



Contrasting cardiovascular mortality trends in Eastern Mediterranean populations: Contributions from risk factor changes and treatments



Julia Critchley^{a,*}, Simon Capewell^b, Martin O'Flaherty^b, Niveen Abu-Rmeileh^c, Samer Rastam^d, Olfa Saidi^e, Kaan Sözmen^f, Azza Shoaibi^c, Abdullatif Hussein^g, Fouad Fouad^{d,h}, Nadia Ben Mansour^e, Wafa Aissi^e, Habiba Ben Romdhane^e, Belgin Unal^f, Piotr Bandosz^b, Kathleen Bennettⁱ, Mukesh Dherani^b, Radwan Al Ali^d, Wasim Maziak^{d,j}, Hale Arık^f, Gül Gerçeklioğlu^f, Deniz Utku Altun^f, Hatice Şimşek^f, Sinem Doganay^f, Yücel Demiral^f, Özgür Aslan^f, Nigel Unwin^k, Peter Phillimore^l, On behalf of MedCHAMPS, This publication was prepared with support from and on behalf of the MedCHAMPS consortium members: Nourredine Achour¹⁵, Waffa Aissi⁵, Riadh Allani⁵, Chokra Arfa⁵, Heidar Abu-Kteish¹³, Niveen Abu-Rmeileh³, Radwan Al Ali⁴, Deniz Altun⁶, Balsam Ahmad⁹, Hale Arık⁶, Özgür Aslan⁶, Latifa Beltaifa⁵, Nadia Ben Mansour⁵, Kathleen Bennett⁷, Habiba Ben Romdhane⁵, Nabil Ben Salah¹⁹, Marissa Collins¹⁶, Julia Critchley¹, Simon Capewell², Mukesh Dherani², Yücel Demiral⁶, Sinem Doganay⁶, Madonna Elias⁴, Gül Ergör⁶, Ibtihal Fadhil¹⁸, Fouad Fouad⁴, Gül Gerçeklioğlu⁶, Rula Ghandour³, Sibel Göğen¹¹, Abdullatif Hussein³, Samer Jaber³, Sibel Kalaca¹², Rana Khatib³, Rasha Khatib³, Saer Koudsie, Bülent Kilic⁶, Olfa Lassoued⁵, Helen Mason¹⁶, Wasim Maziak^{4,8}, Maher Abou Mayaleh¹⁴, Nahed Mikki³, Ghmaez Moukeh⁴, Martin O. Flaherty², Peter Phillimore⁹, Samer Rastam⁴, Gojka Roglic¹⁷, Olfa Saidi⁵, Gül Saatli⁶, Ilhan Satman¹⁰, Azza Shoaibi³, Hatice Şimşek⁶, Nesrien Soulaïman⁴, Kaan Sözmen⁶, Faten Tlili⁵, Belgin Unal⁶, Nigel Unwin²⁰, Nazan Yardim¹¹, Shahaduz Zaman⁹

¹ Division of Population Health Sciences and Education, St. George's, University of London, Cranmer Terrace, London SW17 0RE, UK

² Department of Public Health and Policy, University of Liverpool, Liverpool, UK

³ Institute of Community and Public Health, Birzeit University, Birzeit, State of Palestine

⁴ Syrian Center for Tobacco Studies, Aleppo, Syria

⁵ Cardiovascular Epidemiology and Prevention Research Laboratory, Tunis, Tunisia

⁶ Dept of Public Health, Faculty of Medicine, Dokuz Eylul University, Turkey

⁷ Department of Pharmacology & Therapeutics, Trinity College, Dublin, Ireland

⁸ Robert Stempel College of Public Health and Social Work, Florida International University, Miami, USA

⁹ Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK

¹⁰ Istanbul Faculty of Medicine, Istanbul, Turkey

¹¹ Primary Health Care General Directorate, Turkish Ministry of Health, Turkey

¹² Marmara University, Istanbul, Turkey

¹³ Palestinian Medical Relief Society, State of Palestine

¹⁴ Aga Khan Foundation, Hama, Syria

¹⁵ Institut National de Santé Publique, Tunis, Tunisia

¹⁶ Glasgow Caledonian University, Glasgow, UK

¹⁷ WHO Geneva, Switzerland

¹⁸ WHO EMRO, Cairo, Egypt

¹⁹ Research Department, Ministry of Health, Tunisia

²⁰ University of the West Indies, Georgetown, Barbados

^a Population Health Research Institute, St. George's, University of London, Cranmer Terrace, London SW17 0RE, UK

^b Department of Public Health and Policy, University of Liverpool, UK

^c Institute of Community and Public Health, Birzeit University, State of Palestine

^d Syrian Center For Tobacco Studies, Aleppo, Syria

^e Cardiovascular Epidemiology and Prevention Research Laboratory, Tunisia

^f Dept. of Public Health, Faculty of Medicine, Dokuz Eylul University, Turkey

^g Public Health Program, Department of Health Sciences, Qatar University, Doha, Qatar

^h Department of Epidemiology and Public Health, American University of Beirut, Lebanon

ⁱ Department of Pharmacology & Therapeutics, Trinity College, Dublin, Ireland

^j Robert Stempel College of Public Health And Social Work, Florida International University, Miami, FL, USA

* Corresponding author.

E-mail address: jcritchl@sgul.ac.uk (J. Critchley).

^k The Faculty of Medical Sciences, University of the West Indies, Barbados^l Institute of Health and Society, Newcastle University, UK

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ABSTRACT

Background: Middle income countries are facing an epidemic of non-communicable diseases, especially coronary heart disease (CHD). We used a validated CHD mortality model (IMPACT) to explain recent trends in Tunisia, Syria, the occupied Palestinian territory (oPt) and Turkey.

Methods: Data on populations, mortality, patient numbers, treatments and risk factor trends from national and local surveys in each country were collated over two time points (1995–97; 2006–09); integrated and analysed using the IMPACT model.

Results: Risk factor trends: Smoking prevalence was high in men, persisting in Syria but decreasing in Tunisia, oPt and Turkey. BMI rose by 1–2 kg/m² and diabetes prevalence increased by 40%–50%. Mean systolic blood pressure and cholesterol levels increased in Tunisia and Syria.

Mortality trends: Age-standardised CHD mortality rates rose by 20% in Tunisia and 62% in Syria. Much of this increase (79% and 72% respectively) was attributed to adverse trends in major risk factors, occurring despite some improvements in treatment uptake.

CHD mortality rates fell by 17% in oPt and by 25% in Turkey, with risk factor changes accounting for around 46% and 30% of this reduction respectively. Increased uptake of community treatments (drug treatments for chronic angina, heart failure, hypertension and secondary prevention after a cardiac event) accounted for most of the remainder.

Discussion: CHD death rates are rising in Tunisia and Syria, whilst oPt and Turkey demonstrate clear falls, reflecting improvements in major risk factors with contributions from medical treatments. However, smoking prevalence remains very high in men; obesity and diabetes levels are rising dramatically.

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1. Introduction

Coronary heart disease (CHD) is the most common cause of mortality globally, generating more than 7 million deaths each year. CHD is expected to remain a leading cause of death beyond 2030 [1,2]. Different regions are at varying stages in their CHD epidemics. For example, after peaking in the 1960s, CHD mortality in Western countries has subsequently halved. Central European countries have experienced more recent and abrupt declines following socioeconomic transformations in 1989/1990 [3]. The drivers of these CHD mortality trends are increasingly well characterised in affluent countries. Diverse studies generally suggested that risk factor improvements explain half to two thirds of the mortality declines with the remaining one third to half coming from evidence based treatments [4–6]. CHD and other non-communicable diseases (NCDs) are increasing as a proportion of total mortality in most middle and low income countries [1,2,7]. However, much less information on the CHD burden (mortality, morbidity and costs) and CHD trends are available from these populations. This is particularly worrisome for countries in the Eastern Mediterranean Region, where predictions suggest substantial increases in the number of NCD deaths by 2020 [8]. For countries in this region, there is therefore an urgent need to analyse local and regional CHD trends and quantify the impact of risk factors and treatments.

Risk factor trends across the WHO-EMRO region were recently summarised in GBD Lancet papers [9–12]. However, such analyses risk portraying a relatively “homogenous” view of the region, whereas mortality trends are strikingly heterogeneous. For instance, our analyses show that CHD mortality is rising rapidly in many countries including Tunisia and Syria, but decreasing in other Mediterranean countries such as the occupied Palestinian territories and Turkey.

It is clearly important to identify trends in CHD mortality in low and middle income settings and appraise their variations between countries, so as to inform effective policies to reduce the future disease burden. Our aim was therefore to analyse recent CHD trends in Tunisia, Syria, **occupied Palestinian territories** (oPt, West Bank), and Turkey (middle income countries in the Eastern Mediterranean region), and assess the recent contribution of risk factor changes and evidence based treatments. These four countries were selected on the basis of a) data availability and quality, b) previous successful collaborations, some of which had resulted in substantial relevant data collection over time,

and c) representing a range of economic development, population size, and absolute mortality rates across this region (see [Tables 1 and 2](#)).

2. Methods

The socio-demographic and economic characteristics of the Tunisian, Syrian, oPt (West Bank), and Turkish populations are compared in [Table 1](#).

2.1. The IMPACT model

We used an updated version of the IMPACT CHD mortality model ([Appendix 1](#)). This has been employed and validated in a variety of countries from North America through Europe to China [4,13]. Data on risk factor levels and current uptake levels of evidence-based treatments were identified by extensive searches for published and unpublished data, and complemented where necessary with specifically designed surveys.

Data sources used to populate the model are detailed in [Appendix 2](#) and in previous work [14]. In brief, they include:

- a) Population and CHD mortality data (from national statistical agencies);

Table 1

Socio-demographic and economic comparison of the four Eastern Mediterranean countries.

Sources: Arab Human Development Report 2009. UNDP, HDR 2007/2008 for Tunisia, Syria and oPt (data for 2005). Turkey Statistical Institute for Turkish data (2007).

Country	Population (millions)	Life expectancy (at birth)	% of total mortality attributed to CHD	Per capita GNI PPP\$
Tunisia	10.1	74	27.14%	6820
Syria	18.9	75	34.25%	4010
Palestine (oPt)	3.8	72	21.98%	2710*
Turkey	70	74	18.66%	11,330

Footnotes: GNI per capita PPP\$ is Gross National Income in PPP US \$.

Per capita GNI from World Bank Development Indicators (UN data, 2005).

Life expectancy from World Bank <http://www.indexmundi.com/facts/indicators/SP.DYN.LE00.IN/compare?country=sy>.Proportion of all deaths from CHD <http://vizhub.healthdata.org/gbd-compare/> (year 2010).

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