

A **WHO** PLAN FOR



BURN PREVENTION AND CARE



**World Health
Organization**

Geneva, Switzerland
2008



WHO Library Cataloguing-in-Publication Data

A WHO plan for burn prevention and care.

1.Burns - prevention and control. 2.Wounds and injuries. 3.Fire prevention and protection.
4.Health programs and plans. 5.Developing countries. I.World Health Organization.

ISBN 978 92 4 159629 9

(NLM classification: WO 704)

© World Health Organization 2008

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Printed by the WHO Document Production Services, Geneva, Switzerland.

ACKNOWLEDGEMENTS

This document was prepared following a Consultation Meeting on the Prevention and Care of Burns, which was held on 3–4 April, 2007 at WHO headquarters in Geneva, Switzerland. This meeting was a collaborative effort of WHO and the International Society for Burn Injuries (ISBI), in association with a number of other partners. Among those present and contributing were:

Rajeev Ahuja (Lok Nayak Hospital, India), Hendrina Jacomina Albertyn (Red Cross Children's Hospital, South Africa), Kidist Kebede Bartolomeos (WHO/VIP, Switzerland), Welsly Bodha (Euro Skin Bank, the Netherlands), Gudula Brandmayr (Safekids Worldwide, Austria), Pascal Cassan (French Red Cross, France), Meena Nathan Cherian (WHO/EHT, Switzerland), Wilma de Benavides (Institute of Plastic Surgery and Burns, Bolivia), Mohamoud El-Oteify (Assiut Burn Centre, Egypt), Wijaya Godakumbura (Safe Bottle Lamp Foundation, Sri Lanka), S. William A. Gunn (International Association for Humanitarian Medicine, Switzerland), Chapal Khasnabis (WHO/VIP, Switzerland), Etienne Krug (WHO/VIP, Switzerland), Jacques Latarjet (Centre Hospitalier St Joseph et St Luc, France), Grace Lo (IFRC, Switzerland), David Mackie (Red Cross Hospital, the Netherlands), Colin Mathers (WHO/MHI, Switzerland), Andrew McGuire (San Francisco General Hospital, USA), David Richard Meddings (WHO/VIP, Switzerland), Charles Mock (WHO/VIP, Switzerland), Nhu Lam Nguyen (National Institute of Burns, Viet Nam), Alana Officer (WHO/VIP, Switzerland), James Partridge (Changing Faces, England), Michael Peck (Arizona Burn Center, USA), Tom Potokar (Welsh Centre for Burns and Plastic Surgery, Wales), Eva Rehfuss (WHO/PHE, Switzerland), Ronald Siarnicki (Phoenix Society, USA), Colin Song (Singapore General Hospital, Singapore).

The document was finalized by:

Charles Mock	Department of Violence and Injury Prevention and Disability, WHO, Geneva, Switzerland
Michael Peck	Director of International Outreach, Arizona Burn Center, Maricopa Medical Center, Phoenix, AZ, USA
Margie Peden	Coordinator, Unintentional Injuries Prevention, Department of Violence and Injury Prevention and Disability, WHO, Geneva, Switzerland
Etienne Krug	Director, Department of Violence and Injury Prevention and Disability, WHO, Geneva, Switzerland
Rajeev Ahuja	Head, Department of Burns & Plastic Surgery, Lok Nayak Hospital, New Delhi, India
Hendrina Albertyn	Red Cross Children's Hospital, Cape Town, South Africa
Welsly Bodha	Director, Euro Skin Bank, Beverwijk, the Netherlands
Pascal Cassan	National Medical Advisor, French Red Cross, Paris, France
Wijaya Godakumbura	President, Safe Bottle Lamp Foundation, Rajagiriya, Sri Lanka
Grace Lo	Senior Health Officer, International Federation of Red Cross and Red Crescent Societies, Geneva, Switzerland
James Partridge	Chief Executive, Changing Faces, London, England
Tom Potokar	Welsh Centre for Burns and Plastic Surgery, Swansea, Wales

The World Health Organization thanks Ann Morgan for editorial assistance, Claire Scheurer for administrative support, and Lynn Hegi for design of the cover and layout.

The World Health Organization wishes to thank the American Burn Association, Baskent University, the European Burns Association, the International Association of Firefighters, the International Society for Burn Injuries, the Japanese Society for Burn Injuries, and the Turkish Burn and Fire Disaster Society for their financial contributions which made the publication of this document possible.

Suggested citation:

Mock C, Peck M, Peden M, Krug E, eds. *A WHO plan for burn prevention and care*. Geneva, World Health Organization, 2008.

This document is available on the following web site:

http://www.who.int/violence_injury_prevention.

BURNS

FOREWORD

Burns constitute a major public health problem, especially in low- and middle-income countries where over 95% of all burn deaths occur. Fire-related burns alone account for over 300 000 deaths per year, with more deaths from scalds, electricity, chemical burns and other forms of burns. However, deaths are only part of the problem; for every person who dies as a result of their burns, many more are left with lifelong disabilities and disfigurements. For some this means living with the stigma and rejection that all too often comes with disability and disfigurement.

In high-income countries, much has been achieved in terms of reducing the burden of injury from burns. Implementation of proven interventions, such as smoke detectors, regulation of hot water heater temperature and flame retardant children's sleepwear, has meant that mortality rates from burns have steadily declined over the past 30–40 years. However, such strategies have yet to be widely applied in low- and middle-income countries, and consequently mortality rates remain relatively high, especially among the poorer members of society. Likewise, the benefits of advances in burn treatment and care (which have led to higher survival rates and improved functional recovery of burn victims in most high-income countries) have yet to make much of an impact in most low- and middle-income countries.

The World Health Organization (WHO) has been working collaboratively with the International Society for Burn Injuries (ISBI) and other partners to develop strategies to improve the prevention of burn injuries worldwide, but especially in low- and middle-income countries. The goal is to promote the development of the spectrum of burn control measures, to include improvements in burn prevention and strengthened burn care, as well as better information and surveillance systems, and more investment in research and training. We hope that the broad-based strategic plan presented in this document will catalyse burn prevention and care efforts globally and will assist the many people and agencies worldwide who are currently working to prevent burns and improve the care of burn victims in their communities.

Dr Etienne Krug
Director
Department of Violence and Injury
Prevention and Disability, WHO

TABLE OF CONTENTS

Acknowledgements
Foreword

PART I. BACKGROUND

1. Introduction.....	1
2. Burns : prevalence and risk factors.....	2
3. Preventability.....	3
4. The challenges in addressing burns.....	4
5. Confronting the challenges.....	6
5.1 WHO's role	
5.2 The role of other agencies	

PART II. THE WHO PLAN

1. Advocacy.....	12
2. Policy.....	14
3. Data and measurement.....	15
4. Research.....	16
5. Prevention.....	17
6. Health-care services for burn victims.....	18
7. Capacity building.....	20
8. Conclusion.....	22
References.....	23



PART I

BACKGROUND

1. INTRODUCTION

Mortality rates due to burn injuries vary by as much as a factor of 10 across the different regions of the world. Not surprisingly, rates are lowest in high-income countries where, as a result of a range of interventions such as promotion of the use of smoke detectors, the lowering of temperatures of hot water heaters, the installation of sprinkler systems, and the promotion of flame-retardant children's sleepwear, as well as the development of safer buildings and household fuels and appliances, the number of deaths due to burns, both fire-related burns and other forms of burn injury, has been drastically reduced over recent decades. Progress in this area has been assisted by improved data gathering systems, new and more stringent legislation, social marketing and advocacy. Advances in the treatment and care of burn patients have also contributed to a lowering of burn mortality rates in many high-income countries. In addition, developments in burn care have improved functional outcomes for a great number of burn victims, which coupled with increased emotional and practical support from burn survivor groups, have meant that many burn survivors manage to lead full, meaningful lives despite their injuries.

This is in stark contrast to the situation in the majority of low-and middle income countries. Here, many of the improvements in burn prevention and care which have benefited those living in high-income countries have yet to be widely adopted, and thus mortality rates due to burns remain unacceptably high. In order to lower the burden of suffering from burns worldwide, the World Health Organization (WHO) has joined with the International Society for Burn Injuries (ISBI) and several other partner agencies to develop and promulgate burn prevention, care and recovery programmes. As a first step, in April 2007, WHO convened its First Consultation Meeting on the Prevention and Care of Burns. The principal objectives of this meeting were to identify WHO's role in addressing the public health problem associated with burns, to develop an outline global strategy for prevention and treatment of burns, and to advise WHO on how best to develop its programme on burns.

The present document is a direct result of the consultation meeting, and as such represents the culmination of a concerted effort by burn experts worldwide to formulate an evidence-based global strategy for burn prevention and care. It begins by summarizing the nature of the public health problem related to burn injury worldwide, articulating the disease burden, risk factors, knowledge gaps, and the main challenges that lie ahead. Part I also outlines WHO's unique combination of skills and expertise that make it well placed to take a lead role in the development of burn prevention and care. The main body of the document, Part II, is devoted to setting out the strategic plan for burn prevention and care that has emerged from this consultation process. The approach adopted has much in common with WHO's other injury prevention activities, for example, in the field of road traffic injury prevention and in relation to the impacts of intentional injury (violence) on health. Publication of world reports on these issues (1, 2) has increased awareness of the nature and scale of the impact of injuries on public health worldwide. Likewise, the publication of WHO's *Guidelines for essential trauma care* (3) and *Pre-hospital trauma care systems* (4) has done much to raise awareness of the need for affordable, sustainable improvements in trauma care globally (see also section 5.1).

2. BURNS : PREVALENCE AND RISK FACTORS

It is estimated that each year over 300 000 people die from fire-related burn injuries. There are more deaths from scalds, electricity, chemical burns and other forms of burns. Millions more suffer from burn-related disabilities and disfigurements, many of which are permanent but all of which have a cascade of secondary personal and economic effects on both the victim and their families.

The burden of burn injury is one that falls predominantly on the world's poor. The vast majority (over 95%) of fire-related burns occur in low- and middle-income countries. Within this group of countries, not only are burn deaths and injuries more common in people of lower socioeconomic status but, among those who suffer severe burns, it is the most economically vulnerable that are the more likely to be thrown into further poverty as a consequence.

Fire-related mortality rates are especially high in South-East Asia (11.6 deaths per 100 000 population per year), the Eastern Mediterranean (6.4 deaths per 100 000 population per year) and Africa (6.1 deaths per 100 000 population per year). These compare with much lower rates of, on average, just 1.0 deaths per 100 000 population per year in high-income countries (see Table on page 3). This is one of the largest discrepancies for any injury mechanism.

Differences in burn mortality rates vary across different age groups and between the sexes. For instance, fire-related burns are the sixth leading cause of death among 5–14 year olds and the eighth leading cause death among 15–29 year olds from low and middle-income countries. In terms of the sex differences, women are usually at higher risk of burns than men, especially in the younger age groups: death from fires is the sixth leading cause of death among females aged 15–29 years. The highest rates of fire-related deaths are recorded in females from South-East Asia, where rates are estimated to be as high as 16.9 deaths per 100 000 population per year. Burns are one of the few injury mechanisms that have a higher death toll among women than men.

As previously mentioned, burns are also a leading cause of disability and disfigurement. It is estimated that fire-related burns account for 10 million Disability Adjusted Life Years (DALYs) lost globally each year (5). This figure includes people with burn wound contractures and other physical impairments which limit their functional abilities and thus their chance of leading normal, economically productive lives. However, it excludes the impacts of disfigurements, which often result in social stigma and restriction in participation in society but which are more difficult to quantify.

Risk factors for burn injury differ according to region, but typically include alcohol and smoking, use of open fires for space heating, use of ground level stoves for cooking, the wearing of long, loose-fitting clothing while cooking, high set temperature in hot water heaters, and sub-standard electrical wiring. Many of these risk factors are eminently amenable to prevention efforts.

3. PREVENTABILITY

In high-income countries, much has been done to lower the burden of burn injury. Among the list of burn prevention strategies that have been developed and implemented are smoke detectors, regulation of hot water heater temperatures, flame resistant children's sleepwear, and housing codes that assure safety of electrical wiring. The effectiveness of such interventions varies, but in many cases, notable successes have been recorded. For example, use of smoke detectors has been associated with a 61% reduction in the risk of death from residential house fires in the United States of America (6). Multifaceted community burn prevention strategies have decreased burn-related hospital admissions among Norwegian children by 52% (7). Moreover, burn prevention strategies have been found to be very cost-effective. A study conducted in the United States, for instance, demonstrated that every US\$ spent on smoke detectors saves US\$ 28 of health-related expenditure (8). These advances have been assisted by development of related surveillance systems, legislation, social marketing and advocacy.

Parallel developments in burn care have also contributed to the lowering of burn-related mortality and morbidity in high-income countries. Recent advances in burn care have included improved capabilities for the resuscitation of burn victims, better care of burn wounds (through techniques such as skin grafting), improved infection control and more effective rehabilitation programmes. Burn survivor groups have also played an important role, not only by providing much needed peer support but also through their campaigning and advocacy efforts, in particular, in relation to burn prevention and treatment. In addition, they have been instrumental in gaining legal protection for burn survivors from discrimination in the workplace and society.

ESTIMATED NUMBER OF DEATHS AND MORTALITY RATES DUE TO FIRE-RELATED BURNS BY WHO REGION* AND INCOME GROUP, 2002

REGION	Africa		The Americas		South-East Asia		Europe		Eastern Mediterranean		Western Pacific		WORLD
Income group	low/ middle	high	low/ middle	high	low/ middle	high	low/ middle	high	low/ middle	high	low/ middle	high	low/ middle
Number of burn deaths (thousands)	43	4	4		184	3	21	0.1	32	2	18		312
Death rate (per 100 000 population)	6.1	1.2	0.8		11.6	0.7	4.5	0.9	6.4	1.2	1.2		5.0
Proportion global mortality due to fires (%)	13.8	1.3	1.3		59.0	1.0	6.7	0.02	10.3	0.6	5.8		100

*Countries within each geographical region have been further subdivided by income level, according to the divisions developed by the World Bank.

Source: WHO Global Burden of Disease Database, 2002 (version 5).

THE CHALLENGES IN ADDRESSING BURNS

It is evident, from the experience of the high-income countries, that it is possible to reduce burn mortality and morbidity through a combination of measures aimed not only at reducing the likelihood of a fire but also the severity and impact of a burn injury. While such strategies have been successful throughout much of the developed world, in the low- and middle-income countries, burn-related death rates remain unacceptably high. Overcoming the barriers to the development and implementation of burn prevention, care and recovery programmes across the world, which would correct this inequality and lower the rates of death, disability and disfigurement from burns globally, will be a major challenge for WHO and its partner organizations.

The main barriers to the wider adoption of burn prevention have been identified as being in the following areas:

Advocacy : There is limited awareness of the magnitude and cost of the burn problem among policy-makers and donors. An awareness that the current high rates of burn death, disability and disfigurement could be brought down by affordable and sustainable improvements in prevention and care is also lacking.

Policy development : Many of the strategies that have helped to lower the burden of burns in high-income countries have been implemented through policy changes. However, many low- and middle-income countries have not yet developed burns policies, nor have they put into place action plans, legislation or regulations to address the problem of burns. Even when burn policies exist, enforcement is often inadequate.

Data and measurement : It is generally acknowledged that accurate problem description is the key to planning effective interventions, yet in many less well resourced countries, data on burns are scarce and/or inaccurate. In some countries, a lack of reliable data on risk factors further hampers the development and enactment of effective burn prevention strategies, while in others, incomplete reporting of burn events leads to underassessment of the scale of the public health problem.

Research : The reductions in burn mortality that have been seen in high-income countries have been achieved as a result of the application of scientifically-based programmes for prevention and care. The development and implementation of such interventions owes much to the quality and breadth of the research that underpins them. Needless to say, the research and the tools that have brought about such successes relate specifically to the situation and circumstances of high-income countries. Low- and middle-income countries, however, require interventions that are appropriate to their particular circumstances (see **Prevention** below). This means that interventions may need to be specifically developed, or at the very least, adapted to suit low-resource settings, a process which requires considerable research effort. Thus, in many countries, burn control is hampered not just by the lack of basic data, but also by lack of research infrastructure and capability to support the necessary intervention trials, economic analyses, programme effectiveness studies, social science research and health utilization analyses.

Prevention : Some of the strategies developed in high-income countries would successfully address the risk factors present for burns in some low- and middle-income country settings, particularly urban environments of middle-income countries. These include strategies such as smoke detectors, regulation of hot water heater temperature, and enacting and enforcing housing codes to make electrical wiring safer. However, in low-income countries, especially in rural areas and among the urban poor, the epidemiologic pattern of, and risk factors for, burns differ markedly from those that characterize the high-income countries and thus very different strategies are going to be required. In this regard, some of the factors that are of prime concern include (9–11):

- the use of cooking pots on ground level (pots on ground level are more readily knocked over, and can increase the risk of scald burns, for example, among toddlers and young children);
- the use of open wood fires;
- the use of kerosene (paraffin) stoves and lamps (these can be easily knocked over and then ignite);
- the wearing of loose fitting cotton clothing which can ignite while cooking on an open fire (a risk factor for women in Asia).

It is clear – given that approximately two billion people worldwide cook on open fires or very basic traditional stoves – that in order to reduce the number of fire-related burn deaths worldwide, evidence-based strategies to address these particular risks are going to be needed. At the time of writing, the peer-reviewed medical literature contained no reports from low-income countries documenting the successful implementation of burn prevention strategies, i.e. of interventions that have resulted in a decrease in burn rates. However, there have been some promising pilot projects addressing some of the above risk factors, such as efforts to promote safer paraffin stoves in South Africa and safer, more stable paraffin lamps in Sri Lanka.

Services : The type of burn care that is routinely available in high-income countries is currently beyond the reach of the vast majority of the world's poor. Inequity in service coverage means that someone with a moderate level per cent body burn would most likely die in a low- and middle-income country, but would be saved in a high-income country. Similarly, in low- and middle-income countries, those who suffer even a fairly small per cent body surface area burn injury to the extremities will often develop significant disabilities from burn wound contractures; in high-income countries this could be prevented with simple physical therapy (physiotherapy) and rehabilitation methods, and in some cases, reversed by reconstructive surgery (12). It is to the detriment to the health of many that rehabilitation capabilities, whether for burns or other disabling injuries, are among the least developed capabilities in the spectrum of trauma care in many low- and middle-income countries (13). Inequities are also evident in the availability of support networks: whereas burn victims support groups play an active role in providing peer support and assisting in the recovery of burn victims in high-income countries, such groups are almost entirely absent in low- and middle-income countries.

Capacity : Burn prevention activities demand a workforce with a wide range of skills and expertise: epidemiologists are needed to analyse data on burns and their risk factors; clinicians are needed to understand the broader trauma system issues as they relate to strengthening burn care; and public health practitioners, psychologists and media experts among others are required to design, implement and evaluate successful and sustainable burn prevention programmes. All of these professionals, along with representatives of nongovernmental organizations (NGOs), civil society and members of the public, need to acquire skills in advocacy in order to help raise the profile of burns and ensure its place on the agenda of governments, international agencies and donors. Critically, many low- and middle-income countries lack adequate numbers of skilled personnel who can undertake the work that needs to be done to move forward in burn prevention.

5. CONFRONTING THE CHALLENGES

In recent years, WHO has been actively involved in promoting burn prevention and care worldwide through a range of special projects and activities. These include the development of a Burn Kit and various training materials (e.g. the TEACH-VIP training modules cover burn prevention), plus a number of subject-specific publications (e.g. the Burn Fact Sheet). Several of WHO's guidance documents include details on burns, among them the *Injury surveillance guidelines* (14) and *Guidelines for essential trauma care* (3). Moreover, the forthcoming *World report on child and adolescent injury and violence prevention* will contain a separate chapter on burns. Although much of WHO's burn work is coordinated by the Department of Violence and Injury Prevention and Disability, other WHO departments have played active roles in promoting burn prevention. The Public Health and Environment Department, for example, has been engaged in projects to evaluate and promote safe improved stoves, while the Essential Health Technologies Department has been instrumental in the development of burn care training materials, such as those included in *Surgical care at the district hospital* (15) and the *Integrated management of emergency and essential surgical care (IMEESC) tool kit* (16).

In 2007, WHO called upon leading burn experts from around the world to guide the further development of its burn prevention programme and to address the above-noted challenges. The First Consultation Meeting on Burn Prevention and Care allowed WHO to draw on the knowledge of many dedicated individuals, and also collective expertise of international organizations such as the ISBI, in developing its 10-year plan for burn prevention and care.

The proposed Burn Plan relies on WHO's normative, facilitative and coordinating role in public health (see below). The plan also addresses WHO's own organizational priorities. WHO Director-General, Dr Margaret Chan, has stated that she wants to use WHO's impact on improving health among two of the world's most vulnerable

groups, women and people living in Africa, as an indicator of the organization's success. It should thus be noted that burns are a particular problem in these two groups: burns are the only major injury mechanism for which the death rate is higher among women than men; while the burn rates in Africa are among the highest in the world.

5.1 WHO'S ROLE

WHO is the United Nations specialized agency for global health. Its objective is the attainment of the highest level of health by all peoples of the world. WHO is governed by 193 Member States, representatives of which meet each year at the World Health Assembly to decide on the direction of WHO's work. The World Health Assembly thus provides a unique platform for the discussion of major public health issues and plays a central role in the development and implementation of strategies for disease prevention, measurement and analysis, research, capacity development, service provision and advocacy. In all of these areas, WHO has the capacity to organize, to provide technical support and advice and, through working with its multiple partners, to increase the level of preventive effort worldwide.

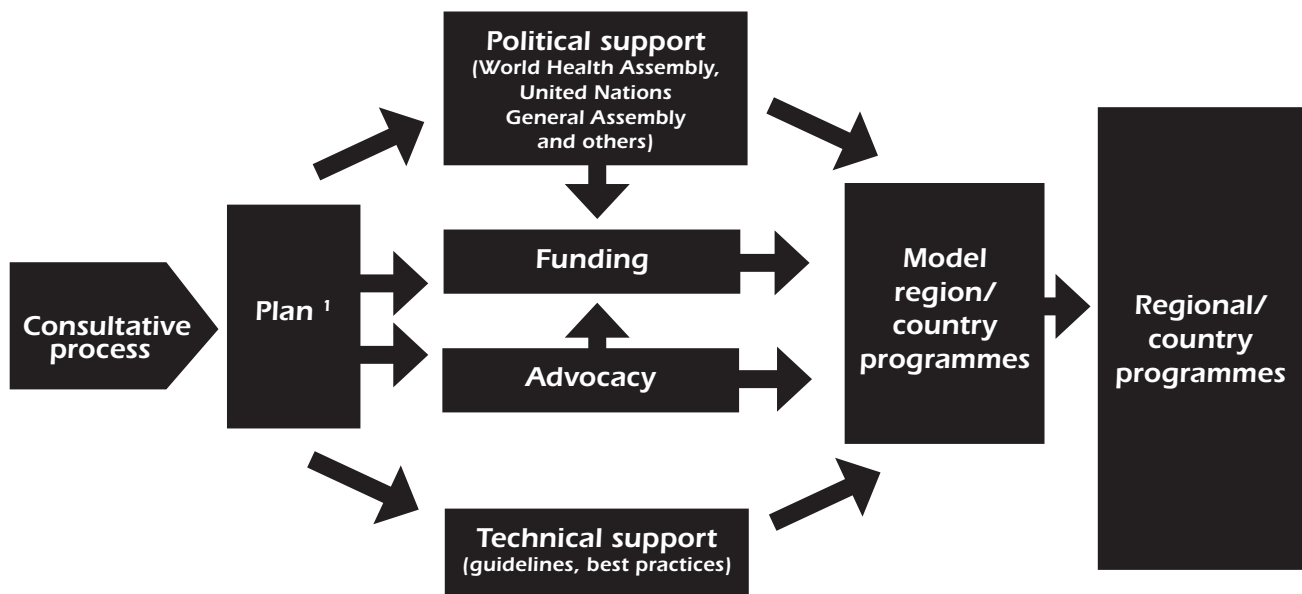
Injury control and trauma care have been discussed at a number of recent World Health Assemblies with the result that several resolutions mandating WHO to work in the area of violence, trauma care, disability and rehabilitation have been adopted. WHO's efforts in the areas of burn prevention and care will follow the public health approach and will attempt to address the knowledge gaps, inequalities and inequities that have been identified. Within WHO, work programmes will seek to make links between injury prevention and other areas of endeavour, such as environmental health, health systems development and clinical care. These will require WHO to engage with a wide range of agencies and NGOs and also with broader economic and social issues, such as poverty and poverty reduction.

WHO's Department of Violence and Injury Prevention and Disability acts as a facilitating authority for international science-based efforts to promote safety and prevent injuries and mitigate their consequences as major threats to public health and human development. It does this by:

- raising awareness and advocating for increased human and financial resources;
- collating, analysing and disseminating global data;
- promoting and facilitating :
 - the improved collection of data
 - the adoption of best practice
 - prevention and control at the country level
 - the provision of services for victims and survivors
 - teaching and training;
- fostering multidisciplinary collaboration among concerned global, regional and national organizations.

In the recent past, the Department of Violence and Injury Prevention and Disability has had substantial success in using documents such as this as a means of collecting and synthesizing available information on a given topic. More importantly, such efforts serve as a starting point for a longer-term consultative process, the ultimate aim of which is improvements in the degree and quality of injury prevention and trauma care efforts at the regional and country level. The main components of the overall process are illustrated in Figure below. This model has been employed to good effect in the cases of violence, road traffic injuries, child injury prevention, and emergency and trauma care provision (1–4, 17). It will also form the basis of WHO's work on burn prevention and care. It is a fundamental precept of the model that the work on burn prevention and care is done in partnership with countries and other agencies.

ADDRESSING THE BURDEN OF INJURY: A WHO APPROACH



¹ Plan and other associated planning documents such as the world reports on traffic injury prevention and on violence.

5.2 THE ROLE OF OTHER AGENCIES

Given the multisectoral and multidisciplinary nature of burn prevention and care, strong partnerships and international cooperation will be required to successfully implement the proposed plan. This includes all of the groups that have been involved in the consultative process to establish the plan, as well as others. All of these can play a role in advocacy and raising the profile of burn prevention and care globally and in individual countries. Each partner organization has its own particular skills and areas of expertise which it can bring to the collaboration, as follows:

- the International Society for Burn Injuries (ISBI), Interburns and other professional groups: such groups can help to strengthen the practice of burn care within their own profession, especially in low- and middle-income country settings;
- National Red Cross and Red Crescent Societies and other similar groups: aid groups tend to focus on the most vulnerable members of society (including women and children) and also are in a good position to promote pre-hospital care, first-aid training and injury prevention;
- firefighters: firefighters have much practical experience in on-the-ground prevention work within their jurisdiction;
- international NGOs, such as Safe Kids Worldwide: Safe Kids Worldwide targets burns along with other childhood injuries in its advocacy work;
- WHO collaborating centres, especially those focusing on burns: the research capability of WHO collaborating centres will help to identify the risk factors for burn injury that are particular to the areas and countries they serve, and thereby add to the body of knowledge and understanding that underpins the development of effective prevention programmes;
- burn survivor groups, such as the Phoenix Society and Changing Faces: survivor groups, who by speaking on behalf those disabled and disfigured by burns, can contribute much to the process of raising awareness of the needs of burns victims;
- hospitals, community groups, and local burn societies: these groups and institutions are positioned to be the leaders of burn prevention and care activities in their areas;
- communities: their involvement in and ownership of burn prevention and care programmes will assure the sustainability and success of such programmes.



PART II

THE WHO PLAN

This part of the present document sets out what WHO, in consultation with its partner organizations, sees as the important steps towards the goal of decreasing the rates of burn and burn-related death, disability and disfigurement globally. It is the result of an extensive process of consultation with numerous organizations and individuals concerned with burn prevention and care, including those who participated in the First Consultation Meeting on Burn Prevention and Care, which was held on 3–4 April 2007. It focuses on those key areas where WHO has a particular contribution to make in relation to burn prevention and care.

A 10-year plan (2008–2017) was developed in order to direct WHO's efforts at a country, regional and global level, the principal objectives behind the framework being:

- to build understanding of the nature, extent and preventability of burns;
- to achieve the strongest possible impact by fostering and building partnerships to address burns;
- to foster and build capacity to undertake effective interventions and to evaluate their effectiveness.

Implementation of the strategic plan will require the involvement of all three administrative levels of WHO (i.e. the country and regional offices as well as headquarters), partner organizations and national governments. While ministries of health are central to this effort, the engagement of other government departments will also be an important part of the work. Indeed, a wide range of sectors will need to be consulted. The involvement of NGOs, networks and advocacy groups, including those concerned with research, health service delivery and evaluation, and disability and rehabilitation, is also going to be essential (see Part I, section 5.2).

Actions to prevent burns and to improve treatment options for victims do not stand alone. Consequently, this plan has been linked to broader efforts in strengthening health systems, environmental improvements, data improvement and capacity development.

The WHO Burn Plan has seven main components which correspond to the challenges in burn prevention and care (see Part I). These are listed in the adjacent box, and described in greater detail in the tables below. In each case, a plan and the expected products and outcomes are identified.

AT A GLANCE

The BURN PLAN

1. ADVOCACY

- Raising awareness
- Promoting and supporting action
- International, multisectoral cooperation

2. POLICY

- Effective and sustainable burn prevention and care policies
- Action plans, legislation, regulations, enforcement

3. DATA AND MEASUREMENT

- Magnitude and burden
- Risk factors

4. RESEARCH

- Set agenda of priorities
- Promote and foster trials of promising interventions

5. PREVENTION

- Stronger, more effective burn prevention programmes
- More countries with national burn strategies

6. SERVICES

- Strengthen treatment services available
- Acute care
- Rehabilitation
- Recovery

7. CAPACITY BUILDING

- Sufficient knowledge and skill to effectively carry out all of the above components of the Burn Plan

EXPLANATORY NOTE

Each of the seven key components that form the basis of the WHO Burn Plan has its own set of goals. In the following subsections, these stated goals are followed by a table, which outlines the actions (area of work) required to achieve these goals and the specific products and outputs that will be produced by these actions. Sometimes one area of work corresponds to one output. Sometimes several areas of work are interrelated and thus lead to the same set of outputs. In such cases, the areas of work are listed together in the same row as are their corresponding outputs. The final column of the table (timeline), indicates the timetable for completion of each of the products and outputs.

1. ADVOCACY

GOALS

- Raise awareness of the impact of burns and the potential for prevention among policy-makers and donor agencies.
- Promote action on burn prevention and care through the fostering of political will and the generation of resources.
- Develop and foster international, multisectoral cooperation on burn prevention and care.
- Reduce stigma and empower people who suffer from disfigurement after burn injury.

AREA OF WORK	PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> ▪ Promote awareness of burn prevention and care among policy-makers and donor agencies. ▪ Advocate for resources for burn prevention and care among multi- and bi-lateral donors, foundations, national governments, local agencies and the private sector. 	<ul style="list-style-type: none"> ▪ Key messages, to be used to raise awareness and the profile of burn prevention and care on the world agenda. ▪ Updated fact sheets, a web site and other advocacy tools, such as posters and documents, for burn prevention and care. ▪ Statements in support of burn prevention and care by political and opinion leaders. ▪ <i>Global review of treating and preventing burns</i> ▪ Chapter on burns for inclusion in WHO's <i>World report on child injury prevention</i>. ▪ Identification of a high profile champion or spokesperson for burn prevention and care. 	<p>2008–2009</p> <p>2008–2009</p> <p>2008 onwards</p> <p>2009 onwards</p> <p>2008</p> <p>2009 onwards</p>

<ul style="list-style-type: none"> Advocate for the inclusion of burn prevention and care in activities by focal points in ministries of health. 	<ul style="list-style-type: none"> Inclusion of burn prevention and care in the activities of ministry of health focal points on injury control. 	2008 onwards
<ul style="list-style-type: none"> Advocate for the inclusion of burn prevention and care in international fora relating to health in general and injury control in particular. 	<ul style="list-style-type: none"> Sessions on burn prevention and care in international fora on health and injury. 	2008 onwards
<ul style="list-style-type: none"> Improve communication among those working in the burn field globally. Foster collaboration among organizations that are concerned with burn prevention and care, including WHO collaborating centres and other intersectoral networks. Foster the involvement of NGOs in the promotion of burn prevention and care initiatives. 	<ul style="list-style-type: none"> A resource directory of those working in the burn field. An international network of burn survivors and burn survivor groups. An expanded network of collaborating centres¹, emphasizing low- and middle-income countries. Regional meetings of those involved in burn prevention and care. 	2008–2009 2009 onwards 2009 onwards 2009 onwards
<ul style="list-style-type: none"> Work with journalists and the media to increase their interest in and involvement with burn control. 	<ul style="list-style-type: none"> Increased number of articles appearing in the media on the burden of burns and advocating for potential solutions. 	2008 onwards

NGO, Nongovernmental organization.

1. Collaborating centres currently include Centre des Brulés, Hospital Saint-Luc, Lyon, France and the Mediterranean Council for Burns and Fire Disasters (MBC). Additional institutions, particularly those from low- and middle-income countries, will be encouraged to become WHO collaborating centres on burns in the future.

2. POLICY

GOAL

- Increase the enactment and implementation of effective, sustainable burn prevention and care policies worldwide, including action plans, legislation, regulations and enforcement.

AREA OF WORK		PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> ▪ Incorporate burn prevention and care into national and local health plans and injury control plans. ▪ Support the development of appropriate policy and legislation for burn prevention and care by countries. 	<ul style="list-style-type: none"> ▪ Policy statements and guidelines on burn prevention legislation, regulations and enforcement. ▪ Appropriate information to support policy recommendations, such as estimates of cost-effectiveness of burn prevention and treatment strategies. 	<ul style="list-style-type: none"> 2008 onwards 2008 onwards 	
<ul style="list-style-type: none"> ▪ Increase the number of countries that have and are implementing legislation and policies on burn prevention, such as policies on smoke detectors, set temperatures of hot water heaters, flame resistant children's sleepwear, fire and electrical codes, safe stoves and Reduced Ignition Propensity (RIP) cigarettes, in locations where these would be appropriate. 	<ul style="list-style-type: none"> ▪ Increased number of countries that receive and utilize guidance from WHO on policies, strategies and regulations on burn prevention and care. ▪ Increased number of countries with national health insurance plans that include burn prevention and care. 	<ul style="list-style-type: none"> 2008 onwards 2009 onwards 	

3. DATA AND MEASUREMENT

GOAL

- Facilitate and enhance the collection, analysis and dissemination of data on burns (including data on mortality, morbidity, health impacts, disability and associated costs) at the country, regional and global levels.

AREA OF WORK	PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> Improve Global Burden of Disease (GBD) estimates and national data on burn deaths and disabilities. 	<ul style="list-style-type: none"> Identification of existing country-level burn survey and surveillance data for use in GBD estimates. 	2008 onwards
<ul style="list-style-type: none"> Promote the inclusion of burn-related questions in national Demographic and Health Surveys (DHS) and other surveys. 	<ul style="list-style-type: none"> A set of key questions which could be included in forms for surveillance and in questionnaires for surveys such as the DHS. 	2008–2009
<ul style="list-style-type: none"> Promote the inclusion of more detail on mechanism of injury and details of treatment for fatal burn cases recorded in mortuary databases. 	<ul style="list-style-type: none"> A set of key questions which could be included with data elements gathered for mortuary databases. 	2008–2009
<ul style="list-style-type: none"> Harmonize data gathering, for example, by WHO, national health data systems and other groups, on the burden of burns. 	<ul style="list-style-type: none"> Greater use of external-cause codes for burns in hospital databases. 	2008 onwards
<ul style="list-style-type: none"> Strengthen health information systems for burn data, including standardizing data gathered in a variety of specific circumstances, including burn admissions (e.g. trauma registries) and burns treated in emergency departments (e.g. minimum data elements). 	<ul style="list-style-type: none"> Standard chart for burn admissions, which would be useful for clinical care, record-keeping and data gathering (separate ones would need to be developed for general hospitals and for burn centres). 	2008–2009
<ul style="list-style-type: none"> Increase quality of burn data for use in risk factor analysis to provide firm scientific basis for prevention efforts. 	<ul style="list-style-type: none"> Updated standards for burn/trauma registry, which had been included in the original Burn Kit. 	2008–2009
	<ul style="list-style-type: none"> Standardized questionnaire for data gathering in more depth in community studies or for use in hospitals in one-time studies. 	2008–2009
<ul style="list-style-type: none"> Increase dissemination of data on the burden of burns and the benefits of burn prevention and treatment strategies. 	<ul style="list-style-type: none"> All of above products and outputs plus those listed in advocacy section. 	2008 onwards

DHS, Demographic and Health Survey; GBD, Global Burden of Disease.

4. RESEARCH

GOALS

- Identify key research needs in the field of burn prevention and care, set an agenda of priorities, and ensure that information on these priorities is available to researchers, governments, donors and other stakeholders.
- Promote and foster trials of promising interventions for preventing burns, especially in low- and middle-income countries.

AREA OF WORK		PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> ▪ Develop a research agenda for burn prevention and care, to include a list of high priority research questions and potential research projects, and which encompasses epidemiologic/ etiologic aspects of burn injury, prevention programmes and their evaluation, clinical care, outcomes, costing and cost-effectiveness. 	<ul style="list-style-type: none"> ▪ A task force/network of burn prevention and care researchers, emphasizing participation of those from low- and middle-income countries. ▪ Publication of key research needs, a research agenda, and lists of high priority research questions and potential research projects. ▪ A web site of research priorities and needs in the burn field. 	<ul style="list-style-type: none"> ▪ An expanded network of collaborating centres, emphasizing low- and middle-income countries, so that their involvement in formulating research questions and in conducting research to answer these questions is increased. ▪ A set of model countries for piloting and evaluating good practices in burn prevention and care. 	2008–2009
			2009 onwards
			2009 onwards
<ul style="list-style-type: none"> ▪ Promote and support network(s) for information exchange and debate on matters relating to burn prevention and care. ▪ Promote and provide technical support for research into promising burn prevention strategies. 	<ul style="list-style-type: none"> ▪ An expanded network of collaborating centres, emphasizing low- and middle-income countries, so that their involvement in formulating research questions and in conducting research to answer these questions is increased. ▪ A set of model countries for piloting and evaluating good practices in burn prevention and care. 	<ul style="list-style-type: none"> ▪ An expanded network of collaborating centres, emphasizing low- and middle-income countries, so that their involvement in formulating research questions and in conducting research to answer these questions is increased. ▪ A set of model countries for piloting and evaluating good practices in burn prevention and care. 	2009 onwards
			2009 onwards

5. PREVENTION

GOALS

- Support the development of stronger and more effective burn prevention programmes in all countries.
- Increase the number of countries with national strategies and programmes for preventing burns.

AREA OF WORK	PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> ▪ Promote known interventions in circumstances where they are likely to work (e.g. urban/middle income environments), to include smoke detectors, hot water heater temperature, flame resistant sleepwear, fire and electrical codes, Reduced Ignition Propensity (RIP) cigarettes and fuel tank integrity. 	<ul style="list-style-type: none"> ▪ Best practices booklet, which demonstrates effective burn prevention programmes, and is aimed at potential burn prevention practitioners, such as public health and other professional audiences. 	2008–2009
<ul style="list-style-type: none"> ▪ Compile and publish pilot work demonstrating lowering of burn rates from prevention work in low-income settings. 	<ul style="list-style-type: none"> ▪ Editorial in the journal <i>Burns</i> soliciting articles on burn prevention trials in low-income countries. ▪ Publication of reports of well-evaluated pilot programmes on burn prevention in low-income countries, where thus far risk factors have not been well addressed and peer-reviewed publications of successful burn prevention programmes have been lacking. 	2008 2008 onwards
<ul style="list-style-type: none"> ▪ Improve ability of burn prevention groups to engage in programme evaluation and monitoring. 	<ul style="list-style-type: none"> ▪ Primer on evaluation and monitoring of burn prevention programmes aimed at burn prevention groups working in low- and middle-income countries. 	2009 onwards
<ul style="list-style-type: none"> ▪ Provide guidance to countries on burn prevention programmes and their evaluation. ▪ Provide guidance on how to integrate burn prevention activities into other areas of health promotion. 	<ul style="list-style-type: none"> ▪ Technical support to countries and regions to develop plans for burn prevention programmes and their evaluation. ▪ A set of model countries for implementing and evaluating good practice in burn prevention. 	2008 onwards 2009 onwards

6. HEALTH-CARE SERVICES FOR BURN VICTIMS

GOAL

Strengthen treatment services for persons affected by burns, including acute care, rehabilitation and recovery, especially in low- and middle-income countries.

AREA OF WORK		PRODUCTS AND OUTPUTS		TIMELINE	
<ul style="list-style-type: none">▪ Update and expand usage of existing WHO burn guidelines, such as the clinical care guidelines contained in <i>Integrated management of emergency and essential surgical care (IMIEESC)</i> tool kit and the resource guidelines contained in the <i>Guidelines for essential trauma care</i>.		<ul style="list-style-type: none">▪ Increased use of existing WHO burn guidelines.		2008–2009	
<ul style="list-style-type: none">▪ Assist the International Federation of Red Cross and Red Crescent Societies and other stakeholders with the development of training materials on burn prevention and care for use in first-aid courses.		<ul style="list-style-type: none">▪ Simplified version of the Burn Fact Sheet for first-aid training, which incorporates both prevention and basic first-aid messages.		2008 onwards	
<ul style="list-style-type: none">▪ Strengthen burn care quality improvement programmes.		<ul style="list-style-type: none">▪ New WHO trauma quality improvement guidelines, which include burn components.		2008–2009	
<ul style="list-style-type: none">▪ Increase standardization for resources at burn centres.		<ul style="list-style-type: none">▪ Standards for staffing and equipping burn centres, including standards for number of more highly-trained burn personnel (e.g. burn nurses, burn surgeons), as well as assessment of need and cost-effectiveness of such more highly-trained staff.		2008 onwards	
<ul style="list-style-type: none">▪ Increase access of burn victims with disfigurement to services and compensation which countries provide to disabled persons but which are currently not available to disfigured persons.		<ul style="list-style-type: none">▪ Normative standards defining what levels of disfigurement correspond to what level of disability.		2009 onwards	

<ul style="list-style-type: none"> ▪ Promote improved access to medical rehabilitation services, including physical, occupational and psychosocial services and services that can take into account the special needs of children. ▪ Integrate burn survivors into the disabled rights movement. ▪ Establish greater numbers of burn survivors groups and increase the use of existing groups. 	<ul style="list-style-type: none"> ▪ Elements of relevance to burn victims incorporated into the <i>Medical rehabilitation guidelines</i> and the <i>World report on disability</i>. 	2008 onwards
	<ul style="list-style-type: none"> ▪ A booklet of case studies (to include as many examples as possible from low- and middle-income countries) describing the experience of both burn survivors and burn survivor groups, to increase awareness and highlight best practices. ▪ International versions or expansions of burn survivor groups such as Survivors Offering Assistance in Recovery (SOAR) and Changing Faces. 	2008–2009 2009 onwards



7. CAPACITY BUILDING

GOAL

- Strengthen the capacity of people in countries worldwide to effectively undertake the spectrum of burn control activities, including advocacy, policy development, data collection, research, prevention and improved burn-care services.

AREA OF WORK	PRODUCTS AND OUTPUTS	TIMELINE
<ul style="list-style-type: none"> Include burn prevention and related activities in MENTOR-VIP, the WHO mentoring programme for injury and violence prevention. Provide seed funding and technical support to networks that promote injury-related research in high priority issues, such as pilot burn prevention programmes in low- and middle-income countries. Promote the provision of scholarships to conferences and training programmes, such as those using TEACH-VIP, that will build capacity and foster collaboration in burn prevention and care between countries and regions. Target systems and structural support with a view to ensuring sustainable financial support and promotion of intersectoral collaboration. 	<ul style="list-style-type: none"> Mentors and mentees who are especially interested in burn prevention and care activities. Burn prevention and care networks in low- and middle-income regions. Primer on evaluation and monitoring of burn prevention programmes aimed at burn prevention groups working in low- and middle-income countries. Strengthened teaching materials and training capacity to support the delivery of services for burn victims, including acute care, rehabilitation and recovery. Increased opportunities for technical exchange on burns among ministry of health focal points in relevant fora (e.g. regional committee meetings, regional consultations on injury-related topics) 	<p>2008–2009</p> <p>2008 onwards</p> <p>2008–2009</p> <p>2008 onwards</p> <p>2008 onwards</p>
<ul style="list-style-type: none"> Improve communication and cooperation between ISBI, WHO, Interburns and other stakeholders engaged in the development of burn-related teaching aids and course curricula. 	<ul style="list-style-type: none"> Increased harmonization of burn care training materials between the different groups. Increased use of these training materials for refresher courses for health workers at all levels and for use in schools of medicine, nursing and other relevant professions. 	<p>2008 onwards</p> <p>2008 onwards</p>

ISBI, International Society for Burn Injuries.

This plan addresses work to be undertaken by WHO and other stakeholders globally. It is hoped that the plan will assist stakeholders in maximizing the effectiveness of their work and in garnering the funds needed to conduct their activities. However, it is important to emphasize that there is much that can be done with relatively little in the way of additional resources, especially in terms of advocacy. The adjacent list of products and outputs will be completed by WHO and its partners with existing resources and staff within the next two years.

The BURN PLAN

TWO-YEAR PROGRAMME

1. ADVOCACY

- Update the burn fact sheets.
- Update those components of the WHO web site that address burns.

2. POLICY

- Web-based compilation and analysis of national and local policy on burn prevention and care.

3. DATA AND MEASUREMENT

- Identify existing burn data for use in global burden of disease estimates
- Define key questions for surveillance and surveys (e.g. Demographic and Health Surveys).
- Define key questions for mortuary databases.
- Create standardized charts for burn admissions.
- Update forms and standards for burn registries from those previously in the Burn Kit (published by WHO in 1994).

5. PREVENTION

- Compile a best practices booklet on burn prevention programmes.

6. HEALTH-CARE SERVICES FOR BURN VICTIMS

- Update and expand usage of existing WHO burn guidelines, such as the clinical care guidelines contained in *Integrated management of emergency and essential surgical care (IMEESC) tool kit* and the resource guidelines contained in the *Guidelines for essential trauma care*.

8. CONCLUSION

The major gaps in burn prevention and care have been identified as being in the following areas:

Advocacy : There is limited awareness of the problem, particularly among policy-makers and donors.

Policy : Implementation and enforcement of policies to address the burn problem is limited.

Data and measurement : Data on the magnitude of the problem, risk factors and economic consequences are either inaccurate or inadequate.

Research : Research on the burden and risk factors for burns in the circumstances of low- and middle-income countries, as well as in relation to the evaluation of intervention trials or the cost-effectiveness of burn prevention and care strategies, is lacking.

Prevention : (a) Inadequate application of known, effective prevention strategies, such as smoke detectors and regulation of hot water heater temperature, in environments where they would likely be effective, such as urban areas in middle-income countries; (b) Insufficient scientific evaluation of strategies to confront the risk factors causing burns in low-income countries.

Services : The application of effective burn care (including acute care, rehabilitation and long-term recovery of burn victims) in many low and middle-income countries is inadequate.

Capacity : There are insufficient numbers of people trained in the skills needed to undertake the above spectrum of burn control activities.

WHO's work in the area of burn prevention and care will follow the public health approach and, in so doing, will attempt to address the gaps and inequities identified above. WHO and its partners are committed to promoting the development of multidisciplinary national strategic plans for burn prevention within countries by strengthening capacity and the level of training, and by supporting the collection of data, research and the development of appropriate interventions to strengthen the prevention and care of burns. In addition, WHO will be instrumental in pushing forward the agenda of burn prevention and care by advocating at a global and regional level and encouraging donors to support efforts to reduce the magnitude of the burden. Concerted multisectoral efforts, strong partnerships and international cooperation will be essential to take this agenda forward.

REFERENCES

1. Peden M et al., eds. *World report on road traffic injury prevention*. Geneva, World Health Organization, 2004.
2. Krug EG et al., eds. *World report on violence and health*. Geneva, World Health Organization, 2002.
3. Mock C et al. *Guidelines for essential trauma care*. Geneva, World Health Organization, 2004.
4. Sasser S et al. *Prehospital trauma care systems*. Geneva, World Health Organization, 2005.
5. *The injury chartbook: A graphical overview of the global burden of injuries*. Geneva, World Health Organization, 2002.
6. Marshall SW et al. Fatal residential fires: who dies and who survives? *Journal of the American Medical Association*, 1998, 279:1633–1637.
7. Ytterstad B, Sogaard AJ. The Harstad Injury Prevention Study: prevention of burns in small children by a community-based intervention. *Burns*, 1995, 21: 259–266.
8. Haddix AC et al. Cost-effectiveness analysis of a smoke alarm giveaway program in Okalahoma City, Oklahoma. *Injury Prevention*, 2001, 7:276–281.
9. Ahuja RB, Bhattacharya S. Burns in the developing world and burn disasters. *British Medical Journal*, 2004, 329:447–449.
10. Lau YS. A insight into burns in a developing country: A Sri Lankan experience. *Public Health*, 2006, 120:958–965.
11. Albertyn R, Bickler S, Rode H. Paediatric burn injuries in sub-Saharan Africa – an overview. *Burns*, 2006, 32:605–612.
12. Forjuoh SN. Burns in low- and middle-income countries: a review of available literature on descriptive epidemiology, risk factors, treatment, and prevention. *Burns*, 2006, 32:529–537.
13. Mock C et al. Evaluation of trauma care capabilities in four countries using the WHO/IATRIC Guidelines for Essential Trauma Care. *World Journal of Surgery*, 2006, 30: 946–956.
14. Holder Y et al., eds. *Injury surveillance guidelines*. Geneva, World Health Organization, 2001.
15. *Surgical care at the district hospital*. Geneva, World Health Organization, 2003 (http://www.who.int/surgery/publications/scdh_manual/en/index.html, accessed 3 December 2007).
16. *Integrated management of emergency and essential surgical care (IMEESC) tool kit*. Geneva, World Health Organization, 2007 (<http://www.who.int/surgery/publications/imeesc/en/index.html>, accessed 3 December 2007).
17. Scott I et al. *Child and adolescent injury prevention: A WHO plan of action 2006–2015*. Geneva, World Health Organization, 2006.

