

# The burden of acute coronary syndromes in the United Kingdom



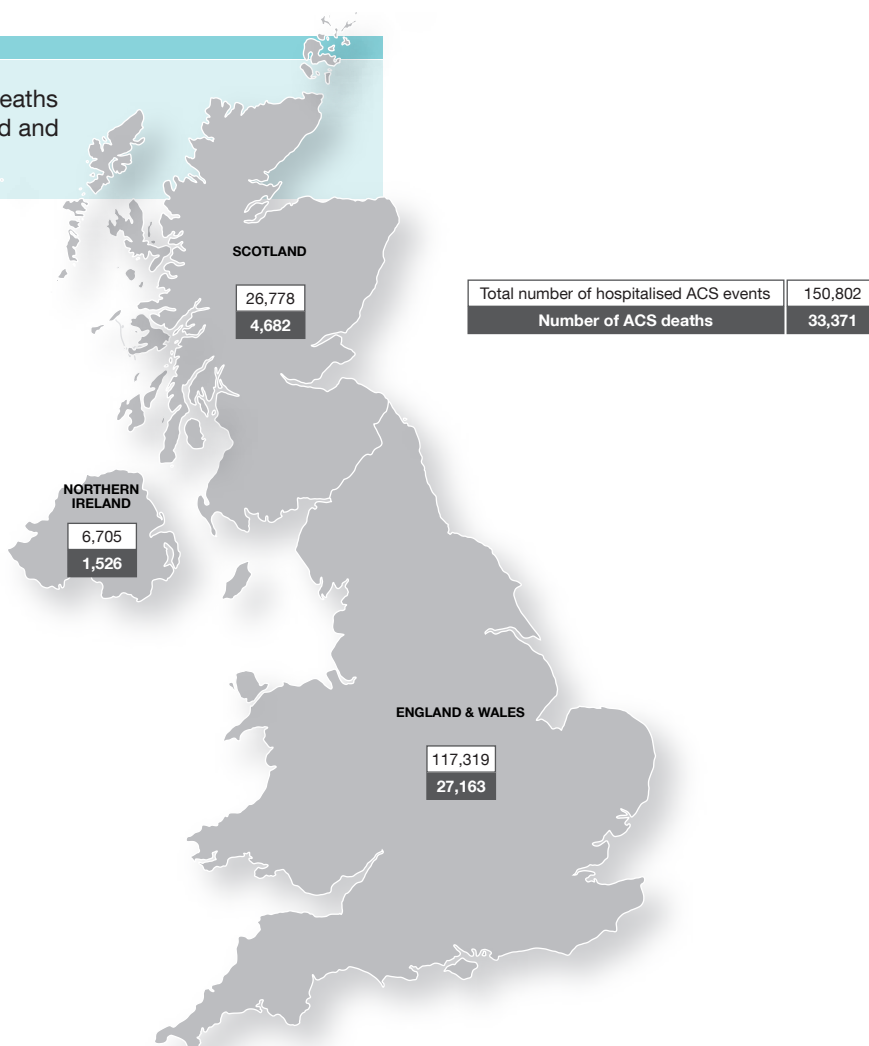
Charles River Associates was commissioned by AstraZeneca to undertake this research. The findings are the responsibility of the authors. AstraZeneca did not have any editorial control of the report, but did review it for technical accuracy.

## ACUTE CORONARY SYNDROMES IN SUMMARY

- Every four minutes someone is admitted to hospital suffering from a heart attack or a chest pain event in the UK, totalling over 150,000 hospitalisations a year.
- Each day over 90 people die from a heart attack in the UK amounting to over 33,000 deaths in 2009.
- 1.5 million days of work are lost due to British workers requiring time off work to recuperate from a heart attack or chest pain event.
- Over 327,000 disability adjusted life years are lost due to ACS in a year, signifying the burden individuals and their families have to suffer through a reduction in their quality of life.

Direct healthcare expenditure and economic losses due to ACS amounted to £3.6 billion in 2009-10. The societal burden suffered by individuals with ACS and their family and friends can be valued at £9.8 billion. This significant burden of disease highlights the need to improve prevention, treatment and long-term management of individuals suffering from ACS.

**Figure 1** Number of hospitalisations and deaths due to ACS in England and Wales, Scotland and Northern Ireland in a year



**Source** Hospital admissions data and mortality statistics in the different regions

**Note** Number of hospital admissions for England, Wales and Northern Ireland are factual based on hospital discharge records for 2009-10 obtained from regional databases; Hospitalisations in Scotland are based on 2008-09 admissions. Mortality is based on regional mortality statistics by cause of death for 2009; for Northern Ireland, data from 2008 were used

**A**cute Coronary Syndromes or ACS comprise a set of life-threatening health conditions affecting the heart. In ACS, the blood supply to the heart is suddenly blocked due to cholesterol build-up and the formation of a blood clot in the heart's arteries. The resulting undersupply of oxygen to the heart can lead to a spectrum of heart conditions from chest pain (unstable angina) to a heart attack (myocardial infarction), during which the heart is damaged. An unstable angina episode results in a heart attack within three months in about 30% of patients.<sup>1</sup>



ACS events and the resulting 150,000 hospitalisations represent a significant direct cost to the UK healthcare system.<sup>2</sup> Approximately 8% of patients hospitalised for a heart attack are readmitted within a month in the UK.<sup>3</sup> If ACS are not treated quickly and adequately the condition can lead to death. In fact, ACS are one of the top five causes of death in this country, after different forms of cancer and stroke.<sup>4</sup>



### Occurrence of ACS in the United Kingdom

In a 12-month period in 2009-10, 150,802 hospitalisations were due to ACS in the UK. 98,506 (65%) of hospitalisations were due to heart attacks and 52,296 (35%) were due to chest pain.

A number of risk factors contribute to the high occurrence of ACS. These include diabetes, dyslipidemia, hypertension, obesity, smoking and ageing.<sup>5</sup> Although the number of smokers appears to be declining in the United Kingdom, the number of people with other risk factors like diabetes and obesity is rising.<sup>6</sup> As the country's population ages and grows<sup>7</sup>, the number of individuals suffering from ACS is likely to rise.

Heart attack and chest pain were the cause of over 150,000 hospitalisations in the UK and resulted in over 33,000 deaths in 2009. In comparison, less than 2,300 people die in traffic accidents in the UK each year.

A large proportion of deaths from ACS are likely to occur before patients ever reach a hospital<sup>8</sup> and about one in 20 die within 30 days of being admitted to hospital for a heart attack.<sup>3</sup> In 2009, the number of British residents who died from ACS was 33,371 – approximately 6% of the total number of deaths in the UK.<sup>9</sup>

As the prevalence of risk factors and patient's access to care differs significantly across the UK<sup>10</sup>, so does the occurrence of ACS and the number of people dying from them. Figure 1 shows the estimated number of ACS events and resulting deaths in each region.

### The treatment cost of ACS in the United Kingdom

Depending on the severity of the ACS event, patients undergo a series of diagnostic tests and medical procedures in hospital.<sup>11</sup> Unstable angina patients are monitored for several days to ensure that their condition does not progress to a heart attack, while patients diagnosed with heart damage caused by a heart attack often require an operation to clear and prevent further blockage of the blood supply to the heart. One common procedure for heart attack patients is a coronary angioplasty with stent placement. Following an ACS event, physicians recommend that patients participate in cardiac rehabilitation, adhere to a medication regime and undergo regular monitoring to prevent further life threatening events.

Patients with chest pain and heart attack need to be admitted to hospital as early as possible to receive adequate care. Hospitalisations due to ACS events are frequent in the UK and incur significant costs. Days in the ward, staff salaries, diagnostic tests and medical procedures contribute to the overall cost. A range of factors including the patient's diagnosis and condition, availability of medical procedure at the treatment location and local clinical practice will determine what resources are utilised.

NHS England reimburses hospital trusts £3,872 for treating a heart attack and £452 for managing a chest pain incident, whereas the costs to NHS Scotland amount to £2,633 and £646, respectively. Figure 2 shows the hospitalisation cost associated with ACS quantified for each region.



**Figure 2** The direct healthcare cost associated with treatment of ACS in the UK in 2009-10 (in '000 £)

Region	Hospital	GP visits & rehabilitation	Pharmaceuticals
England and Wales	310,639	22,775	It was assumed that ~19% of total healthcare expenditure for ACS is due to pharmaceutical costs <sup>12</sup>
Scotland	55,086	5,454	
Northern Ireland	8,310	1,283	
<b>UK Total</b>	<b>374,035</b>	<b>29,512</b>	<b>94,659</b>

**Sources** CRA analysis; NHS National Tariff Information, Scottish Tariffs, Northern Ireland HRG Tariff, Unit costs of Health and Social Care, National Audit of Cardiac Rehabilitation Services

Cardiac rehabilitation and regular monitoring through a family doctor or a specialist contributes 6% to the total annual direct cost associated with ACS. Finally, treatment guidelines suggest that patients are prescribed a range of medications to address risk factors for ACS like dyslipidemia, high blood pressure and blood clotting (thrombosis). Assuming that approximately 19% of total ACS healthcare expenditure is spent on medicines<sup>12</sup>, expenditure on the long-term pharmaceutical management of ACS can be estimated to be approximately £100 million in 2009.

### The economic cost of ACS

Direct costs arising from treatment in hospital and community settings represent only a fraction of the cost of ACS to UK society. ACS have a cost to the economy due to death of qualified workers, premature retirement and sick leave due to poor health. They are responsible for an estimated 1.5 million days of sick leave per year in the UK. Productivity losses due to premature death and retirement can be estimated to result in a £3.1 billion loss to the UK economy in 2009.

In 2009, British workers missed an estimated 1.5 million days of work, that is over 4,000 years, due to poor health associated with ACS. Productivity losses due to ACS are worth almost £3.1 billion to the British economy. That represents approximately 0.13% of the 2009 gross domestic product of the UK.



Direct costs associated with treatment of heart attack and chest pain vary substantially across the UK. On average, in the UK £3,320 is spent on the treatment of an ACS event. Expenditure on hospitalisations represents the biggest cost component (75%) of care.



## The total burden of disease associated with ACS

Adding direct healthcare expenditure and economic losses, ACS have caused costs of approximately £3.6 billion in the UK in 2009–10. However, the costs from a societal perspective go beyond this. There is a considerable burden associated with individuals experiencing loss in both length and quality of their life. This burden of disease amounted to 327,522 disability adjusted life years lost (DALYs) in 2009. Assuming a willingness to pay to reduce this burden of around £30,000 per DALY<sup>13</sup>, the societal cost of ACS for the UK amounts to £9.8 billion.

**Figure 3** The direct and economic cost of ACS in the UK in 2009–10 (in '000 £)

Cost category	Chest pain	Heart attack
<b>Direct costs</b>		
Hospitalisation costs	25,298	348,737
GP visits and rehabilitation	5,440	24,072
Pharmaceutical costs		94,659
<b>Economic costs – Lost value to British economy</b>		
Productivity losses (Morbidity)	8,071	1,851,439
Productivity losses (Mortality)	0	1,228,252

Source CRA analysis

### Footnotes

- 1 Turpie American Journal of Managed Care 2006. Burden of disease: medical and economic impact of acute coronary syndromes.
- 2 Taylor et al. 2007 Current Medical Research and Opinion Acute Coronary Syndromes in Europe: 1-year costs and outcomes.
- 3 Chang et al. Journal Epidemiology and Community Health 2005. Are international differences in the outcomes of acute coronary syndromes apparent or real? A multilevel analysis.
- 4 Mortality by cause of death statistics obtained from Office of National Statistics, General Register Office for Scotland and Northern Ireland Statistics and Research Agency.
- 5 Yusuf et al. Lancet. 2004. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study.
- 6 European cardiovascular disease statistics 2008 Edition.
- 7 EuroStat.
- 8 Norris RM. Heart 2000. The natural history of acute myocardial infarction.
- 9 Mortality by cause of death statistics obtained from Office of National Statistics, General Register Office for Scotland and Northern Ireland Statistics and Research Agency.
- 10 www.heartstats.org – Regional differences in CHD risk factors and Regional differences in treatment for CVD and CHD.
- 11 Bassand et al. 2007 European Heart Journal Guidelines for the diagnosis and treatment of non-ST-segment elevation acute coronary syndromes.
- 12 Steven Allender et al. (European cardiovascular disease statistics 2008) estimated that 19% of total healthcare expenditure on coronary heart disease (I20-25) in the UK in 2006 was due to cost of medication. This was assumed to be the case also for ACS in 2009-10.
- 13 DALYs have been equated to QALYs gained (Franco Sassi, Health Policy & Planning 2006. Calculating QALYs by comparing QALY and DALY calculations).

### About the Report

Charles River Associates' Life Sciences Practice was commissioned by AstraZeneca to investigate the economic and societal burden associated with Acute Coronary Syndromes (ACS). This short paper represents a summary of the full report which can be accessed from [www.crai.com/publications](http://www.crai.com/publications). The information and conclusions set forth herein are based on independent research and publicly available material. For further questions on the report, please contact Roby Kanichay ([rkanichay@crai.com](mailto:rkanichay@crai.com); +44-(0)20-7959-1417) or write to:

Charles River Associates, Life Sciences Practice, 99 Bishopsgate, London, EC2M 3XD