

Increased Responsiveness to
emergencies, quality of health
emergency treatment and long term
rehabilitation

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Outline

- A “love-hate” story: Road traffic accidents and the Health System
- When Health comes in first
 - Counting deaths, treating and characterizing survivors
- When Health comes in last
 - Emergency/Hospital/Rehabilitation treatment
 - The dangers of gadgets
- Globalization should help us learn from somebody else’s failures
- (Suggested) recommendations

Road Traffic Accidents vs. health

- Currently –segregation
 - Road Traffic “World”: Health care is what is needed once the crash has occurred

The Haddon Matrix

PHASE		FACTORS		
		HUMAN	VEHICLES AND EQUIPMENT	ENVIRONMENT
Pre-crash	Crash prevention	Information Attitudes Impairment Police enforcement	Roadworthiness Lighting Braking Handling Speed management	Road design and road layout Speed limits Pedestrian facilities
Crash	Injury prevention during the crash	Use of restraints Impairment	Occupant restraints Other safety devices Crash-protective design	Crash-protective roadside objects
Post-crash	Life sustaining	First-aid skill Access to medicals	Ease of access Fire risk	Rescue facilities Congestion

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- Currently –segregation
 - Health “World”: Injury (not crashes) is that bothersome burden that we have to address while we are busy taking care of diseases (e.g., Disease AND Injury)
 - Classification systems, compensation schemes, etc
 - The MV “injury” professionals: injuries are not accidents



But... this is a health problem

Figure 2: The risk transition. Over time, major risks to health shift from traditional risks (e.g. inadequate nutrition or unsafe water and sanitation) to modern risks (e.g. overweight and obesity). Modern risks may take different trajectories in different countries, depending on the risk and the context.

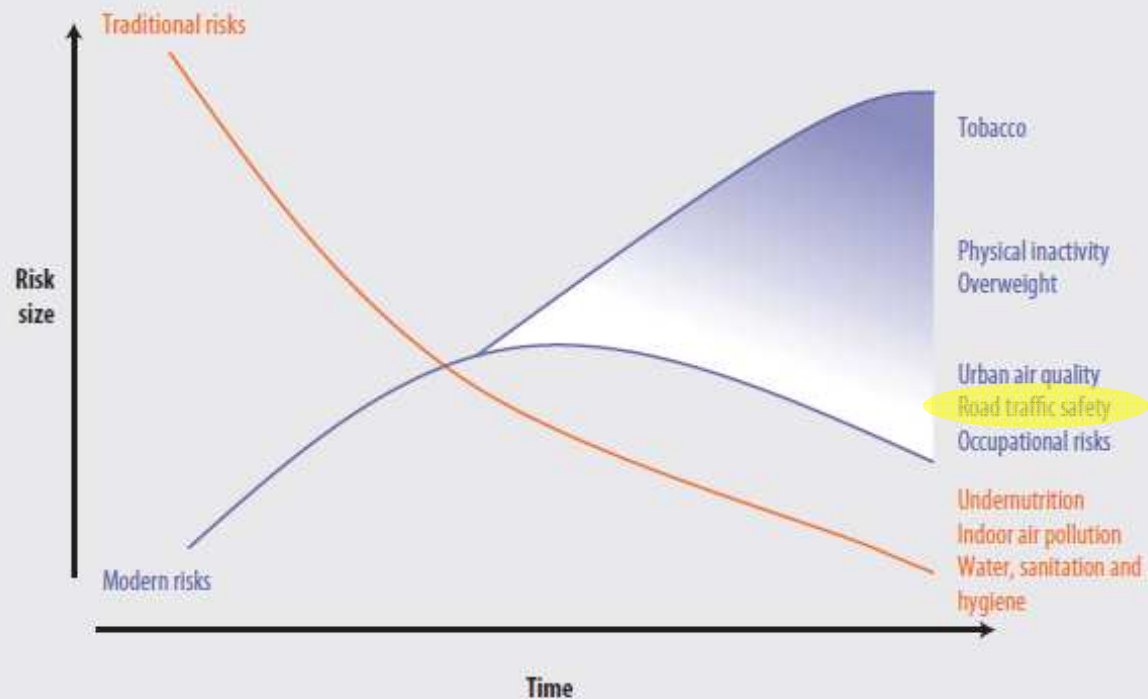




TABLE 1

Change in rank order of DALYs for the 10 leading causes of the global burden of disease

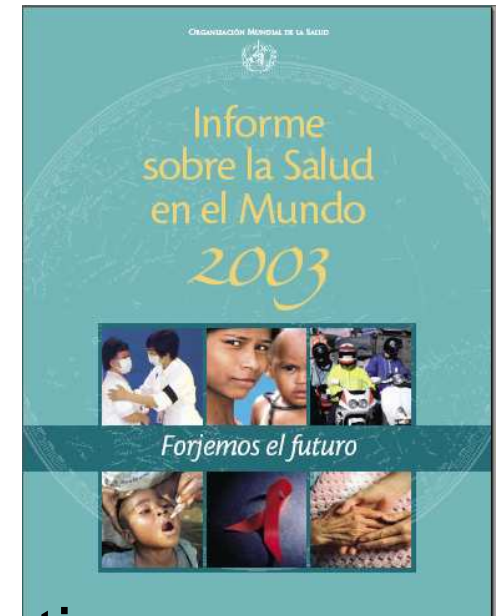
1990		2020	
Rank	Disease or injury	Rank	Disease or injury
1	Lower respiratory infections	1	Ischaemic heart disease
2	Diarrhoeal diseases	2	Unipolar major depression
3	Fetal conditions	3	Road traffic injuries
4	Unipolar major depression	4	Cerebrovascular disease
5	Ischaemic heart disease	5	Chronic obstructive pulmonary disease
6	Cerebrovascular disease	6	Lower respiratory infections
7	Tuberculosis	7	Tuberculosis
8	Measles	8	War
9	Road traffic injuries	9	Diarrhoeal diseases
10	Congenital abnormalities	10	HIV

DALY: Disability-adjusted life year. A health-gap measure that combines information on the number of years lost from premature death with the loss of health from disability.

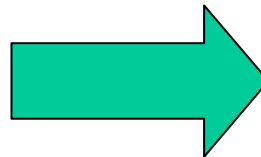
Source: reference 1.



WHO 2003 Report



World Unattended
Epidemics



Need for action

- Cardiovascular Dis.
- Tobacco control
- **Motor vehicle injuries**

- We know the magnitude of the problem
- We know the causes
- There exist policies that we can use

HEALTH SYSTEM CHALLENGES: A FEW FACTS AND FIGURES

- Globally, health is a US\$3.5 trillion industry, or equal to 8% of the world's GDP.
- ★ Large health inequalities persist: even within rich countries such as USA and Australia, life expectancy still varies across the population by over 20 years.
- ★ Recent essential medicines surveys in 39 mainly low- and low-middle-income countries found that, while there was wide variation, average availability was 20% in the public sector, and 56% in the private sector.
- ★ Each year, 100 million people are impoverished as a result of health spending.
- ★ Extreme shortages of health workers exist in 57 countries; 36 of these are in Africa.
- ★ In over 60 countries, less than a quarter of deaths are recorded by vital registration systems.
- ★ An estimated 50% of medical equipment in developing countries is not used, either because of a lack of spare parts or maintenance, or because health workers do not know how to use it.
- ★ Private providers are used by poor as well as rich people. For example, in Bangladesh, around $\frac{3}{4}$ of health service contacts are with non-public providers.
 - In 2000, less than 1% of publications on Medline were on health services and systems research.
 - Globally, about 20% of all health aid goes to support governments' overall programmes (i.e. is given as general budget or sector support), while an estimated 50% of health aid is off budget.
 - There has been a rapid increase in global health partnerships. More than 80 now exist, of which WHO houses over 30.



Benefits of MV injury reduction –even in the abstract



Millenium Development Objectives

1. **Eradicate extreme poverty**
2. **Achieve universal primary education**
3. **Promote gender equity and empowerment of women**
4. **Reduce children <5y mortality**
5. **Improve maternal health**
6. **Fight HIV, AIDS, Malaria & others**
7. **Ensure environmental sustainability**
8. **Strengthen world alliance for development**



WHEN “HEALTH” COMES IN FIRST

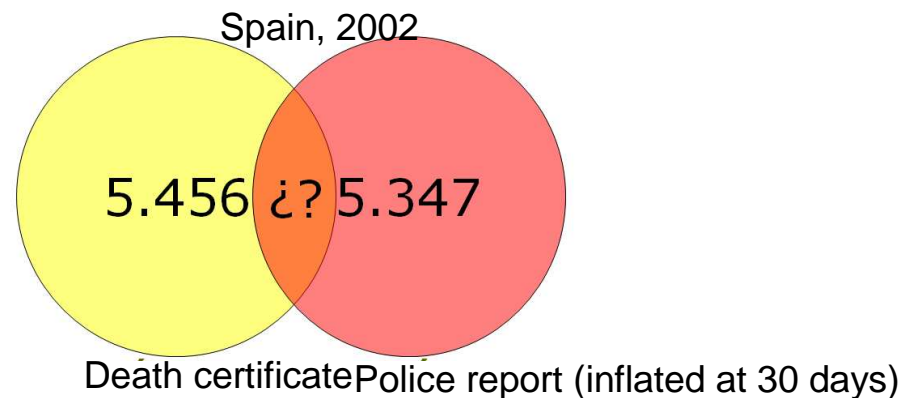
Contributions “at the beginning”

Counting deaths

	Deaths approx. 2007
Albania	384
Armenia	371
Azerbaijan	1107
Bulgaria	1006
Georgia	737
Greece	1659
R. Moldova	589
Romania	2712
Russian F.	33308
Serbia	962
Turkey	4633
Ukraine	9921
total	57389

Data sources

- Police records vs. Death certificates





The timing of death

The Golden hour

The polymodal
distribution of deaths

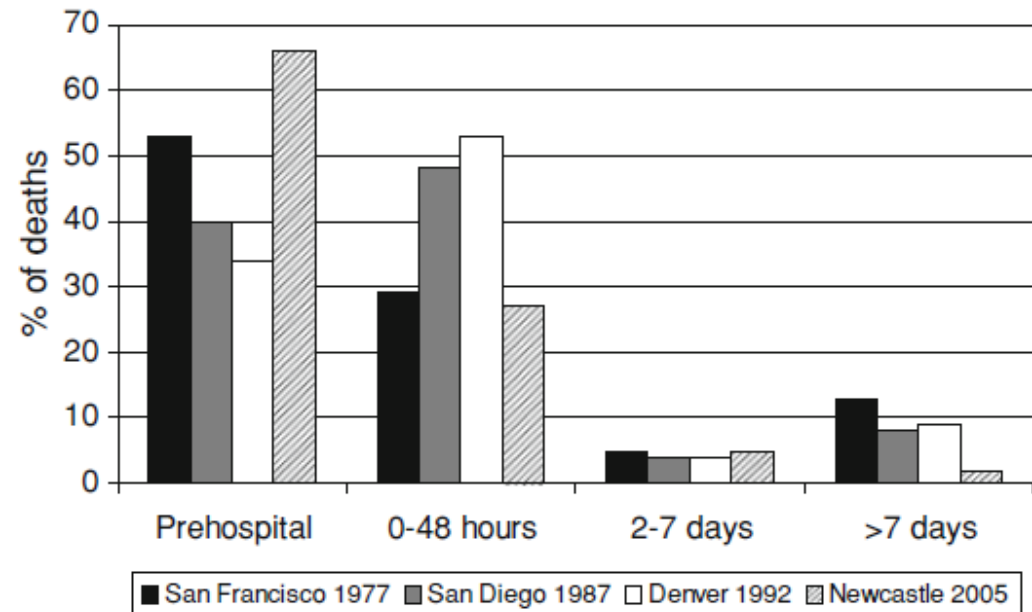


Fig. 4 Changing pattern of the time distribution of high-energy traumatic deaths

All injuries are not alike --survival

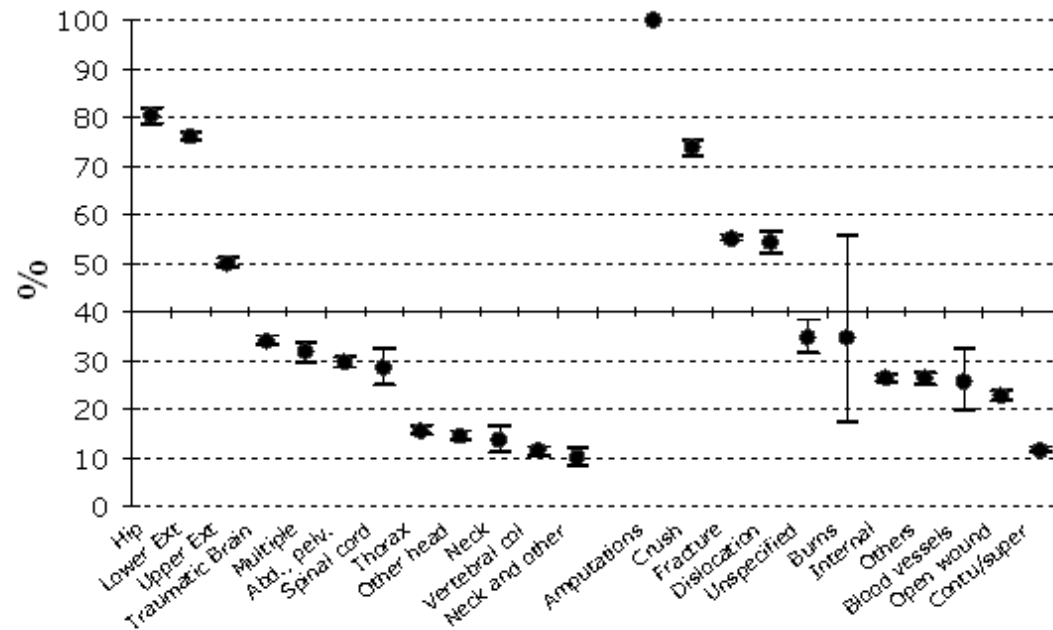
- “Immediate” deaths related to
 - Central Nervous System
 - Exsanguinations
 - Combinations of both
 - Chest injuries
- “Delayed” deaths related to
 - (Multiple) organ failure
 - Pelvic fractures
- 50%-60% of MV deaths are prior to hospital
- < 5% of inhospital deaths are “preventable”



All injuries are not alike - disability

Characterization of most disabling injuries to guide passive safety measure development

Percentage (and 95% CI) of hospitalized RTV discharged alive who were expected to have some functional limitation one year post discharge, according to the pFCI-AIS98 scores by body region and type of injury. Selected 8 European countries (BU, HU, NT, NO, PT, SL, SP, SW), 2004. (N=87,259 subjects)





WHEN “HEALTH” COMES IN LAST

“ It takes little energy to scramble an egg. But all the science in the world cannot put it back together.”



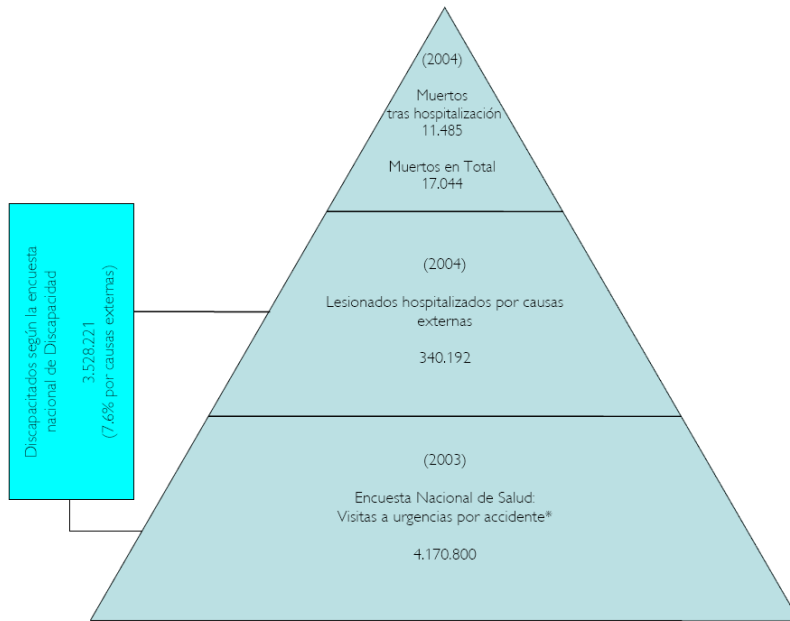
Difficulties in counting “non-fatal” through hospital data

- Even when controlling for injury severity
Hospital admission varies by:
 - Age/gender
 - Health insurance system
- Even when admitted, characterization of victims is not easy
 - Nature of injury vs. “mechanism” of injury
 - Insurance vs. diagnoses



Some estimates of magnitude

Pyramid



Spain 2004, all injuries –MV deaths were

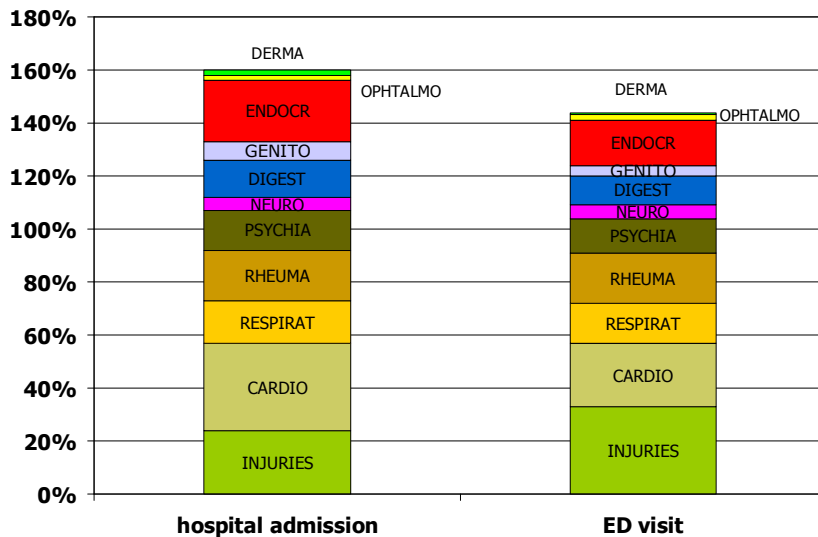
Hospital admissions

	deaths	Non deaths
Albania	384	1344
Armenia	371	2720
Azerbaijan	1107	3432
Bulgaria	1006	9827
Georgia	737	7349
Greece	1659	20675
R. Moldova	589	2985
Romania	2712	29832
Russian F.	33308	292206
Serbia	962	22201
Turkey	4633	169080
Ukraine	9921	40847



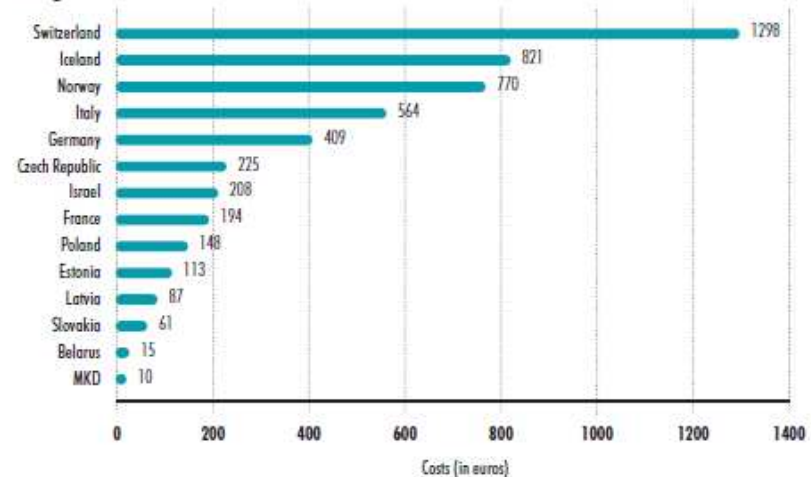
Some estimates of magnitude

Hospital/ED admissions & Length of stay Cost



Source: Segui-Gomez et al 2007

Fig. 6. Costs (in euros) of road traffic deaths and injuries per person, gross output method, selected countries in the WHO European Region^a



^a Data have been adjusted for inflation, applying, where necessary, a proper inflation or discount rate and using 2007 as the base year. Conversion to euros was performed using the exchange rate of 31 July 2008.

Source: European status report on road safety, WHO 2009

Heard in passing: “Bed occupancy is such that is MV injuries were eliminated, we could reduce waiting lists by 2-3 months”



What we are caring for...

RTIs to 1304 children younger than 12 years, discharged from hospitals in 10 European countries, 2004

Site	Type									Total (%)
	Fracture	Dislocation	Internal	Open wound	Amputations	Blood vessels	Contusion/Superficial	Crush	Burns	
Traumatic brain injury	124	0	531	142	0	0	0	99	0	896 (43)
Other head	72	10	0	71	26	1	156	0	0	336 (16)
Neck	0	0	0	0	1	0	13	0	0	14 (1)
Neck and head other	0	0	0	0	0	0	44	0	1	45 (2)
Spinal cord	3	0	0	0	0	0	0	0	0	3 (0)
Vertebral column	16	1	0	0	0	0	0	0	0	17 (1)
Thorax	14	0	18	1	9	1	57	0	0	100 (5)
Abdomen, pelvis, trunk and lower back	20	1	73	6	22	1	114	0	0	237 (11)
Upper extremity	143	2	0	28	4	0	28	1	1	207 (10)
Lower extremity	134	1	0	25	9	0	47	1	1	218 (10)
Hip	17	3	0	0	4	0	3	0	0	27 (1)
TOTAL	543	18	622	273	75	3	462	101	3	2100 (100)

Source: Lopez-Valdes et al. (33).

Common reactions´: Let´s ...

- ...get there earlier
- ...do more things at the scene
- ...bring the guy(s) to the nearest/best hospital
- ...operate quickly/intense treatment
- ...



Get there earlier



- Yet, No historical improvement on prehospital %s

Do more things at scene



- Yet, evidence suggests a “plateau” effect

Bring the patient where needed

- Nearest/Best
 - Need to develop Triage Criteria

- Via Call Center



- Via computerized “on star” from vehicle



- Need to proof evidence of effectiveness

- Not resolved issue yet

Care well for him/her

- Define “Best”

- Trauma volume/trauma mix
- All inclusive volume/mix
- Injury specific? E.g., burns

Table 2 Breakdown of journal articles included in review by outcome indicators and patient care context

	Number of articles
<i>Outcome indicators^a</i>	
Change in mortality	13
Change in other outcome of tangible patient benefit ^b	12
Change in process of care	11
<i>Results</i>	
Improvement	34
No difference	2
<i>Study context</i>	
Prehospital care	2
Hospital care	30
System-wide care	4
Total number of articles meeting criteria	36

^a Each article was assigned one primary outcome for purposes of categorization

^b Other outcomes of tangible patient benefit include but are not limited to: reduced morbidity (infection, pressure ulcers, and other complications), improved patient satisfaction, and reduced cost

Source: Juillard et al, World J Surg 2009

- One concern: EQUITY!

So--A Decade for Action

International coordination/strengthening global architecture for road safety

National activities

Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
Road safety management	Infrastructure	Safe vehicles	Road user behaviour	Post crash care



Pillar 5: Improving post crash care

Increase responsiveness to emergencies and improve the ability of health systems to provide appropriate emergency treatment and longer term rehabilitation.

Activity 1: Develop prehospital care systems through the implementation of existing guidelines on prehospital care trauma care.

Activity 2: Develop hospital trauma care systems and evaluate the quality of care through the implementation of guidelines on trauma care systems and quality assurance.

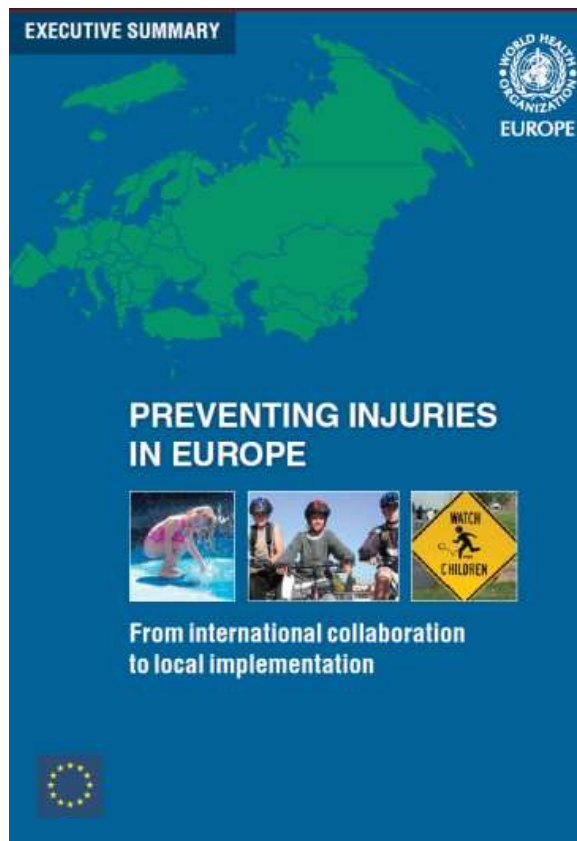
Activity 3: Implement appropriate road user insurance systems to finance rehabilitation services for crash victims.

Potential indicators:

- Number of countries who have implemented the guidelines.
- Number of countries who have implemented comprehensive road crash rehabilitation insurance systems.



And Preventing injuries in Europe tell us...



- Build on current national achievements with a greater emphasis on the development of national policies.
- Achieve more widespread implementation of evidence-based programmes in countries in the Region as defined in the report.
- Reinvigorate political commitment and the governance role of the health sector to engage other sectors and stakeholders for a multisectoral response.
- Strengthen collaboration between WHO, the European Commission, countries and civil society to maintain the momentum that has been achieved.
- Improve access to reliable and comparable injury surveillance information to make the extent, causes and consequences of the problem more visible across the Region.
- Step up efforts in building institutional capacity and train professionals from health and other sectors by using the TEACH-UP course.
- Address the capacity-building needs to improve quality of trauma care services in the Region.
- Maintain support for the exchange of experience between the network of Ministry of Health focal people for preventing violence and injuries.
- Address risk factors such as alcohol and socioeconomic inequalities.
- Increase investment in resources and political commitment to fill the gaps identified in this report.



How are we doing?

Fig. 1. Have there been any new developments in preventing violence and injuries?

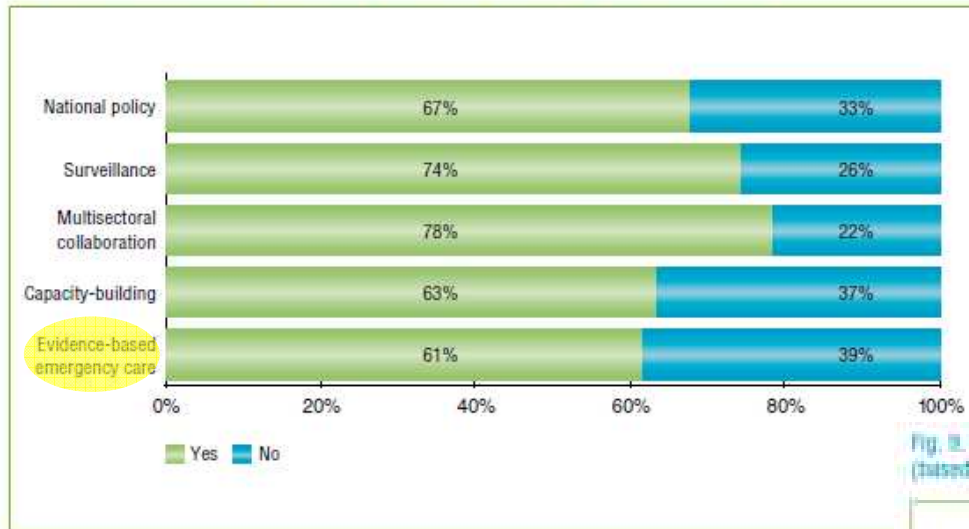
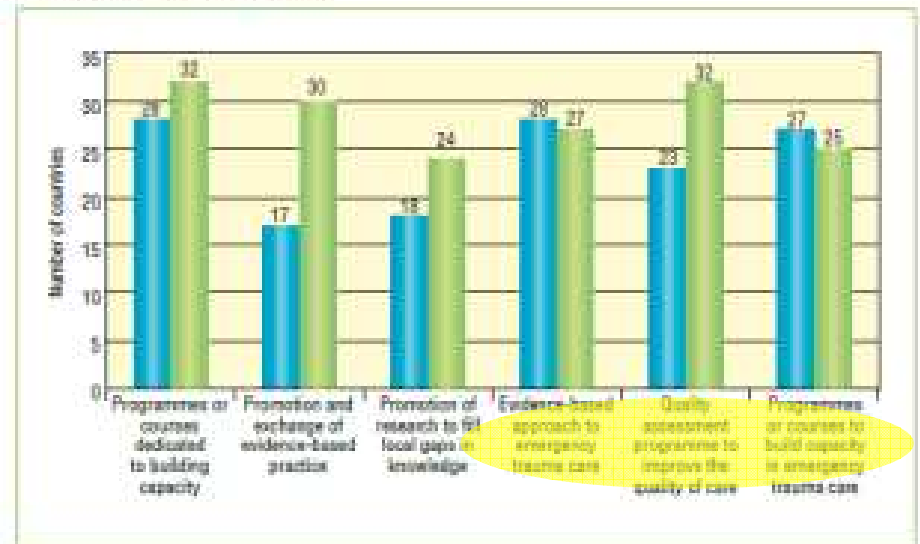


Fig. 2. Number of countries that have achieved steps essential to capacity-building, 2008 and 2009 (based on 87 responding countries)





GLOBALIZATION AND ITS EFFECTS

What do we have

- Scientific literature available worldwide
 - Reviews, systematic reviews, guidelines
- Medical technology available worldwide
 - barrier is price
- Recommendations for trauma quality improvement assessment: WHO-IATSIC review



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- Evidence of effectiveness and efficiency of interventions

Financial savings from selected injury prevention interventions

Expenditure of €1 each	Savings (€)
Smoke alarms	69.0
Car child restraints	29.0
Bicycle helmets	29.0
Motorcycle helmets	16.0
Upgraded marked pedestrian crossings	14.0
Roadside lighting	10.7
Guardrails on roadsides	10.4
Prevention counselling by paediatricians	10.0
Area-wide speed and traffic management	9.7
Poison control centres	7.0
Daytime running lights (normal bulbs)	4.4
Pedestrian bridges or underpasses	2.5

Sources: data from *Cost effective EU transport safety measures* (27), Miller & Levy (28) and *Cost-benefit analysis of measures for vulnerable road users* (29).



Intervention	Comparison	Target	\$ per QALY	\$ per Life saved
Belt use (50% use)	No use	population drivers	<0	<0
Day driving lights	Lights only at dark	occupants	<0	<0
Speed limits <90 Km/h	Speed limit <105 Km/h	roads	82,000	220,000
Belt use (9% use)	No use	Rear middle seat occupants	2,400,000	6,000,000



Median costs per Year of Life Saved

	Intervención:			
	Fatal disease	Fatal injury	Toxin control	All
Medicine	\$19,000 (n=310)	N/A	N/A	\$19,000 (n=310)
Housing improvements	N/A	\$36,000 (n=30)	N/A	\$36,000 (n=30)
Transport	N/A	\$56,000 (n=87)	N/A	\$56,000 (n=87)
Occupational	N/A	\$68,000 (n=16)	\$1,400,000 (n=20)	\$350,000 (n=36)
Environmental	N/A	N/A	\$4,200,000 (n=124)	\$4,200,000 (n=124)
All	\$19,000 (n=130)	\$48,000 (n=133)	\$2,800,000 (n=144)	\$42,000 (n=587)



Evidence of efficiency of other health related interventions in lesser developed environments

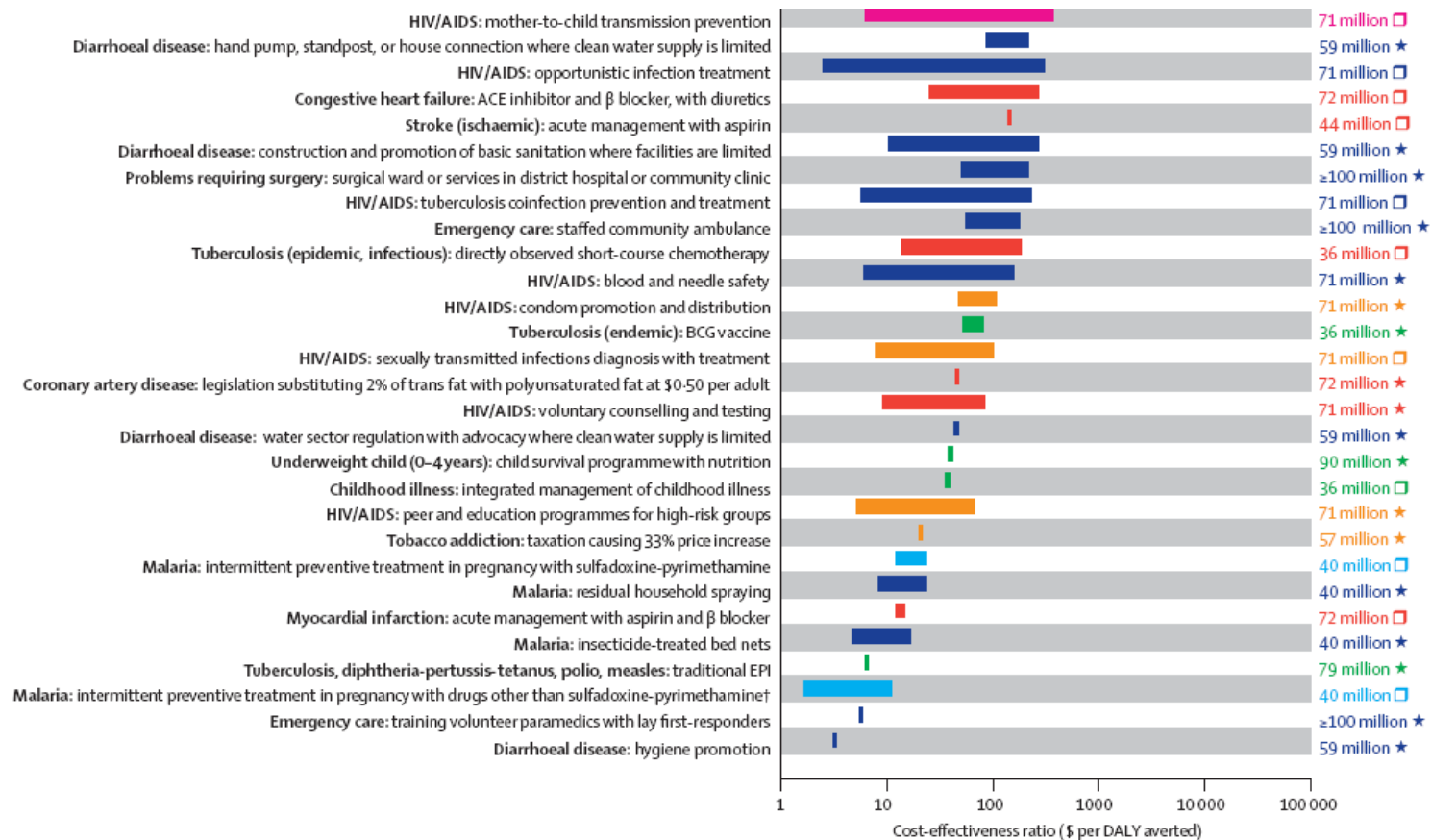


Figure 1: Cost-effectiveness of interventions related to high-burden diseases in low-income and middle-income countries (>35 million DALYs)

Bars=range in point estimates of cost-effectiveness ratios for specific interventions included in each intervention cluster and do not represent variation across regions or statistical confidence intervals. Point estimates obtained from DCP2, calculated as midpoint of range estimates reported, or calculated from a population-weighted average of region-specific estimates reported. Only interventions with cost-effectiveness reported in terms of DALYs are included in figure. *Advertising bans, smoking restrictions, supply reduction, and information dissemination. †Chloroquine=first line drug; artemisinin-based combination therapy=second-line drug; and sulfadoxine-pyrimethamine=first-line or second-line drug.



RECOMMENDATIONS

(Someone else's)

HEALTH SYSTEMS CHALLENGES AND OPPORTUNITIES

Managing multiple objectives and competing demands

A significant increase in funding for health

'Scaling-up' is not just about increasing spending

The health systems agenda is not static

Development partners have their impact on health systems

THE SIX BUILDING BLOCKS OF A HEALTH SYSTEM

- Good **health services** are those which deliver effective, safe, quality personal and non-personal health interventions to those that need them, when and where needed, with minimum waste of resources.
 - A well-performing **health workforce** is one that works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances (i.e. there are sufficient staff, fairly distributed; they are competent, responsive and productive).
 - A well-functioning **health information** system is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health system performance and health status.
 - A well-functioning health system ensures equitable access to essential **medical products, vaccines and technologies** of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use.
 - A good **health financing** system raises adequate funds for health, in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them. It provides incentives for providers and users to be efficient.
 - **Leadership and governance** involves ensuring strategic policy frameworks exist and are combined with effective oversight, coalition-building, regulation, attention to system-design and accountability.
-

(Someone else's) _2

“Unfortunately, the focus of trauma research continues to be finding the next best clinical therapy. We strongly recommend that the trauma community support a similar emphasis on primary prevention of injuries through influencing the research agenda of the funding agencies”

Ours

- Collaboration –from the beginning
- **Common sense** in the use of scarce resources
 - We ALL benefit of efficient use of time and money
- Invest on equity-related research
- Invest/Learn on effectiveness demonstrations regarding acute care and rehabilitation treatment on:
 - Brain injuries
 - Extremity injuries
 - Coagulopathy-related issues



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Thanks!