Outcome

WHO checklist

Surgical site infections

Safe medication

Safety walkrounds

Learning culture

Process

Correct patient identification

Improvement

Patient Safety Friendly Hospital Initiative

Reporting system

Hospital acquired infections

Assessment

Safe surgery

Falls prevention

Medical error

High alert medication

Indicators

Patient safety
tool kit

Patient safety tool kit

World Health Organization

Regional Office for the Eastern Mediterranean

Contents

Foreword

Patient safety is considered a priority for health systems worldwide. In the WHO Eastern Mediterranean Region, available data show that, on average, health care-related harmful incidents affect 8 in 100 patients, and 4 out of 5 incidents are preventable.

In 2011, the WHO Regional Office for the Eastern Mediterranean published the *Patient safety assessment manual* as part of the WHO patient safety friendly hospital initiative. It aims to assess the level of compliance against a set of evidence-based standards covering the various domains of patient safety at the hospital level. Since the manual was published efforts have been made by local teams for the expansion and ownership of this initiative as a tool that enables them to understand and assess the level of safety in their health care institutions. A second edition of the manual is currently in preparation.

This new publication, *Patient safety tool kit*, builds on the growing regional need to develop the capacities of health professionals with regard to developing a patient safety improvement programme at the operational level and implementing corrective measures, adapted to local settings.

Universal health coverage has been proposed as a goal for health in the next round of global development priorities post-2015. The bottom line is that simply expanding access will not be enough unless we simultaneously ensure that the care provided is of sufficiently high quality, where safety should be one of its core dimensions.

Improving patient safety and reducing the burden of unsafe care must continue to be an important priority for all the health care systems in the Region. I encourage ministries of health, as well as academic institutions and professional associations to own and make use of the *Patient safety tool kit*.

Ala Alwan
WHO Regional Director
for the Eastern Mediterranean

Acknowledgements

Introduction

The tool kit

Across the world there are many different approaches, tools, resources and guidelines addressing improvement of patient safety. These are largely concerned with describing the actions required to improve safety. Increasingly the focus in all countries is to address the "how", specifically how to help create the necessary conditions to ensure that appropriate activities are undertaken reliably and in a sustained manner that will result in safer care.

The WHO patient safety friendly hospital initiative aims to assist institutions within countries to launch a comprehensive patient safety programme. It involves assessment of the level of patient safety in health care facilities. The *Patient safety assessment manual*, published by WHO Regional Office for the Eastern Mediterranean in 2011 and developed as part of the initiative, aimed at measuring patient safety programmes at health care facilities and instilling a culture of safety. It comprises a set of standards that enable health care facilities to identify areas where improvement is required. It is also intended to motivate staff to take part in patient safety improvement.

The *Patient safety tool kit* is a complementary tool that is intended to help health care professionals implementing patient safety improvement programmes. It describes the practical steps and actions needed to build a comprehensive patient safety improvement programme (Box 1). It blends the best of current approaches into a single, comprehensive resource. The emphasis is on its practical value to health care leadership and management and front-line clinicians. It describes a systematic approach to identifying the "what" and the "how" of patient safety. It acknowledges that patient safety is one component of an overall quality strategy.

Where possible, unnecessary explanations or evidence that already exist across multiple sources have been omitted. The focus is on providing information and suggestions that will be of operational value with an emphasis on avoiding duplication and distractions and providing an efficient, useful resource. There is no one single approach that is suitable to all health care facilities. The tool kit is structured in a way that will help the reader navigate patient safety improvement in a logical way, informed by the available evidence. It aims to maximize the likelihood of developing/ strengthening and implementing a successful patient safety programme, including contextually relevant interventions, so that avoidable patient harm is minimized.

> ### Box 1. Rationale for the *Patient safety tool kit*
>
> The *Patient safety tool kit* is a hands-on instrument for improving patient safety. It will help raise awareness and build capacity and provide a reference for health care facilities as well as national health authorities in the development and implementation of patient safety programmes.

How the tool kit fits within an overall quality approach

Patient safety is one part of an overall quality approach to health care delivery. As is evident from the literature, and highlighted in this tool kit, many lives are harmed each day as a result of defects in the structures and processes of treatment and care. Patient safety deficiencies impact on outcomes, quality of life and the effectiveness and efficiency of healthcare, and can lead to significant inequity. Patient safety has therefore been described as more than just a clinical problem – it is a human problem, an economic problem, a system problem, a public health problem and a community problem.

The impact of the health system on patient safety and quality of life is significant, and in many contexts health system constraints will need to be addressed. This must be carried out in parallel to developing and implementing a programme and interventions, as described in this tool kit, in order to make patient safety an integral part of quality and safety improvement activities. In some instances this will include addressing health infrastructures and widening access to essential equipment and supplies.

Action on patient safety demonstrates leadership and management commitment in moving towards high quality, integrated, person-centred care. Fig. 1 illustrates patient safety as one part of this and positions the tool kit as a robust, evidence-informed resource to help on-the-ground implementation of the right interventions to prevent adverse events.
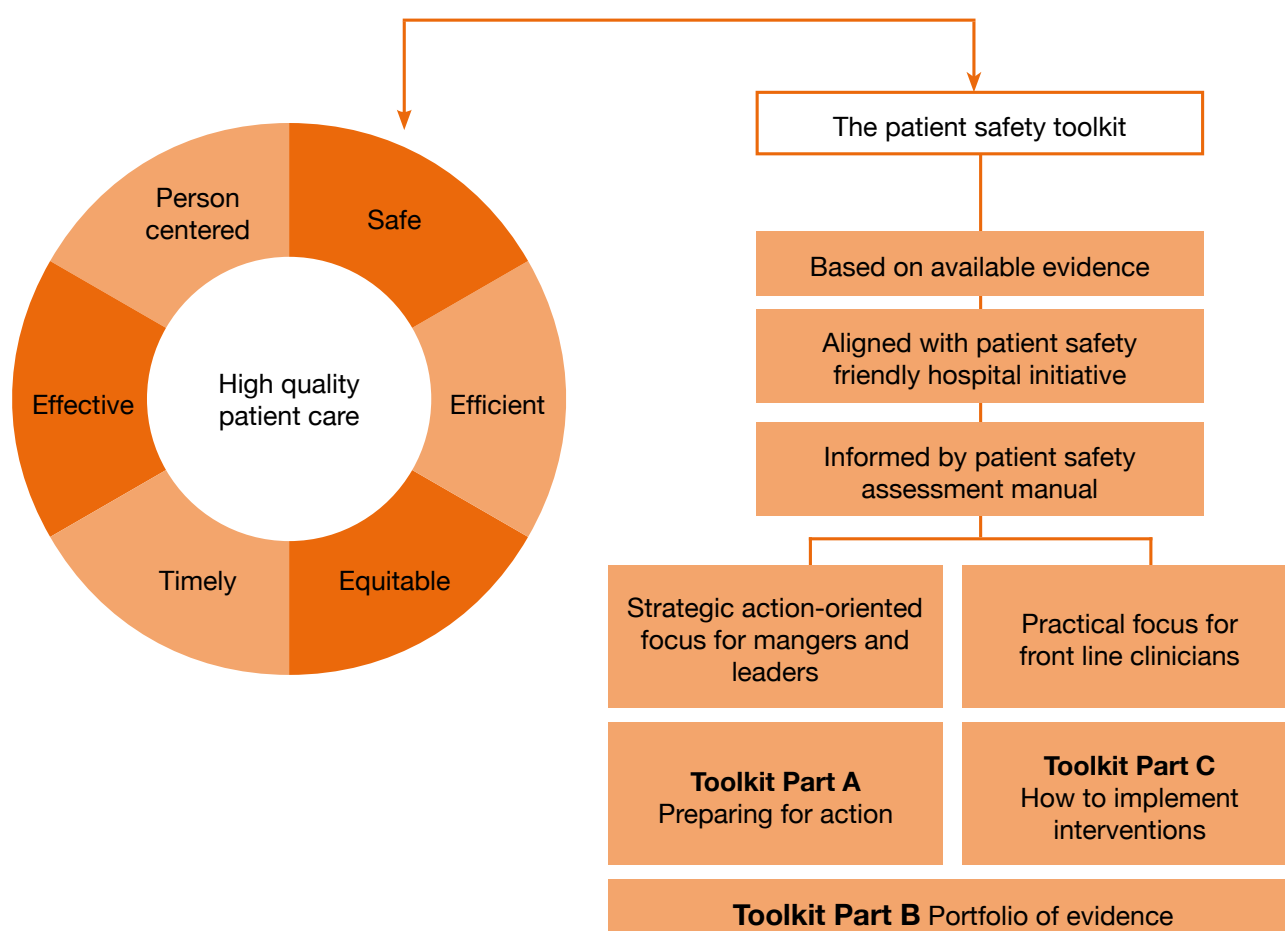
Fig. 1. The link between the *Patient safety tool kit* and high quality patient care

Structure of the tool kit

This tool kit was developed with valuable inputs from a team of patient safety experts from within and outside the Region. It lists patient safety priority solutions that are field-oriented and gives links to the supporting bibliographic references. At the end of each section a checklist is provided to help field teams follow the steps required for successful implementation of the corrective solutions.

The content of the *Patient safety tool kit* is distributed across three main sections: Preparing for action, Portfolio of evidence and How to implement interventions. The tool kit covers a considerable breadth of information dealing with the steps to follow for the establishment of a patient safety programme by a multiprofessional team that involves managers, clinicians and nurses. The various sections cover organizational issues and specific solutions such as the fundamentals of safety culture, incident reporting system, correct patient identification, human factors, medication safety, etc.

Part A: Preparing for action

Burden of harm as a consequence of adverse events

A high quality health system delivers care that is safe and free from unnecessary harm. It is well accepted, and supported by a growing body of evidence, that across all countries of the world the burden of harm and death as a result of adverse events remains unacceptably high, including the human and economic burden (see Box 2).

Patient safety is inevitably influenced by the health care system. The evidence highlights a number of factors contributing to harm, including:

- weak health care systems;
- suboptimal infrastructure and limited supplies of essential equipment for safety;
- limited leadership and management capacity;
- inadequate training or supervision of clinical staff;
- absence of protocols or policies;
- failure to implement protocols and policies;
- inadequate communication;
- prevailing punitive and blaming culture with inadequate reporting;
- delays in providing, or failure to provide, a reliable service.

Health care systems that are not fully functional will inevitably result in error and patient harm. A patient safety programme does not occur in a vacuum and awareness of the impact of health systems on patient safety is critical. While the existence of protocols and treatment guidelines, for example, is one important part of preventing adverse events, a multifaceted approach is needed to ensure reliable and sustainable implementation of such a programme. A patient safety programme requires a combination of local will, multidisciplinary teams, leadership, management commitment and involvement, a receptive culture, planning, education and ongoing measurement.

This patient safety tool kit outlines the steps necessary to achieve the goal of safer care for patients. The local context and the impact of the health system itself will, however, influence the starting point for action. In summary, improving patient safety requires a significant and sustained response across all levels of the health care system.

▤ To find out more on the evidence relating to the burden of harm, including the facts and figures presented here, refer to the evidence summary in Part B.

Box 2. Burden of harm as a consequence of adverse events

Global burden: Globally one in 10 patients is affected by adverse events.

Local burden: In the Eastern Mediterranean Region the range of harm is 2%–18%. In one of the biggest studies to date, 14% of patients sustained permanent disability and 30% died from causes associated with the adverse event.

Economic burden: In the Eastern Mediterranean Region each adverse event caused an average of 9.1 additional days in hospital. Efforts to quantify the economic burden estimate that for low/middle-income countries the cost of all adverse events averages US$ 7295 million (range US$ 1976–US$ 21 276).

Source: BMJ Qual Saf 2013;22:809-815 (87)

Purpose of the patient safety tool kit

The purpose of the *Patient safety tool kit* is two-fold. For hospitals aiming to achieve the status of a patient safety friendly hospital, the tool kit is designed to help them address the standards listed in *Patient safety assessment manual*. Secondly, for hospitals aiming to improve the safety and quality of healthcare, but which are not part of the patient safety friendly hospital initiative, the tool kit is designed to help them achieve the necessary improvements in a stepwise manner.

The tool kit focuses on how to put in place and implement the measures needed to improve patient safety and service quality. It describes a stepwise approach towards improving patient safety and is of equal relevance to hospitals at the start of their improvement journey and those which have already started to develop and implement a patient safety programme.

⊟ To find out more about the patient safety friendly hospital initiative, the Patient safety assessment manual and its standards see Part A Step 1 and Step 3. For information on the evidence, refer to Part B.

Who should use the tool kit?

Patient safety improvement will only ensue with a combination of committed leadership and management supporting a programme of improvement and front-line practitioners who understand how to implement the necessary interventions for safety.

The terms "leadership and management" and "front-line clinicians" are used throughout the tool kit (Table 1). The separation of these two terms is somewhat artificial and there will be times where front-line clinicians also assume management and leadership roles. However, in order to direct actions and guide implementation, it is important to try and clarify the different roles and responsibilities.

The tool kit is targeted for use in hospitals; its principles could, however, be adapted to other settings such as ambulatory care (and potentially primary care).

Table 1. Summary of terms used in this tool kit

Term	Organizational level	Department/ward level
Leadership and management	Hospital Administrator Chief Executive Officer Chief Operating Officer Medical Director Nursing Director	Operational and general managers, e.g. senior hospital staff member responsible for patient safety, patient safety officer, patient safety coordinator, quality officer, risk manager, infection control officer, health promotion officer, etc. Clinical and departmental leaders, e.g. head of surgery, nurse manager, biomedical engineer, blood safety officer, etc.
Front-line clinician	Medical Director Nursing Director	Individual staff, e.g. nurses, doctors, ancillary staff, administrative staff, etc.

How to use the tool kit

This tool kit provides front-line clinicians and leadership and management with a step-by-step guide although it is important to note that improving patient safety is not a linear process and many parts of the tool kit describe activities that are interconnected.

The tool kit provides:

- tools to secure leadership and management commitment for a patient safety programme;
- tools to establish/strengthen a patient safety programme;
- tools to undertake an analysis of the current status of patient safety in the hospital and generate data to improve patient safety performance;
- tools to prioritize improvement action;
- implementation resources, including education, advocacy, evaluation and culture changes relating to generic and specific patient safety interventions.

Leadership and management: work through the rest of Part A. Refer to Part B for the scientific evidence in support of patient safety. Refer to Part C for how to implement the interventions described in the tool kit.

Front-line clinicians: refer primarily to Part C for information on how to implement interventions described in the tool kit.

Part A is concerned with building the foundation for success. It is particularly relevant at the organizational level. During this step a number of preparatory actions are required.

- Read through and choose the sections most relevant to the specific context.
- Download/access the relevant resources from the list of resources in each section.
- Use the resources to help develop an action plan.

Part B summarizes the evidence on patient safety improvement. It helps to address the effectiveness and credibility of the approaches described. It is a "for information" section and is not intended to be used during the practical implementation phase (Part C).

Part C outlines how to implement a patient safety programme and focuses on a number of specific interventions to help get organizations started. The specific interventions/tools provided are not exhaustive and some hospitals will identify priorities related to, for example, the health care system itself to ensure the right infrastructures and teams are in place to support patient safety.

- Read through and choose the sections and interventions that have been prioritized for action based on individual context.
- Download the relevant resources from the resources box in each section.
- Use the resources to help implement and evaluate an action plan.

Rationale for including the resources and evidence summary (inclusion criteria)

The resources and evidence listed throughout the tool kit are included after a rapid review of:

- service delivery and safety resources/publications of WHO;
- resources/publications from the WHO Regional Office for the Eastern Mediterranean;
- publications of other WHO departments working in fields related to patient safety and quality improvement (headquarters and regions).

A cross-section of international safety organizations (including United Nations partners). Inclusion of a resource/publication available at the time of writing is based on the perceived likelihood of the usefulness of the resources/publications in relation to the interventions and the free availability and accessibility of the resources/publications at no cost (where possible).

No scoring system has been developed in association with the inclusion criteria. Inclusion of a resource/publication does not imply endorsement by WHO of any specific organization associated with the resource.

Stepwise approach to developing and implementing a patient safety programme

Outline of the steps within the tool kit

The steps included in this tool kit to improve patient safety and how the tool kit relates to each step are summarized in Fig. 2.
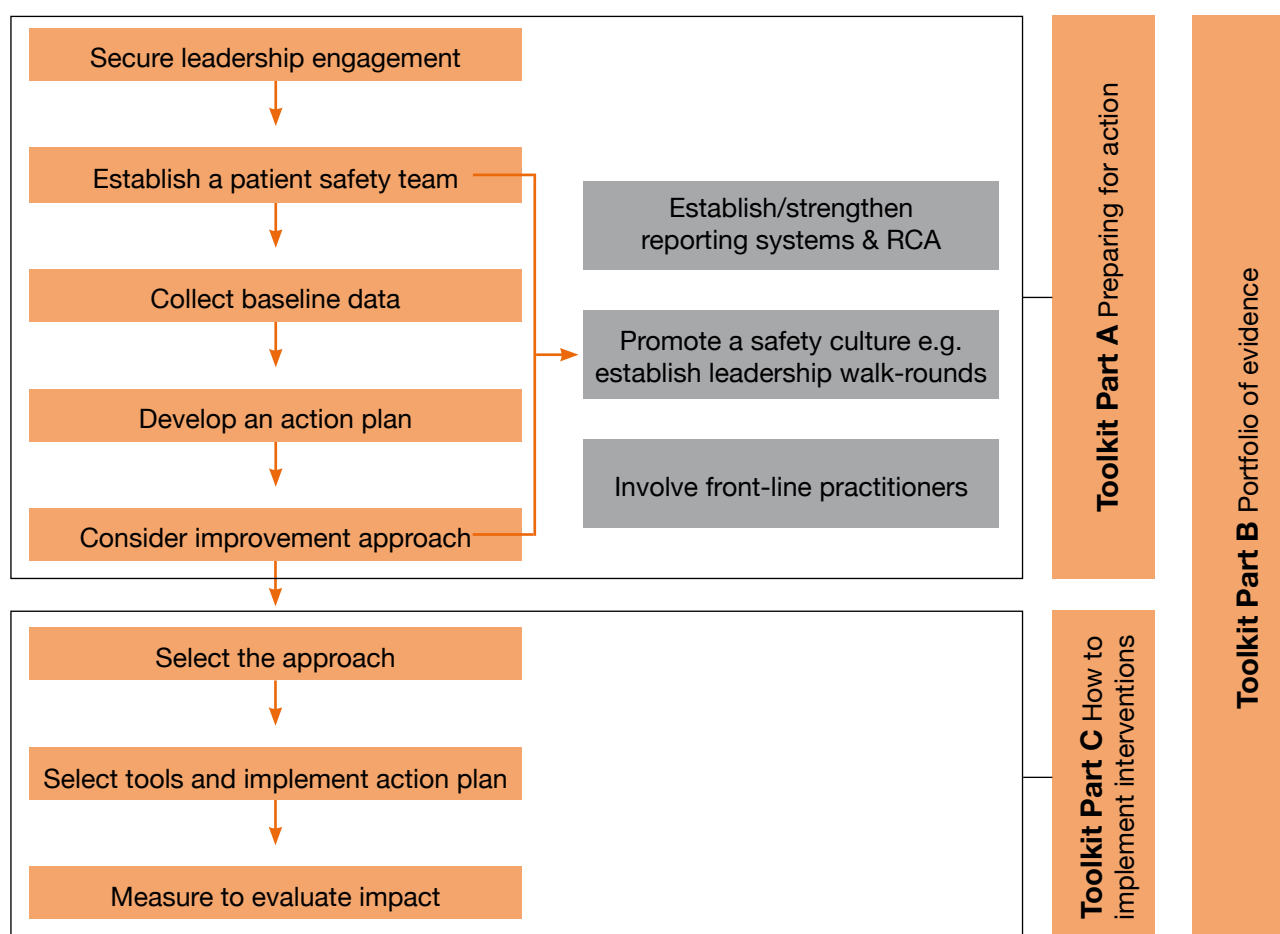
Fig. 2. Diagram illustrating the stepwise approach to developing and implementing a patient safety programme

Step 1: Securing leadership and management commitment

The aim of Step 1 is to gain strong leadership and management commitment for the patient safety programme and agreement to commit resources to develop and sustain the programme.

At the organization level, senior leadership and management commitment is essential, and evidence suggests that without it patient safety improvement is unlikely to succeed. Integrating a patient safety programme with an organization's goals is the ultimate aim.

At both the organization level and across wards and departments, excellent leadership is a core part of clinical governance for ensuring the necessary processes are in place including the establishment and maintenance of a non-blaming learning culture. There is also an emerging body of knowledge on the importance of improving institutional safety culture as a foundation for success in patient safety improvement.

Promoting and building a culture of safety

Safety culture has been described as a performance-shaping factor that guides the behaviour of health care professionals towards viewing patient safety as one of their highest priorities. A safety culture exists when each individual health care worker assumes an active role in error prevention and their role is supported by the organizational leadership and management. Patient safety culture is concerned with the shared attitudes, beliefs, values and assumptions that influence how people perceive and act upon safety issues within their organization.

Assessing patient safety culture is an important intervention in itself and can provide useful information at the beginning of the improvement. A number of surveys exist internationally to measure patient safety culture and the results provide a metric that can be assessed more readily than many other health outcomes. It is also positive to use different qualitative approaches to surveys to determine the perceptions of the health care workers relating to the organizational culture, including brainstorming or nominal group technique sessions and focus group sessions.

Assessing safety culture provides an organization with a basic understanding of the safety-related perceptions and attitudes of its department/ward-level leaders and managers and front-line staff, and can act as a diagnostic tool to identify areas for improvement as well as a platform for launching a patient safety programme. One method of developing a strong patient safety culture involves senior leadership and management undertaking what are described as leadership safety walkrounds.

Establishing patient safety executive walkrounds

Patient safety executive walkrounds provide an informal but structured method for organizational leadership and management to understand front-line safety issues and present an opportunity for discussing patient safety and demonstrating commitment and support. Strong leadership and management support for patient safety interventions, demonstrated through "safety walkrounds", has helped many organizations make a significant impact on their safety culture although there is some debate on their effectiveness.

Patient safety leadership walkrounds can result in a number of benefits.

- They demonstrate organizational leadership and management-level commitment to patient safety.
- They help to establish clear lines of communication about patient safety among front-line practitioners and organizational leaders and managers.
- They provide opportunities for organizational leaders and managers to learn about patient safety.
- They identify opportunities for improving safety.
- They can help to encourage reporting of issues, errors and near misses.

- They can help to promote a culture of patient safety.
- They can help to establish local solutions to minimize risk.

Where to start: example essential activities to occur during Step 1

Action	Additional information
The person identified as the designated senior staff member with responsibility, accountability and authority for patient safety contacts the organizations leadership and management and quality lead (if the position exists) to brief them on the need for, and benefits of, improving patient safety. If appropriate, refer to the Patient Safety Friendly Hospital Initiative and the Patient safety assessment manual as starting points for identifying gaps and making patient safety a strategic priority.	Step 1, Resources section Part B, Summary of evidence
Explain the WHO Eastern Mediterranean Region mandate for action on patient safety.	Part B, Summary of evidence
Explain the potential stepwise approach to be taken to improve patient safety.	Part A, Fig. 1
Briefly describe what is expected of the organizational leadership and management. At a strategic level this relates to support for establishing the programme, committing time and resources to support the programme, e.g. through visible leadership and patient safety executive walkrounds, and communicating with departmental leads and front-line practitioners on the purpose and value of walkrounds using e.g. posters, leaflets.	Step 1, Suggested roles and responsibilities Part B, Summary of evidence
If a decision is made to undertake patient safety executive walkrounds the organizations leadership and management agree to: • provide feedback and follow-up, including follow-up visits, to address issues or concerns raised; • put in place methods to evaluate success, including the effects on the environment of care, staff and patient attitudes and completion of actions; • create opportunities for front-line staff who will not be physically present on the day of rounds to express safety concerns	Step 1, Suggested roles and responsibilities Part B, Summary of evidence
Secure verbal and written support for establishing/strengthening a patient safety programme and establishing a patient safety team.	Step 2
Consider the equipment, supplies and human resources necessary to deliver safe healthcare.	Resources section

Secure commitment to summarizing the available reports/studies on the current patient safety situation at the facility level; explain the different types documents, including the value of undertaking a patient safety culture assessment using one of the available survey tools. The use of the nominal group technique or focus group sessions should also be considered as part of identifying the causes of harmful events.	Step 3 Part B, Summary of evidence
Secure commitment to developing an action plan that will help the hospital progress to achieving patient safety as a strategic priority (informed by the baseline assessments), taking into account the necessary equipment, supplies and human resources requirements. The action plan will help in the development of an annual budget for patient safety activities.	Step 4
Explain the approaches to improvement.	Step 5 Part B, Summary of evidence

Resources to help with activities in Step 1

Topic	Summary
Introduction to patient safety[1,2]	A simple factsheet summarizing the burden, including economic, and a model for patient safety as well as definitions of patient safety concepts.
Patient safety in developing countries[3]	Presentation summarizing the findings on patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital study, undertaken by the WHO.
Regional frameworks: Patient safety assessment manual[4]	Outlines the critical, core and development patient safety standards needed for the establishment of a patient safety programme at the hospital level. Explains how to undertake an assessment, select evaluators, and contains tools for undertaking an assessment.
Establishing a patient safety programme[5]	A patient safety plan that can be used as a reference when developing or modifying patient safety plans in each organization.
Establishing a patient safety programme[6]	The Comprehensive Unit-Based Safety Programme framework for patient safety improvement is comprised of five steps; however the programme is a continuous, cyclical process. Steps for launching a Comprehensive Unit-based Safety Programme team before and after starting the programme are described.
Identifying patient safety gaps[7]	Seven questions for leadership and management to identify gaps in safety culture. The questions explore the level of understanding of the importance of patient safety, whether an open and fair culture exists, active reporting of incidents, robustness of information, openness when things go wrong, learning from patient safety incidents, and implementation of national guidance and safety alerts.
Guide for leaders[8]	This is designed to provide highly practical approaches for leaders, including a how to guide, case studies and resources.

Roles and responsibilities[9]	Provides a structure and examples of how to implement leadership and management roles and responsibilities listed in the next section "Suggested roles and responsibilities", including how to ensure the patient's voice is heard at this level.
Guide for leaders[10]	This paper presents eight steps for leaders to achieve patient safety and high reliability. A range of resources are available. The steps address strategic priorities, culture, and infrastructure, stakeholder engagement, communications and awareness raising, communicating aims at the system level, measurement, analysis, support for staff and patients involved in error, alignment of approaches and system redesign.
Safety culture: background and introduction[11]	Short introduction to safety culture emphasizing that high reliability organizations maintain a commitment to safety at all levels, from front-line providers to managers and executives.
Safety climate assessment tools[12]	This tool, including a simple questionnaire is applicable to any industry and provides an objective measure of safety culture as the starting point for improvement.
Systems thinking and high reliability organizations[13]	Introduction to health system complexity, the Swiss cheese model, and applying learning from high reliability organizations to patient safety.
Culture and safety improvement programmes[14]	Website of the Comprehensive Unit-based Safety Programme emphasizing the central importance of culture in sustainable patient safety improvements and the importance of organizational level support for patient safety improvement.
Safety culture assessment tools[15]	Access to the survey forms, user guides and a comparative database. The tool is available in Arabic.
Qualitative approaches to understand causes of harmful incidents[16]	A series of tools explaining the nominal group technique method that can be used to either identify causes of harmful incidents or to develop an action plan to tackle harmful incidents. It does not count harmful incidents.
Leadership walkrounds: general[17]	Brief outline of leadership walkrounds and the importance of two-way communication between executives and front-line staff.
Leadership walkrounds tool kit[18]	A short guide and tool kit aimed at helping organizations undertake safety walkrounds highlighting how they enable executive/senior management teams to have a structured conversation around safety with front-line staff and patients. Useful summary algorithm (page 5), sample letters/posters for communicating walkrounds and sample questions for executives to ask staff and patients.
How to undertake successful walkrounds[19]	Describes the process of walkrounds and presents a simple 1-page summary of the three phases of successful walkrounds.

Training films – walkrounds[20]	Four short films that highlight the process of implementing leadership safety walkrounds in three National Health Service Trusts in England.
Case study – walkrounds[21]	Explains how a National Health Service Trust in England implemented its patient safety walkrounds.

Suggested roles and responsibilities

Supported by the designated patient safety staff member and team, the organizational leadership and management:

- agree to develop of a patient safety programme including policies, guidelines and standard operating procedures; that include patient safety priorities as well as the required resources;
- provide demonstrable leadership, for example highlight safety risks through open discussions with hospital staff and conduct patient safety walkrounds on assigned wards;
- ensure leadership and management accountability and governance;
- agree to the establishment and monitoring of explicit system level measures to ensure data are collected to improve safety performance e.g. implementation of an incident management system;
- consider implementing root cause analysis and ensure necessary resources to reduce the re-occurrence of problems in the future;
- build patient safety and improvements in knowledge and capability among staff;
- monitor progress and drive the execution of plans.

How to access the resources (references)

1. Fundamentals in patient safety: what is patient safety? Geneva, World Health Organization, 2012 (http://www.who.int/patientsafety/education/curriculum/course1_handout.pdf, accessed 16 November 2014).
2. Definitions of key concepts from the WHO patient safety curriculum guide. Geneva: World Health Organization; 2011 (http://www.who.int/patientsafety/education/curriculum/course1a_handout.pdf, accessed 16 November 2014).
3. Wilson RM, Michel P, Olsen S, Gibberd RW, Vincent C, El-Assady R, et al. Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. BMJ. 2012;344:e832. doi: http://dx.doi.org/10.1136/bmj.e832.
4. Patient safety assessment manual. Cairo: WHO Regional Office the Eastern Mediterranean; 2011 (http://applications.emro.who.int/dsaf/emropub_2011_1243.pdf?ua=1, accessed 16 November 2014).
5. Patient safety plan. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/resources/Pages/Tools/PatientSafetyPlan.aspx, accessed 16 November2014).
6. The comprehensive unit-based safety program (CUSP): the CUSP framework. Baltimore, Maryland: Johns Hopkins Center for Innovation in Quality Patient Care; 2009 (http://www.hopkinsmedicine.org/innovation_quality_patient_care/areas_expertise/improve_patient_safety/cusp/five_steps_cusp.html#pre, accessed 16 November2014).
7. Questions are the answer! Seven questions every board member should ask about patient safety. London: National Health Service, National Patient Safety Agency; 2009 (http://www.nrls.npsa.nhs.uk/resources/?EntryId45=59885, accessed 16 November2014).
8. Leadership. London: Patient Safety First; 2014 (http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Leadership/, accessed 16 November2014).

9. The 'How to Guide' for leadership for safety. London: Patient Safety First; 2008 (http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/How-to-guides-2008-09-19/Leadership%201.1_17Sept08.pdf, accessed 16 November2014).

10. Leadership guide to patient safety. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2006 (http://www.ihi.org/knowledge/Pages/IHIWhitePapers/LeadershipGuidetoPatientSafetyWhitePaper.aspx, accessed 16 November 2014).

11. Patient safety primers: safety culture. Rockville, Maryland: Agency for Healthcare Research and Quality; 2014 (updated) (http://psnet.ahrq.gov/primer.aspx?primerID=5, accessed 16 November 2014).

12. The safety climate tool. Buxton, Derbyshire: UK Health and Safety Laboratory; 2010 (http://www.hsl.gov.uk/products/safety-climate-tool, accessed 16 November 2014)

13. To err is human: systems and the effect of complexity on patient care. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course3_handout.pdf, accessed 16 November 2014).

14. The comprehensive unit-based safety program (CUSP). Baltimore, Maryland: Johns Hopkins Center for Innovation in Quality Patient Care; 2009 (http://www.hopkinsmedicine.org/innovation_quality_patient_care/areas_expertise/improve_patient_safety/cusp/, accessed 16 November 2014).

15. Hospital survey on patient safety culture. Rockville, Maryland: Agency for Healthcare Research and Quality; 2004 (http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/, accessed 16 November 2014).

16. Patient safety: Method tools: nominal group. Geneva: World Health Organization; 2014 (http://www.who.int/patientsafety/research/methodological_guide/method_tools/en/index3.html, accessed 16 November 2014).

17. Conduct Patient Safety Leadership Walk Rounds™. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/knowledge/Pages/Changes/ConductPatientSafetyLeadershipWalkRounds.aspx, accessed 16 November 2014).

18. Quality and safety walk-rounds tool kit. Naas, County Kildare, Ireland: Health Service Executive; 2013 (http://www.hse.ie/eng/about/Who/qualityandpatientsafety/Clinical_Governance/CG_docs/QPSwalkarounds240513.pdf, accessed 16 November 2014).

19. Leadership for safety, supplement 1: Patient safety walkrounds. London: Patient Safety First; 2009 (http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/How-to-guides-2008-09-19/How%20to%20Guide%20for%20Leadership%20WalkRounds%202009_04_07.pdf, accessed 16 November 2014).

20. Leadership walkround films. London: Patient Safety First; 2014 (http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Leadership/WalkRounds/, accessed 16 November 2014).

21. South Tees NHS Foundation Trust: case study. London: Patient Safety First; 2014 (http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Leadership/southtees/, accessed 16 November 2014).

Checklist (Step 1)

By the end of this step users should have completed the following.

1. Secured organizational leadership and management commitment for the patient safety programme ☐

2. Considered developing a patient safety strategy (or integrating patient safety within the hospital strategy) ☐

3. Addressed human and financial resource requirements including support for the senior patient officer and development of terms of reference ☐

4. Made a decision on how to undertake baseline surveys ☐

5. Agreed a staged action plan to move forward ☐

6. Secured leadership and management agreement to visibly support, e.g. Safety walkrounds ☐

7. Agreed a measurement approach for each stage of the plan and implementation of interventions; ☐

8. Discussed how to address hospital safety culture within the patient safety team ☐

9. Presented a case for undertaking safety culture assessment to leadership and management ☐

10. Included safety culture assessment questionnaires into the action plan (if appropriate) ☐

11. Identified a list of senior executives to undertake patient safety leadership walkrounds ☐

12. Established a schedule of patient safety leadership walkrounds ☐

13. Incorporated patient safety leadership walkrounds into the action plan ☐

14. Established a reporting mechanism to provide feedback and impact evaluation for walkrounds ☐

▤ To find out more about the evidence for organizational leadership and management engagement, safety culture and patient safety walkrounds as patient safety strategies, refer to Part B.

Step 2: Establish a patient safety team

The activities in this step should be undertaken in close conjunction with those in Step 1. An operational patient safety team is essential to drive the programme forward. The team should be established as a multidisciplinary patient safety internal body, the purpose of which is to oversee and guide the implementation and management of the programme and be the driving force to sustain it over time.

The multidisciplinary patient safety internal body should meet regularly to advance the patient safety programme. The involvement of front-line practitioners in patient safety improvement should start during Step 2.

Front-line practitioners are the eyes and ears of patient safety, and the individuals with the expertise and knowledge necessary to make patient safety improvement a reality. Involving front-line practitioners at an early stage of improvement is key to success.

Where to start: example essential activities to occur during Step 2

Action	Additional information
Establish a multidisciplinary patient safety internal body (or review existing equivalent team using the information in this section)	Step 2, Resources section Part B, Summary of evidence

The patient safety internal body should ideally include a representation from the different health care professionals. For example, clinicians, nurses, administrative staff, pharmacists, dentistry, patient representatives if available.	Step 2, Resources section Part B, Summary of evidence
These persons must be able to dedicate a minimum of their time to this programme and regular, documented meetings should be scheduled to take place during the year.	Step 1, Roles and responsibilities
The team may consider including tangible inputs from areas such as infection prevention and control, risk management, medication safety and/or findings from qualitative researches (nominal group technique, focus group discussion reports with different categories of healthcare professionals), this should lead to drawing a clear picture on the magnitude of the problem as well as the safety priorities	Step 3
Team members should have fundamental knowledge of the hospital; they must represent all parts of the process to be improved. It is very easy to unintentionally omit those people who are considered to be external to a process, for example, representatives of the radiology department, laboratory, etc.	Step 2, Resources section
When assembling the patient safety internal body, consider group dynamics and human factors. A multidisciplinary team is optimal, and includes different levels of experience or training, different skills sets (e.g. clinical, negotiation, data) and allows members to join at any phase of the programme.	Step 2, Organization of work: human factors Step 2, Resources section
The ideal size of a team is 5–9 members. If the team is becoming too large, it may indicate that the scope of the project is too ambitious.	Step 2, Resources section
There should be a good coordination among patient safety and quality management teams for better coherence and integration of improvement activities	Step 2, Resources section
The designated patient safety officer arranges a meeting and invites a range of clinical and non-clinical practitioners.	Step 2, Resources section
The designated patient safety officer secures departmental/ward level leadership and management support for (and presence at) the meeting.	Step 2, Resources section
The designated patient safety officer presents reports of any baseline assessment and other relevant local safety information to all clinical and non-clinical practitioners in the hospital, e.g. the patient safety friendly hospital initiative assessment.	Step 3
The meeting is a chance for a formal review of the findings of the baseline assessments and a chance to seek the opinion of front-line practitioners on what the priorities and the next steps should be.	Step 3
There should be an opportunity for front-line staff to ask questions and to clarify any points raised. Front-line staff should be asked for their opinions on the key risks to patients across the hospital.	Step 3

Using a combination of quality improvement tools and techniques, it will be possible to diagnose the problems specific to the organization and help to organize and prioritize information (see resources section); at the end of this session, staff opinions on the main patient safety risks should be clear. Techniques can include brainstorming or nominal group technique sessions and focus group discussions.	Step 3
If a meeting cannot be organized, opinions can be gathered via, for example, simple surveys asking open questions such as: • How will the next patient be harmed in this hospital? • What are the three greatest risks facing patients in this hospital?	Step 2, Resources section Step 3
Make a record of the findings of the meeting that will feed into the development of a structured action plan.	Step 4

Resources to help with activities in Step 2

Topic	Summary
Role of teams in safety and quality[22]	Booklet describing why teams are important in safety, a two-team approach, team roles, team development, strategies for effective teamwork, steps and tools.
Effective teams[23]	WHO summary paper on effective teamwork and its impact on patient safety. Practical tips on how to build strong teams and address conflict
Improving teamwork and communication for safety[24]	Part of the Patient Safety Resource Centre; links to tools and resources including safety briefings.
The role of a safety officer[25]	Summarizes six key components of a patient safety officer's role.
Identifying the best approach[26]	The tools include method protocols for preparing and conducting each type of study, the necessary support forms and materials for training investigators and communicating with health care facility stakeholders.
Preparing teams for action[27]	This interactive webinar is for use by researchers, quality managers, clinicians and other professionals with an interest in understanding and tackling patient safety concerns in hospitals without needing to rely on good medical records.
Quality improvement methods[28]	Outlines the most popular and effective methods leading to significant improvements in practice including clinical practice improvement, failure modes and effects analysis, and root cause analysis.
Tools for gathering data on the burden of patient safety problems[29]	The WHO methodological guide helps health practitioners and patient safety researchers in developing and transitional countries measure and tackle patient harm at the healthcare facility level. It describes five methods that have been piloted in four developing countries from four world regions and that been effective even in the absence of good medical record keeping.

Tools to obtain information from staff on the causes of harm[30]	Nominal group technique methods can be used to either identify causes of harmful incidents or to develop an action plan to tackle harmful incidents.
Tools to obtain information from staff and diagnose the patient safety problem[31]	This guide aims to provide practical advice to clinicians and managers on how to use health care data to improve the quality and safety of health care in a systematic way. The guide describes a number of quality improvement tools and techniques, including process flowcharts, brainstorming or nominal group technique sessions, and focus group discussions and presents a number of summary diagrams.
Quality improvement tools[32]	An A–Z list of quality improvement tools covering multiple aspects of improvement including actions plans, before action reviews, driver diagrams and Pareto charts.

Suggested roles and responsibilities

Senior staff member responsible for patient safety:

- manages the available documents/reports on any previous Patient safety Friendly Initiative assessment (if applicable);
- briefs the staff on The patient Safety Friendly Hospital initiative requirement, objectives and methodology;
- organizes meetings on patient safety activities;
- acts as a contact person for questions;
- helps identify resources;
- helps when appropriate in documenting findings and process.

Patient safety team:

- supports the senior staff member responsible for patient safety.

How to access the resources (references)

22. Guide to implementing quality improvement principles. Atlanta, Georgia: Alliant GMCF; 2010 (http://www.gmcf.org/AlliantWeb/Files/QIOFiles/Nursing%20Homes/Implementing%20QI%20Principles%2010SOW-GA-IIPC-12-237.pdf, accessed 16 November 2014).
23. To err is human: being an effective team player. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course4_handout.pdf, accessed 16 November 2014).
24. Teamwork and communication. London: The Health Foundation; (http://patientsafety.health.org.uk/area-of-care/safety-management/teamwork-and-communication, accessed 16 November 2014).
25. The comprehensive unit-based safety program (CUSP): patient safety officers. Baltimore, Maryland: Johns Hopkins Center for Innovation in Quality Patient Care; 2009 (http://www.hopkinsmedicine.org/innovation_quality_patient_care/areas_expertise/improve_patient_safety/patient_safety_officers/, accessed 16 November 2014).
26. Tools for measuring and tackling patient harm (A range of resources including slide-decks). Geneva: World Health Organization; 2010 (http://www.who.int/patientsafety/research/methodological_guide/en/, accessed 16 November 2014).
27. Methodological guide (interactive webinar). Geneva: World Health Organization; 2011

(http://www.who.int/patientsafety/research/methodological_guide/interactive_webinar/en/, accessed 16 November 2014).

28. Knowledge is the enemy of unsafe care: quality improvement methods. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course7a_handout.pdf, accessed 16 November 2014).

29. A methodological guide for data-poor hospitals. Geneva: World Health Organization; 2010 (http://www.who.int/patientsafety/research/methodological_guide/en/, accessed 16 November 2014).

30. Talking points for nominal group meetings; facilitators training pack. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/research/methodological_guide/method_tools/en/index3.html, accessed 16 November 2014).

31. Easy guide to clinical practice improvement (see part 2, pages 15–37). North Sydney, Australia: New South Wales Health Department; 2002 (http://www.health.nsw.gov.au/pubs/2002/pdf/cpi_easyguide.pdf, accessed 16 November 2014).

32. Quality improvement tools. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools.aspx?search=affinity, accessed 16 November 2014).

Checklist (Step 2)

By the end of this step users should have completed the following.

1. Identified a designated senior staff member with responsibility, accountability and authority for patient safety; ☐

2. Identified a multidisciplinary patient safety internal body that is committed to improving patient safety ☐

3. Developed clear roles for each member of the team; ☐

4. Assembled a team that is aware of the wider patient safety hospital strategies ☐

5. Held a meeting with front-line practitioners to sensitize, undertake engagement and advocacy and start to diagnose the patient safety problems in the hospital, and made notes of actions arising ☐

6. In the absence of a meeting, contacted staff via survey or telephone to seek input ☐

7. Reviewed baseline data ☐

8. Agreed priorities ☐

9. Developed an action plan ☐

▤ To find out more about the evidence behind patient safety teams and involving front-line practitioners when executing a patient safety programme, refer to Part B.

Complementary activities to be considered during Step 2

Improving the safety and quality of hospitals is not a linear process. During Step 2 a number of other activities are recommended to help build capacity and develop the infrastructure and processes to support the implementation of an effective improvement programme. This section describes three areas of potential focus and activity.

a) Developing an incident reporting system

This part of the tool kit is a practical guide to taking the first steps to setting up an incident

management and reporting system (if one is not already in place). It is not intended to be comprehensive, but will reference other more detailed and publicly available documents to guide patient safety teams and help in making decisions. It is an introduction to the relevant issues and questions that may need to be addressed when working through plans.

The audience for this section comprises department/ward level leadership and management who want to start using an incident management system.

Incident reporting (also referred to as adverse event reporting) involves health care staff actively recording information on events or circumstances that have led to harm to patients or could have potentially harmed patients. Feedback of findings and subsequent actions and recommendations is critical. Recommendations may include changes in processes and system redesign. Reporting of a serious incident should trigger an in-depth investigation to identify its cause (see next section: Understanding risk and root cause analysis).

Incidents can be collected from a number of sources (therefore providing a number of options) such as incident reporting, retrospective case-note review (closely linked to a hospital's medical records system), root cause analysis, and coroners' reports. Each method has strengths and weaknesses associated with it including ease and cost of data collection, the comprehensiveness of the information, and the ability to use the data for counting. When considering developing or strengthening an incident reporting system, it is important to work towards a system where patient safety incidents are reported to patients and their carers in a structured manner that ensures transparency and compassion.

The central aim of incident reporting is to find out what happened, what contributed to the incident occurring and how the incident could have been prevented. Incident reporting works best in an open, non-punitive, non-blaming, learning and continuous improvement culture.

Where to start: example essential activities to consider when setting up an incident reporting system

Action	Additional information
Working with the patient safety team, the designated patient safety staff member determines that incident reporting is the most appropriate method for each institution and fits with the patient safety strategy, is informed by patient safety culture assessments and is achievable (taking into account how the system will be implemented, e.g. paper versus digital system driven)	Resources section
If a decision is taken to implement (or improve existing) reporting systems, the designated patient safety staff member and patient safety team agree clear aims, activities, roles and responsibilities, and timelines as well as the resources required for implementation.	Resources section Checklist for developing a reporting system
Develop a structured disclosure policy and procedure.	Resources section
Engage clinical and managerial leaders in promoting and endorsing the system by explaining the benefits (including cost–benefit) of incident reporting. Successful incident reporting takes place in a culture where the leadership support staff involved in patient safety incidents (as long as there is no intentional harm or negligence).	Resources section

Determine the scope of the incident reporting system including which incidents to target (e.g. it might be realistic to start with only very serious incidents). In general, focused reporting systems are more valuable for deepening the understanding of a particular domain of care than for discovering new areas of vulnerability.	Resources section
Consider whether to focus on what are termed "near misses". These are more common than adverse events and offer a great opportunity for analysis of things that may go wrong and therefore are a valuable source of patient safety learning.	Resources section
Determine the method for collecting data. Methods will vary according to local infrastructure and technology and can include email, Internet, fax, paper and phone calls. Collection methods can range from a ward-based, simple and relatively informal process to an institution-wide, paper-based system or a jurisdiction-wide, multi-institution, electronic system.	Resources section
At a basic level collect information on: • what happened; • who it happened to; • when it happened; • where it happened; • how it happened (i.e. what went wrong); • why it happened (i.e. what underlying, contributory or deep-rooted factors caused things to go wrong).	Resources section
Narrative information should also be considered – it provides valuable information to promote learning in patient safety.	Resources section
Agree how to analyse and respond to the data collected, including identifying roles and responsibilities, prioritizing the response, feeding back results and recommendations, and the confidentiality of the data.	Resources section
Consider how to communicate with patients and their carers when adverse events occur.	Resources section
Undertake a pilot test in a small number of wards before rolling out a system organization-wide.	Resources section

Resources to help with setting up an incident reporting system

Topic	Summary
Checklist for developing a reporting system[33]	These comprehensive guidelines address the role of reporting in patient safety and present a checklist for developing a reporting system.
Overview of incident reporting[34]	A comprehensive introduction to reporting and analysing incidents.
Factsheet: learning from error[35]	Summary of the importance of a systematic approach to learning from error.

Protocol for incident investigation[36]	The protocol outlines a process of incident investigation and analysis for use by clinicians, risk and patient safety managers, researchers and others wishing to reflect and learn from clinical incidents. It is designed for use in many contexts and used either quickly for education and training or in substantial investigations of serious incidents.
Template: classification of incidents[37]	Likelihood and consequences tables to assist with the classification of incidents.
Template: reportable events[38]	A simple form to be used for reporting adverse events.
Tools for gathering data on the burden of patient safety problems[39]	This guide helps health practitioners and patient safety researchers in developing and transitional countries measure and tackle patient harm at the health care facility level. It describes five methods that have been piloted in four developing countries from four world regions and that been effective even in the absence of good medical record-keeping.
Framework for setting up a reporting system (including roles and responsibilities)[40]	The Canadian Incident Analysis Framework supports those responsible for, or involved in, managing, analysing and/or learning from patient safety incidents and incorporates a range of methods and tools including Team Management Checklist (p81) and Team Membership – roles and responsibilities (p83).
Communicating about incidents with patients and families[41]	The framework is a best-practice guide for all health care staff including boards and front-line practitioners. It explains the principles behind Being open and outlines how to communicate with patients, their families and carers following harm.
Foresight training[42]	The pack aims to help pre- and post-registration nurses and midwives develop and practice the skills needed to identify situations when a patient safety incident is more likely to occur.

How to access the resources (references)

33. WHO draft guidelines for adverse event reporting and learning systems (see page 75). Geneva: World Health Organization; 2005 (http://www.who.int/patientsafety/events/05/ Reporting_Guidelines.pdf, accessed 16 November 2014).

34. Incident reporting. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/safe/patient-safety-tools.aspx, accessed 16 November 2014).

35. Knowledge is the enemy of unsafe care: learning from error. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course5_ handout.pdf, accessed 16 November 2014).

36. Systems analysis of clinical incidents: the London protocol. London: Imperial College, Centre for Patient Safety and Service Quality; 2013 (http://www1.imperial.ac.uk/cpssq/ cpssq_publications/resources_tools/the_london_protocol/, accessed 16 November 2014) [available in Arabic].

37. Risk management standards (consequences and likelihood tables). Wellington, New Zealand: Health Quality and Safety Commission; 2013 (http://www.hqsc.govt.nz/assets/ Reportable-Events/Resources/SAC-Matrix-1-July-2013.pdf, accessed 16 November 2014).

38. Reportable event brief form 2012. Wellington, New Zealand: Health Quality and Safety

Commission; 2012 (http://www.hqsc.govt.nz/publications-and-resources/publication/306/, accessed 16 November 2014).

39. Methodological guide for data-poor hospitals. Geneva: World Health Organization; 2010 (http://www.who.int/patientsafety/research/methodological_guide/en/, accessed 16 November 2014).

40. Canadian incident analysis framework. Edmonton: Canadian Patient Safety Institute; 2012 (http://www.patientsafetyinstitute.ca/English/toolsResources/IncidentAnalysis/Documents/Canadian%20Incident%20Analysis%20Framework.PDF, accessed 16 November 2014).

41. Being open (framework and alerts). London: National Health Service, National Patient Safety Agency; (http://www.nrls.npsa.nhs.uk/beingopen/, accessed 16 November 2014).

42. Foresight training resource packs. London: National Health Service, National Patient Safety Agency; 2008 (http://www.nrls.npsa.nhs.uk/resources/?entryid45=59840, accessed 16 November 2014).

Checklist (establishing a reporting system)

By the end of this step users should have completed the following.

1. Made a decision on whether to establish an incident reporting system and associated policies and procedures ☐

2. Listed the aims, activities, roles and responsibilities, timelines and resource requirements ☐

3. Secured the agreement of clinical and managerial leads to promote the system ☐

4. Developed an agreed methodology for data collection, analysis and feedback ☐

5. Identified a pilot site for testing the system ☐

▤ To find out more about the evidence behind establishing a reporting system as part of a patient safety programme, refer to Part B.

b) Understanding risk and root cause analysis

Root cause analysis is a process for determining the underlying causes of adverse events. It is used after an incident has occurred to uncover the primary causes and contributing factors (see Box 3). It focuses on an incident and the circumstances surrounding it. Root cause analysis is a retrospective process and is useful because it identifies lessons that may prevent similar incidents in the future, focusing on prevention rather than blame or punishment. The aim is to identify weaknesses in the system, including human or other factors, rather than the individual performance of practitioners. There are a number of models for root cause analysis ranging from simple to complex; all models examine factors such as communication, training, fatigue, scheduling of tasks/activities and personnel, environment, equipment, rules, policies and barriers that can contribute to error.

Box 3. Using root cause analysis

Root cause analysis is a structured approach to incident analysis. Analysis identifies how and why patient safety incidents happen. Analysis is used to identify areas for change and to develop recommendations that deliver safer care for patients. Two models are highlighted by WHO as particularly useful for undertaking root cause analysis, the London Protocol and the Veterans Affairs model (see Resources section for details).

Table 2. An illustrative example of the objectives, processes and key steps of root cause analysis

Objective	Organizational level	Department/ward level
What happened?	Initial flow diagram	Read incident description.
		Chronologically map events and construct flow diagram.
		Determine contributory factors (why and how did it happen) for each box.
	Data gathering	Conduct interviews.
		Gather documentation (medical records, medication charts, coroners' reports, policies, procedures).
		Review equipment.
		Review setting where incident took place.
	Final flow diagram	Construct final flow diagram by adding information obtained during data gathering in chronological order.
		At each box, ask, "Why is this relevant? And what can be done to prevent it from happening again?"
Why did it happen?	Cause and effect diagram	Start with the problem statement.
		Identify immediate contributing factors.
		Keep asking "why" until the root cause has been identified.
	Causation statements	Use the cause and effect diagram to construct causation statements.
		Start with the root cause, then intermediate cause, then immediate cause then finish with the problem statement.
		Use conjunctive phrases (increased likelihood, resulted in, etc.) to link causes.
		Repeat for each root cause.
How can it be prevented in future?	Recommendations	Make recommendations for each causation statement.
		Keep them SMART (specific, measurable, achievable, realistic and timely).
		Consider strong and weak recommendations.
	Monitor and measure outcomes	Define recommendations into quantifiable outcomes.
		Confirm that what was expected to be accomplished DID occur.
		Aim to measure effectiveness of the action, NOT completion of the action.

Source: Bagian JP, Gosbee J, Lee CZ, Williams L, McKnight SD, Mannos DM. Jt. The Veterans Affairs root cause analysis system in action. Comm J Qual Improv. 2002;28:531-545.

Following root cause analysis it is possible to identify potential changes that could be made in systems or processes to improve performance and reduce the likelihood of similar adverse events or near misses in the future.

One example of an approach to the process of root cause analysis is summarized in Table 2. The resources section (How to conduct root cause analysis) provides templates and tools needed to undertake root cause analysis:

Where to start: example essential activities to consider when setting up root cause analysis

Action	Additional information
Secure department/ward level leadership and management support to release practitioners to be trained in root cause analysis	Step 1, Resources section
Identify a hospital-wide multidisciplinary team to be trained on the principles of root cause analysis	Step 2, Resources section
Described clear roles of the team, focusing on building capacity of root cause analysis Facilitators to lead investigations	Step 2, Resources section
Undertake training using one of the models listed in the resources section	Resources section
Agree how the action plan summarizing results and recommendations will be fed back to local teams and leadership and management.	Resources section

Resources to help establish root cause analysis

Topic	Summary
Root cause analysis factsheet[43]	Simple overview of root cause analysis.
How to conduct root cause analysis[44]	General summary of root cause analysis and links to an information sheet providing an overview on conducting a root cause analysis and developing recommendations.
How to conduct root cause analysis (including training)[45]	A suite of resources to support good practice in root cause analysis investigation including tools, templates, guidance, e-tool kits and training materials.
Template action plans[46]	A suite of templates designed to lead investigation teams through best practice in investigation and report writing.
Training in root cause analysis[47]	Short slide deck introducing root cause analysis.

How to access the resources (references)

43. Patient safety root cause analysis. Geneva: World Health Organization; http://www.who.int/patientsafety/education/curriculum/course5a_handout.pdf, accessed 16 November 2014).

44. Root cause analysis [web resources].Victoria, Australia: Department of Health; 2014 (http://www.health.vic.gov.au/clinrisk/investigation/root-cause-analysis.htm; http://docs.health.

vic.gov.au/docs/doc/B942A0AF4584E5B7CA257903001EE837/$FILE/Conducting-RCAs.pdf, accessed 16 November 2014).

45. Root cause analysis (RCA) investigation [web resources].London: National Health Service, National Patient Safety Agency; 2010 (http://www.nrls.npsa.nhs.uk/resources/collections/root-cause-analysis/, accessed 30 November 2014).

46. Root cause analysis (RCA) investigation action plan templates[web resources].London: National Health Service, National Patient Safety Agency; 2010(http://www.nrls.npsa.nhs.uk/resources/?entryid45=75425, accessed 30 November 2014).

47. Patient safety curriculum guide (multi-professional). Learning from errors to prevent harm [presentation]. Geneva: World Health Organization; (http://www.who.int/patientsafety/education/curriculum/PSP_mpc_topic-05.pdf, accessed 16 November 2014).

Checklist (root cause analysis)

By the end of this step users should have completed the following.

1. Secured leadership and management support to establish root cause analysis ☐

2. Trained a multidisciplinary team on how to undertake root cause analysis ☐

3. Used root cause analysis findings to inform future patient safety actions at ward and hospital level ☐

▤ To find out more about the evidence behind root cause analysis as part of a patient safety programme, refer to Part B.

c) Organization of work – human factors

The integration of human factors within patient safety improvement is increasingly being considered in standards of care. Human factors are concerned with how human beings interact with the systems in which they work, including the environment, equipment and machines as well as human-to-human interactions (Box 4). Understanding the role that human factors play in the safety and quality of patient care can result in more effective, more efficient and safer care.

Human factors embrace:

- organizational safety culture
- work environment
- teamwork
- leadership
- communication
- situation awareness
- decision-making
- the impact of stress and fatigue on clinical practice.

In summary, human factors are involved in improving the reliability of healthcare through focusing on the impact that the design of workplace environments and care processes can have in creating intuitive systems and devices. Designs that take human factors into account can help build resilience and lead to safer clinical systems that benefit everyone, both patients and health care practitioners.

Box 4. Teamwork and patient safety

"The problem is not disease-specific or harm-specific, it is in the way we work together, the way the team behaves, the way we communicate, the way we share information and handover, the way we observe, detect and respond. Everyone understanding and using the principles and knowledge that human factors bring is the solution – the solution is not to focus on [pressure ulcers]. By focusing on human factors the [pressure ulcer] problem is addressed, so is every other unsafe practice or care. For some reason it is seen as too simple as to be the solution!"

Senior National Health Service professional describing the value of human factors to patient safety (http://www.health.org.uk/blog/how-can-healthcare-get-it-so-right-and-so-wrong-part-2/, accessed 2 December 2014)

Where to start: example essential activities to strengthen patient safety through approaches that take human factors into consideration

Action	Additional information
Reinforce the need for organizational level leadership and management support for the role of human factors in developing a positive safety culture.	Step 1, Resources section
Secure organizational level leadership and management support for embedding training on human factors, e.g. within existing risk management training, using the resources in this section, and evaluate progress over time.	Resources section
Secure organizational level leadership and management support for leadership walkrounds as a visible sign of leadership commitment to improving patient safety.	Step 1
Secure organizational level leadership and management support for undertaking culture assessment surveys to identify staff perceptions on the culture within the organization.	Step 1
Advocate for establishing an incident reporting system and acting on results as part of developing a culture of safety.	Step 2, Root cause analysis section

Resources to help introduce and strengthen human factors

Topic	Summary
Introduction to human factors (generic)[48]	General information on key topics in human factors, case studies and articles.
Introduction to human factors (healthcare)[49]	Information on human factors in a health care context with links to training material and videos

Summary of human factors[50]	Provides a basic description of major topic areas relating to human factors relevant to patient safety, with some indication of possible tools that can be used in a health care workplace for measurement or training.
Training, general[51]	Slide deck explaining human factors.
Training, situational awareness[52]	A short video that addresses situational awareness - a problem that can be understood and addressed through human factors. A family member discusses his personal experience of healthcare.
Factsheet[53]	Short (three page) overview of human factors.
Human factors for boards[54]	A learning resource that recognizes the fundamental impact boards have on safety within their organization. The aim of the resource is to encourage boards to invest time and resources in human factors by raising awareness and demonstrating how human factors impact on quality, safety and productivity.
How to implement human factors (basic)[55]	A useful introduction to the concept of human factors in healthcare and how its elements can be applied by individuals and teams working to improve patient safety. Part A is for use by leadership and management; Part B is on how health care practitioners can apply the principles in the workplace.
How to implement human factors (advanced)[56]	The resource shares practical experience of applying human factors in healthcare and provides examples and case studies to demonstrate the implementation of human factors in healthcare.

How to access the resources (references)

48. Human factors and ergonomics. London: Health and Safety Executive; (http://www.hse.gov.uk/humanfactors/, accessed 30 November 2014).

49. Human factors portal. Edinburgh; NHS Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/safe/human-factors.aspx, accessed 16 November 2014).

50. Human factors in patient safety: review of topics and tools. Geneva: World Health Organization; 2009 (http://www.who.int/patientsafety/research/methods_measures/human_factors/human_factors_review.pdf, accessed 16 November 2014).

51. Patient safety curriculum guide – why applying human factors is important for safety. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/PSP_mpc_topic-02.pdf, accessed 16 November 2014).

52. Just a routine operation (patient's story and surgeon's response). London: National Health Service Institute for Innovation and Improvement; 2013 (www.institute.nhs.uk/safer_care/general/human_factors.html, accessed 16 November 2014).

53. Patient safety curriculum guide – why applying human factors is important for safety [handout]. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course2_handout.pdf, accessed 16 November 2014).

54. Getting to grips with human factors – strategic actions for safer care[website]. Clinical Human Factors Group; 2013 (http://chfg.org/articles-films-guides/guidance-documents/a-new-human-factors-resource-for-boards-from-the-chfg, accessed 16 November 2014).

55. Carthey J, Clarke J. The 'How to Guide' for implementing human factors in healthcare. London: National Health Service, Patient Safety First; 2009 (http://www.chfg.org/wp-content/uploads/2010/11/Human_Factors_How_to_Guide_2009.pdf, accessed 16 November 2014).

56. Implementing human factors in health care – taking further steps. Clinical Human Factors Group [website]; 2013 (http://www.chfg.org/wp-content/uploads/2013/05/Implementing-human-factors-in-healthcare-How-to-guide-volume-2-FINAL-2013_05_16.pdf, accessed 16 November 2014).

Checklist (human factors)

By the end of this step users should have completed the following.

1. secured leadership and management support for human factors as part of the programme ☐

2. incorporated human factors approaches including training within the action plan ☐

▤ To find out more about the evidence behind human factors as part of a patient safety programme, refer to Part B.

Step 3: Collect baseline data

In some hospitals there will be a range of existing contextual data available on the baseline situation relating to patient safety and quality. Use all available information to prevent wasteful inefficiency and duplication of previous efforts.

Collecting data to improve patient safety performance enables a hospital to compare its process and outcome indicator data with other hospitals, including (where relevant) Patient Safety Friendly Hospitals, and act on benchmarking results through an action plan and patient safety projects targeting specific interventions.

The range of available data might include:

- previous results from patient safety situational analyses, e.g. patient safety friendly hospital initiative assessment results; these might highlight, for example, gaps in patient safety policies, guidelines and standard operating procedures at the hospital and department level;
- demographic-type information e.g. number of beds, staff turnover rate, staff: patient ratio;
- information on the technical competence of staff relating to patient safety, including training records;
- risk management/clinical governance-type reports, e.g. incident reports, sentinel events, numbers and rates of infection, previous adverse event research studies, morbidity and mortality meeting reports, patient satisfaction or complaints, trigger tools methods, clinical audit data and medical record review, risk management reports, liability claims, and lists of high volume procedures or conditions;
- feedback from front-line practitioners, e.g. brainstorming or nominal group technique and focus group sessions (see Step 2: Involving front-line practitioners, and resources section);
- feedback from patients, including patient complaints and litigation;
- safety culture assessment results (see Step 1).

All of these data will help to prioritize actions. Available information should be developed into a report and presented in a format that can be easily understood by both clinical and non-clinical audiences, including leadership and management.

Depending on a hospital starting point, the central aim of this step is to use or collect relevant data to provide context and a baseline for the current situation across the hospital or to use existing data to inform the prioritization process.

Where to start: example essential activities to consider during Step 3

Action	Additional information
Review existing data related to patient safety, risk management and infection prevention.	Resources section
Consider using the *Patient safety assessment manual*.	Step 1, Resources section; Resources section
If collecting new data, use a staged approach that includes developing data definitions with inclusion and exclusion criteria, piloting data collection tools, developing data collection protocols including outlining sampling strategy and agreeing who collects data and how they are collected, recorded, and submitted.	Resources section
Consider using qualitative tools and techniques with health care workers, such as brainstorming or nominal group technique sessions or focus group discussions.	Step 2, Involve front-line practitioners; Resources section
Consider setting targets related to patient safety goals as part of the hospital patient safety strategy.	Resources section
Use benchmarking data within the action plan for improvement.	Step 4

At the end of this activity there should be a clear picture on the data that exist (and the data that are missing) at the facility level to inform the prioritization process, and there should be a plan to address any gaps.

Suggested roles and responsibilities

Designated senior staff member for patient safety:
- determines what data are available;
- coordinates the patient safety assessment using the Patient safety assessment manual *(57);*
- leads on developing a staged approach for data collection using the tools described in this section and includes this in the action plan (see Step 4).

Resources to help with activities in Step 3

Topic	Summary
Patient safety assessment manual[57]	Each domain comprises a number of subdomains, 24 in total. A set of critical (20 in total), core (90 in total) and developmental (30 in total) standards are distributed among the five domains. Hospitals are scored as patient safety friendly based on four levels of compliance (level 4 is the highest attainable level).
Situational analysis[58]	Provides a framework for the rapid collection of information utilizing predominantly a yes/no approach based around 12 patient safety action areas.
Tools for gathering data on the burden of patient safety problems[59]	The WHO Methodological guide for data-poor hospitals helps health practitioners and patient safety researchers in developing, helps transitional countries measure, and tackles patient harm at the health care facility level. It describes five methods that have been piloted in four developing countries from four regions of the world that been effective even in the absence of good medical record keeping.

How to measure (plan-do-study-act)[60]	Comprehensive resource outlining the importance of testing changes and measuring impact successfully. The guide explains what measurement for improvement is and how it differs from other sorts of measurement (Part 1) and addresses the process of collecting, analysing and reviewing data (Part 2).It focuses on the Institute for Healthcare Improvement model for improvement and how to use it.
Patient safety culture assessment surveys[61-63]	Three rigorously tested tools. The Hospital survey on patient safety culture assesses at the individual, unit and organizational level based around 12 safety culture dimensions and 42 items. The Manchester patient safety framework lists five levels of increasingly mature organizational safety culture across various domains. The Safety attitudes questionnaire focuses on safety climate and asks health care teams to describe their attitudes to six domains, using a Likert scale to score.
Clinical audit[64-66]	Royal College of Psychiatry: a practical "step-by-step guide" for carrying out a clinical audit project. St Michael's Hospital, University of Toronto: How to extract information from medical records using pre-established criteria and standards. Victoria Quality Council: the guide assists all members of the health care team to understand the role of data in quality improvement and how to apply some basic techniques for using data to support improvement efforts.
Patient stories[67]	This guide is aimed at senior leaders who wish to use patient stories at board level and those staff members who will be involved in the process. It outlines the process of selecting and gathering stories and gives guidance on presenting them in the boardroom.

How to access the resources (references)

57. Patient safety assessment manual. Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2011 (http://applications.emro.who.int/dsaf/emropub_2011_1243.pdf, accessed 16 November 2014).

58. African partnerships for patient safety patient safety situational analysis (Short form). Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/implementation/apps/resources/APPS_Improv_PS_Situational_Analysis_SF_2012_04_EN.pdf, accessed 16 November 2014).

59. Methodological guide for data-poor hospitals. Geneva: World Health Organization; 2010 (http://www.who.int/patientsafety/research/methodological_guide/en/, accessed 16 November 2014).

60. Clarke J, Davidge M, James L. The how-to guide for measurement for improvement. London: National Health Service, Patient Safety First; 2009 (http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/How-to-guides-2008-09-19/External+-+How+to+guide+-+measurement+for+improvement+v1.2.pdf, accessed 16 November 2014).

61. Surveys on patient safety culture[web resource]. Rockville, Maryland: Department of Health and Human Services, Agency for Healthcare Research and Quality: 2012 (http://www.ahrq.gov/legacy/qual/patientsafetyculture/, accessed 16 November 2014).

62. Attitudes and safety climate questionnaire [web resource]. Houston: University of Texas,

Center for Healthcare Quality and Safety; 2004 (https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/, accessed 16 November 2014).

63. Manchester patient safety framework. London: National Health Service, National Patient Safety Agency; 2006 (http://www.nrls.npsa.nhs.uk/resources/?entryid45=59796,accessed 16 November 2014).

64. Undertaking a clinical audit project: a step-by-step guide. London: Royal College of Psychiatrists; (http://www.rcpsych.ac.uk/pdf/clinauditChap2.pdf, accessed 16 November 2014).

65. Chart audit. Toronto: University of Toronto, Faculty of Medicine, Knowledge Translation Program; 2008 (http://www.stmichaelshospital.com/pdf/research/kt/chartaudit.pdf, accessed 16 November 2014).

66. A guide to using data for health care quality improvement. Melbourne, Australia: Victorian Government Department of Human Services; 2008 (http://ecinsw.org.au/sites/default/files/field/file/vqc_guide_to_using_data.pdf, accessed 21 November 2014).

67. Clarke J. Leadership for safety 'how to' guide supplement: using patient stories with boards. London: National Health Service, Patient Safety First; 2010 (http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/Intervention-support/Patient%20stories%20how%20to%20guide%2020100223.pdf, accessed 21 November 2014).

Checklist (Step 3)

By the end of this step users should have completed the following.

1. Reviewed all available baseline data on the state of patient safety ☐

2. Undertaken additional baseline assessments e.g. Patient safety friendly hospital initiative and/or culture assessment ☐

3. Used the baseline assessment results to identify gaps and develop priorities within the action plan ☐

Step 4: Develop an action plan

The central aim of developing an action plan is to provide a focus for all subsequent activities and enable measurement against progress.

The information collected so far will help create the evidence to stimulate action on (or strengthen) patient safety, guide the process for priority setting, and create the structure for the plan. The results should be presented to leadership, management, and the patient safety improvement team in a clear, short action plan, supplemented with detailed supporting documents. There are a number of project tools to help with this step, e.g. project plans (Gantt charts), risk registers and driver diagrams (see resources).

Where to start: example essential activities to consider during Step 4

Action	Additional information
Analyse the baseline data.	Step 3; Resources section
Undertake a gap analysis and prioritize actions and interventions to address gaps.	Step 3; Resources section

After analysing gaps, consult Part C of the tool kit to begin considering interventions and approaches to address the gaps.	Part C
Involve front-line practitioners.	Step 2
Consider how to involve patients and carers.	Resources section
Develop a draft action plan and share with leadership and management.	Resources section

Suggested roles and responsibilities

The designated senior staff member for patient safety is responsible for the following tasks:

- reviews all baseline data;
- makes the list of agreed priority action areas/interventions into an action plan template (see resources) stating the aim of the intervention (goal and timelines), activities and tools used to support implementation, who will lead, and performance measures to help track progress and manage the intervention;
- consults Part C of the tool kit to consider which specific interventions to implement and the practical approaches that need to be undertaken based on the gaps identified from the baseline assessment;
- involves front-line practitioners in the development of the plan and consider its impact on workflow;
- considers how to involve patients/patient groups in the development of the action plan and attempt to address patient engagement in every action described;
- makes sure the plan includes details of tasks, resources, timelines and measurements (see Annex 1 for sample template).

Resources to help with activities in Step 4

Topic	Summary
Action planning – general[68]	Emphasizes the importance of reviewing survey results as the foundation for developing an action plan and lists seven steps of action planning to give hospitals guidance on next steps to take to turn their survey results into actual patient safety culture improvement.
Action plan: approaches[69]	Describes a teamwork system to improve institutional collaboration and communication relating to patient safety and presents templates for action.
Sample action plan[70]	Describes simple steps in developing a quality improvement action plan and provides a blank template.
Developing the plan[71]	The section on developing a plan and addressing barriers (p.23) presents a useful outline of how to develop an action plan.
Project plan template[72]	See pages 38–40 for a project plan template (adapted from the project planning template developed by the National Health and Medical Research Council, 2007) for local site-based implementation activities.
Project management tools[73]	Template driver diagrams, project plans and risk registers.

Patient engagement[74]	Presents a range of tools and information to help build partnerships, advocate for safer care, provide information to patients and raise awareness of patient safety issues.

How to access the resources (references)

68. What's next? Action planning for improvement. Rockville, Maryland: Agency for Healthcare Research and Quality; 2012 (http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/2012/hosp12ch8.html, accessed 16 November 2014).

69. The ten steps of action planning. Rockville, Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/education/curriculum-tools/teamstepps/instructor/essentials/implguide1.html, accessed 16 November 2014).

70. Action plan, Edinburgh: National Health Service Scotland Quality improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools/action-plan.aspx, accessed 16 November 2014).

71. Stop the clot. Integrating VTE prevention guideline recommendations into routine hospital care, 3rd edition. Melbourne, Australia: Australian Commission on Safety and Quality in Health Care; 2011 (http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/cp134_stop_the_clot_3rd_ed.pdf, accessed 16 November 2014).

72. Implementation tool kit for clinical handover improvement and resource portal. Sydney: Australian Commission on Safety and Quality in Health Care; 2014 (http://www.safetyandquality.gov.au/our-work/clinical-communications/clinical-handover/implementation-tool kit-for-clinical-handover-improvement-and-resource-portal/, accessed 21 November 2014).

73. Action plan. Edinburgh: National Health Service Scotland, Quality improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools/action-plan.aspx, accessed 16 November 2014).

74. Addressing global patient safety issues. An advocacy tool kit for patients' organizations [web resource]. London: International Alliance of Patients' Organizations; 2014 (http://iapo.org.uk/patient-safety-tool kit, accessed 2December 2014).

Checklist (Step 4)

By the end of this step users should have completed the following.

1. Identified key interventions to be targeted ☐

2. Described all actions to be taken to implement the interventions by careful consideration of Part C of the tool kit ☐

3. Identified lead staff and other appropriate staff to undertake tasks ☐

4. Made a record of planned start and end dates and an overall timeline ☐

5. Described how interventions will be measured and the frequency of measurement ☐

6. Briefed senior leadership and management ☐

7. Involved front-line practitioners ☐

▤ To find out more about action planning as part of a patient safety programme, refer to Annex 1.

Step 5: Consider improvement approach

In accordance with the baseline assessment and the prioritization process users should now have an action plan that describes what needs to be addressed to improve patient safety both at the organizational level and in relation to specific patient safety interventions. The final step is to develop all of this into an implementation approach.

There are many models to help implement improvement and a number of these are summarized briefly in this section, with supplementary information available in the resources section, to help with decision-making.

The Institute for Healthcare Improvement uses the Model for improvement (see Fig. 3) which is widely used as a framework to guide improvement work and has been described as a simple yet powerful tool for accelerating improvement; it is based around three questions.

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?

Efforts to improve patient safety should provide the answers to these three questions (may be answered in any order); the questions, combined with the plan-do-study-act cycle, form the basis of the model, which is aimed at accelerating improvement by complementing existing approaches that organizations may already be using.
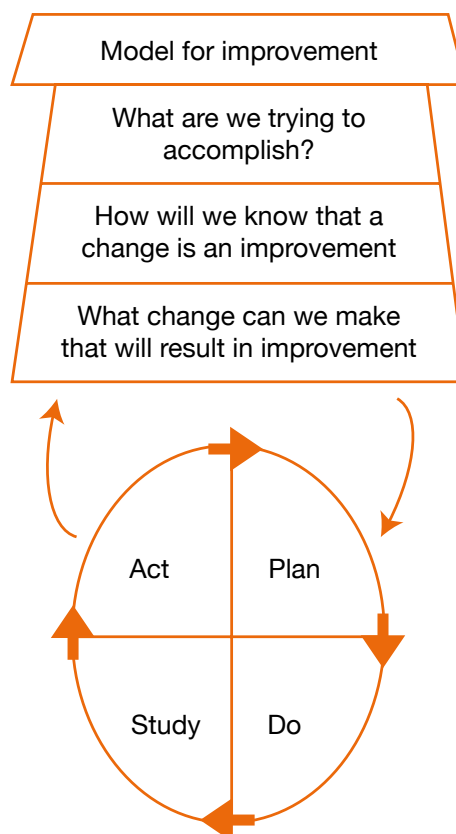
Fig. 3. Model for improvement

Source: Institute for Healthcare Improvement (78)

41

The Johns Hopkins Comprehensive Unit-based Safety Program (CUSP) provides a framework for the delivery of evidence-based change. The program uses a "4Es" model for engaging staff.

- Engage: How does this make the world a better place?
- Educate: What do we need to do?
- Execute: What keeps me from doing it? How can we do it with my resources and culture?
- Evaluate: How do we know we improved?

The WHO multimodal improvement strategy was developed to improve hand hygiene compliance in healthcare. However, it presents a useful five-step approach to behaviour change and addresses the common barriers to guideline adherence. It is accompanied by a guide to implementation and a suite of implementation tools relating to:

- system change – to overcome the system constraints to guideline implementation;
- training and education – to address knowledge deficits;
- audit and feedback – to address perceptions and reality mismatch;
- reminders in the workplace – to address perceptions;
- institutional safety climate – to address lack of motivation and beliefs and attitudes.

Models for improvement such as these help to address the known barriers to implementation.

Where to start: example essential activities to consider during Step 5

Action	Additional information
The designated patient safety officer and team make a decision on the implementation strategy (or strategies) to adopt, guided by answers to the following questions. • What is the change? • Why has the team suggested this change? • What is the goal? • Who will be involved in the change? Are there other staff members who may be affected by this change? • What are the barriers to change? Who may stop it happening? • Where will the change take place (remember to start small)? • When will it be made (start date)? • When will it be evaluated (evaluation date)? • How will it be evaluated? • How will we know if we can expand this change to other areas?	Resources section
Institute a regular dialogue with staff using a variety of methods (meetings, mail, etc.) to overcome potential barriers and instil the belief that implementation will improve patient outcomes and working conditions. Try to use established forums and, if possible, avoid creating more meetings whose sole purpose is the intervention. A stakeholder analysis communication plan can assist this process (although these can look complicated, very simple tools can be used).	Resources section
Consider running small group educational sessions that enhance learning via social interaction with peers.	Resources section

Maintain regular contact with leadership and management and continue to build support from nurse managers and administrators at all levels, to support the vision and to embed the action plan locally.	Step 1; Step 2; Resources section
Work with identified champions to drive through improvement.	Resources section
Staff expertise and knowledge of how local systems work (as opposed to the way managers think the work) is probably the important source of information when implementing an intervention. The techniques outlined in Step 2 on involving front-line practitioners will also be very important. Illustrating the plan using driver diagrams may also be useful.	Step 2; Resources section

Suggested roles and responsibilities

The designated senior staff member for patient safety is responsible for the following tasks:

- works with the patient safety internal body, reviews the action plan;
- reviews the improvement methods presented here and the specific methods described in Part C;
- decides on an overall model for implementing the patient safety programme including the need for bespoke models depending on the specific interventions targeted.

Resources to help with activities in Step 5

Topic	Summary
How to use quality improvement models[75]	An outline of quality improvement concepts, measures and issues to consider when building an improvement project. Overview of the science of quality improvement with a focus on plan-do-study-act.
Quality improvement methods[76]	Basic information on quality improvement methods, focusing on the most popular and most effective ones leading to significant improvements: clinical practice improvement, failure modes and effects analysis, and root cause analysis.
Spread and sustainability of quality improvement[77]	The resource has been written to be shared and discussed within teams and to be used to develop change ideas on how best to spread and sustain improvements.
Plan-do-study-act approach to improvement[78]	Overview of the Institute for Healthcare Improvement approach to quality improvement.
How to apply the Institute for Healthcare Improvement model[79]	Provides an overview of the model and how to use it and template plan-do-study-act worksheets.
WHO multimodal strategy[80]	A stepwise resource for improving hand hygiene using a 5-step multimodal behaviour change strategy.

Stakeholder analysis[81]	Stakeholder analysis and mapping is one of the first steps to be taken in change projects. This tool describes how to use stakeholder analysis to identify who needs to be involved in the change.
Barriers to improvement[82]	A practical tool to help hospitals integrate venous thromboembolism (VTE) recommendations into routine hospital care. The section on barriers (p.20) presents a useful outline of how to address barriers to implementation.
Model for improvement[83]	The tool kit aims to help interprofessional/interdisciplinary teams improve quality and safety based on the plan-do-study-act model for improvement.
Comprehensive Unit-based Safety Program[84]	Step by step approach to the Comprehensive Unit-based Safety Program improvement approach.
Implementation tool kit[85]	This practical tool kit outlines a systematic implementation process, and is designed to assist nurses and other health care professionals to support evidence-informed clinical and management decision-making.
Implementation research[86]	Intended to support those conducting implementation research and those with responsibility for implementing programmes. The main aim of the guide is to boost implementation research capacity as well as demand for implementation research that is aligned with need, and that is of particular relevance to health systems in low- and middle-income countries.

How to access the resources (references)

75. Knowledge is the enemy of unsafe care: using quality improvement methods to improve care [handout]. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course7_handout.pdf, accessed 21 November 2014).

76. Knowledge is the enemy of unsafe care: quality improvement methods [handout]. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course7a_handout.pdf, accessed 21 November 2014).

77. The spread and sustainability of quality improvement in healthcare. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2014 (http://www.qihub.scot.nhs.uk/media/596811/the%20spread%20and%20sustainability%20ofquality%20improvement%20in%20healthcare%20pdf%20.pdf, accessed 16 November 2014).

78. How to improve. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/knowledge/Pages/HowtoImprove/default.aspx, accessed 16 November 2014).

79. Model for improvement. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools/model-for-improvement.aspx, accessed 16 November 2014).

80. Guide to implementation. A guide to the implementation of the WHO multimodal hand hygiene improvement strategy. Geneva: World Health Organization; 2009 (http://www.who.int/gpsc/5may/Guide_to_Implementation.pdf, accessed 16 November 2014).

81. Stakeholder analysis and mapping. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools/stakeholder-analysis-and-mapping.aspx, accessed 21 November 2014).

82. Stop the clot. Integrating VTE prevention guideline recommendations into routine hospital care, 3rd edition. Melbourne: National Health and Medical Research Council, Australian

Commission on Safety and Quality in Health Care; 2011 (http://www.nhmrc.gov.au/_files_
nhmrc/publications/attachments/cp134_stop_the_clot_3rd_ed.pdf, accessed 16 November
2014).

83. Improvement frameworks: getting started kit. Edmonton: Canadian Patient Safety
     Institute; 2011 (http://www.patientsafetyinstitute.ca/English/toolsResources/
     ImprovementFramework/Documents/Forms/AllItems.aspx, accessed 18 August 2014).

84. CUSP tool kit: assemble the team, facilitator notes. Rockville, Maryland: Agency
     for Healthcare Research and Quality; 2012 (http://www.ahrq.gov/legacy/cusptool
     kit/2assembleteam/assembleteamnotes.htm, accessed 16 November 2014).

85. Tool kit: implementation of best practice guidelines, 2nd edition. Toronto: Registered
     Nurses' Association of Ontario; 2012 (http://www.albertahealthservices.ca/Researchers/if-
     res-rnao-guide.pdf, accessed 16 November 2014).

86. Peters DH, Tran NT, Adam T. Implementation research in health: a practical guide. Geneva:
     World Health Organization and Alliance for Health Policy and Systems Research; 2013
     (http://who.int/alliance-hpsr/alliancehpsr_irpguide.pdf, accessed 21 November 2014).

Checklist

By the end of this step users should have completed the following.

1. Decided on an improvement model (or models – different models may be used for the
    specific interventions described in Part C) ☐

2. Briefed leadership and management on the model ☐

3. Briefed local champions on the action plan and improvement model(s) ☐

4. Publicized the approach across the hospital ☐

5. Established a regular reporting system for feedback on patient safety activity
    (internal and external) ☐

🗎 To find out more about the evidence behind quality improvement methods and their role in
developing and implementing a patient safety programme, refer to Part B.

What happens next?

The preparation phase of patient safety improvement has been completed (Fig.4).

• Users should now have secured leadership and management engagement (including their
  role in promoting a safety culture through for example leadership walkrounds), involved front-
  line practitioners, established a patient safety team, collected and analysed baseline data,
  developed an action plan and considered an improvement approach.

• In addition users will have started to address how to establish and strengthen incident
  reporting systems and investigations and considered the role of human factors in patient
  safety improvement programmes and how this relates to each specific setting.

Part B provides a summary of the evidence on the approaches described within this tool kit.

Part C provides examples of how to implement the action plan relating to the specific interventions
that the patient safety team has agreed to focus on.
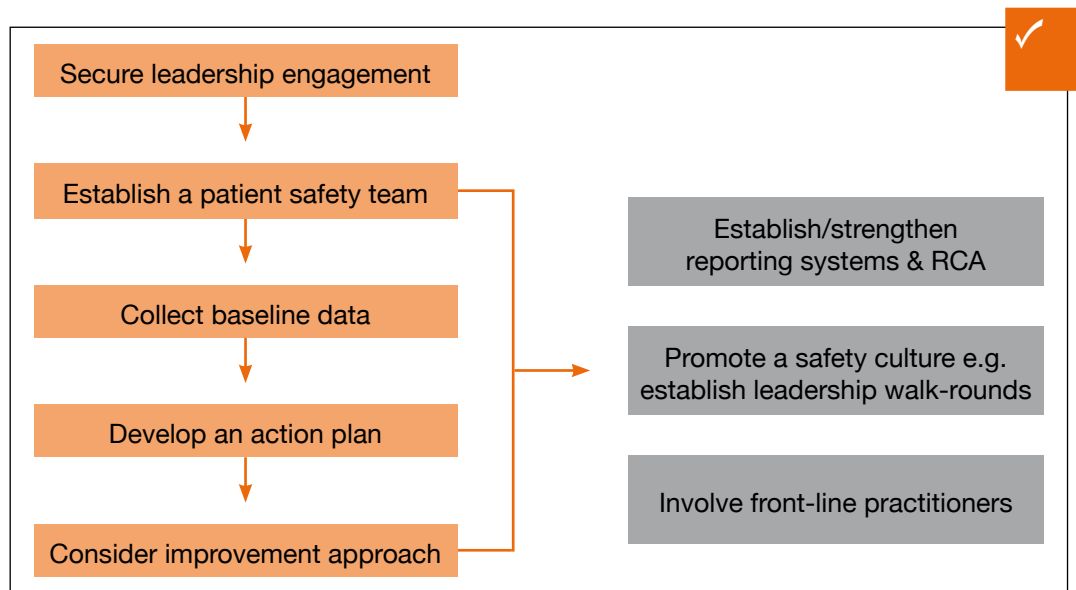
Fig 4. Schema of the preparation phase

Part B: Portfolio of evidence

Use of available evidence

Part A of this tool kit prepares individuals, teams and organizations for action. It addresses the activities required to build a strong foundation for implementation. It introduces the prerequisites for building a hospital environment and culture that values patient safety and can demonstrate this.

Part B relates to the available evidence for patient safety, for which there are an increasing number of academic studies on almost every aspect. This part of the tool kit summarizes the evidence, making it simple and easy to access the publications that support the case for patient safety and quality improvement.

Depending on the status of patient safety in each individual hospital, this section will most likely be of relevance to the following people:

- organization level hospital leaders and managers, including finance managers;
- hospital quality department leads;
- designated patient safety officer, patient safety team and patient safety internal body;
- local ward/department patient safety champions.

General evidence on unsafe care

According to WHO estimates, in developed countries as many as one in 10 patients are harmed while receiving hospital care and these numbers are significantly higher in developing countries. Harm can be caused by a range of errors or adverse events. There is growing recognition that patient safety and quality of care are critical elements of universal health coverage. In this section the available evidence on unsafe care and its contributing factors is summarized.

Resources explaining aspects of patient safety and unsafe care

Topic	Summary
Burden of unsafe care: global[87]	The study estimates that there are 421 million hospitalizations in the world annually, and approximately 42.7 million adverse events. Adverse events result in 23 million disability-adjusted life years (DALYs) lost per year. Approximately two-thirds of all adverse events and the DALYs lost from them occurred in low- and middle-income countries.
Burden of unsafe care: Eastern Mediterranean Region and Africa[88,89]	A study carried out in 26 hospitals (including in Egypt, Jordan, Morocco, Sudan, Tunisia and Yemen) found that almost a third of patients impacted by harmful incidents died, 14% sustained permanent disability and 16% sustained moderate disability; 80% of incidents were preventable. The study lists the most common adverse events. The major causes were related to the training and supervision of clinical staff, the availability and implementation of protocols and policies, and communication and reporting.
	In a two-stage retrospective medical record review of 620 inpatients admitted during 2005 based on the use of 18 screening criteria, 62 experienced an adverse event, giving an incidence of 10%.

Interventions to improve patient safety[90]	The Agency for Healthcare Research and Quality has identified the top 10 patient safety strategies ready for immediate use. These interventions, if widely implemented, could dramatically enhance patient safety and save lives.
Taxonomy of patient safety[91]	Document classifying patient safety topics.
Methods for assessing the scale and nature of harm[92]	This report describes the strengths and weaknesses of available methods for assessing the nature and scale of harm caused by the health system according to a defined set of criteria.
Overcoming barriers to guideline compliance[93]	The paper suggests five strategies that could help in adherence with clinical guidelines, including unambiguous checklists and working with implementation scientists to identify and mitigate barriers and share successful implementation strategies.
Analysis of patient safety incidents (United Kingdom)[94]	The study analysed deaths reported to a patient safety incident reporting system after mandatory reporting of such incidents was introduced. The findings demonstrate the potential utility of patient safety incident reports in identifying areas of service failure and highlight opportunities for corrective action to save lives.

How to access the resources (references)

87.   Jha AK, Larizgoitia I, Audera-Lopez C, Prasopa-Plaizier N, Waters H, Bates DW. The global burden of unsafe medical care: analytic modelling of observational studies. BMJ Qual Saf. 2013;22:809–15 (http://qualitysafety.bmj.com/content/22/10/809.full.pdf+html, accessed 16 November 2014).

88.   Wilson RM, Michel P, Olsen S, Gibberd RW, Vincent C, El-Assady R et al. Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. BMJ. 2012;344:e832 (http://www.bmj.com/content/bmj/344/bmj.e832.full.pdf, accessed 16 November 2014).

89.   Letaief M, el Mhamdi S, el-Asady R, Siddiqi S, Abdullatif A. Adverse events in a Tunisian hospital: results of a retrospective cohort study. Int J Qual Health Care. 2010;22(5):380–5 (http://intqhc.oxfordjournals.org/content/22/5/380.full-text.pdf, accessed 8 October 2014).

90.   Shekelle PG, Pronovost PJ, Wachter RM, McDonald KM, Schoelles K, Sydney M et al. Top 10 patient safety strategies that can be encouraged for adoption now. Ann Intern Med. 2013;58(5 Pt 2):365–8 (http://annals.org/article.aspx?articleid=1657884, accessed 22 November 2014).

91.   Conceptual framework for the international classification for patient safety. Geneva: World Health Organization; 2009 (http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf, accessed 21 November 2014).

92.   Michel P. Strengths and weaknesses of available methods for assessing the nature and scale of harm caused by the health system: literature review. Geneva: World Health Organization; 2005 (http://www.who.int/patientsafety/research/P_Michel_Report_Final_version.pdf, accessed 16 November 2014).

93.   Pronovost PJ. Enhancing physicians' use of clinical guidelines. JAMA. 2013;310(23):2501–2 (http://jama.jamanetwork.com/article.aspx?articleid=1787420, accessed 16 November 2014).

94.   Donaldson LJ, Panesar SS, Darzi A. Patient-safety-related hospital deaths in England: thematic analysis of incidents reported to a national database, 2010–2012. PLoS

Medicine. 2014 (http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001667, accessed 16 November 2014).

Patient safety standards

Patient safety standards were developed as part of the WHO patient safety friendly hospital initiative and are included in the *Patient safety assessment manual* published by the WHO Regional Office for the Eastern Mediterranean in 2011. The standards provide institutions with a means of determining the level of patient safety, either for initiating a patient safety programme or as part of an ongoing programme. Assessment is voluntary and is conducted through an external, measurement-based evaluation by the WHO Regional Advisory Group on Patient Safety as the primary assessment team.

The five domains under which the standards are organized are:

- leadership and management measures
- patient and public involvement measures
- safe evidence-based clinical practices measures
- safe environment measures
- lifelong learning measures.

How to access the resources (references)

95. Siddiqi S, Elasady R, Khorshid I, Fortune T, Leotsakos A, Letaief M et al. Patient safety friendly hospital initiative: from evidence to action in seven developing country hospitals. Int J Qual Health Care. 2012;24(2):144–51 (http://www.ncbi.nlm.nih.gov/pubmed/22302070, accessed 16 November 2014).

96. Patient safety friendly hospital initiative: from evidence to action in seven developing country hospitals (case study). Dublin: International Society for Quality in Health Care; 2012 (http://www.isqua.org/docs/fellow-point-document/case-study-patient-safety-friendly-hospital-initiative.pdf?sfvrsn=0, accessed 16 November 2014).

Resources on the patient safety friendly hospital initiative

Topic	Summary
Regional frameworks – Patient safety friendly hospital initiative[95]	Article outlining the principal approach of the patient safety friendly hospital initiative and its associated assessment manual including 140 patient-safety standards across five domains: leadership and management, patient and public involvement, safe evidence-based clinical practices, safe environment and lifelong learning.
Patient safety friendly hospital initiative[96]	Case study approach to considering the adaptation and adoption of the Patient safety friendly hospital initiative standards.

Securing leadership and management engagement

Commitment from the organizational leadership and management is critical for the success for patient safety improvement programmes. This is supported by a growing body of evidence, summarized in the list of resources.

Resources on the roles of leadership and management in patient safety

Topic	Summary
The importance of leadership for patient safety[97]	A selective review of the industrial safety literature for leadership research with possible application in health care was undertaken. Emerging findings show the importance of participative, transformational styles for safety performance at all levels of management. The review highlighted the importance of middle managers who need to be involved in safety and who foster open communication while ensuring compliance with safety systems.
How to improve patient safety[98]	This patient safety guide is based on evidence that recommends that patient safety should be a top leadership and management priority.
Developing a patient safety programme[99]	This paper encompasses the importance of designing and implementing a system that takes into account the concerns of front-line personnel; it is aimed at being a tool for learning and not accountability.
Leadership and management roles[100]	Describes the six things all boards are recommended to do to improve quality and reduce harm: setting aims; getting data and hearing stories; establishing and monitoring system-level measures; changing the environment, policies and culture; learning, starting with the board; and establishing executive accountability.
Clinical governance[101]	Outline of clinical governance as a systematic approach to improving quality and the importance of leadership, strategic planning, patient involvement, and management of staff and processes.
Developing a patient safety plan[102]	This paper describes a strategy-focused approach that recognizes that patient safety initiatives completed in isolation will not provide consistent progress toward a goal, and that a balanced approach is required that includes the development and systematic execution of bundles of related initiatives.
Analysis of barriers facing leaders and managers in patient safety improvement[103]	This study documents the challenges boards face on the ground as they seek to respond to changing expectations in governance of quality.

How to access the resources (references)

97. Flin R, Yule S. Leadership for safety: industrial experience. Qual Saf Health. 2004;13:ii45–ii51 (http://qualitysafety.bmj.com/content/13/suppl_2/ii45.full, accessed 16 November 2014).
98. Seven steps to patient safety. London: National Health Service, National Patient Safety Agency; 2009 (www.npsa.nhs.uk/sevensteps, accessed 16 November 2014).
99. Bagian JP, Lee C, Gosbee J, DeRosier J, Stalhandske E, Eldridge N et al. Developing and deploying a patient safety program in a large health care delivery system: you can't fix what you don't know about. Jt Comm J Qual Improv. 2001;27(10):522–32 (http://www.ncbi.nlm.nih.gov/pubmed/11593886, accessed 21 November 2014).
100. Conway J. Getting boards on board: Engaging governance in quality and safety. Jt Comm J Qual Patient Saf.2008;34(4):214–20 (http://www.regioner.dk/

aktuelt/arrangementer/afholdte+arrangementer/arrangementer+2010/~/media/
F6DAB5F8406F45A3949DD711C6F0B54F.ashx, accessed 21 November 2014).

101. Halligan A. Implementing clinical governance: turning vision into reality. BMJ.
     2001;322:1413 (http://www.bmj.com/content/322/7299/1413, accessed 16 November 2014).

102. Zimmerman R, Ip I, Christoffersen E, Shaver J. Developing a patient safety plan. Healthc
     Q. 2008. 2008;11(3 Spec. No.):26–30 (http://www.ncbi.nlm.nih.gov/pubmed/18382157,
     accessed 16 November 2014).

103. Bismark MM, Studdert DM. Governance of quality of care: a qualitative study of health
     service boards in Victoria, Australia. BMJ Qual Saf. 2013;23(6):474–82. (http://qualitysafety.
     bmj.com/content/early/2013/12/10/bmjqs-2013-002193.full, accessed 16 November 2014).

Establishing a patient safety team

There has been limited academic work published on the establishment of patient safety teams. The evidence summary presented here outlines some of the factors that should be considered in establishing a team.

Resources to help with establishing a patient safety team

Topic	Summary
Creating an effective team[104]	This study highlights the importance of integrating patient safety teams into pre-existing committees and departments. It is critical that pre-existing groups feel that patient safety represents value added and is not a threat to their current roles.
Impact of implementing a patient safety team[105]	Addresses the impact of establishing local ward/department level patient safety teams within maternity units.
Teams and teamwork[106]	This paper discusses the learning that can take place within organizations and the cultural change necessary to encourage it. It focuses on teams and team leaders as potentially powerful forces for bringing about the management of patient safety and better quality of care.

How to access the resources (references)

104. Gandhi TK, Graydon-Baker E, Barnes JN, Neppl C, Stapinski C, Silverman J et al. Creating
     an integrated patient safety team. Jt Comm J Qual Patient Saf. 2003;29:8 (http://www.
     ingentaconnect.com/content/jcaho/jcjqs/2003/00000029/00000008/art00001, accessed
     16 November 2014).

105. Dowell L. Implementing a patient safety team to reduce serious incidents. BMJ Qual
     Improv Report. 2013;2(http://qir.bmj.com/content/2/1/u201086. 2).w697.full, accessed 16
     November 2014).

106. Firth-Cozens J. Cultures for improving patient safety through learning: the role of
     teamwork. Qual Health Care. 2001;10(Suppl. 2):ii26–31 (http://qualitysafety.bmj.com/
     content/10/suppl_2/ii26.full, accessed 16 November 2014).

Collecting baseline data

Reporting of measurement data is a strong driver for improvement. Collecting, collating and reporting in a reliable, meaningful way is essential, including taking account of sample sizes, bias, tools for analysis and final feedback presentation.

Resources to help with collecting baseline data

Topic	Summary
Measurement, accountability and research models[107]	The paper addresses the difference between measurement for improvement and measurement for accountability and research, highlighting how improvement is concerned with sequential testing and small sample sizes, has an associated accepted bias, and embraces changing hypotheses as learning emerges. Its analysis and presentation uses run charts or statistical process control, and information is used only by those involved in the improvement project.
Impact of audit and feedback[108]	The review emphasizes the idea that measurement in itself is an intervention and that audit and feedback have been shown to have significant positive impacts on professional practice behaviour.
Safety culture assessment tools[109]	This research scan provides a brief overview of some of the tools available to measure safety culture and climate in healthcare and lists their strengths and weaknesses.
Patient surveys[110]	The review describes the main approaches to involving patients in safety, including collecting feedback retrospectively, asking patients to help plan broad service change, and encouraging patients to help identify risk.
Controversies in quality improvement measurement[111]	This editorial addresses the ongoing debate over the degree to which standards of evidence and methods from traditional clinical research can or should apply to quality improvement.

How to access the resources (references)

107. Solberg L, Mosser G, McDonald S. The three faces of performance measurement: improvement, accountability and research. Jt Comm J Qual Improv. 1997;23(3):135–47 (http://www.ncbi.nlm.nih.gov/pubmed/9103968, accessed 16 November 2014).

108. Jamtvedt G, Young JM, Kristoffersen DT, O'Brien MA, Oxman AD. Audit and feedback: effects on professional practice and health care outcomes (review). Cochrane Database of Systematic Reviews. 2006;2. Art. No. CD000259 (http://apps.who.int/rhl/reviews/CD000259.pdf, accessed 21 November 2014).

109. Report: Measuring safety culture – research scan. London: The Health Foundation; 2011 (http://www.health.org.uk/public/cms/75/76/313/2600/measuring%20safety%20culture.pdf?realName=p6V3X0.pdf, accessed 16 November 2014).

110. Evidence scan: Involving patients in improving safety. London: The Health Foundation; 2013 (http://patientsafety.health.org.uk/sites/default/files/resources/involving_patients_in_improving_safety.pdf, accessed 16 November 2014).

111. Shojania KG. Conventional evaluations of improvement interventions: more trials or just more tribulations? Editorial. BMJ Qual Saf. 2013;22:881–4 (http://qualitysafety.bmj.com/content/22/11/881.full, accessed 16 November 2014).

Involving front-line practitioners

There is limited published work specifically addressing the involvement of front-line practitioners in safety improvement, however this strategy forms part of much research into general patient safety improvement.

Resources to help with involving front-line practitioners

Topic	Summary
Engaging staff in the why and how of studying and improving patient safety at a health facility[112]	This guide describes five methods for measuring and tackling patient harm (piloted in four developing countries that demonstrated they can effectively be used even in the absence of good medical record-keeping).
Impact of staff engagement[113]	This study looked at real-time safety audits performed during routine work as a way of detecting errors. Involving clinical personnel in detection of gaps in performance facilitated acceptance.

How to access the resources (references)

112. A methodological guide for data-poor hospitals. Geneva: World Health Organization; 2010 (http://www.who.int/patientsafety/research/methodological_guide/PSP_MethGuid. pdf?ua=1, accessed 16 November 2014).
113. Ursprung R, Gray JE, Edwards WH, Horbar JD, Nickerson J, Plsek P et al. Real time patient safety audits: improving safety every day. Qual Saf Health Care. 2005;14:284–9 (http://qualitysafety.bmj.com/content/14/4/284.full, accessed 16 November 2014).

Establishing/strengthening reporting systems

Reporting and learning are at the core of patient safety improvement and this is reflected in the large number of academic studies on the subject.

Resources to help with establishing a reporting system

Topic	Summary
Near miss reporting[114]	This clinical review article suggests that reporting of near misses offers numerous benefits over adverse events: greater frequency allowing quantitative analysis; fewer barriers to data collection; limited liability; and recovery patterns that can be captured, studied, and used for improvement.
Cost-benefit analysis of reporting systems[115]	This paper discusses the cost implications of adverse events and is concerned with guiding organizations in patient safety improvement strategies.
Incident analysis[116]	Editorial proposing more attention be placed on incident analysis as part of reporting and learning from adverse events.
Sources of data[117]	This report describes the strengths and weaknesses of available methods for assessing the nature and scale of harm caused by the health system according to a defined set of criteria.

Perspectives on human error[118]	This paper addresses the person and the system approaches to error management.
Classification of incidents[119]	This paper calls for an integrated framework for the management of safety, quality and risk, with an information and incident management system based on a universal patient safety classification. An example of an incident management and information system serving a patient safety classification is presented, with a brief account of how and where it is currently used.
Classification of patient safety[120]	This technical report provides a detailed overview of the conceptual framework for the International Classification for Patient Safety, including a discussion of each class, the key concepts, with preferred terms, and the practical applications.
Feedback mechanisms[121]	This paper explores how to better apply information to improve systems. It highlights the fact that much valuable operational knowledge resides in safety management communities within high-risk settings, and calls for further work to establish best practices for feedback systems in healthcare that effectively close the safety loop.
Justifying a centralized reporting system[122]	Results of a multicentre study on adverse event and near miss reporting in the National Health Service (United Kingdom) that acted as a platform for the creation of a national system for data collection.
Systematic review of reporting[123]	This study examines the quality of reporting of harms in systematic reviews, and calls for improvements in reporting of adverse events as an important step towards a balanced assessment of an intervention.

How to access the resources (references)

114. Barach P. Reporting and preventing medical mishaps: lessons from non-medical near miss reporting systems. BMJ. 2000;320:759 (http://www.bmj.com/content/320/7237/759, accessed 5December 2014).

115. Cost implications of adverse health events. Edinburgh: National Health Service, National Education Scotland Patient Safety Multidisciplinary Steering Group; 2010 (http://www.nes.scot.nhs.uk/media/6472/PS%20Cost%20Briefing%20Paper.pdf, accessed 16 November 2014).

116. Vincent CA. Analysis of clinical incidents: a window on the system not a search for root causes. Qual Saf Health Care. 2004;13:242–3 (http://qualitysafety.bmj.com/content/13/4/242.full, accessed 16 November 2014).

117. Michel P. Strengths and weaknesses of available methods for assessing the nature and scale of harm caused by the health system: literature review. Geneva: World Health Organization; 2005 (http://www.who.int/patientsafety/research/P_Michel_Report_Final_version.pdf, accessed 16 November 2014).

118. Reason J. Human error: models and management. BMJ. 2000;320(7237):768–70. (http://www.bmj.com/content/320/7237/768, accessed 16 November 2014).

119. Runciman WB, Williamson JAH, Deakin A, Benveniste KA, Bannon K, Hibbert PD. An integrated framework for safety, quality and risk management: an information and incident management system based on a universal patient safety classification. Qual Saf Health Care. 2006;15(Suppl. 1):i82–90. (http://qualitysafety.bmj.com/content/15/suppl_1/i82.abstract, accessed 16 November 2014).

120. More than words: conceptual framework for the International Classification for Patient Safety. Technical report. Geneva: World Health Organization; 2009 (http://www.who. int/patientsafety/implementation/taxonomy/icps_technical_report_en.pdf, accessed 16 November 2014).

121. Benn J, Koutantji M, Wallace L, Spurgeon P, Rejman M, Healey A et al. Feedback from incident reporting: information and action to improve patient safety. Qual Saf Health Care. 2009;18:11–21 (http://qualitysafety.bmj.com/content/18/1/11.abstract, accessed 16 November 2014).

122. Shaw R, Drever F, Hughes H, Osborn S, Williams S. Adverse events and near miss reporting in the National Health Service. Qual Saf Health Care. 2005;14(4):279–83. (http:// www.ncbi.nlm.nih.gov/pmc/articles/PMC1744051/, accessed 16 November 2014).

123. ZorzelaL, Golder S, Liu Y, Pilkington K, Hartling L, Joffe A et al. Quality of reporting in systematic reviews of adverse events: systematic review. BMJ. 2014;348:f7668(http://www. bmj.com/content/348/bmj.f7668, accessed 16 November 2014).

Establishing/strengthening root cause analysis

Root cause analysis is a widely used and well-established technique for identifying the causes of adverse events. Many studies have been published on the application of the approach, and a number of recent papers explore how root cause analysis might be improved in the future.

Resources to help with establishing and using root cause analysis

Topic	Summary
Developing a root cause analysis tool kit[124]	A multisite, retrospective analysis of root cause analysis cases and solutions. The result was a tool kit and guidelines for root cause analysis teams to promote systems-level sustainable and effective solutions for adverse events.
Value and impact of root cause analysis[125]	This study describes the types of adverse events occurring among older patients (age ≥ 65 years) in Department of Veterans Affairs hospitals. Secondary objectives included determining the underlying reasons for the occurrence of these events and to report on effective action plans that have been implemented in Veterans Affairs hospitals.
Root cause analysis developments[126]	The authors developed a framework that seeks to improve the root cause analysis process and provide further insights into advancing patient safety.
Reliability of root cause analysis[127]	Examines a root cause analysis tool that uses causal trees to describe adverse events and tests its reliability.
Root cause analysis effectiveness[128]	This commentary discusses the history and experience of root cause analysis and points out the lack of evidence supporting its use to reduce risk or improve safety. Also absent are best practices for establishing recommendations for action, follow-up, and analysing results. The authors suggest that many recommendations stemming from root cause analyses should focus at the level of the health care system to prevent the inefficiencies of having individual institutions recycle the same discussions locally.
Critical exploration of incident analysis[129]	A discussion on the merits of incident analysis, its value as a method of engaging teams in reflecting on safety, and the challenges of maximizing the value of incident analysis.

How to access the resources (references)

124. Hettinger AZ, Fairbanks RJ, Hegde S, Rackoff AS, Wreathall J, Lewis VL et al. An evidence-based tool kit for the development of effective and sustainable root cause analysis system safety solutions. J Healthc Risk Manag. 2013;33(2):11–20 (http://www.ncbi. nlm.nih.gov/pubmed/24078204, accessed 16 November 2014).

125. Lee A, Mills PD, Neily J, Hemphill RR. Root cause analysis of serious adverse events among older patients in the Veterans Health Administration. Jt Comm J Qual Patient Saf. 2014;40(6):253–62. (http://www.ncbi.nlm.nih.gov/pubmed/25016673, accessed 16 November 2014).

126. Pham JC, Kim GR, Natterman JP, Cover RM, Goeschel CA, Wu AW et al. ReCASTing the RCA: an improved model for performing root cause analyses. Am J Med Qual. 2010;25(3):186–91 (http://www.ncbi.nlm.nih.gov/pubmed/20460564, accessed 16 November 2014).

127. Smits M, Janssen J, de Vet R, Zwaan L, Timmermans D, Groenewegen P et al. Analysis of unintended events in hospitals: inter-rater reliability of constructing causal trees and classifying root causes. Int J Qual Health Care. 2009;21(4):292–300. http://intqhc.oxfordjournals.org/content/early/2009/06/19/intqhc.mzp023.full.pdf+html, accessed 16 November 2014).

128. Wu AW, Lipshutz AKM, Pronovost PJ. Effectiveness and efficiency of root cause analysis in medicine. JAMA. 2008;299(6):685–7 http://jama.jamanetwork.com/article. aspx?articleid=181432, accessed 16 November 2014).

129. Vincent CA. Analysis of clinical incidents: a window on the system not a search for root causes. Qual Saf Health Care. 2004;13:242–3 (http://qualitysafety.bmj.com/content/13/4/242.full, accessed 16 November 2014).

Promoting a patient safety culture

The culture of a hospital is an important predictor of patient safety. The evidence presented here focuses on a systematic review of promoting safety culture as a patient safety strategy in its own right and on available safety culture assessment tools.

Resources to help with establishing a patient safety culture

Topic	Summary
Establishing patient safety systems and the importance of culture[130]	This paper describes the background and plans for the comprehensive programme of the United Kingdom National Health Service on learning more effectively from adverse events and near misses – one of the seminal papers of the patient safety movement.
Promoting a culture of safety[131]	This systematic review identifies and assesses interventions used to promote safety culture or climate in acute care settings. The selected studies targeted health care workers practising in inpatient settings and included data about changes in patient safety culture or climate after a targeted intervention. Within the study limits, evidence suggests that interventions can improve perceptions of safety culture and potentially reduce patient harm.

Impact of safety climate on errors[132]	A cross-sectional study of 91 hospitals to examine the relationship between hospital safety climate and hospital performance measures on selected patient safety indicators. The results link hospital safety climate to indicators of potential safety events.
Safety culture assessment[133]	This paper discusses the use of safety culture assessment as a tool for improving patient safety. It describes the characteristics of culture assessment tools and discusses their current and potential uses. The paper also highlights critical processes that health care organizations need to consider when deciding to use these tools.
Safety culture assessment tools –general[134]	This study examines the multilevel psychometric properties of an Agency for Healthcare Research and Quality hospital survey on patient safety culture.
Safety culture assessment use –applications[135]	Outlines the findings of a baseline assessment of patient safety culture in a large hospital in Riyadh, comparing results with regional and international studies using the Agency for Healthcare Research and Quality Hospital Survey on Patient Safety Culture. The study explores the association between patient safety culture predictors and outcomes.
Safety culture assessment use –applications[136]	The aim of this study was to investigate the psychometric properties of the Hospital Survey on Patient Safety Culture and its appropriateness for hospitals Arabic-speaking countries.

How to access the resources (references)

130. Donaldson L. An organisation with a memory. Clin Med. 2002;2(5):452–7 (http://www.clinmed.rcpjournal.org/content/2/5/452.full.pdf, accessed 16 November 2014).

131. Weaver SJ, Lubomksi LH, Wilson RF, Pfoh ER, Martinez KA, Dy SM. Promoting a culture of safety as a patient safety strategy: a systematic review. Ann Intern Med. 2013;5;158(5 Pt 2):369–74. (http://annals.org/article.aspx?articleid=1656428, accessed 16 November 2014).

132. Singer S, Lin S, Alyson A, Gaba D, Baker L. Relationship of safety climate and safety performance in hospitals. Health Serv Res. 2009;44 (2 Pt 1):399–421. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2677046/, accessed 16 November 2014).

133. Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. Qual Saf Health Care. 2003;12:ii17–23 (http://qualitysafety.bmj.com/content/12/suppl_2/ii17.full, accessed 16 November 2014).

134. Sorra J, Dyer N. Multilevel psychometric properties of the Agency for Healthcare Research and Quality hospital survey on patient safety culture. BMC Health Serv Res. 2010;10:199 (http://www.biomedcentral.com/1472-6963/10/199, accessed 16 November 2014).

135. El-Jardali F, Sheikh F, Garcia NA, Jamal D, Abdo A. Patient safety culture in a large teaching hospital in Riyadh: baseline assessment, comparative analysis and opportunities for improvement. BMC Health Serv Res. 2014;14:122 (http://www.biomedcentral.com/1472-6963/14/122, accessed 16 November 2014).

136. Najjar S, Hamdan M, Baillien E, Vleugels A, Euwema M, Sermeus W et al. The Arabic version of the hospital survey on patient safety culture: a psychometric evaluation in a Palestinian sample. BMC Health Serv Res. 2013;13:193 (http://www.biomedcentral.com/1472-6963/13/193, accessed 22 November 2014).

Patient safety walkrounds/communication

The importance of leadership walkrounds for patient safety has been the subject of recent academic scrutiny. It appears that walkrounds, as part of a multifaceted improvement approach, do add value to a patient safety programme and the progression to a culture of safety.

Resources on the importance of leadership walkrounds

Topic	Summary
Impact of walkrounds on safety culture[137]	A systematic review that found some evidence of leadership walkrounds and multifaceted unit-based strategies as two strategies with some stronger evidence to support a positive impact on patient safety culture in hospitals.
Impact of walkrounds on safety culture[138]	This study found that patient safety walkrounds provide any healthcare organization a unique opportunity to facilitate the foundation of a safe culture.
Impact of walkrounds on safety culture and staff burnout[139]	This cross-sectional survey study evaluated the association between receiving feedback about actions taken as a result of walkrounds and healthcare worker assessments of patient safety culture and burnout across 44 neonatal intensive care units (NICUs). Walkrounds are linked to patient safety and burnout.
Impact of walkrounds on staff attitudes[140]	This study measured the impact of walkrounds on one important part of safety culture – provider attitudes about the safety climate in the institution. The findings suggest that walkrounds have a positive effect on the safety climate attitudes of nurses who participate in the walkrounds sessions and are a promising tool to improve safety climate and the broader construct of safety culture.

How to access the resources (references)

137. Morello RT, Lowthian JA, Barker AL, McGinnes R, Dunt D, Brand C. Strategies for improving patient safety culture in hospitals: a systematic review. BMJ Qual Saf. 2013;22(1):11–8 (http://www.ncbi.nlm.nih.gov/pubmed/22849965, accessed 22 November 2014).
138. Budrevics G, O'Neill C. Changing a culture with patient safety walk-rounds. Healthcare Quarterly. 2005;8:20–5 http://www.longwoods.com/content/17657, accessed 16 November 2014).
139. Sexton JB, Sharek PJ, Thomas EJ, Gould JB, Nisbet CC, Amspoker AB et al. Exposure to Leadership WalkRounds in neonatal intensive care units is associated with a better patient safety culture and less caregiver burnout. BMJ Qual Saf. 2014;23(10):814–22http://qualitysafety.bmj.com/content/early/2014/05/13/bmjqs-2013-002042.short?rss=1, accessed 16 November 2014).
140. Thomas EJ, Sexton JB, Neilands TB, Frankel A, Helmreich RL.The effect of executive walk rounds on nurse safety climate attitudes: A randomized trial of clinical units. BMC Health Serv Res. 2005;5:28http://www.biomedcentral.com/1472-6963/5/28, accessed 16 November 2014).

Considering an improvement approach

The papers listed here present a snapshot of the evidence on the different approaches to improving quality as well as barriers and success factors.

Resources to help with improving quality of a safety programme

Topic	Summary
A proven improvement model[141]	Seminal book demonstrating rapid improvement initiatives using plan-do-study-act cycles, with stories from business, law, and health care to illustrate the successes of this approach. Accompanied by a resource guide to change concepts.
Multimodal behaviour change strategies[142]	This evaluation of the implementation of WHO's multimodal hand-hygiene strategy found it to be feasible and sustainable across a range of settings in different countries and that it leads to significant compliance and knowledge improvement in health care workers, thus supporting recommendation for use worldwide.
Multilevel approach to improving quality and safety[143]	The study explores the different initiatives in the United Kingdom and the United States of America and the need for consideration of amulti level approach to change that includes the individual, group/team, organization, and larger environment/system level. Attention must be given to issues of leadership, culture, team development, and information technology at all levels.
Implementation of a safety programme[144]	This paper describes the implementation and validation of a comprehensive unit-based safety programme in intensive care settings.
10 key challenges of quality improvement programmes[145]	A study of 14 quality improvement programme evaluations that identified10 key challenges, including the importance of convincing people that there is a problem and that the solution chosen is the right one. Getting data collection and monitoring systems right and being aware of the organizational context, culture and capacities are among the key challenges The evaluations also showed that time invested in getting the theory of change, measurement and stakeholder engagement right, can result in the success of an intervention.
Quality improvement programme – case study[146]	This article presents a case study of the Jönköping quality programme carried out in 2006. It presents evidence of how the programme was implemented. There is some evidence of process improvements in a number of departments and of improvement in outcomes in one department. The programme is widely perceived to be of benefit and some of the explanations for this are presented.

How to access the resources (references)

141. Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP. The improvement guide: a practical approach to enhancing organizational performance, 2nd edition. San Francisco: Jossey-Bass Publishers; 2009 (http://www.ihi.org/resources/Pages/Publications/ImprovementGuidePracticalApproachEnhancingOrganizationalPerformance.aspx, accessed 16 November 2014).

142. Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML et al. Global implementation of WHO's multimodal strategy for improvement of hand hygiene: a quasi-experimental study. Lancet Infect Dis. 2013;(10):843–51. (http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(13)70163-4/abstract, accessed 16 November 2014).

143. Ferlie EB1, Shortell SM. Improving the quality of health care in the United Kingdom and the United States: a framework for change. Milbank Q. 2001;79(2):281–315. (http://www.ncbi.nlm.nih.gov/pubmed/11439467, accessed 16 November 2014).

144. Peter P; Weast B, Rosenstein B; Sexton JB, Holzmueller CG, Paine LP et al. Implementing and validating a comprehensive unit-based safety program. J Patient Saf. 2005;1(1):33–40 (http://journals.lww.com/journalpatientsafety/Abstract/2005/03000/Implementing_and_Validating_a_Comprehensive.8.aspx, accessed 16 November 2014).

145. Dixon-Woods M, McNicol S, Martin G Overcoming challenges to improvement. London: Health Foundation; 2012 (http://www.health.org.uk/publications/overcoming-challenges-to-improving-quality/, accessed 16 November 2014).

146. Øvretveit J, Staines A. Sustained improvement? Findings from an independent case study of the Jönköping quality program. Qual Manag Health Care. 2007;16(1):68–83 (http://www.ncbi.nlm.nih.gov/pubmed/17235253, accessed 16 November 2014).

Addressing organizational workflow and human factors

The papers listed here present some of the evidence on the emerging academic work on human factors and patient safety.

Resources to help with addressing human factors in patient safety

Topic	Summary
Human factors and patient safety –review[147]	This report provides a basic description of major topic areas relating to human factors relevant to patient safety, with some indication of possible tools that can be used in a health care workplace for measurement or training of these topics. First an explanation of the human factors approach is provided. An organizing framework is presented to provide a structure for the discussion of the topics, by categorizing them as: organizational/managerial, team, individual, work environment.
Human factors and patient safety –summary[147]	This paper suggests that health care would benefit from human factors and ergonomics evaluations to systematically identify problems, prioritize them correctly and develop effective and practical solutions. It gives an overview of the discipline of human factors and ergonomics and describes its role in improving patient safety.
Review of human factors approaches[149]	Review article describing specific examples of human factors engineering-based interventions for patient safety. Studies show that these can be used in a variety of domains to support patient safety improvement.
Human factors and infection prevention and control[150]	In this paper the authors discuss the application of the principles encompassed in human factors within infection prevention and control activities.
Techniques for fostering teamwork[151]	Description of ongoing patient safety implementation using a teamwork approach. The paper describes specific clinical experience in the application of surgical briefings, the properties of high reliability perinatal care, the value of critical event training and simulation, and the benefits of a standardized communication process in the care of patients transferred from hospitals to skilled nursing facilities.
Teamwork and patient safety[152]	This review examines current research on teamwork in highly dynamic domains of healthcare such as operating rooms, intensive care, emergency medicine or trauma and resuscitation teams, with a focus on aspects relevant to the quality and safety of patient care.

How to access the resources (references)

147. Flin R, Winter J, Sarac C, Raduma M. Human factors in patient safety review of topics and tools: report for Methods and Measures Working Group. Geneva: World Health Organization, Patient Safety; 2009 (http://www.who.int/patientsafety/research/methods_measures/human_factors/human_factors_review.pdf, accessed 16 November 2014).

148. Gurses AP, Ant Ozok A, Pronovost PJ. Time to accelerate integration of human factors and ergonomics in patient safety. BMJ Qual Saf 2012; 21: 347–51 (http://qualitysafety.bmj.com/content/early/2011/11/30/bmjqs-2011-000421.abstract, accessed 16 November 2014).

149. Carayon P, Xie A, Kianfar S. Human factors and ergonomics as a patient safety practice. BMJ Qual Saf 2014;23:196–205. (http://qualitysafety.bmj.com/content/23/3/196.full.pdf+html, accessed 16 November 2014).

150. Storr J, Wigglesworth N, Kilpatrick C. Integrating human factors with infection prevention and control. London: Health Foundation; 2013 (http://patientsafety.health.org.uk/sites/default/files/resources/integrating_human_factors_with_infection_prevention_and_control_1.pdf, accessed 22 November 2014).

151. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. Qual Saf Health Care. 2004;13:i85–90 (http://qualitysafety.bmj.com/content/13/suppl_1/i85.full?sid=60571c19-ae76-4f50-815c-1ff2f67db1df, accessed 16 November 2014).

152. Manser T. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. Acta Anaesthesiol Scand. 2009;53(2):143–51 (http://onlinelibrary.wiley.com/doi/10.1111/j.1399-6576.2008.01717.x/full, accessed 16 November 2014).

Safe surgery interventions

Burden

Problems associated with surgical safety are well recognized worldwide. The annual volume of major surgery has been estimated at 187 million to 281 million operations, and it has been documented that major complications occur in both developed and developing countries. The WHO guidelines for safe surgery 2009 summarize the evidence on the burden of harm and the interventions to tackle this. It is estimated that, assuming a 3% perioperative adverse event rate and a 0.5% mortality rate globally, almost seven million surgical patients suffer significant complications each year, and one million of these die during or immediately after surgery. Surgical care errors contribute to a significant burden of disease despite the fact that 50% of complications associated with surgical care are avoidable.

Resources on safe surgery

Topic	Summary
The burden of unsafe surgery and the importance of surgical safety surveillance[153,154]	Summarizes evidence on the burden of harm in developed countries (3%–22% of inpatient surgical procedures) with a death rate of 0.4%–0.8%. Nearly half the adverse events were determined to be preventable. Studies in developing countries suggest a death rate of 5%–10% associated with major surgery, and the rate of mortality during general anaesthesia is reported to be as high as 1 in 150 in parts of sub-Saharan Africa.
	Describes recommendations for reporting and learning, including day-of-surgery mortality rate, postoperative in-hospital mortality rate, surgical site infection rate and surgical Apgar score (a simple outcome score for surgery

	based on intra-operation measurements of estimated blood loss, lowest heart rate, and lowest mean arterial pressure; it provides information on how an operation went by rating the condition of a patient after surgery on a scale from 0 to 10).

How to access the resources (references)

153. Weiser TG, Regenbogen SE, Thompson KD, Haynes AB, Lipsitz SR, Berry WR et al. An estimation of the global volume of surgery. Lancet. 2008;372(9633):139–44. (http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(08)60878-8/fulltext,accessed 22 November 2014).

154. WHO guidelines for safe surgery 2009. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241598552_eng.pdf, accessed 16 November 2014).

Drivers/mandates for action

WHO's Second Global Patient Safety Challenge: "Safe surgery saves lives" was launched in 2007 to improve the safety of surgical care around the world. The impact of such an international driver led to the engagement of ministries of health, professional bodies, and academics, as well as front-line practitioners.

Resources explaining the global need for safe surgery

Topic	Summary
Global call to action for safer surgery[155]	Web pages that explain the need for safer surgery and WHO's work on this second global patient safety challenge.

How to access the resources (references)

155. Safe surgery. Geneva: World Health Organization; 2014 (http://www.who.int/patientsafety/safesurgery/en/, accessed16 November 2014).

Surgical safety checklist

A key strategy of "Safe surgery saves lives" is the Surgical safety checklist *(156)*, the testing of which was published in the *New England Journal of Medicine* in 2009. The checklist was designed for use in low-, medium- and high-cost countries; the goal is to promote critical safety steps which minimize common avoidable risks. It is based on 10 essential objectives (or standards) and comprises 19 safety measures distributed over three phases of an operation:

- Phase 1: before the induction of anaesthesia;
- Phase 2: before the incision of the skin;
- Phase 3: before the patient leaves the operating room.

Key elements are necessary to successfully implement and maintain the Surgical safety checklist in practice, including leadership, ownership and a safe working environment. It has been found that implementation of this evidence-based checklist, which directs clinical practices and aims to reduce risk, can contribute to reduction in some of the common complications and adverse events occurring in surgery such as retained foreign objects; wrong site surgery; medication errors and surgical site infections, all related to the importance of undertaking safe anaesthesia, safe surgical team-work and basic surgical surveillance to allow for reporting of errors/incidents.

Resources to help with implementing a surgical safety checklist

Topic	Summary
The checklist and directions/ rationale for implementing it[156–159]	Outlines the steps required for safe surgery as well as an explanation of whole organization implementation support, necessary for avoiding unintended consequences. Details lists of references/evidence for points recommended within the safe surgery checklist.
Checklist – global testing[160]	Details the results of the field-testing of the implementation of the checklist. Use was associated with concomitant reductions in the rates of death and complications among patients at least 16 years of age who were undergoing non-cardiac surgery in a diverse group of hospitals across the world.
Checklist implementation –progress and barriers[161]	Reviews global progress and barriers in implementation of the WHO surgical checklist.
Checklist implementation – high and low income country comparison[162]	Contextualizes barriers to the use of the checklist in low- and middle-income countries, and recommends further research for a better understanding of what (if any) modifications need to be made. Concludes that implementation of the surgical checklist is likely to be optimized, regardless of the setting, when it is used as a tool in multifaceted cultural and organizational programmes to strengthen patient safety. It cannot be assumed that the introduction of a checklist will automatically lead to improved communication and clinical processes.

How to access the resources (references)

156. Implementation manual. WHO surgical safety checklist 2009. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241598590_eng.pdf?ua=1, accessed 29 March 2015).

157. Selected bibliography supporting the ten essential objectives for safe surgery. Geneva: World Health Organization; (http://www.who.int/patientsafety/safesurgery/bibliography/en/, accessed 16 November 2014).

158. Performance of correct procedure at correct body site. Geneva: World Health Organization; 2007 (http://www.who.int/patientsafety/events/07/02_05_2007/en/, accessed 16 November 2014).

159. Preventing unintended retained foreign objects. Oakbrook Terrace, Illinois: Joint Commission; 2013 (http://www.jointcommission.org/sea_issue_51/, accessed 16 November 2014).

160. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AH, Dellinger EP et al. A surgical safety checklist to reduce morbidity and mortality in a global population. N Engl J Med. 2009;360(5):491–9 (http://www.nejm.org/doi/full/10.1056/NEJMsa0810119, accessed 16 November 2014).

161. Perry WRG, Kelley ET. Checklists, global health and surgery: a five-year check-up of the WHO surgical safety checklist programme. Clinical Risk. 2014; June (http://cri.sagepub.com/content/early/2014/06/19/1356262214535734.abstract, accessed 16 November 2014).

162. Aveling EL, McCulloch P, Dixon-Woods M. A qualitative study comparing experiences

of the surgical safety checklist in hospitals in high-income and low-income countries. BMJ Open. 2013;3(8):e003039 (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3752057/, accessed 22 November 2014).

Venous thromboembolism

Venous thromboembolism is one of the most common complications of surgical care and one of the most common preventable causes of hospital death. In a global study, the most common adverse event in low- and middle-income countries was noted as venous thromboembolism. Many health care institutions modify the briefing section of the Surgical safety checklist to include prophylaxis for venous thromboembolism, and addressing this aspect of patient safety has become a priority for some countries.

Resources to help with addressing venous thromboembolism

Topic	Summary
Venous thromboembolism – global burden[163]	Based on analytic modelling of observational studies investigating unsafe medical care in inpatient care settings and stratified by national income to identify incidence of seven adverse events, venous thromboembolism was noted to be the most common in low- and middle-income countries (incidence 3.0%).
Venous thromboembolism –guidelines[164–168]	Guidelines address key recommendations, including: every hospital develop a formal strategy that addresses the prevention of venous thromboembolism; recommend against the use of aspirin alone as thromboprophylaxis for any patient group; and mechanical methods of thromboprophylaxis be used primarily for patients at high risk of bleeding or possibly as an adjunct to anticoagulant thromboprophylaxis. Reviews also provide background evidence, risk assessment approaches and risk reduction strategies.
Venous thromboembolism – background to the need for action[169]	Describes adherence to recommendations forvenous thromboembolism and outlines the need for action.
Venous thromboembolism – example country targets[170]	An English-focused document; it gives clear information on how venous thromboembolism prevention can be managed.

How to access the resources (references)

163. Jha AK, Larizgoitia I, Audera-Lopez C, Prasopa-Plaizier N, Waters H, Bates DW. The global burden of unsafe medical care: analytic modelling of observational studies BMJ Qual Saf. 2013;22(10):809–15 (http://qualitysafety.bmj.com/content/22/10/809.full, accessed 16 November 2014).
164. Guidelines on the prevention of VTE in adults. Riyadh: Saudi Arabian Venous Thrombo-Embolism Advisory Group; 2011 (http://savte.com/download/SAVTE%20Guidelines%20Booklet.pdf, accessed 16 November 2014).
165. Prevention of venous thromboembolism - evidence-based clinical practice guidelines. American College of Chest Physicians; (http://journal.publications.chestnet.org/article.aspx?articleid=1085923, accessed 16 November 2014).

166. Antithrombotic and thrombolytic therapy, 8th edition: ACCP guidelines. Chest. 2008;133(6 Suppl.):67S 70S (http://journal.publications.chestnet.org/issue.aspx?issueid=22073, accessed 22 November 2014).

167. Venous thromboembolism: reducing the risk: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. London: National Institute for Health and Care Excellence; 2014 (http://guidance.nice.org.uk/CG92, accessed 22 November 2014).

168. Preventing hospital-acquired venous thromboembolism [web resource]. Rockville, Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/vtguide/index.html, accessed 16 November 2014).

169. Rehmani RS, Memon JI, Alaithan A, Ghabashi A, Shahid K, Latif S et al. Venous thromboembolism risk and prophylaxis in a Saudi hospital. Saudi Med J. 2011;32(11):1149–54. (http://www.ncbi.nlm.nih.gov/pubmed/22057603, accessed 16 November 2014).

170. Commissioning services that deliver high quality VTE prevention: guidance for commissioners. London: National Health Service England; 2013 (http://www.england.nhs.uk/wp-content/uploads/2013/08/vte-prev-guide-may2013-22.7.13.pdf, accessed 16 November 2014).

Surgical site infections

The briefing section of the Surgical safety checklist contains key points to support surgical site infection prevention, e.g. whether antibiotic prophylaxis is given or not and the appropriate timing.

Resources on antibiotic prophylaxis

Topic	Summary
Antibiotic prophylaxis in surgery[171,172]	Describes evidence-based recommendations for administering surgical antibiotic prophylaxis where this is necessary, including the optimum timing (within 60 minutes of skin incision) in support of the surgical safety checklist.
Antibiotic prophylaxis in surgery[173]	Describes the appropriateness of antibiotic prophylaxis administered before surgery at a major referral hospital.

Note: See section on health care-associated infection for more information on prevention of surgical site infection as well as the sections on safe patient identification and medication safety, which link to ensuring safe anaesthesia and surgery.

How to access the resources (references)

171. Antibiotic prophylaxis in surgery: a national guideline. Edinburgh: Scottish Intercollegiate Guidelines Network; 2014 (http://www.sign.ac.uk/pdf/sign104.pdf, accessed 16 November 2014).

172. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Bethesda, Maryland: American Society of Health-System Pharmacists; 2013 (http://www.ashp.org/DocLibrary/BestPractices/TGSurgery.aspx, accessed 16 November 2014).

173. Vessal G, Namazi S, Davarpanah MA, Foroughinia F. Antibiotic administration at the surgical ward of a major referral hospital, Islamic Republic of Iran. East Mediterr Health J. 2011;17(8):663–8 (http://www.emro.who.int/emhj-volume-17/volume-17-issue-8/article5.html, accessed 16 November 2014).

Operating room behaviours

The body of evidence around team and individual behaviours in the operating room has grown in recent years and some examples are provided here (the sections that cover all aspects of health care culture and team working applies to the all interventions described).

Resources on the importance of behaviours in the operating room

Topic	Summary
Engaging clinicians and the importance of communications[174–177]	These articles provide an overview of the challenges of current/ongoing behaviours within operating rooms and approaches that can be used to enhance team working.

How to access the resources (references)

174. Lingard L, Espin S, Whyte S, Regehr G, Baker GR, Reznick R et al. Communication failures in the operating room: an observational classification of recurrent types and effects. Qual Safe Health Care. 2004;13(5):330–4 (http://www.ncbi.nlm.nih.gov/pubmed/15465935, accessed 16 November 2014).

175. Whyte S, Lingard L, Espin S, Baker GR, Bohnen J, Orser BA et al. Paradoxical effects of interprofessional briefings on OR team performance. Cogn Tech Work. 2008;10:287–94 (http://link.springer.com/article/10.1007/s10111-007-0086-8, accessed 23 November 2014).

176. Lingard L, Regehr G, Espin S, Whyte S. A theory based instrument to evaluate team communication in the operating room: balancing measurement authenticity and reliability. Qual Saf Health Care 2006; 15(6):422–6 (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2464881/, accessed 23 November 2014).

177. Mazzocco K, Petitti DB, Fong KT, Bonacum D, Brookey J, Graham S et al. Surgical team behaviors and patient outcomes. Am J Surg. 2009;197(5):678–85 (http://psnet.ahrq.gov/resource.aspx?resourceID=8453, accessed 16 November 2014).

Medication safety interventions

Burden

Medication errors are common and are described as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health professional or others. Such events may be related to professional practice, health care products, procedures and systems (including prescribing), order communication, product labelling, packaging and nomenclature, compounding, dispensing, distribution, storage, administration, education, monitoring and use. Death from medication errors does occur. Safe evidence-based clinical practices and a safe working environment are vital to reduce adverse events known to be common around the globe.

Adverse drug events are an outcome of poor medication safety and while a recent global study found lower rates in low- and middle-income countries compared with high-income countries (2.9% vs 5.0%), this aspect of medication safety still warrants attention in all countries, especially given data collection of medication errors is not yet ubiquitous.

Medication reconciliation is also a key part of medication safety and this links with the importance of safe patient identification. This aspect of medication safety is concerned with obtaining a complete and accurate list of the patient's current medications, comparing the physician's admission, transfer or discharge medication orders to that list, and resolving any discrepancies before an adverse event can occur.

Drivers/mandates for action

Around the world many regions/countries have acted to address medication safety, and at international level summary guidance and tools have been made available as part of patient safety solution packages. Currently (2014) WHO is exploring the potential for setting a new global challenge on this topic.

Resources to help with addressing medication safety

Topic	Summary
Burden of harm – general[178,179]	Describes medication errors in the context of unsafe medical care, highlighting why it is one of the priorities to be addressed across all countries. Highlights risk factors for adverse drug events and highest risk medications, e.g. heparin.
Burden of harm – regional[180,181]	Medication error rates varied from 7.1% to 90.5% for prescribing and from 9.4% to 80.0% for administration.
Burden of harm – general[182]	The review found that incident reporting systems do not capture all incidents in hospitals and should be combined with complementary information about diagnostic error and delayed treatment from patient complaints and retrospective chart review.
Burden of harm – paediatrics[183]	This retrospective cohort study found that children with complex chronic conditions are at higher risk for adverse drug events that lead to emergency department visits, but not hospital admissions, compared with other children.
Medication errors – overview, reporting and prevention[184]	A useful summary of definitions, types of errors, detection and reporting and the role of balanced prescribing as a preventative strategy.
Medication errors – prevention[185]	Highlights the importance of generic names, tailoring prescribing for individual patients, learning and practising collecting of medication histories, knowing which medications used in the local area carry high risk of adverse events, being familiar with the medications prescribed, using memory aids, using the 5 Rs (readiness, resourcefulness, resilience, responsibility, reflectiveness) when prescribing and administrating, communicating early, developing checking habits, reporting and learning from medication errors.
Medication reconciliation[186]	Reviews the clinical and cost–effectiveness of interventions aimed at the prevention of medication error at the point of admission to hospital.
Monitoring and reporting[187]	An international monitoring and evaluation system managed by a WHO collaborating centre, outlining support for data collection and reporting. Guidelines on reporting medication errors, etc.

How to access the resources (references)

178. Jha AK, Larizgoitia I, Audera-Lopez C, Prasopa-Plaizier N, Waters H, Bates DW. The global burden of unsafe medical care: analytic modelling of observational studies. BMJ Qual Saf. 2013;22:809–15 (http://qualitysafety.bmj.com/content/22/10/809.full.pdf+html, accessed 23 November 2014).

179. Medication errors portal. Rockville, Maryland: Agency for Healthcare Research and Quality; 2012 (http://psnet.ahrq.gov/primer.aspx?primerID=23, accessed 16 November 2014).

180. Alsulami Z, Conroy S, Choonara I. Medication errors in the Middle East countries: a systematic review of the literature. Eur J Clin Pharmacol. 2013;69(4):995–1008 (http://www.ncbi.nlm.nih.gov/pubmed/23090705, accessed 16 November 2014).

181. Al-Faouri IG, Hayajneh WA, Habboush DM. A five years retrospective study of reported medication incidents at a Jordanian teaching hospital: patterns and trends. Int J Humanit Soc Sci. 2014;4(5):1 (http://www.ijhssnet.com/journals/Vol_4_No_5_1_March_2014/33.pdf, accessed 23 November 2014).

182. de Feijter JM, de Grave WS, Muijtjens AM, Scherpbier AJJA, Koopmans RP. A comprehensive overview of medical error in hospitals using incident-reporting systems, patient complaints and chart review of inpatient deaths. PLoS One. 2012;7(2):e31125(http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0031125, accessed 16 November 2014).

183. Feinstein JA, Feudtner C, Kempe A. Adverse drug event–related emergency department visits associated with complex chronic conditions. Pediatrics. 2014;133(6):e1575–85 (http://psnet.ahrq.gov/primer.aspx?primerID=23, accessed 16 November 2014).

184. Aronson JK. Medication errors: what they are, how they happen, and how to avoid them. QJM. 2009;102(8):513–21 (http://qjmed.oxfordjournals.org/content/102/8/513.full.pdf+html, accessed 23 November 2014).

185. Patient safety curriculum guide (multi-professional)   Medication safety. Geneva: World Health Organization; 2014 (http://www.who.int/patientsafety/education/curriculum/tools-download/en/, accessed16 November 2014).

186. Campbell F, Karnon J, Czoski-Murray C, Jones R. A systematic review of the effectiveness and cost effectiveness of interventions aimed at preventing medication error (medicines reconciliation) at hospital admission. London: National Institute for Health and Care Excellence; 2007 (http://www.nice.org.uk/guidance/psg001/resources/systematic-review-for-clinical-and-cost-effectiveness-of-interventions-in-medicines-reconciliation-at-the-point-of-admission4, accessed 23 November 2014).

187. Introduction to the WHO Programme for International Drug Monitoring. Geneva: World Health Organization; 2014 (http://www.who-umc.org/DynPage.aspx?id=98080&mn1=7347&mn2=7252&mn3=7322&mn4=7324, accessed 23 November 2014).

Falls interventions

Background

There are many risk factors in health care for patient falls; they can be grouped into two categories: intrinsic and extrinsic factors. One is related to the person's condition, which includes factors that address a person's physical and physiological condition (intrinsic); the other is related to the environment. This includes factors that address the physical environment surrounding the patient (extrinsic). Such risk factors can be either anticipated or unanticipated. The anticipated risk factors are the ones that can be addressed before a patient falls and should be part of patient

safety initiatives, both in hospitals and in long-term care institutions, where falls are thought to be particularly common. Adopting an operational definition of "falls", with inclusion and exclusion criteria, is seen as being especially important for addressing the problem within health care facilities.

Drivers/mandates for action

The global burden related to falls has been described by WHO, however no clear international call to action has yet been made. Many countries are setting prevention of falls as a patient safety priority based on reporting and learning from health care facilities. This has underlined that many vulnerable, elderly patients are subject to avoidable adverse events (including fracture of the neck of the femur) while in hospital that require surgical interventions and result in longer admission periods. Evidence-based clinical practices and safe working environments are vital to reduce adverse events; falls can be prevented.

Note: This section does not aim to cover underlying medical conditions as a cause of falls.

Resources to help with preventing falls

Topic	Summary
Falls – the causes and added burden on health care systems[188,189]	The web pages and report outline falls in the general sense. The magnitude of falls worldwide and in the Region is presented as well as risk factors and associated costs. Anticipated and unanticipated falls are described, including patient condition and environmental factors for health care systems to be aware of. A falls prevention model is also presented.
Falls prevention – patient assessments and solutions[190–193]	Patients should be assessed for their fall risk: on admission to a health care facility, on any transfer from one unit to another within a health care facility, following any change of condition, following a fall, at regular intervals, such as monthly, biweekly or daily. Changes to the environment and walking aids are a core part of falls prevention in health care.

How to access the resources (references)

188. Global report on falls prevention in older age. Geneva: World Health Organization; 2014 (http://www.who.int/mediacentre/factsheets/fs344/en/, accessed 16 November 2014).

189. World report on ageing and health. Geneva: World Health Organization; 2015 (in press).

190. Clinical practice guideline for the assessment and prevention of falls in older people. London: Royal College of Nursing; 2004 (https://www.rcn.org.uk/__data/assets/pdf_file/0003/109821/002771.pdf, accessed 23 November 2014).

191. Falls: assessment and prevention of falls in older people. London: National Institute for Health and Care Excellence; (http://www.nice.org.uk/guidance/cg161/resources/cg161-falls-guidance, accessed 23 November 2014).

192. Anderson O, Boshier PR, Hanna GB. Interventions designed to prevent healthcare bed-related injuries in patients. Cochrane Database Syst Rev. 2011;(11) (http://www.ncbi.nlm.nih.gov/pubmed/22071860, accessed 23 November 2014).

193. Currie L. Fall and injury prevention. In: Hughes RG, editor. Patient safety and quality: an evidence-based handbook for nurses. Rockville, Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/clinicians-providers/resources/nursing/resources/nurseshdbk/CurrieL_FIP.pdf, accessed 16 November 2014).

Safe patient identification interventions

Burden

Ensuring safe patient identification is an important patient safety strategy for preventing such adverse events as surgery on the wrong patient, medication errors, blood and blood product transfusion-related errors, errors in laboratory investigations, invasive procedures on the wrong patient, and discharge of infants to the wrong families. Available data suggest these have a significant impact, including death resulting from wrong patient identification. Up-to-date evidence-based clinical practices and a safe working environment are vital to reduce adverse events.

Drivers/mandates for action

The WHO has worked with other organizations to outline the importance of safe patient identification. This provides an opportunity for all countries to place this topic as a priority patient safety intervention, and patient identification errors have indeed led to safety initiatives being applied in many facilities.

Resources on the importance of safe patient identification

Topic	Summary
Safe patient identification[194,195]	Summarizes the burden and gives recommendations to prevent error, including responsibility for checking identification before care, the use of two patient identifiers, standardizing the approaches to patient identification, educating patients and the need for clear protocols.
Patient identification and procedure matching[196–198]	Resources to help guide correct identification of all patients whenever care is provided and correctly match patients to their intended treatment, including specimen processing. Includes roles and responsibilities and definitions.
Patient identification methods[199,200]	Features details of wristband specifications taken from a country-wide exercise.

How to access the resources (references)

194. Patient safety aide-memoire – patient identification. Geneva: World Health Organization; 2007 (http://www.who.int/patientsafety/solutions/patientsafety/PS-Solution2.pdf, accessed 23 November 2014).

195. Right patient – right care. London: National Health Service, National Patient Safety Agency; 2004 (http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCUQFjAA&url=http%3A%2F%2Fwww.npsa.nhs.uk%2FEasySiteWeb%2FGatewayLink.aspx%3FalId%3D3234&ei=_ZzrU4zKMK7y7AbPnIGYCg&usg=AFQjCNFXqj1zIsHN4uDO2g2XbhA15-N7uw&bvm=bv.72938740,d.ZGU, accessed 23 November 2014).

196. Patient identification and procedure matching. Melbourne, Australia: Australian Commission on Safety and Quality in Health Care; 2012 (http://www.safetyandquality.gov.au/wp-content/uploads/2012/10/Standard5_Oct_2012_WEB.pdf, accessed 16 November 2014).

197. Surgical specimen identification errors: a new measure of quality in surgical care. Rockville, Maryland: Agency for Healthcare Research and Quality; 2007 (http://psnet.ahrq.gov/resource.aspx?resourceID=5123, accessed 16 November 2014).

198. Wagar EA, Tamashiro L, Yasin B, Hilborne L, Bruckner DA.Patient safety in the clinical laboratory: a longitudinal analysis of specimen identification errors. Arch Pathol Lab Med. 2006;130(11):1662–8 (http://www.archivesofpathology.org/doi/full/10.1043/1543-2165(2006)130[1662:PSITCL]2.0.CO;2, accessed 16 November 2014).

199. Design and specification of patient wristbands: Evidence from existing literature, NPSA-facilitated workshops, and a NHS Trusts survey. London: National Health Service, National Patient Safety Agency; 2007 (http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCYQFjAB&url=http%3A%2F%2Fwww.nrls.npsa.nhs.uk%2FEasySiteWeb%2Fgetresource.axd%3FAssetID%3D60135%26type%3Dfull%26servicetype%3DAttachment&ei=sJ3rU9zRAeqf7Aao6IHgCQ&usg=AFQjCNFxdFXq8Eg4yQDkxi_VSdviVZMZgg&bvm=bv.72938740,d.ZGU, accessed 16 November 2014).

200. Wristbands for hospital inpatients improve safety. London: National Health Service, National Patient Safety Agency; 2005 (http://www.nrls.npsa.nhs.uk/EasySiteWeb/getresource.axd?AssetID=60032, accessed16 November 2014).

Health care-associated infection interventions

Burden

Health care-associated infection is acquired by patients while receiving care and represents the most frequent adverse event. It is defined as a localized or systemic infection that results from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) for which there is no evidence of infection on admission to a health care facility. There is an increasing body of work on the global burden of harm caused by health care-associated infection and the strategies necessary to reduce this. Infected patients have longer hospital stays and are treated with less-effective drugs, which are more toxic and/or more expensive. Some patients will not recover and others may develop long-term complications. The WHO has reported that at any given time 7% of patients in developed and 10% in developing countries will acquire at least one health care-associated infection, and death from health care-associated infection does occur. Up-to-date, evidence-based clinical practices and safe working environments are vital to reduce risk.

Resources on the importance of health care-associated infection

Topic	Summary
The burden of health care-associated infection –worldwide[201]	Systematic reviews of the literature on endemic health care-associated infection from 1995 to 2010 in high- and low-/middle-income countries.
The burden of health care-associated infection– developing countries[202]	The review found a high burden of health care-associated infection in developing countries (15.5% pooled prevalence). The findings indicate a need to improve surveillance and infection-control practices.

How to access the resources (references)

201. Report on the burden of endemic health care-associated infection worldwide. Geneva: World Health Organization; 2011 (http://apps.who.int/iris/bitstream/10665/80135/1/9789241501507_eng.pdf?ua=1, accessed 16 November 2014).

202. Allegranzi B, Bagheri Nejad S, Combescure C, Graafmans W, Attar H, Donaldson L et al. Burden of endemic health care-associated infection in developing countries: systematic review and meta-analysis. Lancet. 2011;377(9761):228–41 (http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)61458-4/abstract, accessed 16 November 2014).

Antimicrobial resistance

The emergence of the global challenge of antimicrobial resistance has further increased the concern about, and impact related to, health care-associated infection. The call to action against antimicrobial resistance includes more than prevention and management of health care-associated infection, for example, it involves the development of better diagnostics, antibiotic therapies and control measures within veterinary health. However, this increasing global challenge has highlighted the importance of infection prevention and control measures when providing health care.

Resources to help with addressing antimicrobial resistance

Topic	Summary
The burden of health care-associated infection – developing countries[203]	The review found a high burden of health care-associated infection in developing countries (15.5% pooled prevalence). The findings indicate a need to improve surveillance and infection-control practices.
Antimicrobial resistance – surveillance[204]	This report, produced in collaboration with Member States and other partners, outlines the magnitude of antimicrobial resistance and the current state of surveillance globally.
Antimicrobial resistance – lessons learned[205]	This book presents a comprehensive overview of antimicrobial resistance and what we know about how to prevent it, and highlights current gaps.
Strategies to reduce antimicrobial resistance[206,207]	Outlines the need for good infection prevention and control measures to help prevent infections occurring; rapid diagnosis and correct treatment of infections; patients' information; surveillance, and research and development on new, effective antimicrobials.

How to access the resources (references)

203. Allegranzi B, Bagheri Nejad S, Combescure C, Graafmans W, Attar H, Donaldson L et al. Burden of endemic health care-associated infection in developing countries: systematic review and meta-analysis. Lancet. 2011;377(9761):228–41 (http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)61458-4/abstract, accessed 16 November 2014).

204. Antimicrobial resistance: global report on surveillance 2014. Geneva: World Health Organization; 2014 (http://www.who.int/drugresistance/documents/surveillancereport/en/, accessed 16 November 2014).

205. The evolving threat of antimicrobial resistance - options for action. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/implementation/amr/en/, accessed 16 November 2014).

206. Five year antimicrobial resistance strategy 2013 to 2018. London: Department of Health; 2013 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244058/20130902_UK_5_year_AMR_strategy.pdf, accessed 16 November 2014).

207. Report on the consultative meeting on antimicrobial resistance for countries in the Eastern Mediterranean Region: from policies to action (2013). Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2014 (http://applications.emro.who.int/docs/IC_Meet_Rep_2014_EN_15210.pdf?ua=1, accessed 16 November 2014).

Drivers/mandates for action

WHO's first Global Patient Safety Challenge; "Clean care is safer care" was launched in 2005. This call to action on infection prevention and control in health care was taken up across the globe aided by the power of Member State ministry of health "pledges" to WHO and the establishment of actions to enhance hand hygiene in health care as the "entrance door to patient safety". The response led to ongoing commitment from WHO in the form of an international hand hygiene campaign (with a global annual day) as well as other supporting activities, and regional, country (including a WHO-recognized clean hands country network) and health care facility initiatives.

For antimicrobial resistance, the call to action from WHO has been equally as strong, but without the support of an annual global programme of work in support of local action. In 2014, however, the WHO global annual campaign "SAVE LIVES: clean your hands" combined hand hygiene and antimicrobial resistance messages, producing new advocacy and education tools to support action targeting the spread of both drug-sensitive and drug-resistant organisms.

Resources describing action on antimicrobial resistance

Topic	Summary
Global call(s) to action[208–211]	Background and rationale for the first Global Patient Safety Challenge and global action on antimicrobial resistance.
Regional call to action[212]	Contains details of the call to action in the Eastern Mediterranean Region.

How to access the resources (references)

208. Clean Care is Safer Care programme. Geneva: World Health Organization; 2005 (http://www.who.int/gpsc/background/en/, accessed 23 November 2014).
209. Pittet D, Donaldson L. Clean Care is Safer Care: a worldwide priority. Lancet. 2005;366(9493):1246–7 (http://www.who.int/gpsc/information_centre/ps_2005_Lancet_Worldwide_priority_en.pdf?ua=1, accessed 16 November 2014).
210. World Health Assembly Resolution: Antimicrobial drug resistance. Geneva: World Health Organization; 2014 (http://apps.who.int/gb/ebwha/pdf_files/WHA67/A67_39-en.pdf, accessed 23 November 2014).
211. SAVE LIVES: clean your hands   WHO's global annual campaign. Geneva: World Health Organization; 2014 (http://www.who.int/gpsc/5may/en/, accessed 16 November 2014).
212. Resolution: Infection prevention and control in health care: time for collaborative action (EM/RC57/R6). Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2010 (http://applications.emro.who.int/docs/EM_RC57_r6_en.pdf, accessed 23 November 2014).

Health care-associated infection surveillance systems and understanding common organisms/organisms of concern

Health care-associated infection surveillance is the systematic, active, ongoing observation of the occurrence and distribution of health care-associated infection and of the events or conditions that increase the risk of its occurrence. Undertaking valid and dependable surveillance relies on the use of definitions and protocols, and most surveillance activities require the services of a properly equipped laboratory.

Understanding the common organisms that exist in a region, country and facility is vital to infection prevention, particularly those organisms that can be pathogenic and/or antimicrobial resistant.

It forms part of the specialty of infection prevention, and those with skills in laboratory testing and epidemiology are important in both the proactive activities that are required for prevention of infection and in understanding the right approach to take when an outbreak occurs.

Resources describing the most common organisms in health care-associated infection

Topic	Summary
Most common organisms/ organisms of global concern and approaches for health care-associated infection surveillance[213–219]	Recommendations for health care facilities and review of the role of public health authorities – particularly for common organisms. Recommendations for monitoring health care-associated infection/ organisms.

How to access the resources (references)

213. Guidance for control of Carbapenem-resistant enterobacteriaceae. Atlanta, Georgia: Centers for Disease Control and Prevention; 2012 (http://www.cdc.gov/hai/pdfs/cre/cre-guidance-508.pdf, accessed 16 November 2014).

214. Acute trust tool kit for the early detection, management and control of carbapenemase-producing Enterobacteriaceae. London: Public Health England; 2013 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/329227/Acute_trust_tool_kit_for_the_early_detection.pdf, accessed 23 November 2014).

215. Ahmed MO, Elramalli AK, Amri SG, Abuzweda AR, Abouzeed YM. Isolation and screening of methicillin-resistant Staphylococcus aureus from health care workers in Libyan hospitals. East Mediterr Health J. 2012;18(1):37–42 (http://applications.emro.who.int/emhj/V18/01/18_1_2012_0037_0042.pdf, accessed 16 November 2014).

216. Coia JE, Duckworth GJ, Edwards DI, Farrington M, Fry C, Humphreys H et al; Joint Working Party of the British Society of Antimicrobial Chemotherapy; Hospital Infection Society; Infection Control Nurses Association. Guidelines for the control and prevention of meticillin-resistant Staphylococcus aureus (MRSA) in healthcare facilities. J Hosp Infect. 2006;63(Suppl. 1):S1–44 (http://www.his.org.uk/files/7113/7338/2934/MRSA_Guidelines_PDF.pdf, accessed 6 November 2014).

217. Clostridium difficile overview. Stockholm: European Centre for Disease Prevention and Control; 2014 (http://www.ecdc.europa.eu/en/healthtopics/healthcare-associated_infections/clostridium_difficile_infection/pages/index.aspx, accessed 23 November 2014).

218. Guidance on prevention and control of Clostridium difficile infection (CDI) in care settings in Scotland. Edinburgh: National Health Service Scotland, Health Protection Network; 2014 (http://www.documents.hps.scot.nhs.uk/about-hps/hpn/clostridium-difficile-infection-guidelines.pdf, accessed 16 November 2014).

219. Tracking infections in acute care hospitals/facilities. Atlanta, Georgia: Centers for Disease Control National Healthcare Safety Network (NHSN); 2013 (http://www.cdc.gov/nhsn/acute-care-hospital/, accessed 30 November 2014).

How health care-associated infection is acquired and transmitted

An organism, whether drug resistant or not, may be transmitted by a single route or in several ways. The common ways that microbes are transmitted are by direct or indirect contact (contact transmission), droplet transmission, airborne transmission and percutaneous (bloodborne).

Resources to help with explaining how infection is transmitted

Topic	Summary
How infections are transmitted and their management[220,221]	Describes the different ways in which infections are spread (direct contact, indirect contact, droplet transmission, airborne transmission and percutaneous) and steps to prevent transmission.

How to access the resources (references)

220. Patient safety solutions – infection prevention and control. Geneva: World Health Organization; 2012 (http://www.who.int/patientsafety/education/curriculum/course9_handout.pdf, accessed 24 November 2014).

221. 2007 guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. Atlanta, Georgia: Centers for Disease Control and Prevention: 2007 (http://www.cdc.gov/hicpac/2007ip/2007isolationprecautions.html, accessed 24 November 2014).

Establishing an infection prevention programme

Prevention of health care-associated infection has been widely studied and there is an accepted standard approach to establishing and monitoring the right systems, structures, policies and processes and outcome measures (through surveillance activities) that comprise infection prevention programmes. Training is also considered a vital component.

Resources to help with establishing an infection prevention programme

Topic	Summary
The core components for infection prevention and control programmes[222]	This paper identifies those components of an infection control programme which are considered essential for any infection prevention and control programme to meet its objectives. The core components are constructed around organization of the programmes; technical guidelines; human resources; surveillance of infections and assessment of compliance with infection prevention and control practices; microbiology laboratory; environment; monitoring and evaluation of programmes; and links with public health or other services.
Setting up an infection prevention and control team/ programme[223]	A two-page aide-memoire for health care institutions to guide action related to the priorities of the infection prevention and control programme and the resources available (intended to be adapted to local needs). Outlines the structure and composition of a hospital infection control programme and describes the responsibilities of all members of the team. Describes suggested set-up of an infection control team and committee and the role of audit.
Health care-associated infection precautions[224–227]	Synthesizes best evidence for the all infection precautions as well as prevention of surgical site infections, central line-associated bloodstream infections, catheter-associated urinary tract infections, ventilator-associated pneumonia, Clostridium difficile, and methicillin-resistant *Staphylococcus aureus* (MRSA).

How to access the resources (references)

222. Core components for infection control programmes. Geneva: World Health Organization; 2009 (http://apps.who.int/medicinedocs/documents/s16342e/s16342e.pdf, accessed 16 November 2014).

223. Core components of infection prevention and control programmes in health care (aide-memoire). Geneva: World Health Organization; 2011 (http://www.who.int/csr/resources/publications/AM_CoreCom_IPC.pdf, accessed 24 November 2014).

224. SHEA, IDSA, AHA, APIC; The Joint Commission. Compendium of strategies to prevent healthcare-associated infections in acute care hospitals: update. Arlington, Virginia: Society for Healthcare Epidemiology of America; 2014 (http://www.shea-online.org/View/ArticleId/289/Compendium-of-Strategies-to-Prevent-Healthcare-Associated-Infections-in-Acute-Care-Hospitals-2014-Up.aspx, accessed 24 November 2014).

225. Siegel JD, Rhinehart E, Jackson M, Chiarello L; Health Care Infection Control Practices Advisory Committee. Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. Am J Infect Control. 2007;35(10 Suppl. 2):S65–164. (http://www.cdc.gov/hicpac/2007ip/2007isolationprecautions.html, accessed 16 November 2014).

226. Standard precautions in health care: aide-memoire. Geneva: World Health Organization; 2007 (http://www.who.int/entity/csr/resources/publications/standardprecautions/en/index.html, accessed 16 November 2014).

227. Loveday HP, Wilson JA, Pratt RJ, Golsorkhi M, Tingle A, Bak A et al; UK Department of Health. epic3: National evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. J Hosp Infect. 2014;86(Suppl. 1):S1–70 (http://www.his.org.uk/files/3113/8693/4808/epic3_National_Evidence-Based_Guidelines_for_Preventing_HCAI_in_NHSE.pdf, accessed 16 November 2014).

Hand hygiene improvement

WHO guidelines for hand hygiene in healthcare were issued in 2009. The guidelines provide a comprehensive account of the challenges and solutions to hand hygiene action at the point of patient care, where it is needed most for patient safety given that hand hygiene is frequently quoted as being the single most important infection prevention measure. A multimodal approach to improving hand hygiene that addresses the system, training and education, audit and feedback, reminders in the workplace and institutional safety climate forms the cornerstone of the guidelines and has been pilot tested at global level.

Resources to help with improving hand hygiene

Topic	Summary
Guidelines[228]	Consensus evidence on hand hygiene improvement addressing behaviour, barriers and strategies for sustainable improvement.
Field testing of the WHO multimodal strategy related to hand hygiene improvement[229]	Results of the pilot testing of the implementation of the WHO multimodal improvement strategy across the globe, including in Saudi Arabia.

Expert evidence in support of hand hygiene action, including alcohol based handrub and evidence for the technique[230–232]	Hand hygiene listed as one of the top 10 patient safety strategies, by a panel of international safety and quality experts, on which there is enough evidence for immediate adoption. The guidelines and evidence resources also provide support for presenting the case for implementation.
The right times for hand hygiene – point of care[233]	The scientific rationale and background to the most important times for hand hygiene to stop transmission of microbes and enhance patient safety.

How to access the resources (references)

228. WHO guidelines on hand hygiene in health care. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf, accessed 16 November 2014).

229. Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML et al. Global implementation of WHO's multimodal strategy for improvement of hand hygiene: a quasi-experimental study. Lancet Infect Dis. 2013;13(10):843–51 (http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(13)70163-4/abstract, accessed 16 November 2014).

230. Shekelle PG, Pronovost PJ, Wachter RM,McDonald KM, Schoelles K, Dy SM et al. Top 10 patient safety strategies that can be encouraged for adoption now. Ann Intern Med. 2013;58(5 Pt 2):365–8 http://annals.org/article.aspx?articleid=1657884, accessed 16 November 2014).

231. Guidelines on hand hygiene in health care. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf, accessed 30 November 2014).

232. Hand hygiene evidence. Geneva: World Health Organization; 2014 (http://www.who.int/gpsc/information_centre/key_articles/en/, accessed 30 November 2014).

233. Sax H, Allegranzi B, Uçkay I, Larson E, Boyce J, Pittet D. 'My five moments for hand hygiene': a user-centred design approach to understand, train, monitor and report hand hygiene. J Hosp Infect. 2007;67(1):9–21 (http://sprixx.com/atthepointofcare/My_Five_Moments_for_Hand_Hygiene_a_User_Centered_Design_Approach_to_Understand_Train_Monitor_and_Report_Hand_Hygiene.pdf, accessed 16 November 2014).

Health care-associated infection priorities for patient safety intervention

Four types of health care-associated infection (along with the interventions associated with their reduction/prevention) have received the highest attention around the world in relation to causes of patient harm and the recognized global burden of health of care-associated infection. They are catheter-associated urinary tract infection, ventilator-associated pneumonia, surgical site infection, catheter-related bloodstream infection.

All of these are associated with invasive/surgical procedures that breach the body's defence system and which must be addressed as part of patient safety. They are of concern in a country/facility whether the organisms involved are sensitive or resistant. As well as undertaking surveillance to understand the magnitude of the problem associated with organisms and interventions that can cause health care-associated infection, the information presented here guides on actions to prevent harm. It should be noted that while special situations will arise in a country, for example in the past severe acute respiratory syndrome (SARS) and more recently Middle East respiratory

syndrome (MERS), that need to take priority, the aspects of infection prevention and control for patient safety presented in this section should not be overlooked.

Resources to help with dealing with the major health care-associated infections

Topic	Summary
All health care-associated infection priority areas[234,235]	Synthesizes best evidence for the prevention of surgical site infections, central line-associated bloodstream infections, catheter-associated urinary tract infections, ventilator-associated pneumonia.
Catheter-associated urinary tract infection[236]	Highlights the problem that globally, overall, catheter-associated urinary tract infection is the most common health care-associated infection, and gives recommendations, including exploring alternatives to indwelling catheters, use of aseptic technique, daily review of the need for the indwelling catheter.
Ventilator-associated pneumonia[237]	Includes recommendations on review of sedation and potential for weaning/extubation, avoiding the supine position, using chlorhexadine for daily mouth care.
Surgical site infection[238]	Highlights the problem that globally surgical site infection is the most common health care-associated infection in low- and middle-income countries, and gives recommendations, including pre-operative, peri-operative and post-operative actions such as appropriate antibiotic prophylaxis.
Catheter-related bloodstream infection[239,240]	Includes recommendations for insertion and management of central and peripheral lines such as skin prep and aseptic technique.

How to access the resources (references)

234. SHEA, IDSA, AHA, APIC; The Joint Commission. Compendium of strategies to prevent healthcare-associated infections in acute care hospitals: update. Arlington, Virginia: Society for Healthcare Epidemiology of America; 2014 (http://www.shea-online.org/View/ArticleId/289/Compendium-of-Strategies-to-Prevent-Healthcare-Associated-Infections-in-Acute-Care-Hospitals-2014-Up.aspx, accessed 24 November 2014).

235. Loveday HP, Wilson JA, Pratt RJ, Golsorkhi M, Tingle A, Bak A et al; UK Department of Health. epic3: National evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. J Hosp Infect. 2014;86(Suppl. 1):S1–70 (http://www.his.org.uk/files/3113/8693/4808/epic3_National_Evidence-Based_Guidelines_for_Preventing_HCAI_in_NHSE.pdf, accessed 16 November 2014).

236. Literature reviews for catheter insertion and maintenance (acute settings). Edinburgh: Health Protection Scotland; 2012 (http://www.hps.scot.nhs.uk/haiic/ic/publicationsdetail.aspx?id=50992, accessed 16 November 2014).

237. VAP Prevention bundle: guidance for implementation. Edinburgh: National Health Services Scotland, Scottish Intensive Care Society Audit Group; 2012 (http://www.sicsag.scot.nhs.uk/HAI/VAP-Prevention-Bundle-web.pdf, accessed 24 November 2014).

238. What are the key infection prevention and control recommendations to inform a surgical site infection (SSI) prevention quality improvement tool? Edinburgh: Health Protection

Scotland; 2012 (http://www.hps.scot.nhs.uk/haiic/ic/publicationsdetail.aspx?id=50987, accessed 24 November 2014).

239. Preventing infections when inserting and maintaining a central vascular catheter (CVC). Edinburgh: Health Protection Scotland; 2013 (http://www.hps.scot.nhs.uk/haiic/ic/publicationsdetail.aspx?id=50994, accessed 24 November 2014).

240. Preventing infections when inserting and maintaining a peripheral vascular catheter (PVC). Edinburgh: Health Protection Scotland; 2014 (http://www.hps.scot.nhs.uk/haiic/ic/publicationsdetail.aspx?id=50996, accessed 24 November 2014).

Part C: How to implement interventions

Structure of interventions

Part A of this tool kit prepares individuals, teams and organizations for action. It addresses the activities required to build a strong foundation for implementation. It introduces the prerequisites for building a hospital environment and culture that values patient safety and can demonstrate that value.

Part B summarizes the available evidence for patient safety.

Part C is concerned now with implementing the interventions within the action plan. Part C will prompt managers and front-line practitioners to:

- select the approach to implementation
- select tools
- implement action plans
- have a process through which to measure and evaluate impact.

Each intervention follows the same general structure:

- key point
- preparation for action checklist
- addressing local barriers and culture
- evidence to support the interventions
- roles and responsibilities
- case studies
- summary checklist.

While the priority patient safety topics are covered in this section, the steps could, in fact, be applied to any patient safety topic identified locally using relevant tried and tested tools.

Safe surgery

> **Key point**
>
> It has been found that implementation of the WHO surgical safety checklist and use of the implementation manual alongside other tools, applied within a whole facility/team improvement culture, can contribute to a reduction in common surgical complications and adverse events.

Preparation for action checklist (includes overall facility roles and responsibilities)

1. The operating rooms where the improvement intervention will take place have been identified, team meetings held, including with facility leaders, to discuss the action plan, the impact it should have and how long the intervention/improvement support will go on for – consider a campaign approach (see Annex 1) ☐

2. Baseline data are available for the problem that is being addressed by the intervention (refer to Part A) ☐

3. Current evidence-based policies and procedures are available ☐

4. Facility patient safety team is in place and is actively supporting the intervention, e.g. will visit the identified department on a weekly basis at an agreed time (refer to Part A) ☐

5. Visible "sign up" commitment, as well as visual reminders regarding the intervention have been made available by management/administrators, e.g. through meeting minutes, facility announcements, posters, etc. (refer to Part A) ☐

6. The approach to implementation of the intervention has been selected (refer to Part A). ☐

7. Times for discussions regarding intervention progress have been agreed and a schedule shared with all involved, e.g. handoffs, safety briefings ☐

8. Operating room multidisciplinary team organized to work as a team (human factors); this has been addressed and can be evidenced, with support in place to address any team conflicts (refer to Part A) ☐

9. All products required to ensure that the improvement intervention can take place are reliably available, e.g. pulse oximetry. If products are not available, resource mobilization must take place before the intervention starts ☐

10. All products required to do the intervention are stored/kept in the right place so they can be accessed at the right time when providing care (human factors) ☐

11. Facility training does not contradict advice being given during the improvement intervention; instead it is based on the current evidence/policies ☐

12. A process and tools are in place for action if serious incidents or other problems are encountered during the intervention, e.g. organization reporting system, root cause analysis tools (refer to Part A) ☐

Addressing local barriers and culture

Barriers to change, especially within a busy health care workforce, are common. It is necessary to address local barriers and the prevailing culture in order to truly achieve improvement, and thuspatient safety, over time. See Part A; consider "the right" improvement approach for each individual setting and the intervention and the application of human factors theory in healthcare.

Evidence to support surgical safety interventions

Topic	Summary
Surgical safety actions[241,242]	Includes critical safety steps to be employed before anaesthetic induction, before skin incision, before the patient leaves the operating room.
	A tool kit that contains a range of resources on minimum standards in emergency, surgery, trauma, obstetrics and anaesthesia at first referral level health care facilities. The targets for this are policy-makers, managers, and health care providers (surgeons, anaesthetists, non-specialist doctors, health officers, nurses, and technicians). It contains teaching guidelines on surgery, a training curriculum on surgical skills (documents and videos), best and safe practices for clinical procedures and quality and safety protocols.
Surgical safety implementation[243–245]	Describes the steps for implementing the use of the surgical checklist and for ensuring correct procedure at correct body site.

Prevention of venous thromboembolism (VTE)[246–250]	Includes sample venous thromboembolism protocol/order set, an audit form for preventing hospital-acquired venous thromboembolism, useful flowcharts for patient assessment and care and for tracking prevalence of venous thromboembolism as well as talking points to engage others.
	Additionally, there is a range of resources to ensure venous thromboembolism prevention, including assessments and links to other resources and a list of links to a range of venous thromboembolism assessment tools from around the world.
Training to improve knowledge[251–253]	Describes the main adverse events in surgery, the barriers and actions to be taken to ensure knowledge-building, capacity-building, creating formats and strategies and a training session on aspects of preventing harm from surgery.
	There is also a recording of key prevention points by an expert in the field from a developing country.

Note: Surgical site infection prevention is covered in more detail in the section on health care-associated infection.

How to access the resources (references)

241. Surgical safety checklist. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241598590_eng_Checklist.pdf?ua=1, accessed 29 March 2015).

242. Integrated Management for Emergency and Essential Surgical Care (IMEESC) tool kit. Geneva: World Health Organization; 2014 (http://www.who.int/surgery/publications/imeesc/en/index.html, accessed 24 November 2014).

243. Implementation manual. WHO surgical safety checklist 2009. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/publications/2009/9789241598590_eng.pdf?ua=1, accessed 29 March 2015).

244. Performance of correct procedure at correct body site – example of performance of correct procedure at correct body site flowchart. Geneva: World Health Organization; 2007 (http://www.who.int/patientsafety/events/07/02_05_2007/en/, accessed 16 November 2014).

245. Surgical safety. London: National Health Service, Patient Safety First; 2014 (http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Perioperativecare/, accessed 16 November 2014).

246. Sample venous thromboembolism protocol/order set. Rockville Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/vtguide/vtguideapb.html, accessed 16 November 2014).

247. Chart audit form: preventing hospital-acquired venous thromboembolism. Rockville Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/vtguide/vtguideapd.html, accessed 16 November 2014).

248. Preventing hospital-acquired VTE – a guide for effective quality improvement. Rockville Maryland: Agency for Healthcare Research and Quality; 2008 (http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/vtguide/vtguide.pdf; also available from: http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/vtguide/index.html, accessed 24 November 2014).

249. Programme maintenance area: reducing harm from hospital acquired thrombosis. Cardiff:

NHS Wales, 1000 Lives; 2014 (http://www.1000livesplus.wales.nhs.uk/thrombosis, accessed 24 November 2014).

250. Patient safety and human factors: RCN programme - venous thromboembolism (resources). London: Royal College of Nursing; 2014 (http://www.rcn.org.uk/development/practice/patient_safety/rcn_programme/vte#vte, accessed 24 November 2014).

251. Patient safety curriculum guide. Multi-professional edition. Geneva: World Health Organization; 2011 (http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf?ua=1, accessed 29 March 2015).

252. Implementing the WHO surgical safety checklist in Ethiopia (website – video). Boston: Harvard School of Public Health/World health Organization, Safesurg.org; 2010 http://www.safesurg.org, accessed 24 November 2014).

253. Venous thromboembolism (VTE) prevention in the hospital (webinar). Rockville Maryland: Agency for Healthcare Research and Quality; 2010 (http://archive.ahrq.gov/professionals/quality-patient-safety/quality-r esources/value/vtepresentation/maynardweb.html, accessed 24 November 2014).

Roles and responsibilities

Hospital leaders/managers

- Demonstrate that the safer surgery improvement initiative is owned and supported by leaders at all levels, including through taking part in safety walkrounds, etc.
- Facilitate senior physician and nursing support engagement and acceptance of the initiative/intervention, and describe expectations for role modelling.
- Provide/negotiate (with commissioners of services) a dedicated budget to achieve adherence to the safer surgery initiative (this might include staffing numbers).
- Provide visible "sign up" commitment/materials to support safer surgery initiatives, e.g. posters, memos from named hospital leaders.
- React to and address issues regarding the availability of products/equipment/technology to ensure safer surgery.
- Support surgical safety surveillance and review and respond to data/results, endorsing action plans as appropriate as well as considering the forum for reporting safe surgery errors/improvements (including open reporting). Monitoring and feedback is essential to drive any patient safety initiative.
- Feature adherence to the surgical checklist on senior management meeting agendas with clear, documented actions coming from any discussions.
- Facilitate commitment to multidisciplinary surgical checklist training and education at least annually.

Front-line staff

Note: Includes nurses, anaesthetists and surgeons but is not an exhaustive list.

Besides being committed to working as part of an effective team, to the intervention and to role-modelling for other staff, roles and responsibilities include the items on the following list.

- Perform actions, as agreed between colleagues, for each surgical procedure as noted on the checklist.
- Understand the approach being used as part of the improvement intervention, asking questions on this and appreciating its value.
- Take part in (multidisciplinary team) safety briefings, etc.
- Report and follow up on issues regarding availability of products/equipment/technology to

ensure safer surgery, as featured in the checklist.

- Contribute to and review surgical safety surveillance data and alerts, taking note of recommendations and acting to improve as part of the team.
- Attend surgical checklist training and education at least annually.

Case studies

These examples can help all staff understand the impact of adverse events.

Patient impact:

- Lifebox checklist case studies, http://www.lifebox.org/wp-content/uploads/3-casestudyfront.jpg and http://www.lifebox.org/wp-content/uploads/4-casestudyback.jpg.
- WHO Patient safety curriculum guide (page 227), http://www.who.int/patientsafety/education/curriculum/tools-download/en/.

Patient safety first:

- Available at http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/zoes-story/.

Wrong site surgery:

- New England Journal of Medicine, http://www.nejm.org/doi/full/10.1056 NEJMcpc1007085.

Summary checklist

By the end of this step users should have completed the following.

1. Developed new or reviewed existing policies and procedures to ensure current evidence-based clinical practice recommendations, and addressed consistency across training and education programme content to avoid any confusion in practice ☐

2. Developed or reviewed systems for providing training (at least annually) as well as for accurate training records related to aspects of this intervention ☐

3. Checked that the whole facility and the identified units are informed and prepared for the intervention ☐

4. Selected and made available (a rolling programme for issue of) the resources to support the intervention and highlighted these within the action plan ☐

5. Selected the right approach to implementing a surgical safety improvement intervention in the facility ☐

6. Undertaken an exercise to identify any additional local barriers before applying the intervention ☐

7. Checked that everyone involved is clear on their roles and responsibilities for the intervention ☐

8. Set a clear timeline for assessing progress and reporting on impact (e.g. through surveillance data) ☐

▤ To find out more about the evidence on safe surgery, refer to Part B.

Medication safety

> **Key point**
>
> Medication errors and adverse drug reactions/events occur worldwide and can be addressed and avoided through a safe multidisciplinary process, including patient involvement, and with a focus on storage, prescribing, dispensing, administering and monitoring. The 5Rs is a term used to describe basic checks for medication safety; right patient, right medication, right dose, right route and right time, which supports tailoring prescribing for individual patients, communicating clearly and instilling checking habits. Tools are available to support best practices.

Preparation for action checklist (includes overall facility roles and responsibilities)

1. The unit(s) where the improvement intervention will take place have been identified, team meetings held, including with facility leaders, to discuss the action plan, the impact it should have and how long the intervention/improvement support will go on for – consider a campaign approach (refer to Annexes 1) ☐

2. Baseline data are available for the problem that is being addressed by the intervention (refer to Part A) ☐

3. Current evidence-based policies and procedures are available ☐

4. Facility patient safety team is in place and is actively supporting the intervention, e.g. will visit the identified department on a weekly basis at an agreed time (refer to Part A) ☐

5. Visible "sign up" commitment, as well as visual reminders regarding the intervention have been made available by management/administrators, e.g. through meeting minutes, facility announcements, posters, etc. (refer to Part A) ☐

6. The approach to implementation of the intervention has been selected (refer to Part A) ☐

7. Times for discussions regarding intervention progress have been agreed and a schedule shared with all involved, e.g. handoffs, safety briefings ☐

8. The unit multidisciplinary team is organized to work as a team (human factors). This has been addressed and can be evidenced, with support in place to address any team conflicts (refer to Part A) ☐

9. All products required to ensure the improvement intervention can take place are reliably available, e.g. safe, reliable prescribing charts, policies, standard order sets – if products are not available resource mobilization must take place before the intervention starts ☐

10. All products required to do the intervention are stored/kept in the right place so they can be accessed at the right time when providing patient care (human factors), as well as safe drug storage addressed (different drugs with similar names not close to each other) ☐

11. Facility training does not contradict advice being given during the improvement intervention; instead it is based on the current evidence/policies ☐

12. A process and tools are in place for action if serious incidents or other problems are encountered during the intervention, e.g. organization reporting system, root cause analysis tools (refer to Part A) ☐

Addressing local barriers and culture

Barriers to change, especially within a busy health care workforce, are common. It is necessary to address local barriers and the prevailing culture in order to truly achieve improvement, and thus patient safety, over time. See Part A; consider "the right" improvement approach for each setting/the intervention and the application of human factors theory in health care; see Part A.

Evidence to support medication safety interventions

Topic	Summary
Safe medication actions through the whole journey to administration[254–257]	Ordering, prescribing, dispensing, administering, monitoring, managing look alike/sound alike drugs, being familiar with the medications being prescribed, learning and practising collecting medication histories. Understand common abbreviations being used.
Knowing and identifying medications associated with high risks of adverse events[258]	Developing policies and/or procedures to address identification, location, labelling and storage. Developing and using coloured labels to be sited at different locations, e.g. on IV giving sets, cupboards, medication bottles with a high risks of causing harm.
Medicines reconciliation[259,260]	Obtaining a complete and accurate list of a patient's current medications and compare with physician's admission, transfer or discharge medication orders.
Standard order sets[261]	Using standard order sets laid out in a proven format to prevent errors.
Monitoring, reporting and learning from medication errors[262]	Reliably collecting information to report medication errors.
Training to improve knowledge[263]	Describes the main adverse events in surgery, the barriers, and actions to be taken to ensure knowledge-building and capacity-building, as well as accomplishing formats and strategies.

Also consider the following points to support local interventions resourced or created locally:

- memory aids to prompt staff and patients, where appropriate;
- facility medication process flowcharts;
- bar-coding technology;
- dedicated dispensing cabinets to suit local culture.

How to access the resources (references)

254. Medication safety tools and resources. Horsham, Pennsylvania: Institute for Safe Medication Practices; 2014 (http://www.ismp.org/tools/default.asp, accessed 24 November 2014).
255. The nine patient safety solutions, 2007. Geneva: World Health Organization; 2007 (http://www.who.int/patientsafety/events/07/02_05_2007/en/, accessed 16 November 2014).

256. Changes: improve core processes (tools). Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/resources/Pages/Changes/ImproveCoreProcessesforAdministeringMedications.aspx;http://www.ihi.org/resources/Pages/Changes/ImproveCoreProcessesforDispensingMedications.aspx; and http://www.ihi.org/resources/Pages/Changes/ImproveCoreProcessesforOrderingMedications.aspx, accessed 24 November 2014).

257. High risk medications: insulin safety. Irish Medication Safety Network; 2012 (http://www.imsn.ie/Insulin%20Tool%20box%20talk%20(final).pdf, accessed 24 November 2014).

258. Principles of designing a medication label (links). Horsham, Pennsylvania: Institute for Safe Medication Practices; 2014 (http://www.ismp.org/Tools/guidelines/labelFormats/Piggyback.asp;http://www.ismp.org/Tools/guidelines/labelFormats/Injectable.asp; andhttp://www.ismp.org/Tools/guidelines/labelFormats/solids.asp, accessed 24 November 2014).

259. Medications at transitions and clinical handoffs (MATCH) tool kit for medication reconciliation. Rockville Maryland: Agency for Healthcare Research and Quality; 2012 (http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/match/match.pdf, accessed 16 November 2014).

260. How-to guide: prevent adverse drug events (medication reconciliation) web resource. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventAdverseDrugEvents.aspx, accessed 16 November 2014).

261. Guidelines for standard order sets. Horsham, Pennsylvania: Institute for Safe Medication Practices; (http://www.ismp.org/Tools/guidelines/StandardOrderSets.asp, accessed 24 November 2014).

262. Medication incident report template. Irish Medication Safety Network; 2014 (http://www.imsn.ie/MIRTemplateG2014V2.pdf, accessed 24 November 2014).

263. Patient safety curriculum guide. Multi-professional edition. Geneva: World Health Organization; 2011 (http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf?ua=1, accessed 29 March 2015).

Roles and responsibilities

Hospital leaders/managers

- Demonstrate that the medication safety improvement initiative is owned and supported by leaders at all levels, including through taking part in safety walkrounds, etc.
- Facilitate senior physician and nursing support, engagement and acceptance of the initiative/intervention and describe expectations for role modelling.
- Provide/negotiate (with commissioners of services) a dedicated budget to achieve adherence to the medication safety initiative (this might include staffing numbers).
- Provide visible "sign up" commitment/materials for the medication safety intervention, e.g. posters, memos from named hospital leaders.
- React to and address issues regarding availability of products/equipment/technology to ensure medication safety.
- Support collection and collation of medication safety data, reviewing and responding to these, and endorsing action plans as appropriate as well as considering the forum for reporting medication errors/improvements (including open reporting) – monitoring and feedback is essential for any patient safety initiative.
- Feature mediation of safety errors/data on senior management meeting agendas with clear, documented actions coming out from any discussion.

- Facilitate commitment to multidisciplinary medication safety training and education at least annually.

Front-line staff

Note: Includes nurses, doctors and pharmacists but is not an exhaustive list; the role of the family also plays a key part.

Besides being committed to working as part of an effective team, to the intervention and to role-modelling for other staff, roles and responsibilities include the items on the following list.

- Perform actions, as agreed between colleagues, for each medication activity, for example as described in the interventions list in this section.
- Understand the approach being used as part of the improvement intervention, asking questions on this and appreciating its value.
- Take part in (multidisciplinary team) safety briefings, etc.
- Report and follow up on issues regarding availability of products/equipment/technology to ensure medication safety, for example space to store similar-named medications separately, and safe and reliable prescribing charts/standard order sets.
- Contribute to and review feedback data and alerts on medication errors/safety, taking note of recommendations and acting to improve, as part of the team.
- Attend medication safety training and education at least annually.

Patient case studies

These examples can help all staff understand the impact of adverse events.

Patient impact

- Patient engagement in medication safety (Presentation at the 26th World Health Assembly, 2013), at: http://www.who.int/patientsafety/patients_for_patient/barbara-farlow.pdf?ua=1.
- Patient safety curriculum guide (multi-professional edition); 2011, at: http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf?ua=1.

Summary checklist

By the end of this step users should have completed the following.

1. Developed new or reviewed existing policies and procedures to ensure current evidence-based clinical practice recommendations, and addressed consistency across the training and education programme content to avoid any confusion in practice ☐

2. Developed or reviewed systems for providing training (at least annually), as well as for accurate training records related to aspects of this intervention ☐

3. Selected the right approach to implementing a medication safety improvement intervention in the facility ☐

4. Selected and made available (a rolling programme for issue of) the resources to support the intervention and highlighted these within the action plan ☐

5. Checked that the whole facility and the identified units are informed and prepared for the intervention ☐

6. Undertaken an exercise to identify any additional local barriers before applying the intervention ☐

7. Checked that everyone involved is clear on their roles and responsibilities for the intervention ☐

8. Set a clear timeline for assessing progress and reporting on impact (e.g. Through measurement data) ☐

🗎 To find out more about the evidence on medication safety, refer to Part B.

Falls

> **Key point**
>
> Falls in the elderly are particularly common and cause a burden on health care systems as well as individuals and their families. Anticipated risk factors in health care should be addressed to prevent patient falls; these include patient and environmental assessments and changes. Falls can be avoided.

Preparation for action checklist (includes overall facility roles and responsibilities)

1. The unit(s) where the improvement intervention will take place have been identified, team meetings held, including with facility leaders, to discuss the action plan, the impact it should have and how long the intervention/improvement support will go on for – consider a campaign approach (refer to Annex 1) ☐

2. Baseline data are available for the problem that is being addressed by the intervention (refer to Part A) ☐

3. Current evidence-based policies and procedures are available. ☐

4. Facility patient safety team is in place and is actively supporting the intervention, e.g. will visit the identified department on a weekly basis at an agreed time (refer to Part A) ☐

5. Visible "sign up" commitment, as well as visual reminders regarding the intervention have been made available by management/administrators, e.g. through meeting minutes, facility announcements, posters, etc. (refer to Part A) ☐

6. The approach to implementation of the intervention has been selected (refer to Part A) ☐

7. Times for discussions regarding progress of the intervention have been agreed and a schedule shared with all involved, e.g. handoffs, safety briefings ☐

8. The unit multidisciplinary team is organized to work as a team (human factors) – this has been addressed and can be evidenced, with support in place to address any team conflicts (refer to Part A) ☐

9. All products required to ensure the improvement intervention can take place are reliably available, e.g. walking aids, non-slip footwear – if products are not available resource mobilization must take place before the intervention starts ☐

10. All products required to do the intervention are stored/kept in the right place so they can be accessed at the right time when providing patient care (human factors) ☐

11. Facility training does not contradict advice being given during the improvement intervention; instead it is based on the current evidence/policies ☐

12. A process and tools are in place for action if serious incidents or other problems are encountered during the intervention, e.g. organization reporting system, root cause analysis tools (refer to Part A) ☐

Addressing local barriers and culture

Barriers to change, especially within a busy health care workforce, are common. It is necessary to address local barriers and the prevailing culture in order to truly achieve improvement, and thus patient safety, over time. See Part A, consider "the right" improvement approach for the particular setting/the intervention and the application of human factors theory in healthcare.

Evidence to support interventions to prevent falls

Topic	Summary
Assessments and actions to prevent falls; training to improve knowledge[264–266]	Designing falls prevention and management programmes and effective interventions for high-risk fall patients using recommended and locally appropriate aids.
	Tool kits for improving quality of care in relation to falls; contain numerous assessment sheets and action plan style tables.
	Important information for training health care workers and others on the steps to prevent falls.

How to access the resources (references)

264. STEADI (stopping elderly accidents, deaths & injuries) tool kit for health care providers [web page]. Atlanta, Georgia: Centers for Disease Control and Prevention; 2012 (http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/index.html?s_cid=tw_injdir154, accessed 25 November 2014).

265. Falls tool kits. Washington DC: US Department of Veterans Affairs; 2014 (http://www.patientsafety.va.gov/professionals/onthejob/falls.asp#/patientsafety/docs/fallsTool kittools, accessed 25 November 2014).

266. The "How to" guide for reducing harm from falls. London: Patient Safety First; 2009 (http://www.patientsafetyfirst.nhs.uk/ashx/Asset.ashx?path=/Intervention-support/FALLSHow-to%20Guide%20v4.pdf, accessed 16 November 2014).

Roles and responsibilities

Hospital leaders/managers

- Demonstrate that the falls prevention initiative is owned and supported by leaders at all levels, including through taking part of safety walkrounds, etc.
- Facilitate senior physician and nursing support, engagement and acceptance of the initiative/intervention and describe expectations for role modelling.
- Provide/negotiate (with commissioners of services) a dedicated budget to achieve adherence to the falls prevention intervention (this might include staffing numbers).
- Provide visible "sign up" commitment/materials for falls prevention initiatives/interventions, e.g. posters, memos from named hospital leaders.
- React to and address issues regarding availability of products/equipment/technology to ensure falls prevention.
- Support collection and collation of falls occurrence and prevention data, and review and respond to data, endorsing action plans as appropriate as well as considering the forum for reporting falls prevention (including open reporting) – monitoring and feedback is essential

for any patient safety initiative.

- Feature falls prevention data/information on senior management meeting agendas with clear, documented actions coming out from any discussions.
- Facilitate commitment to multidisciplinary falls prevention training and education at least annually.

Front-line staff

Note: Includes nurses, doctors and support staff but is not an exhaustive list; the role of the family also plays a key part.

Besides being committed to working as part of an effective team, to the intervention and to role-modelling for other staff, roles and responsibilities include the items on the following list.

- Undertake timely assessments and actions to prevent falls in patients, for example, as described in the interventions list in this section.
- Understand the approach being used as part of the improvement intervention, asking questions on this and appreciating its value.
- Take part in (multidisciplinary team) safety briefings, etc.
- Report and follow up on issues regarding availability of products/equipment/technology to ensure prevention of falls, for example walking aids, non-slip shoes, equipment storage facilities.
- Contribute to and review feedback data and alerts related to falls, taking note of recommendations and acting to improve, as part of the team.
- Attend falls prevention training and education at least annually.

Summary checklist

By the end of this step users should have completed the following.

1. Developed new, or reviewed existing, policies and procedures to ensure current evidence-based clinical practice recommendations, and addressed consistency across training and education programme content to avoid any confusion in practice ☐

2. Developed or reviewed systems for providing training (at least annually) as well as for accurate training records related to aspects of this intervention ☐

3. Selected the right approach to implementing a falls prevention intervention in the facility ☐

4. Selected and made available (a rolling programme for issue of) the resources to support the intervention and highlighted these within the action plan ☐

5. Checked that the whole facility and the identified units are informed and prepared for the intervention ☐

6. Undertaken an exercise to identify any additional local barriers before applying the intervention ☐

7. Checked that everyone involved is clear on their roles and responsibilities for the intervention ☐

8. Set a clear timeline for assessing progress and reporting on impact (e.g. through measurement data) ☐

▤ To find out more about the evidence on falls prevention, refer to Part B.

Safe patient identification

Key point

Safe and reliable patient identification prevents adverse events such as the wrong surgery on patients, medication errors, blood and blood products transfusion-related errors, laboratory investigation errors, invasive procedures on the wrong patients, and discharge of infants to the wrong families. Errors in patient identification cause significant impact on health care systems, patients and their families, and can be avoided.

Preparation for action checklist (includes overall facility roles and responsibilities)

1. The unit(s) where the improvement intervention will take place have been identified, team meetings held, including with facility leaders, to discuss the action plan, the impact it should have and how long the intervention/improvement support will go on for – consider a campaign approach (refer to Annex 1) ☐

2. Baseline data are available for the problem that is being addressed by the intervention (refer to Part A) ☐

3. Current evidence-based policies and protocols are available ☐

4. Facility patient safety team is in place and is actively supporting the intervention, e.g. will visit the identified department on a weekly basis at an agreed time (refer to Part A) ☐

5. Visible "sign up" commitment, as well as visual reminders regarding the intervention have been made available by management/administrators, e.g. through meeting minutes, facility announcements, posters, etc. (refer to Part A) ☐

6. The approach to implementation of the intervention has been selected (refer to Part A) ☐

7. Times for discussions regarding intervention progress have been agreed and a schedule shared with all involved, e.g. handoffs, safety briefings ☐

8. The unit multidisciplinary team is organized to work as a team (human factors) – this has been addressed and can be evidenced, with support in place to address any team conflicts (refer to Part A) ☐

9. All products required to ensure the improvement intervention can take place are reliably available, e.g. identification bands – if products are not available resource mobilization must take place before the intervention starts ☐

10. All products required to do the intervention are stored/kept in the right place so they can be accessed at the right time when providing patient care (human factors) ☐

11. Facility training does not contradict advice being given during the improvement intervention; instead it is based on the current evidence/policies ☐

12. A process and tools are in place for action if serious incidents or other problems are encountered during the intervention, e.g. organization reporting system, root cause analysis tools (refer to Part A) ☐

Addressing local barriers and culture

Barriers to change, especially within a busy health care workforce, are common. It is necessary to address local barriers and the prevailing culture, in order to truly achieve improvement, and thus patient safety, over time. See Part A; consider "the right" improvement approach for the particular setting and the application of human factors theory in healthcare.

Evidence to support interventions for safe patient identification

Topic	Summary
Checking identification before care – the use of two patient identifiers, managing unconscious patients[267,268]	Emphasizes the steps for health care workers to take to check the identity of patients on admission as well as when matching the correct patients with the correct care service (e.g. laboratory results, specimens, procedures) before care/treatment/medication is administered and before transfer/ discharge. Highlights the importance of a list of points to be followed in practice by all if a patient is unconscious or unidentifiable.
Specimen labelling and results[269]	Guidance on the use of patient identifiers as part of specimen labelling and to ensure maintenance of specimen identifiers throughout the analytical process.

Also consider educating and informing staff, patients and others where appropriate ontheir involvement in safe and correct identification.

How to access the resources (references)

267. Standard 5. Patient identification and procedure matching. Adelaide: Government of South Australia; (http://www.sahealth.sa.gov.au/wps/wcm/connect/3c4b3d804f5c3b828987cd33 0cda8a00/5_Patient+Identification+and+Procedure+ARG_v2_Feb+2014.pdf?MOD=AJPER ES&CACHEID=3c4b3d804f5c3b828987cd330cda8a00, accessed 16 November 2014).

268. Reducing patient identification errors. Cardiff: NHS Wales, 1000 Lives Plus; 2010 (http:// www.1000livesplus.wales.nhs.uk/sitesplus/documents/1011/T4I%20%285%29%20 Patient%20ID%20%28Feb%202011%29%20Web.pdf, accessed 16 November 2014).

269. Specimen labelling at point of collection. Surry Hills, New South Wales: Royal College of Pathologists of Australia; 2013 (http://www.rcpa.edu.au/getattachment/827b212b-5a1e- 4c36-bc11-d778974698c1/Specimen-Labeling-at-Point-of-Collection.aspx, accessed 16 November 2014).

Roles and responsibilities

Hospital leaders/managers responsibilities

- Demonstrate that the safe patient identification initiative is owned and supported by leaders at all levels including through taking part in safety walkrounds, etc.
- Facilitate senior physician and nursing support, engagement and acceptance of the initiative/ intervention, and describe expectations for role modelling.
- Provide/negotiate (with commissioners of services) a dedicated budget to achieve adherence to the safe patient identification intervention (this might include staffing numbers).
- Provide visible "sign up" commitment/materials for safe patient identification initiatives/ interventions, e.g. posters, memos from named hospital leaders.
- React to and address issues regarding availability of products/equipment/technology to ensure standardized approaches to safe patient identification, while recognizing that

any new technology system must be introduced at the same time as adapting workflow processes to support this.

- Support collection and collation of safe patient identification adherence data, and review and respond to data, endorsing action plans as appropriate while considering the forum for reporting safe patient identification (including open reporting) – monitoring and feedback is essential for any patient safety initiative.
- Feature safe patient identification activities/adherence on senior management meeting agendas with clear, documented actions coming out from any discussions.
- Facilitate commitment to multidisciplinary safe patient identification training and education at least annually.

Front-line staff

Note: Includes nurses, doctors and support staff but is not an exhaustive list; the role of the family also plays a key part.

Besides being committed to working as part of an effective team, to the intervention and to role-modelling for other staff, roles and responsibilities include the items on the following list.

- Perform actions, as agreed between colleagues, for recommended safe patient identification, for example as described in the interventions list in this section.
- Understand the approach being used as part of the improvement intervention, asking questions on this and appreciating its value.
- Take part in {multidisciplinary team} safety briefings, etc.
- Report and follow up on issues regarding availability of products/equipment/technology to ensure safe patient identification, for example patient identification bands or other "marker".
- Contribute to and review feedback data and alerts on safe patient identification activities, taking note of recommendations and acting to improve, as part of the team.
- Attend safe patient identification training and education at least annually.

Summary checklist

By the end of this step users should have completed the following.

1. Developed new or reviewed existing policies and procedures to ensure current evidence-based clinical practice recommendations, and addressed consistency across training and education programme content to avoid any confusion in practice ☐

2. Developed or reviewed systems for providing training (at least annually) as well as for accurate training records related to aspects of this intervention ☐

3. Selected the right approach to implementing a safe patient identification intervention in the facility ☐

4. Selected and made available (a rolling programme for issue of) the resources to support the intervention and highlighted these within the action plan ☐

5. Checked that the whole facility and the identified units are prepared for the intervention ☐

6. Undertaken an exercise to identify any additional local barriers before applying the intervention ☐

7. Checked that everyone involved is clear on their roles and responsibilities for the intervention ☐

8. Set a clear timeline for assessing progress and reporting on impact (e.g. through measurement data) ☐

▤ To find out more about the evidence on safe patient identification, refer to Part B.

Health care-associated infection

Key point

Health care-associated infections, including those arising from drug-resistant organisms, are a problem in all countries of the world and as such it is essential that those which are most prevalent in countries/facilities are known and targeted, with patient safety and the potential for prevention/ improvement at the core of any interventions. Given the nature of the region and those infections that if tackled could best improve patient outcomes, this section focuses on interventions ready for adoption now.

Preparation for action checklist (includes overall facility roles and responsibilities)

1. The unit(s) where the improvement intervention will take place have been identified, team meetings held, including with facility leaders, to discuss the action plan, the impact it should have and how long the intervention/improvement support will go on for – consider a campaign approach (refer to Annex 1) ☐

2. Baseline data are available for the problem that is being addressed by the intervention (refer to Part A) ☐

3. Current evidence-based policies and procedures are available ☐

4. Facility patient safety team is in place and is actively supporting the intervention, e.g. will visit the identified units where improvement will take place on a weekly basis at an agreed time (refer to Part A) ☐

5. Visible "sign up" commitment, as well as visual reminders regarding the intervention have been made available by management/administrators, e.g. through meeting minutes, facility announcements, posters etc.(refer to Part A) ☐

6. The approach to implementation of the intervention has been selected (refer to Part A) ☐

7. Times for discussions regarding intervention progress have been agreed and a schedule shared with all involved, e.g. during daily walkrounds, handoffs, safety briefings ☐

8. The unit multidisciplinary team is organized to work as a team (human factors) – this has been addressed and can be evidenced, with support in place to address any team conflicts (refer to Part A) ☐

9. All products required to ensure the improvement intervention can take place are reliably available, e.g. alcohol handrub, sterile kits, insertion devices, personal protective equipment, clinical waste receptacles – if products are not available resource mobilization must take place before the intervention starts ☐

10. All products required to do the intervention are stored/kept in the right place so they can be accessed at the right time when providing patient care (human factors) ☐

11. Facility training does not contradict advice being given during the improvement

intervention; instead it is based on the current evidence/policies ☐

12. A process and tools are in place for action if serious incidents or other problems are encountered during the intervention, e.g. organization reporting system, root cause analysis tools (refer to Part A) ☐

Addressing local barriers and culture

"If I cleaned my hands all the time I should I'd never have time to do anything else."

"I can either clean my hands or treat patients – you choose."

"There's no evidence for hand hygiene."

Barriers to change/compliance, especially within a busy health care workforce, are common. It is necessary to address local barriers and the prevailing culture in order to truly achieve improvement, and thus patient safety, over time. See Part A; consider "the right" improvement approach for the particular setting/the intervention and the application of human factors theory in healthcare

Evidence to support developing and setting up an infection control programme

What	Summary of the how
Setting up an infection prevention and control programme – aide-memoire[270]	Useful checklist for setting up an infection control programme and a table listing core interventions.
Developing an infection prevention and control team[271]	Outlines who should lead/be involved in a team/programme of work and how meetings can be structured.
Infection prevention and control practices in resource poor settings[272]	This book is authored by experts in infection prevention and control, microbiology, and epidemiology. The intent of the book is to provide a foundation of scientifically-based infection prevention and control principles and requirements.
Undertaking infection prevention monitoring[273–274]	Promotes rapid and full quality improvement actions on all key aspects of infection prevention based on available evidence. Promotes reliable monitoring of hand hygiene according to WHO recommendations.
Adopting and applying standard infection prevention and control precautions[275,276]	Easy to read tools that support the application of all standard precautions, including hand hygiene, use of personal protective equipment, cleaning, waste and linen management, sharps and exposure management.
Prevention of surgical site infection through a care bundle[277]	Lists easy to follow evidence-based steps necessary for prevention of surgical site infection.
Prevention and/or management of device-associated infections, including catheter associated urinary tract infection, blood stream infections, ventilator-associated pneumonia[278–281]	Lists easy to follow evidence-based steps necessary for prevention of catheter-associated urinary tract infection, bloodstream infection and ventilator-associated pneumonia as well as simple data collection.

Actions for performing any aseptic and clean procedures[282]	Describes easy to follow steps that should be taken to prevent organisms from entering patients' bodies during invasive procedures.
Hand hygiene to prevent and/or manage any organisms (including drug resistant) spread during patient care/interventions[283–288]	Outlines the WHO "My 5 moments for hand hygiene" – times to perform hand hygiene action for patient safety. Features the WHO steps required for a hand hygiene improvement strategy. Describes the WHO steps to be undertaken for handrub and handwashing. Describes to steps to locally produce alcohol-based handrub. Promotes engagement with leadership to support culture change.
How to implement infection prevention and control surveillance programmmes[289,290]	Highlights the importance of applying a reliable approach to developing a surveillance strategy, including hospital-level support, and surveillance methods, including prevalence and incidence surveys, definitions, how data will be collected, and feedback.
Training to improve knowledge[291–294]	Highlights the importance of using a range of resources to educate and train staff and others on a regular basis, including a variety of approaches, examples of harm, key evidence-based information and interactive, engaging activities.

Note: An established infection prevention and control programme/team can support these interventions although it is not essential as long as there is expertise within the facility to direct on the understanding of how organisms are transmitted.

Also consider the following areas of health care-associated infection prevention to support local interventions, resourced or created locally:

• patient involvement activities
• antimicrobial stewardship policies and training
• specific tools for management of airborne infections
• tools to direct on injection safety

Note: This section does not address infection outbreak situations where the measures outlined here for patient safety (in addition to others) must be strictly managed by local expertise and will be dependent on local circumstances and epidemiological investigation.

How to access the resources (references)

270. Aide-memoire for infection prevention and control in a health-care facility. Geneva: World Health Organization; 2004 (http://www.who.int/injection_safety/AM_InfectionControl_Final.pdf, accessed 25 November 2014).
271. Core components for infection prevention and control programmes. Geneva: World Health Organization; 2009 (http://apps.who.int/medicinedocs/documents/s16342e/s16342e.pdf, accessed 16 November 2014).
272. Basic concepts in infection control. Portadown, Co. Armagh, Northern Ireland: International Federation of Infection Prevention and Control; 2011 (http://www.theific.org/basic_concepts/index.htm, accessed 25 November 2014) (one copy of each of the

chapters in this book can be freely downloaded for personal use, together with the accompanying teaching slides).

273. Quality improvement tools. Bathgate, West Lothian, Scotland: Infection Prevention Society; 2014 (http://www.ips.uk.net/professional-practice/quality-improvement-tools/quality-improvement-tools/, accessed 25 November 2014).

274. Tools for evaluation and feedback. Geneva: World Health Organization; 2014 (http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/, accessed 25 November 2014).

275. Standard infection control precautions in health care: aide-memoire. Geneva: World Health Organization; 2007 (http://www.who.int/entity/csr/resources/publications/standardprecautions/en/index.html, accessed 25 November 2014).

276. SICPs campaign materials. Edinburgh: Health Protection Scotland; 2014 (http://www.hps.scot.nhs.uk/haiic/ic/sicpscampaign.aspx, accessed 25 November 2014).

277. Bundle for preventing surgical site infections. Edinburgh: Health Protection Scotland; 2013 (http://www.documents.hps.scot.nhs.uk/hai/infection-control/bundles/ssi/ssi-bundle-v1.pdf, accessed 25 November 2014).

278. Bundle for preventing infection when inserting and maintaining a urinary catheter (acute settings). Edinburgh: Health Protection Scotland; 2013 (http://www.documents.hps.scot.nhs.uk/hai/infection-control/bundles/cauti/uc-acute-v1.pdf; http://www.documents.hps.scot.nhs.uk/hai/infection-control/bundles/cauti/uc-acute-v1.pdf, accessed 25 November 2014).

279. Bundle for preventing infection when inserting and maintaining a central venous catheter (CVC). Edinburgh: Health Protection Scotland; 2013 (http://www.documents.hps.scot.nhs.uk/hai/infection-control/evidence-for-care-bundles/key-recommendations/cvc.pdf; http://www.documents.hps.scot.nhs.uk/hai/infection-control/bundles/cvc/cvc-bundle-v1.pdf, accessed 25 November 2014).

280. Bundle for preventing infection when inserting and maintaining a peripheral vascular catheter (PVC). Edinburgh: Health Protection Scotland; 2013 (http://www.documents.hps.scot.nhs.uk/hai/infection-control/evidence-for-care-bundles/key-recommendations/pvc.pdf; http://www.documents.hps.scot.nhs.uk/hai/infection-control/bundles/pvc/pvc-bundle-v1.pdf, accessed 25 November 2014).

281. VAP prevention bundle: guidance for implementation. Edinburgh: National Health Service Scotland, Scottish Intensive Care Society Audit Group, 2012 (http://www.sicsag.scot.nhs.uk/HAI/VAP-Prevention-Bundle-web.pdf, accessed 16 November 2014).

282. ANTT: a standard approach to aseptic technique. Nurs Times. 2011;107(36):12–14 (http://www.nursingtimes.net/Journals/2011/09/09/s/z/e/130911_review_Rowley.pdf; and http://antt.org/ANTT_Site/ANTT-Approach.html, accessed 16 November 2014).

283. Guide to the implementation of the WHO multimodal hand hygiene improvement strategy. Geneva: World Health Organization; 2009 (http://whqlibdoc.who.int/hq/2009/WHO_IER_PSP_2009.02_eng.pdf?ua=1, accessed 25 November 2014).

284. Tools as reminders in the workplace. Geneva: World Health Organization; 2014 (http://www.who.int/gpsc/5may/tools/workplace_reminders/en/, accessed 16 November 2014).

285. Hand hygiene self-assessment framework, Geneva: World Health Organization; 2010 (http://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf?ua=1, accessed 25 November 2014).

286. Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (http://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf?ua=1, accessed 25 November 2014).

287. Protocol for evaluation of tolerability and acceptability of alcohol-based handrub in use

or planned to be introduced (methods 1 & 2). Geneva: World Health Organization; 2009 (http://www.who.int/entity/gpsc/5may/Protocol_for_Evaluation_of_Handrub_Meth1. doc?ua=1; (http://www.who.int/entity/gpsc/5may/Protocol_for_Evaluation_of_Handrub_ Meth2.doc?ua=1, accessed 25 November 2014).

288. Tools for institutional safety climate. Geneva: World Health Organization; 2009 (http://www. who.int/gpsc/5may/tools/safety_climate/en/, accessed 25 November 2014).

289. Prevention of hospital-acquired infections: a practical guide, 2nd edition. Geneva: World Health Organization; 2002 (http://www.who.int/csr/resources/publications/drugresist/en/ whocdscsreph200212.pdf?ua=1, accessed 25 November 2014).

290. Tracking infections in acute care hospitals/facilities. Atlanta, Georgia: Centers for Disease Control and Prevention; 2013 (http://www.cdc.gov/nhsn/acute-care-hospital/index.html, accessed 25 November 2014).

291. Patient safety curriculum guide. Multi-professional edition. Geneva: World Health Organization; 2011 (http://whqlibdoc.who.int/publications/2011/9789241501958_eng. pdf?ua=1, accessed 29 March 2015).

292. Tools for training and education. Geneva: World Health Organization; 2014 (http://www. who.int/gpsc/5may/tools/training_education/en/, accessed 25 November 2014).

293. Healthcare associated infections: training resources. Edinburgh: NHS Education for Scotland; 2012 (http://www.nes.scot.nhs.uk/education-and-training/by-theme-initiative/ healthcare-associated-infections/training-resources.aspx, accessed 25 November 2014).

294. SAVE LIVES: clean your hands (video). Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2014 (http://www.youtube.com/watch?v=kOKeFv5VvY4&fea ture=youtu.be&app=desktop, accessed 25 November 2014).

Roles and responsibilities

Hospital leaders/managers

- Demonstrate that infection prevention initiatives/programmes of work are owned and supported by leaders at all levels, including through taking part in safety walkrounds.
- Facilitate senior physician and nursing support, engagement and acceptance of the initiative/ intervention and describe expectations for role modelling.
- Provide/negotiate (with commissioners of services) a dedicated budget to achieve infection prevention interventions (this might include staffing numbers).
- Provide visible "sign up" commitment/materials to support infection prevention initiatives/ interventions, e.g. posters, memos from named hospital leaders.
- React to and address issues regarding availability of products/equipment/technology to ensure infection prevention.
- Support collection and collation of infection surveillance date, and review and respond to data, endorsing action plans as appropriate as well as considering the forum for reporting health care-associated infection rates/improvement (including open reporting) – monitoring and feedback is essential for any patient safety initiative.
- Feature infection prevention on senior management meeting agendas with clear, documented actions coming out from any discussions.
- Facilitate commitment to multidisciplinary infection prevention training and education at least annually.

Front-line staff

Note: Includes all front-line staff; the role of the patient and family can also play a key part.

Besides being committed to working as part of an effective team, to the intervention and to role-

modelling for other staff, roles and responsibilities include the items on the following list.

- Perform recommended actions whenever touching, or performing an intervention on, patients, for example as described in the interventions list in this section.
- Understand the approach being used as part of the improvement intervention, asking questions on this and appreciating its value.
- Take part in (multidisciplinary team) safety briefings, etc.
- Report and follow up on issues regarding availability of products/equipment/technology to ensure infection prevention measures can happen, for example resources to clean hands and other items required to perform aseptic/clean procedures.
- Contribute to and review infection and procedure feedback data and alerts on infection issues, taking note of recommendations and acting to improve, as part of the team.
- Attend infection prevention training and education at least annually.

Case studies

These examples can help all staff understand the impact of adverse events.

Patient impact

Patient safety curriculum guide (multi-professional edition) http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf?ua=1.

Ginny's story (video) https://www.youtube.com/watch?v=s5x1f3_NJX8.

Summary checklist

By the end of this step users should have completed the following.

1. Developed new, or reviewed existing, policies and procedures to ensure current evidence-based clinical practice recommendations and addressed consistency across training and education programme content to avoid any confusion in practice ☐

2. Developed or reviewed systems for providing training (at least annually) as well as for accurate training records related to aspects of this intervention ☐

3. Selected the right approach to implementing infection prevention interventions in the facility ☐

4. Selected and made available (a rolling programme for the issue of) the resources to support the intervention and highlighted these within the action plan ☐

5. Checked the whole facility and the identified units are prepared for the intervention ☐

6. Undertaken an exercise to identify any additional local barriers before applying the intervention ☐

7. Checked that everyone involved is clear on their roles and responsibilities for the intervention ☐

8. Set a clear timeline for assessing progress and reporting on impact (e.g. Through surveillance data) ☐

▤ To find out more about the evidence on the prevention of health care-associated infection as a patient safety intervention, refer to Part B.

Measurement to evaluate impact

Note: The importance of measurement in support of evaluating impact and advancing patient safety has already been noted throughout the tool kit; specifically, see Part A, Step 3: Collect baseline data. As stated in Part A, important measurement activities include developing data definitions with inclusion and exclusion criteria; piloting data collection tools (many of which are available); developing data collection protocols (many of which are available) including outlining a "sampling" strategy; and how and by whom data are collected, recorded, and submitted. Measurement can take on many formats and where guidance or tools are available for specific patient safety topics, these have been included in Part C. It is also common in patient safety topics for health care facilities to identify a "target" that needs to be reached to demonstrate improvement, progress and institutional safety climate.

Key point

Measurement is an essential part of any patient safety improvement, not just as an added activity, if resources allow. It should be planned and started early on in any patient safety improvement initiative or evaluating impact and demonstrating success will be difficult.

Preparation for action checklist

1. Make the purpose of measurement very clear to all clinicians involved in the project – to understand what has been achieved and to catalyse further action to improve ☐

2. Articulate a direct link between the measurements being collected and what the project is aiming to achieve; only tight, purposeful data should be collected as collection, analysis and reporting can take up valuable staff time and resources ☐

3. Identify a team to collect just enough data to determine whether the changes being made are leading to improvement/success ☐

4. Measurement for patient safety improvement projects should be focused on small sequential tests not (personal) accountability; use results to support staff to be part of planned improvement initiatives, or indeed for research projects ☐

Principles of measuring for improvement

The principles of measuring for improvement include the following points.

- Plot data over time because improvement and change happen over time.
- Focus on the measures that are directly related to the specific aim.
- Use sampling to collect data: a simple and efficient method of collecting data to identify change, especially if data are not directly available from electronic sources.
- Provide information and training for those collecting data and integrate measurement into the daily routine.
- Create simple graphs: run charts are often a good first choice.
- Refine the data collection process.

Summary of resources to help with activities in this step

Topic	Summary
Run charts[295]	Provides guidance on how to present data/compliance over time.
Patient safety indicators and their monitoring[296,297]	Describes a systematic literature review performed within a programme of research on the use of information to drive quality and safety. The review focused on research into the application of routinely collected hospital data to measure incidents of potential adverse events and possible patient harm. Particular attention was given to patient safety indicators. An international perspective was taken although the majority of the research was conducted in the United States of America. However, the increasing interest in patient safety indicators and overall patient safety in other countries should be acknowledged and supported. Draws together academic evidence and practical experience to produce a framework for safety measurement and monitoring.
Trigger tools[298]	Highlights the use of "triggers" or clues to identify adverse events as effective methods for measuring the overall level of harm in a health care organization.

How to access the resources (references)

295. Run charts. Edinburgh: National Health Service Scotland, Quality Improvement Hub; 2012 (http://www.qihub.scot.nhs.uk/knowledge-centre/quality-improvement-tools/run-chart.aspx, accessed 25 November 2014).
296. Review of patient safety indicators. London: Imperial College London, Centre for Patient Safety and Service Quality; 2013 (http://www1.imperial.ac.uk/cpssq/research_themes_2/cpssq_research_themes/safety_indicators_review/, accessed 25 November 2014).
297. The measurement and monitoring of safety. London: The Health Foundation; 2013 (http://www.health.org.uk/publications/the-measurement-and-monitoring-of-safety/, accessed 25 November 2014).
298. IHI trigger tool for measuring adverse events. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2014 (http://www.ihi.org/resources/Pages/Tools/IHIGlobalTriggerToolforMeasuringAEs.aspx, accessed 25 November 2014).

Example indicators to guide measurement

Note: The following list of safety goals provides health care facilities with practical examples of targets they might want to achieve in relation to all the topics featured in the tool kit. These can be built upon using local understanding of needs. It is important that locally the culture is one that accepts and facilitates progress towards targets or goals and openness and honesty in support of all staff in order to embrace improvement rather than impose blame or punishment on individuals.

Topic	Example indicator	Measurement option/ approach	Suggested frequency
Surgical safety	Wrong site surgery	Record for each individual operating room, 0%–100%	Monthly
	Adverse drug reactions during surgery	Record for each individual operating room, 0%–100%	Monthly
	Antibiotic administration within 60 minutes of skin incision	Record for each individual patient, 0%–100%	Each occasion
	Availability of necessary equipment for safe surgery (as per WHO surgical checklist)	Record for each individual operating room, 0%–100%	Monthly
	Staff understanding of the seriousness of adverse surgical events (listed above)	Record for each individual staff member and collate results, 0%–100%(use tried and tested perception/knowledge understanding evaluation tools)	At least annually
	Unplanned return to the operating room	Record for each individual operating room, 0%–100%	Monthly
Medication safety	Administration errors of look alike/sound alike medications	Record for each individual medication, 0%–100%	Monthly
	Wrong medication administration to similarly named patients	Record for each patient, 0%–100%	Each time they occur
	Medication ordering through to final administration errors – standard order set adherence	Record for each individual prescription/medication order, 0%–100%	Monthly
	Medicines reconciliation errors	Record for each individual patient, 0%–100%	Monthly
	Staff understanding of how common medication errors occur	Record for each individual staff member and collate results,0%–100% (use tried and tested perception/knowledge understanding evaluation tools)	At least annually
	Staff understanding of high risk adverse events	Record for each individual staff member and collate results,0%–100%(use tried and tested perception/knowledge understanding evaluation tools)	At least annually

Topic	Example indicator	Measurement option/ approach	Suggested frequency
Prevention of falls	Incidence of falls in patients identified as at risk (based on the definition of falls within the health care facility)	Record for each individual patient, 0%–100%	Monthly
	Availability of equipment to prevent falls (as identified and resourced for at-risk wards/patients including exact numbers needed to facilitate all in need patients)	Record for each individual patient/ ward, 0%–100%	Monthly
	Staff understanding of the main reasons for falls in the facility	Record for each individual staff member and collate results,0%–100%(use tried and tested perception/knowledge understanding evaluation tools)	At least annually
	Staff understanding of the falls assessment procedure	Record for each individual staff member and collate results,0%–100% (use tried and tested perception/knowledge understanding evaluation tools)	At least annually
Safe patient identification	Wrong patient identification	Record for each individual patient, 0%–100%	As this occurs
	Absence of two patient identifiers	Record for each individual patient, 0%–100%	Monthly
	Wrong specimen results reported to the wrong patient (due to patient identification error)	Record for each individual patient, 0%–100%	As this occurs
	Staff understanding of the main reasons for patient identification errors	Record for each individual staff member and collate results,0%–100%(use tried and tested perception/knowledge understanding evaluation tools)	At least annually
Prevention of health care-associated infection	Bacteraemia	Record for each individual patient(as per surveillance guidance)	Quarterly

Topic	Example indicator	Measurement option/ approach	Suggested frequency
	Surgical site infection	Record for each individual patient(as per surveillance guidance)	Quarterly
	Hand hygiene compliance	Record for each individual ward/ unit,0%–100% (consider recording by staff group)	Monthly
	Staff understanding of the main reasons for healthcare-associated infection	Record for each individual staff member and collate results,0%–100% (use tried and tested perception/knowledge understanding evaluation tools)	At least annually

Glossary

Adverse event: any injury caused as a result of treatment and care.

Checklist: a list of critical actions to be taken to ensure patient safety.

Disclosure: open communication of patient safety incidents/adverse events.

Error: an act of commission (doing something wrong) or omission (failing to do the right thing) that leads to an undesirable outcome or significant potential for such an outcome in a patient.

Evidence-based: refers to a recommendation that is based on the results of medical research as opposed to, for example, a personal opinion.

Failure mode and effects analysis: a methodology for prospectively analysing and identifying error risk within a particular process.

Foresight training: foresight is the ability to identify, respond to and recover from the initial indications that a patient safety incident could take place. Foresight training consists of scenarios relevant to staff in primary care, acute care and mental health care settings.

Clinical governance: a systematic approach to maintaining and improving the quality of healthcare.

Handoffs and handovers: the process when one health care professional updates another on the status of one or more patients for the purpose of taking over their care.

Hand rubbing: cleaning hands with an alcohol-based handrub.

Hand washing: washing hands with plain or antimicrobial soap.

Healthcare-associated infection: an infection occurring in a patient during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission. This includes infections acquired in the health care facility but appearing after discharge and also occupational infections among health care workers of the facility.

Health literacy: an individual's ability to find, process and comprehend the basic health information necessary to act on medical instructions and make decisions about their health.

Human factors (or human factors engineering): human factors engineering is the discipline that attempts to identify and address safety problems that arise due to the interaction between people, technology and work environments.

Informed consent: the process whereby a physician informs a patient about the risks and benefits of a proposed therapy or test. Informed consent aims to provide sufficient information about the proposed treatment and any reasonable alternatives where the patient can exercise autonomy in deciding whether to proceed.

Medication reconciliation: the process of avoiding inconsistencies in medication regimens associated with transitions in care.

Near miss: an event or situation that did not produce patient injury, but only because of chance.

Nominal group technique: a group process involving problem identification, solution generation, and decision making.

Patient safety: freedom from accidental or preventable injuries produced by medical care. Practices or interventions that improve patient safety are those that reduce the occurrence of preventable adverse events.

Plan, do, study, act: the plan-do-study-act cycle tests a change by developing a plan to test the change (plan), carrying out the test (do), observing and learning from the consequences (study), and determining what modifications should be made to the test (act).

Point of care: the place where three elements come together: the patient, the health care worker, and care or treatment involving contact with the patient or his/her surroundings (within the patient zone).

Quality: quality in healthcare can be defined as the "degree of excellence" in healthcare. Excellent healthcare should have the following six characteristics:

- safe: avoiding harm to patients from care that is intended to help them;
- effective: providing services based on scientific knowledge and which produce a clear benefit;
- person-centred: providing care that is respectful or responsive to individuals' needs and values;
- timely: reducing waits and sometimes harmful delays;
- efficient: avoiding waste;
- equitable: providing care that does not vary in quality because of a person's characteristics.

Risk management: the activities, including planning, organizing, directing, evaluating and implementing, which are involved in reducing the risk of injury to patients and health care workers.

Root cause analysis: a framework for reviewing patient safety incidents (and claims and complaints). Investigations can identify what, how, and why patient safety incidents happened. Analysis can then be used to identify areas for change, develop recommendations and look for new solutions.

Run charts: a type of statistical process control or quality control graph in which some observation (e.g. manufacturing defects or adverse outcomes) is plotted over time to see if there are "runs" of points above or below a centre line, usually representing the average or median. In addition to the number of runs, the length of the runs conveys important information. For run charts with more than 20 useful observations, a run of 8 or more dots would count as a "shift" in the process of interest, suggesting some non-random variation.

Safety culture: high-reliability organizations consistently minimize adverse events despite carrying out intrinsically hazardous work. Such organizations establish a culture of safety by maintaining a commitment to safety at all levels, from front-line providers to managers and executives.

Walkround: a routine visit undertaken in a clinical area, usually by organizational leaders and managers, to provide a "snapshot" of actual practice and safety

Note: This glossary is based on a number of available patient safety glossaries including those of the Agency for Healthcare Research and Quality, the Health Foundation and the National Patient Safety Agency (United Kingdom).

Annex 1. Template implementation action plan[a]

Step	Action	Who	When	Resources needed	Progress measures
1. Decide specific implementation processes and strategies Who will be responsible for what actions? When will each action occur? What resources are required? What measurement approach will be used to monitor progress?	Examples: Make all necessary resources available, including patient information Book meeting rooms				
2. Develop communications and advocacy plan How will information be communicated?	Examples: Consider a high profile launch event and set a launch date Establish regular communications with front-line practitioners (emails/meetings/bulletins/information sheets/ word of mouth)				
3. Assess risks based on action plan Work in teams to identify barriers List strategies to overcome	Examples: Shortages of staff Shortages of equipment and supplies				
4. Identify monitoring processes Establish baseline Set measures to monitor progress (see evaluation and measurement section)	Examples: Education on audit tools for patient safety champions Gather baseline data before launch date			Measurement tools and patient surveys	

Step	Action	Who	When	Resources needed	Progress measures
5. Obtain approval of implementation plan Implementation plan and tools approved by relevant leadership and management	Example: Leadership and management to discuss plan and resources/support required at leadership and management meetings				
6. Develop improvement approach Depending on choice of improvement approach, consider conducting a pilot study	Example: All sections of the tool kit have been worked through and checklists addressed, in particular, the tools and resources are available for pilot				
Identification of quantitative and qualitative measurement processes	Examples: Education on audit tools for ward/department representatives Gather baseline data before launch date				
Frequency and timing of data collection	Example: Collect data on each intervention				
Feedback schedule Level of feedback (individual, team, organization) Data comparisons Timing and frequency of feedback Method of feedback (presentations, bulletins / email/word of mouth, etc.)	Examples: Display progress for each unit prominently Display progress compared to baseline Monthly progress via, e.g. posters, meetings, word of mouth Monthly update to executives – email with graphs attached				

Step	Action	Who	When	Resources needed	Progress measures
7. Develop improvement approach further based on pilot study results Study results from pilot Proceed to widespread implementation Report and respond to results	Example: Trial on small number of wards				
8. Celebrate short-term wins Plan for celebration to mark milestones	Examples: Spread results across hospital Profile in patient and staff newsletter				

Sources:

Adapted from: Action plan 2011–2012: WA strategic plan for safety and quality in health care 2008–2013 [presentation]. Perth: Government of Western Australia, Department of Health; 2011 (http://www.safetyandquality.health.wa.gov.au/docs/StrategicPlan_ActionPlan2011-12.pdf, accessed 9 Dec 2014).

Implementation tool kit for clinical handover improvement. Sydney, ACSQHC (based on the Registered Nurses' Association of Ontario and St. Elizabeth Health Care); 2007.

Implementation of best practices guidelines: project plan. Toronto, Canada: Registered Nurses' Association of Ontario & St. Elizabeth Health Care; 2012.

The *Patient safety tool kit* describes the practical steps and actions needed to build a comprehensive patient safety improvement programme in hospitals and other health facilities. It is intended to provide practical guidance to health care professionals in implementing such programmes, outlining a systematic approach to identifying the "what" and the "how" of patient safety. The tool kit is a component of the WHO patient safety friendly hospital initiative and complements the *Patient safety assessment manual*, also published by WHO Regional Office for the Eastern Mediterranean.