine practices. Rather, as we tried to make visible, how these materials were ‘used’ in a practice was connected to intelligibility. Building on Schatzki’s site ontology (2002) we illustrated how arrangements had different meanings for participants in a (specific) practice and that this was tied to the ends and purposes of the practice. In doing so we showed that the medication list was much more than a representation of a ‘fixed’ documented past, but became an object of ‘materialized understanding’ (Reckwitz, 2002, p. 212) as it incorporated the knowledge and practical understanding of practitioners engaging with the list.

The above discussed links between material entities and practices through intelligibility and prefiguration not only play a role in configuring work practices, but also have relevance for coordinating medication review actions. Here, we build on Schatzki’s conceptions of coordination which recognises the significance of a bundle’s interconnections, the ‘concentration of relatedness, its density and continuity’ (2012, p. 17). Coordination of medication review practices rests on the hanging together of actions *within* a practice, such as the continuous documentation of medication changes in a patient’ trajectory from admission to discharge. But

even more important for the coordination of medication review is how actions *between* practices hang together. It is key for medication safety to obtain an accurate medication history and to assess medication appropriateness on admission. However, to make best use of medication review, these aims and principles should be integrated in all medication-related practices throughout the hospital stay (Scullin, Scott, Hogg, & McElnay, 2007). Such between-practice coordination occurred when actions or material entities from one practice overlapped with actions of the second medication review practice. For example, as a nurse practitioner regularly tracked whether actions formulated in the pharmacist recommendations had been followed up and took up any unresolved issue with physicians in pre-ward rounds. Further instances of coordination between the two practices emerged through orchestration, that is, through practices sharing the same ends, rules, or understandings (Schatzki, 2005, 2012). Pharmacists' practices of engaging with patients when asking about their actual medication use and explaining the purpose of their medicines were *orchestrated* with activities of the other practice in the bundle, namely discussing the discharge summary and medication list with the patient. Here, orchestration means that participants in the practices 'react together to the same thing without a need to agree' (Nicolini, 2012, p. 173). Participants in both practices reacted to the fact that patients often do not have full knowledge about their medicines, but *want* to understand why they have to take medicines and how. Thus, participants in both practices had common motivations without sharing the same ends. In the former practice, pharmacists aimed to find out how patients actually used their medicines, *all* of their medicines, and why patients were not using them. Participants in the inpatient medication management practice embraced a narrower undertaking, focusing mostly on medicines which they had newly prescribed and which had particular significance for the surgical condition. Nevertheless, this orchestration created an

interwovenness of the normative organisation of the practices involved and thus contributed to the coordination of actions in the bundle.

Here, we do not understand coordination as a state or a result where the bundling of medication review practices with arrangements is settled once and for all. Rather, the emergence of coordination as a practice-arrangement bundle should be understood as an ongoing accomplishment. Drawing upon Schatzki's practice ontology (2005), changes in practice-arrangement bundles occurred gradually where components of a bundle, such as a single action, parts of arrangements, or the understandings of the purpose of a practice were altered while other components remained unchanged. Observing the practices involved in creating pharmacist recommendations over time made visible how interconnections between practices and arrangements emerged. About three years after medication review implementation, the pharmacist recommendation was made to align with the local implementation objectives. These objectives, while not specified in detail at the outset, were gradually developed through discussions in interprofessional meetings, but also altered through less formal exchanges between individual health care professionals. The pharmacist recommendation came to express a common orientation towards *how*, *when*, and *by whom* to take care of potential medication problems. Changes in the entire arrangement of communicating the recommendations by pharmacists were interwoven with wider work practices at the ward since merely handing over the printed recommendation to the nurses or dropping them off at the doctors' office 'did not work'. Depending on the problem at hand, pharmacists therefore had to interact directly with ward physicians or nurse practitioners, taking up 'more serious or urgent' medication issues with specialists, and 'more standard or simple' ones with interns or residents. Again, practical intelligibility through health care practitioners' reactions to other participants' actions played a

role in coordination. But, relevant when implementing a practice in routine health settings, coordination was also tied to several organisational arrangements at the site. Arrangements such as the composition of ward rounds, staff rotations between wards, or tight surgery schedules all affected the interconnectedness of practices and at times made the coordination of medication review actions more difficult.

## **Conclusion**

In this article, we provided an empirically informed analysis of how medication review was accomplished with respect to the coordination of its actions in two surgical wards. With respect to improved medication safety it is critical that medication review be conducted in a coordinated way. Applying a sociomaterial lens and using Schatzki's notion of practice-arrangement bundles enabled us to explore professional work practices and coordination in a novel way. In doing so, we made visible the relational, fluid and open-ended character of coordination as well as the strong role of materiality in shaping medication review practices and coordination. Further, by illustrating the use and construction of a central coordinating artifact, the pharmacist recommendation, we showed how practices and interconnected material arrangements were altered over time. A sensitivity for practice and materials involved is necessary to understand the enactment of medication review in everyday work and the ongoing efforts required to sustain practice-arrangement bundles for coordination.

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