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**PLAN OF ACTIONS RELATED TO THE ENVIRONMENTAL
HEALTH RISKS IN TOURIST ESTABLISHMENTS**

In cooperation with



WHO

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CHAPTER 1. INTRODUCTION

The tourism sector has developed into one of the most important and largest global industries. Its rapid growth has exceeded the global domestic product for the past thirty years [1]. According to the World Tourism Organization (WTO), the global tourism market will triple in size by 2020. Sustainable development of tourism reinforces social cohesion, cultural and economic development and strengthens synergies with other economic sectors [2]. In countries with intense tourist activity like most of Mediterranean countries, physical and social environment may have consequences for the health and well-being on both tourists and local population. In particular, since tourists spend most their time in tourist establishments, there is a need to identify the environmental health risks associated with them that pose a threat to human health [2].

In the framework of the MED POL Programme Phase IV, the preparation of a plan of activities that are related to the environmental health risks in tourist establishments performed.

Environmental Health is concerned with the assessment and control of those factors in the environment which may potentially harm human health. It includes not only the direct pathological effects of chemicals, radiation or biological agents but also the effects on health and wellbeing of aspects of the physical, psychological, social and aesthetic environments, including housing, land use, urban development and transport (The Implementation of the European Charter on Environment and Health, 1990).

The main factors affecting human health in tourist establishments are associated with the following issues:

1. Outdoor air pollution.
2. Indoor air pollution.
3. Drinking water.
4. Water sanitation.
5. Bathing and recreational waters.
6. Sun exposure.
7. Heat exposure.
8. Noise pollution.
9. Well-being and aesthetics.
10. Food safety and eating establishments.
11. Hotel safety standards.
12. Principal communicable diseases.

The present report consists of thirteen chapters. In the first part of each chapter the above-mentioned 12 factors are presented focusing mainly on the environmental health risks related to these factors; and in the second part an indicative plan of actions, measures and activities is proposed to minimize the environmental health risks in tourist establishments.

1.1.1 References

- [1] Fortuny, M., Soler, R., Cánovas, C. and Sánchez, A. (2007). "Technical approach for a sustainable tourism development. Case study in the Balearic Islands" *Journal of Cleaner Production*, doi:10.1016/j.jclepro.2007.05.003.
- [2] WHO (2007). Meeting on health risks associated with tourist establishments in the Mediterranean, Report on a joint WHO/UNEP meeting, Athens, Greece, 24-26 April 2007.

CHAPTER 2. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO OUTDOOR AIR POLLUTION

2.1 Outdoor air pollution

2.1.1 Characteristics/pollutants and sources of pollution/hazards

Outdoor air pollution harms human health and is known to increase the incidences of respiratory and lung diseases, particular in sensitive groups of people, such as young children and the elderly. Moreover, economic impacts of outdoor air pollution include potential losses in the sector of tourism, while poor air quality can limit opportunities for economic growth.

Pollutants are usually chemicals which are released into the air, in varying quantities, from both natural and man-made sources. Natural pollutants include emissions from land, water, and plants, radiological decomposition, forest fires and volcanoes or other geothermal sources. The concentrations of these substances vary according to local sources and weather conditions.

Air pollution impacts on human health are created directly through inhalation of pollutants, and indirectly through the food chain or drinking water. Pollutants also affect quality of life through their direct, negative impact on ecosystems.

2.1.2 Health impacts and hazards

Ambient air pollutants may cause irritation, odour annoyance, acute or long-term toxic effects. The susceptibility of individuals to any pollutant depends on their pre-existing status, with regard for example to age, sex, pregnancy, pulmonary disease, cardiovascular disease and genetic differences, as well as lifestyle factors, such as exercise and nutrition [1].

2.1.3 Guidelines and standards

There are WHO guidelines which cover both indoor and outdoor pollution. The guidelines are based on characteristics applicable to all countries, such as the relationship between chemical exposure levels, doses and their effects. The guideline values, revised in a series of expert consultations, are intended to serve as a basis for the establishment of national standards and other control measures set by each country, which reflect their level of development and national capability in air quality management, as well as local health risks, technical feasibility and economic considerations. For non-carcinogenic toxic substances the guidelines indicate levels combined with exposure time for which no adverse effects are expected.

For some substances ecologically based guidelines for preventing negative effects on terrestrial vegetation are also given. The guidelines are intended to assist governments in risk management and the setting of standards, but are not intended to be regarded as standards in themselves [2].

European Directive for ambient air quality (2008/50/EC), 'lays down measures aimed at the defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole; assessing the ambient air quality in Member States on the basis of common methods and criteria; obtaining information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures; ensuring that such information on ambient air quality is made available to the public; and maintaining air quality where it is good and improving it in other cases' [3].

2.2 Measures and actions to minimize environmental health risks in tourist establishments

2.2.1 Measures and actions by governmental bodies

The following measures and actions can be recommended, by governmental bodies, for the prevention of health impacts from outdoor air pollutants in local level:

- 1) Information, reporting, education and training actions.
 - a. Promotion of outdoor environment campaigns in local level, focusing on local characteristics/ air pollution problems, health effects and recommendations for individuals' contribution to the reduction of outdoor air pollution.
 - b. Information and education strategies by local authorities in co-operation with environmental and health agencies of both public and private sector, targeting to (a) people who suffer from asthma and allergy, information should be related to the link between sources of pollutants and health effects, recognition of outdoor environment illness symptoms and recommended actions for treatment, and (b) people involved in tourism industry. In this case information should be related to the implementation of common practices for the reduction of pollutant emissions in tourist areas.

Information and education material can be provided through internet, the media and reading matter in public places and tourist environments. Additionally, education material for tourist companies can be sent in the form of guidance accompanied with training courses for operators and staff.

- 2) Actions to avoid/reduce sources, risks and exposure.
 - a. The most concerned pollutants and respective pollution sources should be addressed in tourist areas, by environmental agencies of local authorities through surveillances.
 - b. Reduction of road traffic in tourist areas via the development of traffic management schemes, by local authorities, including:
 - i. The encouragement of car free residential development, local pedestrian improvements, including the development of interactive, enhanced cycling facilities.
 - ii. Implementation of flexible in time operation systems with telecommuting availability to employees in public and private sector when feasible.
 - iii. It is noted that prior to the introduction of traffic management schemes, such as those to reduce through traffic -except public transport vehicles, extensive public consultation should be carried out through traffic reduction campaigns.
 - c. Reduction of the potential generation of Volatile Organic Compounds by evaporation using sealed containers for gasoline and degreasers where exist.
 - d. Reduction of emissions through promotion of alternative fuels, e.g. biodiesel, bioalcohol (methanol, ethanol, butanol) hydrogen, non-fossil methane, non-fossil natural gas etc.
 - e. Reduction of the levels of fine particulate matter and ground-level ozone via [4]:

- i. The promotion of clean transportation with the cleaning up emissions from transit buses, the promotion of a province-wide anti-idling campaign, the retro-fitting older heavy duty diesel vehicles and the support of greener ports and marine vessels.
 - ii. The promotion of clean communities with the development of an air shed management plan, the encouragement of people to make cleaner choices in household, the implementation of provincial smoke management plans and the support of research on air quality and health.
- f. Apply local strategies related to development and deployment of innovative energy solutions regionally (e.g. use "task" lighting where possible rather than general lighting, compact fluorescent bulbs use 75% less energy and give off less heat, etc.)
- g. Installation of vapour recovery systems on fuelling stations to recapture Volatile Organic Compounds evaporating during fuelling.
- h. Harmonization with current legislation and guidelines, e.g. European Directive for ambient air quality 2008/50/EC [3], WHO Guidelines for outdoor air pollution [2].
- 3) Planning, operation, monitoring and assessment actions.
- a. Identification of target objectives in local level to meet the national air quality standards.
 - b. Adequate monitoring of traffic and air pollution, before and after traffic management schemes. Installation of monitoring and recording systems of pollutant levels, covering areas with intense tourist activity.
 - c. Reporting and assessment of monitoring data and feedback of local pollution reduction policies.
- 4) Research-study-investigation.

Local authorities' support of research on air quality issues and health, focusing on the application of management practices for the reduction of air pollutant emissions at sources with the participation of private sector.

2.2.2 *Recommendations for tourist establishment operators*

Recommendations for tourist establishment operators deal mainly with the implementation of the proper landscape management practises in tourist establishments, in order to protect the local outdoor environment. Additional recommendations may include the following:

1. Application of environment friendly practises in establishments' operation related to the use of chemicals in cleaning/ disinfection and building maintenance, for more details see Chapter 3.
2. Use of renewable energy sources for establishments' operation, e.g. photovoltaic solar panels and solar water heating systems; and wind turbines according to the regional characteristics.
3. Compliance with the national regulations related to air pollution reduction.

4. Tourist establishment operators should keep tourists informed on the necessary precautions protecting themselves from health problems like allergies, asthma and respiratory illnesses, irritations etc., due to their potential exposure in outdoor air polluted conditions. Information can be provided through leaflets in tourist establishments. These precautions include:
 - a. Adequate information about the outdoor conditions in the country of their destination.
 - b. Awareness of recognition of illness symptoms and first aid recommendations.
 - c. Being supplied with the appropriate medication to tackle emergency health incidents, e.g. allergies or asthma.
 - d. Avoiding the exposure of special groups of tourists (infants, young children, pregnant women, elderly and people with pre-existing health problems) to outdoor air pollution health risks.

2.2.3 References

- [1] WHO (2000). Air quality guidelines for Europe, 2nd edition, http://www.euro.who.int/air/activities/20050223_4.
- [2] WHO (2005). Air quality guidelines, www.euro.who.int/air/activities/20050222_2.
- [3] <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0050:EN:NOT>.

For further reading you can consult the following references for the formulation of the measures and actions for outdoor air quality in tourist environments:

- [4] Ozone prevention & air quality action plan, The University of Texas Health Science Center at San Antonio, Environmental Health and Safety Department, June 2008.
- [5] http://www.camden.gov.uk/ccm/cms-service/stream/asset/?asset_id=593231.
- [6] <http://www.bcairsmart.ca/>.

CHAPTER 3. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO INDOOR AIR POLLUTION

3.1.1

3.2 Indoor air pollution

3.2.1 Characteristics/pollutants and sources of pollution/hazards

Common indoor air pollutants include [1]:

- 1) Environmental Tobacco Smoke (ETS).
- 2) Biological pollutants including moulds, bacteria and dust mites, pollen and viruses may breed in stagnant water which has accumulated in ducts, humidifiers and drain pans, humidification chambers of air conditioning systems (poorly maintained air conditioning systems), or where water has collected on ceiling tiles, carpets or insulation. Insect or bird droppings can be sources of biological contaminants.
- 3) Nitrogen dioxide.
- 4) Carbon monoxide. Carbon monoxide or CO is commonly known as “The Silent Killer”. Having no odor, color, or taste, it is a poisonous gas that is difficult to detect. It is produced by the incomplete combustion of fossil fuels, becoming significantly more lethal in non ventilated rooms, and in buildings where modern insulation limits air circulation. All appliances, heaters (including water heaters), and cars should be maintained regularly to prevent dangerous levels CO emissions. Among the most worrisome contributors to health hazards related to CO are hotels and motels without CO detectors, consequently, a significant risk of CO poisoning exists for travelers [2].
- 5) Radon.
- 6) Volatile Organic Compounds (VOCs), such as paints, varnishes, pesticides and cleaning products.
- 7) Formaldehyde, contained in some forms of pressed and laminated wood products, as well as in tobacco smoke.
- 8) Chemical compounds from outdoor sources. These refer to pollutants from motor vehicle exhausts, plumbing vents or building exhausts (e.g. bathrooms and kitchens), which enter the building through poorly located air intake vents, windows or other openings.

3.2.2 Health impacts and hazards

Health problems caused by indoor pollutants range from temporary discomfort to serious illnesses, including asthma, allergies, cancer and lung disease [3] :

- 1) Environmental Tobacco Smoke. Tobacco smoke has been found to be carcinogenic in humans and to produce a substantial amount of morbidity and mortality at specific levels of nicotine [4].
- 2) Toxic compounds and respirable particulate matter. High concentrations of some VOCs can cause chronic and acute health effects, and some are known to be carcinogens. Low to moderate levels of multiple VOCs may also produce acute reactions.

- 3) Sick Building Syndrome (SBS) and Building Related Illness' (BRI) syndromes [5]. Sick Building Syndrome and Building Related Illness are associated with acute or immediate health problems; radon and asbestos cause long-term diseases which occur years after exposure. Radon and asbestos are not considered to be causes of SBS or BRI, but, are nevertheless serious health risks which should be included in any comprehensive evaluation of a building's Indoor Air Quality (IAQ) [6, 7].
- 4) Biological contamination. Physical symptoms related to biological contamination include cough, chest tightness, fever, chills, muscle aches and allergic responses, such as mucous membrane irritation and upper respiratory congestion.

Release of biological contaminants, such as the Legionella pneumophila, can produce aerosols that are then inhaled and caused diseases, such as Legionnaire's Disease or Pontiac Fever in susceptible individuals. Legionella infection is caused by contaminated air-conditioning cooling towers, hot water systems, humidifiers and other containing water devices, while there is no direct person-to- person transmission [8].

- 5) Carbon Monoxide Poisoning. Symptoms of CO poisoning include headaches, dizziness, nausea, vomiting, weakness, chest pains, and confusion. High levels of carbon monoxide can cause loss of consciousness and death. Because the symptoms mimic other common illnesses, it is often hard to determine if poisoning has occurred [2].

3.2.3 Guidelines and standards

The WHO guidelines [4] cover both indoor and outdoor pollution (see also section 2.1.3).

3.3 Measures and actions to minimize environmental health risks in tourist establishments

3.3.1 Measures and actions by governmental bodies

The following measures and actions can be recommended, by governmental bodies for the prevention of health impacts from indoor environments, especially asthma, allergy and indoor climate illnesses targeting to tourist establishment environments [9, 10]:

- 1) Information, reporting, education and training actions.
 - a. Seminars and meetings targeted on establishment operators and staff training, which can be hold by local authorities in co-operation with indoor environment management specialists and private sector (e.g. indoor air equipment companies). Objectives of these meetings should be related to indoor air pollution sources, consequential health hazards, required standards for good indoor air quality, development of pollutant reduction strategies and its application in tourist establishments.
 - b. Promotion of indoor environment campaigns in local level, focusing on local characteristics/ air pollution problems, health effects and recommendations for individuals' contribution to the reduction of indoor air pollution.
 - c. Information and education strategies by local authorities in co-operation with health care agencies of both public and private sector, targeting to people who suffer from asthma and allergy. Information and education material can be provided through internet, the media and reading matter in public places and tourist environments. Information is related to the link between sources of

pollutants and health effects, recognition of indoor environment illness symptoms, how illness can be reduced and peoples' ability to function can be improved.

- 2) Actions to avoid/reduce sources, risks and exposure.
 - a. Local authorities' inspection for the compliance with the current health guidelines for indoor air quality, e.g. WHO guidelines, in tourist environments [4].
 - b. Development of indoor air pollution reduction strategies and plans, in local level, considering the protection of population from indoor air pollution as an integral part of public health protection policy. These strategies and plans should be related to buildings' operational conditions including the following :
 - i. Identification of dangerously pollutant in indoor environments.
 - ii. Surveillance of pollutant levels in buildings.
 - iii. Staff training in working places regarding the implementation of practices for indoor air pollution reduction including: a) performance of proper air cleaning in indoor spaces, b) smoking restrictions, c) avoiding the use of not tolerated products (e.g. cleaning chemicals), d) monitoring systems for temperature, humidity and CO levels control, e) building and equipment maintenance etc.
 - iv. Issuance of lists containing specifically hazardous chemicals used in buildings' cleaning/ disinfection, pest control etc., and recommended substances. Even though hazardous chemicals are identified, there is a need for identification of specific commercial products containing them.
 - v. Assessment the results of implemented actions and evaluation of indoor air pollution reduction strategy.
- 3) Planning, operation, monitoring and assessment actions.
 - a. Development of integrated monitoring plan implemented in tourist environments regionally, by local authorities in co-operation with medical agencies, to allow the determination of the human exposure and interactions between indoor air pollution and health.
 - b. Increasing of competence among tourist establishments ensured good indoor environment conditions by provision economic incentives in local level, with the supporting of private sector (e.g. commercial companies).

3.3.2 *Recommendations for tourist establishment operators*

Generally, the biggest access barriers for people with chemical sensitivities related to operations and maintenance of indoor environments, such as tourist establishments, are the following [11]:

- pesticides, not only indoors, but also outdoors,
- fragrances, especially fragrance emitting devices (FEDs), air fresheners, and deodorizers, and
- volatile cleaners, including citrus and pine.

The recommendations for making indoor environments more accessible for people with chemical sensitivities deal mainly with the following areas [11]:

1. Pest control,
 2. Cleaning and disinfection,
 3. Mechanical Heating Ventilating and Air Conditioning (HVAC) system,
 4. Landscape maintenance, and
 5. Maintenance of indoor environment.
1. The recommendations for pest control include the following:
 - 1.1 Improvement of sanitation to control pest outbreaks by:
 - a. Making structural repairs, such as fixing leaky pipes and caulking cracks,
 - b. Using physical or mechanical controls such as screens, traps, vacuums, and mechanical weed cutters and
 - c. Frequent trash removal, restricting eating to designated areas, securing trash container lids, and steam cleaning trash containers.
 - 1.2 Prohibition of pesticide applications in indoor spaces that are constantly occupied. Pesticides should be applied when there is the longest time before the area will be re-occupied.
 2. The recommendations for cleaning and disinfection include the following:
 - 2.1 Reduction of odors by:
 - a. Using of fragrance-free, low-Volatile Organic Compound cleaning products,
 - b. Avoiding Fragrance Emitting Devices, plug-ins, or sprays; urinal or toilet blocks; or other deodorizer/re-odorizer products and
 - c. Increasing cleaning and ventilation and/or using baking soda or zeolite to absorb odors.
 - 2.2 Avoiding the use of cleaner/disinfectant combination products.
 - 2.3 Avoiding or limiting the use of cleaning products containing specific chemicals like chlorine, ammonia, quaternary ammonium, phenol, isopropyl and other alcohols, formaldehyde, and other petroleum distillates. Additionally, avoiding the use of products without labeled ingredients.
 - 2.4 Use of hot water for cleaning to reduce the need for soaps, detergents and disinfectants.
 - 2.5 Development of a plan to replace cleaning chemicals currently in use with safer alternatives.
 - 2.6 Use of disinfectants only in areas and at strengths (i.e, levels of disinfection) required by law. Checking with local health department to obtain details of all legal requirements.
 - 2.7 Application of ventilation, when using cleaning products.

- 2.8 Schedule heavy cleaning, repairs and maintenance during low or no-occupancy periods whenever possible.
- 2.9 Storage and use of chemicals, e.g. paints, adhesives, solvents, and pesticides, in well ventilated areas, and use of these pollutant sources during periods of non-occupancy; and allowing time for building materials in new or remodeled areas to off-gas pollutants before occupancy.
- 2.10 Air cleaning can be a useful adjunct to source control and ventilation, but has certain limitations. Particle control devices, such as the typical furnace filter, are inexpensive, but do not effectively capture small particles; high performance air filters capture the smaller, respirable particles but are relatively expensive to install and operate. Mechanical filters do not remove gaseous pollutants. Adsorbent beds may remove some specific gaseous pollutants, but these devices can be expensive and require frequent replacement of the adsorbent material. In sum, air cleaners can be useful, but have limited application.
3. The recommendations for the mechanical Heating Ventilating and Air Conditioning system include the following:
 - 3.1 Application of a strict maintenance schedule for the routine maintenance of HVAC systems, e.g. periodic cleaning or replacement of filters.
 - 3.2 Use of non-chemical methods to maintain Heating Ventilating and Air Conditioning ducts free of particulate matter, dust, and debris, such as physical removal or use of vacuums. Venting contaminant source emissions to the outdoors.
 - 3.3 Use of demand controlled ventilation (DCV) that provides liberal amounts of airflow and outdoor air ventilation.
 - 3.4 Increasing ventilation rates and air distribution to reduce indoor pollutant levels. In many buildings, Indoor Air Quality (IAQ) can be improved by operating the Heating Ventilating and Air Conditioning system to at least its design standard, and to American Society of Heating Refrigerating and Air conditioning Engineers (ASHRAE) Standard 62-1989 if possible [12].
 - 3.5 When there are strong pollutant sources, local exhaust ventilation may be appropriate to exhaust contaminated air directly from the building. Local exhaust ventilation is particularly recommended to remove pollutants that accumulate in specific areas such as rest rooms, copy rooms, and printing facilities.
 - 3.6 Application of proper landscape maintenance practices to reduce outdoor pollution sources.
4. The recommendations for the landscape maintenance to reduce outdoor pollution sources, which may affect indoor environments, include the following:
 - 4.1 Maintenance of lawns and gardens organically. Application of proper pest management practices to eliminate or minimize the use of herbicides, fungicides, insecticides, and other pesticides.
 - 4.2 Avoiding the use of synthetic fertilizers.
 - 4.3 Avoiding using of dust-blowing equipment like leaf blowers. Sweeping, raking, and use of vacuums are the preferred methods for removing debris.

- 4.4 Avoiding the use of diesel-powered and 2-cycle engine equipment. Using of electric lawn and landscape equipment whenever possible.
- 4.5 Use of rock, gravel, flat stones, or pavers for mulch, and/or use tytar landscape barrier to suppress weeds. Avoiding organic mulches, like cocoa beans, peat moss, wood chips, and bark, especially near operable windows and doors of buildings. These mulches usually emit volatile fumes and may produce or harbor mold.
- 4.6 Avoiding the use of Chromated Copper Arsenate (CCA) wood or wood chips because they contain arsenic and other toxic chemicals, which can leach into the environment. Avoid the use of railroad ties because they contain creosote.
- 4.7 Application of pesticide, fertilizers, and lime only when there is little or no wind and apply them in a manner that prevents drift. Post signs and provide advance notification to building occupants before starting these applications.
- 4.8 Use of least toxic, low-Volatile Organic Compound paints, stains, and finishes on outside equipment, like benches, poles, decks, and porches.
- 4.9 Properly maintenance of the building envelopes in order to prevent mold problems and block pest entry.
5. Recommendations for the proper maintenance of the indoor environments include the following:
 - 5.1 Routinely inspection and cleaning of roof and gutters to make sure they are draining properly. Promptly repairing of roof or plumbing leaks. Regularly inspections of walls and foundations, especially all utility entrance seals (e.g., phone, water, electric, and cable) for cracks and repairing promptly if found. Insulation of cold pipes to prevent condensation.
 - 5.2 Prompt removal and replacement of water-stained ceiling, tiles, and carpeting and wall panels.
 - 5.3 Removal of excess water from carpeting damaged by clean water and quickly dries it to avoid mold buildup.
 - 5.4 Immediately removal of any wet carpeting that has been contaminated with sewer water, heavy dirt and soils, or toxic chemicals.
 - 5.5 Sealing of rusted surfaces with a least toxic low VOC sealant to minimize emissions of airborne particles.
 - 5.6 Reduction of the impacts of buildings' renovations on indoor environment by:
 - a. Proper performance period, when the areas are unoccupied (or the least occupied in buildings that are in constant use) and
 - b. Performance of maximum outdoor air ventilation with no recirculation, during and for a reasonable period of time after the application of new materials and finishes (especially wet-applied products such as paints, sealants, caulks, and adhesives).

- 5.7 Measures for prevention of carbon monoxide poisoning, including:
- a. Installation of carbon monoxide detector-alarm systems in hotel rooms to prevent CO poisoning and especially during sleeping, that most CO deaths occur because people do not experience any of the symptoms while asleep [2].
 - b. Ensuring that any work carried out in relation to gas appliances is well and regularly maintained. Establishment operators must be provided with completed safety certification by equipment maintenance companies [13].
 - c. Warning signs installations in high risk areas in the establishments.
 - d. Installation of carbon monoxide detector-alarm systems in areas of high risk in the establishment [13].
- 5.8 Specific measures for the prevention of Legionellosis in tourist establishments, including [14] :
- a. Identification of high-risk building areas based on water exposure and occupant susceptibility.
 - b. Conduction of an environmental risk assessment. Having the cooling towers, domestic water system, manufacturing equipment and other aerosolizing devices evaluated with respect to conditions that promote growth or transmission of waterborne pathogens.
 - c. Development of a management plan including:
 - i. Outline of objectives, plan for communication and review, and high-risk occupant areas.
 - ii. Designing, operating and maintaining building water systems to minimize legionellae and other pathogens is crucial to reducing the risk of disease. Preventive measures include:
 - ✓ Domestic water system, cooling towers: List steps to take immediately based on the risk assessment measures that cost little or nothing and should thus be implemented out of good sense, as well as more costly measures that are required to solve high-risk problems.
 - ✓ Policies for regular maintenance and operation of systems, construction periods and special situations.
 - ✓ Establish policies for physical cleaning, water treatment, maintenance, conditions to avoid, water testing and tower location.
 - ✓ Develop a checklist for regular inspections.
 - ✓ HVAC equipment: Include policies for humidifiers, ductwork, air handling units and air filters.
 - ✓ Manufacturing equipment: List the aerosolizing water devices in your plant, with policies and procedures that will be implemented to reduce risk.
 - ✓ Other equipment: As applicable, list preventive measures for decorative fountains, whirlpool spas, misters, carpet cleaning equipment, ice makers, etc.
 - iii. Environmental sampling to test the water for Legionella and check whether the preventive measures are working. Test results, especially after a few screenings, usually indicate specific changes in the operation or maintenance of water systems, helping facility managers make better decisions about maintenance.

- d. Document all risk reduction efforts: preventive maintenance, equipment changes, environmental sampling and disinfection procedures.
- e. Development of disease response plan including:
 - i. Determination of how tourist establishment will respond to cases of disease.
 - ii. Outline steps for epidemiologic as well as environmental aspects of an investigation, and for emergency disinfection of cooling towers and the domestic water system.
 - iii. Disinfection methods for plumbing systems. Since preventive measures alone, including high hot-water temperatures, do not always control legionella in domestic water systems, it is sometimes necessary to install a continuous disinfection system. If test results indicate that legionellae are proliferating in the system, or if a case of Legionnaires' disease is identified, disinfection procedures should be implemented.

3.3.3 References

- [1] www.ncsl.org/programs/environ/envhealth/iaqser.htm.
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- [3] Anderson, T. (2002). *Indoor air quality*. Environmental Health Series, No. 6.
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- [5] www.epa.gov/iaq/pubs/sbs.html.
- [6] www.epa.gov/radon.
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For further reading you can consult the following references for the formulation of the measures and actions for indoor tourist environments:

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- [9] <http://www.regjeringen.no/en/dep/hod/documents/reports-and-plans/reports/2001/The-Norwegian-National-Environment-and-Health-Action-Plan.html?id=105635>.
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CHAPTER 4. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO WATER SUPPLY-DRINKING WATER

4.1 Water supply - Drinking water quality

4.1.1 Characteristics/pollutants and sources of pollution/hazards

Water is a scarce resource in much of the Mediterranean region, particularly in the southern and eastern countries where renewable natural resources are limited and have in some cases been exploited to their maximum capacity. Agriculture is the main user of water and irrigated land is expected to increase by 38% in the South and 58% in the East by 2030, though agricultural demand in the northern countries would remain stable or possibly decline [1].

The demand for drinking water is expected to continue to meet the needs of a growing urban population and the expanding tourism industry, which doubles the population of many towns in the hottest season. A supply-based approach to the growing demand for water has led to over exploitation of underground renewable and non-renewable resources, the development of interregional or international transfers, with the associated risk of conflict over management, and new methods of supplementing supplies such as reuse of treated wastewater for irrigation and desalination of sea water. Poorer countries may lack the capacity to exploit the water resources they have. Water is a key area of environmental development for a sustainable future [1].

Many aquifers, particularly in the North, have an excessively high pesticide or nitrate content. Sanitation systems in the South and Eastern countries may be poor and many rivers are chronically polluted with non-treated domestic and industrial discharges [1].

Drinking water may potentially be contaminated by chemical or biological contaminants.

4.1.2 Health impacts and hazards

Chemical contamination of drinking water is less likely to affect tourists than the local population, since harmful effects tend to be cumulative. Tourists are more likely to suffer acute effects from pathogenic microorganisms, to which the local population may have acquired immunity.

The most common health risk from contaminated drinking water is travellers' diarrhoea.

4.1.3 Guidelines and standards

The following guidelines and standards are related to the quality of drinking water:

- 1) The WHO drinking water guidelines [2] aim to protect public health by providing an assessment of the health risk presented by microorganisms and chemicals present in drinking water. Guide values are recommended for specified contaminants using a consistent process of assessment. The guideline values are not mandatory, but rather intended to inform the development of risk management strategies incorporating local, national and regional standards.
- 2) The Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes is the first major international legal approach for the prevention, control and reduction of water-related diseases in Europe [3]. By adopting the Protocol, the signatory countries agreed to take all appropriate measures to achieve: adequate supplies of wholesome drinking-water,

adequate sanitation of a standard that sufficiently protects human health and the environment, effective protection of water resources used as sources of drinking-water, and their related water ecosystems, from pollution from other causes, adequate safeguards for human health against water-related diseases; and effective systems for monitoring and responding to outbreaks or incidents of water-related diseases. The Protocol is developing surveillance methods for the emergence of water-related health threats including diseases of microbiological origins such as cryptosporidiosis and giardiasis severe and acute diarrhoea of undetermined origin, jaundice and dehydration.

- 3) The WHO water quality guidelines for the safe use of wastewater, excreta and greywater [4] are guidelines particularly significant for countries in the Eastern Mediterranean Region who are urged to review their existing regulatory and management frameworks in this area to ensure that wastewater is used in agriculture to alleviate water shortages, but without risk to human health.
- 4) The Codex Alimentarius Commission (CAC) has developed a worldwide Standard for Natural Mineral Waters, which provides a definition, establishes limits for certain chemical substances and microorganisms and specifies permitted treatment and handling procedures [5].
- 5) Directive 80/777/EEC as amended covers the definition of natural mineral water, its exploitation, treatment, microbiological criteria, chemical contaminants, sales descriptions, labelling and packaging. European Commission Directive 2003/40/EC 'establishes the list, concentration limits and labelling requirements for the constituents of natural mineral waters and the conditions for using ozone-enriched air for the treatment of natural mineral waters and spring waters' [6].

4.2 Measures and actions to minimize environmental health risks in tourist establishments

4.2.1 Measures and actions by governmental bodies

The drinking water quality varies from place to place, depending on the conditions of the source water from which it is drawn and the treatment it receives [5].

The following measures and actions can be recommended, by governmental bodies, for the strengthening of the protection of drinking water quality in tourist areas [7].

- 1) Information, reporting, education and training actions.
 - a. Training and educating water professional on local authorities' responsibility [8]. Developing, complying and transferring technological and managerial information to the water supply community, through conferences, workshops, section meetings etc.
 - b. Reporting actions by water agencies in local authorities (e.g. with a production of an annual report) to ensure accountability. Indicatively, the following reporting measures are mentioned:
 - i. Water quality information will be regularly reported to the public,
 - ii. Provincial health agencies will have a statutory obligation to advise government if additional source protection is necessary to protect public health,

- iii. Water suppliers will be held accountable for meeting the terms and conditions of their operation permits. They will also be required to report imminent threats, such as treatment equipment failure, to drinking water officers and must ensure immediate public notifications,
- iv. Testing laboratories will be required to report health threats when identified, and
- v. Anyone operating, maintaining or repairing a water system will be required to undergo training, meet qualifications set out in new regulations, or be supervised by someone who does.

2) Actions to avoid/reduce sources, risks and exposure.

- a. Development of water source protection strategy in local level including:
 - i. Water pollution surveillance in tourist areas and addressing of target priorities according to local pressures.
 - ii. Monitoring of quality in water sources.
 - iii. Implementation of proper waste water management practises (see Chapter 5).
 - iv. Proper waste management practices including recycling, avoiding unlimited and uncontrolled waste disposal and combustion on the landfill and compliance with current guidelines for waste disposal (e.g. European Directive 2006/12/EC, which prohibits the abandonment, dumping or uncontrolled disposal of waste, and must promote waste prevention, recycling and processing for re-use).
- b. Performance of proper water treatment and continuous monitoring of water quality to meet existing regulations, guidelines and standards (e.g. WHO Guidelines [2]).
- c. Use of proper distribution systems. Replacing of age parts and scheduled maintenance.
- d. Monitoring and meeting acceptable safety standards for the tap water. Being flexible for small water supply systems. On case – by-case basis, drinking water officers may also permit different monitoring and assessment requirements of small water systems than would be required for large systems. For example, there could be more flexibility in the time allowed for small water systems to comply to standards, as long as interim measures are adequate to protect against immediate health risks.
- e. Development of pollution control policies in tourist areas with intense agricultural activity, involving:
 - i. Farmers' training through training courses in local associations. Training courses should be associated with current legislation (e.g. Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources [9] It is designed both to safeguard drinking water supplies and to prevent wider ecological damage in the form of the eutrophication of freshwater and marine waters generally); and best agricultural practises for minimization of environmental impacts.
 - ii. Provision of economic incentives for application of biological agricultural practises.

4.2.2 Recommendations for tourist establishment operators

When drinking water is provided to tourist establishments not by the municipal water supply network, but from local sources in the establishments, mainly from wells, the operators of tourist establishments should perform the following [10]:

1. Annual disinfection of the well, especially when the well is inactive or seasonal.
2. Frequent water sampling, especially when changes in taste /odour/appearance of water occur.
3. Frequent inspection of the well cap and the joints for cracks and security.
4. Avoidance of having grading slope land close to the well.
5. Upgrading well system to today's standards.
6. Checking the area around the well for surface water sources of contamination.

Furthermore, the water supply distribution system in the buildings of tourist establishments should be assessed [11]. Because systems for large buildings are limited to the building environment and since dose-response is not easily described for bacteria arising from growth, adequate control measures are defined in terms of practices that have been shown to be effective. In undertaking an assessment of the building's distribution system, a range of specific issues must be taken into consideration.

These factors relate to ingress and proliferation of contaminants and include the following:

- The pressure of water within the system,
- The intermittent supplies,
- The temperature of the water,
- The cross-connections, especially in mixed systems,
- The backflow prevention, and
- The design of the system to minimize dead/blind ends i.e., a length of pipe, closed at one end, through which no water passes, and other areas of potential stagnation.

In Mediterranean countries, where standards of hygiene and sanitation and infrastructure for controlling the safety of drinking water are not usually implemented, there is a high risk of contracting travellers' diarrhoea. In these countries tourist establishment operators should provide information for individuals, through information leaflets, related to the precautions for minimizing the risk of water borne infection. These precautions include [12] the following:

- 1) Avoiding drinking un-bottled water,
- 2) Avoiding eating uncooked food (e.g. salads),
- 3) Avoiding the use of ice cubes), unless they are made from safe water,
- 4) Avoiding cleaning teeth in unsafe water, and

- 5) Carrying oral dehydration salts and water-disinfection agents.

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CHAPTER 5. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO WATER SANITATION

5.1 Water sanitation –Waste water pollution

5.1.1 Characteristics/pollutants and sources of pollution/hazards

Wastewater discharges constitute an essential component of water pollution effecting both drinking and bathing water. It has been a customary and common practise to discharge of sewage into nearby fresh and marine waters [1].

Infectious diseases associated with wastewater pollution deal with microbial pollution of faecal origin of marine coastal waters, including a) infectious diseases related to bathing/swimming in wastewater-polluted marine coastal waters and b) infectious diseases related to the consumption of seafood (mainly filter-feeding bivalves) harvested in wastewater-polluted marine coastal water [2].

5.1.2 Health impacts and hazards

Wastewater or natural water supplies into which wastewater has been discharged, are likely to contain pathogenic organisms similar to those in the original human excreta. There have been extensive reviews published on the range of these pathogenic organisms normally found in human excreta and wastewater. Pathogenic organisms and their health impacts are the following [3]:

- Bacteria. The faeces of a healthy person contains large numbers of bacteria (> 10¹⁰/g), most of which are not pathogenic. Pathogenic or potentially pathogenic bacteria are normally absent from a healthy intestine unless infection occurs. When infection occurs, large numbers of pathogenic bacteria will be passed in the faeces thus allowing the spread of infection to others. Diarrhoea is the most prevalent type of infection, with cholera the worst form. Typhoid, paratyphoid and other Salmonella type diseases are also caused by bacterial pathogens.
- Viruses. Numerous viruses may infect humans and are passed in the faeces (> 10⁹/g). Five groups of pathogenic excreted viruses are particularly important: adenoviruses, enteroviruses (including polioviruses), hepatitis A virus, reoviruses and diarrhoea-causing viruses (especially rotavirus).
- Protozoa. Many species of protozoa can infect humans and cause diarrhoea and dysentery. Infective forms of these protozoa are often passed as cysts in the faeces and humans are infected when they ingest them. Only three species are considered to be pathogenic: Giardia lamblia, Balantidium coli and Entamoeba histolytica. An asymptomatic carrier state is common in all three and may be responsible for continued transmission.
- Helminths. There are many species of parasitic worms or helminths that have human hosts. Some can cause serious illnesses and the ones that pass eggs or larval forms in the excreta are of importance in considering wastewater use. Most helminths do not multiply within the human host, a factor of great importance in understanding their transmission, the ways they cause disease and the effects that environmental change will have on their control. Often the developmental stages (life cycles) through which they pass before reinfesting humans are very complex. Those that have soil, water or plant life as one of their intermediate hosts are extremely important in any scheme where wastewater is used directly or indirectly. The helminths are classified in two main groups: the roundworms (nematodes) and worms that are flat in cross section. The

flatworm, in turn, may be divided into two groups: the tapeworms which form chains of helminths "segments" and the flukes which have a single, flat, unsegmented body. Most of the roundworms that infect humans and also the schistosome flukes have separate sexes. The result is that transmission depends upon infection with both male and female worms and upon meeting, mating and egg production within the human body.

5.1.3 *Guidelines and standards*

The southern Mediterranean countries need help with such things as waste management and water treatment etc. [4]. The Protocol on Water and Health 2005 [5] covers both drinking water and wastewater treatment in a holistic approach. In order to protect both human health and water resources, the parties to the Protocol include in their monitoring system the methodology for assessing the quality of service of sanitation networks and the performance of wastewater treatment plants developed by the Mediterranean Action Plan [5].

Additionally consult section 6.1.3, guidelines and standards for bathing and recreational waters.

European Community has adopted the Council Directive of 21 May 1991 (91/271/EEC) concerning urban waste water treatment. This Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors [6].

5.2 Measures and actions to minimize environmental health risks in tourist establishments

5.2.1 *Measures and actions by governmental bodies*

Mismanagement of waste water especially in tourist areas leads to environmental degradation and among others to the reduction of financial sources. Measures and actions by governmental bodies in local level, regarding water sanitation are extended to the following areas:

1) Information, reporting, education and training actions.

Training conferences and meetings targeted on tourist establishment operators and staff, by local authorities in co-operation with water management specialists and private sector. Objectives of training courses should be related to the implementation of best management practices in compliance with current regulations and constraints; and development of effective waste water reduction strategies in tourist establishments.

2) Actions to avoid/reduce sources, risks and exposure.

- a. Development of local strategies regarding waste water management tailored to regional priorities and needs in tourist areas – reduction of produced waste water, treatment methods and reuse complying with application constraints [7].
- b. In the framework of local strategies, improvement of communication and coordination of all stakeholders in sustainable water and wastewater including local government and private sector [7], through the use of available technology and organizing regularly meetings.
- c. Extension of municipal waste water treatment plants, where needs, to respond to seasonal increase of population, avoiding overloading impacts.

- d. Local authorities' regularly inspections to ensure the compliance of establishment operation with the current regulations.
- 3) Planning, operation, monitoring and assessment actions
- a. Building and sharing an evidence base in local level, on water sanitation approaches by conducting monitoring, impact evaluation and research on their sustainability, implementation and cost effectiveness [7].
 - b. Improving accountability and leadership for water supply, sanitation, and hygiene, by defining a lead agency and mechanisms for coordination at the local level for sanitation [7].
 - c. Building infrastructure by empowering local authorities and communities through supporting of private sector [8].

5.2.2 *Recommendations for tourist establishment operators*

Recommendations for tourist establishment operators include:

1. Effective waste water management plan, based on existing regulation/guidelines, including:
 - a. Avoiding waste water discharge into coastal waters, considered as the basic principal of waste water management policy.
 - b. Connection with the local sewage treatment plants.
 - c. Installation of infrastructure and facilities for waste water treatment on site. In cases where establishments are not connected to municipal waste water treatment plant small scale treatment plants (e.g. compact systems for waste water treatment) are recommended.
 - d. Reuse of treated water within the establishments' premises for irrigation purposes.
 - e. Reduction of water consumption and quantities of produced wastewater using water aerators, new toilet flushers, water monitoring programs (frequent maintenance and checks, installation of consumption meters), installation of timers and "change per request" program for sheets and towels [9] and low flow restrictors to faucets and showerheads.
2. Training and education of establishments' staff for the implementation of waste water management policies through technical conferences and consultation by public and private sector experts.
3. Installation of monitoring equipment where required, e.g. in case of waste water treatment on site, for operational and economic effectiveness control.
4. Tourist information in the form of leaflets, about implemented waste water management policy and recommendations for water saving in the establishments (e.g. low flow in showers and faucets, request for changing sheets and towers etc.).

5.2.3 References

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CHAPTER 6. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO BATHING AND RECREATIONAL WATERS

6.1 Bathing and recreational water

6.1.1 Characteristics/pollutants and sources of pollution/hazards

WHO states that “good health and well-being require a clean and harmonious environment in which physical, psychological, social and aesthetic factors are all given their due importance” [1]. In bathing and recreational waters the beach is a significant component of the “environment”; thus, cleanliness of a beach is one of the most important characteristics of a waterside resort sought by visitors [2]. The general public usually infer that a highly littered beach also has poor water quality [3].

Most of the countries in the Mediterranean have experienced damage to the aesthetic quality of coastal, bathing waters from eutrophication, including discolouration of water and malodour. Economic loss was identified in terms of tourist days lost, reduced use of hotels, restaurants and other amenities, damage to tourist-dependent activities such as food industry, damage to fishing activities and to the image of the area as a tourist resort [4].

The most important means of pollution and hazards for beaches and bathing-recreational waters are the following:

- 1) Litter.
- 2) Marine debris.
- 3) Poor quality of sand.
- 4) Water sports.
- 5) Exposure to heat and cold.
- 6) Microbiological pollution. Pathogenic microorganisms, including bacteria, viruses and protozoa, which are discharged into the aquatic environment through sewage discharges and faecal contamination from infected persons or animals. A significant portion of human body wastes and wastewater flows, laden with pathogenic microorganisms, find their way into coastal seawaters. Even the faecal body wastes from communities without any water carried sewerage systems are frequently swept into streams and rivers during heavy rains, by surface run-off, which eventually carries these wastes into the seas [5].
- 7) Toxic algal products.
- 8) Contaminated seafood.
- 9) Chemical pollutants, including trace metals, radio nuclides, pesticides, agricultural waste, oils, detergents and illicit dumping of toxic waste.

6.1.2 Health impacts and hazards

The main health impacts and hazards related to bathing and recreational waters, are the following:

- 1) Impacts of litter. There is a potential risk of contamination by vectors of infectious diseases such as Hepatitis B and HIV associated with discarded syringes and other medical waste [6]. Discarded food, dead animals, oil and containers have been associated with microbiological hazards and visible litter has also been found to correlate with high counts of Escherichia Coli, commonly associated with human faecal material [7].
- 2) Impacts of marine debris. Injuries, which may be caused on the beach by marine debris, include cuts caused by broken glass and discarded ring tabs from cans; skin

punctures from abandoned syringes; exposure to chemicals from leaking containers washed ashore [8, 9].

- 3) Impacts of sand poor quality. The quality of beach sand is recognized as a factor in the transmission of a number of skin and other contact infections [4].
- 4) Accidents, resulting from water sports and other activities, such as scuba and deep sea diving, sailing and boating and other water sports. The accidents include injuries, pressure effects, decompression sickness (DCS) and infections of the outer ear. Particular risks of drowning in recreational waters are caused by tides and currents, falls from boats, being caught in submerged obstacles or falling asleep on inflatable mattresses which can be swept out to sea. Diving from trees, balconies or structures, and poor underwater visibility are contributory factors.
- 5) Impacts of exposure to excessive cold and heat. Cold water removes heat from the body 25 times faster than cold air. The immediate effects of immersion in cold water (<15°C) during cold winter months can include life-threatening respiratory and cardiovascular effects, which may lead to drowning. If the sudden immersion does not cause death, the initial effects will lessen and progressive whole body cooling occurs, leading to hypothermia. A person who has consumed alcohol will succumb more rapidly to hypothermia [10].
- 6) Impacts of microbiological pollution from sewage and other sources. The main diseases associated with waterborne infections include gastroenteritis, hepatitis, skin lesions, wound infections, conjunctivitis, otitis, respiratory infections and generalized infections [11]. Typhoid fever and cholera, the most important of the waterborne infections transmitted by ingestion of polluted water, are also possible. Also important are water-washed infections, associated with the recreational use of natural water and generally due to poor hygiene. These are acquired by contact with contaminated water or bathing in close proximity to an infected person and include those affecting the eye, mucous, ear or skin, such as trachoma, conjunctivitis, scabies and otitis. In developed countries they are associated with recreational exposure to contaminated marine waters, freshwater lakes, ponds, creeks and rivers and also with inadequately treated water in swimming pools, hot tubs, and whirlpools [11]. The most important of the water-related infections transmitted by vector are caused by the inhalation of water aerosols, for example Legionella pneumophila and non-tuberculous mycobacteria [12] or by consumption of raw or undercooked contaminated shellfish.
- 7) Impacts of algae and cyanobacteria. Health hazards include marine cyanobacterial dermatitis (swimmers' itch or 'seaweed dermatitis') which may occur after swimming in seas containing the blooms of certain species of marine cyanobacteria. Several marine dinoflagellates and flagellates have been associated with the death of fish and/or death of invertebrates; fish kills are often used as an index of potential human health risks needing further investigation. Fragments of marine dinoflagellate cells and/or toxins may be harmful to humans if inhaled from sea spray [13].

Several non-toxic plankton organisms often occur in blooms when significant inputs of nutrients and intensive sunlight are experienced. The resulting 'red tides' have no direct human health impacts, but cause aesthetic problems such as discoloured water, reduced transparency, scum formation and bad odours.

- 8) Impacts of seafood contamination. Enteric organisms from faecally contaminated water collect in the tissue of bivalve molluscan shellfish and numerous outbreaks have been attributed to their consumption, such as hepatitis A and E viruses. Naturally occurring toxins produced by unicellular algae accumulate in shellfish which when consumed may cause toxic episodes, such as amnesic shellfish poison (ASP), diarrhoeic shellfish

poison (DSP), neurotoxic shellfish poison (NSP), and paralytic shellfish poisoning (PSP) [14]. The problem of algal bio-toxins in shellfish is a relatively recent one in the Mediterranean. Warmer seas are associated with the risks of toxic and non-toxic algae growth and blooms and more information is required on the resultant health effects, particularly in areas known to be subject to regular or sporadic 'algal bloom' (eutrophication) phenomena [4]. In a number of Mediterranean countries, whole consignments of mussels regularly have to be destroyed because of contamination with algal biotoxins, yet it is difficult, if not impossible, to include routine analysis of shellfish that ensures safety from microorganisms, such as vibrios, viruses and microtoxins.

- 9) Impacts of chemical pollution. In recreational waters there is usually significant dilution of contaminants so the risk is smaller than for microbiological contaminants. More information is needed on long term health effects such as cancers and damage to immune system in marine animals. Levels of contamination in seafood are of concern. Many shellfish can concentrate levels several thousand-fold in their flesh; examples are accumulation of mercury in tuna fish and shellfish, cadmium in mussels, arsenic, organotin compounds from paints used on yacht hulls, organohalogen compounds (particularly PCB's). Some pesticides and polycyclic aromatic hydrocarbons (PAHs) can cause sufficiently high levels to interfere with commercial harvesting and sales.

6.1.3 Guidelines and standards

The following references are related to guidelines and standards for bathing and recreational waters:

- 1) The WHO Guidelines for Safe Recreational Water Quality.
WHO Guidelines for Safe Recreational Water Environments, Volume 1: Coastal and Fresh Waters, http://www.who.int/water_sanitation_health/bathing/srwe1/en/.
WHO Guidelines for Safe Recreational Water Environments, Guidelines for safe recreational waters, Volume 2 - Swimming pools and similar recreational-water environments, http://www.who.int/water_sanitation_health/bathing/bathing2/en/.

The WHO guidelines give recommendations for sampling regimes, methods, organisms, chemicals, heavy metals and physical substances. Public Health Managers need to ensure the adequacy of local arrangements to ensure WHO exposure guidelines are not exceeded. Those responsible for public health recognise that preventing the pollution of recreational waters, and in particular contamination with sewage, will reduce the incidence of water-related infections and diseases caused by ingesting contaminated water. Recreational water quality standards are targeted specifically to waterborne diseases [15, 16].

- 2) MED/POL Phase II. Health Risks from Marine Pollution in the Mediterranean. Part I: Implications for Policy Makers. WHO Regional Office for Europe, 1995.
- 3) Bartram, J. and Rees, G. (eds.) (2000). Monitoring Bathing Waters: a Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes. E & FN Spon: London. 337 pp. Chapter 12 offers 'Elements of Good Practice' concerning the monitoring of litter since this may be highly site specific and there are few standards regarding beach cleanliness.
- 4) The WHO, Regional Office for Europe, Coordinating Unit for the Mediterranean Pollution Action Plan, (MAP) has summarised and described the history and development of coastal recreational water quality standards in the Mediterranean. This work had a principal role in and provided much of the evidence base for the evolution of

the WHO guidelines, the WHO/UNEP interim criteria for bathing waters, and the EU Directives for bathing water quality [17].

Additionally, among UNEP's initiatives on marine litter, there are UNEP/IOC Guidelines for monitoring of marine litter; Abandoned and lost fishing gear; and Marine litter and market-based instruments. This report provides an overview of the status of marine litter in UNEP's assisted Regional Seas, and highlights the amounts, main sources, impacts, and economics of marine litter, and discusses legislation, policies, compliance and enforcement mechanisms; institutional frameworks and stakeholder involvement; education and outreach strategies; monitoring programmes and research; mitigation activities among other aspects [18].

6.2 Measures and actions to minimize environmental health risks in tourist establishments

6.2.1 Measures and actions by governmental bodies

The following measures and actions can be recommended, by governmental bodies, for the strengthening of the protection of bathing and recreational waters [19].

- 1) Information, reporting, education and training actions.
 - a. Development and maintenance of an Internet database providing information, in local scale, on recreational water quality to the public, with local details on advisories and closings.
 - b. Arrangement of a series of technical conferences intended for local recreational water quality managers, defined issues and activities related to beach health.
 - c. Development and support of training as needed. Efforts may involve training on new methods, technology transfer and guidance implementation. Training can be provided by specialists to regional offices and local agencies.
 - d. Education and training, by local authorities in co-operation with private sector (e.g. water agencies, commercial companies etc.), for staff members in tourist establishments. Training programmes may include series of conferences and meetings and provision of education material (e.g. notes, cd's, website addresses etc.) related to current guidelines for safe bathing and recreational waters, methods and technology for the implementation of the guidelines, management strategies and techniques and practical recommendations for its application in tourist environments.
 - e. Promotion of health recreational environment campaigns using the media.
 - f. Development of campaigns using the media and/or permanent services for the cleaning and collecting of solid wastes that pollute coastal and marine areas; Demonstrations through awareness raising campaigns in selected destinations and with selected stakeholders [20], according to regional pollution sources.

2) Actions to avoid/reduce sources, risks and exposure.

- a. Prevention of pollution at source, via programmes organised by local authorities. The main objectives of these programmes will be keeping beach and recreational water areas clean, promotion of public education and imposing sanctions. Recommended actions involve:
 - i. Litter Surveys. These assess types, amounts, distribution and source of litter in order to assess the effectiveness of remedial measures at source.
 - ii. Implementation of recycling policies – for packaging wastes in co-operation with private sector (e.g. recycling companies).
 - iii. Beach quality monitoring programmes will produce inconsistent results unless monitoring parameters, sampling stations and sites and sampling frequencies are standardised. WHO has provided specific guidance [21].
 - iv. Mechanical Beach Cleaning. This is costly and may interfere with beach ecology. It usually involves a sieving process, which is not suitable for pebble beaches. On the positive side it is quick and can cover large areas. Many popular tourist beaches in the Mediterranean are cleaned daily with the cost met directly or indirectly by beach users. Beach cleaning is common practice for district councils reliant upon their tourist industry. Recent surveys suggest that 43% of UK local authorities clean beaches manually and 57% clean using both manual and mechanical techniques; no authority uses purely mechanical methods [22].
 - v. Manual Beach Cleaning. These programmes are inevitably smaller scale but can help to raise community awareness and enable the sourcing of the litter.
 - vi. Regularly inspections by local authorities for the performance and implementation of proper water and waste water treatment, according to the existing legislation, guidelines and standards in tourist areas.
- b. Identification of appropriate approaches for managing risk in non-primary contact recreational waters, e.g. boating waters.

3) Planning, operation, monitoring and assessment actions.

- a. Planning of bathing and recreational environment management strategy taking into account the growing and seasonal fluctuating population in tourist areas, by local authorities involving:
 - i. Formation of separate groups, in local level, responsible for (a) water quality, (b) beach quality and (c) safety in recreational activity establishments.
 - ii. Addressing required activity of each group by local authorities including (a) surveillances, (b) identification of health risk priorities regionally, and (c) monitoring/ recording programmes related to water quality, beach quality and provision of safe services in establishments.
 - iii. Water quality monitoring and recording in bathing and recreational waters complying with WHO guidelines and in accordance to regional specific characteristics (such as shellfish growing areas etc.).

Performance of monitoring programmes, such as in shellfish growing areas, based on algae counts, mouse-test and an assessment of toxin levels in mussels and oysters [13]. Surveillance of the phytoplankton can give advanced warning of algal blooms and impending toxicity allowing for preventative action, such as early harvesting of shell fish or closure of areas

before toxins accumulate in seafood. Monitoring is essential for marine fish farms to protect against fish-killing flagellates and dinoflagellates. It is noted, that several Mediterranean countries have monitoring programmes.

- iv. Co-ordination of stakeholders' activity, associated with both pollution sources and remedy measures on the above mentioned groups' responsibility.
- v. Ensuring the implementation of current guidelines and standards (e.g. WHO Guidelines) through regularly inspections.
- vi. Construction and update of an internet data base, in local level, using the collected data and information from actions ii, iii, iv, v and assessing the effectiveness of current strategy

4) Performance of research, studies and investigations.

- a. Conducting of research activities in local level, in the framework of recreational environment management strategies (Point 3) to improve the science supporting recreational water monitoring programs, involving:
 - i. Conducting a local survey for beach health, collection of detailed data on local beach monitoring efforts, applicable standards, water quality communication methods, contamination problems and any protection activities. Results will be made available to local water quality managers and the public via the Internet and through local information outlets.
 - ii. Use of predictive computer models for the assessment of water quality could be recommended to local authorities. These models will be used for tracking pathogens or their indicators in recreational waters.
 - iii. Health surveillance of the general population and tourists is also recommended to local authorities, to strengthen reporting of algae illnesses.

The Blue Flag scheme is organised by the Federation of Environmental Education (FEE), formerly the Federation of Environmental Education in Europe. It was developed originally to promote quality in EU bathing waters but has now, with the cooperation of UNEP and WTO, been extended to other countries worldwide. Beach criteria must be similar within a region, but will vary between regions, according to specific regional environmental conditions [23]. The award is based on compliance with 29 criteria covering three areas:

- a. environmental education and information;
- b. water quality;
- c. environmental management;
- d. safety and services.

It is awarded for one season only. Mediterranean countries currently participating in the Blue Flag Award scheme include Croatia, Cyprus, France, Greece, Italy, Montenegro, Morocco, Slovenia, Spain and Turkey.

6.2.2 Recommendations for tourist establishment operators

Recommended actions for tourist establishment operators include the following:

1. Avoiding waste water discharge into the coastal waters, considered as the main principal of waste water management practice (for more details see Chapter 5).
2. Preserving beach environment clean through:
 - 2.1 Performance of scheduled beach cleaning.
 - 2.2 Application of waste recycling in co-operation with local authorities or private sector (e.g. recycling companies) and placing common and recycling bins in recreational places.
3. Supplying with the required equipment of provision of shadow in recreational environments (e.g. tents, pergolas etc.).
4. The limitation of the hazards of beach and water sports equipment requires [24]:
 - 4.1. Safety training for operators. For many activities and sites, the operators are licensed and can deny access to potential but unsuitable users such as intoxicated persons. It is worth remembering that the more complex the construction or use, the greater the risk.
 - 4.2. Safe beach equipment. Beach equipment hired out to holiday-makers and with different inherent hazards may include deck chairs, sun loungers, windbreaks, mats, surfboards, canoes, windsurfers, dinghies, row, motor and sail boats, water skis, jet skis, inflatable lilos, pedal boats and diving equipment.
 - 4.3. Prevention of drowning. It has been estimated that 80% of drowning are preventable, but surprisingly being able to swim and water safety instruction have not been shown to be effective preventive measures [21].

State agencies in co-operation with tour operators should effectively take measures (following WHO guidelines and recommendations) for the prevention of accidents in bathing and recreational waters including [21]:

- i. Public education concerning hazards and safe behaviour.
 - ii. Regulations to discourage unsafe behaviour.
 - iii. Restriction of alcohol provision.
 - iv. Provision of properly trained life guards.
 - v. Provision of rescue services.
 - vi. Availability of resuscitation skills/facilities.
 - vii. Co-ordination with user groups concerning hazard awareness and safe behaviour.
 - viii. Regulations for safety on boating.
5. Tourists' education. Tourist establishment operators should provide the required information / recommendations to tourists for the prevention/ reduction of accidents, infections, exposure to physical hazards and poisoning and toxicoses in bathing and recreational waters. Information material, such as leaflets, may be provided to guests at establishment receptions or rooms. Required recommendations include the following [25]:

- 5.1 Adopting safe behaviour in all recreational waters.
- 5.2 Avoiding consumption of alcohol before any activities in or near recreational waters.
- 5.3 Provision of constant supervision of children in the vicinity of recreational waters.
- 5.4 Avoiding temperature extremes in spas, saunas, etc.; this is particularly important for users with pre-existing medical conditions, pregnant women and young children.
- 5.5 Avoiding excessive exposure to sunlight.
- 5.6 Avoiding beaches obviously polluted by sewage.
- 5.7 Seeking of information locally about the quality of recreational waters in the area.
- 5.8 Avoiding contact with contaminated water.
- 5.9 Avoiding swallowing any contaminated water.
- 5.10 Obtaining advice locally about the presence of potentially dangerous aquatic animals.
- 5.11 Wearing shoes when walking on shores, riverbanks and muddy terrain.
- 5.12 Specific recommendations for prevention of physical hazards from water sports include:
 - i. Wearing adequate swimsuit in water skiing. There are few risks to water skiing per se, if a life preserver is worn in case of being stunned while falling in to the water. Women are advised to wear an adequate swimsuit for protection against a high-speed douche. A wetsuit protects against high speed falls in the water.
 - ii. Taking precautions in sailing and wind surfing. These sports are not dangerous if sensible precautions are taken:
 - a. novices should sail upwind rather than downwind and along the coast rather than out to sea, to avoid the dangers of wind strength increasing;
 - b. wear appropriate protective clothing to retain body heat without overheating;
 - c. a life preserver or buoyancy device is always advisable.
- 5.13 Recommendations for the prevention of other physical hazards such as exposure to excessive cold or sun and heat include [21]:
 - i. Wearing a lifejacket or personal flotation device which keeps the airways free of water.
 - ii. Wearing a wet suit or survival jacket if swimming in cold water, and taking precautions against immersion, such as a safety line.
 - iii. Wearing of suitable lightweight clothing and wide brimmed hats, seeking shade, swimming in cool water and drinking plenty of fluids.

6.2.3 *References*

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- [3] Williams, A.T., Pond, K., Philipp, R. Aesthetic Aspects. Ch. 12 in J Bartram and G Rees (Eds.) Monitoring Bathing Waters. A practical guide to the design and implementation of assessments and monitoring programmes. WHO 2000.
- [4] MED/POL Phase II. Health Risks from Marine Pollution in the Mediterranean. Part I: Implications for Policy Makers. WHO Regional Office for Europe, 1995.
- [5] <http://www.iwaponline.com/jwh/001/0053/0010053.pdf>.
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- [9] Fanshawe, T., & Everard, M. (2002). The impacts of marine litter. (Report No. MaLITT).
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- [13] Baden, D.G., Mende, T.J., Poli, M.A., Block, R.E. (1984). Toxins from Florida's red tide dinoflagellates, *Ptychodiscus brevis*. In Regelis EP (Ed), Seafood Toxins. Washington DC, American Chemical Society, pp. 359-367.
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- [15] WHO Guidelines for Safe Recreational Water Environments, Volume 1: Coastal and Fresh Waters, http://www.who.int/water_sanitation_health/bathing/srwe1/en/.
- [16] WHO Guidelines for Safe Recreational Water Environments, Guidelines for safe recreational waters, Volume 2 - Swimming pools and similar recreational-water environments, http://www.who.int/water_sanitation_health/bathing/bathing2/en/.
- [17] Kamizoulis, G., and Saliba, L. (2004). Development of coastal recreational water quality standards in the Mediterranean. Environmental International, 30: 841-854.

For further reading you can consult the following references for the formulation of the measures and actions for bathing and recreational waters in tourist establishments:

- [18] http://www.unep.org/publications/search/pub_details_s.asp?ID=4021.
- [19] <http://www.epa.gov/ord/html/documents/600r98079.pdf>. EPA's plan of activities for bathing and recreational water quality.
- [20] <http://www.blacksea-commission.org/Publications/SavingTheBS/08/EN/3.htm>.
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CHAPTER 7. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO SUN EXPOSURE

7.1 Sun exposure

7.1.1 Characteristics/pollutants and sources of pollution/hazards

Human exposure to ultraviolet radiation (UVR) is increasing as carbon dioxide interferes with the recovery of the upper atmospheric ozone layer [1].

Also, skin cancer rates are increasing in many parts of the world including Europe. A part of the reason for the rise can be explained by the more recent affordability and accessibility of airline travel, particularly to warm and sunny destinations.

7.1.2 Health impacts and hazards

In July 2006 it was estimated that 60,000 deaths per annum are caused by too much exposure to UVR. Of these around 48,000 are attributed to malignant melanoma and the remainder to skin carcinomas. Malignant Melanoma has a high cure rate, only if it is detected early [2].

Small amounts of UVR are beneficial for well-being and required for the production of vitamin D, essential to bone health. Possible beneficial effects on some cancers and immune disorders are currently under investigation [2]. However, prolonged exposure to solar UV may result in acute and chronic ill health effects, the most serious of which are skin cancer and malignant melanoma [2].

Terrestrial solar UVR includes both UVB and UVA, both of which can be damaging to the skin and eyes. Intensity depends on latitude and the time of year and day. It is measured by the Global Solar UV Index, which was developed by the WHO, with UNEP and the World Meteorological Organization. The higher the value of the index, the greater the potential for damage and the shorter time for it to occur, with values greater than 10 are considered extreme. In general, the Index is highest at points closest to the equator, and UVB radiation is particularly intense in the summer and in the middle of the day [3].

The most obvious harmful acute effect of UV radiation is erythema or sunburn, which is an inflammatory response. UVB is 3 times more harmful than UVA in this respect.

Exposure of the eyes may result in keratitis (snow blindness), which in the long term may lead to the development of cataracts, pterygium (a fleshy growth on the surface of the eye) or, rarely, squamous cell carcinoma of the eye.

Long term effects are skin cancer and accelerated aging of the skin (photoaging) which is mainly due to UVA. Even a short period of intense exposure, as in sunbathing, is associated with a 2-fold increase in melanoma risk [2]. Sensitivity to all these conditions depends on skin type with fair skins being the most sensitive.

A wide range of medicinal drugs may cause photosensitization, which can interact with sunlight causing adverse reactions such as phototoxic or photo-allergic dermatitis.

Phototoxic contact reactions may also be caused by topical application of some cosmetic products, including perfumes and oils.

Exposure to UV radiation may suppress the immune system, increasing the risk of infections. Efficacy of vaccinations could also be limited.

7.1.3 Guidelines and standards

This INTERSUN report [4] provides information to people on how to protect themselves from the potentially harmful effects of exposure to UV radiation. Following a detailed review of the scientific literature conducted by a WHO Task Group meeting convened under joint sponsorship with the United Nations Environment Programme and the International Commission on Non-Ionizing Radiation Protection, a number of adverse health effects resulting from exposure to UV have been identified that need to be addressed through further research and more particularly through educational programmes for people most exposed to UV.

The purpose of the report is to provide information to the general public and workers on the various health hazards known to be associated with excessive exposure to UV and measures that can be taken to reduce this exposure to acceptable levels.

7.2 Measures and actions to minimize environmental health risks in tourist establishments

7.2.1 Measures and actions by national and governmental bodies

Some countries have early warning systems for episodes of high temperature or air pollution and high UV exposure days, which advise people to reduce outdoor activity. These markedly reduce hospitalization and premature death. It is needed to consider the worth of gathering evidence of such patterns and associations in the different Mediterranean countries.

The Djerba Declaration on Tourism and Climate Change [5], which encourages the tourism industry to adjust its activities to become more energy-efficient with cleaner technologies, further, highlights the interdependence of tourism and environmental issues.

Measures and actions to minimize of health risks from exposure to the sun involve mainly local action including:

- 1) Tourists' education. Tourists can take precautions to avoid the negative effects of exposure to sunlight, and information is widely available in pharmacies, travel clinics, websites etc. Information leaflets for tourists and for tourist establishment operators provided by WHO (INTER-SUN programme) can be found in references [6].

Tourist education should be provided by establishment operators (mainly in hotel, resorts and recreational establishments) through reading and digital matter (e.g. leaflets, DVDs, etc.). Information material should involve health impacts of sun exposure and precautions for protection including sensitive tourist groups like infants, children pregnant women, elderly people and people with pre-existing health problems.

- 2) Health education programmes. With the launch of its 2006 report, WHO [7] joined with UNWTO to distribute information, including a new UV flyer, to all national ministries responsible for tourism.

Governments are advised to use the UV Index as an educational tool in public health promotion programmes.

- 3) Establishment of specific regulations in local level for tourist resorts to provide required shade in the form of trees, or beach umbrellas, roofed verandas etc. to protect tourists.

- 4) Health campaigns by public health agencies to promote education and awareness programmes e.g. the health campaign “Slip, Slap, Slop”(more details can be found in references [8]), or using INTERSUN materials.

Additionally, health campaigns can be supported by private sector e.g. medical care centres and pharmacy companies.

- 5) Local authority strategies for the reduction to global warming. Tourist areas’ planning to reduce reliance on private automobiles can tackle traffic and gas emission problems and contribute to the reduction of local outdoor pollution levels (for more detail see Chapter 2).
- 6) Provision of incentives to the introduction of environmentally benign energy technologies in large scale tourist establishments (e.g. photovoltaic solar panels and solar water heating systems; and wind turbines according to the regional characteristics and economic criteria) for the reduction of air pollutants and greenhouse gasses emissions.

7.2.2 Recommendations for tourist establishment operators

The World Health Organization encourages the tourist industry and the media to report forecasts of the maximum level of UVI, and the INTERSUN programme has developed UV Index graphics for this purpose, using an international colour code. People are accustomed to watching and acting on routine weather forecasts and if UVI levels for the next day are included in these, they can take appropriate action to protect themselves.

Recommendations for tourist establishment operators for the prevention of tourist health hazard exposure involve:

1. Development of sun protection policies and strategies involving (5) availability of adequate shaded places and eliminating of sun reflective areas in tourist establishments; (2) training establishments’ staff to play a modelling role for sun protection; and (3) Providing effective informational programs on sun safety and preventive measures to tourists including leaflet issuance and visual presentations/projections on screens in specific activity areas in the establishment (for large scale establishments). Recommendations should include the following [9]:
 - 1.1 Avoiding exposure to the sun in the middle of the day, when the UV intensity is greatest.
 - 1.2 Wearing clothing that covers arms and legs (summer clothing is UV-protective and generally more effective than even good-quality sunscreen).
 - 1.3 Wearing wrap-around UV-protective sunglasses and a wide-brimmed sun hat.
 - 1.4 Applying a broad-spectrum sunscreen with protection factor (SPF) 15+ liberally on areas of the body not protected by clothing, and reapply frequently.
 - 1.5 Taking particular care to ensure that children are well protected.
 - 1.6 Taking precautions against excessive exposure in or on water – UV radiation can penetrate clear water to a depth of 1 metre or more.
 - 1.7 Checking that any medication being taken will not affect sensitivity to UV radiation.

- 1.8 Avoiding any exposure to the sun and using any products that have previously caused the adverse reaction, if adverse skin reactions have occurred previously.
- 1.9 Avoidance of sunlamps and tanning particularly for under 18s; and knowing the UV Index [6].
2. Providing adequate shaded places in the form of trees/ pergolas, beach umbrellas, roofed verandas etc.

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CHAPTER 8. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO HEAT EXPOSURE

8.1 Heat exposure

8.1.1 Characteristics/pollutants and sources of pollution/hazards

A recent climate change report for the European Commission anticipates that by the year 2070 in Southern Europe there will be additional 87,000 deaths /year caused by a difference of temperature of 3°C hotter than at present and that the sea level could rise by 1.0 m [1].

Other effects of changing climatic conditions damaging to health are heat waves and air pollution which can cause considerable ill health and loss of life [2].

8.1.2 Health impacts and hazards

Exposure to heat and humidity results in loss of water and electrolytes and may lead to heat exhaustion and heat stroke. Consuming additional fluids and salt can help to prevent this. The old and the very young are particularly susceptible to dehydration [3].

Heat and humidity can cause skin irritation (prickly heat) and aggravate existing fungal skin infections such as tinea pedis (athlete's foot). Hot, dry and dusty air may irritate the eyes and respiratory tract, which may result in infection [3].

8.2 Measures and actions to minimize environmental health risks in tourist establishments

8.2.1 Measures and actions by governmental bodies

It is argued that a heat wave is a serious risk to health and local and national governments should think of having management strategies similar to those in respect of an epidemic of a communicable disease, including prediction, detection and prevention as well as rapid response from health and social systems. The World Health Organization has recommendations for short term and long term strategies for reducing the health impacts of heat waves [4].

The recommended measures and actions describe what needs to be done by health and social care services and other bodies to raise awareness of the risks relating to severe hot weather and what preparations organisations should make to reduce those risks. The action plan covers the following areas [5]:

- 1) Information, reporting, education and training actions.
 - a. Development of heat-health watching system, by local authorities in co-ordination with health agencies, which will monitor, record and report heat health incidents, and consultation rates to the department of health, in order to assess how people's health is affected by the weather and to give some insights into how well health services are responding.
 - b. Advice and information issuance by the department of health directly to the public using the media, before a heatwave is forecast and when one is imminent.
 - c. Local authorities will raise awareness among care home managers and staff about the very significant heat-related health risks, and will encourage additional staff training by training courses in line with the department of health.

2) Actions to avoid/reduce sources, risks and exposure.

- a. Long-term multi-agency planning by local authorities for minimizing the impact of climate change in tourist areas. This planning may involve actions including 'greening the built environment', increasing shading around and insulation of buildings, increasing energy efficiency and reducing carbon emissions.
- b. Local authorities in co-operation with hospitals and care, residential and nursing homes to provide cool areas and care services to reduce the risk of heat-related illness in tourist populations.

3) Planning, operation, monitoring and assessment actions.

Local authorities will encourage the tourist establishment operators taking account of the dangers of heat by ensuring the provision of appropriate equipment for shaded and cool places, cold water, well trained staff and ready access to medical care services.

4) Legislative actions, guidelines and standards.

Establishment of regulations in local level for the protection of tourists from exposure to heat waves involving:

- i. Establishment of basic monitoring and reporting requirements of heat and humidity conditions in tourist establishments (e.g. temperature monitoring devices in bedrooms etc.).
- ii. Standards for equipment related to improving indoor environment in tourist establishments (equipment for shading, temperature control etc.).
- iii. Regulations for the development and implementation of heat wave policies and strategies in tourist establishments.
- iv. Regulations for tourist establishment ready action in case of emergency as a part of heat wave implemented policies.

8.2.2 Recommendations for tourist establishment operators

Recommendations for tourist establishment operators related to:

1. Achieving sustainable summer comfort in establishments, the main steps include [6]:
 - 1.1. Definition of the thermal comfort objectives.
 - 1.2. Control of heat gains at the building envelope.
 - 1.3. Control of heat transfer through the building envelope and thermal mass control.
 - 1.4. Reduction in internal heat loads by e.g. sun shading devices, glazing, ensuring that the building is effectively air tight, reflective painting of roofs and walls, radiant barriers on roofs and walls, ventilated roofs, double skin facades and insulation.
 - 1.5. Using of passive means to remove energy from the building (e.g. natural ventilation, evaporative cooling, high thermal mass and night ventilation etc.).

- 1.6. Using low-energy equipment indoors (to reduce the amount of heat produced indoors).
- 1.7. Using of high efficiency conventional active cooling plants.
- 1.8. Performing operation, maintenance and monitoring of building equipment.
2. Development of effective heat protection policies and strategies including all the above (point a-i) and additionally:
 - 2.1 Provision of first aid medical care services for heat- health incidents.
 - 2.2 Provision of recommendations to tourists, through information leaflets, involving the following [7]:
 - i. Staying in shade and avoiding outdoor activities in the hottest part of the day.
 - ii. Keeping coolly by wearing a loose, cotton, damp cloth or scarf on the back of the neck, or spraying or splashing the face and the back of the neck with cold water several times.
 - iii. Taking cool showers or baths.
 - iv. Drinking regularly water or fruit juice.
 - v. Avoiding alcohol, tea and coffee.
 - vi. Eating more cold food, particularly salads and fruit, which contain water.
 - vii. Seeking advice in case of health problems.
 - viii. Resting for several hours in case of cramp in the arms, legs or stomach, feelings of mild confusion, weakness or problems sleeping.

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CHAPTER 9. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO NOISE POLLUTION

9.1 Noise pollution

9.1.1 Characteristics/pollutants and sources of pollution/hazards

The average person subjected to 45 dB of noise cannot sleep and at around 120 dB the ear begins to register pain. Hearing damage can begin much sooner, at around 85 dB, but duration of exposure is also a factor, with hearing sensitivity decreasing over time if exposed to excessive noise.

It has been estimated that in the EU around 40% of the population are exposed to traffic noise with an equivalent sound pressure level exceeding 55 dB/A in the daytime, and 20% are exposed at night to equivalent sound pressure levels exceeding 55 dB/A which are sleep disturbing [1].

Environmental, or community, noise resulting from road, rail or air traffic, construction work, and industry or neighbourhood activity can be harmful to health and well-being. Potential sources of noise pollution sources in tourist establishments include:

- 1) Night noise from night time entertainment, including bars, nightclubs and discotheques, all of which are potential sources of noise pollution.
- 2) Noise associated with construction and supplies to tourist establishments.
- 3) Noise in hotels coming from outside the hotel, other hotel areas such as common areas and other bedrooms and the technical installations of the hotel and bathrooms and toilets.
- 4) Noise in hotels coming from heavy traffic areas and terminals.

9.1.2 Health impacts and hazards

Excessive noise pollution has adverse effects on communication, concentration and learning, performance, behaviour and sleep, as well as damaging hearing. It can also cause irritability, heartburn, indigestion, ulcers, high blood pressure and possibly heart disease.

A single burst of noise, such as from a passing truck, has been shown to alter endocrine, neurological and cardiovascular functions in many individuals, disturbances which tend to become chronic if the exposure is prolonged or frequent. Noise induced stress creates severe tension and contributes to mental illness [2].

Night time noise causing sleep disturbance is particularly distressing for those not enjoying such amenities, whether they be locals or tourists requiring a quieter holiday. Lack of sleep may in turn lead to daytime fatigue and potentially increase the risk of accidents [3].

Noise is a controllable pollutant. Sometimes solutions can be very simple, for example the introduction of rubber dustbin lids and plastic milk crates, and the banning of night flights over urban areas [2].

9.1.3 Guidelines and standards

In 2000 the WHO published the Guidelines for Community Noise with recommendations on guideline values and management [4].

In 2000 a WHO working group and a workshop developed fundamental principles, based on behavioural, bio-medical, ecological, engineering and ethical considerations, on the Right to a Supportive Sound Environment [5].

Guidelines on night time noise have been developed by the WHO [3]. Regional evidence of night time noise effects on health are being reviewed and the magnitude of associated health risks estimated, in order for guideline values to be proposed for short and long-term exposure.

9.2 Measures and actions to minimize environmental health risks in tourist establishments

9.2.1 Measures and actions by governmental bodies

Priorities in noise management vary from country to country, according to policy objectives, needs and capabilities, but are based on reducing health risks by concentrating on the most important sources of noise [6]. In tourist establishments, it is particularly important that public and environmental health departments avoid the adverse health risks which could arise from the potential increase in noise pollution during the holiday season by reducing noise levels as far as possible for the benefit of both visitors and the local population. Noise management policy encompasses laws and regulations for setting standards and ensuring compliance [6]. Local authorities' measures and actions may include:

1) Information, education and training actions.

- a. Seminars and meetings targeted on establishment operators and staff training, which can be held by local authorities in co-operation with noise management specialists and private sector. Objectives of these meetings should be related to noise pollution sources, consequential health hazards, development of noise reduction strategies and its implementation in tourist establishments.
- b. Promotion of noise reduction campaigns focusing on local characteristics/ noise problems, health effects and recommendations for individuals' contribution to the reduction of noise pollution.

2) Actions to avoid/reduce sources, risks and exposure.

- a. Adopting and complying with the current legislation and health guidelines, e.g. European Directive relating to the assessment and management of environmental noise, 2002/49/EC [7] and WHO guidelines [4].
- b. Development of noise reduction strategies and plans, in local level, considering the protection of population from community noise as an integral part of the policy for environmental protection and implementing actions with short, medium and long-term objectives for reducing noise levels. These strategies and plans should include the following [8]:
 - i. Identification of dangerously noisy environments.
 - ii. Surveillance of noise levels.
 - iii. Reduction noise levels at source where possible implementing measures including point 3.
 - iv. Staff training in working places through training courses.
 - v. Assessment the results of implemented actions and evaluation of noise reduction strategy.

- 3) Planning, operation, monitoring and assessment actions.
- a. Proper land-use planning in tourist areas, e.g.
 - i. siting of accommodation away from industrial areas or transport terminals;
 - ii. siting of night clubs and generally entertainment centres, away from residential areas;
 - iii. by-pass roads for heavy traffic.
 - b. Traffic regulation, e.g. speed limits, banning of night flights etc. and sound barriers installed in heavy traffic areas.
 - c. Requirements for sound proofing insulation in buildings.
 - d. Regulations to control unnecessary noise such as use of car horns, loudspeakers etc. in tourist environments.
 - e. Raising public awareness by education and enforcement. A good example of public awareness raising is with measures to introduce a mobile phone etiquette to help avoid them becoming a public health nuisance by intruding on the '*private space*' of other people. At least in Italy the following measures have been observed for their considerate use in enclosed public spaces and other public places where other people are nearby such as bathing beaches, hotel and municipal swimming pools, public transportation, hotels, supermarkets, railway stations and airports:
 - i. Choosing a mobile phone incoming call sound alert that is gently tuneful, calming and not strident and intrusive.
 - ii. Ensuring the volume of the incoming call alert is kept as low as reasonably possible.
 - iii. Turning off the incoming call sound alert and relying on the vibration alert.
 - iv. Checking the phone screen for incoming call numbers that truly need to be answered immediately.
 - v. Ensuring the voicemail facility for message recording is activated.
 - vi. Cupping one hand in front of one's mouth when speaking to help block sound waves being spread about.
 - vii. Talking quietly.
 - viii. Keeping conversations brief and to the point.
 - f. Monitoring and assessment of noise levels in indoor and outdoor tourist environments. Noise monitoring may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational phase noise levels. Noise monitoring programs should be designed and conducted by trained specialists. Typical monitoring periods may last 48 hours with the use of noise monitors that should be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate. The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert [9].
 - g. Monitoring and assessment of noise health impacts.

4) Legislative actions, guidelines and standards.

- a. Enacting of legislation / enforcement of current legislation to reduce sound pressure levels.
- b. Setting standards for noise level limitations and monitoring and reporting basic requirements in tourist environments in local level.
- c. Conduction of regularly inspections by local authorities to ensure the working places' and establishments' compliance with the above mentioned regulations and standards.

9.2.2 *Recommendations for tourist establishment operators*

Regarding the reduction of noise pollution in tourist establishments provided recommendations are related to:

1. Development of noise management policies including the following:
 - 1.1 Reduction of noise travel by (1) thickness of the walls or partitions; (2) provision of sound insulation; and (3) double glazing [10].
 - 1.2 Provision of soundproof bedrooms to reduce noise coming from outside the hotel, other hotel areas such as common areas and other bedrooms [10].
 - 1.3 Technical installations of the hotel, bathrooms and toilets, at decibel and frequency levels which are at least tolerable for both day and night stays [10], by using equipment with lower sound power levels, installing silencers for fans and acoustic enclosures for equipment casing radiated noise [9].
 - 1.4 Positioning, enclosing, and isolating noisy equipment, e.g. permitting space or buffer zones encompassing two walls between the laundry and public areas, [11].
 - 1.5 Regular establishments' maintenance (building, equipment etc.) to eliminate noise sources.
 - 1.6 Operation regulations in places of the establishments that noise is produced (e.g. bars, clubs etc.).
 - 1.7 Outdoor noise management practices, respective to existing noise sources.
 - 1.8 Provision training and education to staff members, regarding the implementation of noise management strategies.
 - 1.9 Informing tourists about noise pollution issues and provision of recommendations related to individual's behavior. Information material (e.g. leaflets) can be provided at hotel receptions and in rooms.
2. Hotels, tour operators, and municipal authorities may wish to produce a small credit-sized plastic card with this Code of Good Practice for the Considerate Use of Mobile Phones [12] that could be given to tourists and the local public and included with mobile phone sales and rentals. The information could also be incorporated into hotel and holiday brochures and the information available in tourist establishments for guests. *Quiet rooms'* are also increasingly being incorporated into public buildings and

to other places such as some railway carriages as designated places for rest, reading, contemplation, study and meditation.

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CHAPTER 10. WELL BEING AND AESTHETICS IN TOURIST ESTABLISHMENTS

10.1 Well being and aesthetics

10.1.1 Characteristics/pollutants and sources of pollution/hazards

“Healthy tourism” is an important component of the ‘Healthy Cities’ initiative [1]. For healthy tourism, the infrastructure should provide pleasant, aesthetic surroundings, including accommodation and alimentation, and a clean environment free of accident hazards and nuisances [1]. For recreational value and mental health, aspects of architecture and convenience of facilities are also important.

The interdependence of aesthetic quality, environment, health and well-being is recognised by the World Tourism Organisation [2], and is increasingly important for our quality of life [3]; however, it is relatively little-studied and remains poorly understood. Therefore, research is needed to understand better aesthetic health threshold limit values, their relationship to nuisance thresholds, and the effectiveness of control measures.

Aesthetic quality is closely related to visual amenity. Some towns and cities are for example introducing a “Dark Skies” policy so that wherever possible downward facing, focused lighting is there to reduce light pollution so that the stars are rendered more visible and so that the view can be better enjoyed and allow the consequent evoking of pleasing imagery. Another example is the increasing use of water features such as fountains, water sculptures, ponds and cascades in public buildings such as hospitals, libraries, schools, shopping centres and office buildings, and in town squares, to open up spaces, give welcomed opportunities for meeting, gathering, enjoyment, contemplation, reflection, pleasure and humour, and for positive ionisation of the ambient air to help impart a sense of freshness in the air. These developments are part of the increasing awareness that it is important for mental health and emotional well-being to be able to see movement, experience motion, enjoy rhythm and sound and to avoid intrusive noise.

10.2 Measures and actions for well being and aesthetics in tourist establishments

10.2.1 Measures and actions by governmental bodies

Measures for the preserving of well being and aesthetics include the following [4]:

- 1) Information, reporting, education and training actions.
 - a. Promotion of tourist health and well-being by local governmental policy through well-being campaigns.
 - b. Increasing education standards by local authorities and involved agencies (e.g. agencies responsible for food, health and environment) as there is a driving demand for more specialist products and the more prominent inclusion of all the elements relating to tourism industry.
 - c. Increasing availability and quality of information for tourists’ education about potential dangers and precautions for protection, through reading and digital matter provided in tourist establishments.
- 2) Actions to avoid/reduce sources, risks and exposure.
 - a. Development of health risk multi-sector management programs, by local authorities concerning the reduction of tourist health risks at sources. Additional

Development of aesthetics' improvement management policies, taking into account health issues.

- b. Local authorities' regularly inspection for the compliance with the existing regulations/ guidelines of all sectors involved in tourism industry.
- c. Enforcement of research in local level in each sector and proper use of the research results (e.g. for assessment and implemented strategy feedback purposes).
- d. Development of supporting programs, in local level, for small and medium sized businesses, so as to have the capability of providing high quality services in compliance with environmental regulations and to encourage competitiveness in all sector involved tourism industry.

10.2.2 Recommendations for tourist establishment operators

Recommendations for tourist establishment operators target on ensuring the core elements of well-being [5]:

(1) serenity, tranquility, relaxed pace, the ability to create a sense of contentment, ease, peace; (2) activities and establishments' features that can provide an escape from life's routines; and (3) variety of places and activities providing safety and high quality services. This achievement requires the development of an integrated management strategy including:

1. Implementation of environmental friendly practises for operation and maintenance of the establishment (described in details in each chapter).
2. Proper infrastructures, facilities and required maintenance for good operation of the establishment (described in details in each chapter).
3. Seeking staff training and education through training conferences by specialists in relative agencies, considering the improvement of establishments' services as an investment.
4. Provision of information to tourists about health risks and precautions for protection during their accommodation, through leaflets and visual presentations (for significant health issues like accidents or communicable diseases) in establishments.
5. Compliance with the national regulations/guidelines related to general environmental factors, outdoor and indoor air pollution, water supply, water sanitation, bathing and recreational waters, sun pollution, heat pollution, noise pollution, food safety, hotel safety standards and communicable diseases. The recommended actions to ensure the compliance with regulations/ guidelines are described in details in each chapter.

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CHAPTER 11. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO FOOD SAFETY

11.1 Food safety

11.1.1 Characteristics/pollutants and sources of pollution/hazards

The WHO Regional Centre for Environmental Health Activities (CEHA) [1] have estimated that, in 1995 in the Eastern Mediterranean Region, 190 million cases of acute diarrhoea occurred, including 20 million moderate or severe cases that resulted in approximately 350 000 deaths. Contaminated food is thought to be a leading cause of sickness throughout the Region, and it is estimated that only a small fraction of all food borne diseases are currently recognized and reported. The ratio between actual cases and notified may be as high as 100 to 1.

In the EU in 2005, 5,311 food-borne outbreaks were reported, involving 47,251 people and resulting in 5,330 hospitalisations and 24 deaths [2].

11.1.2 Guidelines and standards

In Europe, food hygiene is covered in the EU directive 93/43 which came into effect in 1995 and sets out the requirements for issues in the food and hygiene sectors [3]. This includes the use of a Hazard Analysis and Critical Control Points (HACCP) system. HACCP is a systematic preventive approach to food safety and pharmaceutical safety that addresses physical, chemical, and biological hazards as a means of prevention rather than finished product inspection. All food businesses have to demonstrate in written records what they have done to ensure that the food they are serving is safe to eat, which includes having an HACCP system in place. HACCP shows how, why and where food can become contaminated and what has been done to prevent this from happening. An HACCP system requires accurate and up to date record keeping.

HACCP cover all stages of preparation from preparation of ingredients to sale to the customer with each step carefully analysed to identify potential hazards such as bacteria, foreign bodies, and chemical contaminants or, in the case of allergen-free food, potential allergens. Control may include separation of raw and cooked foods to avoid cross contamination, personal hygiene rules to avoid contamination by bacteria, and correct cooking times and temperatures to ensure that harmful bacteria

11.2 Measures and actions to minimize environmental health risks in tourist establishments

11.2.1 Measures and actions by governmental bodies

The safety of food and drink depends on the standards of hygiene in their preparation and handling. The risk is therefore greatest in countries with low standards of hygiene and sanitation.

Preventive and control measures include decontamination of food and wastes, hygienic measures and sanitary education.

The Federation of Tour Operators in the UK have sought to encourage destination countries to develop and implement food hygiene programmes to improve the safety of the food supply but this mainly affects hotel accommodation.

The Food and Agriculture Organisation of the UN (FAO) recognises that street vendors have a significant role in food safety and has been supporting a range of activities to strengthen this sector and improve safety since 1989. They have collaborated with municipal authorities to improve the quality of the raw and processed foods used by the vendors, and sought to strengthen the food quality capabilities of both national authorities and the private sector [4]. Recommended measures and actions associated with

1. Adequate control of food and water borne illness.
 2. Fresh produce safety, and
 3. Minimization of public health impacts in case of outbreak.
-
1. Effective local level measures and actions for adequate control of food and water borne illnesses needs:
 - 1.1 Good public health surveillance systems with linked laboratory bacterial and viral monitoring programmes for exposures involving food and drink in local scale.
 - 1.2 Close cooperation of local authorities and environmental health officials, tour operators, hoteliers, restaurant owners and operators, and support of the Federation of Tour Operators and the International Tourism Organisation. This can be achieved through regular meetings among stakeholders and use of available technology for communication and information purposes.
 - 1.3 Local authorities' responsibility of raising awareness and understanding of the implications to economic well-being of the local population from insufficient or poorly managed water treatment and sewage treatment plants – the long term benefits can be considerable, both in the numbers of tourist visitors choosing to return to a locality and the health of the local population. Raising awareness of tourism industry stakeholders can be achieved through education courses associated with technical, economic and social issues.
 - 1.4 Ready access to environmental epidemiology field support staff in the event of an outbreak of suspected food or drink poisoning.
 - 1.5 Ready access to experienced microbiologists and public health specialists who can jointly assess the likely routes of infection, drinking water supplies to hotels, restaurants and the local population, the sewage disposal and solid wastes disposal systems for these populations, known gastro intestinal illnesses in the local population, living arrangements and health care facilities of hotel and restaurant staff, and the adequacy of food hygiene training available for hotel and restaurant staff.
 2. Targeting microbial food safety in products consumed in Mediterranean countries, measures and actions should deal with all the parts of the food chain - producing, packing, processing, transporting, distributing, or preparing fresh produce- so as to achieve better control and reduction of food borne illnesses. Based on successfully applied plans, local level measures and actions related to fresh produce safety include the following [5]:
 - 2.1 Local agencies' sanitation inspections to check the compliance with current guidelines, or mostly accepted ones; and national regulations in all parts of the food chain.

- 2.2 Development of education plans intended to (1) raising and maintaining producer, vendor and consumer awareness about how to handle fresh products safely; (2) promoting ready access to educational materials for fresh produce producers, distributors, retailers, food workers, and consumers; and (3) co-operation between governmental bodies and private sector.
- 2.3 Development, supporting, and promoting tools (e.g., fact sheets, model forms, standard operating procedures, checklists) to assist in the implementation of guidance and regulations that cover segments in the fresh produce supply chain.
- 2.4 Identifying and promoting requirements of other legal authorities that support practices and conditions to prevent the microbial contamination of fresh produce (e.g. field sanitation laws and regulations that establish the minimum ratio of toilets to workers and proper hand washing facilities, maximum worker to restroom distance and maintenance of facility cleanliness).
- 2.5 Identifying and seeking solutions to requirements of other legal authorities that could inadvertently increase the risk of microbial contamination of fresh produce (e.g. state water conservation requirements).
- 2.6 Facilitating and supporting research relevant to fresh produce.
3. The minimization of public health impacts in case contamination outbreak occurs can be achieved by local level actions such as the following:
 - 3.1 Identification of the reasons that caused the contamination outbreak, using methods including (1) facility inspections and surveys; and (2) increasing routine monitoring of practices and conditions in all the parts of food chain.
 - 3.2 Continuing to improve and refining appropriate regulatory follow up even after the reason of contamination outbreak is found.
 - 3.3 Increasing the speed of epidemiological, trace back, and environmental investigations and the assessment of the quality of the information obtained through such investigations.
 - 3.4 Preparation of training or guidance as needed for epidemiological, trace back, and environmental investigations by federal, state, and local investigators to promote consistency of investigations and identification of potential sources of contamination and to promote preventive measures to ensure produce safety.
 - 3.5 Development of systems for exchanging and prompt use of data resulted by investigations, between state, and local food safety agencies.
 - 3.6 Collaboration among international organizations, for the protection of countries that import and export fresh produce.
4. Food preparation, processing, manufacturing, packaging, storing, transportation, distribution, handling and offering for sale or supply in foodstuffs shall be carried out in a hygienic way [6]. According to FAO, measures and actions for the implementation of hygiene practices in food chain in tourism sector include [7]:
 - 4.1 Tourist establishment ready availability of infrastructure and facilities including (1) equipment and tools (thermometers, food warmers, bins, etc); (2) provision of

- technical assistance to small business to upgrade design and layout, appropriate sanitary facilities etc in order to meet minimum standards.
- 4.2 Staff-related challenges provided by local authorities in co-operation with tourist establishment operators and trade associations including (1) training intended to involve workers in all sectors in the food sector and at all levels; and to gear training to the competence level of the target audience; (2) involvement of the trade association in educating their members; and (3) exchange programmes – sharing of good practices – technical cooperation (horizontal cooperation).
 - 4.3 Supporting environment by local authorities involving (1) separating inspectorate and technical advisory functions; (2) more ‘user friendly’ enabling environment for small food business through enabled training by government (subsidy, full payment) and reduction of bureaucracy; and (3) raising awareness of consumers.
 - 4.4 Local authorities’ responsibility for raising awareness of the business operators of the basic requirements of the legislation.
 - 4.5 Engaging local businesses in social mobilization (start taking action – implementation).
 - 4.6 Access to low interest loans, grants, revolving loans etc – micro business enterprise funds.
 - 4.7 Integration of food safety into the local tourism and food security development policy by (1) recognition of the importance of restaurants in the tourist industry; (2) private/public sector partnership to lobby support for implementing food safety policies; (3) business certification – several levels of certification with regulations to govern this programme; (4) development of systems of incentives and dis-incentives.
 - 4.8 Step-wise approach to HACCP.
 - 4.9 Institutional strengthening – of the competent authorities.
 - 4.10 Local authorities’ responsibility for the harmonization of food safety regulations regionally.
 - 4.11 Formation of commodity groups regionally.
 - 4.12 Development of food safety policy in local level by (1) promoting the formation of an agricultural health and food safety agency to ensure proper coordination and communication among the various governmental agencies and departments; and (2) promoting communication strategy to target all stakeholders (both private and public sectors).
 - 4.13 Promoting public awareness campaign on food safety, focusing on tourist industry.

11.2.2 Recommendations for tourist establishment operators

Recommendations for tourist establishment operators include:

1. Compliance with the HACCP regulations and current hygiene rules, such as the Council Directive related to the general rules of hygiene for foodstuffs and the

- procedures for verification of compliance with these rules (Council Directive 93/43/EEC [6]).
2. Providing tourist the required information about the precautions should take during their stay in a Mediterranean country. Required information can be provided in the establishments in the form of leaflets and reading matter. Precautions should include [7]:
 - i. Avoiding consumption of potentially contaminated food or drink, by (1) eating only food which has been cooked thoroughly and is still hot; (2) avoiding uncooked food, apart from fruit and vegetables that can be peeled or shelled; (3) avoiding dishes containing raw or undercooked eggs; (4) avoiding food bought from street and unreliable vendors; and (5) avoiding sea food where biotoxins could be present (obtaining advice locally).
 - ii. Boiling unpasteurized milk.
 - iii. Avoiding contact with potentially contaminated recreational water.
 - iv. Carrying medication to treat diarrhoea as well as oral rehydration salts and water-disinfecting agents.
 3. Practical issues for hotels, holiday camps and cruise ships include the following:
 - i. Ability to recognise cases.
 - ii. Management of infected guests.
 - iii. Availability of equipment and staff needed to deal with outbreaks.
 - iv. Screening of guests on arrival / before embarkation.
 - v. Exclusion criteria for guests / passengers.
 - vi. Efficient decontamination and deep cleansing methods.

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CHAPTER 12. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO HOTEL SAFETY

12.1 Hotel safety

12.1.1 Characteristics/pollutants and sources of pollution/hazards

Slips, trips and falls are probably the commonest accidents suffered on holiday [1]. Although data are not readily available for similar accidents involving persons in tourist establishments in the Mediterranean, safe systems need to be ensured.

The potential causes of accidents in hotel establishments include the following [1]:

- 1) Balconies and their balustrades. They may not be secure and the height is often not sufficient to stop someone overbalancing and falling. It must be ensured that children cannot fall out of windows and that if necessary safety catches are fitted.
- 2) Glass doors. Unless they are not fitted with safety glass, can be a particular hazard to children running about and even more so if the floor surface is slippery or there are loose rugs or mats on the floors.
- 3) Entrance ways, stairs and passageways. They must be kept free from obstruction and well-lit. Stair rods and carpets must be secure. Warning signs are needed with wet or freshly polished floors.
- 4) Cleaning and disinfecting chemicals, which may be provided and left in buildings and other accommodation should be clearly labelled and kept out of reach of children.

12.1.2 Guidelines and standards

The enforcement of adequate standards of fire prevention and electrical safety are additional, principal safety factors. The World Tourism-recommended standards include the provision of smoke detectors, alarm systems, fire-fighting equipment, emergency exits, stairways and prominently displayed instructions; for self-catering tourist accommodation these instructions should include information about taking care not to start fires with cigarettes, or with fat frying and chip pans [1].

In December 2006 the Federation of Tour Operators (FTO) called for European legislation on gas heater safety standards, backed up by proper compliance procedures. The FTO have been campaigning for this with the Consumer Safety International for 10 years. In the meantime they follow their own Best Practice Guidelines, part of a series of initiatives developed by FTO's Responsible Tourism Committee to help tour operators to integrate responsible tourism into their core business [2].

The Association of British Travel Agents (ABTA) announced a new Health and Safety initiative which will enable its Members to access a reliable, independently audited hotel database which will ensure that the accommodation offered by its Members is fully compliant with stringent health and safety requirements.

The United Nations World Tourism Organisation (WTO) supports the creation and maintenance of safe environments for world tourism and the monitoring of tourism related risks. It has a recommended hotel classification which includes items related to tourist health [3]. The WTO stipulates that all installations, equipment and furniture in tourist accommodation bedrooms, sanitary facilities and common rooms and areas should be good for heavy use, functional and safe, mutually harmonised and proportional in size to the area

in which they are located, and that the buildings and all items on their premises should be kept in perfect condition as regards operation, wear and presentation, and that health and safety for the maintenance and construction workers there must also be a priority [4]. The WTO website has now started a safety and security network for tourism, aimed at both professionals and the public, which so far has published details for several member states including such things as contact details for the person designated to answer queries on tourist safety in his country, and emergency numbers. Several but not all of the Mediterranean countries are included [5]. The site also includes recommended measures for tourism safety, which include every state taking the necessary measures to identify risks and adopt safety measures and standards in such areas as: fire protection; food safety; sanitary and health requirements; environmental safeguards [6].

12.2 Measures and actions to minimize environmental health risks in tourist establishments

12.2.1 Measures and actions in tourist establishment management policies, procedures and practices

Mediterranean countries have recognized the tourism's contribution to their economies and have given the sector a higher political priority, in order the economic policy objectives to generate employment, earn foreign exchange and contribute significantly to government revenue.

The dependence of social and other sectors on the tourism industry emphasizes the need to protect and maintain the quality of the tourism product throughout the Mediterranean region. The provision of a safe and healthy visitor stay, as well as ensuring environmental sustainability, are critical elements in improving the competitiveness of the sector [7]. Recommended measures and actions for tourist establishment operators, addressing of these concerns and related to management policies, procedures and practices involve [8]:

1. Providing quality food and beverage services through targeting to high quality standards and good hygiene (for more details see Chapter 11).

Incorrect storage and serving facilities for food and beverages can have very serious health implications for guests and staff and can pose a high risk to public health. In some cases, food-borne illnesses may affect a very large number of people in a short space of time.

2. Provision of safe drinking water (for more details see Chapter 4). Additional actions include (1) regular testing of water samples for microbiological, standard chemical, heavy metals and pesticides; (2) comparing sample results with the values of relative guidelines/ regulations; (3) using a pool test kit to measure specific water quality parameters; and (4) conducting a sanitary inspection of the supply.
3. Providing nursing and medical resources in tourist establishments. Medical staff at resorts and tourist facilities must be aware of communicable diseases (for more details see Chapter 13), local diseases and health risks that are unique to the region.
4. Development of health and safety policies including (1) medical staff's education and training; (2) effective medical / first aid recording that assists in identifying trends and updates health and safety plans; and (3) providing tourist the appropriate information for the prevention of diseases and health hazards (for more details see Chapter 13).

5. Development of safety, security and emergency response planning, related to cases such as fire, earthquakes etc., including ready access to rescue agencies and hospitals; and plan of rapid evacuation of the visitors.
6. Provision of engineering and maintenance services in the establishments to eliminate potential health risks. Civil, structural or marine engineering and maintenance services can involve a range of risk situations in development projects and on-going routine activities and tasks.
7. Provision of good housekeeping services, that related to (1) amenities hygiene such as toilet facilities, shower and laundry facilities etc.; (2) bed bugs; (3) chemical spills and hazardous substances; (4) waste disposal (e.g. co-operation with waste management companies when needs), targeting on visitors' protection from infectious and communicable diseases (for more information see Chapter 13).
8. Accessing signage requirements relating to warnings, regulations and lifesaving services according to identified hazards in establishments' places.
9. Ensuring security, by taking precautions against the loss, theft of or damage to guests, employees, or the establishment's property or person. Security also includes taking precautions against fraud, assault and vandalism.
10. Ensuring safe recreational activities by (1) compliance with the relevant regulations and guidelines (for more details see Chapter 6); and (2) ensuring the consistency between activities of the establishment's staff and policy on safety and injury prevention.
11. Performance of public health risk management including risk assessments to identify the level of risk within all establishments' places and ensure the necessary devices / policies are provided to protect personnel and the public from real or perceived harm. Risk management process related to:
 - i. Providing information to executive management so that it can make informed decisions on prioritizing risks.
 - ii. Initiating actions to mitigate or reduce the adverse effects of risk.
 - iii. Effective management of the treatment of risk in a systematic way.
 - iv. Monitoring the actions taken to manage risk.
 - v. Identify any problems in implementing the risk management process.

12.2.2 References

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- [5] http://www.unwto.org/quality/safety/en/safety_02_3.php?op=5&subop=32.
- [6] http://www.unwto.org/quality/safety/en/safety_01_1.php?op=5&subop=27.

For further reading you can consult the following references for the formulation of the measures and actions for hotel safety standards:

- [7] <http://www.carec.org/annrep99/cthsrhc.htm>.
- [8] <http://www.publicliability.net.au/Hotels-Resorts.htm>.

CHAPTER 13. ENVIRONMENTAL HEALTH RISKS IN TOURIST ESTABLISHMENTS RELATED TO COMMUNICABLE DISEASES

13.1 Principal communicable diseases

13.1.1 Main communicable diseases

The risk of exposure to infectious diseases depends on the presence of infectious agents in the area to be visited, but increasing global air travel has accelerated the international exchange of pathogens [1]. Any destination can be reached within 36 hours which is well within the incubation period for most communicable diseases so travellers can become vehicles or victims. Many diseases have been spread outside their endemic areas by travellers [2].

Information about the risks of communicable diseases is available from WHO's annually updated publication International Travel and Health [3], but incidence and mortality statistics are largely lacking or limited to specific outbreaks of emerging diseases [2].

The main communicable diseases are the following:

- 1) Food-borne and water-borne diseases.
- 2) Vector-borne diseases.
- 3) Zoonoses.
- 4) Blood-borne diseases.
- 5) Air-borne diseases.
- 6) Soil transmitted diseases.
- 7) Other important diseases spread by food, drink and poor hygiene.

13.1.2 Food-borne and water-borne diseases

Food and water-borne diseases are transmitted by consumption of contaminated food and drink. The most common food-borne diseases are the following:

- 1) Salmonellosis. It is present in all the Mediterranean countries and originates in animals so contamination of food from animal sources can occur during slaughter, transportation, storage or preparation.
- 2) Noroviruses. They are RNA viruses belonging to the family Caliciviridae which cause gastro-enteritis, with projectile vomiting.
- 3) Travellers' Diarrhoea (TD). It is the most common health problem for travellers, affecting an estimated 18 million travellers per year [4]. It is associated with contaminated food or water and symptoms of diarrhoea may be accompanied by nausea, vomiting and fever.
- 4) Illness caused by biological toxins found in seafood; these include paralytic shellfish, neurotoxic shellfish, amnesic shellfish, ciguatera toxin, scombroid fish and puffer fish.
- 5) Ill-effects from contaminated food and drink by poisonous chemicals. Ill-effects in these cases are usually the result of long-term exposure, so they are not a significant risk for travellers.
- 6) Typhoid fever. It is caused by the typhoid bacillus *Salmonella typhi*, which infects only humans. Transmission is through the consumption of contaminated food or water, possible sources being shellfish from sewage-polluted beds, raw fruit or vegetables

fertilised with human waste, or milk or milk products contaminated by handlers. Flies may also transfer infection to foods. Pollution of a water source may potentially cause an epidemic.

13.1.3 Vector-borne diseases

These diseases are transmitted by insects or other vectors, such as ticks. The most significant diseases in this category are:

- 1) Malaria. There is a very limited risk of malaria during the summer months in some areas of Algeria, Egypt, Morocco, Syria and Turkey, none of which have had indigenous cases in recent years [5]. Risk can be reduced by taking precautions to avoid insect bites.
- 2) Yellow fever. Yellow fever is not endemic in the Mediterranean area; the southern and eastern Mediterranean countries require incoming visitors from infected areas to be vaccinated.

13.1.4 Zoonoses

Zoonoses are diseases transmitted from animals. Infection can be transmitted through bites, through contact with contaminated body fluids or faeces of animals or by consuming foods of animal origin such as meat or milk products.

Examples of zoonoses include the following:

- 1) Rabies. It is the most important infectious disease from animal bites, the virus being present in the saliva of a range of domestic (mainly dogs) and wild animals. It causes an acute viral encephalomyelitis, which is invariably fatal. Initial symptoms are headache, fever and malaise. Vaccination if available to those travelling to rabies endemic areas.
- 2) Brucellosis. It is caused by several species of Brucella bacteria. It is primarily an animal disease and can be transferred to humans by contact with an infected animal or consumption of unpasteurized milk or cheese. Brucellosis is found worldwide and is most common in developing countries and in the Mediterranean. The risk for travellers is low if direct contact with farm animals and the consumption of unpasteurized milk products are avoided.
- 3) Leptospirosis. It includes Weil's disease, is caused by various spirochaetes of the genus *Leptospira*. Infection occurs through contact between the skin or mucous membranes and water or wet vegetation contaminated with the urine of infected animals, most notably rats. Leptospirosis is found world wide, particularly in the tropics. No prophylaxis is recommended as the risk to travellers is low. Precautions include avoiding swimming in potentially contaminated water such as canals, ponds or rivers, and avoiding contact with rodents.
- 4) Campylobacteriosis. It is an infectious disease caused by bacteria of the genus *Campylobacter*. The risk of infection can be reduced by avoiding close contact with animals in areas where infection is likely to be present. Children should be prevented from approaching or handling animals.

13.1.5 Blood-borne diseases

Blood-borne diseases are transmitted by direct contact with infected blood or other body fluids. Examples are hepatitis B, HIV/AIDS and malaria and hepatitis C, which has a medium to high prevalence in the southern countries bordering the Mediterranean.

13.1.6 Air-borne diseases

Airborne diseases are transmitted by aerosol and droplets from the nose and mouth. The risk of infection can be reduced by avoiding close contact with people in crowded and enclosed spaces. Examples of air-borne diseases include:

- 1) Tuberculosis (TB). It can be developed after infection with the tubercle bacillus *Mycobacterium tuberculosis*, which is normally transmitted from person to person. Tuberculosis is still found in Egypt, Lebanon, Syria and Tunisia but the risk for travellers is low if close contact with known TB patients is avoided.
- 2) Meningococcal Disease. It can follow infection with the bacterium *Neisseria meningitides*, which is transmitted from person to person. Recent outbreaks of meningococcal meningitis have occurred in Lebanon and Morocco. Risk to travellers is generally low if crowded conditions are avoided, particularly for young people.
- 3) Newly emerging diseases, such as severe acute respiratory syndrome (SARS) of unknown origin, and avian flu, caused by the influenza virus H5N1.

13.1.7 Soil transmitted diseases

These include diseases where dormant spores of infectious agents enter the body through broken skin, including minor cuts and scratches. The risk of infection can be reduced by protecting the skin from direct contact with soil in areas where soil-transmitted infections are likely to be present.

Examples of soil transmitted diseases include the following:

- 1) Anthrax.
- 2) Tetanus.
- 3) Intestinal parasitic infections such as ascariasis and trichuriasis are transmitted via soil and infection may follow the consumption of soil-contaminated vegetables. Risks are low for travellers in the Mediterranean region.
- 4) Polio. It is a highly contagious disease caused by a virus that invades the nervous system and can cause paralysis within hours. It mainly attacks children under five, and although there is no cure, it can be prevented by a vaccine which provides lifetime protection.

13.1.8 Other important diseases spread by food, drink and poor hygiene

- 1) Cryptosporidiosis. It is an infection caused by the parasites *Cryptosporidium hominis* and *C. parvum*. Infection is by the oral-faecal route; some infected persons have no symptoms but can pass on the infection to others. Children are particularly susceptible. The cryptosporidium parasite is widespread in all countries and it infects man and some animals such as sheep and cattle. It is spread from very close contact with an infected

person or animal, or through the consumption of contaminated drinking water or swimming pool water.

- 2) Giardiasis. It is caused by the parasite *Giardia lamblia* whose cysts may be ingested from drinking or recreational water contaminated by the faeces of infected humans or animals. There is a significant risk for travellers if they use recreational water used by wildlife, or unfiltered water in swimming pools.

13.2 Measures and actions to minimize environmental health risks in tourist establishments

13.2.1 Measures and actions by governmental bodies

Tourist risk exposure to communicable infectious diseases depends on

- The country of destination,
- The purpose of the trip and the itinerary within the country,
- The standards of accommodation, hygiene and sanitation, and
- The behavior of the tourist.

In some instances, disease can be prevented by vaccination, but there are some infectious diseases, including some of the most important and most dangerous, for which no vaccines exist [6].

Recommendations for pre- and post-exposure treatment of the main infectious diseases, as well as precautions should be taken regardless of whether any vaccinations or medication have been administered, are provided by WHO report related to health risks for travellers, more information can be found in reference [6].

Prevention and control of some categories of infectious diseases, e.g. zoonoses, involves various sectors, including agriculture, public health, trade, food industry and communities. Success in controlling them depends on the efficiency of the surveillance system and the coordinated actions of the different sectors involved [7].

The following measures and actions can be recommended in national level, focusing on local authorities' responsibilities for the prevention and control of communicable disease in tourist areas [8,9]:

- 1) Information, reporting, education and training actions.
 - a. Delivering appropriate, relevant and consistent public health education through available technology and communicable disease prevention campaigns, by health organizations and medical agencies in co-operation with local authorities.
 - b. Clinical services, community-based organizations and professional health bodies provision of extensive workforce development and training for various target groups; e.g. health care providers, through training conferences, participation in national meetings.
 - c. Provision of education and training targeted to tourism industry stakeholders, including conferences and delivering of information material related to infectious disease risks, ways of transmission, preservation of appropriate hygiene and sanitation in tourist environments and ready response in case of post- infection.

- 2) Planning, operation, monitoring and assessment actions.
 - a. Addressing local responsibilities related to developing, funding, delivering and evaluating a range of services including health promotion, treatment and care, and workforce training that reflects the prevalence and changing needs of populations at risk.
 - b. Preparing case definitions of communicable diseases under surveillance in local scale.
 - c. Ensuring effective inter-sectoral cooperation between State government, local government, and community-based organizations.
 - d. Establishment of regional health teams to work closely with regional and other governmental and community-based organisations to coordinate and augment existing health services and provide a comprehensive program approach to infectious diseases' prevention and control. The teams will work to a common set of performance indicators and the outcomes will be evaluated on a regular basis so that programs can respond to changing circumstances.
 - e. Improvement of the regional early warning system.
- 3) Legislative actions, guidelines and standards.
 - a. Establishing public policy and legislative frameworks consistent with the national strategy.
 - b. Ensuring that local resources are allocated in accordance with guiding principles.
- 4) Performance of research, studies and investigations.
 - a. Preparation of a local epidemic disease preparedness plan and enforcement of medical research focusing on tourist population health risks [9].
 - b. Conduction of epidemiological surveillance related to communicable diseases, setting priorities for each Mediterranean region and setting specific medical research target.

13.2.2. Recommendations for tourist establishment operators

Recommended measures and actions for tourist establishment operators for the prevention of communicable diseases are related to health and illness implemented strategies and include:

1. Abiding the rules of good hygiene and safe environment in establishments (see Chapter 12).
2. Providing of an adequate trained and educated- medical/ nursing staff to tackle emergency health incidents and protect visitors from mass infections.
3. Providing recommendations to travel agents (through internet or reading matter) related to keeping tourists informed about:

- 3.1 Procedures for obtaining assistance and reimbursement, particularly if the travel agent or company arranges the insurance policy.
- 3.2 General precautions that greatly reduce the risk of exposure to infections. These precautions include the following [6]:
 - i. Mandatory vaccination requirements for infectious diseases.
 - ii. The need for malaria precautions at the travel destination.
 - iii. The existence of other important health hazards at the travel destination.
 - iv. The presence or absence of good-quality medical facilities at the travel destination.
 - v. Information for sexually transmitted disease prevention.
 - vi. Carrying of a medical kit containing: adhesive tape; antiseptic wound cleanser; bandages; emollient eye drops; insect repellent; insect bite treatment; nasal decongestant; oral rehydration salts; scissors and safety pins; simple analgesic; clinical thermometer; antidiarrhoeal medication; antifungal powder; antimalarial medication; condoms; medication for any pre-existing medical condition; sedatives; water disinfectant; and other items to meet foreseeable needs, according to the destination and duration of the visit.

All the above mentioned precautions (point 3) can be provided to tourists by travel agencies in the form of a reading guidance before their travel.

4. Providing recommendations for tourists at their arrival at the establishments, in the form of leaflets, about required actions in case of emergency, for post –infection treatment and prophylaxis and ready access to medical care centres.
5. Availability of proper infrastructure to tackle an epidemic incident (e.g. moving of infected persons to isolated rooms, ready access to hospitals, early warning system for the visitors, ready access to health care centres to obtain required guidelines etc.) .
6. Tourist information about regulations governing the use of swimming pool in water recreational environments for protection of communicable infectious diseases. These regulations include [10]:
 - i. Compulsory showering before using the swimming pool.
 - ii. Not swallowing the swimming pool water.
 - iii. Always washing hands after or using the toilet.
 - iv. Taking children to the toilet with the due frequency.
 - v. Prior to using the swimming pool, children should always be washed with abundant water and soap, particularly in the anal area.
 - vi. It is recommended that children under the age of 6 months do not bathe in the adults' swimming pool.

- vii. Children who are still incontinent, (those who wear nappies) must wear waterproof bathing costumes when using the swimming pool. They should never swim in the nude or swim wearing nappies.
 - viii. People who have recently suffered from diarrhoea (within the preceding 14 days) should not use the swimming pool.
 - ix. Before using the swimming pool, all bathers should wash themselves thoroughly with soap and water in their rooms.
7. It is recommended that children's swimming pools have a water treatment plant that is independent of that of the adults' swimming pools. This may be a legal requirement in some areas.
 8. Showers should be provided in the pool area and the drainage from the showers should be discharged to waste.
 9. Filtration process of swimming pool re-circulating water, if carried out adequately, constitutes an effective method of eliminating pathogen oocysts (e.g. *Cryptosporidium oocystis*). Recommendations for filtration process include:
 - i. The water must be re-circulated and filtered continuous filtering and re-circulating of water.
 - ii. Swimming pool filters' technical inspection at least once a year and prior to the seasonal opening of the hotels.
 - iii. Swimming pool filters' regular backwash, at at least once a week, and in accordance with the manufacturer's instructions. It is preferable to carry out the backwashing operation at the end of the day, and the manufacturer's instructions should be meticulously followed. An excessive frequency of backwashing (more than once a day, for example) could be counterproductive to the efficiency of the filters.
 - iv. Avoiding abrupt changes in the flow through the filters. If backwashing one filter, while the others remain in operation, backwashing should begin and end slowly (15-20 seconds).
 - v. Ideally, the installations should be fitted with flow meters to control filtration and backwashing rates.
 - vi. In installations with sand filters, the adequate use of flocculants is essential in ensuring effective filtration. The flocculants should be added in a continuous way via dispenser pumps, at some point on the circuit prior to the filtration (never directly into the pool itself). Ideally, the mixing time before filtration should be 10 seconds.

13.2.3 References

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