Evidence scan:

Measuring safety culture

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Contents

Key messages

Measuring the safety culture of an organisation can provide insight into areas for improvement and help monitor changes over time. Several tools have been used in various healthcare settings.

Safety culture

Safety culture refers to the way patient safety is thought about and implemented within an organisation and the structures and processes in place to support this. Safety climate is a subset of broader culture and refers to staff attitudes about patient safety within the organisation. Measuring safety culture or climate is important because the culture of an organisation and the attitudes of teams have been found to influence patient safety outcomes and these measures can be used to monitor change over time. It may be easier to measure safety climate than safety culture.

This research scan provides a brief overview of some of the tools available to measure safety culture and climate in healthcare.

Tools

The most rigorously tested and well known tools are:

– Safety Attitudes Questionnaire
– Patient Safety Culture in Healthcare Organisations
– Hospital Survey on Patient Safety Culture
– Safety Climate Survey
– Manchester Patient Safety Assessment Framework

These tools have the largest quantity of empirical evidence about their use, but numerous other tools are available. Safety culture and climate tools have also been used in industries such as aviation, transport and energy production.

Implications

From the available research, it is not possible to recommend one tool as the most effective or efficient for use by healthcare teams in the UK, but the evidence does tell us that some tools, such as the Safety Attitudes Questionnaire, have been more widely tested than others.

Tools that are short, easily repeatable over time and adaptable to various contexts may be most practical.

However, the literature highlights the need for caution. Some studies suggest that tools are not always transferable from one context to another, such that a tool that works well in an intensive care unit (ICU) does not necessarily work well for emergency services. Furthermore, tools that have been validated in the USA have been found to have issues when applied in the UK. This emphasises the importance of testing, validating and sharing the results of any safety culture tool used in the UK, rather than assuming the tools constructed elsewhere will be sensitive and appropriate for the UK.

1 Scope

This research scan focuses on how various tools have been used in practice and highlights the potential strengths and weaknesses of tools as outlined in published research evidence. The research scan is a starting point to ignite debate, rather than providing answers to the question of which tools are most beneficial.

1.1 What is safety culture?

Millions of people use NHS services every year with positive outcomes. However, the systems and processes organisations use vary widely and there is scope to improve the quality, consistency and safety of care. In recent years there has been an increasing focus in the UK and internationally on approaches to improve safety and this has led to greater recognition of the importance of the culture of organisations and teams in the improvement process.

A number of surveys, frameworks and assessment tools have been developed to understand what type of culture an organisation has, whether it is ready for improvement initiatives and the factors that may most help or hinder improvement efforts. General 'organisational culture' tools of various types are available, as are tools specifically to assess safety culture.[1]

'Safety culture' is broadly defined as:

A global phenomenon and encompasses the norms, values, and basic assumptions of an entire organisation. Climate, on the other hand, is more specific and refers to the employees' perceptions of particular aspects of the organisation's culture.[2]

The terms 'safety culture' and 'safety climate' are sometimes used interchangeably, but in academic and research literature, the terms tend to be given distinct meanings as follows.

Safety culture

Safety culture is part of the overall culture of an organisation. The term first became popular following the Chernobyl nuclear disaster when it was suggested that organisations can reduce accidents and safety incidents by developing a 'positive safety culture.'

The notion of safety culture is not unique to healthcare, and has been used extensively in the oil, gas and energy industries, the transport sector, aviation and military, amongst others.

In healthcare, over the past two decades, messages about building a positive safety culture have been reinforced in policy documents, guidelines and national priorities in the UK, Europe, North America, Australasia and some parts of Asia.[3,4]

Organisations with a positive safety culture have communication based on mutual trust, shared perceptions of the importance of safety, confidence in the effectiveness of preventive measures and support for the workforce.

Different tools and frameworks include varying characteristics of safety culture, but the overarching theme is assessing the extent to which organisations prioritise and support improvements in safety.

Safety climate

The term 'safety climate' is sometimes used interchangeably with 'safety culture.' To others it has a specific meaning and is a subset or component of safety culture. In this view, safety culture is a broad term representing all aspects of an organisation's values and actions related to safety, whereas safety climate focuses more on staff perceptions about how safety is managed in their organisation.

Some suggest that it is easier to measure safety climate because culture is much broader, whereas climate focuses on staffs' current perceptions of safety in relation to management support, supervision, risk taking, safety policies and practices, trust and openness. Safety climate is also thought to be more likely to show change following interventions.

In this scan, tools using both terms are included but it is important to note that some tools look solely at staff perceptions (safety climate) whereas others aim to look at broader metrics (safety culture).

These definitions are not used consistently throughout the literature. So, for the purposes of this scan, we have used the term 'safety culture' to include assessments of both culture and climate.

1.2 Purpose

One of the benefits of measuring safety culture is that it provides a tangible indicator of the current status and progress over time of organisations and teams implementing improvements. Other measures of patient safety such as error rates are beset by reporting errors. Outcomes measures may also be insensitive or take a long time to be impacted by changes in processes and systems.[5,6]

Techniques such as chart review and observational studies can be effective for detecting changes in patient safety but are labour intensive and difficult to sustain on an ongoing basis.[7] In contrast, measuring safety culture can be relatively inexpensive, sustainable and is a 'leading' rather than a 'lagging' indicator of safety.[8]

Knowing how best to assess safety culture is important because these tools may help organisations assess their readiness, facilitators and barriers for change, thus giving them more information to aid improvement. The Health Foundation is interested in knowing what tools exist so it can help NHS organisations consider the most appropriate measurement tools for the local context.

Therefore, this research scan summarises readily available published evidence about tools to assess safety culture in healthcare organisations.

1.3 Focus

The scan addresses the following questions:

– What are the main tools that have been used to assess safety culture in healthcare organisations?
– How were they developed and by whom? (where this information is available from research articles)
– What are the criteria for using the different tools? When can they be used?
– What are the strengths and weaknesses of the tools?
– How have the tools been used in practice to aid improvement?
– Are there any practical implications if one tool is used over another?

The focus is on any practical suggestions for healthcare teams considering using these tools.

This section outlines the methods used to collate information. The following sections address the questions above briefly in turn.

There is a separate section for each of the most commonly used tools.

1.4 Methods

To collate evidence, one reviewer searched bibliographic databases, reference lists of identified articles and the websites of relevant agencies for information available as at early January 2010.

The databases included MEDLINE, Ovid, Embase, the Cochrane Library and Controlled Trials Register, PsychLit, Google Scholar, the WHO library and the Health Management Information Consortium. All databases were searched from inception until present.

To be eligible for inclusion, studies had to:

– be primary research or reviews
– be readily available online, in print or from relevant organisations
– be available in abstract, journal article, or full report form
– address one or more of the core questions listed
– be available in English or readily available for translation.

We scanned more than 33,000 pieces of potentially relevant research, selecting the most relevant to summarise here. No formal quality weighting was undertaken within the scan, apart from the selection process outlined above. More than 100 studies were synthesised.

Data were extracted from all publications using a structured template and studies were grouped according to key questions and outcomes to provide a narrative summary of trends.

1.5 Caveats

When interpreting the findings it is important to bear in mind several caveats.

Firstly, the research scan is not exhaustive. It presents examples of available research but does not purport to represent every study about safety culture assessment tools. The purpose is to give a flavour of available research rather than to summarise every existing study in detail.

Although there are a number of descriptive articles available overviewing tools and their history, the research scan focused on empirical studies so narrative material was often excluded.

Secondly, it is difficult to make robust comparisons because the research uses various definitions of safety culture and safety climate and these terms are sometimes used interchangeably. To overcome this we use the term 'safety culture' throughout, but note when tools focus on a specific component, such as staff attitudes.

Conclusions about the usefulness of certain tools are problematic because there are differences in the healthcare contexts in which studies took place. For example, a tool that has worked well in US primary care, may not necessarily have the same benefits when used within primary care or secondary care in the UK.

Even where comparable definitions are used and geographic contexts can be compared, the level of detail reported is sometimes insufficient to consider the practical implications of the tools.

Thirdly, it is important to raise questions about the quality and scope of the included studies. Most research is largely descriptive in nature, focuses on testing the properties of a tool at a single site and does not make comparisons between tools.

There is a lack of evidence about the strengths and weaknesses of various tools and about the practical implications of using them in different settings. This lack of evidence does not mean that specific tools are ineffective or unhelpful, just that little research is available about them.

Numerous studies have been published about some tools, but there is little evidence about other tools or unnamed tools that may have worked well in specific local contexts.

These caveats are all important when considering the synthesis of material overleaf.

2 Commonly used tools

This section focuses on some of the more widely known tools. Surveys that focus on safety culture are outlined first, followed by those measuring safety climate.

2.1 Overview

Numerous different tools have been used to assess safety culture and climate around the world, such as:[9]

– Checklist for Assessing Institutional Resilience
– Culture of Safety Survey
– Danish Patient Safety Culture Questionnaire
– Error Orientation Questionnaire
– Hospital Culture Questionnaire
– Hospital Survey on Patient Safety
– Hospital Survey on Patient Safety Culture
– Manchester Patient Safety Assessment Framework
– Nursing Unit Cultural Assessment Instrument
– Patient Safety Climate in Aesthesia
– Patient Safety Culture Questionnaire
– Patient Safety Culture in Healthcare Organisations Survey
– Safety Attitudes Questionnaire
– Safety Climate Assessment Tool
– Safety Climate Scale
– Safety Climate Survey
– Stanford Safety Culture Instrument
– Teamwork and Patient Safety Attitudes Questionnaire
– Trainee Supplemental Survey
– TUKU – Safety Culture in Health Care Survey
– Veteran Affairs Palo Alto / Stanford Patient Safety Center for Inquiry
– Veterans Health Administration Patient Safety Culture Questionnaire
– Vienna Safety Culture Questionnaire
– World Alliance for Patient Safety Hand Hygiene Campaigns Healthcare - Units Survey on Patient Safety Culture.

These tools are mainly targeted towards hospital contexts but a small number have been tested in other settings such as primary care, nursing homes and emergency services.

This scan does not purport to include all of the instruments available, but rather to provide a flavour of the main tools that have been used and the practical implications of implementation for healthcare teams in the UK.

2.2 Hospital survey on patient safety culture

Development

The US Agency for Healthcare Research and Quality (AHRQ) is sponsoring the development of patient safety culture assessment tools for hospitals, nursing homes and ambulatory outpatient medical offices (primary care). The main tool tested to date is the Hospital Survey on Patient Safety Culture (HSOPSC) which has 12 safety culture dimensions and 42 items. Figure 1 provides examples.

Strengths

Organisations can use the tool to assess their patient safety culture, track changes over time and evaluate the impact of patient safety interventions.

A strength is that the tool assesses safety culture at the individual, unit and organisational level.

A website has been set up to help hospitals manage implementation of the survey, make comparisons with other hospitals and benchmark against larger datasets.[10]

This is currently mainly used by US hospitals but AHRQ is collating feedback about use in other countries.

The tool has been used in combination with other tools in large scale studies. It has also been used to make comparisons between different industries and countries, which suggests some degree of external reliability.

Weaknesses

Some studies have suggested that not all of the items included in the tool are valid, reliable and generalisable.

For instance, researchers in the USA examined the tool's psychometric properties. The survey was administered to 454 healthcare staff in three US hospitals before and after a series of interventions designed to improve the safety culture. Participants included nurses, doctors, pharmacists, and other hospital staff members.

Most of the items were found to be valid but the staffing subscale had rather low reliability. The authors concluded that the tool's usefulness in assessing areas of strength and weakness for hospitals or units is questionable.[11]

Other researchers in the US analysed data from 331 hospitals with 2,267 hospital units and 50,513 respondents to examine the psychometric properties of the survey. The items had acceptable psychometric properties except for the staffing subgroup and questions about supervisor / manager expectations and actions promoting patient safety. The authors concluded that the survey's items and dimensions overall are psychometrically sound at the individual, unit, and hospital levels of analysis but that further work is needed in some areas.[12]

Figure 1: examples of items in Hospital Survey on Patient Safety Culture[13]

Background variables	– What is your primary work area or unit? – How long have you worked in this hospital? – How long have you worked in your current unit? – Typically, how many hours per week do you work? – What is your staff position in this hospital? – Do you typically have direct contact with patients? – How long have you worked in your profession?
Frequency of event reporting	– When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported? – When a mistake is made, but has no potential to harm the patient, how often is this reported? – When a mistake is made that could harm the patient, but does not, how often is this reported?
Rating overall perceptions of safety	– Patient safety is never sacrificed to get more work done. – Our procedures and systems are good at preventing errors from happening. – It is just by chance that more serious mistakes don't happen around here. – We have patient safety problems in this unit.
Patient safety grade	– Give your work area an overall grade on patient safety.
Number of events reported	– In the past year, how many event reports have you filled out and submitted?

Continued...

Figure 1: examples of items in Hospital Survey on Patient Safety Culture[13]

Supervisor / manager expectations and actions	– My supervisor/manager says a good word when he/she sees a job done according to established procedures. – My supervisor/manager seriously considers staff suggestions for improving patient safety. – Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts. – My supervisor/manager overlooks patient safety problems that happen over and over.
Organisational learning	– We are actively doing things to improve safety. – Mistakes have led to positive changes here. – After we make changes to improve patient safety, we evaluate their effectiveness.
Teamwork within units	– People support one another in this unit. – When a lot of work needs to be done quickly, we work together as a team to get the work done. – In this unit, people treat each other with respect. – When one area in this unit gets really busy, others help.
Communication openness	– Staff will freely speak up if they see something that may negatively affect patient care. – Staff feel free to question the decisions or actions of those with more authority. – Staff are afraid to ask questions when something does not seem right.
Feedback and communication about error	– We are given feedback about changes put into place based on event reports. – We are informed about errors that happen. – We discuss ways to prevent errors from happening.
Non-punitive response to error	– Staff feel like their mistakes are held against them. – When an event is reported, it feels like the person is being written up, not the problem. – Staff worry that mistakes they make are kept in their personnel file.
Staffing	– We have enough staff to handle the workload. – Staff in this unit work longer hours than is best for patient care. – We use more agency/temporary staff than is best for patient care. – We work in "crisis mode," trying to do too much, too quickly.
Hospital management support	– Hospital management provides a work climate that promotes patient safety. – The actions of hospital management show that patient safety is a top priority. – Hospital management seems interested in patient safety only after an adverse event happens.
Teamwork across hospital units	– There is good cooperation among hospital units that need to work together. – Hospital units work well together to provide the best care for patients. – Hospital units do not coordinate well with each other. – It is often unpleasant to work with staff from other hospital units.
Hospital handoffs and transitions	– Things 'fall between the cracks' when transferring patients from one unit to another. – Important patient care information is often lost during shift changes. – Problems often occur in the exchange of information across hospital units. – Shift changes are problematic for patients.

Examples of usage

This tool has been widely used outside the US where it was developed. For instance it was applied in five Belgian general hospitals. With 3,940 staff responding, the response rate was 77%. Respondents included nurses and assistants, doctors, physiotherapists, laboratory and radiology assistants, social workers and pharmacists and pharmacy assistants. Scores were found to be low to average in all five hospitals. The lowest scores were 'hospital management support for patient safety' (35%), 'non-punitive response to error' (36%), 'hospital transfers and transitions' (36%), 'staffing' (38%), and 'teamwork across hospital units' (40%). 'Teamwork within hospital units' had the highest score (70%).[14]

In Norway, the survey was translated and 1,919 staff from one hospital responded, providing a response rate of 55%. Half of staff thought patient safety was good or excellent. There was significant variation between disciplines in the culture of reporting incidents. Social educators, nurses and specialist nurses rated patient safety lower than other professional groups. The authors found that Norwegian professionals perceive safety culture to be less adequate than reported by American professionals, with the exception of three dimensions: communication openness, non-punitive response to error and supervisor or manager expectations and actions promoting patient safety.[15]

Other researchers examined the extent to which organisational culture supports patient safety in hospitals in Saudi Arabia. Thirteen general hospitals in Riyadh city took part. Health professionals including nurses, technicians, managers and medical staff responded, 223 people in all. Patient safety was rated as excellent or very good by 60% of respondents but more than half of respondents thought that managers overlooked safety problems that happen repeatedly. Areas of strength for most hospitals were organisational learning and continuous improvement, teamwork within units, feedback and communication about errors. Areas that could be improved were under reporting of events, non-punitive response to error, staffing and teamwork across hospital units.[16]

The same researchers sent the survey to all hospitals in Riyadh, including nine public hospitals and two private hospitals. In total, 1,224 questionnaires were returned over a six-month period, a response rate of 47%. Organisational learning had the highest positive response (76%) and non-punitive response to error had the lowest score (21%).

Key areas in need of improvement in public hospitals were handoffs and transitions, communication openness, staffing, and non-punitive response to error. In private hospitals, improvements were needed in staffing and non-punitive response to error. Event reporting was influenced by feedback and communication about error, staff position, teamwork across units, non-punitive response to error, supervisor or managers expectations and actions promoting patient safety, and type of hospital.[17]

In Turkey, 309 doctors and nurses working in public hospitals in the large city of Konya tested the survey. Most of the scores were lower than the US benchmark scores. 'Teamwork within hospital units' received the highest score (70%), and 'frequency of events reported' received the lowest score (15%). The authors concluded that the Turkish version of the survey was valid and reliable in determining patient safety culture.[18]

In Lebanon, 68 hospitals and 6,807 staff took part including hospital doctors, nurses, clinical and non-clinical staff and others. The dimensions with the highest positive ratings were 'teamwork within units,' 'hospital management support for patient safety,' and 'organisational learning and continuous improvement.' Areas with the lowest ratings included 'staffing' and 'non-punitive response to error.' There were differences across hospitals of different size and accreditation status.[19]

In Spain, the Hospital Survey on Patient Safety Culture questionnaire was distributed to a random sample of health professionals from 24 hospitals, stratified by hospital size. There was a response rate of 40%, with 2,503 people taking part. 'Teamwork within hospital units' and 'supervisor or manager expectations and actions promoting safety' were the most highly ranked dimensions. 'Staffing,' 'teamwork across hospital units,' 'overall perceptions of safety' and 'hospital management support for patient safety' were identified as weaknesses. There were significant differences depending on hospital size, type of professional and service.

There was a more positive safety climate in small hospitals and pharmacy services, and a more negative safety climate perceived by doctors.[20]

Researchers in the Netherlands examined a Dutch translation of the Hospital Survey on Patient Safety Culture. The survey was completed by 583 staff from four general hospitals, three teaching hospitals and one university hospital. Of the 12 dimensions from the original survey, 11 appeared to work well, but two items were removed from the questionnaire and some items were repositioned. The authors concluded that the Dutch translation had acceptable reliability and good construct validity and is similar to the original survey structure.[21]

Researchers in the Netherlands also examined whether the Hospital Survey on Patient Safety Culture measured patient safety culture rather than merely individual attitudes. Data from 1,889 hospital staff working at 87 units in 19 hospitals were analysed. Data were explored at the level of the individual, unit and hospital. The unit level dominated the clustering of responses for the survey dimensions. The hospital level was important for three dimensions: 'feedback about and learning from error,' 'teamwork across hospital units' and 'non-punitive response to error.' This clustering at unit and hospital level reinforces claims that the survey measures group culture and not just individual attitudes.[22]

Researchers in the USA also looked at the relationship between safety culture and safety climate. They defined safety climate as shared perceptions of what an organisation is like regarding safety, whereas safety culture refers to staffs' fundamental ideology and orientation and explains why safety is pursued in a particular way within an organisation. 100% of senior managers and doctors and 10% of other hospital workers were invited to take part at 92 hospitals.

The Patient Safety Climate in Healthcare Organisations and the Zammuto and Krakower organisational culture surveys measured safety climate and group, entrepreneurial, hierarchical, and production orientation. The safety culture survey 18,361 was completed by people and 5,894 completed the organisational culture survey. Aspects of general organisational culture were strongly related to safety climate.

Organisations with a group culture had a better safety climate and more hierarchical culture was associated with lower safety climate.[23]

Other researchers have used this tool to make comparisons between countries. For instance 788 doctors, nurses and non clinical staff from 42 hospitals in Taiwan were surveyed and the data compared to US findings. US data had an average score of 61% for the 12 patient safety domains and the data from Taiwan had an average of 64%. In both the USA and Taiwan the dimension that received the highest positive response was 'teamwork within units.' The dimension with the lowest percentage of positive responses was 'staffing.' There were differences between the US and Taiwan on three dimensions: 'feedback and communication about error,' 'communication openness' and 'frequency of event reporting.'[24]

The Hospital Survey on Patient Safety Culture has also been used to make comparisons between various industries.[25] For instance, researchers in Norway used the tool to measure the safety climate in two organisations: a large university hospital offering a wide range of hospital services

and a large petroleum company producing oil and gas worldwide. The authors found that safety culture is positively related to outcome measures. Safety culture is generally higher in the petroleum industry compared to healthcare.[26]

One of the potential weaknesses of the tool is that it is focused only on hospital contexts. But there is some evidence that the tool could be broadened.

For instance, researchers in the US examined the safety culture of nursing homes from a nurse aide's perspective. Nurse aides (1,579) from 72 nursing homes took part, a response rate of 55%. The Hospital Survey on Patient Safety Culture was used to compare nursing home scores with hospital scores. All of the 12 subscale scores from the nursing home sample were lower than the benchmark hospital scores, indicating a poorer developed safety culture.[27]

Other researchers in the USA modified the Hospital Survey on Patient Safety Culture for use in nursing homes (PSC-NH) and distributed it to 151 staff in four non-profit nursing homes. Scores on each dimension were compared across doctors, pharmacists, advanced practitioners and nurses and with published benchmark data from 21 hospitals. Professions agreed on most of the dimensions. Nursing homes scored worse than hospitals on five safety dimensions: 'non-punitive response to error,' 'teamwork within units,' 'communication openness,' 'feedback and communication about error,' and 'organisational learning.'[28]

Implications

The research scan has found that the Hospital Survey on Patient Safety Culture focuses specifically on the hospital context.

Findings about potential validity issues are also cause for concern. The survey has been found to have some issues with reliability, especially regarding questions about staffing, so some modification may be needed in order to strengthen the tool prior to applying it to a UK context.

This caveat is reinforced by researchers in England who called into question the generalisability of the tool. Questionnaires were completed by 1,437 staff from three hospitals within a large NHS acute trust, giving a response rate of 37%. Reliability analysis of the items within each scale found that more than half failed to achieve satisfactory internal consistency and there was a poor fit when compared with the original American model.

The authors concluded that there is need for caution when using the Hospital Survey on Patient Safety Culture survey in the UK.[29]

On the positive side, the tool has been found to examine the broader concept of safety culture at group level, rather than merely individual attitudes. It is also positive that there have been moves to adapt the tool for other environments.

2.3 Manchester patient safety culture assessment Tool

Development

The Manchester Patient Safety Framework is a tool to help NHS organisations and healthcare teams assess their progress in developing a safety culture. Promoted by the National Patient Safety Agency (NPSA), the tool lists five levels of increasingly mature organisational safety culture across various domains.

The tool was developed from literature reviews and expert input. It is based on a theoretical framework and defines safety culture according to 10 dimensions:

– continuous improvement
– priority given to safety
– system errors and individual responsibility
– recording incidents
– evaluating incidents
– learning and effecting change
– communication
– personnel management
– staff education
– teamwork.

Figure 2: breakdowns used within Manchester patient safety culture assessment tool[32]

Manchester Patient Safety Framework is based on a typology of organisational communication. It asks teams to rate each of the following 10 factors:

– continuous improvement
– priority given to safety
– system errors and individual responsibility
– recording incidents
– evaluating incidents
– learning and effecting change
– communication
– personnel management
– staff education
– teamwork.

Workshop participants rate each factor according to the level of organisational safety culture, as follows:

Pathological: organisations with a prevailing attitude of 'why waste our time on safety' and, as such, there is little or no investment in improving safety.

Reactive: organisations that only think about safety after an incident has occurred.

Bureaucratic: organisations that are very paper-based and safety involves ticking boxes to prove to auditors and assessors that they are focused on safety.

Proactive: organisations that place a high value on improving safety, actively invest in continuous safety improvements and reward staff who raise safety-related issues.

Generative: the nirvana of all safety organisations in which safety is an integral part of everything that they do. In a generative organisation, safety is truly in the hearts and minds of everyone, from senior managers to frontline staff.

These descriptions are extracted verbatim from the assessment tool facilitator's manual.

The tool asks respondents to rank the level of safety maturity in each of these categories using the following subsets:

– pathological: 'Why waste our time on safety?'
– reactive: 'We do something when we have an incident'
– bureaucratic: 'We have systems in place to manage safety')
– proactive: 'We are always on alert for risks'
– generative: Risk management is an integral part of everything we do'.

Figure 2 overviews these categories in more detail.

Assessment is carried out in workshops led by a facilitator from the healthcare organisation.

Strengths

The tool is available for acute trusts, primary care, mental health, and ambulance services and can be applied at an organisational or team level.

It can be used to help teams reflect on safety culture, reveal any differences in perception between staff groups, help understand what a more mature safety culture might look like and help monitor changes over time and the benefits of specific interventions.[30] Another strength is that it is one of the few tools that focuses on safety culture in its broad form and it also examines organisational maturity, thus signposting organisations and teams to areas for improvement.

Weaknesses

The tool has largely been used in the UK although some validation has taken place in North America.[31]

Although the tool is purportedly used widely, little has been published about its use. Most organisations that use it have not published the results.

Examples of usage

Researchers in England adapted the Manchester Patient Safety Assessment Framework for use with community pharmacies. Ten focus groups were undertaken with a sample of 67 community pharmacists and support staff. Participants were able to understand the concepts and recognised differences between the five stages of safety culture maturity. The authors suggested that the tool is likely to have a number of uses including raising awareness about patient safety and illustrating differences in perceptions between staff, identifying areas for improvement, and evaluating patient safety interventions and tracking changes over time.[33]

Although most examples of using this tool come from the UK, researchers in Canada have also tested its applicability in hospitals to good effect.[34]

Implications

This tool has been designed for the UK context and therefore may be more relevant and transferable than tools developed elsewhere, though this has not been tested in a head-to-head comparison.

The value of the tool is that it conceptualises safety culture broadly, but this is also potentially a weakness because it contains some items that are difficult to measure or reflect on and may take longer to complete than more concise tools focused solely on safety climate.

2.4 Safety Attitudes Questionnaire

Development

The Safety Attitudes Questionnaire (SAQ) was derived from the Flight Management Attitude Questionnaire (FMAQ), a human factors survey used to measure cockpit culture in commercial aviation.

The SAQ focuses on safety climate and asks healthcare teams to describe their attitudes to six domains, using a Likert scale to score. Table 1 provides examples of the types of questions included.

Strengths

The tool has been adapted for use in intensive care units, theatres, general inpatient settings such as medical and surgical wards, emergency medical services, ambulatory clinics/primary care and nursing homes and long term care facilities.

This is one of the most commonly used and rigorously validated tools for measuring safety climate in healthcare. A distinguishing feature is that higher scores on this survey have been associated with positive patient and staff outcome data. This contrasts with other tools where there is less likely to be a direct association with patient outcomes.[36]

The SAQ is distinct from other surveys in that it maintains continuity with the FMAQ which has been used for over 20 years. This allows for comparisons between industries as well as identification of common human factors issues.

It can also be used to compare the attitudes of different types of staff within healthcare, and is fully validated for this purpose.

Another strength of the tool is that it is relatively short and quick to complete, and can be used to monitor changes over time with repeated implementation.

Table 1: examples of SAQ questions[35]

Domain	Responses
Safety climate: perceptions of a strong and proactive organisational commitment to safety.	- I would feel perfectly safe being treated in this ICU. - Personnel frequently disregard rules or guidelines developed for our ICU.
Teamwork climate: perceived quality of collaboration between team members.	- Disagreements in the ICU are appropriately resolved. - Our doctors and nurses work together as a well coordinated team.
Stress recognition: acknowledgement of how performance is influenced by stressors.	- I am less effective at work when fatigued. - When my workload becomes excessive, my performance is impaired.
Perceptions of management: approval of managerial action.	- Hospital management supports my daily efforts. - Hospital management is doing a good job.
Working conditions: perceived quality of the work environment, staffing and equipment.	- Our levels of staffing are sufficient to handle the number of patients. - The ICU equipment in our hospital is adequate.
Job satisfaction: positivity about the work experience.	- I like my job. - This hospital is a good place to work.

It has been used extensively in the USA and has also been implemented in Germany,[37] Sweden,[38] Norway[39] and China[40] amongst other countries.

Weaknesses

Although widely tested in the USA, the SAQ has not been implemented extensively in the UK.

As with many safety culture or climate surveys, the tool tends to have modest response rates. On average about half of staff asked to complete the survey respond.

Also in common with many safety climate surveys, the tool can point out differences in attitudes between groups but does not explore why this is the case.

For instance, the tool can identify differences in the perceptions or nurses and doctors or between clinicians and managers, but does not explore why these differences may exist or how to alleviate them.

Examples of usage

A variety of permutations of the SAQ have been tested around the world. For example, one study combined six cross-sectional surveys of 10,843 healthcare professionals in 203 clinical areas (including critical care units, operating rooms, inpatient settings, and ambulatory clinics) across three countries (USA, UK and New Zealand).

Staff attitudes varied greatly both within and between organisations. The authors concluded that the tool was valuable for comparing organisations, prompting improvement interventions and measuring the effectiveness of these interventions over time.[41]

The SAQ has been used extensively in ICUs. For example, researchers in the USA examined whether safety culture varied across four ICUs of a single hospital and between nurses and doctors using the SAQ-ICU version. With 318 staff participating, the response rate was 70%. Average scores varied between the ICUs, except for stress recognition, which was uniformly low. Compared with doctors, nurses had significantly lower perceptions of working conditions and perceptions of management scores. ICU nursing directors tended to think that staff had more positive attitudes, especially regarding teamwork.[42]

Other researchers in the USA measured safety climate in ICUs owned by a large for profit integrated health delivery system. The SAQ was completed by 1,502 doctors, nurses, respiratory therapists, pharmacists, mangers, and other ancillary providers in 110 ICUs in 61 hospitals. There were reasonably positive views about safety climate but perceptions of management and working conditions scored lower than other domains.[43]

US researchers used a modified version of the SAQ to examine perceptions of safety culture in a nationwide sample of emergency medical services agencies. Sixty-one organisations were included and full and part time paramedics and emergency medical technicians were surveyed. A total of 1,715 surveys were received, with an average response rate of 47%. There was wide variation in safety climate scores across agencies. Air medical emergency services agencies tended to score higher across all domains. Organisations with higher numbers of patient contacts annually tended to have lower scores.[44]

The SAQ has been used extensively in hospitals, and research is also beginning to explore its value in primary care.

For instance, researchers in the US adapted the questionnaire for the outpatient setting. The tool was modified to create a 62-item SAQ-ambulatory version (SAQ-A). Staff at an academic practice returned surveys (282), a response rate of 69%. Doctors had the least favourable attitudes about perceptions of management and managers had the most favourable attitudes. Nurses had the most positive stress recognition scores. All professionals had similar attitudes toward teamwork climate, safety climate, job satisfaction and working conditions. The authors concluded that the SAQ-A is a reliable tool and that attitudes relevant to medical error may differ among professionals.[45]

Other US researchers tested the value of this tool in primary care. They selected this tool because it has been widely published about in inpatient venues, has sound psychometrics and has an ambulatory care version. People from the four clinics took part (213), a response rate of 65%. There were no significant differences among the professional groups on the total patient safety score or on five of the six subscales. There were significant differences on total safety scores based on age, with those younger than 31 years having lower overall safety perceptions. The youngest age group also had the lowest scores regarding teamwork climate, safety climate, perception of management, and job satisfaction.[46]

One strength of the tool is that it has been applied in a wide range of contexts. For instance, researchers from the USA examined staff attitudes about safety at a 250-bed long-term care nursing facility. Fifty-one staff completed the survey. Nursing staff and other healthcare staff were generally satisfied with their jobs but gave low scores to management and safety climate.

The survey provided insight into staff attitudes and identified opportunities for improvement.[47]

In Sweden the tool was adapted for use in community pharmacies. The original English language version was translated and adapted to the Swedish context and distributed by email to all 870 Swedish community pharmacies. Data from 4,090 staff in 828 community pharmacies were analysed. The Swedish translation had acceptable psychometric properties. Perceptions of management were most variable across pharmacies and stress recognition was the least variable.[48]

Implications

For UK healthcare teams, the Safety Attitudes Questionnaire may be worth considering. It allows comparisons with other countries as well as other industries, is based upon a theoretical framework that emphasises human factors and has a large body of research behind it.

However an important practical implication is that this survey is still relatively untested outside the USA, and would need to be validated to ensure the assumptions and attitudes are relevant for UK audiences.

This point is reinforced by a study in Germany that sought to use the primary care version of the Safety Attitudes Questionnaire.

The US version was used as a starting point but as primary care differs so markedly between Germany and the USA in terms of organisational and economic issues as well as the number and variety of healthcare professionals, the researchers had to make significant adaptations. The final questionnaire consisted of 68 items, 36 of which were adapted from the original tool and 32 additional items, relating to the involvement of patients, communication, education and training, error management and dealing with regulations.[49]

Another important practicality is that some studies have found that staff believe the tool is quite lengthy. For example, researchers adapting the survey for use with emergency medical services found that there were concerns about respondent burden and the wording and face validity of several questionnaire items.[50]

2.5 Safety Climate Survey

Development

The Safety Climate Survey is a tool originally endorsed by the US Institute for Healthcare Improvement (IHI). It used to be freely available online but this is now no longer the case so IHI have discontinued promoting it.

The tool was developed by researchers at the University of Texas to measure the attitudes and perceptions of frontline clinical staff regarding safety structures and processes.

Figure 3 contains examples of the questions included.

Strengths

The Safety Climate Survey can be used to measure changes over time, before and after interventions are implemented. It can also differentiate the views of various types of staff.

It has been compared with other scales and found to have good reliability and validity.[51]

It also tends to have quite high response rates.

Weaknesses

This tool was developed some time ago and may not include all the factors and features of newer tools.

It has largely been tested in North America so its transferability to other environments is uncertain.

Examples of usage

A number of studies in North America have used the Safety Climate Survey. For example, researchers in Canada tested the tool in four ICUs. All staff including nurses, allied healthcare professionals, non-clinical staff, intensivists and managers were invited to participate. The response rate was 74% and the tool had high internal consistency and reliability. Managers had more positive views of safety climate than other staff.[52]

In another study, researchers in Canada assessed multidisciplinary team members' perspectives of patient safety climate in a 15-bed, closed medical-surgical ICU using a modified version of the Safety Climate Survey. The response rate was 93%. There were three major safety themes needing solutions: appropriate staffing, medication safety, and improving the bedside care of obese people.[53]

The Safety Climate Survey has been used to monitor the value of improvement interventions, particularly in the USA. For example, it was used to examine the impact of executive walk rounds in hospitals. Twenty-three clinical units in a tertiary care teaching hospital in the US were randomly assigned to use walk rounds or not.

Average safety climate scores for nurses were similar in the control and intervention units at baseline. At follow up, nurses in the control group who did not participate in walk rounds had lower safety climate scores than nurses in the intervention group who did participate in an executive walk round session.[54]

The Safety Climate Survey was selected as a primary measure for this study because it was easy to complete and had been validated for monitoring change over time.

Implications

It is difficult to consider the value of this tool in the UK because it has been tested almost exclusively in North American settings.

The tool is reportedly easy to use, with high response rates, but most tests have been in the hospital environment.

2.6 Patient Safety Climate in Healthcare Organisations

Development

The Patient Safety Climate in Healthcare Organisations (PSCHO) survey was developed as part of a Stanford-based patient safety research programme sponsored by the US Agency for Healthcare Research and Quality.

Research about high reliability organisations, such as nuclear aircraft carriers and commercial aviation, guided development of the tool. A review of existing safety climate survey instruments led researchers to identify 16 characteristics of safety climate.

The tool drew from five existing survey instruments. Items from each were reviewed and modified for application to hospitals. Additional questions were generated where gaps were apparent.

Individual survey items ask staff to consider safety-related issues at three levels: individual, unit and the overall organisation.[56]

The original tool included 38 items spread over nine constructs, three organisational factors, two unit factors, three individual factors and one additional factor (see figure 4).[57] Researchers have refined the tool for use in their own environment, adding and subtracting various items.

Strengths

The tool has been used for assessing safety climate in hospitals in the US and many other countries.

When the survey was initially developed, several surveys had been tested for measuring safety climate in high hazard industries outside healthcare. In hospitals, researchers had sought to measure specific elements of safety climate, such as teamwork and production pressure, but tools were not available for taking a more holistic approach. One strength of the survey is that it was one of the first tools developed that aimed to measure safety climate among all hospital personnel and across multiple hospitals of different types. It was an organisation-wide survey that was systematically administered and subjected to rigorous psychometric assessment.[58] It also drew on the lessons learned from tools used in other industries.

Weaknesses

Almost all tests of this tool have been in US hospitals. The response rate is usually average, with around half of invited staff completing the tool.

Examples of usage

The Patient Safety Climate in Healthcare Organisations survey has been used to explore differences in the attitudes of staff groups and make comparisons between hospitals.[60]

For instance, researchers in the USA explored healthcare staff's perceptions of safety climate and ways in which climate varies among hospitals and by work area and discipline. Ninety-two hospitals completed the Patient Safety Climate in Healthcare Organisations survey. 100% of senior managers and doctors were sampled along with 10% of all other workers. A total of 18,361 completed surveys were received, a 52% response rate.

Patient safety climate differed by hospital and among and within work areas and disciplines. Emergency department personnel thought that safety climate was worse. Non-clinical staff perceived better safety climate. Nurses were more negative than doctors regarding their work unit's support and recognition of safety efforts, and doctors had slightly more fear of shame than nurses.[61]

The same researchers tested whether managers have different attitudes compared to clinicians in 92 US hospitals. Frontline workers' safety climate perceptions were 1.4 times more problematic than senior managers. 'Supervisors' perceptions were 1.25 times more problematic than were senior managers.[62]

In another study, researchers assessed variation in safety climate across Veteran's Affairs hospitals. Data were collected from staff at 30 hospitals over a six-month period. 100% of senior managers and doctors were contacted and 10% of other staff were randomly selected. At 10 randomly selected hospitals, an additional 100% of staff working in units with intrinsically higher hazards were sampled. With 4,547 surveys received, the response rate was 49%.

There were differences in safety climate according to management level, clinician status and workgroup. Supervisors and frontline staff reported lower levels of safety climate than senior managers. Clinicians were less positive than non-clinicians. Staff in high hazard areas had a lower safety climate than workers in other areas.[63]

Other researchers in the USA used the Patient Safety Climate in Healthcare Organisations survey to examine the safety climate in the operating theatres and post anaesthesia care units (PACU). Staff at 30 Veterans Affairs hospitals were surveyed. The adapted tool comprised 42 closed ended items representing 12 different dimensions of safety. The overall and dimension specific scores were similar between surgery and other work areas. When staff groups were compared on an item by item level, theatre and PACU staff reported more frequent witnessing of unsafe patient care and perceived less understanding by senior leadership of clinical care and less hospital interest in quality of care.[64]

Implications

This tool has been largely used in US hospitals and mainly by a small group of inter-related researchers.

At the time of its development it was one of the first tools to take a broad view of safety climate, but other similar tools are now available.

It's applicability to the UK context is uncertain and there are few reports about the usability of the tool in practical terms such as the time taken to complete it or how staff react to its implementation.

Figure 3: examples of questions in Safety Climate Survey[55]

A	B	C	D	E	X
Disagree strongly	Disagree slightly	Neutral	Agree slightly	Agree strongly	Not applicable

	A	B	C	D	E	X
1. The culture of this clinical area makes it easy to learn from the mistakes of others						
2. Medical errors are handled appropriately in this clinical area						
3. The senior leaders in my hospital listen to me and care about my concerns						
4. The physician and nurse leaders in my area listen to me and care about my concerns						
5. Leadership is driving us to be a safety-centred institution						
6. My suggestions about safety would be acted upon if I expressed them to management						
7. Management/leadership does not knowingly compromise safety concerns for productivity						
8. I am encouraged by my colleagues to report any patient safety concerns I may have						
9. I know the proper channels to direct questions regarding patient safety						
10. I receive appropriate feedback about my performance						
11. I would feel safe being treated here as a patient						
12. Briefing personnel before the start of a shift (i.e. to plan for possible contingencies) is an important part of patient safety						
13. Briefings are common here						
14. I am satisfied with availability of clinical leadership (please respond to all three) Physician						
Nursing						
Pharmacy						
15. This institution is doing more for patient safety now, than it did one year ago						
16. I belive that most adverse events occur as a result of multiple systems failures, and are not attributable to one individual's actions						
17. The personnel in this clinical area take responsibility for patient safety						
18. Personnel frequently disregard rules or guidelines that are established for this clinical area						
19. Patient safety is constantly reinforced as the priority in this clinical area						

Figure 4: examples of questions included in Patient Safety Climate in Healthcare Organisations survey[59]

I am provided with adequate resources (personnel, budget, and equipment) to provide safe patient care.

My unit emphasizes patient safety procedures and goals to new hires in their first six months of work.

In my unit, disregarding policy and procedures is rare.

Patient safety decisions are made at the proper level by the most qualified people.

Senior management provides a climate that promotes patient safety.

Reporting a patient safety problem will not result in negative repercussions for the person reporting it.

In my unit, anyone who intentionally violates standard procedures or safety rules is swiftly corrected.

Senior management has a clear picture of the risk associated with patient care.

My unit takes the time to identify and assess risks to patients.

Asking for help is a sign of incompetence.

My unit does a good job managing risks to ensure patient safety.

Senior management has a good idea of the kinds of mistakes that actually occur in this facility.

If I make a mistake that has significant consequences and nobody notices, I do not tell anyone about it.

My unit recognizes individual safety achievement through rewards and incentives.

Telling others about my mistakes is embarrassing.

It is hard for doctors or nurses to hide serious mistakes.

Good communication flow exists up the chain of command regarding patient safety issues.

I am less effective at work when I am fatigued.

Senior management considers patient safety when program changes are discussed.

Personal problems can adversely affect my performance.

I will suffer negative consequences if I report a patient safety problem.

Compared to other facilities in the area, this facility cares more about the quality of patient care it provides.

I have learned how to do my own job better by learning about mistakes made by my coworkers.

My unit follows a specific process to review performance against defined training goals.

In the last year, I have witnessed a coworker do something that appeared to me to be unsafe for the patient.

If people find out that I made a mistake, I will be disciplined.

Individuals in my unit are willing to report behaviour which is unsafe for patient care.

I am asked to cut corners to get the job done.

Loss of experienced personnel has negatively affected my ability to provide high quality patient care.

I have enough time to complete patient care tasks safely.

Clinicians who make serious mistakes are usually punished.

In my unit, there is significant peer pressure to discourage unsafe patient care.

I have never witnessed a coworker do something that appeared to me to be unsafe patient care.

In the last year, I have done something that was not safe for the patient.

I am rewarded for taking quick action to identify a serious mistake.

I have made significant errors in my work that I attribute to my own fatigue.

My unit provides training on teamwork in order to improve patient care performance and safety.

Overall, the level of patient safety at this facility is improving.

3 Less common tools

A number of other tools have been used to assess patient safety culture and climate, but have not been well researched. This section provides a brief overview of some of those tools, with a focus on how they have been applied in practice.

Tools that focus on measuring safety culture are examined first, before moving to those examining safety climate.

It is not appropriate to examine the pros and cons of these tools because such limited research is available.

3.1 Modified Stanford Patient Safety Culture survey

Researchers in Canada examined the psychometric properties of a patient safety culture survey. Healthcare staff from 10 Canadian organisations were surveyed, 11,586 individuals, using the Modified Stanford PSC survey.

Comparisons between different versions of the survey did not yield acceptable levels of fit. The two reliable dimensions were organisation leadership for safety and unit leadership for safety. The authors suggested this tool needed further refinement before being used again.[65]

3.2 Patient Safety Culture Improvement Tool

The Patient Safety Culture Improvement Tool (PSCIT) was developed in the US to help healthcare organisations identify practical actions to improve their culture.

The tool is based on a safety culture maturity model that describes five stages of cultural evolution, from pathological to generative.

The tool consists of nine elements that cover five patient safety culture dimensions: leadership, risk analysis, workload management, sharing and learning and resource management. Each element describes the systems in place at each level of maturity so organisations can identify their level of maturity and actions to move to the next level. The tool has not been fully validated.[66]

3.3 Safety Organising Scale

Researchers in the USA tested a self-report measure that captures the behaviours theorised to underlie a safety culture. A total of 1,685 registered nurses from 125 nursing units in 13 hospitals completed the Safety Organising Scale (SOS), a nine item measure of self-reported behaviours enabling a safety culture.

The scale was found to have high internal reliability and to reflect behaviour theory. The tool discriminated between related concepts such as organisational commitment and trust and was able to show variation within and between hospitals. It was also able to predict medication error and falls levels.

The authors concluded that the tool was useful for outlining behaviours associated with safety culture.[67]

3.4 Safety Artefact Interpretation scale

Safety culture is difficult to measure so researchers in Israel tested the value of a tool examining employee interpretations of organisational safety artefacts (or safety signs).

The Safety Artefact Interpretation (SAI) scale was used to collect data in three organisations and this data was then compared with safety climate and leadership evaluations. The tool helped to assess safety compliance and commitment to safety.[68]

3.5 Safety Climate Assessment Tool

In England, the Royal College of Nursing promotes the Safety Climate Assessment Tool (SCAT). This was initially designed for use in other industries and is part of a toolkit to promote a positive safety culture. The toolkit is based on a systems approach to organisational culture and provides a range of tools to help organisations investigate culture including a safety climate questionnaire, focus groups and behavioural observations, and situational audits to explore the efficacy of safety management systems.[69]

The Safety Climate Assessment Tool is a 42-item questionnaire that asks staff to rate their agreement or disagreement with various questions about safety in their organisation. Analysis is organised under three headings: organisation system and environment, organisation system and work groups, and organisation system and individual and work groups.

The nine dimensions measured by the tool are:

– management commitment to patient safety
– work environment
– patient safety rules and procedures
– supportive environment
– involvement
– communication
– personal priorities for safety
– personal appreciation of risk
– priority of patient safety.

The Royal College of Nursing has tested the tool for use in healthcare environments. They found that healthcare teams had no difficulty understanding the questions or the scales and that the tool was a reliable way of obtaining staffs' perceptions about safety climate. Using the tool helped organisations target safety initiatives in areas requiring improvement.

The tool is now available online as a web-based data capture system that provides rapid results and facilitates benchmarking. Data is jointly owned by the RCN and the participating organisation.[70]

3.6 Safety Climate Scale

Researchers at one US hospital examined the extent to which safety is a strategic priority and the extent to which organisational culture supports patient safety. Two surveys were used. The Safety Climate Scale (SCS) was administered with doctors, nurses, pharmacists, and other ICU staff. This tool assesses perceptions of a strong and proactive organisational commitment to patient safety. The second survey, called Strategies for Leadership (SLS), evaluated the extent to which safety was a strategic priority for the organisation and was administered with clinical and administrative leaders.

Staff thought that supervisors had a greater commitment to safety than senior leaders. Nurses had higher scores than doctors for perceptions of safety. Leaders thought that strategic planning of patient safety needs improvement.[71]

3.7 Teamwork and Safety Climate Survey

Researchers in England examined the usefulness of a patient safety climate questionnaire in four acute hospital trusts and nine primary care trusts. The 27-item Teamwork and Safety Climate Survey was used. A total of 1,307 staff took part, a 36% response rate. Analyses were carried out on 897 responses from staff involved in direct patient care.

Some questionnaire items related to multiple factors or did not relate strongly to any factor. Five items were discarded. Two teamwork factors were derived from the remaining 11 teamwork items and three safety climate factors were derived from the remaining 11 safety items.

The authors concluded that a 22-item version of this safety climate questionnaire is useful in both primary and secondary care.[72]

3.8 Japan Safety Climate Scale

Researchers in Japan have developed a scale to measure patient safety climate. Nine non-academic general hospitals in Japan helped to validate the survey with 1,878 professionals including nurses, therapists, technicians, pharmacists and physicians responding.

Worker attitudes towards various dimensions were measured including free communication flow, continuous improvement, reporting or rules compliance and patient or family involvement and organisational factors (supervisors' safety leadership, allied professionals' safety leadership, patient safety committee leadership and rules or equipment availability).

The scale had acceptable dimensionality, reliability and validity.[73]

3.9 Pharmacy Safety Climate Questionnaire

Researchers in England developed and tested a questionnaire to assess safety climate in community pharmacies. A 34-item Pharmacy Safety Climate Questionnaire (PSCQ) was developed. A total of 998 pharmacists working in community pharmacies completed the survey.

Seven components were retained which explained 58% of the data variance. The components were:

- investigating and learning from incidents
- staffing and management
- perceptions of the causes of incidents and reporting
- team working
- communication
- commitment to patient safety
- education and training about safety.

The tool had good face validity, component structure and internal consistency. The authors suggest that community pharmacies can use this tool to measure staff attitudes to safety, compare themselves with other pharmacies, encourage improvement interventions and measure change.[74]

3.10 Gershon Safety Climate Tool

More than a decade ago the US Occupational Safety and Health Administration introduced a Bloodborne Pathogens Standard. Researchers found that several factors influenced healthcare workers' lack of compliance with universal precautions, including organisational safety climate. Safety climate was defined as staff members' perception of their organisational culture and practices regarding safety.

In 2000, Gershon and colleagues published a tool to measure the relationship between healthcare safety climate and safe work behaviour.[75]

Researchers have validated this tool using a survey of 1,746 healthcare workers at risk of occupational exposure to bloodborne pathogens.

There was no relationship between safety climate and employees' gender, age, education, tenure in position, profession, hours worked per day, perceived risk, or attitude towards risk or training. There was a link between safety climate and healthcare worker compliance with universal precautions and the availability of personal protective equipment.[76]

Other researchers have evaluated the psychometric properties of the Gershon tool in various settings, for instance, when altered to address respiratory rather than bloodborne pathogen exposures. A total of 460 US doctors, nurses and nurse aides were surveyed using the modified Gershon tool. Eight safety climate dimensions were extracted from 25 items. The authors concluded that the Gershon Safety Climate Tool has sufficient reliability and validity for use by healthcare decision makers.[77]

4 Unnamed tools

As well as named tools, research is also available about a wide number of tools developed by single research teams or institutions to measure safety culture or climate in their local context. This section provides examples of how these unnamed tools have been used to give a flavour of the research available.

Given the paucity of literature about each individual tool, it would be inappropriate to make suggestions about the strengths and weaknesses of the tools.

4.1 Safety culture tools

Hospital tools

Researchers in Canada developed a cultural assessment survey (CAS) to assess patient safety culture change in obstetric units. A review of patient safety in 'high reliability organisations' and interviews were used to develop preliminary questions. Questionnaires were sent to staff at 11 hospital sites, and interviews and focus groups helped to further refine the tool.

Six cultural dimensions emerged: patient safety as everyone's priority; teamwork; valuing individuals; open communication; learning; and empowering individuals. All six scales had internal reliability.[78]

Staff at 25 US hospitals were surveyed about safety culture using Likert scale questions. There were significant differences in perceived patient safety culture between hospitals, respondents and departments. The authors concluded that safety culture tools can identify and reinforce aspects of safety, culture and features that could be targeted to improve patient safety outcomes across and within hospitals.[79]

Other researchers in the USA have described a simple two-page Culture Check Up Tool, which takes 30 to 60 minutes to complete as a group exercise, and is designed to help clinicians recognise and fix issues with safety culture.[80]

Researchers assessed the attitudes of transfusion service staff about safety culture. A total 945 staff from 43 hospital transfusion services in the US and 10 services in Canada took part, a response rate of 73%. Staff were generally positive about event reporting, but many were afraid of punitive consequences.[81]

US researchers examined features of safety culture and their relationship with patient safety indicators in hospital. A total 455 hospital staff were surveyed, a response rate of 44%.

Staff described their organisations' patient safety, workplace safety and features of safety culture, such as leadership commitment, professional salience, presence of a non-punitive environment, error reporting and communication. Staff regarded patient safety as an essential part of their job.

Two-thirds worried at least once a day about making a mistake that could injure a patient and 43% said that the workload hindered their ability to keep patients safe. Workers' overall assessment of patient safety was linked to leadership commitment to patient safety.[82]

A number of authors have developed tools in languages other than English. For instance, a German language tool for assessing patient safety culture has been tested in acute geriatric units. A review of existing safety culture surveys and expert interviews helped shape a 158 item questionnaire. The survey was tested with 508 doctors and nurses from 31 acute geriatric units and seven comparison departments such as intensive care, surgery and trauma surgery.

Seven dimensions of patient safety culture were identified. Acute geriatric units had higher scores than the comparison group. In the acute geriatric units, higher levels of 'management commitment to patient safety' and lower levels of 'error fatalism' were associated with a reduced incidence of medical errors. In the comparison group, only 'active learning from mistakes' was associated with safety performance.

The authors concluded that some aspects of patient safety culture are more closely related to safety events than others. In acute geriatric units, patient safety is influenced mainly by management's determination of how things are done whereas improvement of the system itself is required in other high-risk wards.[83]

Primary care tools

Most safety culture assessment tools are designed for use in hospital, but researchers in the USA have developed tools for use in primary care (the ambulatory care setting). A panel of experts found that one tool had face validity though it has not been widely tested.[84]

Nursing home tools

Researchers in the USA tested whether perceptions of patient safety in nursing homes vary by length of employment, type of staff and shift worked. Twenty-six nursing homes participated, with 367 nurses and 636 nursing assistants.

The tool used included 34 items on aspects of safety such as overall safety perception, teamwork within and between departments, communication openness, feedback and communication about error, non-punitive response to error, organisational learning, management expectations and actions promoting safety, staffing, and management support for patient safety.

Overall perceptions of safety were acceptable. About 40% of nursing staff found it difficult to make changes to improve things. Only half reported management discussions with staff to prevent recurrence of mistakes. Regardless of staff type, one in five reported feeling punished and two in five said that reporting of errors was seen as a 'personal attack.'[85]

4.2 Safety climate tools

Hospital tools

Researchers in Australia examined factors that influence patient safety behaviours. The Theory of Planned Behaviour was used to develop behavioural models for Patient Safety Behavioural Intent (PSBI) of senior and junior doctors, senior and junior nurses, and allied health professionals. To test the models, 5,294 clinical and managerial staff hospital staff were surveyed.

Two factors influenced patient safety behavioural intent for all professional groups: preventive action beliefs (belief that engaging in the target behaviours will lead to improved patient safety) and professional peer behaviour (perceptions of the safety behaviours of colleagues).[86]

Researchers in the USA examined the link between measures of organisational climate safety factors and risk adjusted surgical morbidity and mortality. Multi-item scales measuring safety culture were administered to surgical staff at 52 sites over a year-long period and perceived levels of communication and collaboration with co-workers were assessed.

There were 6,083 surveys returned, giving a response rate of 52%.

Measures of teamwork climate, safety climate, working conditions, recognition of stress effects, job satisfaction and burnout demonstrated internal validity but did not correlate with risk adjusted outcomes. Reported levels of communication and collaboration with attending and resident doctors correlated with risk adjusted morbidity. The authors concluded that teamwork, safety climate, and working conditions scales do not measure organisational factors that influence risk adjusted surgical outcomes.[87]

Tools have also been tested specific to the NHS, but few details are available.[88]

A number of tools include safety climate as one component amongst others. For instance, the Organisational Policies and Practices questionnaire (OPP) is designed to examine how structures and practices within organisations impact upon staff. It includes a component on safety climate.

Researchers examined the psychometric qualities of the French Canadian version of the Organisational Policies and Practices questionnaire with 124 nurses. There were consistent relationships between the dimensions of the questionnaire and three job related psychosocial indicators: perceived stress, social support and satisfaction, which suggests that questionnaire has good construct validity.[89]

Primary care tools

In Scotland, a tool to measure perceptions of safety climate among primary care teams has been developed. The tool was compiled using a steering group, literature review, semi-structured interviews with primary care team members, and content validity index. There were 563 primary care team members surveyed, based in 49 general practices, a response rate of 84%. The tool was a 30 item questionnaire with five safety climate factors including leadership, teamwork, communication, workload and safety systems.[90]

Average scores were calculated for individuals, practice teams and the region. There were significant differences in perceptions at the practice team level. Perceptions also varied by respondents' years of experience, whether they were community or practice based, their professional roles and practices' training status. Practice managers and GPs perceived the safety climate more positively than other respondents.[91]

5 Other industries

This section briefly describes a sample of the large number of safety culture and climate tools available from other industries. The aim is not to be exhaustive, but rather to signal the variety of tools available and the potential for healthcare organisations to draw on these.

5.1 Safety culture assessment tools

These are also available for other industries such as transport and energy production. For example, the Health and Safety Executive published an overview of tools that have been used to assess safety climate in organisations focused on offshore technology.[92] Reviews of tools available for use in the oil and gas industry are also available.[93] So too are reviews about tools relevant to the rail industry.[94] This section draws on these reviews to provide examples.

There is a wealth of information, articles and reports relating to safety culture in various industries, yet there is still no universally recognised and respected definition or model. Research has been somewhat fragmented and non-specific in theoretical terms.

Some distinguish between three interrelated aspects of safety culture: psychological aspects (often referred to as 'safety climate'), behavioural (or 'organisational') aspects, and situational (or 'corporate') aspects.

Mirroring the situation in healthcare, in many cases the term safety culture is given a meaning that appears to be very similar to that of safety climate and the terms are often used interchangeably in many areas.

Findings from other sectors suggest that measures of safety climate can help understand variables that can impact on human behaviour. But if used in isolation they tend not to reveal why, and in what way, variables impact on the decision making and behaviour of operational staff.

A number of tools have been developed to measure safety climate, but fewer focus on safety culture. The majority of the tools are questionnaire based which require the respondent to answer using a rating scale. Many of the tools have been designed specifically for a particular industry, such as the oil and gas, nuclear, or rail industry.

5.2 Rail Safety Culture Inspection Toolkit

Following public inquiries into train crashes, a safety culture inspection toolkit was developed. The toolkit aimed to provide a pragmatic approach for measuring safety culture in rail organisations and focused on a limited number of indicators known to influence safety culture: leadership, two-way communication, employee involvement, learning culture and attitude towards blame.

A review was undertaken to investigate existing safety culture and climate assessment tools that could be useful for the developing the Safety Culture Inspection Toolkit. Eight safety climate tools and safety culture tools were researched. Most focused on measuring the attitudes and perceptions held by employees towards safety (safety climate).[95]

5.3 Occupational Psychology Centre Safety Culture Questionnaire

The Occupational Psychology Centre Safety Culture Questionnaire (SafeCQ) aims to assess safety culture in rail companies. A review of safety culture in the rail industry was conducted to develop the questionnaire, but the tool has not been widely used.

The tool is based on a 12-element model of safety culture, including:

– communications about safety
– profile of safety within the organisation
– access to safety information
– management involvement in safety
– recognition and openness about safety issues
– control over safety
– attitudes to safety
– safety information
– learning from safety issues
– perceptions of safety performance
– investment in safety
– other factors such as concern over minor incidents and attitudes to shortcuts.[96]

5.4 Rail Safety and Standards Board Safety Culture Tool

The Rail Safety and Standards Board (RSSB) Safety Culture Tool aims to assess the safety culture of rail companies.

It is a self-administered survey, the results of which are collated and analysed by the Rail Safety and Standards Board.

The tool is 66 items long. Responses can range from strongly agree to strongly disagree.

The tool focuses on nine areas of safety culture:

– positive organisational attributes
– management commitment to safety
– strategic flexibility
– participation and involvement
– training
– communication
– reinforcement and incentives
– individual ownership
– individual perceptions.

On-train crew, platform staff, drivers, engineering depot staff and support staff can all be surveyed.[97]

5.5 Serco Assurance Safety Culture Assessment Tool

The Serco Assurance Safety Culture Assessment Tool comprises a questionnaire and an interview to establish attitudes about safety culture. The tool focuses on three dimensions: management and organisational factors, enabling activities and individual factors.

The tool has been used in the nuclear, railway, oil and gas industries. The tool is thought to have wide applicability to a variety of industries.[98]

5.6 Aberdeen University Offshore Safety Questionnaire

The Aberdeen University Offshore Safety Questionnaire (OSQ99) provides companies with information about their safety climate and highlights areas of strength and weakness. It can be used to determine the impact of new initiatives and help with benchmarking.

The tool was designed for use in the offshore gas and other power generating industries. It can also be applied to other industries.[99]

The questionnaire was developed based on an earlier survey, but is considerably shorter.

It contains 80 items requiring answers on a three or five point Likert type scale. The areas covered include general information, communication, involvement in safety, satisfaction with safety activities, attitudes to safety and safety behaviour.

5.7 Health Services Executive Health and Safety Climate Survey Tool

The Health Services Executive Health and Safety Climate Survey Tool (CST) seeks staffs' views about how they are involved in key aspects of health and safety culture and climate in their organisation. The tool also involves employees in seeking improvements based on the information that emerges. It can be used to monitor changes over time.

The instrument is based on the UK HSE 'Model of Successful Health and Safety Management' and 'Reducing Error and Influencing Behaviour' health and safety management approaches.

It comprises a 71 item computer based self assessment questionnaire using a standard five-point rating scale.

The questionnaire statements are organised into 10 factors:

– organisational commitment and communication
– line management commitment
– supervisor's role
– personal role
– workmates influence
– competence
– risk-taking behaviour
– obstacles to safe behaviour
– permit to work systems
– reporting of accidents and near misses.

The tool has been used to assess safety climate across a range of industry sectors, including oil and gas companies and the manufacturing industry. It is used to assess the views of managers, supervisors and the workforce.

5.8 Quest Evaluations and Databases Ltd Safety Climate Questionnaire

The Quest Evaluations and Databases Ltd Safety Climate Questionnaire (QSCQ) provides methods for measuring attitudes, values and beliefs of individual workers. It can be used to identify root causes and define proposed industry norms for error potential. It allows companies to identify where improvement efforts need to be focused.

The tool was developed specifically for the offshore drilling environment and has been used in oil and gas companies.[100]

A review was conducted of all the safety climate tools in the oil and gas industry. This identified 88 factors implicated in accidents, lost production time and near misses. The factors were then grouped into 12 categories to structure the questionnaire: safety priorities, communication, training, environment, individual, procedures, design of work or people, design of things or equipment, management or structural, investigation or evaluation, emergencies, maintenance.

The questionnaire includes 319 items and uses a seven-point Likert scale. An advantage is that a concentrated approach can be taken. For example, the survey can be restricted to specific sections of interest such as management and training.

5.9 Robert Gordon University Computerised Safety Climate Questionnaire

The Robert Gordon University Computerised Safety Climate Questionnaire (CSCQ) provides companies with information about their safety climate and areas of strength and weakness. The questionnaire also allows benchmarking of individual offshore rigs or facilities. It removes the need to go to external bodies for assistance with surveys.

The tool is a Microsoft Excel-based software package, consisting of a questionnaire, an analysis package and user information. The questionnaire has 49 items that are organised into the following areas:

– general information
– job (measuring self-reported, risk-taking behaviour)
– safety attitudes (confidence in safety management; pressure for production; supervision and management; rules and regulations, and safety on installation).

A five-point rating scale is used.

5.10 The Loughborough University Safety Climate Assessment Toolkit

The Loughborough University Safety Climate Assessment Toolkit (LSCAT) is designed to gauge the safety climate in offshore organisations. It is intended to be used periodically to examine changes in safety climate over time. The tool also helps to identify subcultures within organisations or on particular installations.[101]

The questions used in the survey are based on common themes and items from offshore survey instruments. Assessment is undertaken using a triangulation approach including an attitude survey, in-depth informal discussions with individuals, focus groups, examination of written records and databases and document analysis.

The survey contains 47 items covering organisational content, social environment, individual appreciation, work environment and organisation specific factors.

5.11 Other examples from industry

Researchers in the USA developed a survey to measure safety climate based on a review of literature and consultation with an expert panel.

The tool was tested by 229 employees of the City of Cincinnati Department of Public Works, which was found to be valid and reliable.[102]

Researchers in Spain sought to develop evaluation measures for safety attitudes and safety climate by testing instruments and identifying the essential dimensions of the safety climate in airport ground handling companies. There were 166 staff from three airport companies were surveyed. Six key dimensions were identified. There were significant differences in safety attitudes and climate depending on the type of company.[103]

Other researchers in Spain described a model about factors contributing to safety culture and tested a measurement scale with 455 Spanish companies outside healthcare. Managers were important in promoting safe behaviour among employees directly, through their attitudes and behaviours, and indirectly, by developing a safety management system.[104]

Other researchers in Spain evaluated a safety culture instrument focused on organisational values and practices. Seven dimensions were included. There were 299 participants from five companies in different sectors took part. Six dimensions of organisational safety values and practices were validated.[105]

Researchers in China used the theory of preventive safety culture to develop a safety climate scale including seven dimensions and 27 items. A total 342 workers from a factory were surveyed. Six items were deleted and 21 items were confirmed as useful for the safety climate scale. These were divided into seven dimensions: safety competence and consciousness, safety communication, organisational environment, management support, danger judgment, safety control measure and safety training. There was a link between safety climate scores and occupational accidents.[106]

Researchers in the USA examined the validity and internal consistency of a new measure of organisational health and safety climate used in a trial of a worksite cancer prevention programme.

Staff at 20 natural gas pipeline worksites and 20 rural electrical cooperatives completed a questionnaire at baseline and again after three years. The health and safety climate scales had good internal consistency and concurrent validity.

The health climate scale was correlated more highly with organisational measures indicative of a supportive health climate than those indicating supportive safety climate. The scales were not correlated with most employee health behaviours.[107]

6 Summary

Much of the value of these types of surveys lies in raising the profile of patient safety and promoting conversations, thus the exact tool used may be less important than how it is implemented and how feedback is collated and used.

6.1 Findings

It is now increasingly recognised that the culture of an organisation and staff attitudes can have a tangible impact on safety processes and ultimately patient outcomes.[108] A large number of tools are available to assess the safety culture and climate in healthcare organisations and other industries and sectors and several detailed reviews are available comparing the properties and characteristics of these tools.[109,110]

The available instruments vary in length, the dimensions covered, the intended sample population (hospital wide or unit level, or other contexts), and extent of psychometric evaluation. Most tools are self-complete surveys, which use simple Likert scales. Some are available online and the larger and better known surveys allow comparisons and benchmarking with international data.

The available scales tend to have some overlapping dimensions, such as leadership, work environment, safety systems, risk perception, job demands, reporting errors or speaking up, safety attitudes and behaviours, communication and feedback, teamwork, personal resources such as stress, and organisational factors.[111,112]

However, reviews suggest that many of the tools available have not been fully validated or that there are areas for improvement in validity and reliability.

For instance, researchers from Scotland systematically reviewed quantitative studies of tools to assess safety climate in healthcare. Twelve studies were included. Most questionnaires did not have an explicit theoretical underpinning and some instruments did not report standard psychometric criteria. Where information about validity and reliability was available, several questionnaires appeared to have limitations. The authors concluded that more consideration should be given to psychometric factors in the design of healthcare safety climate instruments.[113]

Another earlier review by researchers in the USA compared the characteristics, dimensions and psychometrics of patient safety climate surveys. Nine surveys measuring patient safety climate were examined. All used Likert scales, mostly to measure the attitudes of staff. Nearly all covered five dimensions of patient safety climate: leadership, policies and procedures, staffing, communication and reporting. The strength of psychometric testing varied. All surveys had been used to compare units within or between hospitals, but only one had explored the association between organisational climate and patient outcomes. The authors concluded that patient safety climate surveys vary considerably.[114]

The mostly widely used surveys with acceptable psychometric properties are the Hospital Survey on Patient Safety Culture, Safety Attitudes Questionnaire, Patient Safety Climate in Healthcare Organisations, and the Hospital Safety Climate Scale.

There is little research explicitly comparing the practicalities of using these tools so it is difficult to draw conclusions about using one tool over another.

Much of the value of these types of surveys lies in raising the profile of patient safety and promoting conversations, thus the exact tool used may be less important than how it is implemented and how feedback is collated and used.

All of these tools focus on safety climate, but there is a perception that safety climate is an indicator of the broader concept of safety culture.

Measuring safety climate in healthcare helps to diagnose the underlying safety culture of an organisation or work unit. The prevailing culture influences safety behaviours and outcomes for both healthcare workers and patients. Safety climate questionnaires need to achieve as high a standard of measurement as possible so that healthcare managers can use the resulting data to design effective safety management systems and interventions.[115]

Few studies test the role of intervening variables that may influence the effect of safety climate on patient outcomes, though there is some evidence of a relationship between safety climate and outcomes.[116-118] Only the Safety Attitudes Questionnaire has consistently established links with patient safety outcomes, such as reduced healthcare associated infections.[119]

Reviewers suggest that it is important to be cautious about benchmarking using these surveys. This is because questionnaires are frequently modified or 'tweaked' for individual circumstances.[120]

The degree to which surveys can impart useful knowledge has been questioned. For example, researchers in the USA compared safety climate in 30 Veteran's Affairs hospitals and 69 other US hospitals. Safety climate was similar in Veteran's Affairs and other hospitals.

Characteristics of individuals influenced safety climate across settings. The authors concluded that safety climate is linked more to efforts of individual hospitals than to participation in a nationally integrated system or characteristics of workers and facilities, and that measuring safety climate could therefore only go so far in assisting improvement efforts.[121]

6.2 Practical implications

Bearing these caveats in mind, it is possible to draw out practical issues for NHS healthcare teams and organisations considering using these tools.

1. It is important for organisations to consider whether they are interested in assessing safety culture or climate. Safety climate may be easier to measure, but may not give a holistic picture or recognise the complexity of impacts on patient safety. Furthermore, safety climate tools tend not to explain why staff feel a certain way.

2. Most tools focus on safety climate rather than safety culture, although there are many unnamed or less well validated tools focused on safety culture, particularly those used in sectors outside healthcare. It may be useful for NHS organisations to consider whether tools outside healthcare could usefully be applied in their context.

3. No single tool stands out as being the most useful for organisations in the UK. Each tool has pros and cons (see table 2).

It is possible to categorise the tools according to their ease of use and how well tested and validated they are (see figure 5), but even then this provides general guidance and does not account for local contextual factors.

4. Most tools in healthcare have focused on the hospital environment. Specific tools and frameworks have been developed for UK primary care but these have not been widely tested.[122] It may be unrealistic to think that one tool will be applicable to all health and social care contexts.

Figure 5: example of usability versus testing of the five most commonly cited tools
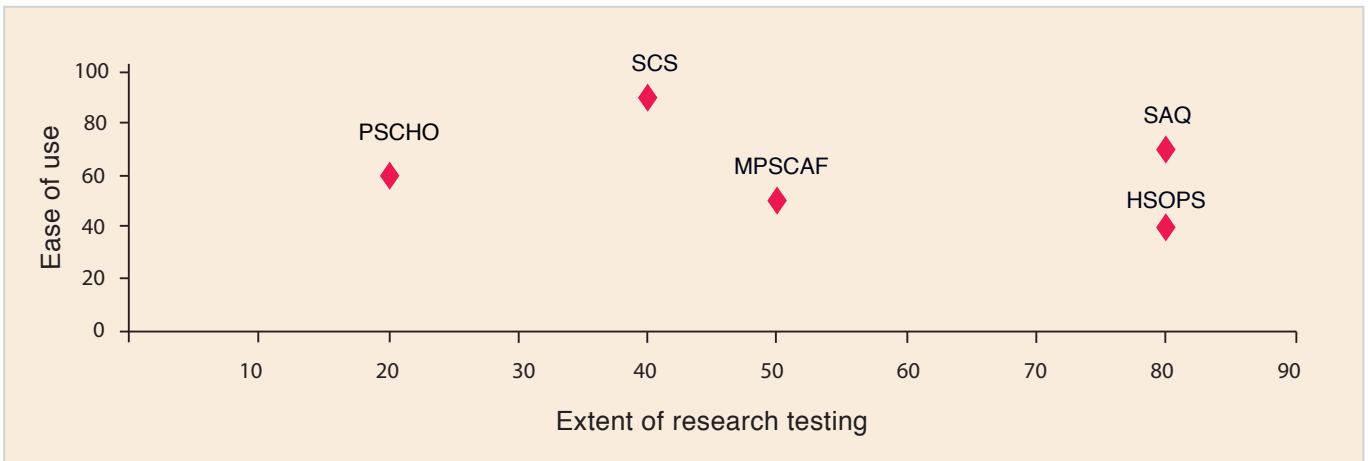
5. Studies have found that managerial actions and unit level climate may be more important than overall organisational safety culture, so it is important to use tools that are sensitive to differences at individual, unit and organisational levels.[123]

6. Organisations that choose to measure safety culture or climate tend to be higher performing from the outset.[124] It is important to bear this in mind when using the tools for comparative purposes or for tracking changes over time. Furthermore, measuring safety culture or climate has the potential to provide a 'false sense of security.' Some researchers have found that organisations that perform well on safety culture tools are less likely to go on to implement improvement efforts.[125]

7. Finally, it is essential to validate safety culture surveys before extending their use to populations outside of the specific geographical and healthcare contexts in which they were developed. Most of the available tools were developed in the USA but some research suggests that various US tools are not adaptable to a European context.

There is no simple answer to the question 'which tool is most effective for assessing patient safety culture or climate within healthcare organisations?', but the literature suggests a wealth of tools from which to choose.

Most of these tools are simple self-administered questionnaires that require little resource to analyse and so could be easily administered within NHS contexts.

Most importantly, it must be emphasised that all of the instruments are for use as tools to spark discussions and facilitate improvement efforts.

The specific instrument used may be less important than having it implemented regularly, sensitively and used in a way that can lead to improvement discussions, rather than an end in itself.

Table 2: summary of key features of the top five most well known tools

Tool and developer	Usage examples	Psychometric properties	Key strengths	Key weaknesses	Evidence quality / quantity
Hospital Survey on Patient Safety Culture (AHRQ)	Hospitals in US, UK, Belgium, China, the Netherlands, Turkey, Saudi Arabia, Spain, Lebanon etc	Psychometric properties have been tested. Issues with staffing scale identified	Can compare with other countries and industries	Focuses only on hospitals Has some validity issues	(green)
Manchester Patient Safety Culture Assessment Framework (NPSA)	Hospitals in UK, pharmacy in UK, hospitals in Canada	No psychometric properties reported in empirical literature	Focuses on the broader notion of safety culture	Little has been published about usage	(red)
Safety Attitudes questionnaire (developed from aviation tool)	Hospital, ICU, pharmacy, primary care, long-term care in many countries	Psychometric properties extensively tested and well validated	- Well validated and established - Can compare with other countries and industries	- Not used much in UK - Some think it takes time to complete	(green)
Safety Climate Survey (University of Texas and US IHI)	Hospitals in North America	Some validation undertaken but no detailed studies of psychometric properties	- Short and easy to complete - Has been compared with other surveys	- Tested mainly in North America - Developed some time ago	(red)
Patient Safety Climate in Healthcare Organisations (Stanford, funded by AHRQ)	Hospitals in the US	Validation of psychometric properties undertaken	- Studies with large sample sizes have validated the tool	- Has been used mainly by one group of researchers - Tested almost exclusively in US hospitals	(red)

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