



2 Week Short Course: **Climate Change and Health** -causes, impacts and adaptation policies-

Heidelberg University, June 9-20, 2008

Curriculum



Course director: Rainer Sauerborn MD, Dr.P.H.

Chair and Director, Department of Tropical Hygiene and Public Health
Former member of the Scientific Advisory Board to the Federal German Government on "Global environmental Change" (www.wbgu.de)

Team of lecturers:

Heidelberg University:

Thomas Jänisch, Dr. med, Ph.D.

Valérie Louis, Ph.D, bioengineer, environmental epidemiologist, remote sensing

Prof. Andreas Ruppel, biologist: infectious diseases, specialty schistosomiasis

Prof. Rainer Sauerborn, MD, Dr.P.H., pediatrics, international public health

Shelby Yamamoto, MSc, environmental scientist

External lecturers:

Prof. Hartmut Grassl*, former Director of Max Planck Institute for Meteorology,
former Director of the WMO (World Meteorological Organization): climate

Prof. Dr. Gerd Jendritzki, formerly Head of Medical Meteorology, German
National Meteorological Service (DWD): health impact of heat waves

Prof. Margareta Kulesa*, Mainz University, Member of the Scientific Advisory
Board for Global Environmental Change of the German Federal Government
(www.WBGU.de): adaptation, intl. climate policies

Anayo Akunne Ph.D, Oxford: climate change impact on food production & nutrition

Dr. Harald Kunstmann, Forschungszentrum Karlsruhe: regional climate

Dr. Bettina Menne, Director, Climate and Health, WHO Euro Rome: adaptation

* to be confirmed

Venue

Dept. of Trop. Hygiene & Public Health, INF 365, ground floor, seminar rooms 007&008

Accreditation

This advanced short course module is accredited with the European network Master in International Health (www.TropEd.org) as well as within the exclusively Heidelberg based Master in Intl. Public Health. It can also be taken as a stand-alone short course.

Course book

Sauerborn R and Louis V (ed's) (2008) Global environmental change and infectious diseases: impacts and adaptation potential. Springer, Berlin Heidelberg, New York, in press. Participants will receive an advance copy will be sent the book as soon as it appears (about August 08).

Reading/viewing material sent out to participants before the course

as a "gentle" introduction complex material to be covered in the course.

McMichael AJ (1993). Planetary overload: Global environmental change and the health of the human species. Cambridge University Press, UK.

Al Gore: An inconvenient truth (DVD) 2007

Course reader

It contains the readings of all lectures, the curriculum, the CD with the bibliography as pdf files, as well as other useful information.

Audiovisual material

Pod-casts will be made available to the students, 2 films will be shown in the evenings.

Curriculum Structure

Courses are from 8:00 until 1 pm, followed by a joint lunch with instructors (included in course fee).The afternoons are lecture-free and reserved for tutored group work, films, site visits, computer lab sessions and independent study/review, etc.

Computer lab with internet access: access every morning 7:00-9:00 and evening 18:00-21:00 as a routine, outside these hours, participants can book and check in on an individual basis. You can get access to the University Library (one million books are at your disposal).

Site visits

1 Site visit to the Audi car factory: factory tour, focus: development of hybrid and hydrogen fuelled engines

2, Visit of mosquito control program "Upper Rhine Valley" (Prof. N. Becker)

Social and cultural program

Tour of the castle by guides in historical costumes.

Dinner in local vineyard with wine tasting of local palatinate wines.

Student evaluation

Based on participation in class discussions and group work (tutorial groups), group presentation and short written exam for factual knowledge.

Monday, June 9, 2008

Monday, June 9, 2008	
Day 1	Introduction: scope of the problem and scope of the course
	Objectives
	Teaching methods
	To understand the relevance of climate change for the health of populations To be able to carry out calculations of attributable risk
	Lecture and classroom discussion, based on readings
9:00-10:30	Presentation of participants: background, expectations towards the course Introduction and overview I: Climate change as one of six dimensions ¹ of man-made global environmental change (GEC) <i>Sauerborn</i>
10:30-11:00	<i>Coffee break</i>
11:00-12:30	Introduction and overview II: Health impacts of GEC and overview of climate change impacts on health <i>Sauerborn</i>
12:30- 14:00	<i>Lunch break</i>
13: 0-13:00	How to attribute health effects to climate change: attributable risk <i>Sauerborn</i>
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>
Afternoon free for independent review	
18:00	Social get together at home of course director (RS) with film and snacks <i>Sauerborn and course team</i>
Readings:	Sauerborn R, McMichael AJ. Global environmental change: tipping the balance of infectious diseases? Chapter 1 pg 21-41. In: Sauerborn R and Louis V (Eds). Global environmental change and infectious diseases: impacts and adaptation potential. Springer Verlag 2007, in press. Optional: McMichael AJ, Woodruff RE, Hales S. Climate change and human health: present and future risks. <i>Lancet</i> . 2006 Mar 11;367(9513):859-69. Review. Erratum in: <i>Lancet</i> . 2006 Sep 2;368(9538):842. Smith KR, Deasi MA (2002) The contributions of global environmental factors to ill health. In: Martens P and McMichael AJ (eds) Environmental change, climate and health. Cambridge University Press. Glossary of selected climate terms. Handouts of presentation.

¹ Climate change, decrease of stratospheric ozone, loss and change of biodiversity, land use changes and soil erosion, scarcity of freshwater, destruction of marine ecosystems

Tuesday, June 10, 2008

Day 2		The physical basis of climate change	
	Objectives	Teaching methods	
	To understand the physics of climate change in order to appreciate policies of mitigation (Reduction of greenhouse gases) later in the course	Lecture and classroom discussion based on readings tutorial groups	
8:00-9:00	Climate intro: the physical basis of the greenhouse effect, different greenhouse gases, anthropogenic sources <i>Grassl</i>		
9:00-9:30	<i>Coffee break</i>		
9:30-10:30	Climate impacts, the different effects of increased greenhouse gases on the physical environment and on the biosphere (excluding humans) <i>Grassl</i>		
10:30- 11:30	Scenarios of global warming of the IPCC (Intergovernmental panel on climate change) for industrialized and developing countries <i>Grassl</i>		
11:30-12:00	<i>Short break with refreshments,</i>		
12:00-13:00	Policies to reduce climate change (“mitigation”): emissions form energy and agriculture <i>Grassl</i>		
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>		
14:00-16:00	First meeting of tutorial groups <i>Louis, Sauerborn, Yamamoto</i>		
Readings:	<p>Working Group 1 (climate): Summary for Policy makers. Intergovernmental Panel on Climate Change (IPPC) 4th Assessment Report. Cambridge University Press.</p> <p>Epi KL, Mearns LO, Nyensi B (2003) Weather and climate change: human exposures. pg 18-42. In McMichael et al. (eds). Climate and human health: risks and responses. WHO, Geneva.</p> <p>Optional; Carter TR, La Rovere EL. (2001) Developing and applying scenarios. Pg 147-190. IPCC third assessment report. Vol II. Impacts, adaptation and vulnerability.</p> <p>Handouts of presentation.</p>		

Wednesday, June 11, 2008

Wednesday, June 11, 2008		
Day 3	Health impact: extreme weather events	
	Objectives	Teaching methods
	To understand the potential impact of extreme weather events on populations and on health service infrastructure To be able to describe disaster protection strategies	Lecture and classroom Discussion based on readings Tutorial groups
8:00-9:00	Floods and mudslides: past increases, damage in property, (health) infrastructure, human lives and health, trends and projections <i>Louis</i>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	Sea level rise: causes, trends and projections <i>Louis</i>	
10:30- 11:30	Sea level rise: health impacts <i>Louis</i>	
11:30-12:00	<i>Short break with refreshments, check your emails</i>	
12:00-13:00	Storms and hurricanes: trends and attribution to climate change. Health impacts <i>Louis</i>	
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>	
14:00-16:00	Tutorial groups	
Readings:	<p>Ahern M, Kovats RS, Wilkinson P, Few R, Matthies F. Global health impacts of floods: epidemiologic evidence. .Epidemiol Rev. 2005;27:36-46,</p> <p>Optional: Kovats, El Nino and human health, Bulletin of the World Health Organization, 2000, 78 (9)</p> <p>Handout: Overhead copies</p>	

Thursday, June 12, 2008

Thursday, June 12, 2008	
Day 4	The effect of temperature: Gradual warming and sudden heat waves
	Objectives
	Teaching methods
	<p>To understand the direct effect of temperature on health</p> <p>To be able to design measures to protect vulnerable populations against these effects</p>
	Lecture and classroom discussion, based on readings
8:00-9:00	Health effects of temperature increase (gradual warming) <i>Jendritzki</i>
9:00-9:30	<i>Coffee break</i>
9:30-10:30	Health effects of heat waves: evidence from the US and Europe, projections of future health effects <i>Jendritzki</i>
10:30- 11:30	Heat waves: effect in mega cities of developing world, the heat island effect, early warning systems: examples: Germany and Bangladesh <i>Jendritzki</i>
11:30-12:00	<i>Short break with refreshments, check your emails</i>
12:00-13:00	Overview of climate change impact on insect and rodent borne diseases <i>Sauerborn</i>
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>
14:00-16:00	Tutorial groups: review, questions and answers
Readings:	<p>Weiss RA, McMichael AJ. (2004) Social and environmental risk factors in the emergence of infectious diseases. <i>Nature Medicine Suppl.</i> 10(12):S70-75.</p> <p>McMichael AJ. (2000) The Urban environment and health in a world of increasing globalization:; issues for developing countries. <i>Bull WHO</i> 78(()) 1117-1126.</p> <p>Schär C, Jendritzki G. (2003) Hot news from the summer. <i>Nature</i> 432:559-560.</p> <p>Handout: Overhead copies</p>

Friday, June 13, 2008

Day 5	Climate change impact on infectious diseases I) Malaria, dengue fever, schistosomiasis	
	Objectives	Teaching methods
	To understand the impact of climate change on malaria and schistosomiasis both in changes of transmission characteristics and in changes of populations at risk	Lecture and classroom discussion, based on readings Field visit to mosquito control program in Rhine area
8:00-9:00	Climate change impact on malaria I <i>Sauerborn</i>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	Climate change impact on malaria II <i>Sauerborn</i>	
10:30- 11:30	Climate impact on Dengue in an urbanizing world <i>Jänisch</i>	
11:30-12:00	<i>Short break with refreshments, check your emails</i>	
12:00-13:00	Schistosomiasis, Leishmaniasis <i>Ruppel, Louis</i>	
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>	
14:00-17:00	Field visit: Malaria control program in the Upper Rhine Valley. Vector (<i>Culex</i> mosquito larva) control with biological means (<i>Bacillus thuringensis</i>) <i>N. Becker, R. Sauerborn</i>	
19:00	Course dinner in Palatinate Vineyard	
Readings	<p>Githeko A. (2007) African Highland Malaria. in: Sauerborn R and Louis V (Eds). Global environmental change and infectious diseases: impacts and adaptation potential. Springer Verlag, in press.</p> <p>Matthies F, Louis V, Jänisch T, Sauerborn R (2007) Climate Change. pg 42-71. in: Sauerborn R and Louis V (Eds). Global environmental change and infectious diseases: impacts and adaptation potential. Springer Verlag, in press.</p> <p>Optional: Epstein PR. Climate Change and public health: emerging infectious diseases. Encyclopedia of energy Vol 1, pg 381-391. Elsevier 2004.</p> <p>Handout: Overhead copies</p>	

Monday, June 16, 2008

Day 6	Climate change impact on infectious diseases	
	II) Rodent-borne and water borne climate sensitive diseases	
	Objectives	Teaching methods
	To understand rodent borne and water borne climate sensitive diseases To be capable of designing public health intervention against them	Lecture and classroom discussion, based on readings Tutorial group work
8:00-9:00	Tick borne encephalitis and Lyme disease in Europe and North America <i>Sauerborn</i>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	Cholera and other gastrointestinal infections <i>Louis</i>	
10:30- 11:30	Rodent borne diseases: leptospirosis and cryptococcosis <i>Louis</i>	
11:30-12:00	<i>Short break with refreshments, check your emails</i>	
12:00-13:00	Climate change and outdoor and indoor air pollutions: links and adaptation measures <i>Yamamoto</i>	
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>	
14:00-16:00	Tutorial groups	
Readings	<p>Lipp EK, Huq A, Colwell RR. Effects of global climate on infectious disease: the cholera model. Clin Microbiol Rev. 2002 Oct;15(4):757-70.</p> <p>Kovats RS, Edwards SJ, Hajat S, Armstrong BG, Ebi KL, Menne B et al. The effect of temperature on food poisoning: A time-series analysis of salmonellosis in ten European countries. Epidem. Infect. 2004;132:443-53.</p> <p>Optional: Meites E et al.(2004) Re-emerging leptospirosis, California. Emerging Infect.Diseases 10(2): 406-412.</p> <p>Handout: Overhead copies</p>	

Tuesday, June 17, 2008

Day 7	Food and water: the essentials of good health are getting scarce	
	Objectives	Teaching methods
	To understand the links between climate change, food production and the water cycle To derive from this knowledge the anticipated increase in a set of climate sensitive diseases	Lecture and classroom discussion, based on readings
8:00-9:00	The impact of climate change on food production <i>Akunne</i>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	Global malnutrition: pattern and contribution of climate change <i>Akunne</i>	
10:30- 11:30	Health consequences of water scarcity: trachoma, scabies, etc <i>Sauerborn</i>	
11:30-12:00	<i>Short break with refreshments,</i>	
12:00-13:00	Food-borne and water-borne climate sensitive diseases: an overview. <i>Louis</i>	
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>	
Afternoon free for individual study		
Readings:	<p>Rosenzweig C. et al (2001) Climate change and extreme weather events: implications for food production, plant diseases and pests. <i>Global Change & Human Hlth.</i> 2(2):90-104.</p> <p>Müller O and Krawinkel M (2005) Malnutrition and health in developing countries. <i>CMAJ</i> 173(3):279-285.</p> <p>Guerrant RL. Cryptosporidiosis: and emerging highly infectious threat. <i>Emerging Inf. Dis.</i> 3(1):51-57.</p> <p>Optional</p> <p>Patz J, Louis V, Akunne A.(2007). Land use and soil degradation. In: Sauerborn R and Louis V (Eds). <i>Global environmental change and infectious diseases: impacts and adaptation potential.</i> Springer Verlag,pg 92-105. In press.</p> <p>Foley JA et al. (2005) Global consequences of land use. <i>Science</i> 309:570-4.</p> <p>Handout: Overhead copies</p>	

Wednesday, June 18, 2008

Wednesday, June 18, 2008		
Day 8	Preventing climate change (mitigation)	
	Objectives	Teaching methods
	To understand mitigation as a strategy to prevent climate change To be familiar with a set of technical policy options To understand the lag time between policy implementation and climate improvement	Lecture and classroom discussion, based on readings Site visit to car factory. Discussion with engineers for CO2 reduction strategies
8:00-9:00	Energy systems: the <i>first</i> key for mitigation <i>Sauerborn</i>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	Land use: the <i>second</i> key for mitigation policies <i>Sauerborn</i>	
10:30- 11:30	International bodies (IPCC etc.) and agreements/protocols (Kyoto) <i>Kulesa</i>	
11:30-12:00	<i>Short break with refreshments,</i>	
12:00-13:00	Policy tools : CO2 tax, pollution permits and trading, regulation & legislation <i>Kulesa</i>	
13:00-19:00	<u>Field visit to Audi car factory:</u> Tour of the plant and discussion with engineers regarding new CO2 reduction strategies in engines: fuel cell and hybrid engines <i>Louis, Sauerborn</i>	
Readings	WBGU (2003) Towards sustainable energy systems. Summary for policy makers. Springer Verlag. Heidelberg, New York. Stern, Nicolas (2007) The Stern Review: The economics of climate change. Executive Summary. Cambridge University Press. Optional WBGU (2003) Towards sustainable energy systems. Whitebook. Springer Verlag. Heidelberg, New York. (you find the document on your CD as pdf file) Stern, Nicolas (2007) The Stern Review. Cambridge University Press. (The full text is on your course CD) Handout: Overhead copies	

Thursday, June 19, 2008

Thursday, June 19, 2008		
Day 9	Adaptation	
	Objectives	
	Teaching methods	
	<p>To understand the options for adaptation of health systems and interventions</p> <p>To apply this to a specific facet of climate impact in the participant's health care setting</p>	<p>Lecture and classroom discussion, based on readings</p>
8:00-9:00	<p>Overview of types of adaptation: spontaneous and planned; individual, community, national and international levels</p> <p><i>Sauerborn</i></p>	
9:00-9:30	<i>Coffee break</i>	
9:30-10:30	<p>Adaptation strategies I</p> <p><i>Menne, WHO</i></p>	
10:30- 11:30	<p>Adaptation strategies II</p> <p><i>Menne, WHO</i></p>	
11:30-12:00	<i>Short break with refreshments,</i>	
12:00-13:00	<p>Assessing adaptation needs and strategies</p> <p><i>Menne, WHO</i></p>	
13:00-14:00	<i>Joint lunch</i> <i>in a separate room at the restaurant of the Medical School</i>	
14:00–15:00	Course evaluation	
	<i>Coffee and Apfelstrudel</i>	
16:00-17:00	<p>Public Health Keynote Lecture (brown bag lunch, open university-wide): "WHO strategies to protect health from climate change impacts"</p> <p><i>Menne</i></p>	
20:00	Guided tour to Heidelberg Castle (guides in historical costumes)	
Readings	<p>Kovats S. Ebi K, Menne B. (2003) Methods of assessing human health vulnerability and public health adaptation to climate change. WHO-Europe, Rome office.</p> <p>ESSP (2007) Vulnerability and adaptability. In Confalonieri U and McMichael A (eds). Global environmental change and human health. Science and Implementation Plan. ESSP Report No 4.</p> <p>http://www.essp.org/fileadmin/redakteure/pdf/GEC_HHSciPlan.pdf</p> <p>Optional:</p> <p>Grambsch A, Menne B. Adaptation and adaptive capacity in the public health context (2003). In: McMichael et al. (Eds) Climate change and human: risks and responses. pg 220-233.</p> <p>Handout: Overhead copies</p>	

Friday, June 20, 2008

Friday, June 20, 2008	
Day 10	Health sector specific approaches
	Objectives
	Teaching methods
	To understand and be able to implement specific health interventions to protect populations against the impact of climate change
	Lecture and classroom discussion, based on readings Student presentation
8:00-9:00	Early warning and surveillance systems <i>Sauerborn</i>
9:00-9:30	<i>Coffee break</i>
9:30-10:30	Health infrastructure strengthening, training needs for health staff <i>Sauerborn</i>
10:30-12:00	Presentation of adaptation measures developed by tutorial groups (4) in the past 2 weeks. <i>Sauerborn (facilitator)</i>
12:00-13:00	<i>Written exam (multiple choice)</i>
13:00-14:00	<i>Joint lunch in a separate room at the restaurant of the Medical School</i>
14:30- 16:00	Vaccination against climate change sensitive diseases: state of the art. <i>Sauerborn</i>
16:00-16:30	End of course, Culinary delights, Goodbye
Readings	No readings Handout: Overhead copies

Course managers:

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