First Do No Harm: closing the gap in patient safety

A proposal to improve the safety of patients and the effectiveness of healthcare using Human Factors methods

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Human Factors: A key to patient safety and effective healthcare

The most important single change in the NHS…would be for it to become, more than ever before, a system devoted to continual learning and improvement of patient care, top to bottom and end to end.
Don Berwick, 2013

To err is human, to cover up is unforgivable, and to fail to learn is inexcusable.
Sir Liam Donaldson, 2004

Human error in medicine, and the adverse events which may follow, are problems of psychology and engineering not of medicine.
John Senders, 1993

We need fresh thinking to understand the human factors that inform patient safety

Error in healthcare is often assumed to be due to poor clinical performance, weakness and lack of technical perfection. Accepting error as "normal" is an essential mind-set to move forward. Assuming error means designing systems to avoid, trap and mitigate against errors and become more resilient. Healthcare is more dependent on the "human" in the system than any other safety critical industry, yet has failed to understand the relevance of human factors.
Martin Bromiley, 2014

Boards (strategically and locally) need to support and resource safety and quality, aligned with robust performance metrics to monitor delivery and impact
Gary S. Kaplan, MD, Chairman and CEO of Virginia Mason 2014

I have the understanding and willingness but not the tools.
Dr Mark Brady, Consultant Nephrologist and Physician, 2014

The role of trainee clinicians (the next generation) has got to change and they should be empowered to drive change at the front line
Dr Marc Wittenberg, Clinical Fellow to Dr Mike Bewick, Deputy Medical Director at NHS England & National Medical Director's Clinical Fellow Scheme

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Executive Summary

Patient Safety is just not getting better fast enough.

Every year the NHS needlessly kills or injures thousands of patients. Sometimes, it does so in a way that catches the public's attention, such as at Mid-Staffordshire Hospital Trust or in children's cardiac surgery at Bristol Royal Infirmary. Enquiries are held, investigations conducted, reports are published and recommendations are made. But still the errors and harm are repeated.

We have a systemic problem.

In addition to incalculable costs in lost lives, injury, disability and distress to patients and in lifelong disruption to the lives of their families, these failures cost the NHS billions of pounds year after year after year. We don't quite know how bad the damage is or how much it costs because we don't yet fully measure unsafe care.

Although many people and organisations are working hard to try and find the answers, the healthcare system does not work as one to address this. Despite the efforts and dedication of many people, NHS patient safety is not getting better fast enough. We need to recognise that the NHS is a high-risk industry and take action accordingly.

The Secretary of State has responded to this challenge with a commitment to reduce avoidable harm by 50% in 3 years. To make this happen, there has to be a transformational change in our approach to the commissioning and delivery of care, how we lead, train and support our staff and how we engage actively with patients.

There is a gap between what we currently do about patient safety and what we need to do to fix it.

Other industries are better at safety

Other industries, like aviation, construction, railways and the nuclear industry, have closed this gap. What do they do that we do not? Two things.

When things go wrong, they investigate to find the cause, not to determine blame, they look beyond the individual. They don't ask 'what is the human factor that made this individual do what they did' but 'what are the human factors that created a situation that allowed the incident to occur'. In other high-risk industries, in the truly safe organisations, they live by the philosophy that 'no job

is that important that it cannot be done safely'. The Olympic build in 2012 is a great example of this and has NHS parallels: a public body, under intense scrutiny, needing to deliver an end result within strict deadlines and with limited finances. These industries then act on eliminating these causes and encourage everyone to prioritise safety. And then when they think about how they deliver their services, they design these systematically to reduce or eliminate the possibility of error.

The science behind both kinds of thinking – diagnosis and design - is called Human Factors[1]. The discipline of Human Factors shows that when people get things wrong, most of the time the underlying cause is not the failing of an individual but a set of circumstances that make error likely or inevitable. The purpose of investigations should not be to find fault but to identify the circumstances around an incident so that they can be adjusted or eliminated and the incident prevented in the future.

Human Factors has also shown that the most effective way to improve safety is to design services so that the possibility of error is reduced and, if an error happens, things fail to safety, not danger.

Human Factors methods needs to become part of the system thinking when changing practices or introducing new ones. It should not, as happens all too often in Healthcare, be an afterthought or not attended to at all.

We already know Human Factors are important…

Many health professionals recognise that the absence of Human Factors thinking is a prime reason why NHS patient safety is so persistently poor. It is also a reason why health care is inefficient; if we don't design our healthcare systems safely, we introduce errors and harm that have to be put right.

These professionals try to make a difference. Many pockets of good Human Factors practice and thinking exist, often developed in isolation, often by people working in their spare time and often in the teeth of passive resistance. Instances

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[1] What are Human Factors in healthcare? 'Enhancing clinical performance through an understanding of the effects of teamwork, tasks, equipment, workspace, culture and organisation on human behaviour and abilities and application of that knowledge in clinical settings'. NQB Human Factors Concordat. http://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf

'Ergonomics or Human Factors are about designing for people, wherever they interact with products, systems or processes. … to ensure that designs complement the strengths and abilities of people and minimise the effects of their limitations, rather than forcing them to adapt.' Institute of Ergonomics & Human Factors

of good practice are developed and proven, but too few channels exist to promote and support common adoption.

Organisationally, that the NHS should adopt Human Factors thinking has already been accepted – in principle. The National Quality Board's Human Factors Concordat agreed in 2013 is a shared agreement about the importance of Human Factors. It is still early days but there is not yet evidence that all bodies are taking action.

So we have pockets of clinical champions trying to make a difference without the leverage to do so. And we have bodies that agree that Human Factors is a good thing, without, at the moment, the means to turn their good intentions into good practice.

Over the past few months, PHSO has seconded its Chief Operating Officer to work with NHS England to lead the scoping and delivery of relationships with decision makers and policy makers on patient safety and human factors, mapping out good practice, gaps and sharing opportunities for future development.

This work has been actively supported by a core group made up of Martin Bromiley[2] (Chair, Clinical Human Factors Group, CHFG), Sir Stephen Moss (ex-Chair Mid Staffs), Professor Jane Reid, James Titcombe (Campaigner and CQC Patient Safety Adviser), Darren Whitehouse (HSL), Dr Suzette Woodward (Sign up to Safety Campaign Director) and this report and proposal has been developed with the support and active engagement of this team.

This work has also been informed by extensive stakeholder engagement with the signatories to the NQB's Human Factors Concordat, NHS arm's length bodies, academics, educators, professional and systems regulators, patient groups, human factors experts including the Institute of Ergonomics, the Parliamentary and Health Service Ombudsman, NHS providers, Foundation Trust Network, National Institute for Health Research, system and professional regulators including the CQC and GMC, incident investigators from other high risk industries, Professors of Patient Safety, NHS England patient safety domain staff, the Health and Safety Executive and its arm's length agency, HSL. We have the written support from organisations and hundreds of clinicians, executives, managers, patient representatives and those that have experienced first-hand the devastating impact that unsafe care can have on patients, families and staff members.

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[2] July 2014 New Statesman's article on Martin Bromiley and his quest for safer healthcare through applying human factors methods can be accessed at: http://www.newstatesman.com/2014/05/how-mistakes-can-save-lives

What would the HealthCare look like if we applied Human Factors methods?

We have developed an analysis with HSL, part of the UK's Health & Safety Executive, how other industries apply human factors methods. We have made a comparison of these factors and how we attend to them in the NHS. This demonstrates what is known globally, that healthcare has yet to achieve the safety performance of other high risk industries.

Applying human factors systematically in the NHS will bring huge benefits:

An open and fair safety and learning culture where
- staff are encouraged and supported to share concerns
- investigations for learning that lead to action being taken to prevent future harm and such learning is shared
- safety culture tools are regularly applied
- the regulatory system reinforces a learning culture and there is demonstrable learning from patient and staff experience

Making it easier for staff to get it right by
- focusing on safer design and designing out unsafe care
- developing safety cases for the assessing the impact any changes in protocols, services, organisational change, staff levels etc
- standardisation with operating procedures, checklists, equipment and documentation that is designed for safety in use
- Boards actively supporting and using the procurement power of the NHS to design for safety
- redesigning clinical and information systems with more effective use of technology

Measurement to help answer the questions: is care safe today and will it be safer tomorrow?
- soft intelligence embedded to inform safety design and monitoring including leadership safety walkabouts; designated patient safety officers; safety briefings and day to day conversations about safety and listening to patients and staff
- performance metrics and monitoring will be designed for safety improvement and implemented NHS-wide, from clinical teams, Directorates, Boards, service and education commissioners and others

Education and training

- with clinicians and non-clinical staff trained to work effectively in teams and with the knowledge of how to design safety and resilience into clinical systems
- mandatory training on safety across organisations to limit variation and risk
- awareness training on human factors methods for all staff, leaders and Boards
- specialist human factors training for those taking leadership roles in safety design, patient safety improvement programmes and safety investigations
- standardisation on how we learn from errors and unsafe care through embedding safety discussions into Morbidity and Mortality Rounds and handovers
- knowledge transfer from other industries
- strategies for aligning and sharing evidence of improved safety

Reduced costs and resources

Unsafe care wastes money. The current estimated cost of unsafe care in the NHS is over £4bn per annum. Evidence from the US and other healthcare systems is that safer care saves money.

The NHS needs to develop business cases for safety; where costs are known and managed, clinical staff have the necessary resources to do their job without having to design 'work-arounds' and the financial levers for improved safety are aligned and designed into commissioning and regulation.

A call to action on Human Factors

We need to do more.

There is an overwhelming consensus about what is needed to improve patient safety through the application of human factors. HF methods need to be embedded in the commissioning and delivery of healthcare across the whole healthcare system wide.

Clinicians, front line organisations, and many organisations are calling for this including the NHS Confederation, Health Education England), Patients Association, AVMA, Sir Stephen Moss, Professor David Haslam, the Foundation Trust Network, NHS Employers, Public Health England, Dr Suzette Woodward (and through her, the Sign Up to Safety Campaign), the GMC, Professor Charles Vincent, Sir Liam Donaldson and many front line clinicians and staff (who are the real drivers for this within the NHS), patients and the membership of the core HF group including Martin Bromiley, James Titcombe and Professor Jane Reid.

The following action is called for:

1. A **strategic direction** with a clear line of sight between national, regional and local agendas on Human Factors; we need an integrated plan of action that builds on the commitment of individual clinicians and individual organisations and with the leadership of all NHS bodies

2. Building on the HF Concordat and extending it to commissioners and providers; to adopt and **embed human factors methods across the whole of the healthcare system.** That is, build human factors and systems methods into 'business as usual'

3. **Channels for clinicians and leaders using Human Factors** that improve patient safety: to share their learning with colleagues, to ensure that there are consistent ways to design safer health practices and share across the NHS

4. **Investigations into unsafe care that are consistent and rigorous**, that apply best practice HF investigation methods, diagnose the true causes of errors and are acted on for learning and safer care

5. **Working with other industries** to learn from how they apply human factors methods and apply those lessons across healthcare

6. Extra **HF expertise and capacity** to develop HF methods in healthcare; from ideas to action, cultural and behavioural change

7. To create a sustainable legacy in patient safety; **designing Human Factors methods into the Sign Up for Safety Campaign** and other initiatives being led by Academic Heath Science Networks, Patient Safety Collaboratives etc

8. The **commissioning of HF tools, guidance and research** to ensure that knowledge from other industries in applying HF is designed into the NHS

9. The establishment of a **resource centre and knowledge networks** for health HF, building on the networks that currently exist and those of Health Education England, Foundation Trust Network, the Clinical Human Factors Group and the Health Foundation.

What leadership and support is needed?

The Human Factors Concordat has been a significant first step. But the NQB agreed that for Human Factors principles and practices to inform all aspects of the healthcare system, multiple actions at multiple levels are needed.

There is some progress on integrating HF into the core business of some of the Concordat signatories but not all have developed or published their implementation plans.

Some of the Concordat signatory organisations are turning their plans into action. For instance, Health Education England is making commendable progress in working with partners, clinicians and human factors experts so that Human Factors practices and principles are included in the curricula and training frameworks for health professionals. HEE is taking a strategic leadership role nationally and regionally in the East Midlands.

The NQB agreed for NHS England to take a leadership role on the Concordat's agreed next steps to:

1. Communicate with commissioners and providers to increase their awareness and understanding of Human Factors

2. Scope the current capacity and capability and identify what support and development the NHS requires

3. Develop programmes of work to embed HF principles and practices in the culture, systems and processes of the NHS.

This has not yet prioritised or resourced although it is planned that this be embedded within the Sign Up to Safety Campaign and the Patient Safety Collaboratives with Academic Health Science Networks.

Knowledge networks that already exist will be invaluable in embedding Human Factors methods across the NHS. But to date, no NHS body has suggested that it takes a leadership, expert support or coordination role.

The NHS needs to resource the embedding of human factors in all its activities. The NQB Human Factors Concordat signatories have already committed to ensure that this is 'business as usual' in their work programmes and many are re-prioritising resources to do so. Service commissioners and providers also need to make this commitment and take action.

We believe that the NHS should agree leadership for human factors for improved safety. There is no one organisation or network of individuals that has an NHS-wide view of the development, implementation and impact of human factors methods in the NHS.

As Don Berwick pointed out in his report in 2013 'where responsibility for safety is diffused and when so many are in charge, no one is.' If no approach or organisation will take on this leadership role, then other routes must be found to support the Sign Up to Safety initiative and the reduction of avoidable harm in the NHS.

We are therefore proposing a Human Factors resource centre to embed human Factors into the NHS, to bridge the gap between our current performance and the performance we need to deliver.

Human Factors resource centre and knowledge network

The core focus will be to support clinicians and front line care delivery organisations achieving safer and more cost effective healthcare with Human Factors methods. It will undertake the following roles:

1. Work with colleagues across the NHS to lead and set a **common strategic direction**, priority and momentum for Human Factors, building on the NQB's HF concordat and coordinating and taking forward the agreed next steps

2. Provide a means for the rapid sharing, testing and promotion **of good practices and learning around Human Factors**

3. **Gather, analyse and publish data** about how human factors is improving patient safety to enable effective measurement of performance; to do so, it will draw on and benchmark against such data in other industries and other countries, as well as good practice in the NHS.

4. Seek to **raise the standard and consistency of investigation** of patient safety incidents by:

   - providing incident investigation that can lead on formal investigations of major patient safety incidents to ensure that such investigations are conducted rigorously, consistently and independently

   - Seeking out, recommending and sharing good investigative practice to help bodies to improve the quality and rigour of their own investigations

   - Work with colleagues across the NHS and in other industries to develop, share and promote resources, such as tools and methods to make investigations more efficient and effective.

5. Work with colleagues across the NHS to establish **good practice for design** of clinical and operational practice using human factors methods to build in safety and reduce the possibility of error.

6. Act as a **focus and leverage for the many efforts on Human Factors** across the NHS – be that bodies seeking to act on the Human Factors Concordat but not knowing how, or individual clinicians who have developed good practice but lack a voice to communicate their good work with others.

We believe that £2.1 million NHS funding will be sufficient for the next three years to establish the HF resource centre and knowledge networks. This funding represents 0.05% of the £4bn estimated annual cost to the NHS of unsafe care. We call for NHS budgets to be re-prioritised to fund this initiative.

The establishment of a Resource Centre will support the NHS in redesigning safer care and improving cost effectiveness across the NHS. Its works will be evaluated and will provide a strong evidence base that it is cost effective to investing in human factors. We are convinced that we will be able to demonstrate many times over the value of this approach. We will seek additional sources of funding and extend the range of services to enhance its mission of improved patient safety through human factors.

Such a centre will be innovative and ground breaking across healthcare globally. It will try a number of things and learn from them. Its ways of working will be agile, collaborative, flexible and fast, using "lean start-up" thinking that is established good practice in industry. It should be set up as an incubator – to test and adjust what works in an agile fashion, maximising the value of its deliverables as quickly as possible.

Conclusion

Our aim is to use human factors methods to improve safety, to help create an enduring legacy from the Sign Up to Safety campaign, Patient Safety Collaboratives and other initiatives and to ensure that the Secretary of State's pledge to reduce avoidable harm is realised and this improvement sustained.

The requirement to improve patient safety is urgent and unrelenting. What the NHS has been doing up to now has not made enough of a difference that our patients deserve. Our call for action and proposal offers the NHS the means to truly become a beacon of excellence. We strongly ask that you give it your most urgent consideration as a core component of a unifying alliance to improve patient safety and more cost effective healthcare.

'There is a right thing to do with regard to quality of care: improve it.
If that takes courage, so be it.'
Don Berwick

First Do No Harm:

A Report, a Call for Action and a Proposal

The ideas reflected here are the result of informal but wide-ranging discussions with clinicians, patients, managers and leaders across the NHS and academic experts, all with an interest in patient safety and the use of Human Factors to improve it.

In the first part of the proposal, we set out a frank appraisal of the current situation with regard to patient safety. We show how learning from other industries makes it clear that Human Factors thinking is essential if the NHS is to realise its ambitions to improve patient safety. We show also that current approaches in the NHS to Human Factors, although commendable and worthy, fall short of what is needed.

We then describe what is needed to bridge this gap between now and where we should be. We follow this with a 'call for action' that we think is needed for the NHS. We provide a solution to help make this happen.

Is Mid-Staffs just another scandal or
a genuine tipping point for NHS transformation?

The failures in Mid Staffordshire Hospital profoundly shocked the nation. Patients, relatives and journalists exposed the deficiencies in compassion, quality and safety of care. The Government's and the Francis and Berwick reports identified what went wrong and made recommendations for a systemic change in the NHS; to support the workforce in delivering safer patient care and at its heart, a culture of learning for action to prevent such failures ever happening again.

The extent of unsafe care in the NHS is still unacceptably high; too many patients are suffering unintentional but avoidable harm and too much money is wasted on the cost of unsafe care. Other high-risk industries have successfully delivered improvements in efficiency and safety through applying human factors approaches in incident investigation and system redesign. Transformation has happened on much larger scale in a number of safety critical industries; Chernobyl, Three Mile Island and Piper Alpha have become bywords in their industries as turning points which heralded a profound change in culture.

In the UK, changes in safety systems and cultures resulted from action taken after the deaths at Hillsborough and Bradford football ground tragedies, the Manchester and Kegworth air crashes and the Southall, Clapham and Hatfield rail crashes.

Human Error: the cause of most accidents and unsafe care

Between 8 to 16% of hospitalised patients in the developed world's healthcare systems suffer unsafe care. About 30 to 50% of these instances are preventable.

Unsafe care is not only morally indefensible but it is expensive too. These costs have never been fully quantified in healthcare. They include the cost to society of caring for people harmed by unsafe care, the costs of additional treatment, the costs of investigations and legal defences. This is certainly above and beyond the annual £1.2bn cost to the NHS of clinical negligence and litigation. We have estimated that this could be as much as £4bn a year for the NHS. It may be very much more. Unsafe care wastes money.

Many organisations treat the main purpose of investigating incidents of unsafe care as being to assign fault or blame. Human Factors shows that, when properly diagnosed, rarely does a single cause explain an unintentional failure. Rather there is a complex interaction between a varied set of elements, including human behaviour, technological aspects of the system, sociocultural factors and a range of organisational and procedural weaknesses.[3]

Decades of experience in high-risk industries outside healthcare have shown that *how* people carry out their work, *how* they relate to others with a different role to theirs, *how* they work in teams, *how* they respond to leadership and *how* they communicate fundamentally determine the quality and safety of the services they provide or what they produce. When things go wrong, accident investigations often show that it is dysfunction in one or more of these areas that have contributed to the bad outcome. These aspects of human behaviour, and more, in the work situation, form the basis of a Human Factors approach to understanding why things go wrong and to taking preventive action to reduce future risks. In different industries, it may be given special names to make it meaningful to the workforce.

Hence an organisation that behaves as if the purpose of investigation is to assign accountability, blame or fault is likely to find that the outcomes of such investigations are likely to be, at best, incomplete and – in very many cases – simply wrong.

And, if the intent (or effect) of investigation is to attribute blame, people become defensive, facts are harder to find and people spend more time "getting their stories straight" than uncovering the truth. And so investigations take longer and cost more to achieve compromised results.

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[3] Organisation with a Memory, DH 2001
http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4065086.pdf

And – much, much worse – if the investigation is flawed, then so are our conclusions. And our fixes will be wrong and the same incidents will happen again and again; patients will continue to be harmed, or killed, needlessly. The Health and Safety Executive (HSE) describes what high-risk industries have known for decades; human failures are responsible for up to 80% of all types of accident and that applying human factors methods reduces accidents.

Other high-risk industries have had their scandals and they have made great progress on making their industries safer. They have done so by thinking systemically about the how and why safety can be compromised – and the best vehicle for such thinking is Human Factors. The key insight from these industries is that the NHS needs to increase its understanding, capacity and expertise in systems thinking and human factors; it needs to be redesigned for improved efficiency and safety.

Human Factors: why the NHS should apply it

Human Factors is a scientific discipline that is applied in all safety critical industries and is embedded within the advice and recommendations of the HSE.

The *World Health Organisation* **(WHO)** states that in health care, human factors knowledge can help design processes that make it easier for doctors and nurses to do the job right. Human factors applications are highly relevant to patient safety because embedded in the discipline of human factors engineering are the basic sciences of safety.

Human factors can show us how to make sure we use safe prescribing practices, communicate well in teams and hand over information to other health-care professionals. These tasks, once thought to be basic, have become quite complicated as a result of the increasing complexity of health-care services and systems.

> *The WHO calls for Human Factors methods to be applied in healthcare*
>
> *Health-care workers need to have a basic understanding of human-factors principles; health-care workers who do not understand the basics of human factors are like infection control professionals who do not understand microbiology.*

Much of health care is dependent on the humans—the doctors and nurses—providing the care. Human factors experts believe that mistakes can be reduced through studying how healthcare providers interact with and are part of the environment. Human factors can make it easier for health-care providers to care for patients safely and efficiently.

> **The Ombudsman calls for Human Factors methods to be applied in healthcare**
>
> *Human Factors methods should be used in the NHS to get to the root cause of service failure and to inform the development of curricula, training frameworks and continuing professional development.*

The *Health Service Ombudsman*[4][5] in making recommendations as a result of investigating the avoidable deaths of Joshua Titcombe and Sam Morrish, has said that she expects the NHS to use human factors principles, practices and tools to be used in independent investigations. The current deficiency in expertise and capacity compromises the NHS' ability to undertake effective investigations that lead to learning and improvement.

Don Berwick has recognised that patient safety problems exist throughout the NHS as with every other health care system in the world. NHS staffs are not always to blame; in the vast majority of cases it is the systems, procedures, conditions, environment and constraints they face that lead to patient safety problems.

Don Berwick's 2013 report stated that the NHS should make sure pride and joy, not fear, should motivate work and that the most important single change in the NHS in response to his report would be for it to become, more than ever before, a system devoted to continual learning and improvement of patient care, top to bottom and end to end.

> **Don Berwick calls for Human Factors lessons that healthcare systems have to adopt**
>
> - *Avoid reliance on memory*
> - *Simplify*
> - *Standardize*
> - *Use constraints and forcing functions*
> - *Use protocols and checklists*

Don Berwick emphasises that a human factors approach puts science into the safety conversation, providing us new ways to look at old problems.

Human Factors methods introduce new and different ways of thinking about the problems in our healthcare systems that continue to put patients at risk.

The *NHS Patient Safety First* campaign produced an introductory guide to the concept of human factors in healthcare[6] and how its elements can be applied by

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[4] http://www.ombudsman.org.uk/__data/assets/pdf_file/0020/24572/Four_-investigations_concerning_Morecambe_Bay-_report.pdf

[5] http://www.ombudsman.org.uk/__data/assets/pdf_file/0003/25896/An-avoidable-death-of-a-three-year-old.pdf

[6] http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/Intervention-support/Human+Factors+How-to+Guide+v1.2.pdf

individuals and teams working to improve patient safety. It built awareness of the importance of human factors in making changes to improve patient safety

> *NHS Patient Safety First Campaign called for Human Factors methods to be applied in healthcare*
>
> *To help NHS organisations:*
> - *Understand why healthcare staff make errors and in particular, which 'systems factors' threaten patient safety*
> - *Improve the safety culture of teams and organisations*
> - *Enhance teamwork and improve communication between healthcare staff*
> - *Improve the design of healthcare systems and equipment*
> - *Identify 'what went wrong' and predict 'what could go wrong'*
> - *Appreciate how certain tools mentioned in this guide can help to lessen the likelihood of patient harm.*

> *Clinical Human Factor Group calls for Human Factors methods to be applied in healthcare*
>
> *If we are to use safety science to benefit patients, we need to extend our understanding of how to apply human factors and how to embed and sustain proven interventions, in the everyday business of healthcare.*

The **Clinical Human Factors Group** has developed a guide for the NHS on the implementation of Human Factors for safe care. Focussed on four major themes; design, teamwork, incident investigations and working in the real world, the guide illustrates that quality and effective performance for patients cannot be assured without consideration of the interdependencies of the system.

Through research, case studies and practical tips, the guide illustrates how human factors can reduce harm and improve both patient and staff safety. It provides insights for all those concerned with quality and can support commissioners and providers of healthcare; leaders, frontline clinicians and managers, in all care settings.

The **Health Foundation** states that complex modern healthcare organisations rely on a wide range of professionals with specialist knowledge and skills, a huge number of processes with many interacting elements and a large amount of technology with different operating requirements and components. To assure the safety of patients, all of these different factors must work well together to support the effective delivery of safe care.

Healthcare is always delivered by people, and those people always work in some sort of organisation. As such, it is unsurprising that human and organisational factors are some of the most important contributors both to safe and effective care - and to unsafe care and safety incidents. The role of human and organisational factors in safety has long been recognised by other safety-critical industries, such as aviation and nuclear power, but it is only relatively recently that these issues have been recognised in healthcare. Human and organisational factors encompass such things as organisational culture, leadership and communication, stress, design of the work environment and technologies, decision making and teamwork. In short, they encompass nearly everything that either supports or distracts from healthcare professionals' daily work.

> *The Health Foundation calls for Human Factors methods to be applied in healthcare*
>
> *It is critically important to understand how different forms of human and organisational factors can cause safety incidents… and how these can be managed in order to ensure that healthcare organisations can move towards being extremely safe, high reliability environments in which the occurrence of errors and mishaps is continually reduced and safety incidents are effectively analysed and learnt from.*

Healthcare, it has been argued, has not been *designed* to be safe. Clinical protocols, ways of working, training, the design and use of equipment and cultures have evolved over decades with custom and practice often taking precedence over the applications of standardised ways of working that other industries have adopted.

One Trust has assessed that it would take 2 years of elapsed time for a Junior Doctor to read all the protocols that they are required to be familiar with and apply. In another Trust, there were 535 protocols that every new Doctor in training needs to know and there is no induction programme or accessible central repository of these to be accessed other than 'on the job.' This is clearly an error rich environment.

Everyone who currently works or trains in the NHS is already 'doing human factors', whether they realise it or not, whether they are trained in it or not. It is not something to be bolted on to the NHS, nor is it another initiative or yet another target for CEOs and Boards to take on board. The essence of a strategic approach to HF is help the NHS do better what it is already doing. But to do so informed by the lessons from other healthcare systems and industries and to share that knowledge systematically and transparently.

Human Factors: learning from other industries

The Secretary of State for Health has publically supported the importance of learning from other industries and other healthcare systems. Other industries design systems to be safe and effective by attending to the human factors in their work; those with responsibility for designing systems to be safe and effective attend to human factors in their work.

Healthcare systems across the world are at an early stage in designing themselves as safe systems; safer for patients to receive care and safer for staff to work within them. Healthcare can learn from other high reliability industries where safety of employees and customers is paramount. In these industries, Human Factors is not a separate agenda or programme, but a way of thinking that needs to be incorporated as part of the design of processes, jobs and training.

Other industries apply Human Factors methods:

- *What people are being asked to do (the task and its characteristics)*
- *Who is doing it (the individual and their competence)*
- *Where they are working (the organisation and its attributes)*

All of which are influenced by the wider societal concern, both local and national.

HSL, part of the Health & Safety Executive, is one of the world's leading providers of health and safety solutions to industry, government and professional bodies.

The main focus of its work is on understanding and reducing health and safety risks, providing health and safety research, expert advice and consultancy, specialist training and products including how to apply human factors for improved effectiveness and safety.

HSL have assisted in an analysis of where HF are being applied for safety has been undertaken and has identified the comparative position of healthcare and other high risk industries in the UK. This identifies that healthcare has much progress to make across the range of HF related activities to embed and deliver a safe, high reliability NHS.

This is the first analysis ever undertaken to our knowledge of how a healthcare system compares to other high-risk industries and is included in summary analysis as Appendix E. It is not specific to the NHS but reflects how healthcare as an industry, globally, attends to these matters.

The HSE calls for Human Factors methods to be applied in healthcare

Applying Human Factors methods optimises human performance through better understanding the behaviour of individuals, their interactions with each other and with their environment, organisational systems and culture. The implementation of human factors approaches allows industries to design, deliver and monitor for effective safety

Whilst the NHS is way behind other industries, in our comparison table, no industry came out with a full 'green' profile. These are challenging issues; if it were easy there would be no work-related fatalities. There is no 'end point' and therefore the NHS shouldn't try to crack it on its own. And another good reason for working collaboratively with other industries.

Other industries, like aviation, construction, railways and the nuclear industry, systematically do what healthcare doesn't do as well as it needs to.

When things go wrong, they investigate to find the cause, not to determine blame, they look beyond the individual. They don't ask 'what is the human factor that made this individual do what they did' but 'what are the human factors that created a situation that allowed the incident to occur'. In other high-risk industries, in the truly safe organisations, they live by the philosophy that 'no job is that important that it cannot be done safely'. The Olympic build in 2012 is a great example of this and has NHS parallels: a public body, under intense scrutiny, needing to deliver an end result within strict deadlines and with finances.

Human Factors where Healthcare has yet to achieve the safety performance of other high-risk industries

- *Safety system design and management*
- *Managing Human Failures*
- *Staffing*
- *Fatigue and shift work*
- *Communications*
- *Procedures*
- *Competence*
- *Organisational change*
- *Organisational culture*
- *Maintenance, Inspection and Testing (MIT)*
- *Learning lessons from when things go wrong*
- *Education*
- *Leadership at all levels*
- *Team working*

These industries then act on eliminating these causes and encourage everyone to prioritise safety. And then when they think about how they deliver their services, they design these systematically to reduce or eliminate the possibility of error.

One of the principle reasons why other industries are better at HF is because their regulator is knowledgeable and expects to see certain things 'beyond the tick box'. The Health & Safety Executive (across industries) and ONR (Nuclear) employ specialist HF inspectors who will 'lift the rocks.' Eventually of course, industry begins to see that HF is 'a good thing' and starts to do it because they see the benefit rather than just because they should.

One lesson that industry teaches us is to use the enormous power the NHS has over its supply chain and the products that it buys.

If it wanted to, the NHS could massively influence the adoption of HF into the design of products that come to the NHS market. There is a powerful business case for NHS providers using procurement to ensure that they standardise equipment across their wards; massively reducing costs and significantly reducing one of the causal factors of errors and unsafe care.

If the NHS is to learn from other industries, then it will need the capacity, expertise and independence to assess what the NHS needs to do better.

Unlike other industries, the NHS does not currently include human factors into education and training so that the vast majority of staff involved in clinical practice, incident investigation, system redesign, commissioning of care and leadership of organisations have little more than a general awareness of HF.

There are few HF expert roles in the NHS. There are a small number of independent consultants and academics that have developed expertise in healthcare. Where human factors related work is being commissioned, clinical staffs are often doing this as well as the 'day job.' The HEE are actively responding to this challenge as part of their Human Factors concordat. But it will take many years to grow our own experts and unsafe care costly care means that we need to act faster than this.

Human Factors in healthcare: an emerging science for improved effectiveness and patient safety

Healthcare globally has started to harness Human Factors approaches through programmes such as:

Human Factors initiatives in healthcare globally

- *Standard Operating Procures including checklists*
- *Designing out unsafe practices*
- *Learning from incident investigation; applying that knowledge*
- *Development of tools and guidelines for clinical team*
- *Simulation and training on Human Factors*
- *A focus on safety cultures and learning*
- *Proactive risk assessment and the use of safety cases*

- **Redesign of clinical procedures as Standard Operating Practices** e.g. the WHO Safe Surgery checklist and the NHS Clean your Hands campaign to reduce hospital acquired infection. These programmes have transformed safety and cost effectiveness and saved thousands of lives in the UK and hugely reduced the length of stay in hospital and the associated costs
- **Designing out unsafe practices;** the ergonomic design of medical devices, new technology and workplaces

- **Learning from incident investigation**; designing human factors approaches to investigation methodologies, ensuing that those trained in investigations are knowledgeable in human factors and can determine the underlying causal factors of error, are independent and working to standards of investigation comparable to those developed in high risk organisations, can speak the 'unspeakable truths' in relation to behaviours and culture to ensure that there is learning from investigations and that organisation leaders act on recommendations for improvement, sharing the learning of not only the causes of error but the actions needed to design safety in and prevent future harm
- **Tools to encourage safety culture** such as those that support decision making relating to staff following investigations into unsafe care and the leadership role of leaders and Boards
- **Simulation centres and whole team training** for improvement and multi-professional and inter-disciplinary learning on machines that simulate a wide variety of very realistic medical scenarios; to improve safety through teaching and training, with research methods being developed to provide tools to reduce error
- **Proactively risk assessing new ways of working**; designing and undertaking safety cases to assess the safety implications of changing operational procedures, organisational changes, changes in resourcing etc
- **Safety and quality improvement science** in campaigns to promote and support the implementation of interventions that are known to improve the safety deterioration, from critical care, perioperative care, high risk medications
- **Research and guidance into applying human factors** in healthcare including the WHO' resources[7]
- **WHO[8] Patient Safety Curriculum Guide** including why applying human factors is important for patient safety.

Human Factors in the NHS: NQB Concordat on Human Factors

For the NHS to make systemic change though the application of human factors, an increase in capacity, expertise and system-wide approach is needed.
The Clinical Human Factors Group (CHFG)[9] supported the Department of Health in the establishment of work in this area.

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[7]

http://www.who.int/patientsafety/research/methods_measures/human_factors/human_factors_review.pdf?ua=1

[8] http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf?ua=1

[9] The Clinical Human Factors Group, set up and chaired by Martin Bromiley, is a broad coalition of over 2000 healthcare professionals, managers and service-users who have partnered with experts in

Following a report from the DH Clinical Human Factors Reference Group (chaired by Sir Stephen Moss), the NQB agreed that system-wide co-ordinated action was required in relation to Human Factors, which led to the development of the National Quality Board[10] Human Factors in Healthcare Concordat, published in November 2013.

NQB's Human Factors Concordat

- *There is some progress on integrating HF into the core business of some of the Concordat signatories but not all have developed or published their implementation plans of action*
- *The NQB agreed that NHS England will take a leadership role in the implementation of the HF Concordat. This has not yet been actioned.*

The NQB believes that Human Factors principles and practices will:
- Contribute significantly to improving the quality of care for patients
- Will support the NHS to optimise leadership, systems and processes, design, education and training, regulation and quality assurance, to build a high preforming, resilient and efficient healthcare system
- Provide leadership and oversight for embedding Human Factors principles and practices at all levels of the system

The NHS Concordat[11] was adopted by the NQB in late 2013 and is the first public commitment to Human Factors in the NHS by leadership organisations.[12] These commitments are summarized at Appendix A.

The Concordat is only the starting point. It will require *every* NHS organisation to commit to embedding an understanding of Human Factors in their 'business as usual' activities and also when things go wrong and need investigation if

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Human Factors from healthcare and other high-risk industries to campaign for change in the NHS. CHDF vision is of a healthcare system that places an understanding of Human Factors at the heart of improving clinical, managerial and organisational practice, leading to significant improvements in safety and efficiency. It has worked tirelessly as a small independent charity with minimal funding (mainly from the Health Foundation, itself a charity) www.chfg.org

[10] National Quality Board (NQB) - which brings together the different parts of the NHS system with responsibilities for quality, alongside patients and experts

[11] http://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf

[12] HF Concordat signatories: NHS England, Health Education England, Care Quality Commission, National Institute for Health and Care Excellence, Trust Development Authority, General Medical Council, Nursing & Midwifery Council, NHS Employers, Parliamentary and Health Service Ombudsman, the Leadership Academy, NHS Litigation Authority. The Concordat has *not* been signed by Monitor, all professional regulators, Clinical Commissioning Groups, NHS health and social care providers, Academic Health Science Networks, Department of Health, all Arm's Length Bodies, Primary Care Organisations, Public Health England

healthcare is to be safer for patients and staff. Human Factors is not a separate agenda or programme, but a way of thinking that should be incorporated as part of the design of processes, jobs and training; HF should be an integral part of redesigning healthcare as a safe system. The NQB agreed next steps for action under the leadership of NHS England. These actions have informed the development of this report but have not yet been commissioned or resourced.

NQB's Human Factors Concordat: Agreed next steps:
- Communicate with commissioners and providers to increase their awareness and understanding of HF
- Scope current capacity and capability in HF
- Identify what support and development the NHS requires & develop programmes of work to embed HF principles and practices in the culture, systems and processes of the NHS

Human Factors in the NHS: what's happening now and what is needed

There is no one organisation or network of individuals that has an NHS-wide view of the development, implementation and impact of human factors methods in the NHS. Evidence has been sourced from the individual organisations that signed-up to the Concordat,' a recent commissioned survey from Clinical Human Factors Group members (predominantly clinical staff working in the NHS, academic HF experts and campaigners), human factors experts working other industries, NHS England Patient Safety staff, the Health Foundation, regulators and senior staff from NQB Concordat organisations.

Patients and users perspectives

- *Patients and carers with experience of working in high risk industries are often shocked by the absence of HF approaches to investigation, learning and system safety design in healthcare*
- *Bereaved relatives of those that have died avoidably are actively campaigning for the adoption of HF approaches to improve the safety and effectiveness of healthcare.*
- *These voices are, quite rightly, getting louder.*

Understanding, leadership and commitment to Human Factors in the NHS

Human Factors methods are increasingly understood to have a significant impact in other industries in improving safety. There are clinical and organisational leaders that are designing HF based programmes; these are beginning to make a difference

to the quality, effectiveness, cost and safety of patient care. These initiatives are being designed and implemented by committed staff but with often-minimal resources and training; there is no mechanism currently in place to share learning systematically across the NHS.

> *Human Factors and the NHS: leadership and learning*
>
> - *The NHS should learn from other high reliability industries*
> - *This learning should be applied across the NHS*
> - *The NHS should agree leadership for human factors for improved safety; as Don Berwick pointed out, 'where responsibility for safety is diffused and when so many are in charge, no one is'*

The Clinical Human Factors Group is taking a network and leadership role, supporting the understanding of and application of human factors methods being applied in the NHS. There is huge demand for support from front line clinicians; tools, guidance, redesigned equipment and procedures etc. Unlike in other industries, Human Factors are not routinely being used in the NHS to improve the efficiency of service design and safety of patients. The NHS does not yet have the knowledge, tools and leadership commitment to consistently and systematically apply HF methods. Boards are not trained in HF or currently prioritise this approach and the NHS doesn't currently routinely train its staff in human factors. Insufficient attention to designing safer systems using human factors and some human factors based tools are no longer available following the closure of the National Patient Safety Agency and the Institute for Innovation and Improvement e.g. the Incident Decision Tree[13]

Programmes designed using human factors methods to reducing hospital acquired infection and improve the safety of surgery are having a significant impact in improving patient safety; these programmes were developed by organisations that either no longer exist or do not have the funding or commitment to design healthcare system-wide programmes

The NHS does not routinely train its staff to applying human factors, in undertaking investigations and in system redesign for safety.

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[13] The Incident Decision Tree is actively under review with a planned re-launch in 2014

Incident investigations

Guidance on incident investigation has been developed using HF methods but many investigations are undertaken by inexperienced staff, don't fully identify the causal factors of error and harm and aren't being acted upon to prevent future harm. There are no system-wide standards on the quality of incident investigation; regulatory approaches to assess the quality of investigations are at an early stage of development. Action plans are often repeated again and again. Boards should take a strong leadership role in ensuring action plans are delivered and the knowledge from them is shared widely.

> *HF methods in incident investigation*
>
> - *Investigations should be for learning*
> - *Standards for investigation should be developed*
> - *Investigations should lead to learning and action to prevent future error and harm*
> - *Training and accreditation programmes should be established for incident investigators*
> - *Knowledge on action plans should widely shared*

There is little research evidence into the quality of NHS investigations and whether learning is applied and improvements in service; there is evidence that some investigations are not leading to actions that prevent future error. Evaluation is needed to assess the quality investigations in the NHS and to inform the development of standards for investigation. Current reporting systems don't focus sufficiently on learning from investigations and the shared application of that learning for improvement. PHSO and others have reported on poor investigations, national guidelines not being followed, causal factors of unsafe care not being identified, action plans not actioned, future error and harm is not being prevented

Investigation reports and their resulting action plans should be shared widely for system-wide learning and improvement. Reports from investigations aren't widely shared or publically available. Do current approaches to investigations report meet the NHS's ambition under the Duty of Candour?

Reporting and investigations for learning is less developed in primary care

Other industries appoint specialist investigators who are industry knowledge experts, are given extensive training on investigation techniques and approaches and supported and supervised until they are fully proficient. The NHS has no such training programme.

Investigations for learning should protect staff to ensure that they can speak freely and in depth on all the issues being investigated. Most industries ensure that the investigations are carried out independently from the organisation and separately from the industry regulators; the final reports being shared widely for learning and further investigation if required.

NHS providers often struggle to find independent and trained HF investigators to undertake their investigations into SUIs, as is required. NHS England is developing the concept of an Investigation Branch to provide in depth analysis of 5 to 10 of serious investigations a year

Designing out unsafe care

The best defence against human error is to design systems that prevent it happening in the first place. Some clinicians are developing innovative forcing functions with devices that 'design out unsafe care.'

Not all these initiatives have the support of NHS leadership so there are missed opportunities to share and implement widely. As a an example one medical consultant innovator has developed 9 safety innovations over 20 years, projects in partnership with the local NHS Innovation hub and the AHSN despite significant local Trust obstacles. He currently has in development simple innovations that will make three never events impossible; he is not currently able to develop and implement these NHS-wide.

There are only a few HF experts in involved in proactively assessing the risk. NHS England is establishing networks to engage with designated provider leads on medical devices and medications safety.

Embedding HF into Patient Safety Initiatives, Clinical Commissioning and service provision for improved safety

Local NHS commissioning and provider organisations are not participants to the HF concordat and many don't know what opportunities there are to improve safety through human factors.

It is anticipated that those linked to the Patient Safety Collaborative programme and 'Sign up to Safety' will have some funding support and leadership commitment for HF methods.

There are clinical and managerial leaders who are prioritising HF within their own organisations and some emerging networks beginning to bring organisations together to share these developments. It is not clear whether

> **Don Berwick called on NHS leaders and Executives to adopt four guiding principles:**
>
> 1. Place the quality and safety of patient care above all other aims for the NHS.
> 2. Engage, empower, and hear patients and carers throughout the entire system, and at all times
> 3. Foster wholeheartedly the growth and development of all staff, especially with regard to their ability and opportunity to improve the processes within which they work.
> 4. Insist upon, and model in your own work, thorough and unequivocal transparency, in the service of accountability, trust, and the growth of knowledge.

this is currently a sustainable model across the NHS; bodies such as Monitor, the TDA and CQC might want to develop a view.

A culture that prioritises patient and staff safety

The culture of an organisation is the pattern of beliefs, values, attitudes, norms, unspoken assumptions and entrenched positions that shape how people behave and work together. It is a very powerful force and something that remains even when teams change and individuals move on. An organisation's culture informs the perceptions, values, attitudes and beliefs of its staff; this is turn affects their behaviour.

A safety culture is where staff within an organisation have a constant and active awareness of the potential for things to go wrong. Both the staff and the organisation are able to acknowledge mistakes, learn from them, and take action to put things right.

Berwick urged the NHS to focus on the culture that you want to nurture: buoyant, curious, sharing, open-minded, and ambitious to do even better for patients, carers, communities, and staff pride and joy.

Other industries have developed human factors tools that give insight into an organisation's safety culture, providing an evidence base for measuring it and improving it.

The Patient Safety First Campaign published a 'How to Guide'[14] on implementing human factors in healthcare. These include organisational management and human factors with a summary and examples of how to developing a positive safety culture and the critical leadership role that Executive and non-executive directors play in developing a positive patient safety culture. The 'Duty of Candour' requirement and recent work to support those 'whistleblowing' need to be underpinned by a culture where staff are encouraged to share concerns and actively engage in designing safer systems.

Human Factors tools and methods need to underpin such changes and improvements in safety culture.

There are currently no health care industry standards for patient safety that are embedded within commissioning guidance. Discussions are underway with NICE to develop an NHS wide approach. Next steps will include:

- Identifying the key objectives (high level) that could be included in any commissioning of NICE by NHS England

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[14] http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/Intervention-support/Human+Factors+How-to+Guide+v1.2.pdf

- The evidence base that currently exists in healthcare and other industries and where the gaps are
- A review of current NICE guidance on standards development to ensure we're aligning with your approach etc

Initial focus will be on developing:

- An evidence base for undertaking investigations into unsafe care; applying human factors methodology

- Cultural assessment tools and decision support tools to apply when things go wrong; what's the evidence for these and should there be a standardised approach to their use NHS wide

- An overall safety systems approach; healthcare has this for environmental safety, health and safety but not yet for patient safety

What will the NHS look like if it embeds HF methods

Based on the analysis of how other industries have applied human factors, methods, if healthcare develops and delivers these approaches then the changes in patient safety would be dramatic.

Current: Responding to serious incidents and minimising the impact of error	*Future: Prevent serious harm by designing in safety*
Safety system and leadership • *Safe care achieved by committed clinical teams often in spite of the system; safety initiatives are often fragmented (although this is being aligned by a coordinating Campaign and Alliance of Quality Improvers)* • *Human Factors not designed into 'business as usual'* • *Safety resourcing not prioritised* • *Initiatives to improve safety are unified through campaigns to encourage system wide* • *Providers told to 'get on with it' but there being few resources and support on 'how' to apply human factors methods* • *Responding to unsafe care* • *Listening to patient stories* • *Board commitment of patient safety*	• *Evidence of system and organisational leadership and prioritisation for safety* • *Safety designed into systems of care throughout the NHS; clinical procedures, team working, patient engagement, clinical directorate, Board and at national inter-agency healthcare system level* • *Whole system change; aligned within a federated healthcare systems* • *Safety resourcing a priority* • *Learn from other industries and healthcare systems* • *Commission safety changes for whole system implementation* • *All parts of the system are*

• *Misalignment of system priorities* • *Sign up to Safety Campaign* • *Boards attend to safety and review outcome of investigations into serious harm* • *Dispersed leadership for human factors and patient safety*	*designed with human factors methods for safer care; all are clear about their role in making healthcare safer for patients. The NHS is supported by resources and knowledge sharing in human factors methods* • *Patient safety movement; leaders, staff and patients*
Unsafe care • *Terrible personal tragedies of avoidable harm and death* • *Errors and harm repeated*	• *Risk of unsafe care and harm drastically reduced and avoidable death eliminated*
Incident investigation • *Focus on Serious Untoward Incidents; less learning from near misses* • *Investigations by untrained staff* • *NRLS is more of a reporting system*	• *Learning from error; understanding why things went wrong. Human factors methods designed in* • *High quality independent investigations by trained and experienced staff* • *Standards set and achieved for learning from investigations* • *Accreditation of incident investigators*
Culture • *Staff don't readily speak up* • *Whistleblowing* • *Blame and retrain culture* • *Lack of learning and knowledge transfer* • *Safety Culture Tools not widely known about or applied* • *Poor staff morale Lack of confidence in healthcare/poor reputation* • *Patient safety problems addressed in silos* • *Regulatory system too often focuses on accountability (changes in hand to this by CQC and others)* • *Inconsistency of treatment of staff involved in serious incidents of unsafe care across different clinical groups* • *Cultures don't consistently support and prioritise safety; often challenging for staff to speak up and share concerns and opportunities for improvement*	• *Open and fair safety culture* • *Staff encouraged and supported to share concerns* • *Action take to prevent future harm* • *Shared learning across the system* • *Safety culture tools regularly applied e.g. Incident Decision Tree, safety measurement questionnaires, observational audits etc* • *Regulatory system reinforces learning culture* • *Duty of Candour to be part of a safety culture of 'that's how do it around here'* • *Learning from patient and staff experience*

• *Duty of Candour to be one of CQC's fundamental standards*	
Design for safety • *Local initiatives led by clinicians to design out unsafe care* • *Successful national programmes on safer system using Human Factors methods: Clean Your Hands Campaign and the Five Steps to Safer Surgery*	• *Focus on safer design* • *Forcing functions to eliminate risk of error and harm* • *Proactively redesign clinical pathways* • *Safety cases for assessing impact of proposed changes in protocols, services, organisational change, staff levels; action the mitigations to maintain and increase safety* • *Standardise using industry wide methods e.g. standard operating procedures, checklists, standardise clinical documentation to minimise variation* • *Boards actively support a learning culture and design for safety through use of safety cases, engagement and empowerment with staff and patients* • *The procurement power of the NHS is used to commission safety improvements in equipment design and medications packaging*
Measurement • *Prevalence studies and reporting systems estimate unsafe care and harm; inadequate early warning signals of unsafe care* • *Not easy to answer the questions: is care safe today and will it be so tomorrow?* • *Quantitative analysis of error rates*	• *Use of soft intelligence to inform safety design and monitoring: safety walkabouts, designated patient safety officers, briefings and day to day conversations about safety, listening to patients* • *Performance metrics and monitoring is designed for safety improvement and implemented NHS-wide; from clinical teams, Directorates, Board and NHS wide*
Training • *Committed to embedding human factors methods* • *'Reinvented here' – resistance to lessons from other healthcare systems and industries* • *Clinicians adopting and applying*	• *Clinicians are trained to work effectively in teams, know how to design in safety and resilience* • *Core training across organisations to limit variation and risk and to build capacity* • *Training on human factors for all*

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human factors but in their spare time and not part of the 'day job' • *Training is technically focused*	*staff* • *Specialist human factors training for safety design, patient safety and investigation staff*
Costs and resources • *Estimated £4bn annual cost of unsafe care* • *Unknown organisational cost of safety* • *Clinical staff do not always have the necessary resources to do their job e.g. 19% of operation proceed with faulty equipment*	• *Reduced costs as care is safer* • *Business case for safety is established* • *Costs are known and managed* • *Clinical staff have the necessary resources to do their job without having to design 'work arounds:'* • *Engagement with Pharma and Industry to design out potential to error*

A Resource Centre and Knowledge and Innovation Network for Human Factors: a proposal

There is currently no mechanism or body with the responsible to undertake and share learning on how to apply human factors for safer and more efficient care; the execution gap between political and policy commitment and the operational front line. There is a need to establish a national resource centre and knowledge network for health human factors with a remit to coordinate and support the implementation of HF across the NHS; coordinating with the initiatives underway or planned, to provide expertise, knowledge, innovation, advice, support and collaboration. A proposal has been developed with key stakeholders to establish a sustainable resource for embedding human factors for safer patient care.; to support the Sign Up for Safety Campaign and create a legacy from it for future improvements in patient safety. This work is vital to deliver the Sign Up to Safety Campaign and it needs to be established urgently.

The current resourcing and approach to human factors is potentially compromising the achievement of the Secretary of State's ambitions to prioritise and improve performance in patient safety and the NHS' response to the Francis and Berwick reports. The NHS needs to addressing the 'execution gap' between the political and leadership commitment and to those who are delivering this at the clinical and organisational front line.

As Berwick identified, responsibility for safety is diffused in the NHS in England, with responsibility divided among many agencies and with unclear or at times non-existent lines of coordination, communication, pattern-recognition and follow-up for action; 'When so many are in charge, no one is'. Berwick recommended that the NHS ensure responsibility for functions related to safety and improvement are

vested clearly and simply in a thoroughly comprehensible set of agencies, among which full cooperation is, without exception, expected and achieved.

To improve patient safety through Human Factors the NHS needs to:

- *Build on the commitment to the HF Concordat and to move from 'why' to 'how' the NHS can make healthcare safer through human factors*
- *Find out what is and isn't happening systematically; identifying gaps and making proposals for safer care through human factors; this report starts this evaluation*
- *Share the emerging HF expertise within healthcare and the learning from other industries*
- *Provide support, advice and knowledge to support front line clinicians, managers and Boards in making their services safer, more patient focused and efficient*
- *Demonstrate how applying human factors leads to improvement; evidence is that just sharing this knowledge isn't enough. The NHS needs to demonstrate how it works in the real world and to support implementation across the service.*

There is currently no strategic platform to drive, support, shape and coordinate the human factors efforts at a national level within the NHS. There is no national or regional body with the remit, resources, knowledge or expertise to support, advise and inspire the NHS to redesign and deliver healthcare using human factors approaches.

Human Factors Experts and champions in the NHS care calling for:

- *A clear line of sight between national, regional and local agendas on HF with a connected strategic direction; to make it easy for patients, clinicians and managers to know 'where to go' to address the problems of unsafe care by specifying 'how' the NHS can make healthcare safe through human factors*
- *The establishment of a resource centre and knowledge network for health human factors with a remit to coordinate and support the implementation of HF across the community of the NHS engaging with service providers, commissioners, patient groups, Academic Health Science Networks, the Foundation Trust network, The Health Foundation, local Patient Safety networks and collaboratives, Universities and Deaneries etc*
- *The commissioning of HF tools, guidance, research etc to ensure that the knowledge from other industries in applying human factors for improved safety and effectiveness is designed into the NHS*

The East Midlands to proposing to promote the application of HF principles in healthcare through a regional centre of excellence through the collaboration of

the Health & Safety Laboratory (HSL), NHS Trusts, Heath Education England, the local Academic Health Network and the National Institute for Health Research.

This initiative is notable because it is an exception and still remains to be funded. Most work on patient safety through human factors is not well supported; funded or coordinated, meaning that where good practice exists it does so in isolated pockets, relying primarily on the efforts of individuals or individual organisations.

Human Factors experts[15] have met recently to consider what needs to be done to develop practical ways to help the NHS and signatories to the Concordat and to deliver on their promises and make recommendations.

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[15] Martin Bromiley (Chair CHFG), Helen Hughes, Sir Stephen Moss (ex-Chair Mid Staffs), Professor Jane Reid James Titcombe (Campaigner and CQC Patient Safety Adviser), Darren Whitehouse (HSL), Dr Suzette Woodward (Sign up to Safety Campaign Director)

Health Human Factors Resource Centre and Knowledge Networks: what would it do and how would it operate?

The vision is for national and regional networks supported by a resource centre for improved patient safety through human factors; so that avoidable harm is reduced and value for money is optimised through the application of HF to design and deliver safe care

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Health Human Factors Resource Centre and Knowledge Network

- *A way to lead the strategic direction of this work.*
- *Channels for people using Human Factors that improve patient safety to share their learning with colleagues.*
- *Investigations of unsafe care with the consistency, rigour and tools to diagnose the true causes of failure, as opposed to seeking blame.*
- *Consistent ways to design safer health practices and ways to share these across the NHS.*
- *Partnerships between NHS providers, commissioners, academics, patient champions, policy leaders, regulators, other healthcare systems and industries to agree what needs to be done, develop and implement the tools to design safety into healthcare by applying human factors methods*

This resource centre and knowledge network for Health Human Factors should provide:

A 'one stop knowledge shop' for human factors

- Providing knowledge on human factors and its application in health care
- Providing support and advice to front line clinicians and organisations including the development and use of tools, guidance and resources
- Coordination with HF experts in other industries to ensure than learning relevant to healthcare can be shared and applied
- Coordination with WHO and national bodies/key academic and healthcare institutions for excellence in human factors in healthcare
- Advising on the specification for the commissioning of HF experts by NHS bodies
- Aligned with other patient safety and quality improvement knowledge networks

A network for clinicians, managers, Boards & patients on human factors; supporting partnerships for HF

- A collaborator with regional centres of excellence (such as that being developed in East Midlands) and the emerging Patient Safety Collaboratives and Academic Health Science Networks
- Building on the collaborative approach of the CHFG, expanding the network to individual clinicians, managers, organisations for extending HF expertise and knowledge
- Support for and sharing of local innovation and excellence in HF, whether equipment design, development of standard operating procedures, training or leadership initiatives. Providing a mechanism to ensure that the NHS gets the best value from local initiatives and that it doesn't constantly re-invent the wheel
- Encourages and actively engages patients and patient groups in promoting Human Factors

Take a leadership role on human factors across the NHS; supporting the mechanisms for:

- Supporting and advising stakeholders and Human Factors concordat signatories from a small core team and/or commissioned experts in Health HF
- Encouraging all NHS organisations to commit to the HF concordat
- Providing advice on developing standards for investigation training/assurance and robust methodologies to help the NHS become a learning organisation; potentially supporting the commissioning
- Leading on cutting edge HF research in health by working with academic/research institutions
- Setting standards and potentially delivering high quality training and 'train the trainer' provision for human factors
- Inspiring and encouraging innovative human factors based approaches to improving safety
- Supporting the development of human factors in the commissioning of services and leveraging the procurement power of the NHS for improved design in medical equipment, medication etc; collaborative working with the MHRA and others

Investigate for learning and safer care

- A mechanism for sharing the knowledge from investigations, actions that are being taken to address the causes of unsafe care and the evaluation of those interventions

- Expert advice on undertaking investigations (using best practice approaches from other industries' investigation)
- Develop an association of independent trained (and potentially accredited) investigators to support local investigation into Serious Untoward Incidents
- Undertake research and evaluation into the quality of investigations for learning; making recommendations for improved investigations
- Complementary to the establishment of an NHS E Investigations Branch

A **resource centre of HF** hosting health human factors experts, knowledge, policy and engagement staff, independent of the NHS; mainly working as part of the distributed network of NHS organisations to bring expertise and advice

The **governance arrangements** have yet to be explored in detail but options could include:

- An integral part of an NHS body
- A social enterprise
- A NIHR supported programmes generating evidence to inform action and identify the most efficient ways of providing services
- An academic based intuition lined to an existing Chair in PS or HF and integrated with local AHSNs, University teaching Trusts etc. There is a formal offer already from one University to host the network, another expressing interest
- A charity

Phase 1: First 12 to 18 months with a small core of staff, associates and contractors:

- *Set up virtual knowledge centre*
- *Develop and support HF networks, integral with HEE, Health Foundation, AHSN networks and Patient Safety Collaboratives*
- *Quick win research into incident investigation*
- *Evaluation of safety system compared with other high risk industries*
- *Develop business case for safer care through human factors*
- *Safety culture pilot programme*
- *Support and engage on HF Concordat implementation*

Phase 2: HF Resource Centre and knowledge networks fully established

Funding requirement
£2.1 million core funding plus income generation

Funding could be from a potential range of organisations including contracting or grant funding from:

- NHS England, NIHR and other central healthcare funding

- NHS part-funded initiative with resources also from providing services and support direct to NHS bodies (this would have to be managed carefully not to compromise the network's independence)
- Innovator funders e.g. Big Lottery, NESTA, etc
- Charitable and philanthropic funding
- Crowd funding (small funds from multiple funders) as befits a social movement

Decision on the source of funding should be made on the likely availability of funding but also the potential implications for independence and perceived independence of decision-making

Support for a HF Resource Centre and Knowledge Network

There is huge support for the proposal and the additional focus, support and resourcing for human factors from:

- *Martin Bromiley and the Clinical Human Factors Group and membership*
- *Professional regulators*
- *Individual clinicians leading on human factors in their Trusts*
- *Academics*
- *Patient groups*
- *HF Concordat signatories*

Informal initial soundings have generated huge support for the additional focus, support and resourcing for a human factors network that is being proposed.

Included as Appendix D is a selection of responses from patients (individual campaigners and organisations representing those that have been harmed by unsafe care), Academics & HF Experts including Professors of Clinical Safety and leading national and international leaders in Patient Safety; many HF Concordat signatories and CHFG leaders including Martin Bromiley, Jane Reid, Stephen Moss, Stephen Ramsden, Bryn Baxendale and strong support from the CHF network of clinicians, academics and managers

Human Factors Resource Centre and knowledge networks: creating a sustainable legacy for improved patient safety

By September 2015, we will have:

1. Been a core contributor to the **Sign Up to Safety Campaign**, supporting the emerging Patient Safety Collaboratives and Academic Health Science networks with HF methods and tools; supporting and working as part of a unifying alliance for improved quality and safety

2. **Created 'one stop shop' knowledge centre** for health human factors

- Mapped and shared all HF activities in the NHS

- Started to regularly share latest thinking and research on human factors in healthcare and other relevant industries

3. Created a **HF network** in the NHS in partnership with the Foundation Trust Network, TDA, NHS commissioners and NHS England, Regulators, charities, professional networks and academics providing information and support on applying   HF knowledge and methods in healthcare

- Promote the **design of safer systems** as part of a wider NHS safety management system; sharing the innovations in development and ready to be implement by clinical innovators in the NHS

4. Delivered **research into the quality of incident investigation** and reported on what needs to be done to get investigations right for learning and improvement; responding the Ombudsman's recommendations for improvement in investigations for learning

5. **Evaluate the design of the NHS's safety management systems** against HF best practice, identifying scope for improvement against standards applied in other UK high risk industries

6. Commission the **business case for safer care though human factors** for use within the NHS to target and prioritise activity against the greatest cost/benefit; proposals to support Board's resourcing prioritisation

7. **Publish on a patient safety culture**; pilot with selected NHS Foundation Trusts the updated Incident Decision Tree as a resource to support NHS organisations response to the new Duty of Candour and to ensure that they respond appropriately to staff members involved in patient safety incident investigations in an open, fair and non-punitive manner

8. Support signatories in developing their **HF concordat implementation plans** and prioritising on areas that have yet to be commissioning, for example the:

- Support and advise on how to design human factors and patient safety into the **commissioning** of health services

- Support the **training** of Boards, Executives and Non Executives in the science of Human Factors and the application in healthcare working with the Foundation Trust Network and other partners

9. **Incubators stage core staffing** to be supplied from funded secondees from NHS and related organisations, independent contractors and commissioned services from HF experts; ideally hosted by

We believe that £2.1 million NHS funding will be sufficient for the next three years to establish the HF resource centre and knowledge networks. This funding

represents 0.05% of the £4bn estimated annual cost to the NHS of unsafe care. We call for NHS budgets to be re-prioritised to fund this initiative. See Appendix A for details

Phase 2: By September 2017, we will have:

1. Embed HF into NHS partnership networks including those delivering the **legacy of the Sign Up to Safety Campaign**, the Alliance for Quality Improvers, Foundation Trust Network quality programme etc

2. **Undertake Investigations into unsafe care**; publishing causal factors, action and implementation plans for shared learning

3. **Delivered HF tools and guidance**, enhancing capability at local level

4. Created a small team of **HF experts** to provide support and advice to clinical teams, NHS leaders and HF concordat members

5. Supported the delivery of the **HF Concordat** and expanded this commitment to NHS commissioners and providers

6. Established a framework and for **working with other industries** on applying human factors in healthcare; publishing **guides and tools** for clinical teams and leaders

7. Formally **established the HF Resource Centre** and knowledge network, with permanent governance and funding to assure a HF legacy in embedding HF methods into healthcare. Published a vision, strategy, business plan and operating model

Appendix A: National Quality Board Human Factors Concordat November 2013[16]

Concordat signatories have publically committed themselves to:

- Raising awareness and promoting Human Factors principles and practices

- Addressing current capability, barriers to adoption, future requirements and best practice in Human Factors

- Creating the appropriate conditions, through commissioning, quality assurance and regulation that support the NHS in embedding HF at a local level

- Including HF principles and practices in core education and training curricula for health professionals and managers and to support on-going professional development

- The development of a just, open and positive organisational culture that optimises human performance, supports strong, respectful and accountable working relationships

- Acknowledging the potential for human error at all levels

- Ensure systematic approach to best practice through proactive identification of risk, effective debriefing, learning from feedback and complaints and dissemination of learning

- Embed an understanding of HF principles and practices, including a commitment to developing genuine 'Learning Organisations'

- Standardisation of clinical care through guidelines, care pathways and protocols

Supporting commissioning and procurement that embeds HF principles and practices.

Health Education England (HEE) is exploring how Human Factors practices and principles can be included in the curricula and training frameworks for health professionals

The **Care Quality Commission (CQC)** is radically changing its assessment of quality in NHS organisations, and in doing so is embedding Human Factors principles within its assessment of how safe, effective, caring, responsive and well-led organisations are; with a particular focus on developing just and open cultures, that encourage learning from mistakes and consider how alert staff are to emerging risk.

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[16] http://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf

To improve recommendations on patient safety, the **National Institute for Health and Care Excellence (NICE)** is considering how evidence on Human Factors can be taken into account in the development of clinical guidelines. Human Factors are of undoubted importance in public health work, for instance around the management of outbreaks of communicable diseases and in the management of serious incidents.

Public Health England (PHE) is working with partners to identify how Human Factors principles can support the delivery of high quality, safe public and population health services that contribute to improving and protecting the public's health.

The **NHS Trust Development Authority (NHS TDA)** is considering how it can best reflect Human Factors principles as part of its oversight, support and development of NHS trusts.

The **General Medical Council** has reflected the importance of recognising Human Factors in the development of generic professional capabilities for post graduate medical curricula. The context for this is the GMC's core guidance for all doctors, *Good medical practice*, which sets out what is expected of doctors, including communication and partnership working with patients.

The **Nursing and Midwifery Council (NMC)** is interested in the impact of Human Factors on the practice of nurses and midwives. Human Factors will inform the review of their code of conduct and practice for nurses and midwives in 2014 and education standards in due course.

NHS Employers will use its extensive communication and engagement channels with NHS employer organisations to ensure that the evidence base for Human Factors and its practical application is made readily available. Through its work with employers on organisational development, cultural change and supporting values driven behaviour, it will ensure that this evidence base is incorporated into our programmes and resources.

The **Parliamentary and Health Service Ombudsman (PHSO)** is developing expertise in Human Factors science and root cause analysis to help providers learn from complaints through better understanding of why mistakes happen.

The **NHS Leadership Academy** is working to promote, educate and share the Human Factors principles throughout its professional leadership programmes and health system development work. In particular, it is ensuring Human Factors approaches are embedded in all of its programmes are integral to its online materials and included in conversations with partners, participants and patients.

The **NHS Litigation Authority (NHS LA)** is developing a Safety and Learning Service for the NHS to help learning from claims. In particular, the service is providing,

through a Safety and Learning Library, resources on all aspects of safety including that of Human Factors so that organisations can truly get to the heart of why claims occur and what can be done to prevent them in the future.

NHS England, together with other organisations, will:

Step 1: Communicate with commissioners and providers to increase their awareness and understanding of the concept of Human Factors, highlighting how the approach can be used to drive improvement in quality and safety

Step 2: Scope current capacity and capability in Human Factors and identify what support and development the NHS requires to fully harness the benefits of Human Factors approaches throughout the system.

Step 3: Develop programmes of work, based on Step 2, to be taken forward by organisations nationally, regionally and locally to enable the NHS to embed Human Factors principles and practices in its culture, systems and processes.

Appendix B: Human Factors in Healthcare - Examples of how the application of HF is having an impact to improve effectiveness and safety

1. Undertaking an investigation using HF approaches will ensure that the underlying causes of an unsafe outcome will be properly identified; action can then be taken to address these underlying causes and prevent future error and harm

   a. *A patient was given an unnecessary knee operation*

Two patients with the same name were set up with one set of medical notes and hence the same hospital number. They had different medical conditions that required hospital appointments in different departments; however, they both just happened to have knee pain at the same time. The wrong patient arrived and had the procedure intended for the other.

A HF investigation found that the causes of the error were:

• The hospital used patient identifier labels so one mistaken patient detail could be replicated many times.

   • An independent translator wasn't always available when either patient turned up for the treatment of their different conditions.

   • Four different hospital numbers were recorded in the patient's medical notes, along with more than one GP and several different addresses.

   • Neither the consent form nor the pre-operation assessment forms were properly completed.

   b. *A child with a known penicillin allergy was prescribed and administered an intravenous dose of an antibiotic of the penicillin class*

A child was due to have a pacemaker fitted. On pre-admission an allergy to penicillin was recorded. This was noted on both the nursing admission assessment form and the anaesthetic record chart. Prior to operation, the allergy was discussed with the specialist paediatric cardiology registrar, the consultant paediatric anaesthetist, anaesthetic specialist registrar and the cardiology consultant. However, following the procedure the patient's plan included intravenous and oral penicillin.

A HF investigation found that the causes of the error were:

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- Intravenous penicillin is the usual antibiotic used following a pacemaker being fitted. There was no up-to-date protocol on what other antibiotics should be used if a paediatric cardiac patient has a penicillin allergy, which initially caused confusion;

- There was no clear record of the allergy in the medical notes when the Consultant Cardiologist advised treatment;

- No system was in place to prevent penicillin prescription when a known allergy was recorded.

- A number of appropriate checks were not followed prior to administration of the antibiotics.

- During independent checks, neither nurse checked allergy status and both were under pressure to complete tasks. The patient's allergy band was on the same side as their identity band, both of which were covered with a bandage for an intravenous drip.

2. Designing a safer system; applying 'forcing functions' to prevent an errors occurring.

In the NHS, some clinicians are designing out error and preventing 'never events'by designing and innovating equipment that significantly improves patient safety.

An aspect of a design that prevents a target action from being performed or allows its performance only if another specific action is performed first. For example, automobiles are now designed so that the driver cannot shift into reverse without first putting his/her foot on the brake pedal. Forcing functions need not involve device design. For instance, one of the first forcing functions identified in health care is the removal of concentrated potassium from general hospital wards. This action is intended to prevent the inadvertent preparation of intravenous solutions with concentrated potassium, an error that has produced small but consistent numbers of deaths for many years.

3. Recognising that humans make mistakes; trying to minimise the risk of them doing so

Where forcing functions are not appropriate, in the complex interpretation of safety critical information, it is important that staff recognise that their judgement can be affected by fatigue, stress and lack of knowledge.

Misinterpretation of cardiotocographs (CTGs), poor documentation and failure to refer to a doctor are key trends in adverse neonatal outcomes. As part of the Patient Safety First Campaign, Leeds Teaching Hospital NHS Trust implemented a 'fresh eyes' approach to CTG ensuring that CTG traces are interpreted by more than one person. This approach recognised that factors such as fatigue, familiarity

and limited knowledge can lead to lack of objectivity and can impede accurate interpretation of a CTG. The trust took this a stage further and implemented a CTG categorisation buddy system where midwives on the delivery suite were paired together to make assessments of each other's CTG traces. Most hospitals use a pre-printed sticker that sets out the NICE criteria to determine if a CTG is to be categorised as normal, suspicious or pathological. The CTG classification is made at least every hour and a sticker is placed in the notes. However, this approach requires a buddy to independently assesses the CTG categorisation and countersign the sticker if they agree. If there is a disagreement the midwife and buddy will immediately refer the CTG to the midwifery coordinator and/or the registrar for their clarification. If agreement still cannot be reached, the CTG is referred to the consultant. Once categorisation has been agreed, guidelines set out an action plan based on NICE recommendations for CTGs found to be suspicious or pathological. A positive approach was also important, with the emphasis not on policing or checking midwives but rather about supporting midwives and making that support an integral part of clinical procedures. The system also had other benefits, providing a good learning opportunity to improve CTG categorisation skills and complement formal CTG training. Within the LTH's maternity units, the buddy system had become an integrated part of everyday practice and had been extend to antenatal fetal monitoring. This has made a huge difference to team working and neonatal outcomes.

In future, we need to think about the CTG interface. At UCLH, for instance, the interface used to be blue trace on blue background and other Trusts have both the maternal and fetal trace black on a black grid background. So there is a design solution that is stronger than the largely human action-based solutions Trusts have implemented at the moment. This 'forcing function' approach could be adopted and standardised across healthcare environments, reducing the risk of error and making it easier for clinician staff to get it right first time.

4. Redesigning the care environment for increased effectiveness and improved safety and wellbeing of patients and staff

There are many problems with the design of existing ambulances that impact negatively on patients and paramedics alike. Some of the most pressing issues concern the treatment space in the back of the emergency ambulance. This environment is difficult to keep clean given the frequency of use and the resultant lack of opportunity to scrub the vehicle down can lead to hygiene and infection control problems. Ambulance crews also suffer from poorly thought-out ergonomics, badly laid out equipment and difficult-to-access storage spaces, all of which can affect performance in critical, life-threatening situations. A multidisciplinary approach to ambulance redesign working with ambulance crews, healthcare providers and patient representatives; Helen Hamlyn Centre for Design and NHS London - Redesigning the Emergency Ambulance project

In order to understand the complexity of the ambulance service, research began with an immersive study that involved joining ambulance crews on several 12-hour shifts, riding in the vehicle on callouts and observing and documenting everything that happened. This gave the opportunity to interview ambulance crews, healthcare providers and patients in situ and observe issues first hand. Through these experiences and by working closely with an Emergency Care Practitioner who was seconded to the research team, key insights were gathered and translated into sketch designs. A full- scale rig simulating the existing treatment space was then created to mock- up ideas. Groups of paramedics were invited to engage and evaluate the different proposals, focusing on opportunities for development. This body of design work aims to result in a redesigned ambulance that will support a system of pre-hospital care and replace existing models as they become obsolete.

Appendix C:

HF related activities and endorsement for our Call for Action including a national resource centre and network for Human Factors; these are a representative sample only

Consultant Anaesthetist

I am a consultant anaesthetist and started training CRM in Simulation suites about 9 years ago. Whilst of huge value to an individual I perceived that this was not enough to bring about organisational change and so in 2009 I led **a multi-disciplinary HF programme in our maternity department**. This combined training in HF and CRM and coaching multi-disciplinary team leaders to introduce team based interventions in their work place. Our programme was evaluated using a before and after cultural survey and demonstrated positive changes in the teamwork climate and safety climate.

I am now **mentoring a regional HF programme in another maternity unit** and adopting the same teaching and coaching approach for introduction of team based behaviours. The Eastern Academic Health Science Network (EAHSN) funds this and early signs are positive.

The latest and most exciting initiative I am involved with involves **improving safer care in mental health, funded by The Health Foundation** and evaluated by UH and UEA. I am working alongside engineers from Cambridge who are experts in safety systems design. By combining their engineering expertise and my input on the teamwork and the cultural aspect of HF we are taking a deeper more rounded approach. In these programmes I also introduce an HF framework for analysing incidents.

As I have proceeded with my work in HF I have come to the conclusion that **Regional / National centres of excellence are essential.** I see them as being sources of resources for both training and coaching material, for case studies of methods of implementation in the workplace, for the training of HF leaders from those with expertise and as a source of discussion for the experts themselves. **HF is a way of being not a set of facts and is therefore a developmental process not an on/ off mechanism.** Development and changing a way of being require experience of doing and reflection on what the literature says and how you experience the world and development requires time and critical analysis. HF is a dynamic subject and new evidence is emerging all the time relating culture to outcomes and it would be easier if a National body collated this.

Consultant in Emergency Medicine

Thank you for the indication that progress is being made in integrating HF into the NHS and training. As a Consultant in Emergency Medicine with an ongoing interest in Human factors **I still struggle to identify the best way to help promote and integrate it into our culture and processes.** It still feels as though it is an optional add on and rather diffuse/obscure when attempting to promote it to people with less background knowledge and enthusiasm than the already converted/keen who are probably inherently ahead of the average and internalize much of the core.

I believe the establishment of a national body to provide strategic and practical direction is a good ambition. I suggest working with bodies such as the Resuscitation Council and Royal College of Surgeons – providers of the advanced life support (ALS)/ advanced trauma life support (ATLS)/ advanced paediatric life support (APLS)/ European trauma life support ETLS courses – and integrating more HF into their courses may be a more efficient direction to go than coordinating new and solely HF courses. It is not clear to me whether your energies and resources allow both approaches to be supported as each has its strengths and weaknesses. **Are there identified leads on HF in each of the Professional Colleges?**

Trustee: Confidential Reporting System in Surgery.

Support to a knowledge network and learning in real time. To minimise the chances of error it is essential that a service and the people who work within it can learn from mistakes and the precursor events and near misses that invariably precede them. I have no doubt that a detailed investigation is being undertaken within (named Trust). Nor that the findings will escalate through the serried ranks of provider, commissioners, NHS Boards and certainly the civil litigation system. **But where can surgeons in hospitals throughout the UK, who are leading the delivery of services, find and profit <u>now</u> from the learning contained within this and other 'Never' events?**

The Royal College of Surgeons published in March of this year a significant report, 'Building a Culture of Candour'. In this it makes clear that a **lack of general access to the details of 'Never' events and Serious Untoward Incidents is holding back the wider dispersal of learning from these mishaps and that it is the duty of Trusts to address a serious deficiency in closing this vital section of the learning cycle.** Until then all of us whether in practice or positions of leadership remain vulnerable to making similar mistakes and this is simply not good enough.

A leading Professor of Clinical Safety Research

I would be very glad to support the general proposal for a centre focused on human factors. As it's a 'how to' centre I think the academic links should be enhanced and potentially it should have an academic home base – which also is 'neutral territory' in the NHS. There is just so much relevant research in psychology for example (say on teams), which the NHS could use and is never accessed. I also think this might help get round the NHS initiative fatigue in the sense that something based partly outside the NHS would not have to defend its territory in quite the same way. **I am sure the xxx AHSN would support, also the Foundation Trust and a consortium of people that I could assemble; no doubt other academics will be making similar offers!**

Emeritus Professor, Paediatric Surgery

The case for a national human factors centre is well made and I guess it might be useful if the discussion document is accompanied by a very specific question of the Academy of Medical Royal Colleges. It is always easy to say yes in terms of support but I think it might be preferable, in my opinion, if they were asked to **provide evidence of integration of human factors into their specialty curricula training programs.** That I think would focus the minds of all specialties.

It would of course give the surgeons at head start and there may be some advantage but also disadvantage in that inasmuch as many of the other specialties would view surgery as perhaps the only discipline where this was relevant. I think your document counters that and we need certainly to get anaesthesia, obstetrics and gynaecology and indeed all other interventional specialties showing evidence of human factors training. But if this is considered-as I suppose that we all do-to be an **integral part of enhanced performance and safe performance** then it will affect everyone. So their endorsement would need to be accompanied by that of the General Medical Council[17]

General Medical Council

We welcome the proposal for a national resource as a means of providing direction and guidance across the NHS and pushing forward the HF agenda. Such a resource could sit well with and bring some coherence to the current thinking on common regulatory approaches, particularly standards that support patient safety. It would undoubtedly demonstrate active leadership following the recent high-profile inquiries, which have underlined the importance of HF issues.

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[17] Endorsement below

We also think that a national resource would help highlight the importance of professionalism and professional practice. Against this background, **we agree that HF must not be seen as a 'bolt-on' or part of the tick-box culture; but rather, as we have argued with generic professional capabilities, that HF underpin and are integral to good clinical care.** We would be very interested in providing support through any oversight or reference group you may have in mind for developing proposals.

Chair of an NHS Arm's Length Body

This is fascinating, challenging, and really important. Please let NHS England know of my complete support for this proposal and my personal commitment; the design of safe systems and standards, the commissioning of services with for safer outcome, learning from investigations and action taken to prevent future harm and error reduction through to inspection, monitoring and regulation. **We need the whole system to be aligned and a national resource and knowledge network is essential in our now fragmented healthcare system.**

Medicines Management Lead

I am very supportive of the plans to develop a national body to implement HF in Health and social care. I think this should have a small core team (akin to the NICE Implementation Collaborative hosted by NHS England) and should use the resources of AHSNs and Patient Safety Collaborative to implement change locally. **Ideally an existing body such as Health Education England or NHS Leadership Academy or NHS IQ would host this.**

Public Health Wales

We would support the setting up of a national body although the relationship with NHS Wales would need some consideration. As well as integration into existing QI and patient safety work it would be **very helpful for a national body to work with HEIs to set up a series of qualifications in HF with standardised curricula. Thus an MSc, BSc or practitioner qualification in Human Factors in Healthcare would mean something, and more importantly, the same thing wherever it was awarded.**

Private Sector CMO

I do think there is a need to establish a body such as this - DH workforce directorate used to be nominally responsible but the review I was involved with did show very clearly the same effect you have centred on in East midlands - **pockets of excellence exist but there is no systematic means of spreading good practice and resources get wasted reinventing wheels or simply not recognising that a wheel exists!**

Whilst accepted and supported quite widely the recommendations of the 2009 review on **the link between staff health and wellbeing and organisational performance, patient outcomes and regulatory performance are still very patchily applied and multiple trusts are currently downgrading rather than up grading their OH support to staff** - with data such as published and further data from Aston University now clearly showing the trends in patient mortality linked to staff engagement. I would like to see health more specifically included within any future terms of reference (yes it's a human factor, but it's all too often left out). **Staff health is critical to efficiency, quality and safety, and so I think needs inclusion in the expertise that any national centre can deploy**

Renal Consultant

I most definitely support the formation of a national group not only independent from the NHS but also from short-term political influence. **I have the understanding and willingness but not the tools.** My memories of life as a junior doctor are fresh and my exposure to systems of care enhanced by my Consultant role but ultimately my greatest exposure was my year on the CMO scheme 2009-10.

HF expert

I am involved with the group of Psychologists looking at the Francis report. I am a Masters graduate in Organisational Psychology and a psychometric assessor and lecturer and have a keen interest in this area with this background and also having seen my aunt go from having a stroke to having her leg amputated with a number of failing along the way. I am keen to help in whichever way I can and above all **support the need for patient safety representatives to be present in hospitals and also for simple procedures to be looked at for example procedures with patients notes are they accessible and up to date, the use of check lists etc. It seems to be there are many lessons to be learnt from other disciplines especially aviation and in many cases the answer is there, but the NHS just has to find them.**

Public Health England

PHE is very committed to applying human factors science to our safety work. We have parts of the organisation where there is a strong culture of safety and learning from mistakes, and others where this is relatively unknown territory. **I think we can learn a great deal form the work that you are leading and also, I hope, to support you in that work.**

Foundation Trust Network

We circulated your letter below along with an update on yesterday's patient safety announcements to all our member chief execs, strategy directors, clinical leads

and chief operating officers – hopefully that reaches a wide audience across trusts. We included your details to sign up to the proposal. I've also passed your contact details to our networks team with a note about your interest in NEDs, clinical leads, Finance directors etc – and we hope Martin will be able to speak at our annual conference in November

Action against Medical Accidents

I am very supportive of the work on Human Factors and would like to see it funded. I do have one doubt about the appropriateness of this bid leapfrogging over other projects badly in need of funding (not least amongst these is funding for the kind of work AvMA does in supporting and advising patients/families when things go wrong and supporting/representing the patient voice in patient safety work). **We keep getting told how vital all of this is and various reports have identified the need to fund and develop this work but we never seem to get any funding.** When we ask about it we are referred to funding programmes like section 64 but the criteria almost always rule us out. There needs to be an open and transparent way of projects getting funding.

Health Education England

HEE are working strongly nationally and in some regions on their HF Concordat commitment. Strong support to the establishment of a HF Resource Centre and their commitment is to:

- **Provide their networks for HF Resource Centre** as a core vehicle to engage and communicate with education providers and front line service providers on reskilling and training the workforce on human factors and to use their Telehub/Innovation portals
- **Support system alignment and engagement for HEE to be a core to support, align and drive this within the NHS**; suggested that HEE, NHS Employers and NHS E (system leadership and commissioning) with a link to the Faculty of Medical Management Leadership (2000 members after a year already with a big demand to support clinical leadership

Leadership Academy

The Leadership Academy has been designing in Human Factors methods into its professional development programme and there is an opportunity to include HF methods in the LA's extensive behavioural change programmes sounds fabulous.

Two areas of work that are being developed are master classes on specific topic areas and guest blogs to engage with the LA's extensive networks (clinical,

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managerial, professional and management programmes); there is a proposal to design a Human Factors master class sounds a wonderful idea and link with the blogs Clinical Human Factors Network and blogs through the Health Foundation network. Support for the securing additional resources to enable provider, commissioners and wider NHS supporting organisations and ALBs develop the HF approach.

NHS Employers

Very strong support for Human Factors and the proposal for a national and regional network and resource centre

Professor of Epidemiology and Public Health and Associate Dean for Patient and Public Engagement

I am currently involved with the programme on implementation of Shared Decision Making supported by the Health Foundation. I've created academic links with both the Australian Commission on Quality and Safety in Health Care and with Jeffrey Braithwaite in Sydney and who has written some great stuff around high reliability organisations.

Consultant Physician in Acute & General Medicine

I've been talking to a few regions about establishing HF training. At the moment, its pretty ad hoc- but reassuringly looks like most are taking an "NHS" route, using capability within to disseminate knowledge via train-the-trainer. I think this will deliver best value long term and also be a "credible" way of sustaining the knowledge.
Our stumbling block at trust and regional levels might be lack of expertise and funding for trainers, its tempting to suggest a nationally held body of expertise (to cover all aspects of healthcare) that can be "loaned out" to regions. My impression is that each region probably has a few "experts" in general aspects of HF with some specific areas of interests. These interest areas are not limited to specialties (e.g. surgery vs. medicine vs. primary care vs. mental health) but also QI, Root cause analyses, leadership and training programmes. **By sharing, we could actually get a pretty comprehensive faculty and spread of specialty knowledge.**

I'd love to know what specialties are more likely to have these unsafe events, in what environments, time of day, day of the week and at what time period of the admission. Locally 83% of all deaths are in General medicine. there are very few surgical deaths.

Theme based analysis and case discussions are something I have been trying to do with Multidisciplinary Morbidity and Mortality meetings locally. Based on the hypotheses that sepsis, deterioration and handover/communication were going to be our big three themes- these were our first three topics.

Anecdotally, when we do local mortality reviews there is a trend of finding patients who do not get the senior review early enough in their deterioration (probably because of poor handover, hierarchical and historical reasons)- particularly at weekends or in the out of hours. The person related human factors that impair these are compounded by system failures, particularly when patients cross-chronological (shift to shift), geographical (community to admission) or silo boundaries (specialty to specialty handover). **In the light of these clear policies, guidelines and pathway need to be taught & embedded, and standardised across the NHS**

I suspect **we still have a very small proportion of preventable deaths that actually get reported, and even retrospective analysis of notes of patients that die- sometimes doesn't either spot that an intervention might have made a difference or its root cause.** I still "find" cases that are mysteriously not labelled as "SIRIS" (serious incidents requiring investigation), and would have remained unreported if I had not stumbled upon them. **The close liaison between NRLS, this theme-based approach to data analysis, the new Patient safety board at Health education England and Human factors all need to be tied together in an improvement programme.** Now we know where Safety and Data capture will be, the remaining question is where Improvement will sit and how all of these closely will interdigitate.

David Haslam, Chair NICE
Fully supportive of our proposals; the healthcare system isn't designing itself for safety. **We need to move beyond fine words but no one is leading.** We need to make connection with Procurement and Innovation to optimise NHS purchasing power

NHS Trust in the Midlands

I am writing on behalf of (Trust name) to offer our support to the establishment of a national resource centre and knowledge network.
 We have long been supporters of human factors, have trained significant numbers of staff in the past and still use the expertise of human factors experts to help us in areas of post incident learning and team building etc. We have a service called Clinical Evidence Based Information Service (CEBIS)– this service is used at an individual patient level, disease level and service/corporate level to help improve effectiveness and safety of care. If you think this particular function could be

helpful to you from time to time, we are happy to offer it as a sign of our support. **I support completely your aims and objectives around the use of human factors in healthcare – I firmly believe its wide adoption is the only way we will be able to achieve a significant step change in patient safety.**

I would like to suggest one further area that to my mind is key to this and that is the **adoption of human factors training in ALL healthcare professionals training** and indeed the use of human factors principles in the recruitment of our future healthcare professionals. The NHS can go a long way to provide awareness training to our current staff and provide refresher training annually but until we have constant conveyor belt of healthcare professionals entering our services who have human factors embedded in their DNA so to speak then this will become an exercise that will be a little like painting the Forth Bridge and indeed will be unsustainable financially.

National Institute for Clinical Excellence (NICE)

The executive summary reads very well. I've highlighted some of the areas below that I think NICE might be best placed to help with, primarily in the context of evidence- based guidance:

- Evidence base for undertaking investigations into unsafe care; applying human factors methodology and the learning from other industries

- Cultural assessment tools and decision support tools to apply when things go wrong; what's the evidence for these and should there be a standardised approach to their use NHS wide?

- An overall safety systems approach; healthcare has this for environmental safety, health and safety but not yet for patient safety

NHS Confederation

This approach sits squarely with one of our "asks" in our 2015 Challenge - that all organisations implement the recommendations from the Berwick report on quality improvement

I think the sum you have requested will only deliver the impact you seek if it levers change in a much greater amount of expenditure - on training, service delivery, regulation etc.

I would be happy to arrange a meeting with Confederation and Employers colleagues to consider how we can support the work. I note NHS Employers are already quoted throughout

Healthcare Special Interest Group of the Institute of Ergonomics and Human Factors.

We held our first patient safety symposium in November 2013 and are now planning the next on November 3rd 2014. The programme includes three invited keynote speakers and a series of refereed presentations by human factors researchers. Given your current focus on the National Quality Board Concordat, would be interested in delivering a keynote address during the day; your views and experiences would be of great interest to the group. We would greatly value your input and expertise.

Clinical Fellow to Dr Mike Bewick, Deputy Medical Director at NHS England & National Medical Director's Clinical Fellow Scheme

Overall, I like the concept of the resource centre and knowledge network and feel that it would occupy a gaping lack in knowledge, skills and capacity.

Fundamentally, this has to be relevant to everyone from board members to the junior doc at 3am and porter. My feeling is that training and education, along with revalidation are powerful drivers here. Getting HF into curriculums in med school, Foundation training and higher training as compulsory modules is vital and complements the movement towards teaching quality improvement techniques. Similarly, making it mandatory for trainees and consultants to show evidence of reporting, investigation and learning for appraisal and revalidation would help. The role of trainee clinicians (the next generation) has GOT to change and they should be empowered to drive change at the front line.

At present, the responsibility and outcomes from RCAs and associated learning is devolved away from the front line. I can't recall the last time I was told about the outcome from an incident report that I had filled in. This has got to change! It is appalling that 60% of reports in the NRLS are not even read for reasons of lack of capacity. The technology now exists to make the system incredible powerful, particularly around near-misses and low harm.

There is a lack of emphasis in the proposal on primary care (where 90% of patient contact takes place). I am attaching a narrative written by a colleague of the context around the lack of reporting and learning mechanisms.

In more general terms, I wonder whether I might, at a future meeting, introduce you to BMJ Quality http://quality.bmj.com? This is a fantastically powerful tool for delivering learning, allowing the implementation of local change and evaluation,

and reporting via a BMJ journal. Many healthcare organisations are now using it and it may well satisfy a number of your objectives.

HF Expert, Health Foundation fellow and expert in safety, regulation and investigation in other industries and healthcare

This is massively important work and has my full support. **This is critical work and there just isn't any organisation or body that can support and lead on this work in the NHS at the moment.** If anything, I would like to see this be more ambitious with a core HF integrated into an independent investigation agency providing a real weight of expertise and ability to actively intervene after adverse events too, along with directing recommendations at all other NHS organisations (regulators included) based on solid HF and system safety thinking. Perhaps a dream but one of the critical aspects missing in the NHS patient safety system at present.

I also wonder if it might be worth expanding the term of "human factors" somehow to include an "and…". My background's very much in HF and I feel that most of what I do is within what you're describing, but I perhaps wouldn't term all of it human factors. The field of HF can be quite a niche area mostly populated by psychologists (even speaking as a psychologist myself!); just a thought in terms of avoiding any potential of creating a new silo of expertise. Perhaps it could be expanded with an "and system safety" or similar, say human factors and safety sciences by way of an indication of ambition and breadth. I'm mindful that words are both trivial and critical, and my sense is this is all about drawing in and appealing to design engineers, system safety analysts, (high) reliability experts, cognitive anthropologists and all those other rare breeds who don't always naturally identify with the term human factors… There are of course bigger strategic issues at play than nomenclature, though it could be important in terms of building a broad coalition and a big tent.

Patient Safety Expert and leader of international and UK programmes; President of Infection Prevention Society

Thank you for this opportunity to position the prevention of healthcare associated infection as integral to the reduction of avoidable harm across healthcare, and for which application of human factors principles plays a critical role in strengthening moving forward. We applaud this work and the urgency associated with it in order to save lives. We fully support the establishment of national body to provide the strategic direction

I think this "cargo cult quality improvement" idea is useful to understand why implementation fails - we put in place the trappings of improvement without understanding and addressing the complete picture (the culture, the context etc).

"In the South Seas there is a Cargo Cult of people. During the war they saw airplanes land with lots of good materials, and they want the same thing to happen now. So they've arranged to make things like runways, to put fires along the runways, to make a wooden hut for a man to sit in, with two wooden pieces on his head like headphones and bars of bamboo sticking out like antennas—he's the

controller—and they wait for airplanes to land. They're doing everything right. The form is perfect. It looks exactly the way it looked before. But it doesn't work. No airplanes land. So I call these things Cargo Cult Science, because they follow all the apparent precepts and forms of scientific investigation, but they're missing something essential, because the planes don't land. (Feynman 1999, 208)"

When QI initiatives are implemented without a proper understanding of what they involve and how they work, they similarly risk becoming distorted imitations that succeed only in reproducing the superficial outer appearance but not the mechanisms (or set of mechanisms) that produced the outcomes in the first instance. In new contexts, not having a well-explicated program theory risks the program's failure.

I think a social science input can help us take a fantastic leap forward with QI and is part of an holistic approach to Human Factors and why things do not work as we might expect.

Consultant, Critical Care

I would like to link in to NHS England and whoever can **help facilitate overcoming the impediments to innovation.** I think I would have a lot to offer contributing to the work of the wider NHS related to innovation and safety.

I have developed 9 safety innovations over 20 years. I have innovated in a number of countries around the world and recognise the problems that inhibit success in the NHS. Most of our projects are in partnership with our excellent regional NHS Innovation hub and the AHSN. I do however have significant local obstacles that I think the NHS could learn from my experience.

The most important innovation for the NHS is the PneuX Pneumonia Prevention System as pneumonia is associated with the greatest nosocomial mortality in the ICU. I also have 3 simple innovations that make 3 never events impossible, but crucially do not add any risk or inconvenience to the procedure.
I have thought about the things that would really help make things happen with our innovations. We are on the cusp of something great!

- I would like to start an NHS project to eliminate 3 Never events across the NHS then globally with engineered solutions. Firstly, central line wire retention, secondly IV misconnection of local anaesthesia and preventing peripheral administration of centrally administered drugs and thirdly misinjection into, and mis-sampling of, an arterial cannula. This I believe would be a powerful safety benefit for the NHS to spread around the world. With our NHS innovation hub and the AHSNs and some central funding and more importantly support from NHS England I am certain I can do this.
- A top down (I know this is not trendy at the moment) funded implementation of a Pneumonia Prevention System in ICUs, so the clinicians and managers do not have to consider up front cost and are incentivised to prevent bacterial colonisation of their patients lungs.

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- The ability to work unimpeded by unnecessary bureaucracy on all these and other projects
- I would like to contribute at a higher level in NHS England with regard to innovation and safety

NHS Foundation Trust – Director of Organisational Development

My own view (and that of many of my colleagues) is that the biggest way to make a difference is to support the front line staff. Training the clinical staff at the coal face with regard to situation awareness, team group climate, authority gradients etc as well as using checklists as a welcome tool to make a difference rather than a burdensome tick box exercise is the way forward. I think the only way to do this effectively is interactive group teaching with lots of games and discussion, perhaps with follow up sessions.

I was slightly anxious regarding the links I followed from the Concordat. Much of what I read focused on boards being instrumental in driving through human factors in the organisation through leadership (nothing wrong with good leadership). There appeared to be many grand mission statements but no clear path through the organisation as to how this would be delivered to the healthcare assistant who finds themselves in a vascular theatre at 4am with things going horribly wrong.

This top down (expecting it just to filter through) sort of approach is why many good initiatives crumble. If you map out the structure of a district general hospital from the chair downwards you will find yourself going through layers and layers of senior management and middle management before you get right down to the clinical staff.

That is why I think that **the majority of this work, but not all, has to start at the front line and go upwards. To do this I think we need small groups of clinicians from individual hospitals who are centrally empowered and resourced to develop and deliver standardised training packages along the lines of ATLS, BLS etc.**

We are however anxious that: (1) commissioners will use human factors as a stick against hospitals, not as something that they should actively be providing money for thus leaving the burden of cost yet again on secondary care and (2) the response from most hospitals to the Concordat will be a meaningless mandatory on line training package with an MCQ at the end which will totally disengage staff but more importantly not lead to change.

Sorry but hospital boards are pretty remote from the frontline especially at 4am.

I am still keen to know more and get involved especially if it helps us deliver better care for our patients. Many of the staff that I have been involved in teaching/talking to about HF have found it a very valuable experience, (not all though as you will always find those who are just not interested).

Appendix D: Initial resource plan - Health Human Factors Resource Centre and Knowledge Networks

Core resources: £2.1 million

HF Knowledge Centre and Networks
- Establish virtual 'one stop shop' of HF for health HF resources, providing advice and coordination across Regional and other networks on HF
- Web and social media knowledge sharing updates for HF
- Patient and staff engagement programme
- Integration and support to Sign Up to Safety, PS Collaboratives etc

Investigations Expertise and support
- Investigations review; do incident investigations lead to learning and action: 100 investigations in 100 days (in response to Ombudsman recommendations)

Commissioned reviews
- Safety system redesign through HF; short evaluation of health care industry
- Learning from other industries evaluation

Safety Culture tools; the Incident Decision Tree implementation
- Technology support and training resource development
- Programme management, training, implementation support & evaluation (3 acute, 2 mental health, 2 community, 2 primary care and 2 social care)

HF Concordat collaboration and support
- Policy/stakeholder engagement; within NHS, healthcare and high risk industries
- HF expertise and support and coordination to HF Concordat signatories

Human Factors tools and methods
- Business cases for applying human factors e.g. equipment procurement
- Adaptation of other industry tools; standardisation, equipment design etc

Leadership & staffing
Lean flexible staffing at least half of the resource being used to commission activity and engage with others. Core staff of 15 people with 50% of funding spent on commissioning activity, running campaigns, office support etc
- Chair/Board of HF experts and NHS leaders including clinicians & academics
- Resource Centre Director/CEO
- Industry HF lead; learning from & with other industries for system redesign
- Policy & stakeholder lead/liaison with HF Concordat members plus assistant
- Comms/social media lead
- Education/training academic HF lead
- Patient engagement lead
- HF expert/practitioners; commissioning and delivering HF tools, linking with clinical and other NHS HF clinicians
- HF investigators; 2 (staring with 2 and building up with matched income)
- Project manager/secretariat/admin manage plus assistant

Appendix E: Human Factors in healthcare and other industries

Key Human Factor Issue	Description	Aviation	Process sector: offshore, chemical…	MOD: equipment design e.g. tanks	Rail	Construction	Nuclear	Healthcare
Industry Safety Trigger	Signigicant event that gave the industry a 'wake up call that led to action and safety impact	Tenerife 197&Kegworth 1989	DuPont 1925 Piper Alpha 1988Deep Water Horizon 2010	Falklands	Clapham 1988 Ladbroke Grove 1999 Hatfield 2000	HSE legislation	3 Mile Island 1979Chernobyl 1986	Organisation with a Memory 2000 Wayne Jowett 2001 Bristol Heart Inquiry Francis report into Mid Staffs 2013
Safety system design and management	Is there industry expertise in designing safety through HF?	Yes. Human Factors embedded in operations and safety and often tested through simulation	Yes. Expertise within consultancies and research institute and within organisations formally gained through qualifications such as Masters in Ergonomics.	Yes. MOD employs human factors and psychologists directly and also tenders research questions relating to human factors to seek external expertise.	Psychologists employed within the rail sector and HF experts employed within sector. Lots of HF consultancies who specialise in rail. Strong management systems needed to secure licenses.	Not in smaller co's but at sector level the construction sector has done some excellent work around building safety cultures (e.g. Olympics 2012) & is beginning to embrace behaviour change and worker engagement often supported by trade associations	Yes. For example Site Licence Companies have 'Suitably Qualified and Experienced Personnel' (SQEPs) in HF	HF Concordat signed up by signature organisations as part of thr NQB. Implementation plans are very immature. No national coordination in place. Safety design not developed as integrated approach; patient safety, staff safety, environmental safety etc
Managing Human Failures	Understanding of different types of human failure (eg errors, mistakes, violations) and how to control for them	Routinely monitored and formally assessed and developed to technical and non-technical framework					Employ HF experts in house	Investigations into unsafe care aren't fully identifting the causal factors; Ombudsman calling for use of HF in investigation and for learning and action
Staffing	Staffing levels; workload; Supervision and management of contractors	?	Skills shortage with ageing workforce. No effective	Not applicable				Greater recognition of the impact staffing levels have on safety and quality of care; NICE guidelines issued

Key Human Factor Issue	Description	Aviation	Process sector: offshore, chemical…	MOD: equipment design e.g. tanks	Rail	Construction	Nuclear	Healthcare
			way of assessing					
Fatigue and shift work	Are shifts designed to maximise human performance and minimise failure?				Train operating companies are good. Freight companies would be orange		Outages are a big issue for fatigue and shift work	12 hours shifts are routine What's the safety case, challenge and action plan?
Communications (spoken and written)	E.g. access to risk assessments, safety warnings, shift handover. Includes day to day operational awareness.							Lots of handover meetings. Minimal HF input? Is the SBAR guidance (human factors designed) applied widely?
Human Factors in Design	Physical environment; equipment, alarm management etc	Embedded through design at manufacturer level based on internationally agreed usability standards (developed from science and accident data)	Some but not enough. Lots of retro-fitting	Leading edge. Lots to learn from MOD.			Some retro fitting	Some in equipment, medications and devices, little in physical environment. Poorly coordinated; not industry wide.
Procedures	Are there agreed procedures for safety critical tasks **that have been developed** with people who have to follow them		Too many procedures? Over-reliance on permits to work. Limited task analysis					Lots of procedures; 500+ that an acute hospital junior doctor needs to know. Have frontline staff been involved in their development? Are they designed for safety? Are they workable?
Competence	Are staff competent (knowledge; skills; attitudes and behaviours) and are these formally					Only focused on technical competence (e.g. can you plaster?)		Training is focussed on technical with 'managers' given access to non-technical skills training; team development and simulation based training in

Key Human Factor Issue	Description	Aviation	Process sector: offshore, chemical...	MOD: equipment design e.g. tanks	Rail	Construction	Nuclear	Healthcare
	developed and monitored							pockets only
Organisational change	Are direct **and** indirect consequences of changes to organisations considered? E.g. changing staffing levels, combining departments etc	Yes		Not applicable			Safety cases have to be made, but unclear as to whether HF considered in all cases	No safety case requirement for organisational change
Organisational culture	'The way things are done.' Is it geared for safety, or is production/target-meeting?	Safety is accepted at all levels as the key driver. If safety and productivity unable to be jointly achieved safety comes first			London 2012 leading edge as is Crossrail but less so with smaller providers			Greater recognition that the NHS needs to be a learning organisation to deliver safety
Maintenance, Inspection and Testing (MIT)	Is there a rigorous MIT programme in place? Does it look at both the outputs and also the process?	Although orange, still good compared to other sectors						Equipment safety does not sufficiently focus on 'in use' – when people make mistakes in using equipment, devices etc; need to design error out
Learning lessons from when things go wrong	Are incidents investigated with HF consideration and are lessons distilled and communicated through organisation?	HF experts involved in investigation of serious incidents						Learning is patchy; investigations do not fully identify causal factors, action taken to address is not widely disseminated – mechanisms for doing so are not well developed
Education	Does HF form part of professional learning curricula?	Yes, formally tested at early stage of pilot training and						Commitment to do so in HF Concordat; some training but patchy

Key Human Factor Issue	Description	Aviation	Process sector: offshore, chemical...	MOD: equipment design e.g. tanks	Rail	Construction	Nuclear	Healthcare
		ongoing assessed						
Leadership at all levels	Do people understand the impact of leadership on safety at all levels of leader (from Board through to peer leaders).	Yes generally but some areas can be weaker				Larger organisations better than smaller contractors		Post-Francis; wider understanding and commitment but doesn't yet have the impact across the NHS. Not designed into commissioning or procurement
Team working	Ensuring that inter and intra team working is effective. E.g. team dynamics, and communication.	CRM well embedded in flight and cabin crew, human factors taught at engineering level, other staff not always involved						Being recognised as an issue but not widely addressed; good work on Safe Surgery as part of national implementation

KEY: GREEN: Industry doing something. ORANGE: Some progress but areas of weakness. RED: Needs work. GREY: Not applicable/unknown.

Analysis provided by HSL, part of the UK's Health & Safety Executive; over 100 years of experience in providing of health and safety solutions to industry, government and professional bodies.