Health promotion and disease prevention within complex systems: diet, physical activity, and obesity

> Harry Rutter @harryrutter

Adult obesity prevalence, latest available data*

Japan 3.49	% (2008)					
S. Korea 3.8	3% (2008)				Measured Da	ita
Switzerland 8.1	1%(2007)					
Italy	9.9%(2007)				Self Reported	l Data
Norway	10.0%(2008)					
Sweden	10.2%(2007)					
France	11.2%(2008)					
Denmark	11.4%(2005)					
Netherlands	11.8%(2009)					
Austria	12.4%(2006)					
Poland	12.5%(2004)					
Belgium	13.8%(20	08)				
Terney	15.29	6(2008)				
Portugal	15.4	%(2006)				
Finland	15.	7%(2008)				
Germany	16	.0%(2009)				
Slovak Republi	ic .	16.9%(2008)				
Czech Republic		17.0%(2005)				
Spain		17.1%(2009)				
Greece		18.1%(20	08)			
Hungary		18.8%(2003)			
Luxembourg		20.(0%(2007)			
Iceland		20.	1%(2007)			
Wales ^d		2	21.0%(2009)		
Englande			23.0%	(2009)		
NorthernIrela	nd ^c		24.	0%(2005)		
Canada			24	.2%(2008)		
Australia			á	24.5%(2007)		
Ireland ^b			1	25.0%(2007)		
New Zealand				26.5%(20	007)	
Scotland [®]				27.0%(2008)	
Mexico					30.0%(2006)	
United States					33	.8%(2008)

http://www.noo.org.uk/NOO_about_obesity/international/

BMI distribution: Reception children





National Obesity Observatory

BMI distribution: Year 6 children



National Child Measurement Programme 2007/08 to 2009/10 (pooled)



Adult (aged 18+) BMI distribution

Health Survey for England 1991-94 and 2007-09



Why is this happening?



EIGHT GUIDELINES FOR A HEALTHY DIET

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The bigger picture





Noncommunicable diseases and mental health

Noncommunicable	diseases
and mental health	

- About NMH
- Countries
- Health topics
- Publications
- Databases
- Media centre
- Events
- Global Forum on NCDs
- Moscow NCDs 2011
 - UN high-level meeting on NCDs

United Nations high-level meeting on noncommunicable disease prevention and control

NCD summit to shape the international agenda

Date: 19-20 September 2011 Place: New York, USA

Noncommunicable diseases - or NCDs - like heart attacks and strokes, cancers, diabetes and chronic respiratory disease account for over 63% of deaths in the world today. Every year, NCDs kill 9 million people under 60. The socio-economic impact is staggering. Global leaders will meet at the United Nations in New York from 19-20 September 2011 to set a new international agenda on NCDs.

This is only the second time in the history of the UN that the General Assembly meets on a health issue (the last issue was AIDS). The aim is for countries to adopt a concise, action-oriented outcome document that will shape the global agendas for generations to come.

Meeting outcomes

Political declaration adopted at the UN General Assembly - 18 September 2011

Statements, speeches

- Opening remarks by the President of the General Assembly
 pdf, 36kb
- Closing remarks by the President of the General Assembly of Atlab

Facts about NCDs



- 36 million people die annually from NCDs.
- 63% of all global deaths are due to NCDs.
- 9 million people die too young from NCDs, before the age of 60.
- 10 facts on NCDs
- Fact sheets on chronic diseases

WHO contacts External Relations Officer





Tabula Rosa, 2004. Borjana Ventzislavova, Miroslav Nicic & Mladen Penev: http://www.adbusters.org/content/brand-baby-1



Source: http://www.esrl.noaa.gov/gmd/ccgg/trends/



http://www.theoildrum.com/node/5521

How do we respond?









http://www.thenutritionpost.com/eatright/do-fast-food-customers-read-the-calorie-charts.html



How should we respond?



Source: The Lancet, Volume 378, Issue 9798, Pages 1202 - 1203, 1 October 2011

Source: http://www.kryztoff.com/RAW/wp-content/uploads/2011/08/street-games-web.jp

Source: http://www.bikingindallas.com/wp-content/uploads/Ciclovia7a.jp

















How do we know what to do?

Evidence trajectories



Time






Standard Evaluation Framework

for weight management interventions



Learn from success

Celebrate failure

Complicated v Complex Systems

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							$\implies d\left(\right.$	$\left(\frac{m_e}{\sqrt{1-\frac{v^2}{c^2}}}\right) \cdot \left(\frac{1}{2}\right)$	$\frac{\left/1 - \frac{v^2}{c^2}}{m_e}\right)$	$= \frac{1 - v u_e/c^2}{-u_e (1 - \frac{v^2}{c^2})}$	- <i>dv</i> , substituti) earlier ab	ng from ove relation	s	
						\Rightarrow	$d\left(m_e\left[1\right]\right)$	$\left[-\frac{v^2}{c^2}\right]^{-\frac{1}{2}} \cdot \left(\frac{v}{c^2}\right)$	$\frac{\sqrt{1 - \frac{v^2}{c^2}}}{m_e} \Biggr)$	$= \frac{1-v u_e/c^2}{-u_e(1-\frac{v^2}{c^2}}$	-dv			C
				-	$\Rightarrow \left(dm_e \right)$	$\left[1 - \frac{v^2}{c^2}\right]^{-\frac{1}{2}}$	$+m_ed\left[1\right]$	$-\frac{v^2}{c^2}\Big]^{-\frac{1}{2}}\bigg)\cdot\left(\frac{v}{c^2}\right)$	$\frac{\left/1 - \frac{v^2}{c^2}}{m_e}\right)$	$= \frac{1 - v u_e/c^2}{-u_e(1 - \frac{v^2}{c^2})}$	\overline{v}^{dv}			
			$\Rightarrow \Big($	$dm_e \left[1 - \right]$	$\left[-\frac{v^2}{c^2}\right]^{-\frac{1}{2}}$	$-rac{1}{2}m_e\left[1- ight.$	$\frac{v^2}{c^2} \bigg]^{-\frac{3}{2}} \cdot d$	$l\left[1-\frac{v^2}{c^2}\right]$ $\cdot \left(\frac{v}{c^2}\right)$	$\left(\frac{1-\frac{v^2}{c^2}}{m_e}\right)$	$= \frac{1 - v u_e/c^2}{-u_e(1 - \frac{v^2}{c^2})}$	\overline{v}			
	$\implies \left(dm_e \left[1 - \frac{v^2}{c^2} \right]^{-\frac{1}{2}} - \frac{1}{2} m_e \left[1 - \frac{v^2}{c^2} \right]^{-\frac{3}{2}} \cdot \left[0 - 2\frac{v}{c^2} dv \right] \right) \cdot \left(\frac{\sqrt{1 - \frac{v^2}{c^2}}}{m_e} \right) = \frac{1 - vu_e/c^2}{-u_e(1 - \frac{v^2}{c^2})} dv$													
				$\Rightarrow ($	$\left(dm_e \left[1 - \right] \right)$	$\left[\frac{v^2}{c^2}\right]^{-\frac{1}{2}} + n$	$u_e \frac{v}{c^2} \left[1 - \right]$	$\left.\frac{v^2}{c^2}\right]^{-\frac{3}{2}}dv\right)\cdot\left(\frac{v}{c^2}\right)$	$\frac{\left/1 - \frac{v^2}{c^2}}{m_e}\right)$	$= \frac{1 - v u_e/c^2}{-u_e(1 - \frac{v^2}{c^2}}$	\overline{v}^{dv}			
					\Rightarrow	$\frac{dm}{m} = \left(\frac{d}{\sqrt{1}}\right)$	$\frac{\frac{n_e}{\frac{v^2}{c^2}} + \frac{m}{(1)}}{\frac{w^2}{c^2}} + \frac{m}{(1)}$	$\frac{u_e(v/c^2)}{1-\frac{v^2}{c^2}\right)^{\frac{3}{2}}}dv\Bigg)\cdot\Bigg(-$	$\frac{\sqrt{1-\frac{v^2}{c^2}}}{m_e} \biggr)$	$= \frac{1 - v u_e/c^2}{-u_e(1 - \frac{v^2}{c^2})}$	dv			
						$=\left(\frac{dm_e}{m_e}\right)$	$+\frac{v/c}{(1-v^2)}$	$\left(\frac{e^2}{2/c^2}\right) dv = \frac{1-u_e(1-u_e)}{-u_e(1-u_e)}$	$\frac{vu_e/c^2}{1-\frac{v^2}{c^2}}dv$	2				
						$-(\frac{dm_e}{dm_e})$	+	$dv, \frac{u_e}{dv} = -$	$1 - vu_e/c$		or by unity $\frac{u_e}{-}$			

SATURN V APOLLO FLIGHT CONFIGURATION

VERSEE STATISTICS	statement of the local division of the local			CRAPIC SAL			
CECRAFT INDRTH AMERICAN AVIATION				VENCLE STATION	4240.79	107, 748	
				. BASE OF COMAND NOSE COME	4203.73	106.774	
LES JETTISON MOTOR & LASHON ESCAPE	STATEM		-	CENTERLINE LAUNCH ENGAPE MOTOR	4185.53	nim, pui	
				BOTTOM OF LES SHINT	2002.02	100.383	
LAUNCH ESCAPE TOWER			X	TOP OF BOOST COVER	1000.00		
COMMAND MODULE							
COMMAND PILOT			A BOOM				
PLOT						1.000 (MAR)	
GARRY ON UMBILICAL	1717.07 01.412	-		AFT HEAT BHIELD	2749.55	11.239	
FUEL SUMP TANK	3760.52 95.527		C AND	VEHICLE STATION PLIGHT SEPARATION	3594.35	91,300	
H, CHYOGENIC STORAGE TANK				VEHICLE SEPARATION	3183.50	91.275	
				PROPULSION MOTOR			
				RENDEZVOUS RADAR ANTENNA			
HES THRUSTER ASSEMBLY & PLACES		-	A CAL	LUMAR EXCURSION MODULE			
I AN UNDER PROPERTY TIMES				LEN FORWARD DOCKING TUNNEL			
				VEHICLE SEPARATION	1340,55	84,827	
		/		VEHICLE STATION	3285.10	82,443	
RUMINT UNIT LINE				INSTRUMENT UNIT	10P 111.14	N7.167	
B IDOUDLAN		trills trilles		S-IVE	TOM 3022,14	H. HIS	B-OR HETERA
LH. TAM SENT	1001.10 01.170			TOP FORWARD SHIRT		\$78,70	17,188
ACCESS PLATFORM SUPPORT FITTING	3461.56 80.303			BOTTOM OF FORWARD SKIRT	2109.56	78,754 554,70	14,000
ANTENNAS CENTERLINE	2193.50 B1.108			FUEL MASS SENSOR PROPE			
COLD HELIUN SPHERES IN			- HIGH	INSTRUMENTATION PROBE			
LOS TANK		S		LOX TANK PROBE			
			ANA NOVE	AUXILIARY PROPULSION SYSTEM (APR)	(2)		
LINE FAIRING LY, FILL & DRAIN			ADALA	LOX VENT (FAR BIDE)	1719.00	70,078 213.15	0.44
TOP OF AFT SHIRT	2032.00 71,023	100,01 7,000	2 December 1	HELINH BPHERES IS PLACES	1.1100	Station of the	26.57
LOX LNg FILL AND DRAIN	2369.02 30.005	214.18 5.40	1 Contraction		-		1.54
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TELEMETRY ANTENNA & PLACES		902.00 22.00		PRESSURIZATION MAET			
				LOR VENT LINE			
LOR TANK				TOP OF LH. FEED FARING & PLATER		#10.71	1.01
CON PROPERTIES AND LOCAT PROPERTIES			COSAN /				
		101.00 1.001		LOK TANK EQUATOR	1648	46,928	
Cit Residential arstea (Proces		100.00 V.III		LOX FILL & DRAIN (FAR SIDE)		207.00	5.257
		11 A	CARANG A			1000	
LHS FALL & BRAIN		341,01 8,641		CHUCHTONN BAFFLE		113.50	
paratization for the fertility (- BOTTOM LAY FEED FAIRING		158.00	4,40
TOP OF AFT BRIET	1880.00 48,000	101.00 1.00 101.00 1.00	CO CAR	- FLIGHT SEPARATION	1160,00	44,794 186,0	4,978
BOTTOM OF SLOSH BAFFLE		184.00 1.10	11:01				
TOP ULLAGE BOCKET FAIRING MOTOR		174.44 1,725	ALC: NOT OF THE REAL	GINERL PLANE		100.0	
TOP OF THEFT CONE		113.00 1.000		BOTTOM ULLAGE N M FAIRING		-0.4	4 -,41
		10.00 1.00					
C TRO-EHHOR				S-IC PLIGHT SEPARATION		0.0	e 0.000
TOP FORWARD SHIRT	1547.00 38.141	-0.0 -1.11	Comment Shirt		1541,00	20.161 -23.7	3,584
			CHER SOUND	LOK VENT			
					1581.00	34,433	
					1521.00	94,433 94,399	
LOWER SECTION OF FORWARD BAIRT	1420.30 36.679			COX LINE	1525,00 1537,00 1404,00	34,433 38,399 35,661	
LOWER SECTION OF FORWARD SKIRT	420.30 3 .479			OOX LINE Y HINS	1537,00 1518,75 1484,00	94,333 94,399 35,661	
LOWER SECTION OF FORWARD BAINT	420.30 S.471			00X LINE Y HINS	1533, 90 1111, 75 1484, 00	98,433 98,399 35,661	
LOWER BECTION OF FORWARD BAIRT	NIO.31 X.873			00X LINE V RINS	1540.40 1011,75 5484.00	94,433 34,389 35,881	
LOWER BECTION OF FORWARD BART	ND.31 X.873			00X LINE Y RHUS MESSURIZATION TUNNEL & PLACESS	1583,90 1919,75 1884,00	94,433 34,399 35,661	
LOWER BECTION OF FORWARD BEINT	440.38 M.471			00% LINE 7 8146 	1587.40 107,75 5884.00	94,433 34,399 35,661	
LOWER BECTON OF FORWARD BAIRT	440.38 34.479 944.38 24,560			00X LINE V RINS PRESSURIZATION TUNNEL & PLACES	1585,00	64,433 (84,399 35,661	
LOWER BECTER OF FORWARD BORT BIRD BLOSH BATFLES LOWER BECTER OF HELIUM BOTTLES (0	1420.30 M.475 846.30 24.541			- 00% Line	1581,00	64,435 (84,389 35,461	
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LONER SECTION OF FORMAD BUILT RING BUGBE BAFFLER LONER SECTION OF HELIJAN BOTTLES IG TOP OF INTERTAIN ASSEMPLY FUEL VERT June	440.30 X.671 146.30 26.60 183.30 26.60			002 LINE 79838/012470H TUNKS, 9 PLACED LINE FEED LINE TUNKS, 9 PLACED	1581.00 1111.75 4484.00	6.433 (4.399 35.661	
LONER SECTION OF FORMAD BOAT RING SLOEK BATTLES LONER SECTION OF HELINA BOTTLES OF TOP OF INTERTAIN ABSCHLY FULL VERY LINE Access SOOD TAK BOD	440,30 S.075 944,30 24,60 980,20 22,484 980,00 21,75			000 Line v ans vassumstanton tunnel & places Los vizes Line tunnel, () PLACES vane	1581.00 159.75 6484.00	6.433 (4.399 35.661	
LONER BECTION OF POINTAID BOINT RINE BLODIE BATFLES LONER BECTION OF HELVIN BOTTLES OF TOP OF INTERTAINS ABECHIC." FUEL, VERT LINE ACCESS BOOK STAR BOO CHI FFLE S BANKIN STAR BOOK	440.30 S.071 94.30 24.60 993.30 24.44 995.40 7.514 794.4 25.75			00 LINE Y BIRS PRESSURFACTOR TUNNEL & PLACED LOX FEES LINE TUNNEL & PLACED Y BIRS	1551.00 1111,75 1664,00	64,433 34,389 35,661	
LONER SECTION OF FORMADE BORT RINE SLOBH BAFFLES LONER SECTION OF HELIJM BOTTLES (J) TOP OF HELITYLAN ASSEMLT FUEL VERT LAN RANGE FLE B BARN BORT LAN FLE B BARN BAR	440,30 X.071 946,30 24,44 950,30 24,44 950,00 27,828 794,14 25,03 754,14 26,705				1981,90 1981,73 1994,00 1995,00 7772,00	14,433 34,399 35,661 45,388 8,669 16,669	
LONGE BECTION OF FORMAND BORT RING BLODG BAFFLES LONGER SECTION OF HELION BOTTLES OF TOP OF INTERTANG ABECING.Y FUCK YEAR JUNE ACCESS BOOF PAR SEC LONG FLL & BARRIN (FAR SEC) LON FLL & BARRIN (FAR SEC)	440,30 X.675 846,30 24,66 860,30 24,64 866,00 27,83 794,00 26,83 794,00 26,85			OD LINE Y BIRS Y BIRS PRESENTION TUNNEL 0 PLACED LOX FEED LINE TUNNEL 0 PLACED V RING VRIME TOT FEED LINE TUNNEL 0 TOT FEED LINE TOT FEED LINE TOT FEED LINE	158.09 196.75 1994.00 9909.00 7772.00 742.00 582.20	16,433 38,399 33,661 43,088 6,408 18,408 17,516	
LONER RECTOR OF FORMAD BORT RING BLODIE BAFFLES LONER BEFFLES LONER BEFFLEN TOP OF INTERTAIN BOTTLES OF TOP OF INTERTAIN ACCESS BOOF FAN BOD LONE FLL & BRAIN IFAN BOD LONE FLL & BRAIN IFAN BOD	430,38 36.471 946,38 26,66 483,38 26,66 486,69 27,85 796,6 26,61 796,6 26,61			000 Line Y BIDS HERRINIZATION TUNNEL 0 PLACED LINE FEED LINE TUNNEL 0 PLACED Y BIDS UN FEED LINE TUNNEL 0 PLACED Y BIDS TOTO OF LINE TANK FOOL PHENAME LINE	1981,90 1981,75 1984,00 900,00 7974,00 942,05	M. 423 58, 399 33, 664 53, 664 64, 566 10, 666 10, 576	
COMER RECTION OF POINTAID BOINT RING BLODIS BAFFLES LONGON SECTION OF HELJAN BOTTLES OF TOP OF INTERTAINS ABSORDLY ACCESS IS BURNING AND ACCESS IS BURNING AND COMERCIAN ABSORDLY	4420,30 36.077 946,30 26,60 992,30 27,444 996,30 20,574 996,30 36,575 996,40 36,757			OD LINE Y BINS PRESENTIATION TUNNEL 0 PLACED LON FORE LINE TUNNEL 0 PLACED V BINS DIFTION OF LON TANK TO FORE LINE TUNNEL IN V BINS	1981,90 1981,75 1984,00 1995,00 2975,05 1982,95	M. 433 33. 684 33. 684 43. 684 43. 684 14. 684 17. 713 10. 287	
LONEX BECTON OF FORMAND BORT AND BUDIE BAFFLES LONEX BECTON OF HELINA BOTTLES OF TOP OF INCLUME ASSEMELT PLOCES NO OF JAR BOD LEAR FLL & BIRAN IFAN BED LEAR FLL & BIRAN IFAN BED BOTTON OF INTERTAIN ASSEMELT	430,38 %.679 846,39 24,66 40,39 24,64 406,00 77,574 74,44 26,73 75,44 45,75			OUL LINE Y BINS YREASANIJATON TUNNEL O PLACEO LOX FEES LINE TUNNEL O PLACEO YANE YANE YANE YANE YANE YANE YANE YANE YANE	1981,90 1981,92 1984,00 9909,00 997,00 992,000,000,000,000,000,000,000,000,000,	M. 433 31, 434 32, 444 33, 444 9, 4449, 444 9, 4449, 444 9, 444 9, 444 9, 444 9, 4449, 4446 1, 4446 1, 44461, 4446 1, 44461, 4446 1, 4446	
CONCE SECTION OF POINTAID BOINT INTE BLOOK BATTLES LINEGR SECTION OF HELION BOTTLES OF TOP OF INTERTAIN ABBEMILY FALL VEDT LINE CAN FILL & BRAIN IFAN BED LINE FILL & BRAIN FAN BED BOTTON OF INTERTAIN ABBEMILY SLOON MAPTLES	448.38 36.69 88.38 36.60 88.39 32.44 88.0 2.45 19.48 2.55 19.48 9.75			OD LINE Y BINS PRESAURISATION TUNNEL O PLACED LON FEED LINE TUNNEL O PLACED V BINS PROF FEED LINE TUNNEL O PLACED V BINS TOP OF FLEXING V BINS TOP OF EXAMPLE FAIRING	1981,00 1981,20 1984,00 1994,00 1997,000 1997,000 1997,000 1997,0000,00000000000000000	M.433 M.333 35.661 25.661 6.461 0.404 0.404 0.705 0.404 0.705 0.404	
LONER RECTOR OF POINTING BOINT RING BLODIE BAFFLES LONER SECTOR OF HELMAN BOTTLES OF TOP OF HETERTANG ASSEMILT ACCESS BOOK JANS BOD LONE FLL, BLORDH ITAM BOD LONE FLL, BLORDH ITAM BOD LONE FLL, BLORDH ITAM BOD LONE HOFTLES FULL, FLL, & BANN	440.31 H.477 441.32 H.476 451.30 H.444 451.30 H.444 151.31 H.477 451.44 H.477 152.45 H.477			OUT LINE Y BINS PRESEMPLATION TUNNEL & PLACED LON FOED LINE TUNNEL & PLACED V BINS DIFFERENCE LINE Y BINS V DIFFERENCE LINE Y DIFFERENCE LINE	198.00 198.73 1994.00 772.06 792.06 995.00 982.00 982.00	M. 203 M. 203 23.681 23.681 6.385 0.486 0.486 0.486 0.486 0.487 0.487 0.387 0.387	
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WORKING DRAFT - V3







Source: 2007. Foresight Tackling Obesities : Future Choices — Obesity System Atlas

How do we know what works?

















Full Generic Map

So did the front of pack labelling intervention work?

Eati

biscı

So did the social marketing intervention work?

- Individuals/populations/environments
- •Small effect sizes
- Important interactions
- •Compensatory behaviours
- •Emergence
- •Flows, feedbacks...
- •Etc etc
- •Analytical / modelling techniques
- •Novel research approaches
- Steal ideas from other sectors
- •What is (are) the most appropriate research paradigm(s)?

iding my bike o did the cycling infrastructure intervention work? Psychologica

Positive Influence

Negative Influence

Food Activity

Hiologic*H*

Mental

What do we do about this?

Do seatbelts promote obesity?



Do seatbelts promote obesity?



Do seatbelts promote obesity?



Places to Intervene in Complex Systems

- 1. Power to transcend paradigms
- 2. Paradigm that the system arises out of
- 3. Goals of the system
- 4. Power to add, change, evolve or self-organize system structure
- 5. Rules of the system
- 6. Structure of information flow
- 7. Gain around driving positive feedback loops
- 8. Strength of negative feedback loops
- 9. Length of delays
- 10. Structure of material stocks and flows
- 11. Size of buffers and other stabilizing stocks
- 12. Constants, parameters, numbers

Source: Leverage Points: place to intervene in a system. Donella Meadows, The Sustainability Institute 1999

Difficulty

Effectiveness

The Intervention Level Framework

Intervention Level	Definition			
Paradigm	System's deepest held beliefs. System goals, rules and structure arise out of the paradigm.			
Goals	The aim/priorities of the system.			
System structure	All of the elements that make up the system as a whole including the subsystems, actors and interconnections between these elements.			
Feedback & Delays	Loops that cause an action by one element of the system to in turn affect the flows into or out of that same element.			
Structural elements	Subsystems, actors and the physical elements of the system.			

Source: Johnston, Matteson, Finegood, Simon Fraser University: personal communication

Obesity strategy analysis



Source: Johnston, Matteson, Finegood, Simon Fraser University: personal communication

Cost-effectiveness











Cost effectiveness grid



Hedgehogs and foxes






Social silences

"... one of the things I learned as an anthropologist is that to understand how a society works you need not just to look at the areas of what we call 'social noise' - ie what everyone likes to talk about...you need to look at the social silences as well."

The real world

















HEAT <> Introduction

S HEAT Health economic assessment tool

Introduction

HEAT for cycling

HEAT for walking

Previous Assessments

Acknowledgement HEAT for walking

Acknowledgement HEAT for cycling

Welcome to the WHO/Europe Health Economic Assessment Tool (HEAT).

This tool is designed to help you conduct an economic assessment of the health benefits of walking or cycling by estimating the value of reduced mortality that results from specified amounts of walking or cycling.

The tool can be used in a number of different situations, for example:

1. When planning a new piece of cycling or walking infrastructure.

HEAT attaches a value to the estimated level of cycling or walking when the new infrastructure is in place. This can be compared to the costs of implementing different interventions to produce a benefit– cost ratio (and help to make the case for investment), or as an input into a more comprehensive economic appraisal exercise.

2. To value the reduced mortality from current levels of cycling or walking, such as to a specific workplace, across a city or in a country. It can also be used to illustrate economic consequences from a potential future change in levels of cycling or walking.

More information

What data do I need?

To produce an assessment, you need to provide data on the number of people walking or cycling, and the amount of walking they are doing (or are projected to do).

more ...

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HEAT > Acknowledgements

Acknowledgements

Health Economic Assessment Tool for walking

This tool has been developed from an original idea of Harry Rutter, National Obesity Observatory England, United Kingdom and it is based on the principles of the Health Economic Assessment Tool for Cycling first published in 2007.

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More information

Acknowledgement for HEAT for cycling

more ...

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SHEAT Health economic assessment tool

HEAT > for walking > Q1: Single or before / after

SHEAT Health economic assessment tool

after

HEAT for walking

Q1: Single or before /

HEAT for walking

Q1: Your data: amount of walking from a single point in time, or before and after an intervention

O Single

Before and after

Next step

- Next question
- Back

Hints & Tips

If you select 'Single', you will be asked to enter data on levels of walking only once.

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If you select 'Before and after', the tool will prompt you to enter two sets of walking data.

The difference in levels of walking between the pre- and post- measures will be used to calculate the health benefits and associated financial savings.

*





HEAT > for walking > Q2: Walking data type

HEAT for walking

Q2: Enter your walking data

The HEAT model requires an estimate of the average duration spent walking in the study population in order to calculate the corresponding health benefit (based on a relative risk from a review of the epidemiological literature on the health benefits of walking). This duration can be entered directly, if available (and this is the most direct data entry route), or calculated based on the distance, number of steps, or number of trips.

- Duration (average time walked per person)
- Distance (average distance walked per person)
- Steps (average number of steps taken per person)
- Trips (average per person or total observed across a population)

Next step

- Next question
- Back



HEAT for walking

Q1: Single or before / after

Q2: Walking data type



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HEAT Health economic assessment tool

HEAT > for walking > Q12: Value of life

HEAT for walking

Q12: Value of statistical life

What is the value of a statistical life?

The value of a statistical life is derived with a methodology called "willingness to pay" to avoid death in relation to the years this person can expect to live according to the statistical life expectancy. The willingness to pay represents how much a representative sample of the population (who in this instance are potential victims) would be willing to pay (in monetary terms) to avoid a specific risk such as the risk of a road crash.

Enter the standard value of a statistical life used in the country of study (and select your currency). This will form the basis of the financial savings shown in the model. If not known, use the default value of €1.5 million, which is the standard value used across Europe.

Please enter the local value of statistical life:



Next step

Next guestion

Hints & Tips

According to economic theory, the willingness to pay comprises lost consumption, immaterial costs (e.g. suffering) and the share of health costs paid directly by the victims.

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HEA Health economic assessment tool

HEAT for walking

Q1: Single or before / after

Q2: Walking data type

Q3: Duration

Q7: Population

Walking Summary

Q8: All current walking or change

Q11: Mortality rate

Q12: Value of life





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HEAT > for walking > Result

HEAT estimate

Reduced mortality as a result of changes in cycling behaviour

The walking data you have entered corresponds to an average of 30 minutes per person per day.

This level of walking provides an estimated protective benefit of: 22.67 % (compared to persons not walking regularly)

From the data you have entered, the number of individuals who benefit from this level of walking is: 10,000

Out of this many individuals, the number who would be expected to die if they were not walking regularly would be: 72.71

The number of deaths per year that are prevented by this level of walking is: 16.48

Financial savings as a result of walking

Currency: EUR

Q11:	Mor	tainty	rate
		2.00	

Q8: All current walking or

Q12: Value of life

HEAT Health economic

assessment tool

HEAT for walking

Q3: Duration

change

Q7: Population

Walking Summary

after

Q1: Single or before /

Q2: Walking data type

Q13: Time period for averaging

Q14: Benefit-cost ratio

Q16: Discount rate

Result

1,500,000 EUR
24,721,000 EUR
247,208,000 EUR
19,089,000 EUR
190,888,000 EUR

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