Objectives, Methods and Findings Of the Disease Control Priorities Project (DCPP)

Introduction and some Illustrations (Burden of and Interventions against Cardiovascular Disease, Road Traffic Injuries and Sickle-Cell Disease)

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Uses of Disease Burden Measures (and Cost-Effectiveness Estimates)

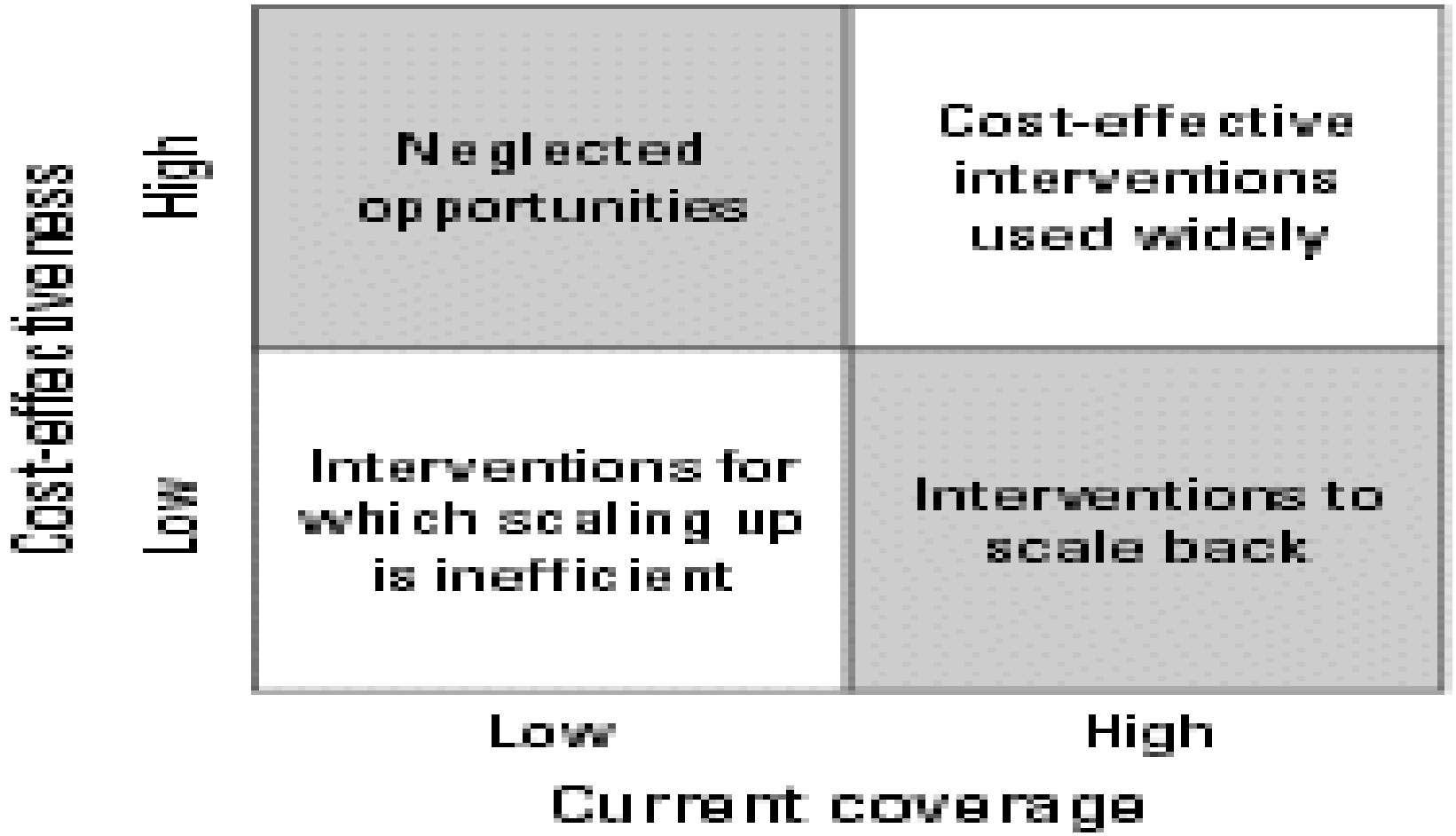
Assessing performance. A country-specific (or regional) assessment of the burden of disease provides an outcome indicator that can be used to judge progress or across countries or regions to judge relative performance.

Generating a forum for informed debate of values and priorities. The assessment of disease burden in a country in practice involves participation of a broad range of national disease specialists, epidemiologists, and, often, policy makers. Discussing the interrelations among diseases and their risk factors in the light of local conditions sharpens consideration of priorities.

Identifying national control priorities. Many countries now identify a relatively short list of interventions, the full implementation of which becomes an explicit priority for national political and administrative attention. Examples include interventions to control TB, poliomyelitis, HIV infection, smoking, and specific micronutrient deficiencies.

Allocating training time for clinical and public health practitioners. A major instrument for implementing policy priorities is allocation of time to training in cost-effective interventions in which disease burden is high. *Allocating research and development resources.* Developing a vaccine for a broad range of viral pneumonias, for example, would have perhaps hundreds of times the effect of a vaccine against Hanta virus infection..

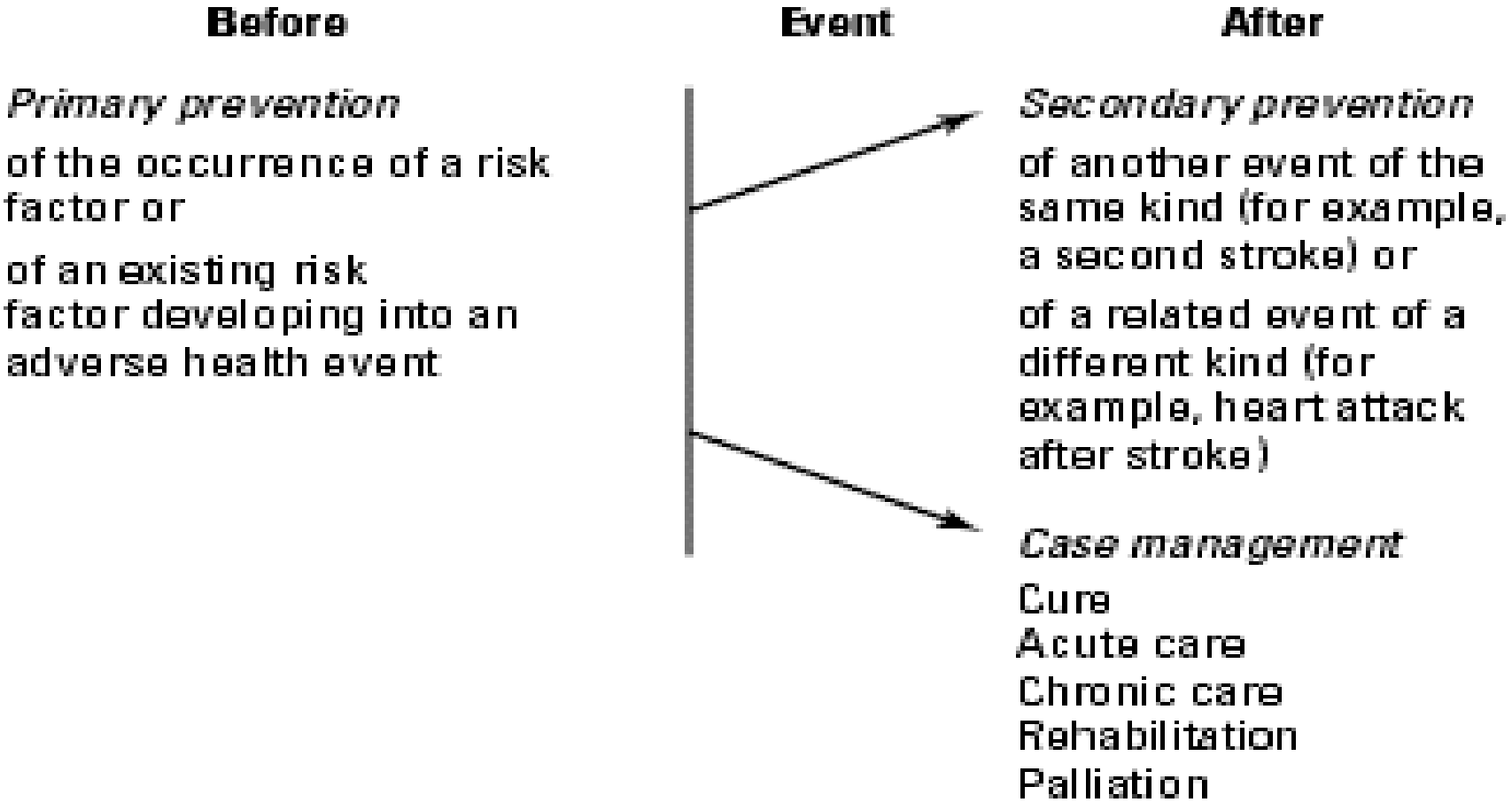
Allocating resources across health interventions. Here disease burden assessment often plays a minor role; the task is to shift resources to interventions, which, at the margin, will generate the greatest reduction in DALY loss. (This is what cost-effectiveness analysis is for.)



Source: Authors.

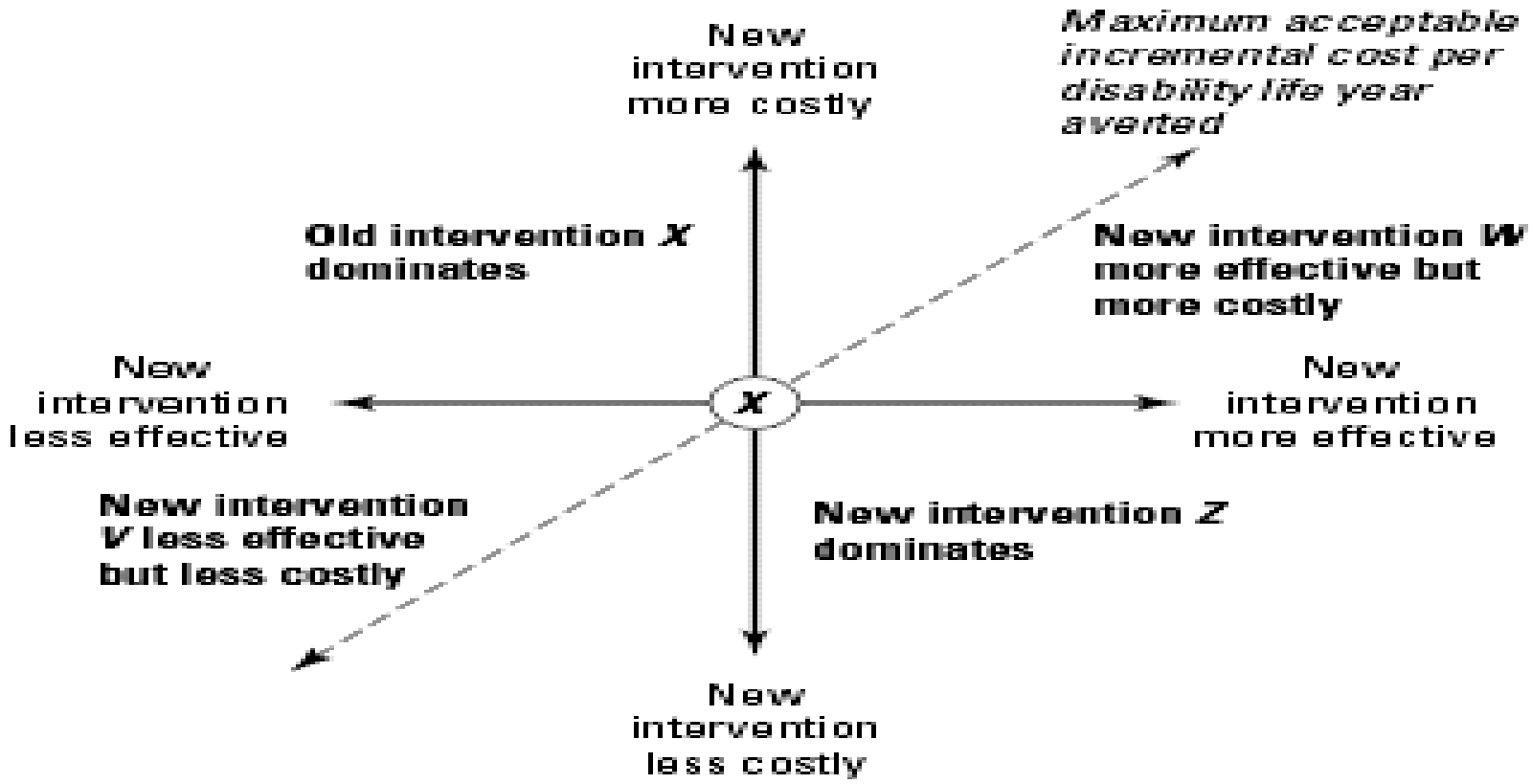
Figure 2.1. Efficiency of Interventions

Figure 15.1. Intervention Categories, with Examples



Interventions Related to the Occurrence of an Adverse Health Event

Figure 15.2. Average and Incremental Cost-Effectiveness and Intervention Choices



Comparison of Cost and of Effectiveness between Interventions

Table 2.B.1. Summary of Personal Interventions for Cardiovascular Disease

Condition	Intervention	Intervention setting	Objective	Target population	Cost-effectiveness (US$/DALY)	DALYs averted (hundreds)	Deaths averted
Ischemic heart disease	Aspirin, beta-blocker, and optional ACE inhibitor	District or referral hospital	Secondary prevention	Adults	688	8.40	—
Ischemic heart disease	Statin, with aspirin, beta-blocker and ACE inhibitor	District or referral hospital	Secondary prevention	Adults	2,028	3.54	—
Ischemic heart disease	Coronary artery bypass graft	Referral hospital	Secondary prevention	Adults	36,793	0.76	—
Myocardial infarction	Aspirin and beta-blocker	District or referral hospital	Acute management	Adults	14	1.04	—
Myocardial infarction	Streptokinase, with aspirin and beta-blocker	District or referral hospital	Acute management	Adults	671	1.04	—
Myocardial infarction	Tissue plasminogen activator, with aspirin and beta-blocker	District hospital	Acute management	Adults	15,869	0.42	—
Myocardial infarction and stroke	Polypill	District hospital	Secondary prevention	Adults	409	—	—
Stroke (ischemic)	Aspirin	Clinic or district hospital	Acute management	Adults over 15	149	1.62	0.12
Stroke (ischemic)	Heparin and recombinant tissue plasminogen activator	District hospital	Acute management	Adults over 15	1,977	1.22	1.70
Stroke (recurrent)	Aspirin and dipyridamole	Clinic or district hospital	Secondary prevention	Adults over 15	81	1.77	14.29
Stroke (recurrent)	Carotid endarterectomy	Referral hospital	Secondary prevention	Adults over 15	1,458	4.93	39.82
Stroke and ischemic and hypertensive heart disease	Polypill by absolute risk approach	District or referral hospital	Primary prevention	Adults	2,128	61.65	—

DALYs and deaths averted are for a 20 percentage point increase in intervention coverage in a hypothetical population of 1 million

Table 2.B.2. Summary of Population-based Interventions for CVD, Diabetes and Traffic Accidents

Condition	Intervention	Intervention setting	Target population[a]	Cost-effectiveness (US$/DALY)	DALYs averted[b] (hundreds)	Deaths averted[b]
Coronary artery disease	Legislation substituting 2% of trans fat with polyunsaturated fat at US$0.50 per adult	Policy level	Adults	48	—	—
Coronary artery disease	Legislation substituting 2% of trans fat with polyunsaturated fat at US$6 per adult	Policy level	Adults	838	—	—
Diabetes, ischemic heart disease, and stroke	Legislation with public education to reduce salt content	Policy level	All ages	1,937	18.73	—
Diabetes, ischemic heart disease, and stroke	Media campaign to reduce saturated fat	Policy level	All ages	2,617	13.86	—
Traffic accidents	Increased speeding penalties, enforcement, media campaigns, and speed bumps	Policy level	Adults	21	0.67	197.16
Traffic accidents	Enforcement of seatbelt laws, promotion of child restraints and random driver breath testing	Policy level	Adults	2,449	0.32	93.87

DALYs and deaths averted are for a 20 percentage point increase in intervention coverage in a hypothetical population of 1 million

Table 33.1. Stages of the Epidemiological Transition and Its Global Status, by Region

Stage	Description	Life expectancy (years)	Dominant form of CVD	Percentage of deaths from CVD	Percentage of world population in this stage	Regions affected
Pestilence and famine	Predominance of malnutrition and infectious diseases	35	RHD, cardiomyopathy caused by infection and malnutrition	5–10	11	Sub-Saharan Africa, parts of all regions excluding high-income regions
Receding pandemics	Improved nutrition and public health leads to increase in chronic diseases, hypertension	50	Rheumatic valvular disease, IHD, hemorrhagic stroke	15–35	38	South Asia, southern East Asia and the Pacific, **parts of Latin America and the Caribbean**
Degenerative and human-created diseases	Increased fat and caloric intake, widespread tobacco use, chronic disease deaths exceed mortality from infections and malnutrition	60	IHD, stroke (ischemic and hemorrhagic)	>50	35	Europe and Central Asia, northern East Asia and the Pacific, **Latin America and the Caribbean**, Middle East and North Africa, and urban parts of most low-income regions (especially India)
Delayed degenerative diseases	CVD and cancer are leading causes of morbidity and mortality, prevention and treatment avoids death and delays onset; age-adjusted CVD declines	>70	IHD, stroke (ischemic and hemorrhagic), CHF	<50	15	High-income countries, **parts of Latin America and the Caribbean**

Table 33.4. Number of Deaths and CVD Events Prevented by the Use of a Four-Component Medical Regimen and CABG per 100,000 Myocardial Infarction Survivors over 10 Years, by Region

Region	Number of events prevented with four-component medical regimen compared with no therapy[a]				Number of incremental events prevented with CABG compared with medical therapy			
	IHD deaths averted	Stroke deaths averted	Myocardial infarctions prevented	Strokes prevented	IHD deaths averted	Stroke deaths averted	Myocardial infarctions prevented	Strokes prevented
East Asia and the Pacific	1,900	104	4,077	209	79	11	248	22
Europe and Central Asia	1,990	89	3,964	179	83	1	294	7
Latin America and the Caribbean	**1,913**	**83**	**4,040**	**118**	**62**	**4**	**258**	**18**
Middle East and North Africa	1,908	95	4,294	118	62	1	296	22
South Asia	1,930	97	4,043	122	34	2	275	30
Sub-Saharan Africa	1,909	91	4,233	173	69	12	254	1

Source: Authors' calculations.

a. Aspirin, atenolol, enalapril, and lovastatin.

Table 34.2. Burden of Sickle Cell Disease by Age Group, Assuming 1,000 Births per Year and Survival to Various Ages, Jamaica, Starting in 1973

	Age group (years)										
Category	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	Total or average
Number of survivors	876	834	807	777	727	680	627	564	491	440	682.3
Number of deaths	124	42	27	30	50	47	53	63	73	51	560
Death rate (percent/year)	2.61	0.98	0.66	0.75	1.32	1.33	1.61	2.10	2.73	2.17	1.63
Number of DALYs lost/death	28.90	28.59	27.77	26.84	25.82	24.69	23.43	22.00	20.39	18.58	24.70
Total DALY losses from deaths	3,584	1,201	750	805	1,291	1,161	1,242	1,386	1,488	948	13,856
Number of DALYs lost from background (chronic) anemia	188	171	164	158	150	141	130	119	106	93	1,420
Total DALYs lost from deaths and chronic anemia	3,772	1,372	914	963	1,441	1,302	1,372	1,505	1,594	1,041	15,276
Number of pain crises/year	242.7	381.0	383.8	584.4	866.7	600.5	523.6	473.4	309.6	182.2	4,548
Number of other acute clinical events	77.5	22.2		182.2							281.9
Number of other chronic clinical events	49.8	14.8	12.8	10.9							88.3

Source: Authors' calculations based on Hambleton 2004a, 2004b.

Table 34.6. Cost-Effectiveness of Penicillin Prophylaxis for Sickle Cell Disease Detected by Newborn Screening, Jamaica

Category	Monthly injection	Daily oral dose	Total/1,000 children
Monthly cost of penicillin (J$)	22	250	26,560
Nurse's time, 10 minutes/month (J$)	90	n.a.	88,200
Clinician's time, 20 minutes 4 6 times/year (J$)	152.67 229.00	152.67 229.00	152,670 229,000
Total year 1, 8 treatments (J$)	2,117–2,728	3,221–3,832	2,140,000–2,750,000
Total, each of years 2–4, 12 treatments (J$)	3,176–4,092	4,832–5,748	3,210,000–4,130,000
Discounted total (discount rate of 3 percent), first 4 years	11,101 14,303	16,889 20,091	11,220,000 14,420,000
Equivalent in U.S. dollars[a]			
US$1 = J$49.8	223–287	339–407	220,000–290,000
US$1 = J$59.8	186–239	282–336	190,000–240,000
Number of deaths averted by prophylaxis	0.024/child	0.024/child	24 deaths
Costs per death averted (US$)	7,750–11,958	11,750–16,958	7,830–12,058
Costs per DALY gained (US$)	267–412	405–585	270–416

Source: Authors' calculations based on data from Hambleton 2004a, 2004b.
Note: n.a. = not applicable. The results are based on a cohort study of 315 cases.
a. Two exchange rates are shown because the exchange rate changed during the course of the study.

Table 39.2. The Haddon Matrix as Applied to Road Traffic Injuries

		Factors		
Phase	**Nature of intervention**	**Human**	**Vehicles and equipment**	**Environment**
Precrash	Crash prevention	Information Attitudes Impairment Police enforcement	Roadworthiness Lighting Braking Handling Speed management	**Road design** **Road layout** Speed limits Pedestrian facilities
Crash	Injury prevention during crash	Use of restraints Impairment	Occupant restraints Other safety devices Crash-protective design	Forgiving roadside (for example, crash barriers)
Postcrash	Life sustaining	First-aid skill Access to medical personnel	Ease of access Fire risk	Rescue facilities Congestion

Source: Authors.

Table 39.5. Annualized Costs and DALYs averted for an Intervention to Build Speed Bumps for the Top 10 Percent of the Most Lethal Junctions in a City of 1 Million, by Region

Region	Cost to intervene in population of 1,000,000 for 1 year[a] (2001 US$)	Present value of annual DALYs averted		Cost per DALY averted (2001 US$)	
		Discounted at 3 percent per year	Discounted at 6 percent per year	Discounted at 3 percent per year	Discounted at 6 percent per year
East Asia and the Pacific	725	167	105	4.34	6.89
Europe and Central Asia	708	158	99	4.48	7.11
Latin American and the Caribbean	**299**	**147**	**92**	**2.04**	**3.23**
Middle East and North Africa	1,070	238	150	4.49	7.12
South Asia	324	168	106	1.93	3.06
Sub-Saharan Africa	498	220	151	2.26	3.30

Source: Authors' calculations.

a. Costs do not include cost offsets from prevented medical care and prevented vehicle repair.