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Integrated Care and the Working Record

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Abstract: By default, many discussions and specifications of electronic health records or integrated care records often conceptualise the record as a passive information repository. This paper presents data from a case study of work in a medical unit in a major metropolitan hospital. It shows how the clinicians tailored, re-presented and augmented clinical information to support their own roles in the delivery of care for individual patients. This is referred to as the working record, a set of complexly inter-related clinician-centred documents that are locally evolved, maintained and used to support delivery of care in conjunction with the more patient-centred chart that will be stored in the medical records department on the patient's discharge. Implications are drawn for how an integrated care record could support the local tailorability and flexibility that underpins this working record and hence underpins practice.

Keywords: case study, integrated care record, patient chart, working record

1 Introduction

For individual healthcare institutions, the proposed benefits from an electronic patient record are widely acknowledged, e.g., [1]. Indeed, the limitations of the paper record are well documented and Korpman's view that 'the paper record is obviously a poor tool for patient care delivery' [2] is shared by many [3]. A common view of the paper record is as a *retrospective information repository* [2,3]: a 'single point of deposition and access for nearly all archival clinical data [and] a passive supporter of clinical activity' [4] that 'fails to meet its essential purpose' [5]. More recently, there has been a growing move towards electronic health record services that integrate patient information across care settings and across care episodes as a life-long record; see for example, Canada Health Infoway [7], Australian Health Connect Project [8] and the National Health Service (NHS) Care Record Service [6,9].

By default, the electronic health record, whether institution-based or life-long, is often conceptualised in the same way as the paper based record above, *as a passive information repository*. Such a conceptualisation of the record as repository deletes by omission another equally valid conceptualisation of the *record at work* in the practical delivery of health care. In institution-based moves to electronic records, acknowledgement for the practical delivery of care is often provided in the form of active elements built on top of the repository functionality such as alerts and reminders and protocol-guided care

[4]. In moves towards more integrated care records, the support for the practical delivery of care is often framed in terms of local tailorability and flexibility. A specific example of this is the UK NHS care record specification which states that ‘the functioning of generic processes across multiple care settings requires an ability to tailor the data items that are collected and the way that information is processed and presented [...] much of this tailoring being done centrally [...] with some tailoring being done at a more local level to recognise specific local needs.’ [6, p7]. While this is encouraging because it acknowledges the importance of local practice, what is not spelt out is what constitutes local needs and when, where and for whom this tailoring should happen.

The focus of this paper is an empirically-derived account of the role of the working patient record through the study of work in a medical unit. The main contribution is to make explicit some of the implicit, taken-for-granted subtleties in how clinicians in one medical unit of a major metropolitan hospital tailored, re-presented and augmented clinical information to support their own roles in the delivery of care for individual patients. In particular, it distinguishes between the archival patient record and the working patient record, of which the patient chart is but a part, that is locally evolved, maintained and used to support clinical practice. Such accounts are important for the future of technology in health care because any move to introduce technology radically impacts the very nature of that care. If we don’t have better understandings of the richness and complexity in the practical accomplishment of work [10], then we won’t be able to co-evolve the design of systems that will fit in with work and the design of new working practices that will take advantage of technology.

Data from the study points to the ways in which local tailorability and flexibility might be supported with new electronic care records through an understanding of how the flexibility and tailorability of the current paper-based chart are appropriated and put to work by different care providers to support their participation in the delivery of care.

The rest of this paper is structured as follows. The case study is set up, describing the methods used and the setting of the medical unit. The following section goes on to describe what constitutes the working record in practice – an evolving distributed collection of complexly inter-related forms, papers and documents that provide clinician-centred views to complement the patient-centred chart. This points to

the flexibility required in the concurrent construction and maintenance of this working record. The following section explores specific characteristics that support this flexible appropriation of the working record. The implications for how flexibility and tailorability could be supported in an integrated care record are then discussed.

2 Case study – methods and setting

Method: An in-depth qualitative study was conducted in the Medical unit of a major metropolitan hospital in Australia. Fieldwork took place over six days across a number of months. The first three days were spent following medical staff, the second three days with nursing staff. Other staff members, such as physiotherapists, pharmacists, etc., were also included as they participated in the work being observed. Follow-up meetings were held with various staff after the fieldwork was completed.

The qualitative methods used for data collection included direct observation, informal questioning of staff as they went about their work, semi-structured interviews, and sitting in on unit meetings and shift handovers. Artefacts such as copies of notes, forms, etc., were also collected; all identifying information was deleted. Photos were taken to illustrate commonly occurring incidences. A grounded theory approach was used to analyse the data.

Setting: The primary setting for this study is a Medical unit spanning two wards in a tertiary-level public hospital in Australia. The unit is headed up by the physician in charge, and supported by the registrar and the resident. Their patients are mostly located in one of two wards. On admission, patients are sent to a special ‘assessment and planning’ ward, which will be referred to as Ward A (for Assessment), for up to 24 hours. Here initial assessments are made, diagnoses postulated, treatment plans devised, referrals to ancillary services organised and first visits arranged. The patients are then transferred to the medical ward, called here Ward M (for Medical) for the duration of their care.

Wards A and M are staffed by nurses who work variable shifts; except for those in more supervisory roles, each nurse is allocated a number of patients to care for during a shift. A designated social worker, physiotherapist, pharmacist and other allied health personnel also form part of the medical unit team. Members of the multi-disciplinary team hold Unit meetings once a week to review all the patients in the

ward. The staff members also have close relationships with other teams such as the Stroke Service team who are called in as required. Cross referrals to other units are also commonplace. Together, these people could be regarded as a care cluster [11] responsible for the care of the medical patients on the wards.

3 Flexibility in concurrent construction and maintenance of the working record

What became clear from very early in the study was that the *archival patient record* was very different to the diverse collection of documents and forms used by clinicians to constitute, what is termed here, the *working patient record*. When an episode of care was completed for a patient, the account of that care was archived in the patient chart; in this hospital, the patient chart was a buff-coloured folder with various organisationally-sanctioned forms and notes, carrying medico-legal status, that were separated into episodes, which in turn were separated into sections.

1.0 The working patient record as a diverse distributed collection

In the practical delivery of care *during* the patient episode, the *working* patient record is centred on the contents of the official buff coloured chart and its associated forms distributed to the folder hanging at the end of the patient's bed. Each member of the care team contributes to the information collected in the official patient chart through progress notes or examination notes or signatures signifying delivery of certain medication or procedures and so on. But the working patient record is also much more than this.

While clinicians worked with the chart, they also worked with various other systems and pieces of paper reflecting their own view of the patient and their role in the care of that patient. Nurses, for example, used multiple pieces of paper. At the beginning of each shift, they would print out or write out a list of all patients in the ward with key information about bed number, diagnosis, age, etc as a ward overview sheet (see Figure 1). If they already had an overview list from the previous day, they might choose instead to update that list, using corrective ink for example to delete a patient who was no longer there, and writing in the new patient on top. This provided a visible history of the status of the ward and made new patients easily identifiable.

Figure 1: One nurse's changeover report, also called ward overview notes (patient names deleted).

They would also write out a more detailed list of those patients they were responsible for that shift, often using a 'Nurses Work Sheet' laid out as a matrix of patients and activities to be carried out.

Figure 2: Physiotherapist's notebook (names deleted); ticks indicate tasks to be performed, crosses tasks completed.

The physiotherapist in the ward had her own work book, in this case a small notebook as shown in Figure 2. Each page was drawn up by hand into a number of columns and was updated daily to reflect current patient status and the activities to be performed for each. The pharmacists had their own patient profile sheet, shown in Figure 3, that was based on a pre-printed template and was filled in for each patient.

Figure 3: Pharmacy department patient profile form

All these, and many more variations, constituted the working record, along with the contents of the buff chart, through which that patient's state and care were negotiated, interpreted, represented, communicated, and acted upon. The forms discussed above provided *clinician-centric views* of work. They were carried around by the individuals concerned who actively annotated them, updated them and referred to them throughout the course of the day to help them plan and manage their work.

2.0 Degrees of formality across forms

Various degrees of formality co-exist in this working record. Some parts are organisationally-sanctioned forms that will end up in the official archived version of the record, such as the progress notes in the chart and the observation and medication sheets that are kept at the end of the bed while in active use. Others semi-official forms have been developed locally to meet specific needs. The pharmacy profile form, for example, was developed by the pharmacists to provide an abstracted view of the patient from the perspective of the medications that the patient has been prescribed. The Stroke Management Service and others have similarly constructed service-specific forms.

There are other organisationally-recognised forms that can be printed out from the information already available in the hospital corporate information system, such as an up-to-that-minute 'Inpatients by doctor' list and a 'Nursing Changeover Report' that includes predefined columns to can be filled in by hand.

Other forms have even more local contexts of use and no formal recognition within the organisation. The physiotherapist's notebook is one example. Another is the 'unofficial' Nursing Changeover Report that was developed by one nurse as a template for his own use and that gradually came to be photocopied and shared around; it is now widely used in preference to the computer-generated form above because the nurses find it more useful. Other forms are in the process of being developed. For example, there is a trial version of a printed 'Food/Fluid Chart' developed in Ward M by the nursing staff and there is a one-off 'Stool Chart' drawn up by hand on the standard progress notes form for use with a particular patient.

3.0 Multiple concurrent interdependent views

What is more relevant than any distinction between formal and informal is understanding how all these parts of the working record are brought into play together and become actively embedded in the very *doing* of patient care. The clinicians' practical accomplishment of patient care 'on the ward floor' is carried out through their active construction, integration and interaction with various components of the working record as relevant. As such, the working record is more than passive archival views over post-hoc data. It is made up of both patient-centric and clinician-centric views over the information that are concurrently constructed and evolved by each person involved in that patient's care. These multiple working views are both interdependent and independent. The content of the patient-centric buff chart serves as a focal point for many of the interdependencies. However the common information is appropriated, added to, and used in role-specific or purpose-specific ways over time, hence the evolution and independence.

The morning ward round in Ward A is an example of concurrent construction of different parts of the working record at the same time and place. The admission round is usually attended by some combination of the consultant physician, registrar, resident, pharmacist, social worker, physiotherapist, the Ward A nurse looking after that patient, and the Case Manager nurse from Ward M. At each patient's bedside, the

registrar relates the patient's story and the group then discuss the case. Each of the people in the round make their own notes: the registrar records the the provisional diagnosis and treatment plan in the progress notes in the buff chart; the resident fills out the management plan and writes up any new drugs to be ordered on the medication sheet that currently sits in the folder at the end of the bed; the pharmacist fills out the Pharmacy Department Profile; the Ward A nurse annotates her notes with new actions; the Ward M Case Manager annotates his list with information that will impact on when and where the patient is transferred; and so on. The weekly Ward M meeting and the Stroke Service meeting, both multi-disciplinary, are other occasions for the simultaneous construction and evolution of the working record. Other forms such as observation sheets or changeover notes are constructed and evolved concurrently but at different times and places during the patient episode.

Interdependencies also arise through 'transformations' between different components of the record. The Case Manager transforms the notes made during the Ward A round into entries onto the Ward M patient/bed allocation board and into dialogue with the nurse who will be responsible for that person's care after transfer. Working notes made by the doctor on the 'Inpatients by Doctor' form are transformed into entries in the progress notes, into written orders for pathology tests, and so on.

As obviously expected, these various forms tend to share some common information such as the patient's name, and number, perhaps diagnosis, etc. Most of this information is sourced from the patient chart; in this way the chart acts as a central reference document. But while the buff coloured chart provides the focus or pivot, it does not represent the totality of the record at work; the working record is made up of an evolving interdependent network of relationships among the concurrently constructed documents, maintained by the people who use them.

In summary, the parts making up the working record vary in interesting ways beyond degrees of formality and structure and content:

Different forms have *different authors/custodians*. While the progress note sheets in the buff chart are collectively authored, other forms have more specific sub-sets of authors/custodians. Ownership often reflects role, e.g., nursing or medical, or team, e.g., the Stroke Management Service. Yet other forms such as the 'Inpatients by Doctor' list have individual authors/owners.

Different forms are written with *different intended audiences* in mind. Progress notes in the buff chart are intended to be read by other clinicians during the episode of care and also beyond that episode for purposes of accountability and so on. Annotations made on the 'Nursing Changeover Report', on the other hand, are only intended for personal use.

Different parts of the working record also have *different intended life-spans*. Progress notes and observations sheets, for example, become part of the archived version stored for as long as government legislation requires. By contrast, the nurse's work sheet tends to be thrown out at the end of a shift.

Different forms have *different 'home' locations*. The home locations mostly reflect the intended authors and/or audiences and tend to facilitate ease of access for these people. The buff chart, for example, is usually found at the nurses' station so that it is accessible for all care providers; the Pharmacy profile is held in the Pharmacy Department because they are the only people who make use of it; while the nurse's work plan is always carried on their person, e.g., in a pocket.

Different parts of the working record serve *different purposes*. Apart from the more obvious medico-legal purposes of the formal archival component, clinicians construct the various forms above to serve many other purposes, e.g., as memory prompts (notes in pocket), time management tools (nurse's work sheet), at-a-glance overviews of ward status (nursing changeover report, where individual patient information is clustered in the one representational form), directed communication media (to be discussed in following section), value-added role-specific views (physiotherapist notebook), giving work progress visible form (by crossing things off Work Sheet etc.), offloading things from memory [12] (by making progress notes on a piece of paper that will later be transferred to the patient chart) and so on.

The clinicians' practical accomplishment of patient care is carried out through the active construction, integration and interaction with all the components of the working record as relevant. The buff chart, the formal archival view of that patient's care, will be stored in the medical records department on the

patient's discharge. To some extent it captures the shared patient-centric processes and information components across multiple care providers but the various other parts of the working record, as just described, constitute the practical ways that different clinicians currently make use of a range of paper and computer-based resources to tailor the data items that are collected and the way that information is processed and presented to support their own roles in the delivery of that care.

4 Flexibility in how people appropriate forms

The physical nature of paper that is used as part of the working record affords a type of flexibility and clinicians make implicit use of this flexibility. The following discussion outlines some of the characteristics of paper, with examples showing how those characteristics supported local tailorability in this medical unit.

People *flexibly interpreted and used forms* as they wanted or needed. While many of the forms were set out as structured templates, the clinicians often left fields blank or added free-form annotations, evolving the formal 'purpose' of the form to meet their own needs.

People appropriated forms differently depending on *personal preferences*. The nurse's work sheet, for example, was drawn up in functional columns of common activities that need to be carried out for the patients assigned to that nurse, e.g., mobilisation, feeding, observation, and medication. However, eight out of nine nurses using this form on one shift had re-formed the columns into time periods by crossing out the functional titles on columns and replacing them with times, e.g., 0800, 0900, to give a temporal rather than functional view of their work.

Figure 4. Extract from a patient medication sheet illustrating overlaid conversations and attached post-it note.

People also *overlaid forms with additional functionality*, often to create more directed modes of communication located at the point of care. A telling example is the extract from a medication sheet, shown in Figure 4. Despite being a medico-legal form that will be filed in the archival chart, this extract shows several examples of embedded conversations/communications around the formal

medication orders. There is an ongoing discussion about whether a particular drug was kept in the fridge or not, written in different coloured pens by different authors; a yellow post-it note is attached to the right of the page with a request for an order to be corrected; and a written note is made to indicate the patient has their own supply of another drug. What is interesting is that none of these annotations are signed, yet people in the ward knew how to read them and made reasonable assumptions about who made the notes.

People also took advantage of the *ready adaptability* of paper and the *direct control* that it offers them for meeting local needs in a timely responsive way. With minimal word processing skills, the nursing staff were able to evolve and trial different iterations of the Food/Fluid chart or, with the stroke of a pen, they were able to draw up their one-off stool chart.

Many of these observations resonate with findings from other qualitative study reports about the features of paper that afford interaction and communication. From studies in a General Practice surgery, Heath and Luff [13], for example, characterise paper as being manipulable, portable, dismantlable, ecologically flexible, and tailorable. Sellen and Harper [14] conclude similar good reasons for using paper and include it being easy to mark and annotate and shows a history of ways in which it has been tailored. Coiera [4] also notes the portability of paper and its ability to support both formal and informal communication.

In summary, local flexibility and tailorability is largely afforded by the physical nature of the paper forms that are appropriated as part of the working record; the physical nature of the working record as an artefact plays a more active role in the practice of healthcare and in communication and coordination than most clinicians are consciously aware of.

5 Implications for Integrated Care Records

What does all this mean for integrated care records (ICRs)? From this study we can draw out two general implications. Firstly, there is no such entity as *the* record in practice. For the medical unit studied here, the 'record at work' was a distributed collection of complexly inter-related forms, papers and documents; the buff coloured chart that will eventually be stored in the Medical Records department is only a small portion of this set. The practical accomplishment of care is only achieved through the skillful

construction, integration, interpretation and communication of information across all these sources by individuals working in relationship with others. It is not only the content but the tangible form of the various parts of the record themselves that is embedded into the milieu of practice.

Secondly, in becoming more explicit about the notion of record underpinning care record development, it would be useful to at least conceptually separate the underlying patient-centric data structures from the clinician-relevant processes and practices through which clinicians capture, access, re-present and use that data to support their own practical delivery of care – support for local tailorability and flexibility is required at this process and practice level. This is in line with Reddy et al [15] who argue that ‘computer systems offer the ability to decouple information from its representations. This decoupling opens up a rich design space for systems that allow people with different interests, concerns and work practices to work together effectively.’

Support for clinical practice is often framed in terms of functionality such as decision support and enactment of clinical pathways. Complementary support could be considered in terms of the following questions that reflect needs for local tailorability and flexibility:

- *How can the care record support concurrent clinician-centred views* that are interdependent yet independent for different clinicians? What information is common and core and what information is relevant to specific individuals or roles? To what extent can different degrees of formality be supported? Factoring into this is consideration of who are the authors or custodians of the data, who are the intended audiences, what is the intended life span of the information, whether it will eventually become part of the archival record or reside in some other home location?
- *To what extent will local responsiveness be supported?* Is it possible to provide template facilities and ways of isolating effects so that staff on wards could draw up new forms as needs arise for local purposes or for iteratively prototyping new forms? Is there a balance to be found between standardisation and allowing staff to deal with local needs in a timely structured way?

- *Given the obvious portability and usefulness of paper, is there an evolving role for paper as part of a care record solution?* The computer system currently in place in this medical unit supported ongoing use of paper by letting people print out forms such as the ‘Inpatients by Doctor’ list or the ‘Nursing Changeover Report’. Given the wide range of individual preferences in what forms people used and how they used them, is it possible to give clinicians personal profiles where they could specify, for example, that they preferred their work sheet structured by time not functional activities? Accepting the ongoing use and value of paper forms as a considered design direction could also open up new ways of integrating paper with computer systems, for example, through electronic paper [16], digital pens [17] and digital ink [18].
- *To what extent can conversations about the work at the point of work be supported*, as was seen with the medication sheet example? While a full discussion is beyond the scope of this paper, the flexibility of current paper-based systems to support such conversations is important for communication among clinicians. How will an integrated care record provide communication support [19]?

6 Conclusions

Coiera states that ‘the result [from the creation of electronic records] has sometimes been that systems have been designed primarily for data collection, rather than for use by healthcare workers in daily clinical practice’ [4, p282]. The move to integrated care records, and a concern for local tailorability and flexibility, provides an opportunity to rethink care records from the perspective of practice. Tailorability and flexibility can be considered at a level of granularity that takes account of the ‘*record at work*’, not just the archival record, and that supports the *people* on the ward floor who do the local processing and re-presenting of information to support their own practical engagement in direct patient care.

Further, it provides an opportunity to interpret integration not just as integrating care across care settings and care episodes but also integrating care within a care setting across different clinicians; the multiple concurrent parts of the working record centred around the common patient chart represent a microcosm of the integration issues in the broader structural context of health care. The challenge is to provide

clinician-centred support for their role in the delivery of care while providing a patient-centred coherence to that care both within and across settings.

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8 References

- 1 Mount CD, Kelman CW, Smith LR, Douglas RM. An integrated electronic health record and information system for Australia? *Medical Journal of Australia*. 2000; 172: 25-27.
- 2 Korpman RA. Patient Care Automation: The future is now; Part 2. The current paper system – can it be made to work? *Nursing Economics* 1990; 8 (4): 263-267.
- 3 Dick RS, Steen EB (eds). *The Computer-Based Patient Record: An Essential Technology for Health Care*. Washington DC: National Academy Press; 1991.
- 4 Coiera E. *Guide to Medical Informatics, the Internet and Telemedicine*. London: Chapman and Hall Medical; 1997.
- 5 Korpman RA. (1990) Patient Care Automation: The future is now; Part 3. The five rules of automation. *Nursing Economics* 1990; 8 (5): 345-349.
6. Integrated Care Record Service (ICRS) Part II – LSP Services: Output Based Specification Second Iteration. NHS National Programme for Information Technology; August 2003. Available at <http://www.dh.gov.uk/assetRoot/04/07/16/32/04071632.pdf> August 2003. Accessed April 14, 2004.
7. Canada Health Infoway - <http://www.canadahealthinfoway.ca/home.php?lang=en>. Accessed April 14 2004.
8. Health Connect - <http://www.health.gov.au/healthconnect/>. Accessed April 14 2004.
9. Department of Health Output Based Specification for Integrated Care Record Service - http://www.dh.gov.uk/PolicyAndGuidance/InformationTechnology/NationalITProgramme/NationalITProgrammeArticle/fs/en?CONTENT_ID=4071618&chk=FzV2Cm. Accessed April 14 2004.

10. Hartswod M, Proctor R, Rouncefield M, Slack R. Making a Case in Medical Work: Implications for the Electronic Medical Record. *Computer Supported Cooperative Work*. 2003; 12: 241-266.
11. Habing N, Dietz J, Zwetsloot-Schonk B. Activity Patterns in Health Care – Identifying Building Blocks for the CPR. *SIGGROUP Bulletin* 2001; 22 (2): 9-15.
12. Scaife M, Rogers Y. External Cognition: how do Graphical Representations Work? *International Journal of Human-Computer Studies* 1996; 45: 185-213.
13. Health C, Luff P. Mobility in collaboration. In CSCW'98 Proceedings of Computer Supported Cooperative Work Conference 1998; Seattle WA. ACM Press; 1998; p. 305-314.
14. Sellen A, Harper R. Paper as an analytic resource for the design of new technologies. In *CHI'97 Proceedings of Computer Human Interaction Conference* 1997; Atlanta GA. ACM Press; 1997 p. 319-326.
15. Reddy MC, Dourish P, Pratt W. Coordinating Heterogeneous Work: Information and Representation in Medical Care. In *Proc. of the European Conference on Computer Supported Cooperative Work (ECSCW'01)*. 2001; Bonn. Kluwer; p. 239-258
16. Electronic paper. See <http://www.media.mit.edu/micromedia/elecpaper.html>. Accessed April 14 2004.
17. Digital pen. See <http://www.anoto.com/>. Accessed April 14 2004.
18. Digital ink. See <http://www.cs.cmu.edu/People/wearable/ink.html>. Accessed April 14 2004.
19. Coiera E. When conversation is better than computation. *Journal American Medical Informatics Association* 2000; 7: 277-286.

