Team based communication and the healthcare communication space

Janet Alexandra Cornett and Craig Kuziemsky
Telfer School of Management, University of Ottawa, Ottawa, Canada

Abstract

Purpose – While previous studies have described structural, process and social aspects of the healthcare communication space there is no overall model of it. Such a model is an essential first step to improving the operationalization and management of healthcare communication. The paper aims to discuss these issues.

Design/methodology/approach – This paper used a case study approach to study team-based communication on a palliative care unit. Non-participant observation, interviews and documents were analyzed using qualitative content analysis.

Findings – The analysis developed an overall model of the healthcare communication space that consists of five stages: purpose, practices and workflows, structures, implementation, and the development of common ground to support team-based communication. The authors’ findings emphasized that implicit communication remains a predominant means of communication and workflow issues at the individual level are a frequent cause of unnecessary group communication tasks.

Originality/value – To improve team-based communication we first need to develop protocols that support team communication needs such as loop closing of group communication tasks in order to minimize unnecessary individual communication tasks. We also need to develop common ground at the protocol, document and terminology levels as part of supporting team-based communication.

Keywords Communication space, Team communication, Common ground, Palliative care

Paper type Research paper

Introduction

Communication activities comprise a large part of healthcare delivery with the clinical communication space being the summation of activities and behaviors that occur as part of healthcare communication (Coiera, 2000). Communication can be particularly important in team-based settings (Hargestam et al., 2013; Salas et al., 2008). Healthcare communication is frequently cited as being a contributor to medical errors and other adverse events (Zwarenstein et al., 2013; Dayton and Henriksen, 2007; Joint Commission, 2007) with these issues being particularly prevalent during communication activities by healthcare teams (Foronda et al., 2016; Bardach et al., 2017; Murphy and Dunn, 2010; Alvarez and Coiera, 2006).

A communication act can be broadly defined as having a sender, channel, message and recipient (Coiera, 2001). However, healthcare communication can be far more complex (Härgestam et al., 2013; Dayton and Henriksen, 2007) due to different types of channels such as written or verbal and synchronous or asynchronous, different types of communication processes such as open and closed loop (Coiera, 2006) and the need to balance individual and team tasks (Bardach et al., 2017; Dean et al., 2016; Kuziemsky, 2015; Tang et al., 2015; Collins et al., 2011). Implicit and verbal communication remain predominate communication channels (Coiera, 2014; Tang et al., 2015; Lewin and Reeves, 2011) with face-to-face communication estimated as comprising up to 90 percent of all information transactions (Aceti and Luppicini, 2013; Coiera, 2006).

This work was supported by a Discovery Grant from the Natural Sciences and Engineering Research Council of Canada and a School of Management Research Fund from the Telfer School of Management, University of Ottawa. The authors also thank the palliative care team members for allowing the authors to observe and interview them.
Communication can also be a social process - it is a team outcome that is developed through individual activities. Therefore, a key part of understanding communication is making sense of the discourse between individuals and teams (Kuziemsky and Varpio, 2010; Coiera, 2000). Yet to date we lack insight on how to structure communication to support healthcare teamwork (Ezziane et al., 2012; West and Lyubovnikova, 2013). While studies have described how common ground, defined as the common knowledge, beliefs, and protocols that enable communication to occur (Clarke and Brennan, 1991), can support the social dimensions of the communication space, we still lack explicit guidance on how it can support the restructuring and management of team-based care delivery (Collins et al., 2011; Kuziemsky and Varpio, 2010).

Despite communication being a fundamental clinical process, at times it is taken for granted and remains an understudied phenomenon. Studies of clinical processes such as order entry far outnumber studies of communication and communication technologies, even though communication is a much more prevalent process and the basis for other processes (Quan et al., 2013). Models exist for healthcare teamwork such as the Integrated (Health Care) Team Effectiveness Model (ITEM) (Lemieux-Charles and McGuire, 2006), a five concept model for team effectiveness by Salas et al. (2005), as well as structured communication tools such as situation, background, assessment, recommendation (SBAR) and check-back. Team-based communication is central to all these models and tools, but a shortcoming is they focus on communication in the moment and not how a communication act develops over time. Communication to support certain contexts of team-based care delivery such as chronic disease management or palliative care may take place over a continuum of hours or even days.

We can summarize existing knowledge about the communication space into three main categories. First are the structural elements (e.g. channels, tools, models) through which communication occurs. Second are communication processes (e.g. open and closed loop and explicit and implicit processes). Third are the social elements of the space (e.g. common ground). We have a good understanding about each different part of a communication act (e.g. implicit, verbal, open/closed loop) but we lack an overall understanding of communication patterns and structures (Manojlovich, Harrod, Holtz, Hofer, Kuhn, and Krein, 2015; Dayton and Henriksen, 2007).

While research exists on individual parts of the communication space, there is not an overall model of team-based communication that integrates all parts of the space. Such a model is an essential first step to improving the operationalization and management of team-based communication. In particular, we need a better understanding of how individual activities shape team-based communication outcomes.

This paper addresses that shortcoming and uses a palliative care case study to develop an overall model of the healthcare communication space.

**Methods**

We used a case study approach, based on Yin (2008), to study communication via team based care delivery on a palliative care unit. The tenets of a case study approach are the use and triangulation of different data sources that represent varying perspectives, such as between non-participant observations and interview data (Denzin and Lincoln, 1998).

Our study focuses on communication around the implementation of palliative sedation therapy (PST). PST is suitable to study communication because it is a collaborative intervention that requires the input of all team members who possess knowledge that will influence the decision to initiate PST (Cornett and Kuziemsky, 2015).

**Data sources**

Three data sources were used in our study. The first data source was 76 h of non-participant observation done of all three nursing shifts (day, evening and night), and all major team activities (including priority setting each morning and weekly team rounds). Written notes
of observation were created using a template that included information on the individuals involved in the communication act and the purpose, resources used, and method of communication (e.g., face-to-face, telephone, written, etc.).

The second data source was 17 semi-structured interviews, ranging in length from 14 min to 1.5 h with an average of 30 min in length. The interview participants were representative of the healthcare team and included members from multiple different disciplines (physicians, nurses, and allied health).

The third data source was charting documents used on the ward—interdisciplinary progress notes, medication administration record (MAR), nursing assignment sheet, physician priority board. Documents also included the Champlain PST Guidelines and Protocols, which can be considered as the ideal “best practice” document for understanding PST as no unit-specific guidelines had been implemented at the time.

In total, 404 pages of observation data and 169 pages of interview data were transcribed. The transcription yielded 314 pages of observation data and 95 pages of interview data that were reviewed and coded prior to saturation being reached.

Ethical approval for this study was obtained from the hospital’s Research Ethics Board (REB), as the primary location of the research being conducted. Ethics approval was also received from the University of Ottawa’s REB.

Analysis

Our overall objective was to identify different aspects of the clinical communication space in order to model it. Qualitative content analysis (Hsieh and Shannon, 2005) was used for data analysis with two sensitizing concepts. First is the clinical communication space. Coiera (2000) highlights the need to understand the relationship between information and communication tasks that lead to medical errors and other adverse events and suggests that improvement must begin by understanding the activities within the communication space. A particular need is an understanding of how communication occurs across different providers.

The second sensitizing concept was an approach for modeling clinical workflows (Malhotra et al., 2007). The approach emphasizes the need to understand how individual provider workflows integrate into a main (group) workflow model and how contexts such as time or shiftwork influence goal achievement.

Coding and analysis were performed using QSR NVivo 9 qualitative data analysis software and continued until theoretical saturation was reached, determined to be the point when a comprehensive communication space model was developed and no new themes were identified. Analysis was led by the first author and checked and validated by the second author. The validation process led to revisions or reframing of different parts of the communication space model, one example being how the different types of common ground were defined. Different means of external validation of study findings was also done including discussion with peers, member checking of interview data, and presentation of research findings to selected study participants.

Results

Figure 1 shows our overall model of the healthcare communication space, incorporating both of the sensitizing concepts. The workflow modeling approach structured the model into five distinct stages of purpose, healthcare communication practices and workflows, structure, implementation, and common ground, while the communication space concepts provided details for each stage. We used stages to emphasize that a communication act is developed sequentially where each stage builds upon the previous one. Staged models have been used to represent other healthcare management concepts such as transformation (Golden, 2006) and quality improvement (Kellogg et al., 2017).
Stage 1 – purpose of communication
Table I shows our breakdown of communication purposes classified as explicit or implicit. Explicit communication (24 percent of communication acts) has a protocol and takes place as part of an explicit process (e.g., shift change, team rounds). Implicit communication (76 percent) of communication acts had no explicit protocol but rather the communication task emerged informally as part of day-to-day care delivery. Three types of implicit communication were identified (Table I).

Stage 2 – communication practices and workflows
Stage no. 2 defines the communication practices and workflows. We identified two types of communication practices and two types of workflows. Both are described below.

<table>
<thead>
<tr>
<th>Communication type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication of explicit purposes (24%)</td>
<td>E.g. patient assignment to nurses, updating documentation, referral for a consult, verifying/co-signing medication distribution, completing progress notes</td>
</tr>
<tr>
<td>Communication regarding implicit procedures/protocols, education/instruction related</td>
<td>E.g. implicit transitional processes, coordinating care, obtaining information</td>
</tr>
<tr>
<td>Communication to support workflow</td>
<td>Communication that supports unit workflow for team members to efficiently complete their work, E.g. clarify confusion or misunderstanding, looking for someone, request for assistance</td>
</tr>
</tbody>
</table>

Table I. Listing of explicit and implicit communication purposes
Communication practices – open-loop and closed-loop communication

One of the first concepts that emerged from our analysis of the observation data was the difference between open-loop and closed-loop communication. Open-loop communication is unidirectional information sharing that occurs continuously over time and does not involve reciprocal confirmation of receiving the information by its intended recipient(s). Documenting in a progress note is an example of an open-loop communication process. Once a provider begins documenting it becomes a continuous communication act where team members read and add information as needed such as a nurse writing a progress note at the end of her shift. Although s/he knows that the next couple of nursing shifts, and possibly the physicians or other members of the interdisciplinary team may read this progress note, s/he will not necessarily receive any confirmation that this has occurred.

Closed-loop communication differs in that it is bidirectional and has a defined time period associated for closing the loop on communication. Some communication tasks close the loop immediately while other tasks have a longer time period before the loop is closed. A task that is closed immediately is face-to-face communication between a physician and a nurse confirming a change in medication for a patient. The physician will make the request and have it acknowledged immediately by the nurse. Communication on an educational task or a workflow notification are also typically closed immediately. An example of closed loop communication with a longer time frame is a physical therapy referral for a patient. A physiotherapist will receive the referral, complete a consultation, and then close the loop with the physician after seeing the patient.

Workflows: group vs individual

Communication is a group outcome but multiple individual activities are the building blocks of it. Therefore, we need to understand group and individual workflows, as well as the relationship between the two of them. In defining workflows, we make a clear distinction between individual and group workflows in that communication is a group activity between two or more agents. Individual agents may conduct information pulling or pushing activities on their own as part of a communication act, but we only use the term communication to refer to a group activity between two or more agents.

Group workflows

Group workflows involve bidirectional communication between two or more providers. Below we provide examples of group workflows for both explicit and implicit purposes from stage 1.

Explicit group workflows

Explicit communication activities had defined protocols for doing them. One example is referring a patient for a consult. If a patient requires services from an allied health team member, a referral needs to be written that follows a specific set of requirements:

While discussing a patient the attending physician stated that the patient should be stimulated as much as possible, so the recreation therapist said that she would see the patient, but checked that a referral had been written for her to see the patient. (Observation)

Team rounds is another explicit group activity that takes place at a set time each week and follows a standard protocol. The quote below describes how before a patient is started on PST the team will discuss the patient’s situation and develop a collaborative overview of the patient:

At Team Rounds to get the whole team on board with using PST for a patient we are all coming together to ensure we have the same idea of what is going on, the same view. (Interview, RN4)

Other explicit group activities included medical-legal activities related to medication distribution such as counting medication cabinet keys at the end of a shift, or medication reconciliation.
Implicit group workflows

Stage 1 described care coordination, workflow and educational activities as three primary implicit communication activities. Examples of group communication workflows for these three activities are provided below.

Care coordination activities were common and occurred whenever communication was needed as part of planning and/or delivering patient care. The quote below describes how a patient’s changing clinical status could lead to implicit communication to coordinate care delivery for the patient:

If I saw a patient on Monday and they want to go for an X-Ray today, and the patient used to walk but doesn’t now, I will ask a lot of questions: if the patient can still transfer, if the patient declined, or there is a shortness of breath, every detail to make the patient’s life easier I will tell the nurse, or the doctor, or the ward clerk […] it depends on the situation. (Interview, Healthcare Professional 1)

A physician also described how a plan to initiate PST for a patient would lead to communication with the care team to get the opinions of the care team to make sure that all providers are comfortable with delivering sedation:

When I have sedation, I usually talk to the team, because I want to get their gut feelings, is there anything else that they would suggest that we haven’t done, are they comfortable with the idea? Because if the nurses have to nurse the patient, it’s not fair to ask them to nurse the patient if they’re not comfortable with what you’re asking them to do, right? So I usually talk to them. (Interview, MD5)

Implicit communication around workflow were also common group activities. Team members, be it physicians or nurses, often updated other team members about their availability, or lack of it, such as when they were leaving or returning to the unit, or if they are going to be unavailable for communication for a period of time:

One nurse told another nurse where she could be found because she has to go into a patient’s room for a procedure. (Observation)

Implicit communication related to education activities occurred randomly whenever opportunities presented. Below is an example of an education activity that occurred because of confusion around a medication order:

One RPN (Registered Practical Nurse) is giving another RPN verbal hand-off information about the medication information for one patient. The Evening RPN was confused about how the order was written in the MAR, so the Day RPN said that she would change how it was written, and described how to change and re-write it. The confusion was because of a medication that is both PRN (as needed) and regular. (Observation)

Individual workflows

Individual workflows involve unidirectional “pulling” or “pushing” information to or from information sources, excluding individuals, as part of completing a task. Pulling activities included obtaining information from various documents (priority board, nursing assignment sheet, medical chart, MAR) or pulling educational information from the PST guideline or other educational resources.

The quote below describes how a psychologist used the assignment sheet to pull information to locate a specific nurse needed for communication about a patient’s case:

The psychologist was looking for a specific nurse to talk to about a patient. The psychologist looked up which nurse she needed to talk to on the Nursing Assignment sheet. (Observation)

In contrast, information pushing occurs when an individual has information that they want to share with others. Pushing activities included charting in progress notes or a patient’s MAR
during and at the end of the shift, and updating documentation (e.g. doing Nursing Assignment Sheet for next shift). The quote below describes how a nurse pushes information to the priority board to enable physicians to coordinate patient rounds the next morning:

Any urgent issues that would stand out we write on the priority board and then the doctors will come in in the morning and they will see this. (Interview, RN1)

Interchange of individual and group workflows
If a team member encounters difficulty in an individual workflow activity it can lead to group activities to reconcile the difficulties. We identified clarification and confirmation as the two main reconciliation events between individual and group activities.

Clarification events occur when an individual is pulling information and does not understand some aspect of the information. During observations there were several examples of unclear documentation, particularly with medications, leading to group activities to reconcile the issue, with one example described in the following quote:

A nurse asked a physician for clarification about the route of administration for a medication, because the instructions on the order were not clear. (Observation)

The second reconciliation event was confirmation. Confirmation events occurred when one team member wanted to be sure that another member had seen a request to close the loop on a communication event:

A physician confirmed that a nurse had seen the medication order that had been written for their patient, and that the patient would receive the first dose of the medication shortly. The nurse replied that she had seen the order, and that the medication had been given. The physician thanked the nurse and left. (Observation)

During our analysis, we coded for whether a group activity was necessary or not (Table II) with unnecessary activities being either clarification or confirmation events that occurred because of the need to reconcile an individual workflow issue.

While the majority of activities were necessary, there were a significant number of unnecessary activities. However, when we discussed the prevalence of unnecessary confirmation activities with a senior clinical member of the palliative care unit, he commented that some medication orders had been missed in the past and thus providers were engaging in confirmation activities to ensure orders were processed to avoid unnecessary delay of treatments.

Stage 3 – structure
The structural component of our model is how communication transmission occurs and consists of a channel and a tool.

Communication channel
A communication channel is the “pipe” or medium through which communication occurs (Coiera, 2006). Our study identified three types of channels. The first is written or text-based communication. This channel includes an individual either pushing information or pulling

<table>
<thead>
<tr>
<th>Necessity of group activity</th>
<th>No. of events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Could not determine necessity</td>
<td>28</td>
</tr>
<tr>
<td>Necessary activity</td>
<td>513</td>
</tr>
<tr>
<td>Unnecessary activity</td>
<td>134</td>
</tr>
</tbody>
</table>

Table II. Breakdown of group activities
information from a document. Writing in progress notes, the MAR, or the physician priority board were common examples of written communication. Other examples included faxes, e-mail or the hospital electronic medical record system.

The second is verbal communication excluding face-to-face interactions. This channel includes communication devices such as telephone calls, public announcement (PA) system announcements, pagers and mobile phones, and can include synchronous or asynchronous exchange. For example, voicemail messages have a lag between the time of request and time of action. We observed two main types of verbal communication channels. The first were one-to-one channels where a pager or telephone is used to send a message to an individual person. This type of communication was used mostly for communication with physicians, especially to contact them when they were not on the unit. The second was a one-to-many type of channel such as broadly disseminated messages over a PA system. This type of communication was used to raise awareness about some aspect of care delivery (e.g. a call bell) or to coordinate a task (e.g. physician priorities) across multiple providers.

The third category, verbal face-to-face verbal, was categorized separately due to the contexts that must occur for face-to-face verbal communication. As shown in Table I, face-to-face was the predominate communication for both explicit and implicit activities. Face-to-face communication is popular as the person pushing information can obtain instant confirmation that the information was received and possibly that it was understood.

**Communication tools**

Tools are the documents, boards, and artifacts (e.g. telephone) used within channels to communicate across people, processes and spaces. Tools serve different functions and it is important that a tool be appropriate for the intended purpose. For example, information dissemination may be the goal in certain circumstances while in others bidirectional exchange is needed so to enable closing the loop by acknowledging information has been received. In yet other circumstances (e.g. changing a care plan or starting PST) actual collaboration among team members is needed as part of joint decision making.

Table III lists the different communication tools identified during the course of this study and the type(s) of activity a tool can support. In Table III a “+” sign indicates that a tool is able to serve the listed purpose while a “−” means that it is not. A “+/−” sign means that a tool may be used for the stated purpose but it was used inconsistently. The tool purposes came from a definition of information and communication tools (Coiera, 2000; Collins et al., 2011) and collaboration tools (Eikey et al., 2015). For communication and collaboration tools we also differentiate between how tools are currently used on the unit and the potential by which they could be used.

**Information tools**

Information tools enable unidirectional pulling or pushing of information. Examples include a progress note that is written by a nurse, an implicit note in a patient’s MAR providing

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Med flow sheet/MAR</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Medication/treatment order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Nursing assignment sheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician priority board</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Progress notes</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Telephone</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Ward PA system</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

Table III. Tools from our study and their ability to be used for information exchange, communication, and collaboration.
information about the patient, or a reminder over the PA system for nurses to update the priority board. The unidirectional nature of information tools means there is no way of closing the loop through confirmation that a message has been received. All of the tools in Table III are able to serve as information tools.

**Communication tools**

Communication tools go beyond information tools in that they enable bidirectional exchange and allow closing the loop by providing the receiver the means to act in response to the information, or by acknowledging that a message has been seen. As indicated in Table III, the only existing communication tool was the telephone. Several of the tools are coded as +/- for communication because they have potential to act as a communication tool but were not used consistently. One example is the physician priority board. When used properly as a communication tool the nurses update it at the end of the evening and night shifts and the day nurses also add their notes at the beginning of their shift. It then serves as a communication tool when physicians do patient rounds in the morning because they have information on what has happened with a patient as well as why things happened, enabling a physician to act in response to the information as described in the quotation below:

A regular nurse described the priority board’s use to a floating nurse: The board is for priorities – if a nurse wants the doctor to see the patient in the morning because there is a new symptom or a change in the patient’s condition etc. he should write on the priority board. Tomorrow morning the doctors will look at the board and if there is anything that needs the doctor’s attention they will see it and go see the patient. And then based on what the Day nurses think are priorities they will put a star beside the patient’s name. (Observation)

However, the priority board was not always used consistently such as not providing the necessary information about a patient’s situation, resulting in the physician having to engage in implicit communication using additional communication channels, often verbal face-to-face, to obtain the information necessary to close the loop. Other tools such as progress notes or medication/treatment orders similarly offered potential to act as communication tools but did not always provide necessary information to support a communication act.

**Collaboration tools**

Collaboration also involves bidirectional exchange but differs from communication in that it involves the development and testing of rules of engagement and shared understanding that facilitates how people work together (Eikey *et al.*, 2015). Collaboration is less structured than communication and goes beyond knowing why things were done but rather may require back-and-forth dialogue to establish a care plan or some other aspect of patient care planning or delivery. Collaboration often lacks an explicit protocol as the outcome may not be known at the time of the exchange but rather develops over the course of it. An example of a collaborative activity was team rounds that enabled team members to engage in bidirectional dialogue to develop a shared understanding about a patient case, as shown below:

The attending physician spoke to the dietician about a patient’s food – and they discussed what is needed for the patient and whether they should provide certain care or if they should wait due to other aspects of the patient’s life [social and family factors]. The attending physician and dietician are taking these family factors into account and are also incorporating the pharmacy student and medical resident’s comments into their decision making. (Observation)

Collaboration tools must enable bidirectional exchange of information as described above but as shown in Table III, the only collaborative tool was the telephone, if used synchronously, as it enabled back-and-forth dialogue in real-time to support collaboration. Some tools (e.g. progress notes, priority board) have the potential to act as collaboration
tools by enabling the ongoing dialogue illustrated above, but currently there is a lack of policy guiding how they should be used for collaboration. The level of collaborative detail is really up to each individual who pushes information onto a tool.

Stage 4 – implementation of communication act

Up to this point, the communication purpose determines the practice/workflow and structure of a communication act. Stage 4 implements the communication act.

Information seeking and information sharing

Implementation involves sharing and seeking information using either individual or group workflows from stage 2. We categorized information that was sought or shared into four categories: medication, patient, process or staff. Table IV provides an indication of how information seeking and information sharing occurred for each of the four categories and whether people or documents were the source of information for each purpose. Table IV also displays the number of times we identified an information sharing or information seeking event, and the location to which people were sharing information or from where they were seeking information.

Table IV shows that both information seeking and sharing occurred frequently on this unit. Patient information was the most frequently sought or shared information on the unit. There were also differences in what channels were used for communication. People were slightly more likely to conduct an individual information workflow to pull medication and patient information from documents while process and staff information were more likely to be sought from people through a group workflow. However, while patient information was more often sought through an individual workflow it was more often shared with people as a group activity. These findings confirm the findings in stage 2 in that people prefer to push patient information to other people, possibly because they want to close the loop to ensure patient information is received and understood.

Similarly, process information was almost exclusively sought and shared through group workflows. During interviews, poor documentation about processes was the primary reason given for why verbal communication channels were used. Providers commented how process information was often not documented in sufficient detail such as inconsistent documentation of why PST was being used and the context of its use for a patient.

Staff information was sought from people more than twice as often as documents, even though documents existed for that specific purpose (i.e. nursing assignment sheet). However, during observations it was discovered that the nursing assignment sheet was not always completed as required:

The Nursing Assignment – Day sheet was not done yesterday. Neither of the two senior RNs who were on the unit completed this. It was discovered later that the previous day it had also not been created in advance. (Observations)

<table>
<thead>
<tr>
<th>Type of information sought or shared</th>
<th>Medication information</th>
<th>Patient information</th>
<th>Process information</th>
<th>Staff information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information seeking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From documents</td>
<td>24</td>
<td>62</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>From people</td>
<td>17</td>
<td>54</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td><strong>Information sharing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To documents</td>
<td>10</td>
<td>43</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>To people</td>
<td>107</td>
<td>306</td>
<td>105</td>
<td>111</td>
</tr>
</tbody>
</table>

Table IV. Information seeking and sharing
We further identified that there was no specific person assigned to complete the Nursing Assignment sheet during the day shift. Because of the inconsistency in the completion of the sheet people may lose confidence in the validity of its information and seek staffing information from people. That finding reaffirms the importance of the interchange between individual and group activities from stage 2 in that incorrectly completed individual activities can lead to group activities.

*Iterative nature of communication*
Finally, as Figure 1 shows, a communication act is often not a one-time event but rather an iterative set of stages. In conducting a communication act an individual may select a particular workflow (e.g. open loop) in stage 2 or channel (e.g. information seeking from a document) in stage 3 but not achieve a successful communication outcome, resulting in him/her trying another workflow and/or channel.

**Stage 5 – common ground and communication**
The fifth stage of a communication act involves the social aspects of communication. Common ground enables a team to communicate effectively because the information being communicated is understood in its proper context. As part of our analysis we identified three specific types of common ground needed to support the communication space. Each type is discussed below.

*Protocol common ground*
Protocol common ground is the common understanding about unit protocols. We identified two types of protocol common ground. First is common ground on communication channels and workflows. As described in stage 1, people need to be aware of the implicit and explicit tasks on a unit as well as what tasks need to have the loop closed. More specifically, people need to be aware of how their individual workflows impact group level activities. For example, closed loop processes such as medication order confirmation and processing need to be done consistently by all people. In stage 2 we described how an issue with medication orders not being seen in a timely manner was causing the administration of medication to be delayed. This lack of protocol common ground led to a ripple effect where people began to conduct unneeded confirmation requests.

Second is the need for common ground around the actual care delivery itself. PST is decided upon and implemented by the entire care team and they must all have common ground around the PST process and how it will be used for a particular patient. Yet, with respect to PST, standard protocols were described as lacking. In interviews, providers acknowledged that a standard protocol does not exist:

> There is not really a standard way of doing it. (pause while thinking). I would usually go to the nurses coming on and give her a shift report. Basically going up and talking to them about it, “this patient has chosen palliative sedation, where do we go from here”, or “this patient is on palliative sedation, they have a Midazolam pump going, they are comatose and comfortable”. Really it is on the onus of the staff, or nurse, or physician, to really collaborate with one another. (Interview, RN1)

But there was also acknowledgment that a standard protocol would help as it would allow everyone to be on the same page for communication about a patient and that trying to communicate without common ground can be overwhelming:

> I: Would a standard way help?

> RN1: Yes, I would think so, especially more so for the difficult cases. Sometimes if no report has been given or the nurse or the team has no idea what is going on with that family or that patient, then it can be overwhelming when you go into that room. (Interview, RN1)
Document common ground

Clinical documentation is a substantial part of the communication space. While face-to-face communication was the most predominant channel used in our study, written documentation becomes the de-facto communication partner when people are not available. There are two components to document common ground. Team members must understand the tools that are available to support communication but they must also understand how to properly use these tools in order to best serve communication on a care unit.

Proper documentation should be written with sufficient detail for people to understand what and why things were done. Yet in interviews providers acknowledged they did not always chart as clearly as they should, because of the prevalence of face-to-face communication to reconcile issues:

I think a lot of our sharing and communication does take place one on one, verbally at rounds or in the hallway or in the nurses’ station. I feel like sometimes my charting is not ideal, but we talk so much about everything that people usually get the gist of what is going on just by talking to each other. (Interview, Healthcare Professional 10)

While clarification is possible in the day shift, it might not be as available on off-shifts such as the evening or night shift. In off-shifts, poor communication means that a physician or pharmacist may have to be paged, which increases the workload for the communication task:

Let’s say the label sent by the pharmacy is not clear, I would call the pharmacy or I would call the doctor. Like in the Evening we need to call the doctor on call, because the doctor is not here. Just to clarify because we do not want to make a mistake, that’s for sure. (Interview, RPN1)

In this example, the additional group workflow activity could have been prevented had the information on the label been clear.

Another consequence of incomplete documentation is that providers may speculate about the intention of a therapy. In interviews two nurses described how even if is not charted explicitly that a patient is receiving PST, they can infer it from the charted medication and dosages. One example is provided below:

I: You can tell [that someone is being sedated] based on the medications that are in the chart?

RN25: Yes, and their strength. Because a lot of our patients are on Versed and Midaz on a low low dose or a breakthrough dose, depending on their anxiety and/or agitation. It is usually the doses and the strength and if it is more regular. (Interview, RN 25)

While providers may indeed be right about their instincts, it does provide the opportunity for patient safety issues and further communication issues if a medication intention is misconstrued.

Terminology common ground

Finally, even if providers have common ground about communication protocols and documents, the actual operationalization of a communication act (i.e. the process of conveying information) also requires common ground. Differences in linguistic understanding can occur across an interdisciplinary team because of training and other professional differences. The wording used in documentation and conversations has been identified as an area that creates the potential for errors because of misunderstandings. Sometimes it is a question of the wording choices that are used by various team members because the underlying assumptions or knowledge base of those team members are not the same, as is illustrated by the quote below:

One of the RNs asked a medical student what a particular phrase in the physician’s charting meant because she had not heard this phrase before and neither had another of the RNs. The medical student stated that the resident had written the note, and explained that the phrase was another
way of saying [phrase the nurses were familiar with]. The medical student suggested that the
difference in phrase could be due to the medical resident’s background in a different physician
discipline. (Observation)

Formal standards for terms should be used wherever possible to ensure terminology
common ground is achieved, as described by the physician in the quote below:

So that even between physicians and nurses, when we’re talking, is my moderate sedation is the
same as your moderate sedation? If we can actually use a formal tool to assess the level of sedation,
to document it, and monitor it then hopefully that improves the kind of discussions between the
team. (Interview, Physician no. 1)

Discussion
This paper provided a model of the healthcare communication space that consists of five
stages of purposes, communication practices and workflows, structures, process/action, and
common ground. While research exists on individual parts of the communication space this is
the first overall model of team-based communication and the healthcare communication space
that integrates the structural and social aspects of the space. The key contribution of our model
is it provides an overall understanding of healthcare communication to enable development of
management protocols that can be shared and compared across different settings.

Our model confirmed existing work (Tang et al., 2015; Coiera, 2014) in that implicit tasks
dominate the communication space. However, our model extended such work by identifying
specific categories (e.g. education and workflow) of implicit communication. Our model also
emphasizes the need to consider the individual activities that contribute to team-based
communication. We make a clear distinction between individual and group workflows and
define communication as a group activity between two or more agents. We believe this
distinction is necessary in order to understand and manage the interchange between
individual and group activities. To that end, this paper contributed a categorization of
communication practices and workflows by individual providers and teams, including
identification of confirmation and clarification as primary reasons for individual
information seeking leading to a group workflow. While clarification tasks may be
needed at times to ensure patient safety, more research is needed on the individual-group
interchange, for example, ensuring that individual workflows adequately close the loop as
part of group communication tasks.

This paper also provides insight for the design of Health information technology (HIT)
to support communication. HIT is often advocated as a tool to improve team-based
communication but we cannot design such tools until we better understand how
communication occurs. The high percentage of implicit communication identified in our
study emphasizes the need for the development of communication protocols as a first step to
developing HIT. While existing HIT such as electronic health records (EHRs) have been
described as a barrier to some aspects of communication (Manojlovich, Adler-Milstein,
Harro et al., 2015), EHRs are primarily designed to support clinical documentation and not
communication. The majority of the tools we analyzed in this study (Table III) only
supported unidirectional information dissemination with inconsistent support for
communication. Communication needs will not be supported by simply implementing
generic charting documents, HIT, or social media tools, but rather we need to design
technology to support specific communication needs such as support for team-based
workflows and tasks such as loop closing as confirmation that a communication request has
been seen by another team member.

This paper also contributes to our understanding of common ground and team-based
communication. Much of the existing research on common ground originated from the general
communication literature. For example, Clarke and Brennan (1991) make a distinction between
grounding and common ground, the latter being the outcome and the former being the process of developing and updating it. Clarke and Brennan (1991) also describe content and process common ground related to conversations. We extend their work by describing management implications of common ground such as identifying different types of it (protocol, document and terminology) that are needed to support the grounding process within a healthcare team and also describing complexity in the grounding process such as how certain contexts (e.g. shiftwork and asynchronous communication practices) impact common ground formation.

The research in this paper begs the question to what extent can technology supplement human communication for supporting team-based processes? We may very well never design technology that does a better job of facilitating team communication and collaboration than face-to-face interactions. However, we need to recognize that off-shifts and asynchronous care delivery are the reality of modern healthcare delivery and the opportunity for face-to-face communication for loop closing or task clarification may be limited. Thus, it is important that we develop communication tools that can support the healthcare communication space. The findings from this study provide evidence for establishing communication protocols and charting standards that support loop closing in order to reduce the need for verbal communication to clarify or confirm tasks as part of team communication. Our model can also help the implementation of models and tools for healthcare teamwork such as ITEM, SBAR and Check-Back in that we provide details for implementing team communication within the models and tools.

Limitations of this study are that our model is based on a study of one clinical unit in a large Canadian city. Different communication tasks or contexts may emerge in other settings. Further, our case study focused on team-based communication in palliative care delivery, which can be a very complex example of communication. While we see similarities between our case study and other complex models of care delivery (e.g. chronic disease management or community-based care delivery) where diverse teams of providers need to communicate over time, it should not be presumed that all healthcare communication acts will be equally complex. Future work will use our model to study team communication in other settings.

Conclusions
The communication space is a significant part of healthcare delivery and we need to better understand it to effectively design solutions to support it. This paper developed an overall model of the communication space that provides an understanding of the workflow, structure and social aspects of team-based healthcare communication. Healthcare teams largely use implicit verbal communication, which can be problematic given the extent of asynchronous care delivery. More attention needs to be paid to the relationship between individual and group communication tasks in order to minimize issues at the individual-group interchange. Further work is also needed on the development of different types of common ground that support team communication.

References


**Corresponding author**

Craig Kuziemsky can be contacted at: Kuziemsky@telfer.uottawa.ca

---

For instructions on how to order reprints of this article, please visit our website: [www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: permissions@emeraldinsight.com