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Chapter 1 : Health Care Quality and Patient Safety - www.nxgvision.com

definition of the environment is needed, because environmental health action generally tries to change only the natural and physical environments and related behaviours (e.g. hand washing).

However, nanotechnology may also present unintended health risks or changes to the environment. It is presumed that some of these chemicals may present new, unexpected challenges to human health, and their safety should be evaluated prior to release. These cross-cutting issues are not yet understood well enough to inform the development of systems for measuring and tracking their impact. Further exploration is warranted. The environmental health landscape will continue to evolve and may present opportunities for additional research, analysis, and monitoring. Blood Lead Levels As of , there are approximately 4 million houses or buildings that have children living in them who are potentially being exposed to lead. Nearly half a million U. Since no safe blood lead level have been identified for children, any exposure should be taken seriously. However, since lead exposure often occurs with no obvious signs or symptoms, it often remains unrecognized. References 1 World Health Organization. Preventing disease through healthy environments. Status and trends through Impact of regional climate change on human health. Climate change, air quality, and human health. Am J Prev Med. Environmental health, from global to local. Biological interactions of carbon-based nanomaterials: From coronation to degradation. Health and the Built Environment: Am J Public Health.

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Chapter 2 : Health - Wikipedia

Most people in the developed and developing worlds endorse environmental protection (Dunlap,). Public concern about the environment and its relation to human health is demonstrated by the public reaction to reports of contamination at places like Love Canal, Times Beach, and Stringfellow Pits in the United States.

In particular, exposures potentially critical to public health have been sparsely documented. Structure of This Report Chapter 2 reviews basic epidemiologic methods that can be applied to environmental problems and comments on some well-recognized problems that environmental epidemiology faces, including small numbers of persons exposed, agents that have not been well characterized, and concern with small increases in risk. It states principles for inferring causation and discusses the types of evidence needed for environmental-epidemiology studies. Chapter 4 identifies health outcomes that should be subjected to environmental-epidemiologic study, ranging from chronic diseases of poorly understood etiology to those for which some causes are known. It identifies research opportunities for using biologic markers to study environmental factors that may be relevant to several chronic diseases, as well as for improving exposure-assessment information. Chapter 5 considers existing data systems that are relevant to the research needs of environmental epidemiology. Chapter 6 discusses several areas where improvements in methodology will advance the field of environmental epidemiology. Chapter 7 presents a summary of selected gray-literature reports on hazardous wastes. It reviews several state studies of reproductive outcomes to illustrate the constraints on state health departments in carrying out environmental-epidemiologic research. Chapter 8 recapitulates the major conclusions and recommendations of the committee. Special Issues for the Study of Environmental Epidemiology As indicated in the first report, an optimal analysis of potential public-health consequences of suspect exposures proceeds from an assessment of past, current, or future exposures to the formulation of testable hypotheses of effects to be studied in one or more specific populations. An ideal environmental-epidemiology assessment considers all possible adverse health effects in exposed and unexposed persons and includes relevant contributing factors, including those that could confound, or interfere Page 6 Share Cite Suggested Citation: Environmental Epidemiology, Volume 2: The National Academies Press. Few studies meet this ideal; this limitation is also common in peer-reviewed, published reports. The committee relied on a combination of evidence from different sources to assess the impact on public health of exposures suspected of causing symptoms or disease. The types of information from these sources are discussed at length in chapter 2 of volume 1. Small Relative Risks, but Large Numbers of Cases Increasingly, environmental epidemiology concerns the search for factors that might moderately affect the risk of common multifactorial diseases. The effect of an individual environmental exposure on the relative risk of a disease may be small, but this does not mean that it is inconsequential; it can affect very large numbers of people and thus be associated with large numbers of cases of disease. For example, the risk of death in males aged years with a diastolic blood pressure of 95 mm Hg in the Framingham study was only about 1. Increased use of hypertension medication, along with improvements in diet and exercise, is thought to be responsible for some part of the substantial decline in cardiovascular mortality in the last 20 years. Large sample sizes and long-term followup studies are generally necessary to demonstrate potentially serious effects that involve small increases in relative risk. The chronic effects of ozone exposure and the acute effects of particulate air pollution are instances in which the relative risk may be small, but the population disease burden may be substantial. For further discussion on this point, readers are referred to chapter 4. The Need for More-General Monitoring Monitoring systems utilizing existing data sources, as we discuss in chapter 5 , will be of increasing importance. The first report also noted that monitoring may be the only way to determine the extent to which disease rates have changed as a result of changes in environmental contamination. The use of aggregate statistics is also critical to detect trends or patterns in environmental pollution and health consequences that are not apparent at a local level. For example, what was initially thought to be laboratory

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drift in the measurement of blood lead concentrations in the Page 7 Share Cite Suggested Citation: Detecting the effects of monitored changes in disease and exposure also often depends on the alertness of researchers. Similarly, hospital admissions for asthma in children were cut in half in a Utah valley when a steel mill closed down, and admissions returned to their previous level when it reopened; this was also not detected by clinicians or the state health department but required the examination of hospitalization data by an investigator Pope, Developing Relevant Exposure Gradients Exposures to synthetic organic chemicals and other modern products cannot be accurately segregated by source, such as air, water, or soil. Rather, modern exposure scenarios often model multimedia, multi-temporal levels of many complex chemical compounds. Further, physical and biologic characteristics of other environmental factors can influence uptake and total dose of chemicals. Thus, heat, meteorologic conditions, humidity, and particle size affect the extent of uptake of airborne contaminants, and water hardness, pH, acidity, volatility of contaminants, and other natural background factors affect exposure to materials in water. Much work in the past has relied on assumed dichotomous, yes-no exposures, but it is not always possible to find and study populations that are entirely unexposed to some environmental agents. Epidemiologists must work closely with exposure analysts to generate meaningful gradients of exposures for such populations, including the use of models to improve exposure estimates. These models need to include environmental and biologic fate, population activity patterns, biomonitoring, and biomarkers. Wherever possible, models should be validated by monitoring carefully selected subsamples of the population under study. This will allow more-refined estimates of individual exposure to be used in population-based studies, as is discussed in chapters 3 and 6. The Role of Public-Health Departments in Environmental-Epidemiology Research Many issues in environmental epidemiology are in the domain of departments of public health. These concerns are likely to come to the notice of the local public-health department, usually with requests for reassurance in the form of a study. Thus, public-health departments may be asked to study diseases of unknown etiology where there may be insufficient evidence to incriminate the hazardous-waste site or an alternate source and for which there has often been insufficient time since initial exposures if indeed the exposures were from a waste site for the presumed latent period to be exceeded. The public tends to have unrealistic expectations of what an epidemiologic study can produce. Unfortunately, most public-health departments are ill prepared to conduct epidemiologic research Ozonoff and Boden, , or other factors impede research: The staff of the public-health department may have little training in environmental epidemiology, environmental toxicology, or exposure assessment. Public concerns notwithstanding, most public-health practitioners will have been trained to cope with other important matters, such as the study of infectious-disease outbreaks, immunization, improvement of maternal and child health, or even the prevention of cancer, but these rarely have any direct relevance to the environment. These deficiencies in personnel and training can foster simplistic approaches to potential environmental-health problems that inappropriately apply the basic concepts of infectious-disease epidemiology rather than those appropriate to chronic disease. Even if outside specialists are found to perform an appropriate investigation, the resources available to such departments for investigation are usually insufficient. This may result in a limited investigation that is inconclusive, with the suspicion that, if a more thorough study had been conducted, a more definitive answer might have been achieved. Resources may also be lacking for adequate measurement of exposure. Regulators often do not take measurements for the primary purpose of assessing human exposure, but for other purposes, such as to determine compliance with an administrative requirement. A result is that the measurements, good for their intended purpose, may be inappropriate as a basis of studies of human health effects. Political and social considerations can impede the conduct of research. One group seeks assurance that no problem exists, while another seeks validation of its health concerns. Or the source of a possibly hazardous pollutant is an economic mainstay of a community. Even though it may be clear, as in a chemical spill from a railroad car in a populated area, that the public has been exposed to a possible Page 9 Share Cite Suggested Citation: Finally, as emphasized in the first report, many exposed populations are so small, the period of observation so short, the exposure so poorly measured,

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or the outcomes so poorly defined that a verdict of "not proved" is all that can be attained. The situation is usually poorly suited for the conduct of research regardless of the efforts that are expended and the skills of the investigators. Nevertheless, given the great and increasing variety of chemical, physical, and biologic pollution in the environment, the first indication of a hazard from a particular chemical or group of chemicals may still follow an investigation of some event, or cluster, by a public-health department or concerned citizens. Reports from state and local public-health groups may then enter the gray literature and in some cases be the starting point for research that is published in peer-reviewed journals. These locally initiated studies, although using small populations with poorly characterized exposures, may suggest an effect. Efforts to develop databases of such studies might serve 2 purposes: The focus of this report is on environmental-health issues in the developed world, but it is recognized that in developing countries environment-related diseases occur along with the more predominant infectious and chronic diseases. These high levels of air pollution, coupled with other disadvantages in the developing world, may account for the fact that acute respiratory disease is the second leading cause of death in children under 5 years of age in countries of the developing world Leowski, Important risk factors for both infectious and chronic diseases include basic sanitation, living conditions and urban infrastructure, housing, air and water pollution, and working conditions. All of these are threatened by the sanitary burden that is being accumulated in developing countries. These are the areas in which hygienists have had a great impact in the past in developed countries. Conclusions For many chronic, degenerative diseases of potential interest in environmental epidemiology, data on rates of occurrence incidence in de- Page 10 Share Cite Suggested Citation: In addition, exposure is rarely assessed in a manner compatible with the needs of epidemiologic investigation. Thus, it is often impossible to determine whether the incidence of a particular disease has changed in response to a new or changing environmental exposure. Where a gradient of exposure can be determined, the risk of disease can sometimes be related to dose in a specially designed study. However, in many instances, diseases of possible environmental etiology cannot be examined in relation to environmental factors until baseline disease incidences have been determined and appropriate measures or estimates of exposure have been developed. Study of the health outcomes associated with environmental exposures suffers from a lack of sophisticated technology for assessing chronic effects, from basic methodologic limits of study designs, and from the highly charged climate in which such studies are at times conducted. Moreover, cross-sectional study designs, rather than the more-reliable cohort or case-control studies, are often required in environmental epidemiology. Until quite recently, federal and state support has focused on the need for rapid health assessments that do not necessarily comply with the requirements for environmental epidemiology. Few academic departments of epidemiology have concentrated on refinements in the techniques needed to improve environmental epidemiology, and those that do so must struggle with limited resources. The remainder of this volume outlines strategies that can remedy these problems. Chronological trend in blood lead levels between and Toxicological Profile for Lead. Health and environment in the s. The Health of the Planet Survey. Mortality from acute respiratory infections in children under 5 years of age: Principles of Occurrence Research in Medicine. Biologic Markers in Reproductive Toxicology. Page 11 Share Cite Suggested Citation: Biologic Markers in Pulmonary Toxicology. Public Health and Hazardous Wastes. Addendum to Biologic Markers in Immunotoxicology. Science, Technology and Human Values, World Development Report Development and the Environment. Page 1 Share Cite Suggested Citation:

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Chapter 3 : Environmental health - Wikipedia

The Collaborative on Health and the Environment's (CHE's) primary mission is to strengthen the science dialogue on environmental factors impacting human health and to facilitate collaborative, multifactorial, prevention-oriented efforts to address environmental health concerns.

Opinions expressed are his own. Download PDF of this Article Share to Twitter Over the past four decades, the United States has faced steadily rising rates of obesity and associated chronic conditions. Many of these chronic conditions are rooted in nutrition and physical activity behaviors, and are often referred to as lifestyle diseases. Historically, the prevention of lifestyle diseases has focused on changes in individual behavior and personal choices, and personal responsibilities. The context in which options are presented can shape the decision-making processes that impact health. Altogether, the research suggests that altering environments may be an effective driver of behavior change. Individual preferences are often inconsistent over time, especially in situations where immediate pleasures carry long term consequences. For instance, research shows that kitchenware size significantly influences serving and eating behavior. The good news is that the same forces that currently promote unhealthy behaviors can be used to encourage healthy ones. In particular, given their resources, broad reach, and financial and social incentives, both governments and employers are in a unique position to promote healthy behaviors in a way that would affect many lives. But the data tell a different story. A recent study in Childhood Obesity found that a vast majority of middle-school and high-school students like the updated and significantly healthier school lunch that was introduced in Perhaps the most sustainable and far-reaching approach to making healthy foods more accessible is to change food policies e. This would likely lead to higher volumes, more efficient delivery, and lower costs for nutritious foods. The government can also promote healthier eating by improving nutrition labeling. Research suggests that catchier and simplified nutrition labels could have a much greater impact on consumer behavior. In instances where it has already been implemented in some private organizations and outside the United States , the traffic-light model has increased consumer awareness of health and leads to healthier purchases. When options for physical activity are easily accessible, people tend to be more active. For example, a recent study published in the American Journal of Public Health illustrated that the establishment of traffic-free cycling and walking routes increased overall physical activity among those that lived nearby. A healthier workforce results in both reduced health care costs and absenteeism, and in increased productivity. While these programs have traditionally focused on offering employees classes, counseling, and incentives for healthy behaviors such as discounts on insurance premiums, subtler tweaks to the workplace itself could prove just as, if not more effective. An example of these subtler changes is happening at Google. There, company leaders have invested in promoting employee nutrition and health. Instead of relying solely on traditional programs such as nutrition counseling and weight-loss classes, Google redesigned cafeterias to encourage healthier eating. Now, the most nutritious options are positioned at the front of the cafeteria and unhealthy foods are hidden in corners and placed in opaque bowls. Beverage coolers stock water at eye level, and relegate sweetened beverages to the bottom where they are not as easily seen or accessed. These changes “ which notably do not restrict options, but simply rearrange the way options are presented “ have led to dramatic reductions in candy and sugar-sweetened beverage consumption, and increases in the use of smaller plates. Further, similar to current LEED certifications for environmentally-friendly buildings, there could also be a meaningful certification for health-promoting buildings. In addition to the design of physical workplaces, the way that work itself is conducted can also be designed to promote health. That said, some of the ideas “ such as using smaller plates in government cafeterias or simplifying nutrition labels “ come at relatively little additional financial cost, and have already demonstrated health-promoting benefits. These ideas could be fast-tracked for more widespread adoption. Another potential barrier that must be overcome is the political power of special interests groups that rely on built-environments conducive to unhealthy behaviors. For example, a large part of

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the reason that the migration to healthier school lunches has taken so long is because various food interests have launched strong lobbying campaigns against such changes. The government cannot rely solely on the private sector to drive these changes since those who stand to benefit most may be unemployed or not working for progressive employers with the resources to launch effective health campaigns. In addition to these more specific interventions, the clear connection between environment and health should only bolster the case for expanding social service programs more broadly. Realizing and addressing the fact that so many of the outcomes that lie inside of health care are rooted in factors that lie outside of health care is thus critical to improving health. If we want to avert a public health crisis at the hands of chronic lifestyle-driven diseases, we need not only focus on changing individual behaviors, but also on changing the environments that give rise to those behaviors. Governments and employers must recognize the overwhelming influence of context on action, and take advantage of their unique position to intentionally shape environments that promote healthy behaviors. Thinking fast and slow. Farrar, Straus, and Giroux. Organizational Behavior and Human Decision Processes. Plate size and color suggestibility: Journal of Consumer Research. Do defaults save lives? Improving decisions about health, wealth, and happiness. Do healthier foods and diet patterns cost more than less healthy options? A systematic review and meta-analysis. Improving the design of nutrition labels to promote healthier food choices and reasonable portion sizes. International Journal of Obesity. Accessed August 12, Accessed August 28, A traffic light food labeling intervention increases consumer awareness of health and healthy choices at the point-of-purchase. Walking associated with public transit: American Journal of Public Health.

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Chapter 4 : What effects can the Environment have on Health?

Meanings of Environment. Descending from the Middle French preposition environ "around," environment, in its most basic meaning, is "that which surrounds." When preceded by the and unmodified, it usually refers to the natural world ("please don't litter if you care about the environment").

Recent political and economic developments and associated changes in the practice and delivery of health and social care have led managers and professionals to recognise the importance and links between problem solving and decision-making skills. In particular, assessing the impact of political, economic, socio-cultural, environmental and other external influences upon health care policy, proposals and organisational programmes is becoming a recognisable stage of health service strategic development and planning mechanisms. Undertaking this form of strategic analysis therefore is to diagnose the key issues that the organisation needs to address. By understanding your environment, you can take advantage of the opportunities and minimise the threats. The term PEST has been used regularly in the last 20 years and its true history is difficult to establish. Economic, Technical, Political, and Social. Over the years this has become known as PEST with the additional letters are: Ecological factors, Legislative requirements, and Industry analysis Aguilar, The external environment of an organisation, partnership, community etc. The same checklist can also be applied inside an organisation. Initially the acronym PEST was devised, which stands for: Organisations that do analyses regularly and systematically often spot trends before others thus providing competitive advantage. Advantages and disadvantages of using a PEST ELI analysis Advantages Facilitates an understanding of the wider business environment Encourages the development of external and strategic thinking Can enable an organisation to anticipate future business threats and take action to avoid or minimise their impact Can enable an organisation to spot business opportunities and exploit them fully By taking advantage of change, you are much more likely to be successful than if your activities oppose it Avoids taking action that is doomed to failure from the outset, for reasons beyond your control. Who should undertake the analysis? Decision-making is more natural to certain personalities, so these people should focus more on improving the quality of their decisions. People that are less natural decision-makers are often able to make quality assessments, but then they need to be more decisive in acting upon the assessments made. PESTELI is a good exercise for marketing people, and is good for encouraging a business development, market orientated outlook among all staff. If you want to use PESTELI with staff who are not naturally externally focused you can have them do some research and preparation in advance of the exercise. It all depends how thorough you need to be. It is a good subject for workshop sessions, as undertaking this activity with only one perspective i. For example, Ecological or Environmental factors can be positioned under any or all of the four main PEST headings, depending on their effect. Legislative factors would normally be covered under the Political heading since they will generally be politically motivated. Demographics usually are an aspect of the larger Social issue. Industry Analysis is effectively covered under the Economic heading. Examples of these have been added to Table 1. Keeping to four fundamental perspectives also imposes a discipline of considering strategic context and effect. The shape and simplicity of a four-part model is also somehow more strategically appealing and easier to manipulate and convey. The prompts are examples of discussion points, and obviously can be altered depending on the subject of the PEST ELI analysis, and how you want to use it. The following factors may help as a starting point for brainstorming but make sure you include other factors that may be appropriate to your situation: Identify appropriate sources of information. Gather the information - it is useful to use a template as the basis for exploring the factors and recording the information.

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Chapter 5 : Global Health | Healthy People

2 what is the environment in the context of health? 20 3 what is meant by the "attributable fraction" of a risk factor?24 4 methods

Those aspects of the human health and disease that are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health. Environmental health as used by the WHO Regional Office for Europe, includes both the direct pathological effects of chemicals, radiation and some biological agents, and the effects often indirect on health and well being of the broad physical, psychological, social and cultural environment, which includes housing, urban development, land use and transport. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, as well as genetics. They also carry out that role by promoting the improvement of environmental parameters and by encouraging the use of environmentally friendly and healthy technologies and behaviors. They also have a leading role in developing and suggesting new policy areas. Researchers and policy-makers also play important roles in how environmental health is practiced in the field. In many European countries, physicians and veterinarians are involved in environmental health. The environmental health profession had its modern-day roots in the sanitary and public health movement of the United Kingdom. This was epitomized by Sir Edwin Chadwick , who was instrumental in the repeal of the poor laws , and in was the founding president of the Association of Public Sanitary Inspectors, now called the Chartered Institute of Environmental Health. Each of these disciplines contributes different information to describe problems and solutions in environmental health, but there is some overlap among them. Environmental epidemiology studies the relationship between environmental exposures including exposure to chemicals, radiation, microbiological agents, etc. Observational studies, which simply observe exposures that people have already experienced, are common in environmental epidemiology because humans cannot ethically be exposed to agents that are known or suspected to cause disease. While the inability to use experimental study designs is a limitation of environmental epidemiology, this discipline directly observes effects on human health rather than estimating effects from animal studies. Toxicology has the advantage of being able to conduct randomized controlled trials and other experimental studies because they can use animal subjects. However there are many differences in animal and human biology, and there can be a lot of uncertainty when interpreting the results of animal studies for their implications for human health. Exposure science can be used to support environmental epidemiology by better describing environmental exposures that may lead to a particular health outcome, identify common exposures whose health outcomes may be better understood through a toxicology study, or can be used in a risk assessment to determine whether current levels of exposure might exceed recommended levels. Exposure science has the advantage of being able to very accurately quantify exposures to specific chemicals, but it does not generate any information about health outcomes like environmental epidemiology or toxicology. This can in turn be used to develop and implement environmental health policy that, for example, regulates chemical emissions, or imposes standards for proper sanitation. Concerns[edit] This article is in a list format that may be better presented using prose. You can help by converting this article to prose, if appropriate. Editing help is available. January Environmental health addresses all human-health-related aspects of the natural environment and the built environment. Environmental health concerns include:

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Chapter 6 : Definition of Environmental Sustainability

the most frequently studied, 2 but other contexts may also be important for certain segments of the population. 3 Physical Environmental Factors. The factors in the physical environment that are important to health include harmful substances, such as air pollution or proximity to toxic sites (the focus of classic environmental epidemiology); access to various health-related resources (e.g.

An increasing number of studies and reports from different organizations and contexts examine the linkages between health and different factors, including lifestyles, environments, health care organization and health policy , one specific health policy brought into many countries in recent years was the introduction of the sugar tax. Beverage taxes came into light with increasing concerns about obesity, particularly among youth. Sugar-sweetened beverages have become a target of anti-obesity initiatives with increasing evidence of their link to obesity. The maintenance and promotion of health is achieved through different combination of physical, mental , and social well-being, together sometimes referred to as the "health triangle. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. This includes characteristics of the natural environment , the built environment and the social environment. Factors such as clean water and air , adequate housing , and safe communities and roads all have been found to contribute to good health, especially to the health of infants and children. Genetics , or inherited traits from parents, also play a role in determining the health status of individuals and populations. This can encompass both the predisposition to certain diseases and health conditions, as well as the habits and behaviors individuals develop through the lifestyle of their families. For example, genetics may play a role in the manner in which people cope with stress , either mental, emotional or physical. For example, obesity is a significant problem in the United States that contributes to bad mental health and causes stress in the lives of great numbers of people [32]. One difficulty is the issue raised by the debate over the relative strengths of genetics and other factors; interactions between genetics and environment may be of particular importance. Potential issues This section has an unclear citation style. The references used may be made clearer with a different or consistent style of citation and footnoting. March Learn how and when to remove this template message A number of types of health issues are common around the globe. Disease is one of the most common. Another health issue that causes death or contributes to other health problems is malnutrition, especially among children. One of the groups malnutrition affects most is young children. Bodily injuries are also a common health issue worldwide. These include smoking cigarettes, and can also include a poor diet, whether it is overeating or an overly constrictive diet. Inactivity can also contribute to health issues and also a lack of sleep, excessive alcohol consumption, and neglect of oral hygiene Moffett There are also genetic disorders that are inherited by the person and can vary in how much they affect the person and when they surface Moffett, Though the majority of these health issues are preventable, a major contributor to global ill health is the fact that approximately 1 billion people lack access to health care systems Shah, Arguably, the most common and harmful health issue is that a great many people do not have access to quality remedies. Mental health The World Health Organization describes mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community". Having a mental illness can seriously impair, temporarily or permanently, the mental functioning of a person. Mental illnesses are the leading cause of disability in the US and Canada. Examples include, schizophrenia , ADHD , major depressive disorder , bipolar disorder , anxiety disorder , post-traumatic stress disorder and autism. Some of the key mental health issues seen in teens are: There are many ways to prevent these health issues from occurring such as communicating well with a teen suffering from mental health issues. Biological factors, such as genes or brain chemistry Life experiences, such as trauma or abuse Family history of mental health problems Maintaining Achieving and maintaining health is an ongoing process, shaped by both the evolution of health care knowledge and practices as well as

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personal strategies and organized interventions for staying healthy. Diet Percentage of overweight or obese population in , Data source: A healthy diet includes a variety of plant-based and animal-based foods that provide nutrients to your body. Such nutrients give you energy and keep your body running. Nutrients help build and strengthen bones, muscles, and tendons and also regulate body processes i. The food guide pyramid is a pyramid-shaped guide of healthy foods divided into sections. Each section shows the recommended intake for each food group i. Protein, Fat, Carbohydrates, and Sugars. Making healthy food choices is important because it can lower your risk of heart disease, developing some types of cancer , and it will contribute to maintaining a healthy weight. It strengthens muscles and improves the cardiovascular system. According to the National Institutes of Health , there are four types of exercise: Sleep and Sleep deprivation Sleep is an essential component to maintaining health. In children, sleep is also vital for growth and development. Ongoing sleep deprivation has been linked to an increased risk for some chronic health problems. In addition, sleep deprivation has been shown to correlate with both increased susceptibility to illness and slower recovery times from illness.

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Chapter 7 : Chapter 2 - Concepts of environmental management

2 *Journal of Environmental Sustainability - Volume 1 by the Guides. Number one on that list is the term "sustainable." The reasons provided for this.*

The environment can affect health through physical exposures, such as air pollution OECD, b. A large body of work has documented the effects of exposure to particulate matter solid particles and liquid droplets found in the air on cardiovascular and respiratory mortality and morbidity Brook et al. Research has identified specific physiologic mechanisms by which these exposures affect inflammatory, autonomic, and vascular processes Brook et al. The effects of particulate matter on mortality appear to be consistent across countries. For example, a recent review of studies from the late s to mids found a consistent inverse relationship between airborne particulate matter and birth weight in Australia, Brazil, Canada, France, Italy, the Netherlands, South Korea, the United Kingdom, and the United States Parker et al. Another notable example is the evidence linking lead exposures to cognitive development in children Bellinger, ; Levin et al. The evidence of environmental effects of air pollution and lead has been reflected in legislation in many countries directed at reducing levels of these pollutants in the environment. Increasing attention has focused on the implications for health behaviors and social interactions that are created by the built environment. The identification of causal effects using these aggregate summaries raises a number of methodological challenges and does not allow one to identify the specific environmental attributes that may be relevant. More recent work has attempted to identify the specific environmental factors that may be important to specific health outcomes, as well as the pathways through which these factors may operate. For example, the health of some nations is affected by their geography or climate. Page Share Cite Suggested Citation: Health in International Perspective: Shorter Lives, Poorer Health. The National Academies Press. An important example is evidence that links proximity to healthy or unhealthy food stores with dietary behaviors and related chronic disease outcomes Babey et al. Another large body of work has documented how walking and physical activity levels are affected by access to recreational facilities, land use mix, transportation systems, and urban planning and design Auchinloss et al. Across countries, studies have also shown that physical activity by children is associated with features of the built environment, including walking-related features, and physical activity resources Bringolf-Isler et al. The importance of residential environments to obesity and related conditions, such as diabetes, was recently highlighted by a randomized housing intervention: An important difficulty in comparing results across countries is that the proxy measure for the local food environment is often the type of food stores or restaurants available such as supermarkets or fast food outlets , but the extent to which these typologies reflect relevant differences in the foods actually available to consumers may differ significantly across countries. One recent review found that access to open space parks and other green spaces in neighborhoods was associated with physical activity levels in both the United States and Australia Pearce and Maddison, Unfortunately, the study was not designed to identify the specific environmental features responsible for the observed effect. A range of other physical environmental features have been linked to other health outcomes. For example, the density of alcohol retail outlets has been linked to alcohol-related health complications Campbell et al. Transportation systems and other aspects of physical environments that influence driving behaviors are also related to injury morbidity and mortality Douglas et al. Living in socioeconomically disadvantaged neighborhoods as a proxy for a range of environmental exposures has been linked to higher rates of injury in both adults and children Cubbin et al. Social Environmental Factors Factors in the social environment that are important to health include those related to safety, violence, and social disorder in general, and more specific factors related to the type, quality, and stability of social connections, including social participation, social cohesion, social capital, and the collective efficacy of the neighborhood or work environment Ahern and Galea, What also seems important is the stability of social connections, such as the composition and stability of households 7 and the existence of stable and supportive local social environments or neighborhoods in

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which to live and work. A network of social relationships is an important source of support and appears to be an important influence on health behaviors. Features of social environments that may operate as stressors including perceptions of safety and social disorder have been linked to mental health, as have factors that could buffer the adverse effects of stress e. One mechanism through which the social environment can enhance health is through social support. Social support has appeared in many but not all studies to buffer the effects of stress Cohen and Wills, ; Matthews and Gallo, ; Ozbay et al. Resilience to the adverse health effects of stress has also been tied to factors that could influence how one perceives a situation threat versus challenge and how one responds to stressors Harrell et al. One theory for the tendency of some immigrant groups to have better health outcomes than might be expected on the basis of their incomes and education see Chapter 6 is the social support immigrants often provide one another Matthews et al. Studies have shown consistent relationships between social capital and self-reported health status, as well as to some measures of mortality Barefoot et al. Social capital depends on the ability of people to form and maintain relationships and networks with their neighbors. Characteristics of communities that foster distrust among neighbors, such as neglected properties and criminal activity, can affect both the cohesiveness of neighbors as well as the frequency of poor health outcomes Center on Human Needs, b. Spatial Distribution of Environmental Factors In addition to considering differences between the United States and other countries in the absolute levels of environmental factors, it is also important to consider how these factors are distributed within countries. Levels of residential segregation shape environmental differences across neighborhoods Reardon and Bischoff, ; Subramanian et al. Perceptions and stereotypes about area reputation, local demand for products and services, and the purchasing power of residents may also influence the location of health-relevant resources. Physical environmental threats such as proximity to hazardous sites may be more prevalent in low-income or minority neighborhoods, a concern of the environmental justice movement Brulle and Pellow, ; Evans and Kantrowitz, ; Mohai et al. These neighborhoods may also lack the social connections and political power that can help remedy adverse conditions. Other Environmental Considerations The panel focused its attention on the role of local physical and social environments as potential contributors to the U. Nor did the panel examine whether neighborhood conditions exert a greater influence on access to health care in the United States than in peer countries. However, these conditions are important to health. For example, the school environments of children, adolescents, and college students can affect diet, physical activity, and the use of alcohol, tobacco, and other drugs Katz, ; Wechsler and Nelson, Workplaces have also long been recognized as important determinants of health and health inequalities, occupational safety, and access to preventive services Anderson et al. Physical working conditions e. Exposure to job strain exhibits a strong social gradient, which influences inequalities in the health of workers Bambra, Other working conditions and work-related policies for U. Other important differences in work-related policies include employment protection and unemployment benefits, as well as family and sickness leave see Chapter 8. There is scant literature comparing social and physical environmental features across countries. Here we provide selected examples of the ways in which levels or distributions of physical and social environments relevant to health might differ between the United States and other high-income countries. Physical Exposures Few data are available to make cross-national comparisons of exposure to harmful physical or chemical environmental hazards. There is, for example, little evidence that air pollution is a more severe problem in the United States than in other high-income countries Baldasano et al. The heavy reliance on automobile transportation in the United States is linked to traffic levels, which contribute to air pollution and its health consequences Brook et al. Data on population exposures to air pollution across countries are relatively scarce OECD, b. One available measure is the concentration of particulate matter less than 10 micrometers in diameter PM An important factor that influences a range of environmental features relates to patterns of land use and transportation. This characteristic has promoted dispersed automobile-dependent development patterns Transportation Research Board, with consequences for population density, land use mix, and walkability Richardson, , all of which may have health implications. In , the United States had motor vehicles per 1, people compared with in the United Kingdom, in Sweden, in

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France, and in Germany World Bank, b. Cities in the United States tend to be less compact and have fewer public transportation and nonmotorized travel options and longer commuting distances than cities in other high-income countries Richardson and Bae, Many European countries have strong antisprawl and pro-urban centralization policies that may contribute to environments that encourage walking and physical activity as part of daily life Richardson and Bae, For example, aside from their direct links to injury mortality see Chapter 1 , violence and drug use may be indirect markers of social environmental features that affect other health outcomes. As noted in Chapters 1 and 2 , homicide rates in the United States are markedly higher than in other rich nations. There are fewer data to compare rates of other crimes across countries. As noted in Chapter 5 , certain forms of drug use which is often linked to other social environmental features also appear to be more prevalent in the United States than in other high-income countries. In particular, particles that are less than 2. Environmental Protection Agency, At least one study of cross-national differences in social capital found that the United States ranked at an intermediate level compared with other high-income countries in measures of interpersonal trust; the study also found that the United States ranked higher than many other countries on indicators of membership in organizations Schyns and Koop, A previous National Research Council report and a paper prepared for that study Banks et al. However, the focus of that paper was on the social isolation of individuals rather than on social cohesion or social capital measured as a group-level construct. This figure is one of the lowest in the OECD a. According to the World Gallup Poll, people in the United States are less likely than people in other high-income countries to express confidence in social institutions, and Americans also have the lowest voting participation rates of OECD countries. In an interesting link between physical and social environments, Putnam has argued that increasing sprawl could contribute to declining social capital in the United States because suburban commutes leave less time for social interactions. However, it remains unclear whether sprawl helps explain differences in levels of social capital, or health, across countries. Spatial Distribution of Environmental Factors Research in the s demonstrated that people of low socioeconomic status were more likely to experience residential segregation in the United States than in some European countries Sellers, Given the established correlation between neighborhood, race, and socioeconomic composition and various health-related neighborhood resources in the United States, this greater segregation could also result in greater exposure of some population sectors to harmful environments Lovasi et al. Although studies of residential segregation do not directly assess environmental factors, to the extent that segregation is related to differences in exposure to environmental factors, countries with greater segregation may also experience greater spatial inequities in the distribution of environmental factors, resulting in greater health inequalities and possible consequences for overall health status. Studies that use measures of area socioeconomic characteristics as proxies for environmental features have generally reported similar associations of area features with health in both the United States and other countries van Lenthe et al. At least two studies have suggested that spatial variation in health-related resources may have very different distributions in the United States than in other countries. A review of spatial variability in access to healthy foods found that food deserts“areas with limited proximity to stores that sell healthy foods“were more prevalent in the United States than in other high-income countries Beaulac et al. A New Zealand study found that area deprivation was not always consistently associated with lack of community resources including recreational amenities, shopping, educational and health facilities Pearce et al. This finding is in sharp contrast to studies of the United States, which have found associations between neighborhood socioeconomic disadvantage and the absence of resources that are important to public health Diez Roux and Mair, Large geographic disparities in toxic exposures to environmental hazards and in healthy food access have been repeatedly noted in U. Similar geographic disparities may exist for other environmental features. These barriers may inhibit physical activity for parts of the population, resulting in worse overall health. Levels of safety and violence may also be more strongly spatially segregated in the United States than in other countries, resulting in areas with greater exposure to violence and its harmful health consequences.

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Chapter 8 : Environmental Health | Healthy People

Environmental quality in some writings refers to "ambient environmental quality" i.e. the "state of air, water, land, and human artifacts" (Hufschmidt et al, , p.2). However, as used here, it is the relative capability of an environment to satisfy the needs and wants of an individual or society.

In addition, a growing body of research has documented associations between social and cultural factors and health Berkman and Kawachi, ; Marmot and Wilkinson, For some types of social variables, such as socioeconomic status SES or poverty, robust evidence of their links to health has existed since the beginning of official record keeping. For other kinds of variables—such as social networks and social support or job stress—evidence of their links to health has accumulated over the past 30 years. The purpose of this chapter is to provide an overview of the social variables that have been researched as inputs to health the so-called social determinants of health , as well as to describe approaches to their measurement and the empirical evidence linking each variable to health outcomes. It should be emphasized at the outset that the social determinants of health can be conceptualized as influencing health at multiple levels throughout the life course. Thus, for example, poverty can be conceptualized as an exposure influencing the health of individuals at different levels of organization—within families or within the neighborhoods in which individuals reside. Moreover, these different levels of influence may co-occur and interact with one another to produce health. For example, the detrimental health impact of growing up in a poor family may be potentiated if that family also happens to reside in a disadvantaged community where other families are poor rather than in a middle-class community. Furthermore, poverty may differentially and independently affect the health of an individual at different stages of the life course e. In short, the influence of social and cultural variables on health involves dimensions of both time critical stages in the life course and the effects of cumulative exposure as well as place multiple levels of exposure. The contexts in which social and cultural variables operate to influence health outcomes are called, generically, the social and cultural environment. Comprehensive surveys of current areas of research in the social determinants of health can be found in existing textbooks Marmot and Wilkinson, ; Berkman and Kawachi, These variables are highlighted because of their robust associations with health status and their well-documented and reliable methods of measuring these variables, and because there are good reasons to believe that these variables interact with both behavioral as well as inherited characteristics to influence health. Socioeconomic differences in health are large, persistent, and widespread across different societies and for a diverse range of health outcomes. In the social sciences, SES has been measured by three different indicators, taken either separately or in combination: Although these measures are moderately correlated, each captures distinctive aspects of social position, and each potentially is related to health and health behaviors through distinct mechanisms. Educational Attainment Education is usually assessed by the use of two standard questions that ask about the number of years of schooling completed and the educational credentials gained. The quality of education also may be relevant to health, but it is more difficult to assess accurately. An extensive literature has linked education to health outcomes, including mortality, morbidity, health behaviors, and functional limitations. The relationship between lower educational attainment and worse health outcomes occurs throughout the life course. For example, infants born to Caucasian mothers with fewer than 12 years of schooling are 2. An association between education and health in observational data does not necessarily imply causation. Alternatively, the association between education and health may partly reflect confounding by a third variable, such as ability, which is a prior common cause of both educational attainment and health status. The totality of the evidence suggests, nonetheless, that education is a causal variable in improving health. Natural policy experiments—such as the passage of compulsory schooling legislation at different times in different localities within the United States—suggest that higher levels of education are associated with better health lower mortality Lleras-Muney, It is therefore likely that the association between schooling and health reflects both a

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causal effect of education on health, as well as an interaction between the level of schooling and inherited characteristics. Several causal pathways have been hypothesized through which higher levels of schooling can improve health outcomes. They include the acquisition of knowledge and skills that promote health e. Although it is not established which of these pathways matter more for health, they each are likely to contribute to the overall pattern of higher years of schooling being associated with better health status. Moreover, the evidence points to the importance of improving access to preschool education as a means of enhancing the health prospects of disadvantaged children Acheson, Income The measurement of income is more complex than assessing educational attainment. Survey-based questions inquiring about income must minimally specify the following components: In addition to the higher rate of measurement error for income as compared to educational attainment, this variable also is associated with higher refusal rates in surveys that are administered to the general population. As with education, an extensive literature has documented the association between income and health. For example, even after controlling for educational attainment and occupational status, post-tax family income was associated with a 3. That is, the excess risks of poor health are not confined simply to individuals below the official poverty threshold of income. That is, the relationship between the two variables is acknowledged to be dynamic and reciprocal. Ill health is a potent cause of job loss and reduction in income. Indeed, income as an indicator of SES is more susceptible to reverse causation than education, which tends to be completed in early adult life prior to the onset of major causes of morbidity and functional limitations. For example, children do not normally contribute to household incomes, yet their health is strongly associated with levels of household income in both the Panel Study of Income Dynamics and the National Health Interview Surveys Case et al. An alternative possibility is that the relationship between income and health is explained by a third variable—such as inherited ability—that is associated with both socioeconomic mobility and the adoption of health maintenance behaviors. Yet, in the National Health Interview Survey, the impact of family income on child health has been found to be similar among children who were adopted by nonbiological parents compared to children who were reared by their biological parents Case et al. The causal pathways linking income to health are likely to be different from those linking education to health. Most obviously, income enables individuals to purchase various goods and services e. Additionally, secure incomes may provide individuals with a psychological sense of control and mastery over their environment. See Chapter 4 for a detailed discussion of psychological factors and health. That said, it has also been observed that higher incomes are associated with healthier behaviors such as wearing seatbelts and refraining from smoking in homes that do not, in themselves, cost money Case and Paxson, Debate also exists in the literature concerning whether it is absolute income or relative income that matters for health Kawachi and Kennedy, Many definitions of poverty, for example, are based upon the concept of the failure to meet a minimal standard of living defined in absolute terms e. The concept of relative income has been operationalized in empirical research by measures of relative deprivation at the individual level as well as by aggregate measures of income inequality at the community level. Measures of relative deprivation involve assessments of the income distance between individuals and their comparison or reference group—that is defined by others who are alike with respect to age group, occupational class, or community of residence. The causal mechanisms underlying the relationship between absolute income and health are linked to the ability to access material goods and services necessary for the maintenance of health. Relative income is hypothesized to be linked to health through psychosocial stresses generated by invidious social comparisons as well as by the inability to participate fully in society because of the failure to attain normative standards of consumption. Growing evidence has suggested an association between relative deprivation measured among individuals and poor health outcomes Aberg Yngwe et al. A related literature has attempted to link the societal distribution of income as an aggregate index of relative deprivation to individual health outcomes, although the findings in this area remain contested Subramanian and Kawachi, ; Lynch et al. Variables other than household income also may be useful for health research—such as assets including inherited wealth, savings, or ownership of homes or motor vehicles Berkman and Macintyre, While income represents the flow of resources over a

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defined period, wealth captures the stock of assets minus liabilities at a given point in time, and thus indicates economic reserves. Measuring wealth is particularly salient for studies that involve subjects towards the end of the life course, a time when many individuals have retired and depend on their savings. In the Panel Study of Income Dynamics, for example, only a weak association was seen between post-tax family income and mortality among post-retirement-age subjects, while measures of wealth continued to indicate a strong association with mortality risk Duncan et al. Finally, measures of income, poverty, and deprivation have been extended to incorporate the dimension of place. Growing research, utilizing multilevel study designs, has conceptualized economic status as an attribute of neighborhoods Kawachi and Berkman. These studies have revealed that residing in a disadvantaged or high-poverty neighborhood imposes an additional risk to health beyond the effects of individual SES. A recent Department of Housing and Urban Development randomized experiment in neighborhood mobility, the so-called Moving To Opportunity study, found results consistent with observational data: Moving from a poor to a wealthier neighborhood was associated with significant improvements in adult mental health and rates of obesity Kling et al. Disadvantaged neighborhoods are often characterized by adverse physical, social, and service environments, including exposure to more air pollution via proximity to heavy traffic, a lack of local amenities such as grocery stores, health clinics, and safe venues for physical activity, and exposure to signs of social disorder Kawachi and Berkman.

Occupational Status

The third standard component of SES that typically is measured by social scientists is occupational status, which summarizes the levels of prestige, authority, power, and other resources that are associated with different positions in the labor market. Occupational status has the advantage over income of being a more permanent marker of access to economic resources. Three main traditions can be discerned in the way in which different disciplines have approached the measurement of aspects of occupations relevant to health. In the traditional occupational health field, researchers have focused on the physical aspects of the job, such as exposure to chemical toxins or physical hazards of injury Slotte. In the fields of occupational health psychology and social epidemiology, researchers have focused on characterizing the psychosocial work environment, including measures of job security, psychological job demands and stress, and decision latitude control over the work process Karasek and Theorell. Finally, the sociological tradition has tended to focus on occupational status, which includes both objective indicators e. Several alternative approaches currently exist for the measurement of occupational status. For a detailed description, see Berkman and Macintyre as well as Lynch and Kaplan. For example, the Edwards classification U. Census Bureau, is a scheme based upon the conceptual distinction between manual and nonmanual occupations. An alternative and commonly used measure of occupational status is the Duncan Socioeconomic Index SEI, which combines subjective ratings of occupational prestige with objective measures of education and incomes associated with each occupation. SEI scores, which range from 0 to 100, were originally constructed by Duncan using data from the National Opinion Research Center study, which provided public opinions about the relative prestige rankings of representative occupations. These prestige rankings were then combined with U. Census information on the levels of education and incomes associated with each Census-defined occupation. The resulting SEI scores have been updated several times Burgard et al. In the Wisconsin Longitudinal Survey of men and women who graduated from Wisconsin high schools in 1953 or 1954 years old in 1987, Duncan SEI scores were inversely associated with self-reported health, depression, psychological well-being, and smoking status Marmot et al. As is the case with both education and income, an association between occupational status and health may partly reflect reverse causation. That is, ill health e. Although the adverse health impact of job loss e. As noted above, existing measures of occupational status such as the Duncan SEI combine measures of prestige with indicators of education and income that are thought to affect health independently. In addition, there are uncertainties regarding the optimal time point for measuring occupational status, especially since individuals change occupations over their life course. The potential pathways linking occupational status to health outcomes are again distinct from those linking either education or income to health. First, higher status and nonmanual occupations are less likely to be associated with hazardous exposures to chemicals, toxins, and risks of physical injury. Higher status jobs also are more

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likely to be associated with a healthier psychosocial work environment Karasek and Theorell, , including higher levels of control decision latitude as well as a greater range of skill utilization lack of monotony. A greater sense of control in turn implies improved ability to cope with daily stress, including a reduced likelihood of deleterious coping behaviors such as smoking or alcohol abuse. Undoubtedly, a major intervening pathway between occupational status and health is through the indirect effects of higher incomes and access to a wider range of resources such as powerful social connections. In summary, there is good evidence linking each of the major indicators of SES to health outcomes. Together, education, income, and occupation mutually influence and interact with one another over the life course to shape the health outcomes of individuals at multiple levels of social organization the family, neighborhoods, and beyond. Social Networks, Social Support, and Health An independent social determinant of health is the extent, strength, and quality of our social connections with others. Recognition of the importance of social connections for health dates back as far as the work of Emile Durkheim. More recently John Bowlby maintained that secure attachments are not only necessary for food, warmth, and other material resources, but also because they provide love, security, and other nonmaterial resources that are necessary for normal human development Berkman and Glass, Certain periods during the life course may be critical for the development of bonds and attachment Fonagy, According to attachment theory, secure attachments during infancy satisfy a universal human need to form close affective bonds Bowlby, Two social variables are of particular interest in characterizing social relationships:

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Chapter 9 : AN ENSEMBLE OF DEFINITIONS OF ENVIRONMENTAL HEALTH

Sustainability is not just about the environment (4), it's also about our health as a society in ensuring that no people or areas of life suffer as a result of environmental legislation, and it's also about examining the longer term effects of the actions humanity takes and asking questions about how it may be improved (2).

What effects can the Environment have on Health? This brief account can address only a small part of a vast and expanding subject. The environment in which we live can be considered as having three fundamental sets of components: Physical [energy of one form or another] Chemical [matter]. Hazards can present themselves to us in various media. The influence they can exert on our health is very complex and may be modulated by our genetic make up, psychological factors and by our perceptions of the risks that they present. The following deals with general environmental health hazards, and not extremes of climate, occupational hazards, hazards associated with food, most "accidents" or sexually transmitted disease. Health effects from economic and social consequences of environmental change are also not considered here. Associations between an exposure and an adverse health effect do not, on their own, prove that the former is the cause of the latter. Many other non-causal associations could explain the findings. These concerns explain why the language in this context may well be "hedged" even though you might have formed impressions from other sources that some postulated causal associations had been proven.

Physical Hazards, and their Adverse Health Effects Although you will have heard or read a great deal about the environmental consequences of global warming, man will probably be affected through famine, or war long before the health of the population as a whole is harmed to a serious degree by the temperature change. However increasing extremes of temperature, as a result of climatic change, could result in increased mortality even in temperate climates. Important issues concerning physical hazards include those relating to health effects of electromagnetic radiation and ionising radiation. If one excludes the occupational environment, then noise and other physical hazards may present a nuisance to many inhabitants, and impair general well being. Environmental noise does not usually contribute to deafness but notable exceptions may include noisy discotheques and "personal stereos". Electromagnetic radiation ranges from low frequency, relatively low energy, radiation such as radio and microwaves through to infra red, visible light, ultraviolet, X-rays and gamma rays. These last as well as other forms of radioactivity such as high energy subatomic particles. Exposure to ultraviolet UV radiation carries a increased risk of skin cancer such as melanoma, and of cataracts which are to an extent exposure related. Some pollutants such as chlorofluorocarbons CFCs used as refrigerants or in aerosol propellants or in the manufacture of certain plastics can damage the "ozone layer" in the higher atmosphere stratosphere and thus allow more UV light to reach us, and harm us directly. Ultraviolet light may also cause harm indirectly by contributing to an increase in ozone in the troposphere the air we breathe - see below under chemical hazards, or elsewhere in connection with air quality. Radioactivity is associated with an exposure dependent risk of some cancers notably leukaemia. Contrary to popular belief however, most radiation to which the average person is exposed is natural in origin, and, of the man made sources, medical diagnosis and treatment is on average the largest source to the individual. A very important issue is the extent to which radon gas arising from certain rock types beneath dwellings can contribute to cancer risk. According to some estimates it could result in a few thousand cancer deaths per year in the U. The explanation for leukaemia clusters around nuclear power plants is not yet resolved. Similar clustering can occur in other parts of the country. The effect of viral infections associated with population shifts may be important but requires further study. Non ionising electrical, magnetic or electromagnetic fields are an increasing focus of attention. The scientific evidence of adverse health effects from general environmental exposure to these fields is "not proven". If there are adverse effects yet to be proven, the risk is probably likely to be very small.

Chemical Hazards, and their Adverse Health Effects If one includes tobacco smoke as an environmental hazard then it probably represents the single biggest known airborne chemical risk to health, whether measured in terms of death rates or ill-health from

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lung cancer, other lung disease such as chronic bronchitis and emphysema, and disease of the heart, especially, and of blood vessels and other parts of the body. To a much lesser degree of risk, these adverse effects apply to non-smokers exposed passively to sidestream tobacco smoke. General airborne pollution arises from a variety of causes but can usefully be subdivided into pollution from combustion or from other sources. The image shows the silhouette of a power station - an important source of airborne products of combustion. Combustion of coal and other solid fuels can produce smoke containing polycyclic aromatic hydrocarbons - PAH and sulphur dioxide besides other agents such as those also produced by: Combustion of liquid petroleum products which can generate carbon monoxide, oxides of nitrogen and other agents. Industry and incineration can generate a wide range of products of combustion such as oxides of sulphur and nitrogen, polycyclic aromatic hydrocarbons, dioxins etc. Combustion of any fossil fuel generates varying amounts of particulate matter. It also adds to the environmental burden of carbon dioxide - an important "green house" gas but in these low concentrations it does not affect human health directly. Combustion of fuel can also generate hazardous substances in other ways, besides by chemical oxidation, such as by liberating benzene from the "cracking" of petrol or lead from leaded petrol. Some of the primary pollutants such as nitrogen dioxide can, under the influence of UV light generate secondary pollutants notably ozone an allotrope of oxygen. Find out more about air quality in relation to these substances. Undoubtedly tens of thousands of deaths have resulted from acute pollution episodes e. Nowadays some people e. What is still unclear is the extent to which urban airborne pollution in the majority of cities complying with current air quality guidelines, contributes to ill health, i. Health effects of concern are asthma, bronchitis and similar lung diseases, and there is good evidence relating an increased risk of symptoms of these diseases with increasing concentration of sulphur dioxide, ozone and other pollutants. Moreover, there is increasing evidence to suggest that pollution from particulate matter at levels hitherto considered "safe" is associated with an increased risk of morbidity and mortality from cardiopulmonary disease especially in people with other risk factors such as old age, or heart and lung disease. These concerns are the subject of a great deal of research throughout the world. Although high occupational exposures to exhaust especially from diesel, and to benzene does increase the risk of some cancers, reliable direct evidence of an increased to cancer risk to the population at large from the lower levels to which they are exposed is lacking. Incineration can also generate hazardous substances if substances not best suited for disposal by incineration are "disposed" of in this way or if incineration is carried out at too low a temperature for example this may generate dioxins. Products of combustion and other harmful airborne pollutants can also arise within the home. Thus nitrogen dioxide generated by gas fires or gas cookers can contribute to an increased respiratory morbidity of those living in the houses. Certain modern building materials may liberate gases or vapours such as formaldehyde at low concentration but which might provoke mild respiratory and other symptoms in some occupants. Modern building standards for asbestos in buildings are such that the resulting airborne fibre concentrations are so small as not to present any risk at all of asbestosis. However some estimates suggest that perhaps one extra death per year might result in the UK from asbestos related cancer as a result of non-occupational exposure in buildings. The image shows an asbestos body i. Large scale industrial releases with serious acute effects are fortunately rare but you might recollect some events such as in Bhopal India. Various smaller scale events occur such as leaks from road tankers, or fires in warehouses and factories. Special local environmental exposures can arise for example in communities exposed to drifting pesticide sprays containing say, organophosphates. Some natural phenomena such as volcanic eruptions can present serious risks to health. Fortunately they are rare but can be catastrophic. Water can be an important source of chemical hazards. It can leach lead from pipes especially if the water is soft. There is good epidemiological evidence that this can have a relatively small but measurable harmful effect especially on neurological function even at levels hitherto considered "acceptable". Other adverse effects can arise from chemicals added to the water. Chlorination of water has probably saved millions of lives see biological hazards. Some concern has been raised about possible increased cancer risks in association with chlorinated water but there is as yet no proof that a causal association between the two exists. Fluoride added

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to water reduces the risks of caries but can also have unwanted effects such as mottling of the teeth. Although pesticides can and do leach into water, there is no evidence that the current standards for water quality are inadequate in this respect, but most standards are based on evidence other than human epidemiology which in this context is extremely difficult to conduct. Beyond the point of supply further problems in drinking water quality may result. Thus for example water tanks containing lead may increase the burden of this metal in the water, while water softeners may increase its sodium content can be harmful for bottle fed infants. Deposition of solid hazardous waste can result in harmful substances leaching into water supplies, becoming airborne or being swallowed or otherwise absorbed directly for example because of children playing on the sites. If the sites are well contained to prevent leaching into water supplies and segregated from human activity then the risk to human health is usually immeasurably small. However where the position of disposal sites and their contents are unknown and houses are proposed to be built on them or they are to be developed in other ways, extensive prior investigation may be needed in an attempt to estimate health risks. As regards microbiological hazards in water, substantial improvements in the health of the population have resulted historically from the supply of drinking water free from disease causing organisms such as cholera. Similar improvements can be expected in the health of the inhabitants of developing countries if microbiologically safe water is provided by avoidance of contamination, and appropriate purification including disinfection usually by chlorination. Occasional outbreaks of waterborne infection still arise from contamination of drinking water by soiled water usually coliforms. There can be other opportunities for further bacteriological contamination. Thus *Legionella* can grow in sumps or dead legs in the plumbing system and may then be dispersed as aerosols from showers. Recreational water which is heavily contaminated with pathogens, notably coliform bacteria has been shown to be associated with an increased risk of gastrointestinal and other infectious illness, usually self-limiting. So-called "clinical" waste is not merely an occupational hazard of health care workers but is becoming an increasingly more important risk, for example for children finding blood stained needles. Many allergens such as grass pollen grains, or faecal material from house dust mites may cause attacks of asthma or "hay fever" allergic rhinitis. There is evidence that high exposure to these allergens early in life, increases the risk of suffering from asthma later on. An increasing number of studies suggest that airborne chemical pollution can act synergistically with naturally occurring allergens and result in effects on lung function at concentrations lower than those at which either the allergen or the chemical irritant on its own would have produced an adverse effect. The above account demonstrates the wide range of effects that the environment may have on human health, but it is very far from exhaustive and for the sake of conciseness many hazards or their effects have not been mentioned. Moreover, the simplicity of the above has meant that very important concepts have not been discussed. These include the distinction between mere association, and causation, or the quantitative implications of understanding the difference between hazard and risk. Finally, to keep things in perspective, we must not forget, that as a species we are the way are because of the influence of the environment on our evolution. Problems to health arise at two levels: At the level of the species, we must remember that the process of evolution is relatively slow when compared to the rate at which man can bring about environmental change. This means that unless efforts are made to care for the environment, the human species may suffer to an extent that other species already have suffered.