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Promote, prevent, protect

Valentín Fuster, of the Spanish National Center for Cardiovascular Research (CNIC), urges an increased effort in CVD awareness and scientific advances to aid both global health and the economy...

Although cardiovascular disease (CVD) is still the leading cause of death and is expected to increase within the next two decades (Fig. 1), age related CVD mortality has been falling over the past two decades. Numerous studies suggest that risk factor reductions and treatment of established disease each account for approximately 40-60% of the decline in age related CVD mortality. But unless the incidence of CVD decreases in step with the decline in age related mortality over the next 20-30 years, we will experience a rise in its prevalence (Fig. 2).

‘Primary prevention is almost exclusively focused on recognition and management of risk factors, yet the unaddressed problem is that a large proportion of people destined for a myocardial infarction or a stroke are unaware of their risk.’

CVD prevalence worldwide is expected to increase, not only because of longer survivorship, but as a result of the current increasing epidemic of obesity and diabetes, hypertension and dyslipidemia. So, despite great advances in technology and treatment, and reductions in age related CVD deaths, one of life’s amazing paradoxes is that

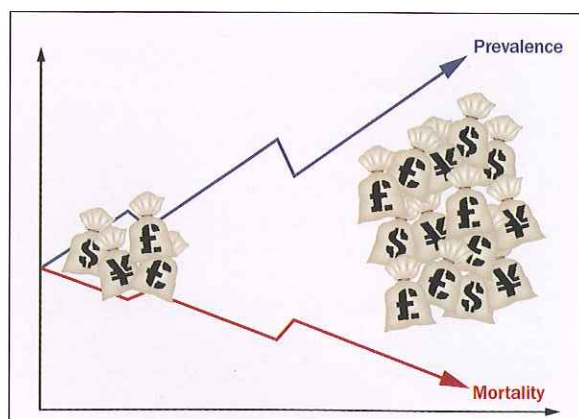


Fig. 2: Economic burden, prevalence and mortality in cardiovascular disease (Fuster V, Mearns B M. The CVD paradox: mortality vs. prevalence. *Nat Rev Cardiol.* 2009 Nov; 6(11):669)

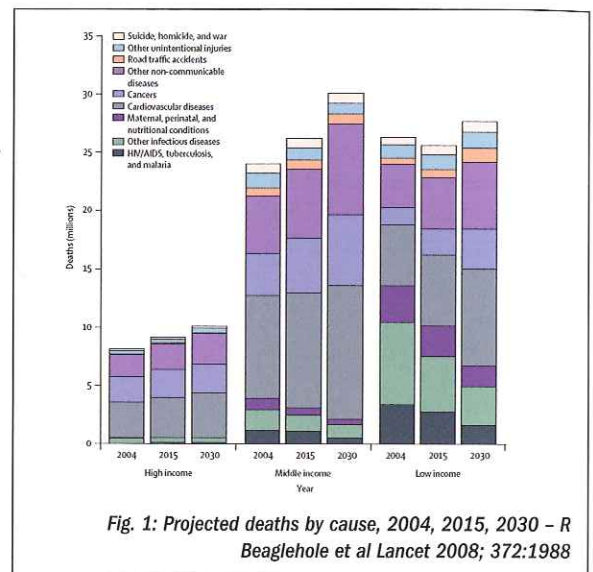


Fig. 1: Projected deaths by cause, 2004, 2015, 2030 – R Beaglehole et al *Lancet* 2008; 372:1988

the prevalence of CVD is increasing. Consequentially, we will have to endure significant economic burden. The solution to the paradox is clear: the promotion of cardiovascular health and prevention of CVD.

At the more biological level, high risk or vulnerable plaques are responsible for most major cardiovascular events. Our prevention strategies currently relate to finding and managing risk factors for the development of these plaques; however, we have three theoretical opportunities for approaching population at risk – recognition of risk factor profile, identification by imaging of burden of atherosclerosis, and education in health promotion and prevention of CVD.

Recognition of risk factor profile

Over the past few decades, risk factors such as obesity, diabetes and sedentary lifestyles have increased, as has cigarette smoking in certain populations, while the incidence of predominantly medication-controlled risk factors (hypertension and lipid disorders) have only gradually decreased. Moreover, three of the key risk factors – age, gender and family history – cannot be modified, so although risk factors can be a key to identifying individuals with elevated risk, only lifestyle changes and pharmacological means can provide a material solution for such people.

The economic burden of risk factors such as hypertension and diabetes, among others, is a heavy one. The economic



Fig. 3: CNIC headquarters in Madrid, Spain

opportunity associated with prevention has also been illustrated by examining the healthcare costs for high-risk asymptomatic individuals with no history of heart disease; some of these individuals went on to have heart attacks or strokes and others did not. The annual healthcare costs for individuals who did not have events started at \$3,500 and rose to \$5,000 over a three year period. For people who experienced an event, their starting annual costs were similar, but increased to over \$20,000 as they experienced myocardial infarction or stroke.

Primary prevention is almost exclusively focused on recognition and management of risk factors, yet the unaddressed problem is that a large proportion of people destined for a myocardial infarction or a stroke are unaware of their risk. Indeed, most heart attacks and strokes occur in individuals who would be classified as being at intermediate or even low risk by the traditional risk-scoring algorithms, such as the Framingham Risk Score. Focusing only on those with the highest risk would have a relatively small impact on overall outcomes; however, focusing on the proportion of the population who experience the majority of events would require us to design public health interventions that apply to the whole population. This is the risk factor dilemma.

Identification of atherosclerosis burden, through imaging and proteomics

There is a need to be able to reliably and simply identify people before their first heart attack or stroke. Better identification of people at risk could involve, in addition to conventional risk factors, identification of subclinical burden of atherosclerosis, for example, by simple non-invasive imaging, or use of new methods for identification, for example, by evolving proteomics from blood sampling. Overall, early treatment of subclinical atherosclerosis could potentially impact on morbidity, mortality and healthcare costs. Success of this strategy, however, relies in our ability to establish new paradigms for detection, screening and treatment.

Promotion of cardiovascular health, through CNIC and SHE

One of the greatest challenges in the cardiovascular field in the 21st Century is to ensure the rapid transfer of

scientific advances into improved healthcare and quality of life of patients through the promotion of cardiovascular health and prevention of CVD.

At one end of the spectrum lies public policy addressing tobacco, salt reduction and cooking oil. At the other end of the spectrum lies how to approach the specific educational mission aimed at the general public and at the population at risk in order to promote health. These concerns lie at the heart of the mission of the CNIC¹ (Fig. 3).

Within the context of the link between science and health, the CNIC is collaborating in the International Foundation for Science, Health and Education (SHE) which aims to integrate research with the promotion of health through education specially focused in children and adolescents. The SHE Foundation is also committed to improving awareness of this reality through the collaboration of several international organisations and groups involved in health promotion.

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Conclusion

We must all make major inroads in the promotion of cardiovascular health and prevention of CVD over the next few years. If we do not increase our efforts, the worldwide increase in life expectancy and the consequential ageing of the population will result in more people developing CVD and requiring treatment for their condition at some point over the course of their lifetime. The consequent economic burden will become impossible to assume for our societies.

¹ The Spanish National Center for Cardiovascular Research (CNIC) is a public research centre that depends on Spain’s Ministry of Science and Innovation, and is funded through public and private resources, notably through the Pro CNIC Foundation, a consortium of 15 large business enterprises in Spain (non-pharmaceutical)



Valentín Fuster MD, PhD
 General Director
 Spanish National Center for Cardiovascular Research (CNIC)
 Tel: +34 91 453 12 00
 vfuster@cnic.es
 www.cnic.es