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Safety of handover: a global online survey of clinical practitioners and leaders regarding patient safety during transitions of care

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Abstract

Background: Handover is a critical process for ensuring quality and safety in healthcare. Considerable research suggests that poor handover results in significant morbidity, mortality, dissatisfaction, and excess financial costs. Despite this, little formal attention, education, and evaluation has been given to handover. There is also paucity of data on the opinions of practitioners on the safety of handover.

Objectives: The aim of this study was to measure the perceived risk, degree of patient harm and the systems used to support handover, and to understand how this varied by care setting, type of clinical practice, location, or level of experience.

Method: An open, anonymous and confidential online questionnaire covering: (a) respondent characteristics; (b) peer-to-peer handover; (c) internal referrals; (d) discharges and transfers between organisations; and (e) leading and improving handover was conducted with healthcare practitioners and managers from various settings.

Results: We gathered a total of 432 completed responses from 26 countries. The average reported performance of handover was rated as 3.9 out of 5.

For each type of handover, 12 - 14% reported errors occurring more than weekly. Of those that knew the outcome of such errors, between 29% and 34% reported that they had witnessed moderate or severe harm. 12% and 17% of respondents believed that handover was high or very high risk (See table 4). These respondents were more likely to have witnessed moderate or severe harm, or to be more senior.

A wide combination of handover systems was utilised by respondents. 28% - 32% relied exclusively on EPRs (with or without face-to-face contact). 21% used Office documents such as Word and Excel for peer-to-peer handover, and over 30% used hand-written or manual systems.

Conclusions: This study suggests the need to do more — and go further — to improve communication and reduce risk during all types of handovers. Clinical leaders should find ways to train and support handover with effective systems, with less experienced staff being the primary focus. More research is needed to demonstrate the interventions that improve the safety of handover.

Keywords

Clinical handover; Patient Handoff; Patient transfer; Referral and Consultation; Medical Records Systems, Computerized; Patient Safety; Risk Management; Attitude; Institutional Practice

Conflicting interests

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Introduction

Handover involves the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or groups of patients, to another person, or professional group on a temporary or permanent basis (1). This can include: (a) peer-to-peer handover, usually at shift end; (b) internal referrals between teams for the purpose of shared care or consultation; and (c) transfers between institutions or discharges resulting in a change in setting. All of these can also be considered as transitions of care and are subject to similar risks.

There is considerable research and evidence that indicate that poor handover results in significant morbidity, mortality, dissatisfaction, and excess financial costs. A study from 2008 showed communication breakdowns were a contributing factor in 43 percent of incidents, and two-thirds of these communication issues were related to issues with handover (2). It has been reported that the Agency for Healthcare Research and Quality (AHRQ) in the USA estimates 70% of deaths caused by medical errors are related to communication breakdown during handover (3). Problems with communication between caregivers during patient transfer may play a role in an up to 80% of serious preventable adverse events (4). Communication failures in American hospitals and medical practices account for at least 30% of malpractice claims, which resulted in over $7 billion of financial loss over 5 years (5). Issues with handover can also cause unnecessary prolongation of hospital stays and significant harm as a result. (6-8).

Handover is a critical process yet is often undertaken in a haphazard fashion, with the method and extent of information transferred varying considerably (9). The frequency of handover in healthcare settings is high; an estimated 4,000 handovers occurring each day in a typical teaching hospital (10). Taken together, the evidence indicates that handover is the source of multitude of errors and the cause of much harm (11).

Despite its high-risk nature, little formal attention, education and evaluation is given to handover (12). The problem has recently been receiving more recognition. The World Health Organization (WHO) has highlighted transitions of care as part of the 2021-2030 safety strategy (13). The UK General Medical Councils (GMC) emphasises the need to “keep colleagues well informed when sharing the care of patients” (14) and importance of employing a standardised handover approach is emphasised by the Accreditation Council for Graduate Medical Education (ACGME) and the Joint Commission on Accreditation of Healthcare, which have included competency in patient handover as a necessary requirement for residency training and hospital quality standards (15).

Despite this, there is a paucity of evidence on the opinions of practitioners on the safety of handover and transitions of care.

We therefore undertook an open, anonymous and confidential online survey of healthcare practitioners and managers in order to measure the perceived risk, degree of patient harm and the systems used to support handover. We wished to understand how this varied by care setting, type of clinical practice, location or level of experience.

Methods

We designed a questionnaire, divided into five sections covering: (a) respondent characteristics; (b) peer-to-peer handover; (c) internal referrals; (d) discharges and transfers between organisations; and (e) leading and improving handover. In sections (b) to (d) we asked in each case for respondents to rate the performance of that type of handover, using a ‘five-star’ scale, considering only their direct and immediate experience; five stars was ‘excellent’, one star was ‘poor’. We also asked about the frequency of patient safety incidents or near misses caused by handover and to subjectively assess the most serious harm that they had witnessed as a result (using the scale: none, low, moderate or

severe). We asked for their subjective assessment of handover risk on a 5-point scale from very low to very high) as well as what systems were used to support handover and what changes might improve handover.

Adaptive questioning was used to avoid questions not relevant to the respondent. The maximum number of questions was 34. Responses were captured using TypeForm online service. Each question was formatted on a separate page. Respondents could review all answers before submitting.

The questionnaire was tested for comprehension, readability, and internal consistency by close colleagues of the investigators. The questionnaire was then translated into Spanish.

The survey was voluntary, with no incentives, and was open to anyone with a link. The target audience was any practitioner or leader active in clinical practice or clinical leaders. The survey ended early if any respondent reported they were not working in a clinical environment. The questionnaire recruited a convenience sample through email and LinkedIn messages to clinical contacts of the investigators as well as through an unpaid advertisement on a UK health-related newsletter (circulation approximately 300,000). Contacts were encouraged to pass-on the survey link to colleagues, to encourage further responses. A Frequently Asked Questions (FAQ) page was given as a link at the front of the questionnaire.

This survey was anonymous by default, although users were invited to add an email address at the end if they were interested in receiving further information. No personal or sensitive information was gathered. No information about patients, relatives or carers was collected nor any data about the specifics of incidents or patient care. Although UK Health Research Authority decision tool indicated that IRB approval was not required (16), ethics committee approval was nonetheless sought from United Family Healthcare, Beijing. Consent to gather the data was implied by completing the survey.

The survey was open from 15th September 2021 to 31st December 2021. Only completed surveys were analysed.

Results

The overall participation rate was 832 of 1481 views (56·2%) and the completion rate was 432 of 832 (51·9%). The average time to completion was 15:42 minutes (See table 1)

	English	Spanish	Overall
Views	1232	249	1481
Starts	702	130	832
Participation rate	56·9%	52·2%	56·2%
Completions	373	68	438
Completion Rate	53·1%	52·3%	52·6%
Time to complete	16:07	13:30	15:42

Table 1: Views, starts and completions by language

Respondents were drawn from 26 different countries. Their characteristics are in table 2

Geographical Region	**(n)**	**%**
China	143	33·5%
South America	69	16·2%
UK & Europe	59	13·8%
GCC	35	8·2%
Africa	32	7·5%
North America	28	6·6%
AsiaPac	15	3·5%
Not stated	46	10·8%
Level of practice	**(n)**	**%**
Senior manager or leader (e.g. CEO, COO)	37	8·4%
Senior level medical or nursing or other clinical leader	147	33·6%
Middle grade clinician, middle manager or ward level leader	90	20·5%
Junior clinician, junior manager or junior ward staff	76	17·4%
Other / unanswered	88	20·1%
Professional group	**(n)**	**%**
Nurse or midwife	240	54·8%
Doctor	116	26·5%
Allied Health Professional	26	5·9%
Administrator or manager	52	11·9%
Other / Unanswered	4	0·9%
Area of Practice (multiple choice)	**(n)**	**%**
Hospital : Medicine	174	32·6%
Hospital : ER / urgent Care	93	17·4%
Hospital : Surgical	86	16·1%
General Practice	100	18·8%
Community Care	33	6·2%
Other	47	8·8%
Sector (multiple choice)	**(n)**	**%**
Government	245	44·7%
Independent	284	51·8%
Charity NGO	19	3·5%
Years in healthcare	**(n)**	**%**
More than 15 years	200	45·7%
10 – 14 years	94	21·5%
5 – 9 years	87	19·9%
1 – 4 years	51	11·6%
Less than a year	6	1·4%

Table 2: Characteristics of respondents

Performance of handover

Respondents were asked to rate the performance of the three types of handovers, using a 'five-star' scale, considering only their direct and immediate experience; five stars was 'excellent', one star was 'poor'.

A majority of respondents scored all handover types in the region of 3·7 – 4·3 stars. The overall average for all handovers was 3·9. Senior clinicians, doctors and allied health professionals all rated

handovers of all types somewhat less favourably — by approximately one star — than junior clinicians, nurses and administrators. See table 3.

	Peer-to-peer handover	Internal referrals	Transfers & Discharges
Professional group			
Nurse or midwife	4·14 (4·02 - 4·26)	4·03 (3·89 - 4·17)	4·12 (4·00 - 4·24)
Doctor	3·71 (3·53 - 3·90)	3·73 (3·55 - 3·91)	3·55 (3·34 - 3·76)
Allied Health Professional	3·72 (3·34 - 4·10)	3·55 (2·93 - 4·16)	3·20 (2·50 - 3·90)
Administrator or manager	4·00 (3·61 - 4·39)	3·59 (3·17 - 4·01)	3·92 (3·61 - 4·23)
Level of practice			
Senior level medical or nursing or other clinical leader	3·82 (3·65 - 3·99)	3·73 (3·56 - 3·91)	3·71 (3·52 - 3·90)
Middle grade clinician, middle manager or ward level leader	3·91 (3·70 - 4·12)	3·90 (3·68 - 4·11)	3·80 (3·59 - 4·02)
Junior clinician, junior manager or junior ward staff	4·26 (4·06 - 4·46)	4·07 (3·83 - 4·31)	4·31 (4·12 - 4·51)
Senior manager or leader (e.g. CEO, COO)	4·15 (3·72 - 4·59)	3·43 (2·90 - 3·96)	3·56 (3·03 - 4·10)

Table 3: Mean star rating in a range 1 (poor) to 5 (excellent) for respondents' direct experience of the performance of handover. 95% CI given in brackets

Frequency of Errors, severity of harm and perception of risk

For each type of handover, a majority reported either no errors or errors less than once a year while a minority (12 - 14%) reported errors occurring more than weekly. Between 14·7% and 22·8% of respondents reported no patient safety incidents. Between, 5·3% and 10·8% reported that safety incidents had occurred, but they did not know the outcome. Of those that did know the outcome, between 29·0`% and 33·9% reported that patients had been harmed moderately or severely. The majority of respondents reported that handovers presented no risk or were low risk, while between 12% and 17% of respondents believed that handover was high or very high risk (See table 4).

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	Peer-to-peer		Internal Referrals		Transfers and discharges	
Frequency of Error	n = 327		n = 245		n = 260	
Very often (every day)	18 (6%)		17 (7%)		13 (5%)	
Often (more than once a week)	19 (6%)		16 (7%)		19 (7%)	
Sometimes (more than once a month)	70 (21%)		44 (18%)		38 (15%)	
Occasionally (more than once a year)	88 (27%)		69 (28%)		62 (24%)	
Rarely (less than once a year)	89 (27%)		62 (25%)		76 (29%)	
Never (I have not experience this)	43 (13%)		37 (15%)		52 (20%)	
Witnessed harm	n = 242		n = 194		n = 192	
I don't know the outcome	18 (5·3%)		39 (12·1%)		29 (10·8%)	
No patient safety incidents have occurred in my experience	77 (22·8%)	Where outcome is known	32 (14·7%)	Where outcome is known	47 (17·5%)	Where outcome is known
Severe harm they have caused serious incidents	28 (8·3%)	11·6%	21 (7·9%)	10·8%	22 (8·2%)	11·5%
Moderate harm the patients were harmed, but not severely	42 (12·5%)	17·4%	39 (14·7%)	20·1%	43 (16·%)	22·4%
Low harm little harm was caused to the patients	94 (27·9%)	38·8%	84 (31·7%)	43·3%	66 (24·6%)	34·4%
No harm	78 (23·1%)	32·2%	50 (18·9%)	25·8%	61 (22·8%)	31·8%
Perception of risk	n = 319		n = 252		n = 258	
Very high risk	18 (6%)		11 (4%)		16 (6%)	
High risk	35 (11%)		18 (7%)		28 (11%)	
Moderate risk	89 (28%)		68 (27%)		70 (27%)	
Low risk	154 (48%)		138 (55%)		123 (48%)	
No risk at all	23 (7%)		17 (7%)		21 (8%)	

Table 4: Frequency of error, witnessed harm and perception of risk

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Correlation between risk, observed harm and level of practice

We sought to correlate the perceived risk of handover and witnessed harm. Table 4 shows a weighted average for witnessed harm and risk (weightings for harm and risk are given in brackets). The correlation given this methodology is 0·97. A similar trend is apparent between level of seniority and perceived risk, see also Table 5.

Perceived Risk	No risk (1)	Low risk (2)	Moderate risk (3)	High risk (4)	V. high risk (5)	Weighted Average
Witnessed Harm (n = 673)						
Severe harm (5)	3	12	18	19	16	2·49
Moderate harm (4)	0	28	61	26	8	2·11
Low harm (3)	3	135	79	10	7	1·50
I don't know the outcome (2)	3	38	25	1	4	1·51
No harm came to the patients (1)	23	111	31	10	2	1·19
Weighted average of harm	**1·66**	**2·36**	**3·05**	**3·65**	**3·86**	
Level of practice (n = 813)						
Senior manager or leader (e.g. CEO, COO)	1	13	18	7	3	1·95
Senior level medical or nursing or other clinical leader	14	150	84	38	17	1·65
Middle grade clinician, middle manager or ward level leader	11	106	60	12	7	1·48
Junior clinician, junior manager or junior ward staff	17	86	27	13	14	1·50
Other / no answer	16	53	32	10	4	1·42

Table 5: correlation of weighted average of perceived risk against witnessed harm and level of practice for all types of handovers (weightings in brackets)

Types of handover systems

Respondents reported the systems used to support handover through a multiple-choice question. The results of these are given in Table 6. A large majority (75-80%) used electronic patient record systems or other specific electronic handover systems (EPRs). A minority of respondents (26·3% - 32·3%) use these systems exclusively or in conjunction with face-to-face discussions. 21% of respondents reporting using Office documents such as Word and Excel for peer-to-peer handover, and over 30% use hand-written or manual systems. 55·5% of respondents reported using face-to-face discussions for peer-to-peer handover and this fraction fell to around 33·5 and 27·7% % for referrals and transfers respectively.

	Peer-to-peer (n = 351)	Referrals (n = 278)	Transfers & Discharges (n = 282)
Electronic patient record systems (EPR/EHR/PAS)	224 (63·8%)	172 (61·9%)	160 (56·7%)
Other specific electronic handover systems	64 (18·2%)	62 (22·3%)	63 (22·3%)
Authorised clinical messaging apps	41 (11·7%)	47 (16·9%)	33 (11·7%)
Electronic whiteboards or displays	55 (15·7%)	26 (9·4%)	20 (7·1%)
Unofficial messaging apps (e.g. WhatsApp, Signal)	58 (16·5%)	45 (16·2%)	23 (8·2%)
Office documents (Word, Excel or similar)	75 (21·4%)	49 (17·6%)	45 (16.%)
Hand-written notes or paper-based systems	123 (35.%)	78 (28·1%)	98 (34·8%)
Manual whiteboards or noticeboards	37 (10·5%)	11 (4·0%)	9 (3·2%)
Face-to-face discussions	193 (55·0%)	93 (33·5%)	78 (27·7%)
Emails	79 (22·5%)	62 (22·3%)	50 (17·7%)
Telephone calls	109 (31·1%)	110 (39·6%)	92 (32·6%)
Taped or recorded handover messages	31 (8·8%)	10 (3·6%)	14 (5·0%)
We don't use any systems	3 (0·9%)	1 (0·4%)	2 (0·7%)
Only EPR/EHR/PAS (other than face-to-face)	101 (28·8%)	73 (26·3%)	91 (32·3%)
No electronic systems used	45 (12·8%)	42 (15·1%)	44 (15·6%)

Table 6: The variety of systems that support handover

Interventions that would improve handover

We asked respondents for changes that they believed would improve as a multiple-choice question. Their responses are summarised in Table 7. The highest scoring responses were more dedicated time for handover (46% - 49%and improved communication systems (49% - 55%), training for staff (41·7% - 42·8%) and improved electronic information systems (43·1% - 44·6%).

206 respondents identified themselves as leaders with responsibilities to improve handover in their area of practice. Of them, 165 (80%) had attempted to improve handover. They reported their success of their efforts on a 7-point Likert scale (1=very poor, 7=Excellent), with a mean of 4·88 (95% CI 4·69 – 5·08). They answered a separate question on what would enable them to improve handover. The highest scoring answer was for better electronic systems with 53·3% positive responses.

	Peer-to-peer (n = 341)	Referrals (n = 273)	Transfers & Discharges (n = 276)
All respondents			
More dedicated time to complete handover tasks	170 (49·9%)	114 (41·8%)	129 (46·7%)
More physical space to allow for face-to-face discussions	127 (37·2%)	82 (30.%)	63 (22·8%)
Improved electronic information systems	147 (43·1%)	126 (46·2%)	123 (44·6%)
Improved communication systems	170 (49·9%)	152 (55·7%)	152 (55·1%)
Training for clinical leaders	93 (27·3%)	82 (30·0%)	67 (24·3%)
Training for staff members	146 (42·8%)	105 (38·5%)	115 (41·7%)
I don't know / prefer not to answer / other	14 (4·1%)	23 (8·4%)	15 (5·4%)
Leaders (n=165)			
Better access to patient information	69 (41·8%)		
Better electronic systems	88 (53·3%)		
More of my own management time	44 (26·7%)		
Better physical layout of clinical areas	42 (25·5%)		
More leadership commitment	61 (37·0%)		
Better motivation among staff	78 (47·3%)		
Improved knowledge among staff	76 (46·1%)		
Training and simulation for staff	82 (49·7%)		

Table 7: Interventions that would improve handover

Discussion

This study is a broad brush. It draws its respondents from a wide range of countries, levels of practice and professional groups. With only 438 respondents, the ability to demonstrate significant differences within these subgroups was limited. As an opportunistic convenience survey, there is an inevitable selection bias. This may have been exacerbated by a completion rate of only 24% from 1,480 views. An average completion time over 15 minutes will also have contributed to that. Despite these limitations, the findings highlight areas of concern that need focus and attention to improve handover practice.

Every practitioner and healthcare leader knows that handovers, referrals and transitions of care can be dangerous for patients: slips, lapses and mistakes easily emerge from the degradation of information that takes place as patients transfer between individuals, teams and care settings. As pointed out in the introduction, the statistics on patient harm are stark.

What is notable in this survey is that it paints a picture of practitioners who believe that their practice is good enough: 3·9/5 stars can be interpreted as a pretty good score. It suggests that handover may resemble driving; everyone thinks they are better than average (23).

Why is this? We propose two possible causes. First, availability bias: 40% of respondents say they have never – or only rarely – seen any harm derive from handover, and when they have, 65% of patients have 'got away with it' suffering only low or no harm. Which means in an average year or two, most clinicians will not see the consequences of a poor handover, in keeping with the stochastic nature of most patient safety risks.

Viewed from the other end of the probability curve, a few years in practice will mean everyone will almost inevitably see something terrible happen as a result of poor handover. This explains why both level of seniority and witnessing significant harm are very strongly correlated with perception of risk.

We would propose a second reason for the apparent complacency; in our experience, handover itself is not always seen as a cause of error. A mis-prescription, for instance, may be treated primarily as medicines management issue. Seeing it as a handover problem will require leaders to look for more subtle contributory factors – and not everyone has the time or training to identify these.

What can be done? Hitherto, the solution to improving handover has tended to focus on better training and the adoption of more systematic ways of communicating, particularly using mnemonics. SBAR is the most mature and widely used (17). Others include iSoBAR, SBAR3 SHARE, and PSYCH (18, 19). While there is some evidence for the effectiveness of such mnemonics on patient outcomes, a systematic review of mnemonics revealed that only half of the studies found significant improvement on patient outcomes, and evidence was also limited to specific circumstances or settings (11). While some small-scale trials have shown benefits of the implementation of such mnemonics, high-quality research is still lacking (20).

The most promising route appears to be the adoption of better systems, and electronic systems in particular (21, 22). More than half of respondents to this survey suggested this would help – and their answers also suggest that their existing EPRs are inadequate to the task. While 56 - 63% of respondents use them, that leaves over a third who do not. And only 30% or so use them exclusively. To make up for the shortfall, they use other methods, many of which are manual, informal or rely on PC documents, messaging apps and handwriting.

Conclusion

This study suggests that 12% – 14% of practitioners witness errors happening during handover at least weekly and more than 1 in 12 have witnessed severe harm as a result. If these statistics point to anything close to the truth, the safety handover is likely a leading cause of patient harm. As well as being morally unsustainable it is also clearly financially detrimental to healthcare providers and systems globally. Handover requires urgent focus and improvement.

The authors believe that handover has reached the point similar to that of operating room preparation, prior to the introduction of the Safer Surgery Checklist. At that point, the risk of surgical mis-hap due to poor communication may have been recognised but little action had been taken. Communication in operating theatres is now consistently addressed as an area of risk. The WHO is now introducing a global programme of safety around transitions of care – which they define as being between care settings (13). This study suggests we need to do more — and go further — to improve communication and safety during all types of handovers.

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