

19 Some aspects of the environment

(will be extended)

Table. Examples of effects related to environmental factors and their possible impact on health (WHO, 1994, Ruwaard et al. 1993, De Jong et al., 1994, Gezondheidsraad, 1993, Staatsen et al., 1993, RIVM-Twivelgroep.

Environmental factor	'intermediary' effects	exposure ¹	Number of persons ²	Disease for which effect might be relevant	proof ³
Air pollution - small particles (PM10) - summer smog (O ₃) - tobacco smoke in surrounding - nitrogen dioxide	(reversible) decrease of lung function respiratory complaints respiratory inflammations increase in frequency, intensity and duration of complaints cardiopulmonary mortality	***	10 ⁵ -10 ⁶ 10 ⁴ - 10 ³ 10 ³	COPD (asthma, chronic bronchitis, emphysema) Cardiovasc.diseases	***
noise	severe hinder disturbed sleep impaired concentration, communication and performance increased blood pressure (hypertension) and pulse ha stress	**	10 ⁶ 10 ⁵ 10 ³ -10 ⁴	Cardiovascdiseases (myocard infarct) impaired well being	*** **
smell	severe hinder	**	10 ⁵	Impaired well being	**
aero-allergens indoors (mites, moist, moulds)	sensibilisation allergy	**	10 ⁴ -10 ⁵	Asthma in young children	**
external safety and quality living area	Risk perception (fear for health impairment) alienation stress	**	10 ⁶	Feeling unhealthy Impaired well being	**
carcinogens					
- benzene - ionising radiation	Interaction with cellular genetic material, chronic tissue damage	*** *	10-100	leukaemia	**
- urban air pollution (PAC,) - radon indoors - tobacco smoke in surrounding	Interaction with cellular genetic material, chronic tissue damage	** *** **	10 ³	Lung cancer	**
Food: Salmonella, Campylobacter, Staphylococcus, Shigella, Listeria, Trichinella, Clostridium, Swimming water: Pseudomonas, Shigella, Giardia, Leptospira, Hepatitis A, Legionella	infection	***	10 ⁶	Infectious diseases and: gastroenteritis, respiratory and ear inflammations	***
1	Assessment of the scale of exposure: * = groups in specific circumstances, * a substantial part of the Dutch population (for instance city dwellers or partners of smokers), *** = virtually the total population				
2	Rough assessment of the order of magnitude of the number of people that is experiencing the effect				
3	Scientific proof for the exposure-response relation: * = weak, ** = moderate, *** = reasonable				

Table: Characteristics of several forms of radiation.

Wave length	energy (from - till)	Category of radiation	Dose unity	sources	effects
–	20 keV 10 MeV	A radiation	Sv	several radio-active materials	genetic effects cancer radiation illnesses (nausea, diarrhoea, burned skin, hair loss)
–		B radiation	Sv	Several radio-active materials, e.g. building materials	
10^{-15} - 10^{-7} m	1,24 GeV 1,24 eV	G radiation and X rays	Sv	Radio-active materials X ray devices Cosmic radiation	
100 - 280 nm	1,24 eV 0,44 eV	UV-C	MED	the sun gas lamps sun bank apparatus halogene lamps welding apparatus medical lasers UV-therapy	sun burn skin ageing skin thickening skin cancer tanning vit.-D formation welding eyes/snow blindness inflammation cataract retina burns immune suppression
280 - 315 nm	0,44 eV 0,39 eV	UV-B			
315 - 400 nm	0,39 eV 0,31 eV	UV-A			
400 - 780 nm	0,31 eV 0,60 eV	light	lumen	sun, fire, lamps, welding gear, lasers	Retina burns light damage cataract
780 nm-1 mm	0,60 eV 1,24 meV	IR		sun, fire, lamps, heating, welding gear, (medical) lasers	over heating burns cataract
1 mm-100 km	1,24 meV 12,4 peV	RF	SAR	Micro wave ovens radio-/tv-waves, radar, inductive heating, (medical) diathermic apparatus, MRI-apparatus	burns cataract
100 km - ∞	12,4 peV 0 eV	ELF		lightning, elektric apparatus, high voltage transport	cancer?

Table: Comparison of the mean doses by ionising radiation in four populations, specified to the most important sources.

Source category	Mean individual yearly dose (mSv)			
	Netherl.	U.K.	U.S.A.	World population
Radon and thoron	1,0	1,3	2,0	1,3
□-rays from soil and building materials	0,35	0,35	0,28	0,41
Natural activity in the body ^a	0,33	0,30	0,39	0,36
Cosmic radiation	0,20	0,25	0,27	0,36
Medical radiation uses	0,40	0,30	0,53	0,4-1,0
Other sources	0,08	0,03	0,13	0,01
Total	2,4	2,5	3,6	2,8-3,4