# Adaptability of nursing shift handovers : theoretical insight from organization science

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# Adaptability of Nursing Shift Handovers: Theoretical Insight from Organization Science

Nursing shift handovers are institutional routines aimed at the transfer of patient information and responsibility among teams of caregivers at the change of shift. They are essential to patient safety and a priority concern for regulatory institutions. Standardization of information transfer during nursing shift handovers is now mandatory in many hospitals. But to date, no study has shown that standardized handover protocols actually improve patient condition. In organization science, research on contingency theory has shown that standardization is efficient only when uncertainty is low. This paper examines how the research on handovers and practical design of handovers could be informed by approaches stemming from contingency theory. The following aspects of adaptability are proposed for more thorough investigation in relation to uncertainty in the unit: adaptability of functions, adaptability of contents, and adaptability of structure.

*Keywords:* standardization, contingency theory, uncertainty, adaptability, handover communication.

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## 1. Introduction

Patient-related communication between healthcare providers is an essential process in health communication as the role of caregivers is not only to provide treatment and care but also to coordinate these activities and inform the patient. This is achieved in a context where regulatory institutions can frame the communication process: governments and institutions have the power to make policies that impact how communication is carried out. The nursing shift handover is an example of how originally ad hoc communication is increasingly constrained by standards.

Nursing shift handovers are institutional routines aimed at the transfer of patient information and responsibility among teams of caregivers at the change of shift. The issue of the appropriateness of the standardization of information during handovers is under debate. Several initiatives to standardize handovers have been proposed (e.g., Arora & Johnson 2006; Haig, Sutton & Whittington 2006) under the assumption that standardized communication would reduce communication errors. But to date no study has shown that standardized handover protocols actually improve patient condition (Cohen & Hilligoss 2009). Standardized protocols have even been found to deteriorate the quality of information transfer during handovers (Boucheix & Coiron 2008). This might be because handovers require adaptability to the environment (e.g., Cohen & Hilligoss 2010). In this paper, we discuss how approaches stemming from organization theory, which examines the necessity for adaptive coordination, are to be considered in research related to the debate on the standardization of handover information transfer: handovers, like organizational coordination in general, require adaptability to the environment. Standardization precludes adaptability by imposing rigid rules to the system.

Surprisingly, studies of handovers have not drawn on organization theory. Most authors have instead relied on common sense, managerial will and outdated propositions of bureaucracy theory (however this is changing, e.g., Patterson et al. 2004; Wears et al. 2003). In the next sections, we provide a review of the variety of practices, content and function of handovers and proceed to review research on handover standardization. Next, we introduce organization theory by presenting the concepts of bureaucracy, different views of routines, and contingency theory for

organizing. We then present studies which examine the impact of uncertainty on organizing more thoroughly. This literature review will illustrate that the environment of units crucially impacts the choice of coordination mechanisms and that adaptability in the individual instances of routines is necessary in order to perform activities efficiently. We then propose to study handovers under a contingency theory framework.

## 2. The Importance of Nursing Handovers

Hospitals are complex organizations that must ensure the continuity of their tasks on a 24-hour basis. Hospital nurses thus work in shifts, generally of 8 or 12 hours each. A shift is composed of a team of nurses and assistants who take care of patients, giving them the treatment and care they need, but also coordinating other activities, such as the admission and discharge of patients, intra-organizational patient transfer, sending samples and receiving lab results. These tasks require coordination among caregivers of different shifts and hence information transfer. Information transfer focuses on all these aspects and inappropriate transfer can lead to gaps in the continuity of care. Gaps in the continuity of care can delay treatment and hence negatively impact patient status. The shift handover is an organizational communicative routine aimed at the transfer of patient information between succeeding shifts, thus ensuring coordination between teams. It also serves the transfer of responsibility in order to allow care continuity (Ekman & Segesten 1995; Miller 1998; Patterson & Wears 2010). And it is not rare that errors are discovered in the process of handing patients over from one healthcare professional to the next (e.g., Cooper et al. 1982; Wears et al. 2003). During handovers, nurses also collectively make sense of complex situations and this common understanding then drives consecutive action (Grosjean & Lacoste 1999; Patterson & Wears 2010). Moreover, each transition between caregivers is a potential "point of failure" (Behara et al. 2005: 309) in the continuity of care.

Thus, shift handovers are essential to patient safety. Nurses play a critical role in the transmission of patient-related information which ensures appropriate care and treatment (Antony & Preuss 2002). The type of information discussed during handovers has an impact on care planning.

Transmission of schema-consistent information leads to better planning whereas schema-inconsistent information impedes it (Downing 2001). In an investigation of medical errors, Arora and colleagues show that errors in communication during handovers can cause health professionals to encounter frequent incidents (Arora et al. 2005).

The building of shared knowledge plays a critical role in the reduction of uncertainty. "Shared functional representations" (Grusenmeyer 1995: 163) are developed during handovers through interactive conversation. A shared functional representation is a model of the situation (e.g., what is happening, what to do next) that is common to two or more individuals, which allows the coordination of the tasks. For these representations to be built, two kinds of information are necessary: information regarding the general situation and secondary information (Grusenmeyer 1995). Information regarding the general situation allows participants with little knowledge of the context to rapidly adapt their understanding to the current status. In the setting of the handover, one example is the diagnosis and the reason of the patient's admission. Secondary information deals with the specificity of the situation. This allows members to develop a more precise view of the current situation when necessary. An example might be an adverse reaction to medication, or the narration of an unexpected event during an intervention (see Bangerter, Mayor & Pekarek Doehler 2011).

Information transfer is important in coordinating activities between succeeding shifts of professionals. Hence, the shift handover is essential in the understanding of the status of the system, i.e., the interrelated activities in the unit and relevant activities outside of the unit. Appropriate information, the type and structure of information as well as interactivity are crucial in the process of assuring task continuity.

In the next section, we discuss variety in different aspects of handovers: what are the types, contents and functions of handovers. We will conclude the section by discussing the debate on standardization, which will foster our point in relation to the necessity of adaptability of communication to the environment.

## 3. Variability of Handovers: Types, Contents and Functions

### 3.1. The Types of Handovers and their Advantages and Drawbacks regarding Information Transfer

Four types of handovers are frequently discussed in the literature: the verbal (or traditional) handover, the bedside handover, the recorded handover and the written handover (Miller 1998). Another form of handover is the computer-based handover (e.g., Baldwin & McGinnis 1994; Strople & Ottani 2006). Miller (1998) describes the main types of handovers: In the verbal handover, patient-related information is transferred verbally from the departing shift to the arriving shift. This can be done in at least two ways. One is that the head nurse or another nurse "in charge" (ibid: 25) of the process transfers patient information and assigns each patient to a nurse. Another way is that patient responsibility for the next shift is pre-assigned (for instance one incoming nurse takes care of all patients of an outgoing nurse) and the handover consists of the outgoing nurse transmitting information to the whole team. In the case of the bedside handover, patient information is verbally transferred at the bedside of the patient from an outgoing nurse to her incoming counterpart. In the case of the recorded handover, the outgoing nurse records the information that she thinks the incoming nurse will need for providing optimal care to her patient. The incoming nurse then listens to the recording and consults written documentation for additional information. The form of the recording can be a tape, or as more recently used, a digital file stored on a computer. In the case of the written handover, all patient information is written by the outgoing nurse; the incoming nurse then reads the information. In the case of the computer-based handover, it is recommended to enter patient information while performing care, for instance using a wireless handheld device (Strople & Ottani 2006). Incoming nurses can then retrieve the information regarding their patients on a computer.

Miller (1998) discussed advantages and drawbacks of handover types: The verbal handover is interactive: it allows for asking questions and providing precisions. It has been criticized for its duration and purported inaccuracy. The advantages of the bedside handover are that the patient is present and thus can provide supplementary information. The incoming

nurse can also crosscheck the information provided by the outgoing nurse and examine the state of the patients during the report (see McMurray et al. 2010). A drawback of the bedside handover is that it raises confidentiality issues, as patients sharing a room can hear all the reports. The recorded handover is more cost effective than the bedside and the verbal report but allows no interactivity (such as asking questions or providing additional information) by other team members; features that are considered essential to patient safety (Patterson et al. 2004). The written handover is characterized by similar advantages and drawbacks as the recorded handover: its non-interactive nature doesn't allow for mutual adjustments between nurses of successive shifts. The computer-based handover allows for entering information at the time the changes are noticed and the care is given (Strople & Ottani 2006). This process is believed to reduce errors regarding the state of patients, but it has also been pointed out that information technology can paradoxically lead to information transfer errors (Ash, Berg & Coiera 2004).

As we have shown above, there is a lot of variability in the types of handovers that are employed in nursing units. Behara and colleagues suggest that differences in types of handovers are in fact adaptive (Behara et al. 2005). Our paper stresses the question of the adaptability of functions and contents of handovers. This will be further discussed after the following review of variability in these aspects of handover communication, which standardization will impact.

### 3.2. Functions of Handovers

The main function of handover is information transmission, but a variety of functions have been documented in the literature. Behara and colleagues state that handovers are opportunities for "asking for clarification, or pointing out omissions, contradictions, and inconsistencies" (Behara et al. 2005). There is also variation between hospitals and units.

On the basis of observational data of natural handovers, Grosjean & Lacoste (1999) developed a typology of functions of handovers and compared three units (gastroenteric, surgery and pediatric) on the frequency of the functions. The authors first recognize two generic functions which are (a) *organizational and meta-operational functions* and

(b) *social and psychological functions.* The generic functions are further divided into sub-functions. For space reasons, the sub-functions are only listed here. *Organizational and meta-operational functions* include: *Information, Interpretation, Confrontation, Evaluation, Decision-making, Day planning and anticipation,* and *Education.* The *Social and psychological functions* include: *Justification and control, Team and self-recognition,* and *Emotional expression.*

Kerr (2002) interviewed nursing personnel about the functions of handovers in order to discover "key issues" (ibid: 127). She then developed a typology consisting of *Informational, Social, Organizational, Educational functions* and used it to code actual handover communication. The *Informational function* covers the *Patient report,* the *Patient update* and *Discussions of family problems.* The *Social function* includes *Social support* and *Socializing.* The *Organizational function* includes the *Organization of the shift* and *Mutual adjustments* in the team as a function of circumstances. The *Educational function* includes *Teaching* and *Socialization.*

Patterson & Wears (2010) conducted a literature review of 400 papers, identifying seven main types of functions of handovers and suggested improvements. These functions and improvements are described in Table 1.

*Table 1:* Function of Handovers and Suggested Improvements

| Function | Description | Suggested improvement |
|---|---|---|
| Information processing | Outgoing nurses transfer necessary information regarding patients' care and treatment to incoming colleagues overcoming noise in communication. | Standardized procedures as a way to improving this function (only) of handovers. |
| Stereotypical narratives | Provide much information in a compact form, efficient way to communicate during handovers, relies on shared knowledge. | Summarize each patient's narrative and derive plan from this. |
| Resilience | Ability of the team to overcome problems and fix errors collaboratively, through discussion and sensemaking. | Questioning of assumptions by the incoming nurses as a means to detect errors. |

(continued)

| Account-ability | Patient responsibility is transferred at the end of the handover. | Explicit mention of what the incoming caregiver has to do during the shift. |
|---|---|---|
| Social interaction | Collaborative construction of the meaning of the situation during interaction between caregivers. | Focus on the acceptance of diverging perspectives on patient treatment. |
| Distributed cognition | Inject information in the pluri-disciplinary network in order to improve coordination. | Make information available to the extended professional arena in charge of the patients, for instance by means of shared artifacts. |
| Cultural norms | Customs, values and norms are communicated and shared during the handover. | Act on these norms and change them in a way that improves patient safety |

Source: Adapted from Patterson & Wears 2010.

It is striking that standardization only aims at improving one of these functions: information processing. Other functions are not taken into account. It is probable that these functions might be suppressed in the process of standardization. Because standardization imposes a rigid way of transferring information and limits discussions during handover to the transfer of information, it strongly reduces possibilities for other functions of handover. For instance, less helpful behavior is manifested by healthcare teams when the work is standardized compared to when it's not (Zala-Mezö et al. 2009). The functions of handover are variable between units. These are essential for patient safety as they provide the establishment of a common direction in patient care, for instance by collectively making sense of situations, and sharing this knowledge between participants to the handover and, after the handover, with other professionals.

### 3.3. Contents of Handovers

Case studies have also dealt with the contents of handovers. Again, different contents have been reported between hospitals and care units, as the examples below illustrate. In an ethnographic case study, Lamond (2000) has compared the content of handovers *(n = 20)* and care plans in four

units (five handovers per unit, two general medical wards and two general surgery wards). Handovers were recorded in two institutions. Table 2 presents the typology, adapted from previous research (Crow, Chase & Lamond 1996), examples of contents for each category and the frequency of coded contents by category.

*Table 2:* Types of Contents and Relative Frequency in Handovers and Notes

| Type of Information | Example | % Handovers | % Care Plans |
|---|---|---|---|
| General information | name, age | 32.1% | 27.5% |
| Physical information | respiratory function, consciousness | 8.9% | 21.8% |
| Physical measures | pulse, blood pressure | 11.0% | 13.4% |
| Functional info. | sleeping, continence | 7.4% | 7.4% |
| Psychological info. | mood, confusion | 3.8% | 3.2% |
| Social info. | occupation, marital status | 3.1% | 10.8% |
| Family related info | understanding, ability to visit | 0.9% | 0.2% |
| Nursing interventions | patient care needs, plans for care | 7.0% | 3.6% |
| Medical treatment | medications, investigations | 18.7% | 10.5% |
| Global judgement | about patient condition, about care | 6.2% | 1.6% |
| Management issues | admissions, discharges | 0.9% | 0.0% |

Source: Adapted from Lamond 2000.

The four most frequent categories of content discussed during handovers are: *General information, Medical treatment, Physical information* and *Physical measures.* The four most frequent categories of content found in care plans are: *General information, Physical information, Physical measures* and *Social information.* This suggests that the content of handovers and care plans overlap in their important aspects. But care plans feature three times more information than handovers do. Lamond concluded that more information is present in care plans than during the handover because nurses frequently present conclusions rather than raw information during handover. This aspect is necessary to reduce uncertainty. As March &

Simon (1958: 186) point out, "Uncertainty absorption takes place when inferences are drawn from a body of evidence and the inferences, instead of the evidence itself, are then communicated." It is noteworthy that such inferences might be lost in standardized handovers.

In another ethnographical study, Liukkonen (1993) analyzes the content of 58 handovers which were transcribed and segmented into statements. The typology, adapted from previous research (Liukkonen 1990), consists of main content categories described as activity classes. These include: *Obligatory activities* (e.g., moving and helping moving, giving and taking drugs; 33 % of statements), *Activities necessitated by obligatory activities* (sitting, waiting; 1 %), *Voluntary activities* (happenings, small matters; 3 %), *Activities which take the characteristics of the patient into account* (physical problems, disturbing behavior; 28 %) and *Other activities* (medical treatment, physical environment; 35 %). *Obligatory activities, Activities which take the patient into account* and *Other activities* account together for 96 % of the statements, whereas *Activities necessitated by obligatory activities* and *Voluntary activities* are anecdotic in their frequency.

According to Van Eaton (2010) content of handovers is quite variable between units. The studies presented above also show that differences exist regarding types of content and their frequency. But reasons for variation remain unknown. Here I argue that variations in handover practices might be needed as they might reflect adaptation of the handover to the environment. Such variations are threatened by standardization, which is currently (overwhelmingly) advocated in nursing science. Scherlock (1995), for instance, described the content of handovers as "frequently imprecise" (ibid: 35) and "unstructured" (ibid: 36), with labeling of patients (e.g., "lazy", ibid: 33) and concluded that handovers require standardization. The next section discusses the debate on standardization.

## 4. Standardization of Handovers

Standardization has recently, but extensively, entered the handover literature (e.g., Sexton et al. 2004). But as Cohen & Hilligoss (2010) point out in an extensive literature review of 545 papers, what is meant by standardization is not clearly defined. This is illustrated by the numerous stand-

ardization systems that are reported in the literature: Cohen & Hilligoss (2009: 30) "have identified nineteen such proposed systems of handoff standards: SBAR (including the variants I-SBAR I-SBARQ and I-SBAR-R), SIGNOUT, I PASS the BATON, FIVE-Ps, PACE, ANTICipate, HANDOFF, Data TRIANGLE, HANDS, Essence of Care, DeMIST, CUBAN, BSAP, SEAM, PEDIATRIC, PSYCHIATRY, STICC, and the Great Ormond Street Protocol" (references to papers omitted here). These standards mostly provide a mnemonic device for the information to be transferred. For instance, SBAR stands for Situation Background Assessment Recommendation. But usually, no clear definition is given for what to put under a letter, except for the word that it stands for (Cohen & Hilligoss 2009), moreover the description of the information to be transferred does not overlap between standards. The variety in standardization approaches (at least 19 different systems) doesn't speak in favor of standardization: if standardization is a solution to the handover, why are the standardization approaches *not* standardized? It may be that this variety is in fact adaptive. In addition, in their literature review of 400 papers, Patterson & Wears (2010: 59) stated that "our review and classification of the handoff literature do not enable us to make recommendations for the use of any particular standardized tool." This suggests that none of the existing standards are able to capture the complexity of patient updates during handover.

Proponents of standardization argue that it is necessary to increase patient safety and reduce costs (e.g., Clancy 2006; Hughes & Clancy 2007). But improvements in patient safety as a result of standardization have not been demonstrated and authors have even argued that an excess in handover standardization could be detrimental for patient safety. In a case study, Boucheix & Coiron (2008) report that the focus charting technique (Lampe 1985) is not an adequate tool to support high-quality information transfer during handovers. This method requires information to be structured in three categories: Data (a description of the situation requiring an intervention), Action (the intervention undertaken) and Result (the outcome of the intervention). The authors report difficulties for nurses to fit care situations to this framework. They also point out that it does not provide sufficient information for accurate patient information transfer, and that necessary information is often forgotten as a result.

Patterson (2008) argues that whereas the standardization of handover allows for a reduction in coordination effort and an improvement in efficacy and efficiency, it doesn't allow for the prioritization of most important information and isn't flexible enough to account for unexpected situations. This view is shared by Merrick, Iedema & Sorenson (2008: 5) who point out that "while such standardization suits routine work contexts [...], staff working in complex or uncertain environments hesitate to adopt structured procedures like 'SBAR' because they are insufficiently sensitive to process complexity, or emerging and uncertain contingencies."

It follows that research is needed in order to give indirect or direct evidence of the implications of handover standardization: in human systems, adaptability is the ability to learn from the environment (Berkes 2007), and standardized routines could preclude this capacity by imposing rigid rules where flexibility should apply (Merrick, Iedema & Sorenson 2008). It is also notable that previous research on handovers has mostly been composed of case studies without theoretical foundations in organization theory. This is surprising because organization theory has been dealing for decades with issues such as the standardization of routines. This issue is addressed in the following sections.

## 5. The Need for Adaptability in Routine Performance

In this section, we will first discuss bureaucracy theory which proposed that standardization and control are the solution to the organizational problem of coordination. This is related to the different view of routines. We hence present classic research on routines as determined patterns of action and new conceptions of routines as adaptive accomplishments. We show that the outdated view of routines as rigid and predetermined does not hold because actors have to perform them in a situated manner.

The notion of standardization is a pillar of bureaucracy theory (Weber 1947) for which coordination is largely reliant on a strong hierarchy and rigid sets of routines for coordinating and performing activities. In a bureaucracy, the leeway of individuals is limited by management as well as their competence in order to restrain control (Mintzberg 1979). As

Merton (1940) points out, a bureaucracy is a formal organizational structure that constrains individual action by strict routines, controls conformity, and applies sanctions if rules are breached. In a bureaucracy, no discussions are allowed regarding the routines as they are considered natural because they enact the norms of the organization. By stressing the importance of conformity to routines as they are devised, bureaucracies paradoxically obscure the reason of their existence. Routines are hence applied blindly and sometimes at the expense of a higher organizational goals. This point is exemplified by Crozier (1964: 3) who critiqued "[...] the slowness, the ponderousness, the routine, the complication of procedures, and the maladapted responses of the bureaucratic organization to the needs which they should satisfy."

Routines are at the core of organizations (March & Simon 1958; Perrow 1972), but the conception of routines has evolved since the seminal book *Organizations* was released (March & Simon 1958). Routines have been considered as standardized succession of actions that are necessary to complete a task (March & Simon 1958; Nelson & Winter 1982), and as standard operating procedures that reduce the need for coordination and problem solving (Cyert & March 1964). This view contrasts with recent research which shows that adaptability is a requirement in the performance of routines. Pentland & Rueter (1994) suggested that even when various instances of a routine are perceived as different, they still can share a common basis in terms of content (the repertoire of the routine), which is organized following what they call "a grammar for action" (ibid: 489). The enactment of the grammar for action is dependent on the setting, which constrains the combinations of the elements. Gersick & Hackman (1990) are interested in communication routines. They show that these routines change as a function of the new understanding (learning) of members of a task performing group, and through their interactions. Feldman (2000) develops a similar idea and describes how routines change as they are enacted by the individuals. She describes routines as emergent accomplishments because they are adapted by the individuals: as the situations they are confronted with vary, individuals tend to select the appropriate solution from an existing repertoire, but also extend their repertoire in case no ready-made solution is found.

## 6. Contingency Theory and the Impact of Uncertainty

The question of the standardization of work processes has also been discussed for decades in the field of contingency theory (e.g., Galbraith 1973). This literature has radically challenged the views of bureaucracy theory and has consistently empirically shown that standardization and formalization are efficient only under low uncertainty conditions (e.g., Donaldson 2001; Grote 2009; Perrow 1967; Van de Ven, Delbecq & Koenig 1976). Contingency theory postulates that there is no "one best way" to organize and that what counts in terms of efficiency is the fit between the organization and contingencies in the environment (Donaldson 2001). Most contingencies in organizations can be considered cases of uncertainty, and interdependence (Donaldson 2001). The remainder of this paper is concerned with uncertainty.

Uncertainty is a major contingency in organizations (Donaldson 2001). Galbraith (1973: 5) defined uncertainty as "the difference between the amount of information required to perform the task and the amount of information already possessed by the organization." Different typologies of sources of uncertainty have been proposed in the literature. For instance, Milliken (1987) defines uncertainty as the unpredictability of the environment and divides it into three types of environmental contingencies: state uncertainty, effect uncertainty and response uncertainty. State uncertainty, is related to the ill-understanding of the underlying causes of changes in the environment. Effect uncertainty is the difficulty in apprehending whether and how changes in the environment will impact the organization. Finally, response uncertainty is related to difficulty in finding what actions to perform and anticipating their consequences. These three types of uncertainty are relevant in the case handovers and nursing care. The impact of uncertainty is described in the following.

At the organization level, the view proposed by contingency theory is that the way organizations coordinate should be related to their environment: for instance, the more predictable the environment, the more rigid the coordination in organizations (a mechanistic system); the more uncertain the environment, the more flexible the coordination (an organic system; Burns & Stalker 1961). The level of uncertainty is positively linked to the efficiency of standardized routines, standardized routines have a low

capacity for transmitting high amounts of information (Daft & Lengel 1984): less information can be transferred in a given timeframe than when non standardized routines are in use. Unstandardized communication is the means through which to transfer the most information between parties and is hence the most efficient way to coordinate in high uncertainty conditions (Mintzberg 1983; Van de Ven, Delbecq & Koenig 1976). Lawrence & Lorsch (1967) show that more uncertainty leads to less formalization and use of coordination mechanisms with a higher capacity. This is supported by research in the air-traffic control setting: Morrow, Rodvold & Lee (1984) have shown that pilots depart from standardized protocols when encountering non-routine situations, using unstandardized language in order to overcome the rigidity of protocols. This relationship is also postulated at the work unit level (e.g., Argote 1982). Units that evolve in a low uncertainty environment should use routine (or standardized) coordination mechanisms, and units in a high uncertainty environment should use non-routine (or unstandardized) coordination mechanisms (Perrow 1967). The possibility to transfer high amounts of information is related to a decrease in uncertainty (Peterson & Pitz 1988). These findings also apply to coordination in hospitals. Argote (1982) investigated the moderating effect of uncertainty on the efficiency of programmed and non-programmed routines. She found that units facing low uncertainty were more efficient when they used standardized coordination mechanisms, whereas units facing high uncertainty were more efficient when they used unstandardized coordination mechanisms. Indeed, health care teams need to be flexible in their way of dealing with clinical situations in order to reduce uncertainty (West & Wallace 1991). Nemeth and colleagues have shown that Intensive Care Units (ICUs) are surrounded by a high degree of informational uncertainty which results in a heightened requirement for information regarding the patients (Nemeth et al. 2008). Uncertainty increases the risk of information gaps (Antony & Preuss 2002). Uncertainty regarding the state of the patient and care to be provided is also related to an increase in errors and in the number of tests undertaken (Arora et al. 2005). Finally, there is a "need for flexible routines" (Grote et al. 2009: 17) in order to face uncertainty in high reliability organizations like hospitals. In the next section, we propose that recourse to contingency theory is necessary in order to determine when to standardize handovers and when not to.

## 7. Recommendations for Future Research

To summarize, handovers in nursing care units are organizational communication routines that happen at shift changes. Their aim is to ensure the safety of patients when one shift leaves the unit and hands the patients over to the next (Perry 2004) and transfer responsibility in order to maintain care continuity (e.g., Patterson & Wears 2010). Handovers are composed of interactions between the outgoing and incoming teams. The handover routine aims at the resolution of uncertainty which is created by the reciprocal interdependence in the actions performed by each team (Thompson 1967). Handovers have been explored in case studies since the seminal studies of Lelan (1973), but studies of handovers have never examined under which contexts the handovers are structured and under which contexts they are adaptable: it is known that contents and functions of handovers vary between units and hospitals (e.g., Lamond 2000; Kerr 2002) but the origins of these differences remain unidentified.

Relying on contingency theory, we are far from being able to recommend handover standardization unless uncertainty is very low. According to contingency theory, the appropriateness of coordination mechanisms is dependent upon the uncertainty of the context. In many industries, including hospitals, standardization has been shown to be efficient when uncertainty is low, and adaptability a requirement when uncertainty is high. This concern on the flexibility of handovers is shared by researchers following an organizational resilience perspective. For instance, flexibility is necessary in critical situations (Smith, Patterson & Woods 2007). Contingency theory hypothesizes that flexibility is needed in uncertain settings, in normal situations as well. This hypothesis has not yet been tested on handover communication.

This knowledge gap could hinder the efficiency of attempts at handover standardization: standardization is likely to impact units differently, because their communication is not organized in a uniform way. The following aspects of adaptability could be investigated more thoroughly: adaptability of functions, adaptability of content, and adaptability of structure. The paragraphs below present some recommendations we can propose, considering the forty years of organizational research on organizing and standardization.

1) Future research on handovers should focus on linking naturally occurring variability in handover content and functions to environmental contingencies (Mayor, Bangerter & Aribot 2011). The literature on contingency theory provides different insight about how to evaluate the level of uncertainty of units under investigation. For instance, Van de Ven & Delbecq (1974) proposed a typology of work units which they related to uncertainty. Others (e.g., Milliken 1987) have argued in favor of measures of perceived uncertainty. Measures of perceived uncertainty in nursing units already exist (Allred et al. 1994) and can hence be used in handover research.

2) Studies of handovers following a contingency theory framework should also directly study their structural adaptability and relate it to work-unit contingencies (Mayor & Bangerter 2011). Pentland (2003) distinguished between the content variety of the routine (the actions that compose the routine) and sequential variety (the flexibility in the ways the actions can be arranged to form the routine). Lag-sequential analyses (e.g., Gottman & Roy 1990) are appropriate to assess sequential variety. These analyses examine the association between two contents of a routine, i.e., if a content is followed by another more frequently than expected by chance. The less number of significant associations, the more potential for adaptability. Comparing handovers facing different degrees of uncertainty using this approach would allow for the identification of differences in flexibility related to the environment.

3) Advocating best practices requires showing empirically that a given practice is more efficient than another. No study has shown that standardization of information during handovers is related to improvements in patient outcomes (Cohen & Hilligross 2009), nor care continuity. This might be because coordination in hospitals, like in other organization, requires adaptability to the context (Argote 1982), which standardization impedes. The contingency theory of organizations has positively linked flexibility to organizational outcomes. Further research on handovers should include measures of outcomes (e.g., continuity of care) in order to assess the (in)efficiency of the routines under study. One approach might be to compare handover procedures that focus on information standardization to handover procedures that allow sense-making between participants in settings differing in uncertainty.

## 8. Conclusion

We have shown that the question of handover standardization is not as straightforward as most nursing literature suggests. While nursing shift handovers have been discussed in this paper, it is believed that its content is also valid for other handovers in healthcare teams and other industries. Several disciplines have tackled the question of standardization. Outdated bureaucracy theory has considered standardization to be the solution for enhancing efficiency. Contingency theory has shown that this is rarely the case. In this paper, we have argued in favor of an approach to the study of handovers that uses contingency as a theoretical framework. We also have proposed several ways in which research of handovers might be improved.

Standardization is by essence the limitation of diversity and hence adaptability. Proponents of standardization pursue the quest of outcome uniformity and are blind to the simple fact that while a given standardized procedure might be appropriate in certain circumstances it might not be when these circumstances change (Merrick, Iedema & Sorenson 2008). It is necessary to acquire knowledge of the environments in which standardization is and is not appropriate.

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