



The past, present and future of patient safety education and research in primary care

Paul Bowie, John McKay, Duncan McNab & Carl de Wet

To cite this article: Paul Bowie, John McKay, Duncan McNab & Carl de Wet (2016) The past, present and future of patient safety education and research in primary care, *Education for Primary Care*, 27:1, 3-9, DOI: [10.1080/14739879.2015.1132672](https://doi.org/10.1080/14739879.2015.1132672)

To link to this article: <https://doi.org/10.1080/14739879.2015.1132672>



© 2016 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 10 Feb 2016.



Submit your article to this journal [↗](#)



Article views: 1435



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)

LEADING ARTICLE

The past, present and future of patient safety education and research in primary care

Paul Bowie^{a,b}, John McKay^a, Duncan McNab^{a,b} and Carl de Wet^{a,b,c}

^aNHS Education for Scotland, Glasgow, UK; ^bInstitute of Health and Wellbeing, University of Glasgow, Glasgow, UK; ^cGriffith University, Nathan, Australia

ABSTRACT

In the first series of related articles, we describe how assurance of patient safety in primary care was traditionally viewed by the medical profession hierarchy as being wholly dependent at the individual level upon a combination of education and training, knowledge, skill, experience and commitment to professional development. As well as summarising the evidence underpinning what we know about patient safety in primary care, we outline how contemporary thinking has evolved to recognise that the safety issue is complex, problematic and systemic, and that it is now beginning to attract the attention of national policymakers, educators and research funders in some countries. We also describe a range of recently developed educational safety concepts and methods that have been implemented as part of current national programme initiatives in the United Kingdom and internationally. Finally, we reflect on international progress on patient safety in primary care thus far; propose a future direction for related education, development and research; and briefly introduce the Human Factors based topics to be addressed in the forthcoming series of interrelated articles in this journal.

KEYWORDS

Primary care; general practice; patient safety; human factors; quality improvement; education; postgraduate training; continuing professional development; system complexity

Introduction

The publication by the US-based Institute of Medicine of *To Err is Human* in 1999 gained worldwide attention through highlighting the problem of patient safety in acute care hospitals.[1] Since then, much of the international policy focus on addressing and improving healthcare safety has been on secondary care settings, rather than wider healthcare.[2] In the United Kingdom, the epidemiology of unintended adverse events in hospitals is reported at 1 in 10 patients, with around half thought to be avoidable, which is similar to international findings.[3] As a consequence, the allocation of resources and the development and implementation of related research, educational and safety improvement initiatives have largely concentrated on specialist care areas in hospitals.[4]

In recent years, there has been a gradual acceptance by medical educators that patient safety in primary care needs to be explicitly addressed at undergraduate and postgraduate levels,[5,6] while a few policy makers and funders also judged it problematic and worthy of attention

in terms of research [7] and improvement.[8] In response, the UK's Royal College of General Practitioner's (RCGP) curriculum on patient safety education sets out a number of core related competencies to be achieved (e.g. managing medical complexity, working with colleagues and teams, and organisational management and leadership); and safety improvement tools (e.g. clinical audit and significant event analysis (SEA)) and basic theoretical concepts (e.g. human error theory and human factors science) that specialty trainees need to be familiar with in preparation for practice.[6]

In terms of wider educational developments and research the World Health Organisation,[5] European Union (through the LINNEAUS EURO-PC programme which recently published its development outputs [5]) and the UK-based Health Foundation [9] have all made attempts to raise and address the safety issues in this setting. In the past few years we have also seen the development and implementation of the Scottish Patient Safety Programme in Primary Care (SPSP-PC) [10] – led by Healthcare Improvement Scotland with expert advice

and support provided by NHS Education for Scotland (NES) – which is arguably the first attempt to take coordinated safety improvement action on a national basis. The recently launched RCGP Patient Safety Toolkit [11] builds on much of this work and is a welcome educational resource. Although the initial focus of SPSP-PC was on general medical practice, this has now spread to encompass community pharmacy and general dental practice, with planning to include the Optometry profession now also underway.[10]

What do we know about patient safety in primary care?

Although around 90% of patient encounters in the United Kingdom take place in primary care (over 300 million annually), the perception of this clinical setting for many is still one of a low-technology, low-risk environment where patient harm is less significant compared to hospital care and so less of a problem. [4] While epidemiological research is currently lacking on this issue, although planning is under way,[12] one estimate by a Health Foundation evidence scan suggests that 1–2% of patient consultations may actually involve an ‘error’.[13] Sandars and Esmail have also reported that ‘there are between 5 and 80 safety incidents per 100 000 consultations, which in the UK would translate to between 37 and 600 incidents per day’.[14] A large review of general practice patient records in the Netherlands [15] found that 2% of consultations may contain a patient safety incident, which matches the findings of a similar but smaller study in Scotland.[16]

The great majority of adverse events in general practice can be classified within four main domains covering: diagnoses, prescribing and medicines management, communication between care providers and patients and wider organisational issues.[13] The limited published evidence also corresponds with what we know about the analysis of medicolegal data.[17] Indeed a recent systematic literature review of malpractice claims in primary care [18] reinforces these findings by confirming that a failure or delay in diagnosis (with the highest frequent claims related to adults with cancer or myocardial infarction, and meningitis in children) was ‘the commonest misadventure cited in malpractice claims’ with medication error cited as the second most commonest reason. The emerging evidence (Box 1) suggests an abundance of systems-wide reasons contributing to why things go wrong in primary care.[13]

Box 1. Examples of systems issues that may contribute to patient harm in primary care

- Poor communication between professionals
- Poor communication with patients
- Lack of coordination, including between primary and secondary care
- Unclear lines of authority
- Thinking that action is being taken by other groups within the organisation
- Drug names that look alike or sound alike
- Environment and design factors
- Infrastructure failure
- Reliance on automated systems to prevent error
- Fragmented reporting systems
- Inadequate systems to share information about errors, which hampers analysis of causes
- Increasing complications due to increasing patient demand
- Cost-cutting measures.
- Variations in the training and experience of health professionals
- Inadequate training
- Fatigue
- Depression and burnout, which impact on how team members cope with diverse patients, unfamiliar settings and time pressures
- Failure to acknowledge the prevalence and seriousness of harm and take steps to do something about it
- Patients taking multiple medications
- Complex medical conditions
- Managing multiple conditions
- Patient frailty

The past – assumptions and efforts

The well-known phrase *to err is human* describes a specific perspective of patient safety in which, at the individual level, medical practitioners are implicitly or explicitly considered to be a key ‘causal factor’ in why things go wrong. This perspective helps to create, justify and maintain the ‘blame and shame’ culture that was (and to some extent arguably still is) characteristic of postgraduate training and everyday medical practice.

The myth of medical infallibility was the prevailing orthodoxy in medicine for much of the 20th century. Ingrained within this widespread view was the assumption that an effective combination of undergraduate education, postgraduate training, acquiring broad

clinical experience and skills, participating in continuing medical education and professional self-regulation were the primary drivers in assuring high standards of care and keeping patients safe.[1,3,13] Towards the end of the century, there was a growing recognition (already well established in other hazardous industries) that human interactions with wider systems issues frequently influenced clinical performance and outcomes, rather than just individual skill, knowledge and experience. [3,13,19] Similarly, concerns were also expressed that the quality of care (as opposed to an explicit focus on its safety) was prone to variability and that these variations in practices should be reduced – hence the introduction of quality improvement (QI) methods such as clinical audit and SEA to the medical professions,[20] the education and training environments and as part of service delivery expectations. However, like most QI approaches in healthcare the evidence for their implementation and impact since 1989 remains largely mixed if not underwhelming, both educationally [21] and in improving patient care in frontline clinical practice.[22]

The present – where are we now?

Putting aside advances in disease management, drug efficacy and medical technology, approaches to monitoring, learning and improving patient safety in primary care in the early 21st century have certainly evolved since the early days of clinical audit. In recent years, attempts to broaden the safety focus to include wider systems issues and concerns that individual practitioners and care teams can identify and learn from have informed postgraduate curriculum developments [11] and national improvement programmes.[10] The testing of a range of adapted and ‘new’ safety improvement methods – particularly as part of the aforementioned SPSP-PC – have identified gaps in our understanding of the nature and complexity of patient safety, opening up educational opportunities to further enhance our knowledge of Human Factors design concepts and systems thinking in the future.[23] While related evaluation of these interventions is evolving [24,25] and they can make important contributions to informing specialty training, appraisal, Continuing Professional Development (CPD) and revalidation obligations,[24] more needs to be done to ensure that they are truly integrated within all primary care educational mechanisms. Some examples of recent patient safety educational developments (with an acknowledged bias towards NES and SPSP-PC outputs) are described in Box 2.

Box 2. Examples of recent patient safety educational developments in primary care [30]

Learning from past harm and ‘near misses’:

- *Trigger review method* – A rapid method of auditing small samples of the electronic patient records of ‘high risk’ patient groups to identify harm events and hazards and direct future learning and action.
- *‘Enhanced’ significant event analysis* – Based on Human Factors principles this is an update to traditional SEA which focuses on understanding and coping with the emotional impacts of being involved in a significant event and to taking a systems based approach to event analysis

Improving reliability of system processes:

- *Care bundles* – The care bundle method is simply a means to audit a small number of healthcare interventions grouped together that normally have a synergistic relationship which impacts on clinical outcome for patients. The care bundle method is very similar to criterion audit but involves a composite ‘all or nothing’ compliance measure, while criterion audits typically report singular compliance measures for individual criteria. Examples of where care bundle implementation has occurred include test results handling, medicines reconciliation, warfarin monitoring and heart failure management.

Team learning

- *Assessing safety culture* – A method for care teams or organisations to measure or diagnose the prevailing safety culture (or climate) and facilitate reflection, discussion and learning around system wide issues that inform local safety culture, e.g., how practice workload affects the delivery of care or how seriously the practice takes learning from significant events. In the United Kingdom, the two most prominent examples are the NES GP Safety Climate Survey and the Manchester Patient Safety Framework.

Priority setting

- *Never events* – A validated list of serious patient safety incidents that should not happen if the appropriate system barriers are in place. The list can inform proactive efforts to put measures in place to minimise related risks and to facilitate priority incident reporting and significant event analyses.

- *GPST safety checklist* – A systematic method to assist educational supervisors in the reliable delivery of safety-critical educational issues in the opening 12-week period of specialty training and aligned with national curriculum competencies.
- *Safety systems checklist* – A systematic method of routinely checking priority safety issues across the general practice workplace which can potentially impact on the wellbeing and performance of people and the practice as a functioning organisation.

Person-centredness

- *Always events* – A ‘new’ method of engaging specific groups of patients at the local practice level to determine their views on what they would always like to happen (resource and feasibility dependent) when they interact with the care team and aligning delivery and measurement of a small number of ‘always events’ to QI efforts (e.g. via a checklist, criterion audit or care bundle approach).

Overall the effectiveness of specific interventions to reliably reduce harm in general practice remains largely unknown.[4] In hospital care, patient safety has improved for selected clinical conditions managed in specialised units as part of national improvement programmes.[26] However, improvements are seldom sustained or spread and are dependent on many highly context-specific factors.[27] The problem of improving patient safety is proving to be a far tougher nut to crack than many had envisioned. What is clear is that the patient safety education, research and improvement agendas in primary care are in a nascent state,[4] and it is currently unclear if the heterogeneity, complexity and uncertainty of everyday general practice will ultimately be amenable to the types of improvement interventions outlined in Box 2, or those tested in other areas of healthcare.[24]

The future – a way forward

In a recent Health Foundation practical guidance report,[28] Vincent and colleagues mapped out a framework which, although intended for healthcare in general terms, can potentially inform the future direction of postgraduate training, educational development and research related to patient safety in primary care. They also posed five questions (Box 3) for care teams and organisations to consider when

understanding how to practically measure and monitor safety in a healthcare setting, using the framework to focus on: ‘past harm, reliability, sensitivity to operations, anticipation and preparedness and integration and learning’.

Box 3. Five questions to consider in determining the safety of a healthcare organisation

There are five key questions that we need to ask when considering whether a healthcare organisation in primary care is safe.

- (1) Has patient care been safe in the past?
- (2) Are our clinical systems and processes reliable?
- (3) Is care safe today?
- (4) Will care be safe in the future?
- (5) Are we responding and improving?

In terms of designing a future research agenda for patient safety, Verstappen and colleagues (2015) from the LINNEAUS collaboration,[29] identified key priority areas and questions for primary care (Box 4), which also aligns well with key parts of the aforementioned practical framework.

Box 4. Research areas and questions proposed by the LINNEAUS collaboration

Definition, epidemiology and types of safety incidents

- What are high-risk patients, consultations and procedures in primary care?
- When is it no longer safe to provide care that would otherwise be considered safe because of the changing harm/benefit ratio?

Diagnosis and treatment

- How can diagnostic performance of primary care physicians be improved while avoiding defensive medicine and inefficient test ordering?
- How can effective methods for improving medication safety, such as decision support systems and pharmacist involvement, be optimised and widely implemented in primary care?

Health care organisation

- Which interventions to prevent infections in minor surgery and other procedures are needed in primary care?

- Which organisational, cultural, and financial factors in primary care contribute to patient safety and how can these be optimised?

Dysfunctioning health care professionals

- How are dysfunctioning healthcare professionals detected and managed?

Patient role

- What can patients do to enhance patient safety in primary care?

Prospective methods

- How are retrospective and prospective risk analyses integrated in the safety system of a primary care practice?

To some extent, work on answering some of these research questions is underway in the UK context. In addition to the ongoing and planned educational developments and research being led by the NES Safety and Improvement team,[30] there are also a small number of active UK-based research groups focusing on primary care patient safety issues such as medication safety,[31,32] diagnostic error and decision support systems,[33] and gaining a better understanding of the nature of systems issues and avoidable harms.[34–36]

Upcoming EPC articles on patient safety

In the forthcoming series of articles on education for patient safety in this journal, members of the NES Safety and Improvement team, together with academic partners, will outline their take on ‘the way forward’ by introducing ‘new’ concepts and approaches for further understanding and enhancing the future of safety management and education in primary care.

The first article will focus on the discipline of Human Factors and Ergonomics (HFE) – essentially the science of human work [37] – which is concerned with improving the wellbeing and performance of people and organisations and is long-established in many safety-critical industries worldwide. In the next article, McKay and colleagues from NES and the University of Nottingham Human Factors Research Group will report the outputs from a pilot study involving the HFE analysis of the general practice specialty training environment. The findings are potentially useful in highlighting possible educational gaps where HFE concepts and principles could be further integrated into the training curriculum, and wider primary care education, research and improvement. For

educators and researchers interested in primary care quality and safety, this provides an ideal opportunity to consider and appreciate the relevance of this discipline and to potentially inform development of approaches that are based on sound HFE principles and recommended methods.

The final two articles by McNab et al. will introduce us to the problems of complexity in healthcare systems and the intriguingly titled ‘Safety-I and Safety-II’. Considering the complexity of healthcare systems at the outset may help explain some of the difficulties of implementing and spreading improvement initiatives, increase learning from adverse events and may challenge our understanding of the notion of ‘human error’. They argue that for too long we have overly focused on ‘counting errors’ and understanding and learning from ‘why things go wrong’, to the detriment of understanding and learning from the everyday work-as-done by all staff that leads to good outcomes in the vast majority of cases.

A key consideration of all articles will be on their relevance to improving our understanding of patient safety, QI and the well-being of people in the workplace, and how we can potentially update and integrate these concepts and methods within our existing educational curricula and frameworks for all primary care professions. However, there is a strong realisation that the implementation potential of any educational safety intervention needs to be tempered by the reality of everyday general practice, and the conflicting goals that must be traded-off by clinicians and managers in addition to the system constraints to which they must adapt routinely as part of their work. To this extent, therefore, the task of properly addressing and improving patient safety in general practice will require political action on at least four fronts:

- Firstly, patient safety education needs to be truly prioritised and the content of related educational curricula and frameworks must be contextualised for general practice, reflect the most up-to-date knowledge and developments in safety, complex systems and human factors sciences, and be consistently and seamlessly integrated at all levels, e.g., undergraduate, postgraduate, appraisal and CPD.
- Secondly, greater evidence-based knowledge of patient safety science in general practice is needed and this is essential to reconcile policy rhetoric (i.e. ‘ungrounded high expectations’) with the frontline reality of safety interventions, and reliably answer what works, how, for whom and to what extent?
- Thirdly, for clinicians to engage with and normalise care improvement approaches as part of their ‘day-to-day’ practice, they need ‘to set aside time and space to conduct the required, appropriate

reflection effectively'. But protected time comes at an opportunity cost meaning other competing service priorities may be forsaken.

- Finally, a strong safety culture within practices is required – high-performing teams are characterised by excellent leadership, effective communication, a commitment to safety improvement, and team members who support each other and learn together.

Conclusion

Patient safety education, developments and research in primary care in the United Kingdom and internationally are gradually making progress after a slow start when compared to the policy attention given to safety in acute hospital care. However, related developments and improvements will continue to be significantly challenged by other priorities such as increasing demand from patients with multiple morbidity, high workload, availability of resources, provision of protected learning time and the vagaries of political systems and decision-making. Additionally, at all educational levels, there is a need for greater integration of knowledge and skills development in systems thinking and understanding the critical role of workplace interactions and complexity in patient safety. Given these competing service and educational demands, we would argue that more fully embracing the systems- and design-based science of HFE potentially offers a more meaningful set of principles and methods in understanding the complexity of safety improvement in primary care – as well as providing a more relevant guiding framework from which to develop related educational and research initiatives.

References

- [1] Institute of Medicine. To err is human: building a safer health system [Internet]; 1999 [cited 2015 December 1]. Available from: <https://iom.nationalacademies.org/~media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20%20report%20brief.pdf>
- [2] The Safer Primary Care Working Group. Safer primary care. A global challenge. Geneva: WHO; 2012. Report No. WHO/IER/ PSP/2012.16.
- [3] Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. *Br. Med. J.* 2001;322:517–519.
- [4] Esmail A. Monitoring and measuring safety: a primary care perspective – thought paper. London: The Health Foundation; 2013.
- [5] World Health Organisation. Patient safety curriculum guide [Internet] [cited 2015 December 1]. Available

- from: <http://caipe.org.uk/silo/files/multi-professional-patient-safety-curriculum-guide.pdf>
- [6] Royal College of General Practitioner's Curriculum. Patient safety and quality of care [Internet]. Revised May 2014 [cited 2015 December 8]. Available from: <http://www.rcgp.org.uk/training-exams/gp-curriculum-overview/~media/Files/GP-training-and-exams/Curriculum-changes/RCGP-Curriculum-2-02-Patient-Safety-and-Quality-of-Care-track-change-2014.ashx>
 - [7] LINNEAUS EURO-PC. Learning from international networks about errors and understanding safety in primary care [Internet] [cited 2015 December 1]. Available from: <http://www.linneaus-pc.eu/index.html>
 - [8] National Patient Safety Agency. Seven steps to patient safety for primary care. London: NPSA; 2009.
 - [9] The Health Foundation [Internet]. Available from: www.health.org.uk
 - [10] Scottish Patient Safety Programme in Primary Care [Internet] [cited 2015 December 1]. Available from: <http://www.scottishpatientsafetyprogramme.scot.nhs.uk/programmes/primary-care>
 - [11] Royal College of General Practitioners. Patient safety toolkit for general practice [Internet] [cited 2015 December 8]. Available from: <http://www.rcgp.org.uk/clinical-and-research/toolkits/patient-safety.aspx>
 - [12] Cheraghi-Sohi S, Singh H, Reeves D, et al. Missed diagnostic opportunities and English general practice: a study to determine their incidence, confounding and contributing factors and potential impact on patients through retrospective review of electronic medical records. *Implement. Sci.* 2015;10:2504. doi:10.1186/s13012-015-0296-z.
 - [13] The Health Foundation. Evidence scan: levels of harm in primary care [Internet]. London; 2011 [cited 2015 December 1]. Available from: <http://www.health.org.uk/publications/levels-of-harm-in-primary-care/>
 - [14] Sandars J, Esmail A. The frequency and nature of medical error in primary care: understanding the diversity across studies. *Fam. Pract.* 2003;20:231–236.
 - [15] Gaal S, Verstappen W, Wolters R, et al. Prevalence and consequences of patient safety incidents in general practice in the Netherlands: a retrospective medical record review study. *Implement. Sci.* 2011;6:3–7.
 - [16] de Wet C, Bowie P. The preliminary development and testing of a global trigger tool to detect error and patient harm in primary-care records. *Postgrad Med J.* 2009;85:176–180. doi:10.1136/pgmj.2008.075788.
 - [17] Vincent C, Davey C, Esmail A, et al. Learning from litigation: an analysis of claims for clinical negligence. *J. Eval. Clin. Pract.* 2004;12:665–674.
 - [18] Wallace E, Lowry J, Smith SM, et al. The epidemiology of malpractice claims in primary care: a systematic review. *BMJ Open.* 2013;3:e002929.
 - [19] De Vries EN, Ramrattan MA, Smorenburg SM, et al. The incidence and nature of in-hospital adverse events: a systematic review. *Qual. Saf. Health Care.* 2008;17:216e23.
 - [20] Department of Health. Working for patients. London: The Stationery Office; 1989.
 - [21] McKay J, Bowie P, Lough M. Variations in the ability of general medical practitioners to apply two methods of

- clinical audit: a five-year study of assessment by peer review. *J. Eval. Clin. Pract.* **2006**;12:622–629.
- [22] Miles A, Bentley P, Polychronis A, et al. Clinical audit in the National Health Service: fact or fiction? *J. Eval. Clin. Pract.* **1996**;2:29–35.
- [23] Human Factors in Healthcare: a Concordat from the National Quality Board [Internet] [cited 2015 December 7]. Available from: <https://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf>
- [24] Bowie P, Halley L, Blamey A, et al. A qualitative evaluation of the safety and improvement in primary care (SIPC) pilot collaborative in Scotland: perceptions and experiences of participating care teams. *BMJ Open*. **Forthcoming**.
- [25] McNab D, McKay J, Bowie P. A before and after study of warfarin monitoring in a single region as part of the Scottish patient safety programme in primary care. *Scott Med J*. **2015**. pii: 0036933015597178. [Epub ahead of print].
- [26] Pronovost PJ, Wachter RM. Progress in patient safety: a glass fuller than it seems. *Am. J. Med. Qual.* **2014**;29:165–169.
- [27] Landrigan CP, Parry GJ, Bones CB, et al. Temporal trends in rates of patient harm resulting from medical care. *N. Engl. J. Med.* **2010**;363:2124–2134.
- [28] Vincent C, Burnett S, Carthey J. The measurement and monitoring of safety. London: The Health Foundation; **2013**.
- [29] Verstappen W, Gaal S, Bowie P, et al. A research agenda on patient safety in primary care. Recommendations by the LINNEAUS collaboration on patient safety in primary care. *Eur J Gen Pract.* **2015**;21:72–77. doi:10.3109/13814788.2015.1043726.
- [30] NHS Education for Scotland. Safety and improvement education resources [Internet] [cited 2015 December 8]. Available from: <http://www.nes.scot.nhs.uk/media/3437356/Safety-and-Improvement-Educational%20Resources-A-Toolkit-for%20Safe-Effective-Person-Centred-Care.pdf>
- [31] Avery AJ, Rodgers S, Cantrill JA, et al. A pharmacist-led information technology intervention for medication errors (PINCER): a multicentre, cluster randomised, controlled trial and cost-effectiveness analysis. *Lancet*. **2012**;379:1310–1319.
- [32] Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND appropriateness method. *Br. J. Gen. Pract.* **2011**;61:526–536.
- [33] Nurek M, Kostopoulou O, Delaney BC, et al. Reducing diagnostic errors in primary care. A systematic meta-review of computerized diagnostic decision support systems by the LINNEAUS collaboration on patient safety in primary care. *Eur. J. Gen. Pract.* **2015**;21:8–13.
- [34] Carson-Stevens A, Hibbert P, Williams H, et al. Characterising the nature of primary care patient safety incident reports in England and Wales: mixed methods study. *BMJ Open*. **Forthcoming**.
- [35] Cresswell KM, Panesar SS, Salvilla S, et al. Global research priorities to better understand the burden of iatrogenic harm in primary care: an international Delphi study. *Plos Med.* **2013**;10(11): e1001554. doi:10.1371/journal.pmed.1001554.
- [36] Daker-White G, Hays R, McSharry J, et al. Blame the patient, blame the doctor or blame the system? A meta-synthesis of qualitative studies of patient safety in primary care. *PLoS One*. **2015**;10:eScholarID:270119. doi:10.1371/journal.pone.0128329.
- [37] Chartered Institute of Ergonomics and Human Factors [Internet]. Available from: <http://www.ergonomics.org.uk/>