Global priorities for patient safety research

With so many unanswered questions on patient safety, it is difficult for researchers to know where to start. **David Bates and colleagues** describe their attempt to identify the priorities

In response to the global need to improve patient safety the World Health Organization formed the World Alliance for Patient Safety in 2004.[1] The alliance is working to improve awareness and political commitment in 10 areas from hand washing and safe surgery to taxonomy and solutions. One important area is research into patient safety.

Currently most research has been done on hospital care in developed nations, where studies show an adverse event rate of about 10%.[2-8] Although fewer data are available from nations with transitional economies, single institution evaluations suggest comparable or even higher rates of injury from medical care.[9-11] Unfortunately, there are few data from the developing world. Another problem is that little research has examined primary care, long term care, and mental health, even though the available data suggest that patient safety in these settings may be as great a problem as in secondary care.[12 13]

New research will be key to improving the safety of health care. However, it is unclear which of the many potential areas of research are most important. Should researchers test whether specific solutions identified in developed nations can be implemented in poorer nations? Should they conduct cost effectiveness analyses?

To answer these questions the WHO World Alliance for Patient Safety set up an international expert working group to identify a global set of priorities for patient safety research. We describe below the group's approach to developing priorities and the actual priorities themselves, and then discuss what our findings

mean and next steps. The full report is available on the WHO website.[14]

Development of priorities

An international, expert working group of 19 clinicians, researchers, and policy makers with a broad range of expertise was convened to identify a set of global priorities for patient safety research. The members came from developing,[3] transitional,[4] and developed nations[12] in all seven WHO regions. Of those from developed nations, eight had research experience in transitional or developing countries. A broad range of research disciplines were represented, including epidemiological, qualitative, and human factors approaches.

The working group identified 50 topics relating to patient safety. This initial set of priorities was generated by examining the evidence about the epidemiology of harm (an extensive review of the literature was commissioned) and through discussion by the panel. Definitions of the individual priorities are available on the WHO World Alliance website.[15] The group used a three stage modified Delphi process to identify the priorities and then rank them according to need for research.[16] Each participant ranked the individual priorities from 1 to 9, with 9

being most important. The group ranked topic areas according to the frequency of the safety issue; the magnitude of harm and its distribution within the population; the effect on the efficiency of the health system; the availability, feasibility, and sustainability of solutions; and the urgency or political backing required to tackle the problem. The rankings were done separately for developing, transitional, and developed countries. We went through three such rounds of rankings, having discussions after each round to explore areas of disagreement until there was broad consensus.

Research priorities

Table 1 shows the top ranking for developing countries. Full rankings are given on bmj.com. There was strong consensus that the top priority was development and testing of locally effective and affordable solutions (score=8.56). Even though data on the epidemiology of harm in developing countries are sparse, group members believed it was urgent to identify and test the cost effectiveness of locally adapted solutions. Indeed, the next highest rankings were cost effectiveness of risk reducing strategies (7.89), counterfeit and substandard drugs (7.72), and inadequate competencies, training, and skills (7.69).

The leading priorities for transitional countries were similar to those for developing nations (table 1): development and testing of locally affordable solutions (8.39) and cost effectiveness of risk reducing strategies (8.21). Only four of the top 10 priorities for research in transitional nations differed from those in developing countries: lack of communication and coordination, poor safety culture, latent organisational failures, and developing better patient safety indicators.

The list of top priorities for the developed nations (table 1) was substantially different with strong consensus that the lack of communication and coordination was most important (8.22), followed by latent organisational failures (7.78), poor safety culture and blame

Health education mural in Liberia

Table 1 | Top five research priorities for developing, transitional, and developed countries

	Developing countries		Transitional countries		Developed countries	
Rank	Research priority	Average (SD) score	Research priority	Average (SD) score	Research priority	Average (SD) score
1	Identification, development, and testing of locally effective and affordable solutions	8.56 (0.51)	Identification, development, and testing of locally effective and affordable solutions	8.39 (0.78)	Lack of communication and coordination	8.22 (0.88)
2	Cost effectiveness of risk reducing strategies	7.89 (1.13)	Cost effectiveness of risk reducing strategies	8.21 (0.74)	Latent organisational failures	7.78 (1.17)
3	Counterfeit and substandard drugs	7.72 (1.23)	Lack of appropriate knowledge and transfer of knowledge	7.42 (0.97)	Poor safety culture and blame oriented processes	7.75 (1.73)
4	Inadequate competences, training, and skills	7.69 (1.34)	Inadequate competences, training, and skills	7.08 (0.88)	Cost effectiveness of risk reducing strategies	7.42 (1.24)
5	Maternal and newborn care	7.39 (1.38)	Lack of communication and coordination	7.00 (1.19)	Developing better safety indicators	7.03 (1.58)

oriented processes (7.75), and cost effectiveness of risk reducing strategies (7.42).

The top 10 priorities for each level of country development included 19 different topics (table 2). Cost effectiveness of risk reducing strategies was a high priority for all nations. Not surprisingly, there was substantial overlap between developing and transitional countries (four topics) and between transitional and developed nations (five topics) but almost no overlap between developing and developed nations (only one topic). Some issues seemed pertinent for countries in only one category of development. For example, the committee prioritised counterfeit and substandard drugs, maternal and newborn care, safe injection practices, and unsafe blood practices for developing countries. Similarly, focusing research on procedures that lack consideration of human factors, health information technology, patients' role in shaping the research agenda, device issues, and drug safety were top priorities only in developed nations.

Local relevance

We found that issues of effectiveness and cost effectiveness were most important for developing nations while issues of communication and safety culture were ranked most highly for developed ones. The transitional nations straddled this divide incorporating top priorities from both developing and developed nations. Even as the underlying evidence for the effectiveness of solutions for developing and transitional nations builds, we suspect that many of the identified priorities for these nations will be relevant for many years to come.

For both developing and transitional countries the highest rankings were development and testing of locally affordable solutions and cost effectiveness of risk reducing strategies. Although limited data are available on the efficacy of solutions to unsafe care, they mostly come from developed nations. The group was also concerned that we cannot assume that these solutions will also be effective or a rational use of resources in less developed settings. For example, ensuring that doctors use computerised systems to write prescriptions in hospitals and staffing intensive care units with trained specialists have been major focus areas for policy makers in high income nations.[17] Such interventions are less relevant in developing countries, which do not generally have hospital computer systems or intensive care units, although the use of simple electronic tools may improve care in specific settings.[18]

Conversely, some solutions that might improve safety in a developing or transitional country are relatively low priority in developed nations, such as ensuring safe injection

practices and strategies for reducing maternal mortality. In many developing nations, needles are routinely reused, which carries a high risk of transmission of blood borne pathogens. One recent study in India found that 62.9% of injections were unsafe.[19] As a result, a multimodal intervention to improve injection practices has been devised, a cornerstone of which is converting to plastic autodisabled syringes that

Table 2 | Commonality in top 10 priority areas in countries with different levels of development

Priority area	Rank (average score)		
	Developing countries	Transitional countries	Developed countries
All countries			
Cost effectiveness of risk reducing strategies	2	2	4
Developing and transitional countries			
Identifications, development, and testing of locally effective and affordable solutions	1	1	—
Inadequate competences, training and skills	4	4	—
Healthcare associated infections	6	7	—
Extent and nature of problem of patient safety	7	8	—
Lack of appropriate knowledge and transfer of knowledge	8	3	—
Transitional and developed countries			
Lack of communication and coordination	—	5	1
Poor safety culture and blame oriented processes	—	6	3
Latent organisational failures	—	9	2
Developing better safety indicators	—	10	5
Developing countries only			
Counterfeit and substandard drugs	3	—	—
Maternal and newborn care	5	—	—
Safe injection practices	9	—	—
Unsafe blood practices	10	—	—
Developed countries only			
Procedures that lack human factors consideration built into design and operation	—	—	6
Health information technology/information systems	—	—	7
Patients' role in shaping the research agenda	—	—	8
Devices that lack human factors consideration built into design and operation	—	—	9
Adverse drug events/drug errors	—	—	10

cannot be reused; the cost effectiveness of this intervention is currently being evaluated.

An example of a solution relevant in all countries is washing hands with an alcohol based handrub to reduce infection rates. The WHO has developed a set of guidelines on hand washing that can be used even in very low resource environments.[20] The approach has met with challenges in Muslim countries because alcohol is forbidden. However, medicinal uses of alcohol are permitted,[21] and solutions should be possible that take into account cultural considerations.

Priority decisions

Surgical errors were rated surprisingly low in all countries, even though they are responsible for a large proportion of adverse events.[3] Whether the group gave lower priority to this issue because good prevention solutions have not been identified is unclear.

The group's focus was on priorities for research, and not necessarily priorities for implementation. For example, the WHO World Alliance for Patient Safety and the WHO Collaborating Centre for Patient Safety Solutions have made available nine interventions to improve safety.[22] All of them were considered as potential priorities for research, but in general the panel ranked them low, probably because of either strong evidence of benefit or strong face validity (such as removal of concentrated solutions from clinical areas). Therefore, although these nine solutions may be high priorities for programmes seeking to reduce unsafe care, they were not considered high priorities for research.

There were other areas that have a high priority for implementation but were not ranked highly for research, such as preventing kernicterus. Although this is an infrequent event, it is catastrophic when it occurs, and at least in developed and transitional nations should be nearly entirely preventable.

Ultimately, big improvements in safety will require better prevention strategies across a wide range of issues, including most of the priorities considered. Clearly, research priorities are affected by the prevalence and types of adverse events that underlie unsafe care. Epidemiological data suggest that the distribution, types, and frequency of adverse events are similar across developed nations.[23 24] However, more variation is likely among developing and transitional nations—the key issues of patient safety in a developing nation in Africa may be very different from those in a country in Central America. The WHO Alliance is undertaking research to elucidate these differences.

It is also unclear where the greatest gains will come from in improving patient safety

globally. Although the incidence of specific types of harm is increasingly well known for many settings, most solutions have been identified in developed nations and they clearly need additional testing. The alliance is beginning to model the global burden and costs of patient safety, which should begin to provide insights into this.

Our effort had a number of limitations. The priorities were not necessarily mutually exclusive. The definitions, though we attempted to ground them, could have been interpreted differently by different participants. The experts came from a wide variety of backgrounds, and experts from developing nations found it hard to judge what was most important in developed nations, and vice versa. Some of the priorities might have ranked higher had they been combined—for example, injection practices and blood practices—and the divisions were necessarily somewhat arbitrary. However, hopefully, countries will be able to use these priorities as a starting place and will carry out their own prioritisation process. Clearly, much more investment in patient safety research is needed.

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ANSWERS TO ENDGAMES, p 1279
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PICTURE QUIZ
A characteristic rash

1 Cutaneous larva migrans is a common, tropically acquired dermatosis caused by the percutaneous penetration and migration of larvae of nematode parasites.

2 Other infestations—including erythema migrans of Lyme disease, migratory myiasis, and larva currens caused by Strongyloides stercoralis—should be considered.

3 Cutaneous larva migrans is self limiting, but its clinical course is shortened by effective treatment with topical and oral anthelmintics such as albendazole, thiabendazole, and ivermectin.

STATISTICAL QUESTION
Standardised mortality ratios
c, d

CASE STUDY
An elderly woman with weight loss and diarrhoea

1 This patient presented with mild triiodothyronine thyrotoxicosis (thyroid stimulating hormone suppressed, free thyroxine normal, and free triiodothyronine raised to just above the upper limit of the reference range).

2 At subsequent follow-up appointments, the patient's thyroid function varied slightly from triiodothyronine thyrotoxicosis to subclinical hyperthyroidism (thyroid stimulating hormone suppressed, free thyroxine and free triiodothyronine within reference range).

3 Triiodothyronine thyrotoxicosis is almost always owing to endogenous hyperthyroidism, whereas potential causes of subclinical hyperthyroidism can be either endogenous or exogenous (see box).

4 The risks associated with triiodothyronine thyrotoxicosis and subclinical hyperthyroidism include: atrial fibrillation; stroke; cardiovascular disease; fracture; and premature death.

5 Triiodothyronine thyrotoxicosis represents the earliest or mildest form of overt hyperthyroidism and should generally be treated in the same way as full blown thyrotoxicosis. Treatment options for subclinical hyperthyroidism range from observation to specific therapies for thyrotoxicosis.

Causes of triiodothyronine thyrotoxicosis and subclinical hyperthyroidism

- Endogenous causes (triiodothyronine thyrotoxicosis and subclinical hyperthyroidism)
- Graves' disease
- Autonomously functioning thyroid adenoma
- Multinodular goitre
- Exogenous causes (subclinical hyperthyroidism only)
- Excessive thyroid hormone replacement therapy in hypothyroid individuals
- Intentional thyroid hormone suppression therapy for differentiated thyroid carcinoma or nodular thyroid disease
- Drugs (for example, glucocorticoids, opiates, levodopa, and amiodarone), and intravenous contrast agents that contain iodine
- Stimulation of the thyroid by human chorionic gonadotropin during pregnancy
- Non-thyroidal illness (for example, euthyroid sick syndrome)