

## In this issue

### Cardiovascular diseases

It is indeed a privilege to edit the special section on Cardiovascular Diseases (CVD) in *Current Science*. This issue is timely, as there has been a rapid increase in the burden of CVD in India.

In a recent review, the prevalence of Coronary Heart Disease (CHD), a major contributor to CVD, obtained through well-conducted cross-sectional surveys was 3–5% in rural areas and 8–11% in urban areas among individuals aged above 20 years<sup>1,2</sup>. Based on these data it is estimated that there are approximately 29.8 million patients with CHD in India<sup>1,2</sup>. Of these, 14.1 million reside in urban areas, while the remaining 15.7 million are rural residents. The Global Burden of Disease study projects 4.8 million CHD deaths by the year 2020 AD, with the majority of deaths occurring in the most productive age group of 35–70 years<sup>3</sup>. Due to this, India will lose 22 million Disability Adjusted Life Years (DALYs (a measure of disability)) by the year 2020 due to CHD<sup>3</sup>. The economic loss of this disease burden is enormous. According to the World Health Organization estimate, India lost US\$ 9 billion in national income from premature deaths due to heart disease, stroke and diabetes in 2005 and the cumulative loss for the periods 2006–2015 was projected to be US\$ 237 billion. Besides the huge burden of CHD, there are certain characteristics of CHD in South Asians that are worrisome. The risk of death due to CHD is substantially higher among Indians. This is evident from ‘migrant’ studies which report a 1.5–3.8 CHD mortality ratio among migrant Indians when compared to the local populations<sup>5</sup>. Similarly, the long-term case fatality rate for South Asians is much greater than other populations as observed in a large international comparative study<sup>6</sup>. Another disquieting aspect is that

CHD tends to occur almost a decade earlier in South Asians as compared to other population groups. This has been seen in several studies from the subcontinent thus causing massive loss of potentially productive years of life. The Potential Productive Years of Life Lost (PPYL) due to CVD deaths in the age group of 35–64 years are expected to jump from 9.2 million in 2000 to 17.9 million in 2030, which amounts to a greater life years lost by India than the combined PPYL of China, Russia, US, South Africa and Portugal<sup>7</sup>.

Combating this epidemic needs a multipronged approach spanning from policy interventions to cost effective primary health care and where needed, high technology tertiary care to individuals with complications. The purpose of this special section is to generate a debate and stimulate interest among research scientists to develop inexpensive but effective alternatives to existing technologies. The articles in this special section can be broadly classified into two groups, those dealing with epidemiology and public health, and those that address specific issues (in relation to developing technologies for biomarkers and arrhythmia ablation).

Gupta and Gupta (page 349) and Desai and Tandon (page 356) discuss the epidemiologic challenges posed by hypertension (high blood pressure) and diabetes. Both these are important biological risk factors for CHD. These two risk factors along with smoking and dyslipidaemia (bad blood fats) contribute to more than two-thirds of the population risk of CVD in India and their prevention is of paramount importance. Though there are effective interventions in reducing the burden of these risk factors, there are substantial gaps in their implementation. Goenka and colleagues (page 367) discuss methods of translating this evidence into action.

Rapid economic growth, globalization and urbanization have further propelled and fuelled this cardiovascular epidemic in our country. These changes lead to dramatic shift in the diet and living behaviours of individuals, families and communities. Consequently, the adverse dietary changes in the population, sedentary activity and increasing tobacco use with consequent changes in the CVD risk factors accrue at great speed and at earlier stages than other countries. Urbanization is inevitable in all societies and countries. However, urbanization in countries like India occurs in a disorderly and chaotic way. Many rural poor due to failure of crops are unable to make a living in the village migrate to cities. As a result, they live in over-crowded and unclean environments in urban slums. They are prone to infectious diseases, stress, inadequate housing and pollution. In addition, smoking is high among slum dwellers. This along with inappropriate diet due to inaccessibility of healthy foods resulting from high costs, lead to an increased propensity of CHD. Migration plays a major role in determining the pattern on urbanization. However, migration has not been accorded importance in the causation of CVD. Jeemon *et al.* (page 378) discuss the role of migration on CVD in Indians.

Despite our current knowledge on the importance of environmental determinants of CVD, the role of genetic determinants should not be ignored. Study of genetic determinants helps in understanding the mechanisms of disease, the reason for high propensity among Indians for myocardial infarction (heart attacks) and also in delineating the complex interplay of genes, diet and other life style factors in determining CHD. The discovery of the complete sequence of human genome around the turn of this century led to several investigations in this area. Padmanabhan *et al.* (page 385) discuss the

complexities involved in genetic studies and their future. This article aims to discuss potential designs and their limitations in conducting genetic studies.

Roy *et al.* (page 392) discuss the need for studying new biomarkers, particularly the role of apo-lipoprotein B (apo B) particles in determining the risk of CHD. Recent evidence suggests that the predictive value of apo B in CHD is remarkably better than other conventional lipid (blood fat) markers such as total and LDL cholesterol. Before advocating it for universal use, issues of standardization and the cost factor should be addressed. We believe that when this biomarker estimation is used on a large scale, costs are likely to reduce and this investigation will receive wider acceptance.

Two diseases which are declining also need to be addressed. These are rheumatic heart disease and endomyocardial fibrosis, both of which affect children and young adults leading to substantial disability. Rheumatic heart disease (which destroys heart valves and leads either to regurgitation or leakage and stenosis or obstruction of valves leading to heart failure) though on the decline is widely prevalent among the poorer sections of the society. Though secondary prophylaxis is effective, it entails long-term (sometime, life long) penicillin injections. Krishna Kumar and colleagues (page 397) debate the role of secondary prophylaxis in the current scenario and the need for vaccines in preventing rheumatic fever. Tharakan and Bohora (page 405) provide a perspective on endomyocardial fibrosis, a disease characterized by heart failure largely due to fibrosis of the endothelial layer of the ventricles.

Finally, heart rhythm abnormalities cannot be neglected and are discussed in detail in two articles. These include the epidemiology of arrhy-

thmias and the role of catheter ablation by Naik *et al.* (page 411) and Juneja (page 416).

The contributing authors to this special section have decades of experience in their chosen fields. Despite their busy schedules, they agreed to contribute articles and we sincerely thank them for their contribution. We are also grateful to Prof. Balaram, Editor, *Current Science* for asking us to edit this special. We hope that these articles will be useful to scientists involved in research and development, physicians, policy makers and all others who are interested in the prevention of cardiovascular disease among Indians.

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4. WHO global report 2005 – Preventing chronic diseases: a vital investment, World Health Organization, Geneva, 2005.
5. Srinath Reddy, K., Shah, B., Varghese, C. and Ramadoss, A., *Lancet*, 2005. 366 (9498), 1744-1749.
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7. Leeder, S., Raymond, S., Greenberg, H., Liu, H. and Esson, K., *A Race Against Time: The Challenge of Cardiovascular Disease in Developing Economies*, Columbia University, New York, 2004.

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### The great avulsion of Kosi

Rajiv Sinha documents (page 429) the Kosi river in north Bihar, one of the disastrous river hazards that occurred in August 2008 and makes an important distinction between inundation related to large scale river dynamics and flooding. The Kosi river has been a problematic river and

repeated, unscientific interventions have made the situation even worse in recent years which culminated in a disaster that affected more than 3 million people in Nepal and north Bihar. The river avulsed by ~120 km, the largest single avulsive shift so far, through a breach in the afflux bund at Kusaha located 12 km upstream of the Kosi barrage. The new course of the river followed one of the palaeochannels of the Kosi, which flowed more than 100 years ago and a large area was inundated following the avulsion. The population living around the new course and



the local administration had not experienced any such event in their life time and were caught totally unprepared. The nature's attempt to attain equilibrium has however been foiled by the mankind by diverting the Kosi river back to its pre-18 August 08 course, and final touches on the plugging of the breach were on as late as May 2009. While a large population is still recovering from this disaster and is getting ready to embrace yet another monsoon, a conscious effort is required from the planners and managers alike to restore the confidence of the people living at the edge. A strong political will is crucial to find a long-term solution to this problem which is certainly one of the most under-rated problems in flood management in South Asia. An environmental assessment of the Kosi basin and a relook at the engineering interventions are long overdue.