

Abstract

Purpose: The objective of this review was to address two research questions: What is evidence-based best practice for intra-hospital inpatient handovers? What areas need further research? We took a particular interest in the interpersonal skills involved in successful handover, theoretically-based approaches to implementing improvements in handovers, and whether there is sufficient data to construct an evaluation methodology.

Design: Narrative synthesis based on search of PubMed, CINAHL and the Cochrane Library.

Findings: We identified 82 papers, comprising 29 implementation studies, 13 conceptual models or improvement methods, 5 subject reviews and 35 background papers. None of the studies met the normal parameters of evidence-based medicine, but this is unsurprising for a complex healthcare service intervention.

Limitations: We only reviewed papers published in English between 2000 and July 2010 that were indexed in CINAHL, Medline or the Cochrane Library or found opportunistically. We did not search any grey literature or hand-search any journals.

Practical implications: The evidence is sufficient to justify widespread adoption of the guiding principles for inpatient handover best practice, provided that concurrent evaluation is also undertaken.

Originality/value: This is the first comprehensive review published in the peer-reviewed literature that examines the evidence base for the practice of inpatient handovers across healthcare professions and specialties.

Additional files: table of 82 papers

Category: Literature review

Keywords: Handover, review, communication, care continuity, pathway

Evidence-based inpatient handovers – A literature review and research agenda

Introduction

Background

What is handover? One dictionary definition of the English word is: “the transfer of power from one person or group of people to another” (Chambers, 2001). In healthcare contexts, the term can be used to mean any transition in patient management between stages in a care pathway or between teams dealing with continuing or concurrent care activities. The definition given by the UK National Patient Safety Agency, also adopted by the Australian Medical Association, is: “the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis” (BMA, 2004). This can include such diverse transfers as: primary care referral to secondary care or diagnostic services; ambulance service handover to emergency department; intra-hospital transfer between wards/departments, referral to a specialist service or handover of responsibility from one shift to the next; inter-site patient re-location; or patient choice to change healthcare provider. Because of widespread concerns about the effects of shift working and reductions in medical trainee working hours in hospitals, this paper concentrates on intra-hospital inpatient handovers.

Development of standard procedures for communication in patient handovers is one of the World Health Organization’s top five priorities for improving patient safety (World Health Organisation, n.d.). Australia has taken the international lead in working on clinical handovers through a programme of studies funded by the Australian Commission on Safety and Quality in Healthcare (ACSQHC) (Jorm, White & Kaneen, 2009). A European Union (EU) project on clinical handover is in progress at the time of writing (Barach & Pijnenborg, 2010). However, the EU project is focussed on the interface between primary care and hospital so although it offers potentially transferable insights about evaluation of process improvement methodologies (Lilford et al., 2010), it is not strictly in scope for this review.

Importance

Why is handover an important topic for clinical governance? Reduced to a bare minimum, the essential fact of transfer intrinsically requires a *change of professional responsibilities* and a *transmission of information*. Whatever the clinical context, there is necessarily a set of risks to patient safety associated with each change and transmission. The precise terms and scope of the change of accountability must be unambiguous to all concerned and the information must be complete, accurate and adequately communicated.

Hospital handovers have long been identified as a crucial point of risk in the patient journey, with concerns about the quality and reliability of the process and information content (Roughton & Severs, 1996). Inpatient handovers are often performed separately by nursing teams and medical teams and both are frequently pressured by time constraints (O’Connell, Macdonald & Kelly, 2008) and miss important information due to poor structure and process (Bomba & Prakash, 2005). In the UK, concern has frequently been expressed about the worsening discontinuities in hospital care arising from rigid shift changeovers imposed to satisfy the European Working Time Directive (Goddard, 2010; Goddard, Hodgson & Newbery, 2010; Lister & Rose, 2010; Royal College of Physicians of London, 2010).

Is further research needed on this topic? Extensive professional guidance has been recently published, notably in the UK (BMA, 2004; Royal College of Physicians of London, 2008a, 2008b; Royal College of Surgeons of England, 2007) and Australia (ACSQHC, 2010; Australian Medical Association,

2006). Yet the evidence base is limited (Jorm & Iedema, 2008) and good practice is by no means universally known or embedded in routine healthcare processes and culture. Reported success in handover improvement seems to be limited to specially funded projects (see for example Skills for Health, 2009).

We undertook an extensive literature review that aimed to address two research questions:

- What is evidence-based best practice for intra-hospital inpatient handovers?
- What areas need further research?

Given the volume of professional guidance on information content and formal protocols, we took a particular interest in the interpersonal skills involved in successful handover and whether there is sufficient data to construct an evaluation methodology. We were also interested in any theoretically-based approaches to implementing improvements in handovers (ICEBeRG, 2006). This paper presents our methods, summary results and an overview of our synthesis and conclusions.

Methodology

Search and selection strategy

We undertook a narrative synthesis (Popay et al., 2006; Pope, Mays & Popay, 2007) of the peer-reviewed medical and nursing literature as indexed in PubMed and CINAHL respectively. We also searched the Cochrane Library, but we did not explicitly search any grey literature. The literature search was undertaken in July 2010.

The search strategy we adopted was to identify papers published in English since 2000 with the word “handover” in the abstract. We did not use the American word “handoff” or cognate terms in our search. We filtered the results using the selection criteria that the abstract critically discussed the *information content or method* of intra-hospital inpatient handovers and offered definite conclusions. We obtained full text papers from the index searches that met the filter criteria.

We decided to include emergency admissions with handover from paramedic teams to the emergency department as the ‘boundary case’ of meeting our criteria for “intra-hospital” as these do physically occur within the hospital and are largely based on interpersonal communication (whereas elective referrals from primary care and discharges from hospital to primary care were excluded as they primarily depend on written communication). We used a flexible definition of ‘hospital’ to include any clinical setting that was residential rather than ambulatory, as the common distinguishing characteristic is the requirement for round-the-clock continuity of care .

Data analysis

We devised data extraction forms for the filtering stage (abstract review) and the detailed full paper review. Data extraction and filtering was undertaken by the lead author and reviewed by both co-authors. Discrepancies were resolved by mutual agreement with the option of independent review by another member of the research group. The analysis and inferences were iteratively reviewed by all authors and other reviewers within our institution.

Quality appraisal

The primary appraisal was the category of paper. We divided papers into (1) implementation studies with evidence of effectiveness, either of existing practice or an intervention to improve handover, (2) papers presenting improvement methods or conceptual models of the problem space, (3) subject

reviews and (4) general background papers, including reports of identified problems with existing practice. Our review concentrates on implementation studies, proposed models and prior reviews.

For implementation studies we devised a simple quality appraisal matrix using a subset of elements from the STROBE (von Elm et al., 2007) and TREND (Des Jarlais, Lyles & Crepaz, 2004) checklists, comprising: hypotheses, study design, sample size, outcome variable(s), effect size, statistical methods and limitations. Based on these attributes we reached subjective ratings of three summary quality measures selected from qualitative assessment frameworks (EPPI, 2009; Pope, Mays & Popay, 2007; Spencer, Ritchie, Lewis & Dillon, 2003):

- Credibility (internal validity; the extent to which the data robustly supports the conclusions)
- Transferability (external validity; the degree of reliable generalization to other settings)
- Transparency (the explicitness of the study evaluation criteria and process).

We appraised the conceptual models by classifying their clarity, utility and maturity. The clarity attribute subsumes the two aspects of consistency and parsimony listed by ICEBeRG (2006), and “utility” is equivalent to their term “usefulness”. By “maturity” we denote the developmental status of the paradigm. This forms a continuum starting from speculative hypotheses, through a mid-range of grounded theories or experimental improvements, through to models that have been prospectively validated in clinical usage. We also categorized whether the model presented itself as explanatory, predictive or normative.

We did not make a formal quality appraisal of the subject reviews but do discuss their strengths and limitations below.

Synthesis

We used a range of techniques to form our synthesis of the evidence, guided by Popay et al. (2006). Initially we constructed a tabular analysis of the studies, and then consolidated recurring conclusions into a thematic classification. We used concept mapping diagrams to explore relationships in the data and look for moderator variables (relating what works for whom, where) and conceptual triangulation. We used the papers we had categorized as background to derive contextual issues and dimensions of practice not covered in the implementation studies and concept papers.

Results

Figure 1 summarizes the results of the review process. In total, eighty abstracts were selected for full text review from the literature searches. Sixteen were excluded at this stage as they did not meet our selection criteria. Eighteen ‘snowball’ references were added to the review scope as they offered implementation studies, conceptual models or subject reviews. We did not pursue secondary references that only gave further background information. The eighty-two papers are summarized in additional file 1. Omission of “handoff” and cognate terms from our search strategy may have led to American literature being under-represented in this review.

There is, to our knowledge, no systematic review published in the peer-reviewed literature that examines the evidence base for the practice of inpatient handovers across healthcare professions and specialties. Lyons, Standley & Gupta (2010) presented a useful summary table of fifty-one papers on clinical handovers in the introduction to their paper but did not portray this as a systematic review and did not offer quality appraisal or critical synthesis. Cohen & Hilligoss (2010) reported on weaknesses in the literature on handovers, based on their unpublished review (Cohen & Hilligoss, 2008). We found two references (Hill & Nyce, 2010; Jenkin, Abelson-Mitchell & Cooper, 2007) to reviews documented in unpublished MSc dissertations (Hill, 2010; Jenkin, 2005) but we

have not yet appraised these. The only thorough subject reviews generally available are Cohen & Hilligoss (2008), Wong, Yee & Turner (2008) and Nagpal et al. (2010). The 2008 reports reviewed papers that were indexed in Medline, but the reviews are not themselves indexed in Medline or CINAHL so we only encountered them as secondary references. There has been a considerable body of literature published since then, some indexed in CINAHL rather than Medline. The systematic review by Nagpal and colleagues, specifically limited to surgery, was included in our synthesis. We also included two sub-topic reviews: a systematic review of mnemonics used to structure the content and process of handovers (Riesenberg, Leitzsch & Little, 2009) and a literature review of inpatient handovers specific to palliative care nursing (Messam & Pettifer, 2009).

[Insert figure here]

Figure 1 – Literature review process

Tables 1-7 summarize the provenance of the reviewed papers, the study designs, subject professions and clinical settings of implementation papers and our subjective quality appraisals. (Several studies considered multiple healthcare professions so the sum total of Table 4 is higher than 29.)

Year	Background	Implementation	Models	Reviews	Total
2010	2	4	4	1	11
2009	6	12	6	2	26
2008	10	3	2	1	17
2007	7	5	1	0	13
2006	1	1	0	0	2
2005	2	2	0	0	4
2004	1	0	0	0	1
2003	0	1	0	0	1
2002	4	0	0	0	4
2001	2	0	0	0	2
2000	0	1	0	0	1
	35	29	13	4	81

Table 1 – Categories of paper by year of publication

Country	Background	Implementation	Models	Reviews	Total
Australia	12	11	7	1	31
Canada	1	1	1	0	3
Denmark	0	1	0	0	1
Europe	1	0	0	0	1
Germany	1	0	0	0	1
Ireland	0	1	0	0	1
Netherlands	0	1	0	0	1
New Zealand	1	0	0	0	1
Saudi Arabia	1	0	0	0	1
Sweden	0	0	1	0	1
UK	15	14	2	2	33
USA	3	0	2	1	7
	35	29	13	4	81

Table 2 – Categories of paper by country of origin

Study design	n
RCT	1
Quasi-expt: pre-post	13
Quasi-expt: simulation	1
Obs: Retrospective cohort	1
Obs: Cross-sectional	9
Qualitative	4
	29

Table 3 – Study designs of implementation reports

Profession	n
Doctors	21
Nurses	16
Paramedics	1
Pharmacists	2
Therapists	1

Table 4 – Subject professions of implementation reports

Setting	n
Acute care	10
Ambulance-ED	1
Surgery	5
ED	1
ICU	4
Simulation	2
ED-ICU	1
Care home-ED	1
Stroke unit	1
Maternity	1
Geriatric	1
Oncology	1
	29

Table 5 – Clinical settings of implementation reports

	Credibility	Transferability	Transparency
High	16	1	10
Medium	12	26	14
Poor	1	2	5
	29	29	29

Table 6 – Quality appraisal of implementation reports

	Clarity	Utility	Maturity
High	9	4	1
Medium	4	8	12
Poor	0	1	0
	13	13	13

Table 7 – Quality appraisal of conceptual models

Discussion

Overview

There has been an explosion of interest in inpatient handovers since 2007: only fifteen papers in our selection from 2000-06, yet over ten in every year since then. This largely flows from the major research investment by the ACSQHC (38% of included papers were from Australia) and concerns about the effects of the European Working Time Directive on medical shift working.

Most studies concern general acute hospital handovers; very few are specialty-specific apart from Emergency Departments, Intensive Care Units and Surgery. Studies seem fairly evenly spread between the principal healthcare professions but there is relatively little evidence within allied health professions. Most study conclusions related to one of four main themes: common problems (information loss, insufficient time and frequent interruptions), structure and process (formalized protocol, defined information set), indirect functions of handover (social and emotional support, education) and critical success factors (communication skills, training).

Evidence-based best practice?

Our review has found no evidence that can be regarded as high quality according to the usual parameters of evidence-based medicine (CEBM, 2010). Even the one RCT we found was a simulation. Therefore the 'strongest' evidence comprises a mixture of quasi-experimental and observational designs. However, for ethical and practical reasons it is seldom feasible to use randomised controlled study designs for complex service interventions (Craig et al., 2008; Shiell, Hawe & Gold, 2008). A pragmatist, pluralist approach has been recommended for health informatics research methodology (Jeffcott, Evans, Cameron, Chin & Ibrahim, 2009; Kaplan, 2001; Scott & Briggs, 2009b).

The nature of the existing evidence base reflects both the immaturity of the field and the kind of knowledge that is attainable for contingent and adaptive social interactions. Similarly, Riesenber, Leitzsch & Little (2009) concluded that the evidence on handover mnemonics was insufficient to synthesise recommendations on best practice. The OSSIE guide to clinical handover improvement (ACSQHC, 2010), a consolidation of the work of the Australian programme, emphasized that most factors (apart from the benefits of face-to-face communication and improved documentation) are not strictly evidence-based. Cohen & Hilligoss (2010) echoed this conclusion and suggested that even the meaning of 'standardisation' remains poorly defined.

While there is no 'properly' evidence-based best practice for intra-hospital inpatient handovers, we suggest that the recurring themes from our literature review do provide a set of guiding principles. These are summarized in Table 8, showing general themes and some useful specifics. Many of these points echo the OSSIE document which we commend to readers as the best available consolidated guidance for a handover improvement programme, offering a substantiated *approach* if not ready-made solutions. (OSSIE is an acronym for the recommended 'phases' of improvement: **o**rganizational leadership, **s**imple solution development, **s**takeholder engagement, **i**mplementation, **e**valuation and **m**aintenance.)

General theme	Specific suggestions
Structured protocol and information content	<ul style="list-style-type: none">• Be alert to potential disadvantages:

	ineffective mnemonics, protocol not fitting the patient
IT solutions can support handover by imposing structure and improving recall	<ul style="list-style-type: none"> • Free text entry is insufficient • Need flexible views to support multiple use cases • Need to embed contextual nature of information
Formal education in communication skills and professionalism	<ul style="list-style-type: none"> • Consider areas of tacit knowledge • How to deal with interruptions
Socio-technical approach	<ul style="list-style-type: none"> • Listening and informing rather than telling and directing • Need user-centric/socio-cultural not info-centric design approach
Continuous quality improvement	<ul style="list-style-type: none"> • Reflective analysis can improve structure, protocols and atmosphere
Cultural issues	<ul style="list-style-type: none"> • May need to manage tension between nurses' preference for standardisation and doctors' predilection for unwritten rules • Disciplines/specialties vary in their pace of work and predictability of patient pathways • Resilience theory fits the complexities of healthcare more effectively than principles of high reliability
Improve cooperation between teams/within multi-disciplinary team	<ul style="list-style-type: none"> • Need common language between teams • Are multi-disciplinary handovers feasible?
Involve patients (or carers) where appropriate	<ul style="list-style-type: none"> • Inappropriate in some cases, for example some palliative care patients
Indirect functions of handover	<ul style="list-style-type: none"> • Consider the social and emotional support function (particularly reported by nurses) • Consider the educational value

Table 8 – Guiding principles

Limitations

This review was limited to papers published in English between 2000 and July 2010 that were indexed in CINAHL, Medline or the Cochrane Library or found opportunistically. We did not search any grey literature or hand-search any journals. Authors might question our subjective categorization or quality appraisal of their papers. We only used the single word 'handover' in our literature searches rather than any cognate terms.

Conclusions

Sufficiency of evidence

The problems of traditional methods and the benefits of improving the structure and process of inpatient handover are well understood. There is some evidence about the indirect functions of handover and isolated evidence that structured handover can in some cases worsen communication.

The appropriate outline for handover information content seems to be reasonably well established by national guidance, for example from the RCP in England and the ACSQHC in Australia.

It has been debated whether health service interventions lacking clear evidence of net benefit should be implemented and evaluated (Crump, 2008) or not implemented unless pessimistic analysis suggests that benefits will obviously outweigh costs or potential harm even in the worst case scenario (Landefeld, Shojania & Auerbach, 2008). We suggest that given the ‘checklist effect’ (Friedman & Wyatt, 2006) of applying a protocol to a previously weakly structured activity, the worst result of applying the general principles identified in this paper, earlier reviews and the OSSIE guide would still be a significant improvement in handover practice. In other words, the evidence is *good enough* to support widespread adoption.

However, what is now needed is rigorous quantitative and qualitative evaluation of implementation in diverse healthcare settings and ecosystems. We also suggest that existing subject reviews of inpatient handovers should be referenced in the Cochrane Library to facilitate wider awareness.

Achievability

The progress in Australia followed major focus and funding from a government agency working under the aegis of the World Health Organization. Can this be replicated in health services that are under dire financial pressure or those lacking strong central governance? The OSSIE guide is clear that “adequate resources must be provided” (page 12). Arguably, this is high-value work that should attract the attention of both healthcare commissioners and agencies funding health services research and development given its potential to improve quality, reduce risk and maximize operational efficiency.

Further research

We believe there is a broad range of research questions that warrant further work, a selection of which is shown in Table 9.

- Can we formulate an evidence-based instrument to evaluate the effectiveness of a handover?
- What is the rate of harmful events caused by failings in handover and can a study practicably be powered to detect significant improvements? (Kitch et al., 2008)
- What are the key communication skills needed (as distinct from patient consultations for example - Mauksch, Dugdale, Dodson & Epstein, 2008) and how can they be learned?
- How will wholly written or electronic handover affect the sequelae of handover?
- Why does structure sometimes worsen communication?
- How do power relations between professions/roles affect handover? (Cohen & Hilligoss, 2008; Scott & Briggs, 2009a)
- What can we learn from how clinicians deal positively with frequent interruptions? (Grundgeiger & Sanderson, 2009; Laxmisan et al., 2007)
- Is the continuous quality improvement approach sustainable once the ‘project’ is finished?
- Is there a chaos-tolerant, ‘treat as seen’ philosophy in emergency settings that detrimentally affects the process of handover?
- How transferable is guidance largely developed in a country with a stereotypically open and direct ethos to more conservative cultures?

Table 9 – Further research questions

In particular we would argue that a feasibility study (Arain, Campbell, Cooper & Lancaster, 2010) is needed to develop and define clinically meaningful and practicably measurable outcome variables for future definitive trials of handover improvement projects.

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References

- ACSQHC. (2010). The OSSIE Guide to Clinical Handover Improvement [Electronic Version]. Retrieved 28 October 2010 from http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/PriorityProgram-05_OssieGuide.
- Arain, M., Campbell, M., Cooper, C., & Lancaster, G. (2010). What is a pilot or feasibility study? A review of current practice and editorial policy. *BMC Medical Research Methodology*, 10(1), 67.
- Australian Medical Association. (2006). Safe handover: safe patients [Electronic Version]. Retrieved 27 Oct 2010 from <http://ama.com.au/node/4064>.
- Barach, P., & Pijnenborg, L. (2010). HANDOVER: Improving the Continuity of Patient Care Through Identification and Implementation of Novel Patient Handover Processes in Europe. Retrieved 28 October 2010 from <https://www.handover.eu/>
- BMA. (2004). Safe handover: safe patients. Guidance on clinical handover for clinicians and managers [Electronic Version]. Retrieved 26 October 2010 from http://www.bma.org.uk/employmentandcontracts/working_arrangements/Handover.jsp.
- Bomba, D. T., & Prakash, R. (2005). A description of handover processes in an Australian public hospital. *Australian Health Review*, 29(1), 68-79.
- CEBM. (2010). Levels of evidence #2. Retrieved 28 October 2010 from <http://www.cebm.net/index.aspx?o=5653>
- Chambers. (2001). Chambers 21st Century Dictionary. Retrieved 27 October 2010 from <http://www.credoreference.com/entry/chambdict/handover>
- Cohen, M. D., & Hilligoss, P. B. (2008). Handoffs in hospitals: A review of the literature on information exchange while transferring patient responsibility or control [Electronic Version]. Retrieved 9 March 2011 from <http://deepblue.lib.umich.edu/handle/2027.42/61498>.
- Cohen, M. D., & Hilligoss, P. B. (2010). The published literature on handoffs in hospitals: deficiencies identified in an extensive review. *Qual Saf Health Care*, 19(6), 493-497.
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ*, 337(doi:10.1136/bmj.a1655).
- Crump, B. (2008). Should we use large scale healthcare interventions without clear evidence that benefits outweigh costs and harms? Yes. *BMJ*, 336(7656), 1276.
- Des Jarlais, D. C., Lyles, C., & Crepaz, N. (2004). Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. *Am J Public Health*, 94(3), 361-366.
- EPPI. (2009). Evidence for Policy and Practice Information and Co-ordinating Centre: Glossary. Retrieved 5 November 2010 from <http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=334>
- Friedman, C., & Wyatt, J. (2006). *Evaluation methods in biomedical informatics* (2nd ed.). New York: Springer Verlag.
- Goddard, A. F. (2010). The European Working Time Directive and the impact on training: the current evidence. *Clin Med*, 10(4), 317–318.

- Goddard, A. F., Hodgson, H., & Newbery, N. (2010). Impact of EWTD on patient:doctor ratios and working practices for junior doctors in England and Wales 2009. *Clin Med*, 10(4), 330-335.
- Grundgeiger, T., & Sanderson, P. (2009). Interruptions in healthcare: theoretical views. *Int J Med Inform*, 78(5), 293-307.
- Hill, W. (2010). *Human Factors in Clinical Handover Communication*. Unpublished MSc Thesis, University of Lund, Sweden.
- Hill, W., & Nyce, J. (2010). Human factors in clinical shift handover communication: review of reliability and resilience principles applied to change of shift report. *Canadian Journal of Respiratory Therapy*, 46(1), 44-51.
- ICEBeRG. (2006). Designing theoretically-informed implementation interventions. *Implementation Science*, 1, 4.
- Jeffcott, S. A., Evans, S. M., Cameron, P. A., Chin, G. S. M., & Ibrahim, J. E. (2009). Improving measurement in clinical handover. *Quality & Safety in Health Care*, 18(4), 272-277.
- Jenkin, A. (2005). *A Critical View of the Process of Patient Handover Between Ambulance and Emergency Department Personnel*. Unpublished MSc Thesis, University of Warwick, UK.
- Jenkin, A., Abelson-Mitchell, N., & Cooper, S. (2007). Patient handover: time for a change? *Accident & Emergency Nursing*, 15(3), 141-147.
- Jorm, C., & Iedema, R. (2008). Innovative Approaches to Enhancing Clinical Handover [Electronic Version]. Retrieved 27 October 2010 from [http://www.health.gov.au/internet/safety/publishing.nsf/Content/com-pres_2008-Int-Forum/\\$File/InnAppEnhClinHover.pdf](http://www.health.gov.au/internet/safety/publishing.nsf/Content/com-pres_2008-Int-Forum/$File/InnAppEnhClinHover.pdf).
- Jorm, C., White, S., & Kaneen, T. (2009). Clinical handover: critical communications. *Med J Australia*, 190(11 Suppl), S108-109.
- Kaplan, B. (2001). Evaluating informatics applications--some alternative approaches: theory, social interactionism, and call for methodological pluralism. *Int J Med Inform*, 64(1), 39-56.
- Kitch, B. T., Cooper, J. B., Zapol, W. M., Marder, J. E., Karson, A., Hutter, M., et al. (2008). Handoffs causing patient harm: a survey of medical and surgical house staff. *Jt Comm J Qual Patient Saf*, 34(10), 563-570.
- Landefeld, C. S., Shojania, K. G., & Auerbach, A. D. (2008). Should we use large scale healthcare interventions without clear evidence that benefits outweigh costs and harms? No. *BMJ*, 336(7656), 1277.
- Laxmisan, A., Hakimzada, F., Sayan, O. R., Green, R. A., Zhang, J., & Patel, V. L. (2007). The multitasking clinician: decision-making and cognitive demand during and after team handoffs in emergency care. *Int J Med Inform*, 76(11-12), 801-811.
- Lilford, R. J., Chilton, P. J., Hemming, K., Girling, A. J., Taylor, C. A., & Barach, P. (2010). Evaluating policy and service interventions: framework to guide selection and interpretation of study end points. *BMJ*, 341, c4413.
- Lister, S., & Rose, D. (2010). Doctors' leaders back calls to relax EU rules that are hurting hospitals. *The Times*, 7 September.
- Lyons, M. N., Standley, T. D., & Gupta, A. K. (2010). Quality improvement of doctors' shift-change handover in neuro-critical care. *Qual Saf Health Care*, doi:10.1136/qshc.2008.028977.
- Mauksch, L. B., Dugdale, D. C., Dodson, S., & Epstein, R. (2008). Relationship, communication, and efficiency in the medical encounter: creating a clinical model from a literature review. *Arch Intern Med*, 168(13), 1387-1395.
- Messam, K., & Pettifer, A. (2009). Understanding best practice within nurse intershift handover: what suits palliative care? *International Journal of Palliative Nursing*, 15(4), 190-196.
- Nagpal, K., Vats, A., Lamb, B., Ashrafian, H., Sevdalis, N., Vincent, C., et al. (2010). Information Transfer and Communication in Surgery: A Systematic Review. *Ann Surg*, 252(2), 225-239.
- O'Connell, B., Macdonald, K., & Kelly, C. (2008). Nursing handover: it's time for a change. *Contemporary Nurse: A Journal for the Australian Nursing Profession*, 30(1), 2-11.

- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., et al. (2006). Guidance on the Conduct of Narrative Synthesis in Systematic Reviews [Electronic Version]. Retrieved 7 October 2010 from http://www.lanacs.ac.uk/shm/research/nssr/research/dissemination/publications/NS_Synthesis_Guidance_v1.pdf.
- Pope, C., Mays, N., & Popay, J. (2007). *Synthesizing qualitative and quantitative health evidence*. Maidenhead: Open University Press.
- Riesenberg, L. A., Leitzsch, J., & Little, B. W. (2009). Systematic Review of Handoff Mnemonics Literature. *American Journal of Medical Quality*, 24(3), 196-204.
- Roughton, V. J., & Severs, M. P. (1996). The junior doctor handover: current practices and future expectations. *J R Coll Physicians Lond*, 30(3), 213-214.
- Royal College of Physicians of London. (2008a). A Clinician's Guide to Record Standards – Part 2: Standards for the structure and content of medical records and communications when patients are admitted to hospital [Electronic Version]. Retrieved 26 October 2010 from <http://www.rcplondon.ac.uk/clinical-standards/hiu/medical-records/Documents/Clinicians-Guide-Part-2-Standards.pdf>.
- Royal College of Physicians of London. (2008b). Handover document headings and definitions [Electronic Version]. Retrieved 26 October 2010 from <http://www.rcplondon.ac.uk/clinical-standards/hiu/Documents/Handover-Documents-Headings-approved.pdf>.
- Royal College of Physicians of London. (2010). Summary RCP Position Statement on Shorter Working Hours [Electronic Version]. Retrieved 28 October 2010 from <http://www.rcplondon.ac.uk/professional-issues/workforce/Workforce-issues/Documents/Summary-RCP-Position-Statement-on-Shorter-Working-Hours.pdf>.
- Royal College of Surgeons of England. (2007). Safe handover: Guidance from the Working Time Directive working party [Electronic Version]. Retrieved 26 October 2010 from http://www.rcseng.ac.uk/new_rcseng/content/publications/docs/publication.2007-05-14.3777986999.
- Scott, P. J., & Briggs, J. S. (2009a). Developing a theoretical model of clinician information usage propensity. *Stud Health Technol Inform*, 150, 605-609.
- Scott, P. J., & Briggs, J. S. (2009b). A pragmatist argument for mixed methodology in medical informatics. *Journal of Mixed Methods Research*, 3(3), 223-241.
- Shiell, A., Hawe, P., & Gold, L. (2008). Complex interventions or complex systems? Implications for health economic evaluation. *BMJ*, 336(7656), 1281-1283.
- Skills for Health. (2009). Salisbury NHS Foundation Trust: Information delivery system supporting Hospital at Night. Retrieved 28 October 2010 from <http://www.healthcareworkforce.nhs.uk/salisbury/>
- Spencer, L., Ritchie, J., Lewis, J., & Dillon, L. (2003). Quality in Qualitative Evaluation: A Framework for Assessing Research Evidence [Electronic Version]. Retrieved 1 November 2010 from http://www.civilservice.gov.uk/Assets/a_quality_framework_tcm6-7314.pdf.
- von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gotsche, P. C., & Vandembroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *PLoS Med*, 4(10), e296.
- Wong, M., Yee, K., & Turner, P. (2008). *Clinical Handover Literature Review*: eHealth Services Research Group, University of Tasmania, Australia.
- World Health Organisation. (n.d.). Action on Patient Safety: High 5s [Electronic Version]. Retrieved 16 August 2010 from <http://www.who.int/patientsafety/solutions/high5s/en/index.html>.