Human Factors

Technical Series on Safer Primary Care

World Health Organization

Human Factors: Technical Series on Safer Primary Care
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Preface

Safer Primary Care

Health services throughout the world strive to provide care to people when they are unwell and assist them to stay well. Primary care services are increasingly at the heart of integrated people-centred health care in many countries. They provide an entry point into the health system, ongoing care coordination and a person-focused approach for people and their families. Accessible and safe primary care is essential to achieving universal health coverage and to supporting the United Nations Sustainable Development Goals, which prioritize healthy lives and promote well-being for all.

Health services work hard to provide safe and high quality care, but sometimes people are inadvertently harmed. Unsafe health care has been recognized as a global challenge and much has been done to understand the causes, consequences and potential solutions to this problem. However, the majority of this work up to now has focused on hospital care and there is, as a result, far less understanding about what can be done to improve safety in primary care.

Provision of safe primary care is a priority. Understanding the magnitude and nature of harm in primary care is important because most health care is now offered in this setting. Every day, millions of people across the world use primary care services. Therefore, the potential and necessity to reduce harm is very considerable. Good primary care may lead to fewer avoidable hospitalizations, but unsafe primary care can cause avoidable illness and injury, leading to unnecessary hospitalizations, and in some cases, disability and even death.

Implementing system changes and practices are crucial to improve safety at all levels of health care. Recognizing the paucity of accessible information on primary care, World Health Organization (WHO) set up a Safer Primary Care Expert Working Group. The Working Group reviewed the literature, prioritized areas in need of further research and compiled a set of nine monographs which cover selected priority technical topics. WHO is publishing this technical series to make the work of these distinguished experts available to everyone with an interest in *Safer Primary Care.*

The aim of this technical series is to provide a compendium of information on key issues that can impact safety in the provision of primary health care. It does not propose a "one-size-fits-all" approach, as primary care is organized in different ways across countries and also often in different ways within a given country. There can be a mix of larger primary care or group services with shared resources and small services with few staff and resources. Some countries have primary care services operating within strong national support systems, while in other countries it consists mainly of independent private practices that are not linked

or well-coordinated. The approach to improving safety in primary care, therefore, needs to consider applicability in each country and care setting.

This technical series covers the following topics:

Patients

- Patient engagement

Health workforce

- Education and training
- Human factors

Care processes

- Administrative errors
- Diagnostic errors
- Medication errors
- Multimorbidity
- Transitions of care

Tools and technology

- Electronic tools

WHO is committed to tackling the challenges of patient safety in primary care, and is looking at practical ways to address them. It is our hope that this technical series of monographs will make a valuable and timely contribution to the planning and delivery of safer primary care services in all WHO Member States.

1 Introduction

1.1 Scope

This monograph describes what "human factors" are and what relevance this approach has for improving safety in primary care. This section defines human factors. The next sections outline some of the key human factors' issues in primary care and the final sections explore potential practical solutions for safer primary care.

1.2 Approach

To compile information for this monograph, the World Health Organization (WHO) sought the advice of experts in the field recommended by the Safer Primary Care Expert Working Group and reviewed the relevant research and published literature. A librarian searched multiple databases and abstracts were reviewed. A grey literature search was conducted via the internet and international experts in delivering safe primary care, in particular from low- and middle-income countries were contacted to source additional input. For brevity, the citations of all references have not been included.

International experts provided feedback, shared examples of strategies that have worked well around the world, and gave practical suggestions about potential priorities for the WHO Member States to improve the safety of primary care services.

1.3 Defining human factors

Human factors and ergonomics are scientific disciplines concerned with:

> *"the understanding of the interactions among humans and other elements of a system, and the profession that applies theoretical principles, data and methods to design in order to optimize human well-being and overall system performance" (1).*

Human factors consider three domains of system design: physical, cognitive and organizational. The physical domain focuses on how the human body and physical activity interacts with work design, for example, the layout of computer desks. The cognitive domain focuses on how mental processes interact with other elements of systems. This includes memory, information processing and decision making. The organizational domain focuses on how individuals and teams interact with tools and technologies.

Examples of different elements of the systems in primary care include:

Physical elements

- Layout of the health care facility and examination room area to promote team communication and situational awareness whilst reducing distractions;
- Location of a computer in the patient examination room in relation to the health care provider and patient;
- Size of the computer screen and character font;
- Handle design of hand tools.

Cognitive elements

- Design and implementation of electronic health records;
- Clinical decision support tools.

Organizational elements

- Clarity of health care provider roles and job design;
- Communication and sharing of information between primary care service and hospitals;
- Designing high-performance teams.

A key principle of human factors approaches is that elements operate within systems. A system is a set of interdependent elements that work together to achieve a goal. To understand how systems perform, it is important to examine the individual system elements and the interactions between those elements.

The Systems Engineering Initiative for Patient Safety (SEIPS) model of patient safety divides systems into five elements: people; tools and technology; tasks; environment (physical and external) and organization. This model has been extended to include the external environment, patient processes of care within and outside health care, and the process of system adaptation.

A principle of systems is that a change to one element affects other elements and alters the system's behaviour. Thus, merely focusing on one element of the system, such as implementing an electronic health record without considering other system elements and interactions between the elements, will not improve patient safety overall *(2)*.

2 Human factors

Human factors approaches gained popularity in health care in the 1950s, but most work has focused on hospital settings. Primary care would benefit from using human factors approaches due to the complexity of primary care, the multiple elements in the system and the coordinating role that primary care plays.

Human factors approaches can be used to design systems that support health care providers to deliver safe patient care at the same time as reducing work injuries and improving the quality of people's working life *(3).* In other words, it is important to consider positive outcomes for both patients and the health care providers offering services. Changes that initially improve patient safety at the expense of outcomes for providers (e.g., clinician burnout and injury) are not sustainable.

Taking a human factors approach means that when safety incidents occur, it is important to have a non-punitive culture. Instead of blaming individuals for events, the systems approach focuses on:

- building systems to reduce potential risks and prevent future errors;
- building system defences to reduce the likelihood of errors resulting in patient harm.

The overall human factors philosophy is that the system should be designed to support the work of people, rather than designing systems to which people must adapt.

3 Potential solutions

There are many aspects of primary care that pose patient safety risks. Patients present to primary care with diverse clinical needs, which makes standardizing care delivery difficult. Primary care manages care that is delivered across settings and specialties, requiring the coordination of services and information. There may be significant time lost between decisions or visits.

WHO has identified five main issues related to patient safety incidents in primary care *(4)*:

- data management and completeness of medical records;
- communication and teamwork;
- transitions of care;
- ordering and interpretation of diagnostic and laboratory test results;
- policy and planning.

This section explores the role that human factors approaches can play with each of these issues.

A greater application of human factors approaches is needed to understand the basic science of primary care, that is, the cognitive and socio-technical processes that teams perform to provide safe care. Human factors approaches tend to use multiple tools to understand gaps in care and design changes to improve safety. There is no simple solution, but a key learning point is that all parts of the system affect each other and that changes should not be made in isolation.

3.1 Data management and records

Primary care providers need access to good quality information and patient records. Issues with information are a root cause of many safety hazards in primary care.

"Information chaos" includes:

- information overload (i.e., too much unnecessary information);
- information underload (i.e., missing or not enough information);
- information scatter (i.e., information located in many different places and difficult to find);
- erroneous or conflicting information.

Coping with information chaos requires providers to manage time pressure, mental workload and interruptions. Human factors approaches have studied how people process information and how systems can be built to support access to sufficient, appropriate and accurate information and decrease reliance on memory *(5).*

Providers must perceive that information exists or is available, understand the information, know where to get additional information and use the information to make predictions or decisions. Assessing providers' situational awareness or mental workload is rarely done in health care settings; however, this is mandatory when designing information systems in other high-risk industries, such as military settings, aviation or nuclear power.

Patients often visit primary care with more than one problem, so providers need to have tools to assist them with information management. One such tool is pre-visit planning, whereby nurses collect structured information ahead of the visit. A randomized trial found that this type of pre-visit planning decreased the amount of time doctors and nurses spent searching for information during visits *(6)*.

Electronic health records can also be used to manage information. However, human factors need to be considered in designing these systems as not to increase the workload or introduce errors *(7)*. It is important to have structured record design with an agreed way to position important information. Linking records to clinical decision support functions can be worthwhile as this ensures that information is available at the time and place of decision making.

Primary care visits often involve the competing demands of managing long-term conditions and acute issues and preventive care needs, especially in the elderly. Primary care providers and patients need to prioritize and judge the incremental benefit or harm of recommendations for individual patient situations. Using decision support tools at the point of care helps to manage all this information and the competing priorities.

However, electronic records can create their own problems. A paper record can easily be carried from the desk to the bedside, and paper information and prompts can be available when decisions need to be made anywhere in the consultation space. When electronic records are used that are visible through a computer screen at the desk, providers may rely more on memory when having discussions and making decisions away from the desk. Portable devices may assist, but small screen sizes and interoperability are an issue.

When electronic health records or other tools do not fit into the workflow, providers may develop workarounds. Workarounds are actions that do not follow protocols, regulations or the intentions of system designers. While usually intended to complete a task faster or more easily, workarounds can also be safety hazards.

3.2 Communication and teamwork

Team cognition is the collective team cognitive activity. It involves shared situation awareness whereby all individuals on the team are mindful of what is going on around them consistently so that they can perform better as a team.

In order to strengthen primary care teams, team roles and responsibilities should be clear, but avoid too much task overlap between team members, which can duplicate work and cause inefficiencies. Work assessment and job task analysis are human factors tools used to study individual and team work. These tools can be

used to design individual tasks and team work that uses all team members well. Team training, work design and well-designed information technology tools can help overcome team performance obstacles *(8).*

It is important to give due consideration to the work environment when assigning tasks. For example, when detail and concentration are needed, it is important not to assign such tasks to someone working in an area prone to interruptions.

Verbal and non-verbal communication, the impact of cultural norms and people's mental state are all things that human factors approaches consider when designing safe work environments and systems. Understanding human interest, motivation and the impact on mental concentration is also important. Ensuring people are doing work that matches their skills and expertise does not just support efficiency; people do better work when they find that the work is challenging and interesting.

Patients are also members of the primary care team. Patient communication also needs to be carefully designed to maintain the relationship between patients and providers. Using electronic record systems can have its pros and cons; therefore it is important to avoid an overemphasis on the technology. An example is when providers are focused on the computer screen, they are may be less able to notice patient cues.

Patient engagement supports patients, carers and families to perform key processes, such as deciding, monitoring or carrying out care. Improving engagement requires more than a change in how providers deliver care. Patients and their families can be viewed as "workers" or part of the team whose "work system" must be designed to support their performance. Tools, tasks and contexts must be designed to help patients in taking part in their care. This may mean that information would need to be presented in a way that fits patients' cognitive needs and abilities, and patients are given time and resources to take part in decisions and care.

3.3 Managing transitions of care

Transitions of care across care settings and between providers occur frequently in primary care. Human factors approaches stress the importance of proper handovers. Transitions from the hospital to the primary care setting can be risky and failures in information transfer are common *(9)*.

Creating systems that support the early detection and correction of failures in information transfer can reduce the likelihood of patient harm and inefficiencies in care. Examples of such systems include pre-visit planning or case management after hospitalization. Care coordination by case managers across care transitions may help to ensure disease stability and reduce hospital readmission for people with long-term conditions.

Other human factors issues in transitions of care include the variability of human performance on attention and perception, different cultural norms, different processes and practices across institutions, different communication styles and variability in understanding and memory. Structured communication tools and processes can assist, such as SBAR (situation, background, assessment and recommendation) and read back *(10)*.

3.4 Diagnostic and laboratory tests

The ordering and interpretation of diagnostic and laboratory tests can be broken into three phases. The pre-analytic phase starts when the test is ordered. The analytic phase occurs when tests are being processed and results are pending. The post-analytic phase is when results are available. Human factors concepts should be used in the design of decision support and to help minimize alert fatigue.

A work system analysis documented 36 failures that could occur in the process of diagnostic test ordering and analysis, many of which cause downstream problems and impact on patient safety. The main flaw was the lack of feedback or information, such as forgetting that a test was ordered, not knowing if the doctor or patient received the test results and lack of action on the results. It was suggested that a test logbook or tracking technology should be used to standardize the process *(11)*.

Patients also need to be given clear information so that they know how and under what circumstances they will receive test results and what to do if they have not received results.

3.5 Policy and planning

Human factors approaches can help match health care policy with the frontline realities of care delivery. Policies meant to improve safety may have unintended consequences that may worsen care, such as alert fatigue, too many safety alerts, or when providers rush to meet safety-related timelines. Ongoing policy evaluation is needed to allow for rational and rapid revisions. Human factors tools, such as proactive risk assessment, can help identify risks and unintended consequences before or after policy implementation.

Many large-scale changes are often implemented with limited understanding of the underlying processes in primary care and the required system changes to achieve the desired outcomes. Macro-ergonomics is a field that considers both the socio-technical and organizational context of change. In primary care, macro-ergonomics would consider the contexts of individual interactions between patients and health care providers, the primary care team interactions, the primary care services within a larger health system and its interactions with other parts of the health system and other organizations or health systems.

Having an understanding of the psychology of change can also be useful when implementing policy and large-scale change. A great deal has been written about the diffusion of innovation *(12)*.

4 Practical next steps

An understanding of human factors may be underappreciated in systems design. Individuals are often blamed for safety incidents, rather than recognizing that some systems were not designed to take into account variations in human performance.

Human factors help to build collective habits and practices to enable the whole team and system to stay safe together. Thus, human factors and systems thinking are key to safer primary care.

Strategies that WHO Member States could consider prioritizing to address human factors issues for improving safety in primary care include:

1. Using human factors approaches to analyze systems

- using human factors tools, such as proactive risk assessment, to identify risks and unintended consequences before or after policy implementation;
- using macro-ergonomic approaches to consider the contexts of individual interactions between patients and care providers, primary care team interactions and how primary care interacts with other parts of the health system;
- considering ways to build resilience into systems. This involves monitoring for failures, building in redundancies for critical system components and ensuring that escalation procedures are in place when providers encounter things that are difficult to cope with;
- including human factors experts in quality improvement and safety efforts.

2. Designing the health care environment around physical needs *(13-17)*

- using ergonomic approaches to ensure that work environments match with physical functions;
- reviewing the risks associated with implementing new technologies or care processes.

3. Providing tailored resources *(18,19)*

- providing cognitive supports, such as checklists, and simplifying work processes to reduce the cognitive burden and the need for health care providers to remember too many things;
- using decision support tools linked to electronic health records;
- putting in place accessible support systems to help incorporate patients as a core member of the care team.

4. Focusing on the user-centred design of information systems *(20,21)*

- conducting assessments to help design health information technology that addresses information needs and matches with health care providers and patients' preferences and the context of use;
- involving end-users in the evaluation of new systems, including health care providers, patients and families;
- redesigning workflow in primary care services to ensure that new systems take provider workflow and patients' experience into consideration;
- using standardized documents and common abbreviations and notations across the system.

5. Training planners, providers and patients *(22,23)*

- training leaders and those responsible for quality and safety planning in human factors concepts;
- providing patients and families with opportunities to practice self-care in low-risk simulated environments;
- using simulation to train health care providers about different handover techniques in routine and non-routine situations.

Importantly, safe systems continually learn and improve. This type of systems learning is different from learning for individuals. Developing systems learning could be a priority for policy-makers and leaders of health care organizations. This includes developing incident reporting and learning systems, legal protection frameworks for analysis and learning, platforms to share lessons with a common technical language, capacity building around quality improvement methods and so on.

Table 1: Opportunities for human factors approaches to improve safety in primary care

Issue	Human factors contributions
Teamwork Design and implementation of effective primary care teams	■ Team science and team training ■ Team situation awareness, team cognition (macro-cognition), communication and coordination ■ Systems approach to redesign ■ Task analysis ■ Workflow assessment ■ Simulation for training ■ Reminder systems to ensure critical communications occur ■ Standardized handovers of patient care

Issue	Human factors contributions
Data management and completeness of patient records Designing and implementing health information technology to support the cognitive needs of primary care providers and teams of providers	■ Task analysis of individual clinicians and teams ■ Usability of technology ■ Information technology design principles ■ User-centred design ■ Systems approach to redesign ■ Workflow assessment ■ Prospective risk assessment ■ Physical layout design ■ Functional allocation of tasks across team members and technologies ■ Data mining and predictive modelling ■ Uncertainty modelling ■ Decision making and decision support ■ Visual display and data analytics ■ Automation of tasks ■ Identifying when standard care is not appropriate
Transitions of care Developing effective communication and care coordination	■ Macro-ergonomics: multilevel, systems interventions and measurement of interventions ■ Workflow mapping of transitions ■ Shared situation awareness measures ■ Standardized communication approaches, checklists and templates ■ Alignment of organizational and personal goals ■ Probabilistic risk analysis methods ■ Simulation-based hazard management and training for transitions ■ Multi-organization process analysis
Ordering and interpretation of diagnostic tests Providing effective diagnostic services	■ Information technology design principles ■ Standardized approach in prioritization and reminder systems ■ Functional allocation of tasks across team members and technologies ■ Decision making and decision support

Issue	Human factors contributions
Health care policy Defining how health care will be provided to people	■ Developing a research base to inform policy development and evaluate impact ■ Risk assessment methods to identify unintended consequences
Large-scale change Planning and implementing major health system reforms	■ Understanding cognitive and socio-technical factors that need to be addressed ■ Systems approach to redesign ■ Macro-ergonomics ■ Building resilient systems: adaptation and flexibility
Ageing population of providers and patients Changing population demography	■ Building resilient systems: adaptation and flexibility ■ Physical layout design ■ Virtual consultation rooms or telemedicine
Patient engagement Involving the patient as an active member of the primary care team	■ Understanding patient "work" ■ Integrating patients and families into primary care teams, including team training ■ Patient and family perspectives on safety hazards and reporting of events ■ Home care and appropriate training for self-care, including use of simulation methods ■ Data displays that support shared decision making ■ Tools that support patient adherence to recommended care ■ Improved communication systems, handovers, and joint decision making between patients and clinicians ■ User-centred design of technologies to enhance patient participation and interaction ■ Testing of technologies by patient end-users ■ Improving interfaces between community, organization and teams

Issue	Human factors contributions
Decision-making support Integrating patient care for multiple medical conditions	■ Data mining and predictive modelling ■ Uncertainty modelling ■ Decision making and decision support ■ Prioritizing diagnostic and therapeutic recommendations
Population health Caring for populations of patients as well as individual patients	■ Workflow mapping ■ Information technology design principles ■ Functional allocation of tasks across team members and technologies

5 Concluding remarks

Primary care services are at the heart of health care in many countries. They provide an entry point into the health system and directly impact on people's well-being and their use of other health care resources. Unsafe or ineffective primary care may increase morbidity and preventable mortality, and may lead to the unnecessary use of scarce hospital and specialist resources. Thus, improving safety in primary care is essential when striving to ensure universal health coverage and the sustainability of health care. Safer primary care is fundamental to the United Nations Sustainable Development Goals, particularly to ensure healthy lives and promote well-being for all at every age.

Understanding the magnitude and nature of harm in primary care is important because a significant proportion of health care is offered in this setting, yet there is little clarity about the most effective ways to address safety issues at this level.

This monograph summarizes the evidence and experience to understand human factors approaches in order to improve patient safety in primary care. However, interventions to adopt human factors principles and practices would need to be implemented in conjunction with other important aspects covered in this series.

The *Technical Series on Safer Primary Care* addresses selected key areas that WHO Member States could prioritize according to local needs. This section summarizes the key messages from all of the monographs and provides a list of 10 key actions that are likely to have the most impact on improving safety in primary care. Links to online toolkits and manuals are also referenced in order to provide practical suggestions for countries and organizations committed to moving forward this agenda.

1. Set local priorities

Countries and regions differ and a strategy that works well in one area may not transfer well to another. Similarly, issues in need of improvement in some regions may not be a priority for others. In seeking to improve safety in primary care, countries could use local information about their safety issues to identify key priorities at the national or regional level. Priority setting could be accomplished by drawing on input from patients and professionals, sourcing local statistics on safety issues and comparing key themes from the literature with local circumstances *(24).*

Checklists are also available to help identify potential patient safety issues such as environmental risks in primary care services *(25).*

One practical way to move forward is creating mechanisms for bringing together key stakeholders to consider the local information available and develop strategic and operational plans for improving safety in primary care. Communicating proposed priorities widely and amending them based on feedback from health

care professionals and patients would help to obtain their buy-in, as well as raise awareness of the importance of improving patient safety in primary care.

Regular measurement of safety related performance indicators could be considered as one of the priorities. Policy-makers can use measurements to help identify local issues where performance is suboptimal and then evaluate different types of interventions for improvements. Priorities could be reviewed every few years to ensure that they remain in line with local needs and good practice.

2. Take a wider systems approach to improving safety

Although the series has described specific technical areas, each monograph refers to interlinkages with other areas. Focusing on improving just one factor may not have a large or sustainable impact on patient safety overall. It may be important to simultaneously improve communication with patients, train health care professionals and introduce new tools to support more streamlined care.

Taking a systems approach to safer primary care means looking at how different components relate to one another and considering various factors which could influence safety. These include factors such as workforce availability and capability.

A practical systems level initiative is to focus on increased communication and coordination across different types of care including primary, secondary and also social care. This may include strengthening technical systems for sharing records and communicating what is happening.

It is also important to build relationships between care professionals. At a policy level, this may involve considering how to develop supportive infrastructure, such as having a directory of services to help build networks of professionals and align resources. If hospital, primary care and social care professionals are able to meet and discuss safety issues, this could foster supportive relationships and increase understanding of each other's roles. Regional forums or meetings could be set up so that professionals from different organizations can get to know each other and share their successes and challenges in improving patient safety.

Manuals and reference lists are available with further ideas for improving coordination and reducing fragmentation across systems *(26,27).*

3. Communicate the importance of safety in primary care

Policy-makers, health care professionals, patients and families may not always be aware that there are important safety issues to consider in primary care. Raising awareness of this as a priority area will help stakeholders to understand why safety in primary care is essential to improve people's well-being and for safeguarding scarce health care resources.

Serious consequences due to the lack of safety in primary care, particularity relating to poor transitions of care between primary and other levels, and administrative, diagnostic and medication errors could be highlighted to raise awareness on the need to improve patient safety in primary care.

Practical ways to increase awareness include incorporating safety-related information into the training of health professionals, communicating effectively to professionals and patients through channels that would be most appropriate for them and spreading key messages through media campaigns. A communications plan could be developed in tandem with local priority setting discussed earlier.

4. Focus on building a positive safety culture

Effective leadership and supportive culture are essential for improving safety in primary care.This means creating an environment where professionals and patients feel able to speak up about safety issues that they are concerned about, without fear of blame or retribution. It means promoting an environment where people want to report risks and safety incidents in order to learn from them and reduce their recurrence, and where incidents are seen as caused largely by system failures rather than individuals. This also includes the importance of having feedback mechanisms in place to explain any improvements made after safety issues have been raised. Promoting transparency is key to building a strong safety culture.

A number of tools are available describing approaches to support the development and measurement of a positive safety culture *(28,29).*

Practical steps that could be taken to strengthen safety culture include: leadership walkrounds, whereby senior managerial and clinical leaders "walk the floor" (in this case, leaders visiting clinics and speaking with staff and patients about what is working well and not so well); starting team meetings with a patient story; using reflective practice to focus on safety issues, such as audits and having mechanisms for reporting safety issues, such as through regular team meetings. Such approaches may need to be adapted for use in smaller primary care clinics. Regardless of the specific method, the focus should be on raising awareness, encouraging safety discussions and taking concrete follow-up actions to build a safety culture.

5. Strengthen ways of measuring and monitoring patient safety

It is important to measure and monitor patient safety improvements over time. This may include having clear definitions of patient safety incidents and indicators to be measured annually, setting up national or local incident reporting systems where data is compiled regularly, or using tools to assess patient experiences and measure improvements in patient safety.

Using checklists in individual practices can both improve the quality of care and act as a structured form of record keeping. A number of examples of checklists to improve safety monitoring are available *(30).*

Data quality is fundamental to measuring improvements in patient safety. If accurate and comprehensive medical records are not kept, then errors and omissions are more likely to occur. As health systems mature, clinical governance processes tend to strengthen. This includes having processes for managing risks and identifying strategies for improvement.

A number of tools are available to measure and monitor different aspects of safety in primary care and countries could examine what is currently available and adapt materials based on local priorities *(31,32).*

6. Strengthen the use of electronic tools

The adoption of electronic tools will be critical to improving safety in many ways. Examples include the use of electronic health records for more accurate and complete patient records; timely and reliable sharing of health data; supporting the diagnosis, monitoring and management of diseases and conditions; effecting behaviour change and reduction of health risk, and empowering and engaging patients and families in their own care. eHealth can help structure communication between professionals in a way that reduces errors and improves coordination. It can reduce unnecessary consultations and hospitalizations and improve access to knowledge about health conditions and their management for both professionals and patients. However, to achieve their full potential, electronic tools need to be integrated with other parts of service delivery and adapted to the local context.

It takes time and resources to implement electronic tools, and requires the capacity to use and maintain them. It is therefore important to be strategic and to understand the foundations and design of systems in order to ensure the best return on investment. Linking the implementation of electronic tools in local settings to a national eHealth strategy is essential as it provides the foundation, justification and support needed to go forward in a coordinated way.

Irrespective of the status of the health system, it is important to strengthen the use of electronic systems to improve patient safety. For some countries, this may involve the introduction of electronic health records to replace paper records. For others, it may mean having integrated electronic systems between primary care and hospital and social care, or making the tools easier for professionals and patients to use. Countries could draw on lessons learned from other countries about implementing electronic health records, including the challenges faced and how these were overcome, and what best practices could be applicable to their own setting.

7. Involve patients and family members

Empowering and encouraging patients to speak up, for example when something does not seem right or when a symptom is inadequately explained, can be fundamental to improving patient safety. Family members play a key role as advocates and informal carers and therefore supporting and educating them can help to improve safety.

Proactive engagement of patients and families can help to accelerate the implementation of health care safety initiatives. When systems open themselves up to patients rather than being reactive, this is likely to improve system efficiency and the quality of care.

A number of tools have been evaluated to enhance patient and family involvement and awareness, including those with limited or low literacy skills *(33-36).*

8. Strengthen workforce capacity and capability to improve safety

There is a need to strengthen the primary care workforce in many settings by training a large pool of generalist workers, including doctors, nurses and those with supporting roles.

Strengthening the workforce also involves focusing on recruitment and retention, including taking steps to enhance the physical and physiological safety of health care workers. Professional burnout, fatigue and stress can all adversely affect patient safety.

The education and training of health care professionals to manage and minimize potential risks and harm that can occur in primary care are central to improving safety at all levels of care. This includes providing training on patient safety for students (including students who may not be training to work in primary care to ensure understanding across the different care pathways), multidisciplinary and inter-professional education, as well as continuing professional development. A number of free training course materials are available to help with this *(37-39)*. As a further step, consideration could be given to making involvement in safety and quality improvement a requirement for ongoing training and professional licensure.

In addition to formal education, informal approaches could also be applied to build the capacity of health workforce to improve safety. This may include holding regional meetings and coaching sessions to review patient safety incidents and areas for improvement and holding small team meetings to upskill staff.

9. Focus on those at higher risk of safety incidents

Some people are at greater risk of safety incidents in primary care. These include children, older people, those living in residential care or nursing homes and people with multiple health conditions. People with simultaneous mental health and physical health issues are also at increased risk of safety incidents.

Focusing on groups at higher risk may improve the quality and safety of care by providing more personalized care and ensuring smoother transitions between and within services. For instance, upskilling professionals in how to identify and treat depression may have an impact given the high rate of adverse events among those with combined mental and physical health issues.

Across the world, most systems were not designed to care for people with multiple health conditions. Systems may thus need to focus more on what can be done to improve care for people with multiple conditions, including whether social interventions would be more worthwhile than increasing medicalization.

A number of guidelines and toolkits suggest practical steps to better support people at higher risk of safety incidents *(40-44).*

10. Celebrate successes and share learning with others

Local teams, regions and countries should celebrate their successes and share learning with others. Hearing what has worked well can spark ideas in others and help to continue the momentum towards safer primary care.

Ongoing research plays a key role in identifying what works best to improve safety and how to implement best practices and success stories across diverse care settings. Although the technical series has drawn together a wide range of evidence and expertise, it has also highlighted a number of gaps about what works best to improve patient safety in the primary care context. By continuing to promote learning through research, and publishing and disseminating findings, countries could contribute to knowledge in this area.

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