



WORLD HEART
FEDERATION®

State of the Heart

Cardiovascular Disease Report

About the World Heart Federation

The World Heart Federation is dedicated to leading the global fight against heart disease and stroke with a focus on low- and middle-income countries via a united community of more than 200 member organizations. With its members, the World Heart Federation works to build global commitment to addressing cardiovascular health at the policy level, generates and exchanges ideas, shares best practice, advances scientific knowledge and promotes knowledge transfer to tackle cardiovascular disease – the world’s number one killer. It is a growing membership organization that brings together the strength of medical societies and heart foundations from more than 100 countries. Through our collective efforts we can help people all over the world to lead longer and better heart-healthy lives. www.worldheart.org

Foreword

Dear Friends,

Every year, 17.1 million lives are claimed by the global burden of cardiovascular disease (CVD) - 82% of which are in the developing world. The increasing number of deaths – especially in low- and middle-income countries – is alarming and saddening, particularly since through steps such as eating a healthy diet, regular physical activity and avoiding tobacco, the majority of these deaths could be prevented.

Over the past decade, the public health and medical communities have been strengthening efforts to fight the growing burden of CVD. Policy changes to combat tobacco use, advances in medicine and a new recognition for the need to prioritize non-communicable diseases, including CVD, as a public health emergency, will positively affect the lives of millions of people around the world. We are therefore proud to present to you this 'State of the Heart' Report, which on the 10th anniversary of World Heart Day celebrates key achievements made in CVD policy, science and medicine over the past 10 years.

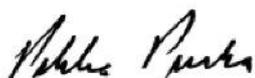
However, against the milieu of success, we must not forget that CVD continues to be the number one killer worldwide. There is an urgent need for further improvements in heart health globally, which is why this report also identifies the challenges still ahead and makes recommendations as to how these can be addressed.

By working together to overcome these challenges, we can ensure more effective collaboration aimed at strengthening health systems; improve care and equal access to medical advancements; and achieve greater public and political attention to the world's number one killer.

We call upon employers, healthcare professionals, policy makers and the general public to join us in the fight against the growing burden of CVD.

We hope this report will encourage and inspire you to promote a heart-healthy world and that you will all join us in achieving this.

In heart health,



Pekka Puska, MD, PhD
President (2009–2010)



Sidney C. Smith Jr, MD
President (2011–2012)

Introduction

The 'State of the Heart' CVD Report content was identified by an expert panel of representatives from the World Heart Federation, with contributions from the World Health Organization. The expert panel members are listed below. For further information please refer to the short biographies at the end of the report:

- **Professor Pekka Puska**
President, World Heart Federation
- **Professor Sidney C. Smith Jr**
President-Elect, World Heart Federation
- **Dr Akira Matsumori**
Secretary, World Heart Federation
- **Dr K. Srinath Reddy**
Chairman, Foundations' Advisory Board,
World Heart Federation
- **Dr Kingsley Akinroye**
Member, World Heart Federation Board
- **Dr Eduardo Morales Briceno**
Member, World Heart Federation Board
- **Dr Shanthi Mendis**
Senior Advisor for Cardiovascular Diseases and
Coordinator, Chronic Disease Prevention and
Management, World Health Organization
(WHO)
- **Dr Kathryn Taubert**
Senior Science Officer, World Heart Federation

The report is divided into three main sections:

The top 10 achievements in CVD over the past 10 years

In this section the expert panel briefly trace the recent history of heart health, and consider the achievements made over the past decade, drawing upon the key influences to improvements being made, and presenting case study success stories to which the wider global health community can aspire.

The challenges ahead

Here the panel discuss the ongoing barriers to global heart health that must be addressed, and consider the tools and expertise that are needed for success in fighting these challenges, particularly in low- and middle-income countries (LMICs) where the strategies of more developed nations are often harder to implement.

Call to action

The expert panel call on policy makers, healthcare professionals and the general public to join them in working towards heart-healthy lives for everyone.

For further information about heart health, please visit:
www.worldheart.org

The top 10 achievements in CVD over the past 10 years

1. Recognition of non-communicable diseases as an urgent public health priority by the United Nations

The global impact of non-communicable diseases (NCDs), which includes CVDs, diabetes, chronic respiratory diseases and cancers, on the social and economic development of all United Nations (UN) countries is enormous. They are responsible for 60 per cent of deaths worldwide (35 million) and half of these can be attributed to CVD, making it the world's number one killer.^{1,16}

The WHO estimates that global deaths from NCDs will continue to rise over the next 10 years with the African region expected to see the highest relative increase (27 per cent).¹ It is estimated that 8 million people die prematurely in LMICs from NCDs every year.¹ NCDs are a major cause of poverty, a barrier to economic development and a neglected global emergency. The UN Millennium Development Goals (MDGs) state that health is critical to the economic, political and social development of all countries², yet they contain no goals or targets for NCDs, the largest burden of disease in LMICs, nor have they received the attention of overseas development aid (ODA), with less than one per cent of total aid received. Governments in LMICs need both financial and technical assistance to turn around the NCD epidemic that threatens to undo development gains made over the last decade.

Recognizing the need to reduce NCDs as an urgent public health priority, 193 Ministers of Health endorsed the Action Plan for the Global Strategy for the Prevention and Control of NCDs at the Sixty-First World Health Assembly. Building on this plan to promote partnerships, the WHO created NCDnet to help implement objective five of the Global NCD Action Plan, catalyzing an

intersectoral, multi-level coordinated response with a particular focus on LMICs and vulnerable populations.³ In 2009, the World Heart Federation and its sister organizations the International Diabetes Federation and

the Union for International Cancer Control formed the NCD Alliance, and were joined in early 2010 by the International Union Against Tuberculosis and Lung Disease, together representing 880 member associations in more than 170 countries.¹

The NCD Alliance mobilized civil society to campaign for a UN Summit on NCDs. On May 13 2010, the UN General Assembly voted unanimously for UN Resolution 64/265 to hold a UN Summit on NCDs in September 2011.⁴ The Summit is the biggest and best opportunity to put NCDs on the global agenda and help make lasting improvements for people living with them. It will address the threat posed by NCDs to LMICs, and

bring together government representatives from both overseas aid donor countries and LMICs with public health experts from around the world. It has the potential to secure commitment from Heads of Government to a coordinated global response to NCDs, substantially increase resources for NCDs and save millions from premature death and debilitating health complications.

Recognition of NCDs as a high-level priority by the UN has also been a landmark event in the World Heart Federation's advocacy efforts. The UN Summit, combined with collective efforts at international and national levels, will result in millions of lives being saved and a reversal in damaging social and economic effects caused by NCDs.

“ NCDs account for over 60% of all global deaths, and have unnecessarily claimed far too many lives. We need a platform to discuss solutions to the growing danger posed by NCDs, and agree on future action to tackle the epidemic. The UN High-Level summit on NCDs is a significant step in the right direction to fight the rising burden of NCDs, and we hope that we will soon see a concrete action plan for global to local levels of NCD prevention. ”

Professor Pekka Puska, President,
World Heart Federation

2. The WHO Framework Convention on Tobacco Control

A massive 1.3 billion people use tobacco; it kills more than 14,500 people every day, and debilitates and sickens many times that number.⁵ In recent years the dangers of tobacco use have become widely recognized and scientific evidence has conclusively established the causal relationship between tobacco use and disease.⁵ Accompanying this increasing scientific knowledge-base is the public health response to the tobacco epidemic. Although numerous tobacco control initiatives have come into place, the WHO Framework Convention on Tobacco Control (FCTC) in particular is recognized as being the most significant and influential effort to strengthen tobacco control worldwide, and was recently described as 'a global galvanizing force for the past decade, serving, as its name implies, as a framework and road map for global tobacco control efforts'.⁵

The Framework Convention, which took effect in 2005 and is the first of its kind, provides instruction for decisive action to reduce the demand and supply of tobacco.⁶ Since its adoption, many countries have taken measures to decrease tobacco use and save lives

through banning tobacco advertising and sponsorship; protecting citizens from tobacco-smoke exposure; and mandating pictorial warnings on cigarette packs.⁷

Today, the FCTC is ratified by more than 160 Parties covering 86 per cent of the world's population.⁸ The treaty is recognized as a substantial achievement because it:⁷

- Catalyzed global action and continues to establish strong momentum for progression towards global tobacco control
- Elevates the importance of tobacco control as a global health and political priority
- Stimulates policy change at the global and national level

Ultimately the FCTC unites countries in the fight against the tobacco epidemic, and advances the move towards a tobacco-free world, and the positive health outcomes associated with it.

" In my opinion the top achievement of the 21st century towards eliminating the mortality and morbidity caused by CVD was the Framework Convention on Tobacco Control, by the World Health Assembly in 2003. The Convention was a landmark achievement, as it was the first global public health treaty which enabled, and importantly continues to drive and influence, governments to take policy action against tobacco. "

Dr Shanthi Mendis, Senior Advisor for Cardiovascular Diseases and Coordinator for Chronic Disease Prevention and Management, World Health Organization

3. Increased awareness of the importance of diet and physical activity on heart health

Throughout recent years, recognition that healthy diets and regular, adequate physical activity are major factors in the maintenance of good heart health has increased. Mainstream media frequently report on the need for a balanced diet, and scientific discoveries into the nutritional value of certain food types has led to the promotion of 'superfoods' to protect your heart, alongside reporting about the links between unhealthy diets and a lack of physical activity on raised blood pressure, high cholesterol, obesity and CVD.

A wealth of information about how to eat healthily and exercise adequately is now at our finger tips. This important achievement can be attributed to the combined efforts of many stakeholders, and the successful campaigns and strategies launched by both governments and non-governmental organizations. As examples: in 2005, the United States Department of Agriculture launched 'MyPyramid',⁹ a new symbol and interactive food guidance system emphasizing the need for a more individualized approach to improving diet and lifestyle; many other governments have similar guidance in place. As an example of a non-governmental campaign, in 2008, the Union of European Football Associations (UEFA) and the World Heart Federation, with the support of the European Commission, launched the children's cookery book, *Eat for Goals!*,¹⁰ through which a multicultural group of 13 internationally renowned male and female football players communicate to young people the importance of a healthy lifestyle. Today the book is available in

seven languages and is sold worldwide.

Overarching to the success of such campaigns is the WHO's Global Strategy on Diet, Physical Activity and Health. Recognizing the opportunity that exists to substantially reduce CVD deaths and disease burden worldwide by improving diet and promoting physical activity, the Strategy provides guidance to encourage healthy living.¹¹

The Strategy is an achievement of the 21st century because widespread adoption of it will:

- Encourage public health actions to reduce risk factors for chronic diseases that stem from unhealthy diets and physical inactivity
- Increase public health awareness and understanding of the influences of diet and physical activity on health, and the positive impact of preventive interventions
- Encourage the development and implementation of global, regional, national policies and action plans to improve diets and increase physical activity that are sustainable, comprehensive and actively engage all sectors

The Strategy represents a significant development in the fight against unhealthy living and the heart-harm it brings.

Eat for Goals

The factors for obesity are many. They include unhealthy diets among a growing number of individuals as time constraints and greater mobility modify eating habits, replacing traditional meals by snacks on the go. Other causes are poor infant feeding practices and overconsumption of food too rich in calories, proteins, fat and carbohydrates as well as sugar. This increase in calorie intake is not being offset by increased physical activity; in fact, globally, humanity is becoming more physically inactive due to urbanization, motorised transport, technology in the home and passive leisure pursuits. *Eat for Goals!* was created to encourage young people to be more conscious of living active lifestyles and eating well.



4. Workplace-wellness initiatives to promote health amongst employees

Globally, chronic diseases are estimated to account for US\$2 trillion in lost productivity each year, mainly in the form of absenteeism.¹² Chronic diseases are thought to contribute to 40 per cent of the total loss of productivity.¹³ In terms of healthcare costs, the WHO estimates that chronic disease makes up approximately 75 per cent globally.¹⁴

Studies have found that workplace-wellness programmes can achieve a 25–30 per cent reduction in medical and absenteeism costs in an average period of about 3.6 years.¹⁵ 80 per cent of premature deaths can be avoided by controlling the main modifiable risk factors: tobacco use, unhealthy diet and physical inactivity. As most employees spend more than half of their waking hours at work, businesses can play an important role in fighting heart disease and stroke.¹⁶

The World Economic Forum 'Working Towards Wellness Initiative' both supports and promotes companies involved in workplace wellness through its "Wellness Alliance for Workplace Health" launched at the Forum's Annual Meeting in Davos in January 2010.

The World Economic Forum also works with businesses, across sectors to help them realize the economic benefits of developing health related products or services. By partnering with the private sector and other key partners, this initiative raises awareness globally, facilitating the development and implementation of sustainable models of chronic disease prevention at the regional level and providing practical support in developing and implementing wellness programmes to businesses.¹³

In 2009 and 2010, the World Heart Federation's theme for World Heart Day was workplace well-being, with a focus on how to encourage people to take charge of their heart health at the workplace. The World Economic Forum, together with the World Heart Federation, is encouraging employers and employees to promote a heart-healthy workplace by adopting

workplace-wellness activities. These activities will demonstrate that improvements in wellness among employees not only improve employees' performance, but also lead to significant returns on investment for companies.

" Apart from having a responsibility towards employees' health, employers stand to benefit from introducing workplace-wellness programmes, as they have been shown to decrease absenteeism, while increasing productivity, retention, creativity and innovation. During the past decade many businesses have recognized the importance of employee health and have committed to include health promotion as a priority in their corporate agenda. "

Olivier Raynaud,
Senior Director, Global Health
and Healthcare Sector,
World Economic Forum

5. Improved public awareness of, and access to, CVD healthcare in developing countries

The WHO estimates that by 2030 the number of annual deaths caused by CVD will rise to almost 23.6 million.¹⁶ With increased access to fatty foods and high rates of tobacco use, CVD is becoming a rising burden in LMICs. CVD is projected to remain the single leading cause of death, and healthcare systems worldwide are exploring ways to address this increasing burden on their resource.

A number of initiatives, including revitalization and integration of essential NCD interventions into primary care driven by the WHO, have been designed to provide a flexible but scientific base on which countries

can build or redesign health systems in accordance with evolving local resources and demands.^{17,18}

Simultaneously, the public has grown more aware of the symptoms and ways to prevent and control CVD. In addition to focused awareness raising efforts by international organizations such as the WHO and the World Heart Federation, there have been significant campaigns in developing countries driven by patient groups and healthcare workers aimed at raising awareness of CVD risk factors, and promoting healthier lifestyle choices and what individuals can do to lead heart-healthy lives.

“ Heart attacks are not discriminative and can affect the rich and poor alike. Historically, the urban affluent may have been better educated on heart attack risk and therefore increasingly likely to disengage from risk behaviours, and more able to promptly access healthcare. However, improved patient awareness of symptoms and increases in technologies such as mobile diagnostic imaging allows CVD risk assessment to occur among the lower-income sections of society and simultaneously to increase patient awareness of heart disease risk. This is a significant achievement in breaking down disparities in CVD healthcare access.”

Dr Srinath Reddy, Chairman, Foundations’ Advisory Board, World Heart Federation

6. Improved recognition of symptoms and treatment for heart attacks

Heart attacks are caused by the interruption of the blood supply to part of the heart, causing heart cells to die. This is most commonly due to blockage of a coronary artery by a blood clot following the rupture of a vulnerable atherosclerotic plaque, which is an unstable build-up of lipids (fatty materials such as cholesterol) and white blood cells in the wall of an artery.¹⁹

Since the 1980s, advances in cardiac biomarkers to determine factors ranging from cholesterol and lipoprotein levels to thrombosis to genetic variants have enabled cardiologists to better determine a patients’ CVD risk and thus allow for earlier corrective action. In addition, increased use of anti-platelet therapy in patients at risk, such as aspirin, which stop

blood clots from forming, have “been shown to reduce mortality rates by reducing the risk of fatal myocardial infarctions, fatal strokes, and vascular death”.¹⁹

Diagnosis and recognition of symptoms have also been enhanced by public education and through advances in diagnostic imaging.²⁰

As a result of the advances in science and the improved prevention and treatment of heart attacks over the period 1999–2008 there has been a 24 per cent relative decrease in incidence and improved outcomes of acute myocardial infarction and acute coronary syndromes, coupled with a reduction in death due to coronary heart disease.²¹

7. Quality improvements in hospitals

It is recognized that differences in access to health resources and therefore CVD care may exist dependent upon socio-economic status, race and ethnicity.^{22,23} For example, it has been documented that among those with acute coronary syndromes, ethnic minority groups are less likely to receive evidence-based care.²²

An achievement in CVD treatment across recent years has been the introduction of quality improvement programmes within hospitals. For example, the American Heart Association (AHA) launched the Get With The Guidelines® web-based program to help hospitals improve the quality of care they provide to coronary artery disease patients by aligning treatment with the most current scientific guidelines for heart disease and stroke treatment.^{24,25} The programme provides hospitals with a robust database and real-time benchmarking capabilities with the ultimate goal of supporting healthcare professionals to enhance patient

outcomes and save lives.²⁵

A review of 443 hospitals participating in the programme between January 2002 and June 2007 concluded that among hospitals engaged in a national quality monitoring and improvement programme, for patients experiencing a heart attack evidence-based care appeared to improve over time and differences in care were reduced, irrespective of the patients' race or ethnicity.²²

The study supports an increasing bank of evidence that participation in quality improvement programmes and the resulting superior patient care may lead to improved short-term and long-term patient outcomes across all socio-economic classes, decreasing health disparities over time, lowering rates of re-hospitalization due to CVD, and eventually the reduction of CVD mortality overall.

China Bridging the Gap (BRIG) Project

The BRIG project is a collaborative project between the World Heart Federation, the Beijing Institute of Heart, Lung & Blood Vessel Diseases-Beijing Anzhen Hospital, the Chinese Society of Cardiology and the China National Health Heart Programme. It aims to improve the quality of care of coronary heart disease patients in China by identifying the major barriers between secondary prevention guidelines and clinical practice in patients with coronary heart disease in China. As a final result, the project will provide evidence-based proposals for improvement of quality of care of coronary heart disease in China, contributing to the overall achievements associated with quality-improvement programmes.



8. Statin therapy

CVD is often caused by a build up of fatty materials such as low-density lipoprotein (LDL), or 'bad' cholesterol, in the arteries. This can lead to the formation of plaques, which narrow the arteries and limit blood flow. Known as atherosclerosis, this condition places patients at a high-risk of death if a plaque ruptures. A blood clot will form at the site of the rupture and can block the artery. If this happens in one of the arteries in the heart a heart attack can occur. If the artery is in the brain, a stroke will result.²⁶

Statins are a group of medicines used to decrease the amount of cholesterol produced by the body. In 1976, two Japanese researchers

- Akira Endo and Masao Kuroda – achieved the development of the first statin cholesterol-lowering agent.²⁷ Since then, statins have 'revolutionized' the treatment of elevated cholesterol, reducing the risk of heart disease and heart attacks in people with increased cholesterol levels.²⁸

The benefits of statin therapy have been clearly documented over the past decade. In 2003, Law *et al.* concluded that statins can lower LDL cholesterol concentration, reducing the risk of ischaemic heart disease (IHD) events by about 60 per cent and stroke by 17 per cent.²⁹ Studies have confirmed that the effectiveness of statins to reduce cardiovascular events in patients at risk is great and today statins are the best-selling drug class of all time having been hailed 'the aspirin of the 21st century'.³⁰

" There is no doubt that the use of statin therapy to lower cholesterol in patients at risk has made a major impact on CVD health outcomes, contributing to the ultimate goal of modern healthcare, which is reducing a patient's risk of CVD events. "

Dr Sidney C. Smith Jr,
President-Elect,
World Heart Federation

Michael Brown and Joseph Goldstein, who were in 1985 jointly awarded the Nobel Prize in Psychology and Medicine for "for their discoveries concerning the

regulation of cholesterol metabolism",³¹ in 2004 declared that millions of lives will be extended through statin therapy.³² In 2007, Robert Shook identified statins as one of seven lifesaving 'miracle medicines' that 'stave off death'.³² Today, the positive impact of statins on reducing CVD morbidity and mortality is well-recognized.

9. The development of monitors to assist in the correct diagnosis of atrial fibrillation

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia (abnormal heart rhythm).³³ It results from abnormal electrical activity, leading to an irregular heart rhythm preventing the blood from being efficiently pumped throughout the body.³⁴ The consequences of AF are significant: people with AF are five times more likely to have a stroke.³⁵ The lifetime risk for developing AF is approximately 25 per cent in the general population,³⁶ and consequently AF is a fast growing public health concern.

Diagnosis of AF is complicated since some patients show no symptoms, whereas other people's symptoms change from day to day.³⁷ Increased awareness of the urgency of accurately diagnosing and subsequently treating AF has led to the development of medical devices. Advances in electrocardiograms (to record the electrical activity of the heart) and echocardiographs (a scan to assess the structure and function of the heart) allow healthcare professionals to detect AF, and

diagnose AF even if the irregular heartbeat occurs infrequently.

In addition to developments in modern technology, awareness campaigns to improve both healthcare professional and patient understanding of AF are likely to lead to more prompt and accurate diagnosis. For example, The World Heart Federation, Atrial Fibrillation Association, Stroke Alliance For Europe and European Heart Rhythm Association have come together to launch AF AWARE, an international campaign to call upon their peers around the world to raise awareness and understanding of AF and its cardiovascular consequences.

Improvements in diagnosis via developments in modern technology or health awareness initiatives, mean that healthcare professionals can more effectively treat AF, thus improving the quality of life of patients; a significant achievement.

A patient's story

Mrs X suffered with symptoms caused by an arrhythmia of the heart for 14 years before receiving an indication that the cause could likely be atrial fibrillation. Throughout these years, her symptoms had a detrimental impact on her life, ranging from a very rapid heartbeat causing her to be off work for several months due to an inability to exert herself, to a very low heart beat and severe pressure and pain in the left-hand side of her chest, her shoulder, neck and face, causing her to feel sick and unwell. Having visited numerous healthcare professionals, and experienced a long haul of endless waiting lists for tests and consultant visits, Mrs X was frustratingly diagnosed with everything from pre-menstrual symptoms to rheumatic fever to stress to a heart attack.

After researching the 'Arrhythmia Alliance' on the Internet, Mrs X recognised a lot of her symptoms as those that can be caused by atrial fibrillation. After visiting an electrophysiologist, Mrs X was provided with a cardiac monitor, to determine her heart rate and rhythm during daily activities. The results from such a monitor can assist with a correct diagnosis, and lead to therapy which can relieve symptoms experienced by Mrs X.

Case study adapted from 'A misdiagnosis of Atrial Fibrillation', a patient story available on the Arrhythmia Alliance website. Please visit <http://www.heartrhythmcharity.org.uk/patient-area/case-studies>

10. Advances in diagnosing and treating congenital heart defects

The origin of congenital heart disease (CHD) largely relies on genetic contributions.³⁸ Cardiac malformations present at birth are an important component of paediatric CVD and constitute a major percentage of clinically significant birth defects, with an estimated prevalence of 4 to 50 per 1000 live births.³⁸ It is estimated that 4 to 10 live born infants per 1000 have a cardiac malfunction, 40 per cent of which are diagnosed in the first year of life.³⁸

Over the past decade, molecular genetic studies through genetic observations within families have provided important insights into the genetic basis of the several forms of CHD. These discoveries demonstrate that the genetic contribution of CHD has been significantly underestimated in the past. Diagnostic precision and defined therapies have significantly lowered morbidity and mortality, and have improved the management of CHD. Many types of genetic testing are currently clinically available.

Right ventricular outflow tract (RVOT) reconstruction forms an integral part of surgical correction in a wide spectrum of congenital heart disease.³⁹ However, the

longevity of biological valves to replace the pulmonary valve is limited because of degeneration and calcification. Further, surgical replacement of the pulmonary valve requires the patient to undergo cardiopulmonary bypass. In the past decade, clinical studies have been undertaken to find solutions to these limitations, and advances have been made for the treatment of pulmonary valvular regurgitation by transcatheter pulmonary valve replacement.³⁹

For individuals with CHD and their families, the advances made on the identification of the genetic causes and the improvements in treatment are very beneficial. Confidence in the diagnosis allows the physicians to explain the exact genetic mechanisms to the patients, and advances in treatments have significantly improved the lives of patients suffering from CHD. A global commitment from the World Health Assembly to address the problem of birth defects especially in LMICs, via the implementation of screening and the provision of ongoing support and care to children with birth defects and their families, may lead to further improvements in diagnosing and treating congenital heart defects.⁴⁰

The top 10 CVD challenges and priorities for the global health community

Challenge one

Secure a results-orientated outcomes statement at the UN High-Level Summit on NCDs, taking place in September 2011

The UN High-Level Summit on NCDs has the potential to lead to major improvements for people and health systems, worldwide, specifically the most vulnerable populations in LMICs. The perception that NCDs are diseases of the wealthy, and the global economic downturn have made it difficult to secure funding for this pressing global health concern. As such, the CVD community must work together with other civil society organizations, led by the NCD Alliance, to advocate for the inclusion of NCDs and the strengthening of health systems in the successor goals to the MDGs. In order to achieve this, the NCD Summit must conclude with a strong outcomes statement that includes a commitment to periodic reporting on progress.

The NCD Summit is a unique opportunity to set a new global priority and draw much needed attention and funding to NCDs in LMICs. It should result in a commitment from Heads of State for the allocation of adequate resources to the diagnosis, prevention, treatment and care of NCDs. The outcome of the NCD Summit should include a concrete political commitment to specific goals and measurable targets that build on the WHO's 2008–2013 Action Plan for NCDs⁴¹ and are viewed as integral to global development.

Recommendation

- Support the advocacy initiatives of the UN and WHO through active collaboration and the mobilization of our member networks
- Increase and accelerate health research on CVD/NCDs and their risk factors, stressing the serious implications they have for current poverty reduction strategies and achievement of the MDGs
- Work with the WHO and other intergovernmental organizations, NGO's and philanthropic organizations to support coherent strategies that incorporate NCDs into the MDGs and relevant social and economic policies

Challenge two

Implementation of 100% smoke-free policy and affordable smoking-cessation programmes

Despite significant progress, smoking cessation remains one of the biggest challenges for the global health community. We earlier identified that the WHO's FCTC represents significant progress towards protecting people from the morbidity and mortality caused by tobacco exposure; however, only 5.4 per cent of the world's population was covered by comprehensive smoke-free laws in 2008,⁴² meaning that further urgent action and more comprehensive adherence to and implementation of the FCTC is needed in order to advance towards a tobacco-free world.

This is a particular challenge in LMICs that are the target for the multinational tobacco industry⁴³ and where low levels of education and income, and lack of access to information, counselling and pharmaceutical therapies is prevalent. We must develop programmes and advocate for policies to tackle active and passive smoking in all communities worldwide, for example:

- The implementation of media or educational campaigns to tackle tobacco industry tactics and raise consciousness about the dangers of tobacco use thereby preventing uptake by today's youth

- Calling for the adoption of tobacco dependence treatment guidelines to increase the number of specialist healthcare professionals and increase governmental financial support, to provide an improved platform for access to smoking-cessation treatments.⁴²

Recommendation

- Increase global adherence to the FCTC
- Continue to raise awareness of the dangers of tobacco use via widespread health and media campaigns
- Advocate for comprehensive smoke-free laws and the adoption of smoking-cessation guidelines globally

Challenge three

Increasing access to affordable, quality essential medicines for CVD in LMICs

As noted within a bulletin of the WHO, a significant portion of CVD death and illness can be prevented if medications are made accessible and affordable. In patients with a high risk of CVD, aspirin, beta-blockers, angiotensin converting enzyme (ACE) inhibitors and lipid-lowering medicines reduce the risk of future vascular events by about a quarter each. However, in LMICs 50–90 per cent of the population have to pay for medicines themselves, rendering treatment unaffordable (and therefore inaccessible) for many.⁴⁴

There are a number of steps that could be taken to increase the accessibility of currently used CVD drugs

within LMICs. One such advance might be the development of a polypill containing a combination of anti-hypertensive, lipid lowering and aspirin therapies within one tablet to improve access to preventative CVD treatments across poorer regions, by saving on purchasing and supply costs and decreasing the complexity of medicines distribution. The UMPIRE (Use of a Multidrug Pill in Reducing Cardiovascular Events) trial, currently in recruitment stage, will evaluate whether provision of a polypill compared with usual medications improves adherence and clinical outcomes among high-risk patients in Europe and India. The results will be used to develop recommendations for equitable access.⁴⁵

Recommendation

- Better promotion of generic treatments, via implementation of policies and incentives for healthcare professionals, could improve access to essential medicines
- Their availability could be improved by convalescing governance and management efficiency, and assessing local supply options
- Prices could be reduced by improving purchasing efficiency, eliminating taxes and regulating mark-ups
- These steps, and further investigation into the development of a polypill, could at least ensure universal access to medicines for essential NCD/CVD interventions particularly in primary care

As suggested within the WHO bulletin⁴³

Challenge four

Closing disparities in CVD health

As identified earlier, economic, social, gender-based and ethnic disparities are significant obstacles to bringing CVD interventions to the most in need. The WHO study on Prevention of Recurrences of Myocardial Infarction and Stroke (WHO-PREMISE) to determine the extent of secondary prevention of coronary heart disease and cerebrovascular disease in LMICs concluded that there are considerable missed opportunities for prevention of recurrences in those with established cerebrovascular disease in these countries.¹⁹ So within countries there are dramatic differences in health that are closely linked with degrees of social disadvantage; these differences are not acceptable in today's world.⁴⁶

The global health community needs to work towards closing this gap to ensure equitable access to CVD treatment and care; however there are a number of challenges to overcome:

- Minorities are often under-represented within healthcare workforces, and as a result minority patients may have difficulties communicating with their CVD physician⁴⁷
- There is limited awareness among cardiovascular practitioners about healthcare disparities⁴⁷

- More and better data revealing the extent of CVD health disparities is needed⁴⁷
- Gaps often exist between evidence-based clinical practice and best-practice guidelines, and the care that is delivered to patients

Recommendation

- Policy makers and medical professionals urgently need to work together to develop policies and strategies to improve medical care for patients of low socioeconomic status and minority groups, and develop methodology for their implementation
- Healthcare professionals should be made aware of health disparities and how to address these via medical education campaigns
- Policy makers and health system leads should promote health resources to ensure adequate treatment reaches minority groups and those of low-income

Challenge five

Increase the prevalence of workplace-wellness initiatives

As noted earlier the workplace is an ideal environment to raise awareness about chronic diseases. Enhancing employee productivity, improving corporate image and moderating medical care costs are some of the reasons that should motivate employers to initiate and invest in workplace-wellness programmes. Reaching over 50 per cent of the world's population,⁴⁸ our challenge is to encourage employers to invest in these programmes to promote health and well-being for all.

Recommendation

- Foster collaboration between stakeholders in global health to engage them in dialogues on workplace wellness, and its benefits
- Advocate for workplace health promotion tools to support organizations developing their workplace-health programmes

Challenge six

Integrating CVD prevention, detection and treatment into primary healthcare settings

A study by Turkay *et al.* revealed that although the causes and effects of CVD are today well known, and more effective tools are available to prevent these diseases, opportunities to reveal coronary heart disease and its risk factors are being missed in primary care.⁴⁹ A 21st century CVD challenge is therefore to revitalise primary healthcare systems to integrate CVD detection, in order to enable more timely diagnosis and effective treatment.

Tools such as the WHO/ISH Cardiovascular Risk Prediction Charts (which support the identification of high-risk individuals and targeted treatment of factors such as blood pressure and blood lipids) and the WHO technical support package of essential interventions to integrate NCD prevention and control into primary care show that solutions are possible and can be implemented cost effectively even in low-resource settings.⁵⁰

Incorporating CVD risk reduction and preventative CVD strategies into primary healthcare is an important challenge, as CVD based healthcare is frequently based on responding to morbidity or acute problems, and healthcare workers may fail to seize interactions with patients as opportunities to inform them about CVD prevention strategies.⁵¹ The integration of preventative healthcare in primary care settings will reduce emergency CVD hospital admissions, and the morbidity and mortality associated with CVD.

Recommendation

- Healthcare professionals should utilize every healthcare interaction to provide patients with information and skills to reduce their CVD risk⁴⁹
- Policy makers need to consider regulations that aid healthy lifestyles (e.g. smoke-free policies) with support and positive incentives (e.g. the provision of smoking-cessation support programmes) for maximum preventive benefits
- Provide patients with information to aid recognition of CVD symptoms and to optimally self-manage diagnosed CVD
- Ultimately steps need to be taken to ensure universal access to the core set of essential CVD/NCD interventions to reduce preventable morbidity and premature mortality⁵⁰

Challenge seven

Increasing the CVD health workforce

The lack of healthcare professionals, especially specialists, community health workers, technicians and adequate outpatient services is a critical problem. Going forward, we must increase the health workforce to be effective by strengthening capacity and mobilizing resources. The challenge is to reach a balance between

effective specialized/hospital care and good primary healthcare with evidence-based prevention and health promotion. For successful programmes and policies: medical knowledge, social and behavioural theory, and strong sustained implementation by an adequately trained workforce are essential.

Recommendation

- Health services need to be encouraged to interact with other community activities for a multi-disciplinary approach to improved CVD care
- Combining personal and public responsibilities towards living a heart-healthy lifestyle will relieve some of the pressure on the health workforce
- Regular monitoring and evaluation of CVD healthcare services will assist in identifying areas for improvement
- Strong interaction between global, regional, national and local CVD service influencers should be encouraged

Challenge eight

Advocate for global efforts towards prevention

Many CVD deaths are preventable by action on the major primary risk factors: unhealthy diet, physical inactivity and smoking. More than 50 per cent of the deaths and disability from heart disease and strokes can be prevented through simple, cost-effective national efforts. Individuals can take action to reduce risk factors such as high blood pressure, high cholesterol, obesity and smoking.⁴⁹

It is vital that governments and individuals take steps to advocate for prevention efforts to reduce deaths from CVD and stroke. Especially with the rising access to foods high in fat and salt in LMICs, it is an increasing challenge to ensure that the population most at risk is aware of the CVD risk factors and informed about the necessity for a healthy balanced diet, regular physical activity and not using tobacco.

Recommendation

- Policy makers should be made aware about the urgency to prevent CVD, and advocate for global, national and regional efforts to prevent the risk factors for CVD
- Governments need to design and implement effective policies and broad health promotion policies
- Introduce population-wide efforts to reduce risk factors through multiple economic and educational policies and programmes⁵²

As suggested by the WHO

Challenge nine

Strengthen global, regional and national partnerships

To support and accelerate the delivery of infrastructure renewal, high-quality public services and the efficient use of public assets, we must develop better partnerships between the public and private sectors. At

the global, continental and country level, we must build partnerships to strengthen the capacity of the health system, mobilize resources and place CVD on the development agenda.

Recommendation

- Create global collaborative efforts with both public and private entities to find solutions to tackling the global burden of CVD

As suggested by the WHO

- Develop guidance documents on how to replicate partnerships at national and local levels

Challenge ten

Improve data collection and monitoring of care provided to patients with CVD

To reduce the deaths from CVD and stroke, we must continue to improve the monitoring of care for coronary heart disease patients. Improvement of prognosis, early intervention with medication and enhanced care within cardiac units is of vital importance to reduce the risk for coronary heart disease (CHD) patients.

We must be results-oriented and ensure adequate data collection to identify barriers to implementing evidence-based clinical practice, and use this robust data to improve the monitoring systems. The challenge is to establish an international baseline for quality of care and a framework for data collection.

Recommendation

- International organizations to develop guidelines for CVD data collection
- National organizations to utilize the guidelines to identify the obstacles to optimal care and to develop effective strategies for removing the obstacles so that patients can have healthier, happier lives; specific intervention strategies must be designed based on the identified problems

Call to Action

This report clearly shows that over the last decade there have been a number of significant achievements in cardiovascular science, medicine and policy, which have contributed to tackling the burden of CVD. Yet, as leading causes of death and disability, CVD continues to affect the lives of millions of people worldwide, and with an ageing population, this figure is only expected to increase unless urgent action is taken. While there is increasing recognition of the economic and health impacts of CVD, it has been surprisingly low in priority on both the global health agenda and many national healthcare systems.

We call on healthcare professionals to:

- Raise awareness of CVD risk factors amongst their patients, and utilize opportunities to educate patients on CVD prevention
- Ensure adequate data collection to identify barriers to implementing evidence-based clinical practice
- Participate in training programmes related to NCDs to ensure a specialised healthcare workforce
- Work with a wide range of colleagues to make certain the engagement of multidisciplinary teams in the prevention and management of CVD
- Adhere to global, national and local guidelines on the management of people with CVD, to ensure swift diagnosis and provision of the right treatment
- Engage with commissioners and funders to encourage the ring-fencing of budget towards the prevention and management of NCDs

As part of an ongoing campaign against heart disease and stroke, the World Heart Federation and partner organizations call for a sustained worldwide effort to prevent and control CVD. We all have a role to play, and should encourage immediate endeavours by international organizations, national governments, healthcare professionals and importantly, the general public.

We call on national governments to:

- Become actively involved with and support the UN High-Level Summit on NCDs
- Prioritize the investment for the treatment and prevention of CVD, and encourage joint funding to ensure resources are delivered to those countries most in need
- Develop strategic responses and national interventions to address CVD
- Improve global access to affordable, quality essential medicines for CVD
- Develop national interventions to strengthen the capacity of the healthcare workforce, and mobilize resources, to maximize efficiency in addressing CVD
- Invest adequately in healthcare and ensure public health action against CVD including universal access to essential CVD/NCD interventions through a primary healthcare approach

We call on individuals to:

- Take action for their own heart health and well-being, including giving up smoking and tobacco use, eating healthily and exercising regularly
- Support initiatives and campaigns to raise awareness of CVD and its impact on individuals and their families
- Join together to encourage employers to invest in employees' health through the adoption of workplace-wellness programmes
- Take responsibility to engage with appropriate healthcare professionals to discuss their heart health, particularly if symptomatic of CVD

We call on international organizations to:

- Continue to fight for strong global initiatives that tackle active and passive smoking
- Provide technical support for national governments to turn around the CVD epidemic
- Drive educational campaigns and advocate for the adoption and implementation of broad policies and tactics for CVD prevention

This report provides evidence that the risk of CVD can be reduced, and that preventing premature deaths and mortality is both possible and realistic. Great progress has been made in the past 10 years, and as we continue the fight against CVD, we invite you to join us in taking action towards heart-healthy lifestyles to positively impact millions of lives.

Biographies



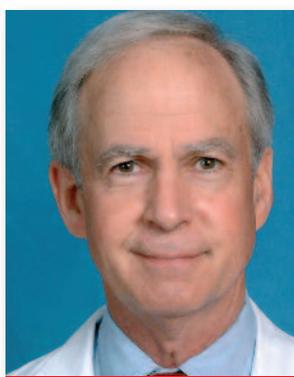
Professor Pekka Puska
President, World Heart Federation

Professor Puska is the Director General of the National Public Health Institute of Finland (KTL), President of the Finnish Heart Association and Chair of the Board.

Prior to this, he was the Director for Non-Communicable Disease Prevention and Health Promotion at the WHO Headquarters in Geneva. At the WHO, he directed the work on integrated prevention of NCD targeting the main risk factors through health promotion, national programmes, policy measures and regional networks.

Professor Puska has, internationally and nationally, been involved in a number of scientific, expert and public health functions, WHO's expert work and multinational projects.

He has published over 500 scientific papers and received numerous honours and awards including the Nordic Award for Public Health in 2005 and the WHO's annual Health Education Award in 1990.



Professor Sidney C. Smith Jr
President-Elect, World Heart Federation

Professor Smith is Professor of Medicine and Director of the Center for Cardiovascular Science and Medicine at the University of North Carolina at Chapel Hill.

Most recently he has been involved in evaluating the role of secondary and primary prevention efforts in the treatment of cardiovascular disease.

Professor Smith has been involved with the American Heart Association (AHA) for the past two decades, serving as Chief Science Officer between 2001 and 2003 and President from 1995–1996. He has received numerous awards from the AHA, the National Heart, Lung and Blood Institute, and the National Institutes of Health. He is a member of various editorial boards and is the author of more than 200 articles and book chapters. He regularly presents at scientific meetings.



Professor Akira Matsumori
Secretary, World Heart Federation

Dr Akira Matsumori is currently Secretary of the World Heart Federation. He is also incoming President-Elect, commencing 1 January 2011.

His major fields of clinical and basic research include cardiomyopathies and myocarditis as well as the pathogenesis and therapy of heart failure.

He is currently a visiting Professor of Medicine at the Department of Cardiology of the Tokyo Medical University. He holds numerous other positions including the First President of the International Society of Cardiomyopathies and Heart Failure as well as President-Elect and Chairman of the Scientific Advisory Board of the Asian Pacific Society of Cardiology, and Vice President of the Asia-Pacific Heart Network.



Dr K. Srinath Reddy
Chair, Foundations' Advisory Board, World Heart Federation

Dr Reddy is President of the Public Health Foundation of India and until recently headed the Department of Cardiology at the All India Institute of Medical Sciences (AIIMS). He is also the Chair of the Initiative for Cardiovascular Health Research in the Developing Countries (IC Health).

Over the past 10 years, Dr Reddy has edited the National Medical Journal of India and been on the editorial board of several international and national journals. He has also provided expertise to a number of consultancies, governmental agencies, the National Human Rights Commission, NGO networks as well as prominent international organizations such as the WHO and the World Bank.

He represented India at the international negotiations on the Framework Convention for Tobacco Control for which he received the WHO Director General's Award for Outstanding Global Leadership in Tobacco Control (World Health Assembly).



Dr Kingsley Akinroye

Member, World Heart Federation Board

Dr Akinroye is the President of the African Heart Network and Executive Director (Scientific Affairs and Research) of the Nigerian Heart Foundation.

He has acted as a Temporary Advisor to the WHO on NCD and was a member of the WHO Mega-Country Health Promotion Network. He served as Principal Investigator (Nigeria) on many national projects in collaboration with WHO.

Dr Akinroye has published articles on heart health promotion and hypertension. He received medical training at College of Medicine, University of Lagos in Nigeria and Postgraduate training at Royal Postgraduate Medical School, Hammersmith Hospital, London; University of Kuopio, Finland and National Public Health Institute, Finland.



Dr Eduardo Morales Briceño

Member, World Heart Federation Board

Dr Eduardo Morales Briceño is the President-Elect of the InterAmerican Heart Foundation (2008-2010).

He also acts as Professor of Clinical Cardiology at the Central University of Venezuela and as Director of the Postgraduate Training Course in Cardiology, Vargas Medical School, Central University of Venezuela. Dr Morales Briceño has dedicated his entire medical and academic career at the University, teaching clinical cardiology (heart failure, valvular heart disease, hypertension, dislipidemias and coronary heart disease) and also lecturing on preventive cardiology (covering topics such as tobacco control).

Dr Morales Briceño is Former President of the Venezuelan and South American Societies of Cardiology, and Former Vice President of the Inter American Society of Cardiology. He is currently an Associate Fellow of the American College of Cardiology, and a Fellow of the American College of Physicians.



Dr Shanthi Mendis

Senior Advisor for Cardiovascular Diseases and Coordinator for the Prevention and Management of Chronic Diseases, World Health Organization

Dr Shanthi Mendis has served as a senior adviser and coordinator of the global cardiovascular diseases programme of the WHO at its Headquarters in Geneva, Switzerland for the last 10 years. Prior to taking up the position in WHO, she served at the Faculty of Medicine, Peradeniya, Sri Lanka as the Professor of Medicine for 8 years.

She is a specialist in Cardiology and Public Health. She completed her undergraduate and postgraduate training in England and postdoctoral training in the USA. She is a Fellow of the American College of Cardiology and a Fellow of the Royal College of Physicians of London.

Dr Mendis has extensive experience in policy development in developing countries, health systems research, and undergraduate and postgraduate training. She has received many honors and awards and has published widely in the scientific literature.



Dr Kathryn Taubert

Senior Scientific Officer, World Heart Federation

Before joining the World Heart Federation, **Dr Taubert** was the Senior Scientist and Special Assistant to the Chief Science Officer at the American Heart Association National Center in Dallas (Texas, USA). During her tenure at the AHA, she also held the positions of the Director of Cardiovascular Science and Vice President of Science and Medicine. Dr. Taubert is the adjunct Professor of Physiology at the University of Texas Southwestern Medical School in Dallas, Texas.

Dr Taubert has published over 120 scientific papers and medical textbook chapters. She is an invited speaker both in the United States and internationally on the topics of infective endocarditis, heart disease in children, heart disease in women, and secondary prevention of atherosclerotic vascular disease. She has received many awards for her contributions to advancing knowledge in cardiovascular disease.

References

1. NCD Alliance. Last accessed at <http://www.ncdalliance.org/node/11>, 20 September 2010
2. United Nations, Statement by Permanent Representative of Finland to the United Nations, Last accessed at http://www.un.org/esa/population/cpd/cpd2010/Country_Statements/AgendaItem4/FINLAND.PDF, 22 September 2010
3. World Heart Organization NCDnet. Last accessed at <http://www.who.int/ncdnet/about/en/>, 24 August 2010
4. United Nations, General Assembly GA/10939, Last accessed at <http://www.un.org/News/Press/docs/2010/ga10939.doc.htm>, 24 August 2010
5. Thomas Glynn et al., The Globalization of Tobacco Use: 21 Challenges For The 21st Century. The American Cancer Society Cancer Journal for Clinicians, 2010, 60:50-61. Last accessed at <http://caonline.amcancersoc.org/cgi/reprint/60/1/50>, 12 August 2010
6. Framework Convention Alliance, The Treaty Part III: Measures Relating to the Reduction of Demand for Tobacco. Last accessed at http://www.fctc.org/index.php?option=com_content&view=article&id=25&Itemid=31, 12 August 2010
7. Framework Convention Alliance, FCTC fifth anniversary makes public health history. Last accessed at http://www.fctc.org/index.php?option=com_content&view=article&id=340:fctc-fifth-anniversary-makes-public-health-history&catid=229:general-news&Itemid=233, 12 August 2010
8. World Health Organization, WHO Report on the Global Tobacco Epidemic, 2009: Implementing smoke-free environments. Last accessed at http://whqlibdoc.who.int/publications/2009/9789241563918_eng_full.pdf, 12 August 2010
9. The United States Department of Agriculture, Johanns Reveals USDA's Steps to a Healthier You. 2005. Last accessed at http://www.mypyramid.gov/global_nav/media_press_release.html, 13 August 2010
10. The World Heart Federation, Eat for Goals! - UEFA, The World Heart Federation and the European Commission come together to tackle childhood obesity. 2008. Last accessed at <http://www.world-heart-federation.org/press/press-releases/detail/article/eat-for-goals-uefa-the-world-heart-federation-and-the-european-commission-come-together-to-tackle/>, 13 August 2010
11. World Health Organization, Global Strategy on Diet, Physical Activity and Health - Global strategy: overall goal. Last accessed at <http://www.who.int/dietphysicalactivity/goals/en/index.html>, 13 August 2010
12. The New Discipline of Workforce Wellness: Enhancing Corporate Performance by Tackling Chronic Disease. World Economic Forum in partnerships with The Boston Consulting Group, 2010. Last accessed at <http://www.bcg.ru/documents/file40624.pdf>, 12 August 2010
13. World Economic Forum. Working Towards Wellness: The Business Rationale. Last accessed at http://www.weforum.org/pdf/Wellness/Bus_Rationale.pdf, 23 March 2010
14. Working Towards Wellness: A cross-industry project to address chronic disease prevention in the workplace. World Economic Forum. Last accessed at <http://www.weforum.org/pdf/Wellness/Wellness-2pager.pdf> (hereafter 'Working Towards Wellness'), 24 August 2010
15. Chapman L. Meta-evaluation of worksite health promotion economic return studies. Art of Health Promotion, July/August 2005; 1-15. Last accessed at <http://www.awcnet.org/trainmaterials/EmpHealthAcademy/2007/ChapmanAHP46MetaEvaluationUpdate.pdf>, 21 September 2010
16. WHO factsheet on cardiovascular disease. Last accessed at <http://www.who.int/mediacentre/factsheets/fs317/en/index.html> 12 August 2010
17. Improving the quality of health care for chronic conditions. Quality and Safety in Healthcare - Developing research and practice, 2010. Last accessed at <http://qshc.bmj.com/content/13/4/299.abstract>, 12 August 2010
18. Mendis Shanthi et al, WHO study on Prevention of REcurrences of Myocardial Infarction and Stroke (WHO-PREMISE). Last accessed at <http://www.who.int/bulletin/volumes/83/11/mendis1105abstract/en/>, 14 September 2010
19. Drew Evan Fenton, MD, Myocardial Infarction: Treatment & Medication, E-Medicine. Last accessed at <http://emedicine.medscape.com/article/155919-overview>,
20. The Future of Cardiovascular Diagnostics: Impact of technological advances on growth opportunities and future market outlook. ReportLinker, 2010. Last accessed at http://www.reportlinker.com/p0185315/The-Future-of-Cardiovascular-Diagnostics-Impact-of-technological-advances-on-growth-opportunities-and-future-market-outlook.html?d=CPDAIN4&utm_source=prnewswire&utm_medium=pr&utm_campaign=prnewswire, 12 August 2010
21. Yeh, R.W. et al, Population Trends in the Incidence and Outcomes of Acute Myocardial Infarction, New England Journal of Medicine, June 2010, 362: 2155-65
22. Mauricio Cohen et al., Racial and Ethnic Differences in the Treatment of Acute Myocardial Infarction: Findings from the Get with the Guidelines-Coronary Artery Disease Program. Circulation, originally published online May 17, 2010; DOI: 10.1161/CIRCULATIONAHA.109.922286. Last accessed at <http://circ.ahajournals.org/cgi/content/short/121/21/2294>, 21 September 2010
23. Shaoli Niu et al., The association between socioeconomic status of high-risk patients with coronary heart disease and the treatment rates of evidence-based medicine for coronary heart disease secondary prevention in China: Results from the Bridging the Gap on CHD Secondary Prevention in China (BRIG) Project. American Heart Journal, 2009; 157:709-715.e1. Last accessed at <http://www.ncbi.nlm.nih.gov/pubmed/19332200>, 21 September 2010
24. The American Heart Association and The American Stroke Association. Get With The Guidelines-Coronary Artery Disease: Factsheet. Last accessed at <http://www.amhrt.org/downloadable/heart/1163801939483CADFactSheet.pdf>, 24 August 2010

25. The American Heart Association, Focus on Quality. Last accessed at http://www.heart.org/HEARTORG/HealthcareProfessional/GetWithTheGuidelinesHFStroke/Get-With-The-Guidelines---HFStroke_UCM_001099_SubHomePage.jsp, 24 August 2010
26. The Society for Cardiovascular Angiography and Interventions, Seconds-Count: Common Cardiovascular Medications. Last accessed at <http://www.scai.org/SecondsCount/Tests/detail.aspx?cid=fa1af2aa-afaf-474c-b941-5ceaeba07bb1>, 12 August 2010
27. Endo Akira, A gift from nature: the birth of the statins, Last accessed at http://www.laskerfoundation.org/awards/pdf/2008_c_endo.pdf, 22 September 2010
28. Kristie Leong, A New Benefit of Statin Therapy: A Decreased Risk of Infection?, Health and Wellness, October 25, 2009. Last accessed at http://www.associatedcontent.com/article/2299703/a_new_benefit_of_statin_therapy_a_decreased.html, 12 August 2010
29. M R Law, N J Wald, A R Rudnicka, Quantifying effect of statins on low density lipoprotein cholesterol, ischaemic heart disease, and stroke: systematic review and meta-analysis. *British Medical Journal BMJ*, 2003;326:1423
30. CBC News, Statins: the Aspirin of the 21st century? Last accessed at <http://www.cbc.ca/health/story/2008/11/10/f-statins.html>, 12 August 2010
31. Nobel Prize, Last accessed at http://nobelprize.org/nobel_prizes/medicine/laureates/1985/, 1 September 2010
32. Robert L. Shook, *Miracle Medicines: seven lifesaving drugs and the people who created them*. 2007, The Penguin Group.
33. Fuster V et al, ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. *European Heart Journal* 2006;27:1979-2030. Last accessed at <http://eurheartj.oxfordjournals.org/content/27/16/1979.full.pdf+html?sid=9c9205c8-1a7f-424e-9fb3-00108d8b96a3> 24 August 2010
34. Fuster V et al., ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. *European Heart Journal* 2006; 27:1979-2030. Last accessed at <http://eurheartj.oxfordjournals.org/content/27/16/1979.full.pdf+html?sid=9c9205c8-1a7f-424e-9fb3-00108d8b96a3>, 24 August 2010
35. Mead GE et al., Cardioversion for atrial fibrillation: the views of consultant physicians, geriatricians and cardiologists, Last accessed at http://www.laskerfoundation.org/awards/pdf/2008_c_endo.pdf, 22 September 2010
36. Heist EK, Ruskin JN, Atrial Fibrillation and Congestive Heart Failure: Risk Factors, Mechanisms, and Treatment, *Progress in Cardiovascular Diseases*, 2006;48: 256-69. Last accessed at [http://www.onlinepcd.com/article/S0033-0620\(05\)00111-8/abstract](http://www.onlinepcd.com/article/S0033-0620(05)00111-8/abstract), 12 August 2010
37. Medtronic, About Atrial Fibrillation. Last accessed at <http://www.medtronic.co.uk/your-health/atrial-fibrillation/index.htm>, 24 August 2010
38. Mary Ella Pierpont et al., Genetic Basis for Congenital Heart Defects: Current Knowledge – A Scientific Statement From the America Heart Association Congenital Cardiac Defects Committee, Chair on Cardiovascular Disease in the Youth. *Circulation*. June 2007.
39. Sachin Khambadkone et al., Percutaneous Pulmonary Valve Implantation in Humans Results in 59 Consecutive Patients. *Circulation*. August 2010.
40. Sixty-third World Health Assembly closes after passing multiple resolutions. Last accessed at http://www.who.int/mediacentre/news/releases/2010/wha_closes_20100521/en/index.html, 14 September 2010
41. WHO 2008-2013 Action Plan for NCDs, Last accessed at http://www.who.int/nmh/publications/ncd_action_plan_en.pdf, 22 September 2010
42. World Health Organization, Only 5.4 per cent of world's population covered by comprehensive smoke-free laws. Last accessed at http://www.who.int/mediacentre/news/releases/2009/smoke_free_laws_20091209/en/index.html, 26 August 2010
43. Thomas Glynn et al., The Globalization of Tobacco Use: 21 Challenges For The 21st Century. *The American Cancer Society Cancer Journal for Clinicians*, 2010, 60:50-61. Last accessed at <http://caonline.amcancersoc.org/cgi/reprint/60/1/50>, 12 August 2010
44. Mendis S, Fukino K, Cameron A, et al. The availability and affordability of selected essential medicines for chronic diseases in six low- and middle-income countries. *Bulletin of the World Health Organization* 2007; 85: 279–288
45. U.S National Institutes of Health, UMPIRE - Use of a Multidrug Pill In Reducing Cardiovascular Events. Last accessed at <http://clinicaltrials.gov/ct2/show/NCT01057537?term=umpire&rank=1>, 26 August 2010
46. CSDH, Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health, World Health Organization, 2008.
47. The American Heart Association and the American Stroke Association. FACTS: Bridging the Gap - CVD Health Disparities. Last accessed at <http://www.americanheart.org/downloadable/heart/1190403824758Disparities%20Fact%20Sheet%209-07%20final.pdf>, 26 August 2010
48. World Economic Forum, Working towards Wellness. Last accessed at <http://www.weforum.org/en/initiatives/Wellness/WorkplaceWellness/index.htm>, 27 August 2010
49. Turkay et al., Missed Opportunities for Coronary Heart Disease: Primary Care Experience. *Croatian Medical Journal*. 2007 June; 48(3): 362–370. Last accessed at <http://ukpmc.ac.uk/articles/PMC2080537/>, 26 August 2010
50. Package of Essential Noncommunicable Disease Interventions for Primary Health Care in Low-Resource Settings 2010, Geneva, World Health Organization 2010
51. World Health Organization. Integrating prevention into health care: Fact sheet N°172. 2002. Last accessed at <http://www.who.int/mediacentre/factsheets/fs172/en/index.html>, 26 August 2010
52. World Health Organisation, Cardiovascular disease: prevention and control. Last accessed at <http://www.who.int/dietphysicalactivity/publications/facts/cvd/en/>, 26 August 2010

Contact details

Additional information about the World Heart Federation is available on our website:

www.worldheart.org

Direct your enquiries to the
World Heart Federation Secretariat:

World Heart Federation
PO Box 155
7 rue des Battoirs
1211 Geneva 4, Switzerland

Tel: +41 22 807 03 20

Fax: +41 22 807 03 39

E-mail: admin@worldheart.org