

**1st INTERNATIONAL CONGRESS of
MARITIME, TROPICAL and
HYPERBARIC MEDICINE 2009**

**Contemporary challenges of health
and safety at work, mission, tourism
and recreation in maritime and tropical
environment**

SUPPLEMENT

**(CONTINUATION OF
THE BOOK OF ABSTRACTS)**

POSTER SESSION

Gdynia, Poland, 4th–6th June 2009

SEAWATER INLETS ON BOARD SHIPS - CHALLENGES TO HEALTH

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Introduction

Occupational saturation divers are frequently bothered with skin and ear infections caused by a very common water bacterium *Pseudomonas aeruginosa*. Since 1985, SINTEF Health Research has made consecutive microbiological surveys of both the infections and the respective environment in the field (freshwater, seawater, gas) in an aim to prevent infections among North Sea deep-divers.

Results

From this it is documented that a) the most important route of infection on board ship is the freshwater supply, b) only a few genotypes of *P. aeruginosa* are responsible for the recurrent outbreaks of infection, and c) these genotypes appear to remain in the water system for years in spite of intensive efforts to eliminate them.

New knowledge in 2007

Freshwater on board is either bunkered from onshore facilities or produced on board from seawater by evaporation (EVO) or reverse osmosis (RO). An onboard review of an infectious outbreak autumn 2007 uncovered an thus far not understood risk of recontamination of the water system related to the fact that one and the same seawater intake often is common for both freshwater production and engine cooling, the latter in constant use both in ports and near offshore installations. Thus, the risk for establishment of distinct microbial communities; e.g. biofilms where they survive for long periods of time and are well protected against biological, physical and chemical disinfection measures are obvious.

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TRAVELLER'S MEDICINE KIT

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Key words: first aid kit, medical travel kit, travel, medicines

When preparing for a travel one must pack a comprehensive medical and first aid kit and remember any possible factors that might affect its content.

The contents of the medical travel kit will vary, depending on: destination (climate, altitude, hygienic and sanitary conditions, potential occurrence of pathogens, poisonous plants and animals), type of holiday and activities during the trip (e.g. safari, hiking, mountaineering), duration of the trip, total size of the group (in order to determine quantities of medicines required), general state of health of those travelling (children, older people, pregnant women and people with chronic medical conditions), access to the local healthcare service and pharmacies in the local area.

It is crucial to have all the original packages of the medicines, including information leaflets (international name, undesirable effects and drug interactions) and in some cases a medical certificate of explanation - prescription with international names of the medicine, with a signature and a stamp of the physician. All medical supplies should be left unopened unless completely necessary (e.g. border checks, airport security).

Aside from the content of the medical kit, when travelling with medicines we should take under consideration the following: means of transport, duration and type of travel. Essential pharmaceuticals should be divided and stored in at least two different pieces of luggage, so that in the instance of one piece of luggage is delayed; lost or stolen an alternate supply is available. When reaching our destination, it is important to properly store the medicine and prevent the negative effects of external factors (humidity, low or high temperatures).

In conclusion, the preparation and careful storage of the medical kit is crucial to the safety of the travellers.

TRAVEL SAFE WITH A CHILD

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During last few years there has been a significant increase in the number of children who travel or live outside their countries. Health issues concerning paediatric international travel cover a variety of activities and age-specific health risks. Although some travel aspects are similar for adults and children, paediatric travellers have their own problems due to their variable immunity and age-based behaviour. Moreover, some medications and vaccines related to travel are not recommended for use among children, despite being licensed for adults.

The health problems which are regarded as the most common are: diarrhoeal illnesses, malaria, as well as vehicle- and water-related accidents. The limited immunity and behavioural factors put children and infants at high risk of diarrhoea and other gastrointestinal diseases.

Another, more serious illness with high mortality is malaria. The appropriate prophylaxis is available and essential in the endemic areas. As insects spread some diseases with no prophylaxis available, personal protection against them is an important part of prevention. Infants and young children are more likely to have contact with soil than adults and therefore they might be exposed to parasite infections. The other problem is rabies, more common in children than in adults, as a result of their increased contact with animals. The completely different issues to be discussed are air travel and altitude illness as well as often reported sun burns.

Clinicians should provide consultations for parents of the travelling children concerning prevention and appropriate intervention to the problems that may occur while travelling with infants and young children.

FIRST AID KIT IN THE TROPICS

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Medical University of Gdańsk**

Supervisor: Kotłowski Andrzej M.D., Ph.D.

Background: The most important aspects of medication that should be taken into consideration while visiting tropical countries

Aims:

- To give guidance and facilitate the choice of indispensable first aid means for travellers and the GPs
- To simplify the process of completing the first aid kit taken on trips in tropical countries
- To popularize the necessity of carrying the first aid kit during the trip in the tropics
- To emphasise the difference between contents of the standard first aid and the first aid that are essential in tropics
- To show diversity of danger in various climatic zones
- To show that the high standard of hygienic conditions and good touristy background aren't enough to prevent disease and injuries

Conclusion: By preparing this poster the author would like to present necessity of being prepared for various danger and diseases in various places in the world. It is shown how different contents of the first aid should depend on the planned area of stay.

Newcomers should be aware of potential threats of the visited tropical areas. The content of the first aid kit should differ depending on the geographical zone and the possible danger that may occur.

WORLDWIDE PROBLEM OF TROPICAL FEVERS

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Supervisor: Kotłowski Andrzej M.D., Ph.D.

Background: Clinical symptoms and main diagnosis which differentiate most common world tropical fevers. Knowledge useful for GPs that get in touch with patients coming from or living in the tropical areas, also needed in times of easy world wide transport and travelling.

Aims:

- General classification of tropical fevers
- To show the main tropical fevers, their common symptoms and diagnosis
- To shorten the way from symptoms to diagnosis
- To present regions of occurrence of the tropical fevers
- To increase the number of proper diagnosis
- To improve the knowledge about world tropical fevers
- To show characteristic clinical symptoms of tropical fevers
- To simplify the algorithm of clinical diagnosis
- To focus the attention on the leading symptoms of the tropical fevers

Conclusion: A simple and transparent schema of common tropical fevers, their clinical symptoms and basic diagnosis could simplify the procedure of proper diagnosis and contribute to avoid delay in patient's recovery.

FIRST AID AFTER A CLOSE ENCOUNTER WITH DANGEROUS ANIMALS OF THE RED SEA WATERWORLD

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Supervisor: Kottowski Andrzej M.D., Ph.D.

Background:

First aid after a close encounter with dangerous life forms of the Red Sea water world is an extremely necessary knowledge for each doctor, especially for those, who enjoy diving and follow up modern thinking and reality.

Aims:

- To visualize the Red Sea water world focusing on fish
- To show that many at first glance mildly looking animals can be dangerous for people
- To improve the knowledge of underwater life using colourful pictures and original classification of species
- To show the differences and specificity of the symptoms which can occur after a close encounter with dangerous representatives of water fauna (burns, bites, injures, intoxications, shock)
- To present how to apply first aid in case of different injures
- To underline how important is neutral buoyancy and control of emotions
- To obey the rule – if you do not know what it is, better do not touch

Conclusions:

Using this poster we would like to show the fabulous beauty of the Red Sea underworld and to instruct how to behave in case of being injured. Additionally we would like to invite you to dive and keep respect of the water world and show how to connect fun and safety during underwater expeditions having first aid knowledge. The poster is expected to be an easy and handfull compendium of the most popular (and sometimes dangerous) underwater organisms and basic first aid procedures.

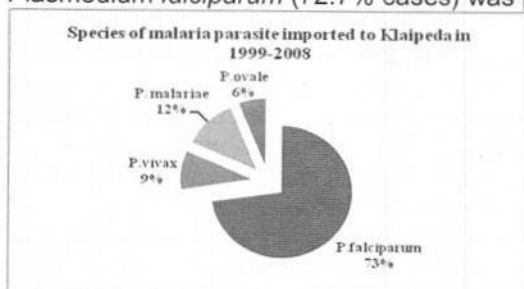
MORBIDITY FROM MALARIA AMONG SEAFARERS IN KLAIPEDA IN THE YEARS 1999–2008

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Klaipeda Public Health Centre

Aim: To analyse morbidity from malaria among seafarers in Klaipeda, 1999–2008

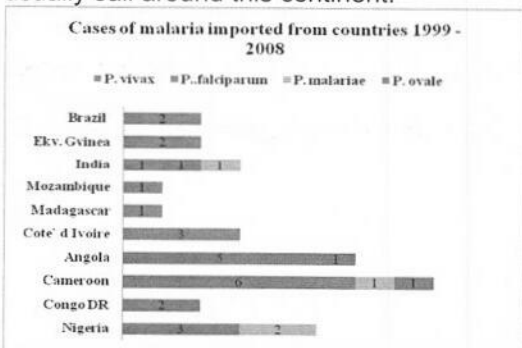
Methods: Descriptive and graphic method

Results: In the last 10 years 33 malaria cases were recorded in Klaipeda (1–8 cases per year), 85% accounted for seafarers. 31 residents were from Lithuania and 2 foreigners. In Lithuania, *Plasmodium falciparum* (72.7% cases) was predominant among all the malaria species.



The first symptoms occurred between 7–30 days after a visit to African ports. Severe forms of the disease were seen in 10% (3 cases), deaths accounted for 6% (2 cases) of all the infected individuals.

Most cases of malaria have been brought from Africa, because seafarers from Klaipeda usually sail around this continent.



Discussion: The incidence of malaria among seafarers is related to the specificity of their work. The most common reason for this disease was the failure to comply with the preventive measures: personal protection against mosquito bites and chemoprophylaxis.

The Klaipeda Public Health Centre provides antimalarial chemoprophylactic drugs for seafarers in Lithuania and abroad, focuses on seafarers' training and their awareness of malaria prevention.

Conclusions: In the course of the last decade there has been no decreasing incidence of severe malaria cases and deaths in Klaipeda. The occurrence of malaria in seafarers is associated with their voyages to endemic malarious areas and disregard of preventive measures.

COMPREHENSIVE TREATMENT FOR PEOPLE TRAVELING ABROAD, A KEY ELEMENT IN CONTROLLING THE INCREASED INCIDENCE OF SEXUALLY TRANSMITTED DISEASES

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Key words: risk behaviour, sexually transmitted diseases, international travel

The problem of getting infected with sexually transmitted diseases (STD) concerns mainly people travelling alone. New places and different cultures may often elicit irrational behaviour in travellers. Alcohol abuse and drugs are additional risk factors. Offers advertised by travel agencies within mass media often encourage such high-risk behaviour. Currently, some of the popular sex tourism destinations are Brazil, the Dominican Republic, Mexico, Sri Lanka, the Philippines, Costa Rica as well as African countries such as Egypt, Tunisia, Kenya and Tanzania.

The high-risk behaviour is also often the result of the travellers' lack of knowledge. Far from their homeland, they either do not take into consideration or purposely ignore the specific epidemiological situation of their destinations (e.g. higher risks of HIV infection).

The aim of our presentation is to present the role of physicians in creating awareness and increasing the safety of travellers abroad, as well as the range of knowledge of the people planning the travel.

Physicians who provide consultations to patients should discuss many additional topics that go beyond the scheme of a typical medical interview.

The physician should strive at the same time to single out the group of people with a higher risk (for e.g., not vaccinated or homosexual patients).

The intimate nature of the topics raised imposes on the physician a requirement to deal with these with great sensitivity.

HOW TO PLAN A SAFE JOURNEY?

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Key words: pre-travel advice, tropical medicine, travel planning, vaccination

Aim: The aim of this presentation is to highlight the situations when a doctor should pay a particular attention to persons planning travel to tropical or subtropical region. The essential point is to give him a relevant pre-travel advice about how to plan safe journey from the health-related point of view.

Methods/Materials: Pre-travel preventive care is becoming an essential health topic. Numerous cases have been studied in order to judge what are the best methods to prepare for a safe journey in healthy patients, people of extreme age groups, pregnant women and patients suffering from different chronic diseases. The matters of concern were different health beliefs of these subjects.

Discussion: Medical examination is considered as the first step which must be taken during planning a tropical journey. The evaluation of the clinical conditions must take place in healthy subjects, as if there are no contraindications; all of them ought to be given proper vaccination and/or medication. Persons from extreme age groups (or their guardians) must be informed about how to recognize the first alarming symptoms, as they get often more feasibly ill and more often with fatal outcome. Pregnant women ought to take under consideration the fact that many vaccinations and medications may be contraindicated or harmful for the foetus. The patients suffering from chronic diseases should remember to visit their doctors at least 2 months before the planned journey, to decrease the risk of unexpected events. Pre-travel preventive care must be adapted to the region of travel destination.

Conclusions: The average knowledge about prophylactic measures is relatively low both in patients and medical workers. Physicians should carefully evaluate the itinerary to check if the patient will be likely to be exposed to specific pathogens. The patient must be given the relevant and fairly simple information about the basic rules of prevention of infectious and parasitic diseases as well as routes of their transmission. The patient is also required to be informed about diseases which cannot be medically prevented.

HOW TO DECIDE ABOUT AND MONITOR RISK OF MALARIA TRANSMISSION ON LOCAL LEVEL?

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Background: Malaria is one of the main diseases, next to pneumonia, diarrhoea and malnutrition, contributing to high mortality and morbidity of children in Papua New Guinea. The observed climate changes and El Nino cycles in Western Pacific resulted in increased incidences of epidemics of malaria in regions considered as being "low risk of malaria transmission" areas. Therefore the differentiation between "high" and "low" malaria risk areas in Papua New Guinea appeared to be impractical. The malaria epidemiological setting in mountain areas (Eastern Highlands, Western Highlands, Southern Highlands and Enga provinces) was described as "instable" and resulted in decision to accept all areas of Papua New Guinea as being of "high risk of malaria transmission" together with costal areas and islands. Such decision had its impact on overtreatment of presumptive malaria cases in areas where no laboratory confirmation of *Plasmodium* sp. parasitaemia was available. However the availability of laboratory diagnosis will improve with introduction of new malaria diagnostic and treatment algorithms being implemented in Papua New Guinea.

Aim: The widespread resistance of *Plasmodium falciparum* to chloroquine has resulted in common treatment failures of malaria cases. To respond this challenge, the combination of arthemeter and lumefantrine (Co-artem) was selected as a first line treatment for uncomplicated malaria. The cost of the new drug, much higher than cost of chloroquine, required changes in diagnostic protocols for malaria in children. To avoid overtreatment with antimalarials, malaria rapid diagnostic tests (RDTs) were introduced to improve specificity of malaria diagnosis done by first line health workers. The presented paper (poster) tries to answer the question if malaria rapid tests, performed by first line health workers, could be used not only to support decision about malaria treatment, but also to monitor the local malaria epidemiological situation.

Results: The results of the malaria rapid tests were plotted on the special graph as proportion of children with detected *Plasmodium* sp. parasitaemia (malaria rapid test results positive) among all children with temperature 37.5°C or recent history of fever of hot skin admitted to children outpatient clinic on the single day. After collected data during the 3 weeks the line was plotted.

The plotted line not only allowed to assess the prevalence of parasitaemia among children with fever, by health workers but also enabled to detect increase in incidences of malaria cases during the monitored period.

Conclusions:

1. Introduction of malaria rapid diagnostic tests as part of standard malaria diagnosis performed by first line health workers can support evidence-based stratification for "high" and "low" malaria risk areas in Papua New Guinea.
2. Simple epidemiological tools such as a graph of proportion of malaria positive cases introduced at health centre level could be used for monitoring local malaria epidemiological situation and could support detection of risk of malaria epidemics in areas of low malaria transmission areas.

AN EVALUATION OF DIFFERENT CULTIVATION METHODS OF BLASTOCYSTIS HOMINIS FOR DIRECT AND MOLECULAR DIAGNOSIS

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Aim: Evaluation of the effectiveness of short-term *in vitro* cultivation compared with wet mount for diagnostics of *Blastocystis hominis*.

Blastocystis hominis is one of the most common parasites of humans and other vertebrates that infect the gastrointestinal tract. The prevalence of the parasite varies (between countries, age, and sex) from 30–50% in developing to 0.5–3% in developed countries. Its pathogenic role hasn't been determined as far, but there are reports associating *Blastocystis* with pathogenicity. The outstanding clinical symptoms of *Blastocystis* infestation are abdominal pain, diarrhoea, constipation, fatigue, headaches, weight loss. Routine diagnosis is usually performed by a simple smear in normal saline or iodine solution. However detection of the parasite remains very difficult since the protozoan has several morphological forms (vacuolar, multivacuolar, ameboid, granular, cyst) which vary in shape and size (from 2 µm to 200 µm). It causes that the protozoan is confused with other gastrointestinal parasites and demands well experienced staff. Formol acetate concentration technique (FECT) destroys its fragile structure and permanent staining by trichrome isn't suitable for making field assessments. Thus the prevalence determined by these methods may be underestimated. *In vitro* cultivation has been used to enhance detection; however the usefulness of it is controversial.

Methods: Simple smears were made by means of normal saline and iodine solution, and then examined under the 40x objective using light microscopy. *In vitro* cultivation was performed using Jones' medium, the NIH modification of Boeck & Drbohlav biphasic medium (BDMM), Iscove's modified Dulbecco's medium (IMDM), all supplemented with 10% horse serum, and Dobell & Laidlaw biphasic medium.

Results: Although there was no significant difference between the wet mounts (10.5%) and *in vitro* cultivation (11.9%) we recommend *in vitro* cultivation because of its sensitivity, convenience and simplicity. Our clinic specializes in treatment of a wide range of parasitoses and the laboratory staff is well experienced in detection of gastrointestinal parasites. Therefore probably we obtained such insignificant difference between simple smears and *in vitro* cultivation, but there are reports on bigger differences e.g. in U.K. the proportion of wet mount and *in vitro* cultivation was like 0:3.9% and in Asia like 16:32%; 15.7:36%; 9.2:30.3% respectively.

Although the cultivation by means of four mediums hasn't revealed any significant difference (DL – 9.4%, BDMM – 10.7%, IMDM – 11.7%, Jones' – 11.9%) we recommend Jones' medium as the most useful one, because of its easy-preparing and low price.

Conclusions:

1. *In vitro* cultivation is a useful method for detection of *Blastocystis hominis*, especially in case of inexperienced laboratory staff.
2. *In vitro* cultivation enables obtaining purified and concentrated material for applying PCR methods.

AFRICAN PLAGUES

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Aim: The aim of this paper is to focus the readers' attention on the most serious problems of the inhabitants of Africa. Owing to which it would be possible to point out the methods of support for those people.

Material and methods: This is a review based on World Health Organisation's (WHO) reports, studies and papers published by the authors who had had direct or indirect contact with the problem of plagues in Africa, or who had carried out research on that subject.

Discussion: Africa is the poorest and simultaneously the most highly inhabited continent (every eighth inhabitant of the World lives there. No accurate data are available, but it is estimated that the population is 700 to 900 million people). Millions of the inhabitants of Africa have no access to fresh water, drugs and medical care. That condemns them to an uneven struggle for survival. In many regions of the continent, there is one doctor per several or several dozens of thousands of people, and there are places like Burkina Faso, where there is 1 doctor per 250 thousand inhabitants. The shortage of drugs is yet another problem. If drugs are available, their price is far too high for so called, normal people. Many Africans do not have access to valuable food. Due to poor sanitary conditions, diseases and famine, 26% of African children die before they reach the age of 5. The main mortality reasons are diarrhoea, malaria and respiratory system infections. The biggest plagues in Africa are: malaria, HIV infection, tuberculosis and famine. An outbreak of AIDS or "21st century plague" expands very rapidly and affects millions of people every day, irrespective of their age, gender or descent. Thousands of people die every day of AIDS (approx. 3000 individuals a day), tuberculosis and other diseases. Malaria kills approx. one million people a year.

Conclusions: Africa still needs external support. The operations of charity organisations are effective, but insufficient. The education and increased awareness of Africans play a crucial role in HIV infection prevention. Hygiene issues should be addressed and undernourishment reduced. The question of the availability of drugs and medical care should also be considered.

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CHICKENPOX ON BOARD SHIPS – AN UNDERESTIMATED PUBLIC HEALTH RISK

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Keywords: chickenpox, immunity, ships, sanitation, public health, international health problems

Background: Despite international notification requirements the magnitude of disease transmission on board ships is unknown. The case series aims to exemplify that chickenpox on board ships is common and of public health relevance.

Methods: Review of Literature and description of cases of chickenpox on board ships which had been reported to the Hamburg Port Health Centre from November 2007 to April 2008.

Results: Five cases of chickenpox from two passenger and two cargo ships were notified. Cases originated from Indonesia (1), Philippines (2) and Sri Lanka (2). The majority of passengers were UK residents. Three cases were notified by the Maritime Declaration of Health. Sources of infection were other crew members, passengers and persons in the home countries. Recommended control measures included isolation, information of crew and passengers on the need to present with symptoms, on the option of post-exposure vaccination and treatment options for special risk groups. All events were communicated to the next port of call for follow up.

Conclusion: Our case series exemplifies that chickenpox is not a rare event in ships. Many seafarers originate from tropical countries where seroconversion to VZV generally occurs in late adolescents and adults. Thus, a substantial portion of the work-force may be non-immune to VCV and potentially introduce the disease from the home countries to the ship or are at risk for infection on the ship.

Port health authorities, shipmasters and -doctors need to be well informed about the significance of chickenpox on board ships and the control measures as recommended by ECDC. Travellers should be advised to report to the ship doctor with any signs of infectious disease and on vaccination in non-immune persons with special risks.

ENVIRONMENT PROTECTION TECHNOLOGY TO ASSESS TOXICITY OF CONTAMINATED WATER METHOD OF BIOTESTING

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Keywords: polluted water treatment, ozone, infusoria *Tetrachymena pyriformis*

The aim of research was the assessment of toxic effect of ozone using the express method biotesting model infusoria – *Tetrachymena pyriformis* in the process of creating a compact system of sewerage household water.

The objectives of the work included:

- toxicity study of water technology in phases sediment actions coagulants;
- establish the effect of ozonization and the degree of detoxification of treated effluent in a pilot environmental module.

The object of the study served as sewage effluent from urban sewage, treatment of which the first stage of processing based on physical (filtration, mechanical advocacy) and physical-chemical principles (coagulation). The second phase of wastewater treatment, aiming at a deep cleaning and disinfection was carried out with the use of ozone.

With the aim of an integrated health study of the effectiveness of ozonization of wastewater, the level of cleaning and disinfection was evaluated on the basic health and hygiene, physical and chemical criteria.

Toxicity testing of residual ozone for infusoria *Tetrachymena pyriformis* – representatives of the simplest, which, along with other aquatic exposed to ozone - carried out under laboratory conditions.

To assess the toxicity of polluted water is recommended to use more ecological – hygiene tests infusoria *Tetrachymena pyriformis* in the hygienic regulation of operating and newly created environmental sanitation systems.

There is a high effect of cleaning and disinfecting of household waste water in the technological cycle – “coagulation, ozonization”.

In experiments biotesting on infusoria *Tetrachymena pyriformis* – residual ozone in treated water at temperature 20°C and concentration of 2.0–2.05 mg/dm³ – has no toxic effect.

Application of infusoria in toxicological evaluation as a test for the waste water is confirmed by expert studies and might be recommended in the process of creating, testing and operation of the new environmental sanitation systems.

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EPIDEMIOLOGICAL ASPECTS OF CARRYING TROPICAL VIRAL DISEASES IN MARINE SHIPS IN PORTS OF SOUTHERN COUNTRIES

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Keywords: viral diseases, marine ships, ports, prevention diseases.

Ecological and geographic characteristics of the ports of hot countries, landscapes of which on a number of natural hearth, transmission illnesses of man of cause of potential danger of skidding on the marine ships of excitors of infectious diseases arboviral aetiology.

Because with what priority positions were regulated and direction on organization of disease safety of crews of courts visitant countries of Africa and South-East Asia.

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FEATURES OF PREVENTION POLLUTION MARINE WATERS (PROBLEMS AND SOLUTIONS)

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Keywords: pollution marine waters, marine, waters, ships, ports, environmental funds, the concept of pollution, the criteria for assessment, prevention.

The purpose and objectives of the study was to develop science-based recommendations for the implementation of measures aimed at improving marine water in areas of intense shipping and recreational areas.

The objects of research were the sea harbour of Odessa, Iljichiovsk, Southern, and their infrastructure in the region of Odessa Gulf North-western region of Ukraine. For a uniform assessment of external factors and the development of environmental hygiene concept, reflects the specificity of quantitative and qualitative changes in the environment in the aspect of studying the water pollution of nature and water facilities.

Reported figures in view of the water factor, regulate the one hand the health of the population (working) on the other hand, determines the actual load, taking into account the differential impact of the facility on a reservoir of physico-chemical and biological criteria.

The above criteria are the ingredients in the management of the environment (the integral principle), as well as wellness and preventive measures aimed at implementing the practice of water transport and maritime medicine basic principles:

- improvement and upgrading of environmental systems and the creation of new designs through the use of biological and chemical activators and reagents to improve the quality of cleaning and disinfection of household sewage and surface waters,
- development of regulations.

This integrated approach based on ecological-hygienic regulation of the technical and operational resources, optimizing the conditions of good governance pressures fleet and shore installations on the environment.

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SANITARY-ECOLOGICAL CONCEPT OF HEALING ZONES OF RECREATION AND COASTAL WATERS

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Keywords: sanitation concept in coastal waters.

In the practical implementation of environmental sanitation, and we developed and implemented active preparations for the treatment of contaminated water and ready-technical projects effective environmental equipment for ships and industrial plants: "biocatalysts wastewater treatment" (the product of dry microorganisms active sludge) for faster start-up and efficient operation of the compact marine and stationary stations cleaning and decontamination of wastewater, based on the biological principle of operation, the product is widely tested on ships; maritime facilities as "Compact biological principle" Pomor production factory ship devices (technological and hygienic examination conducted joint project Institute of Marine and Tropical Medicine, Gdynia, Poland and Ukrainian Scientific Research Institute of Medical Transport, Odessa, Ukraine); "Compact automated station for recycling of industrial", based on physico-chemical principle of operation "attachment to the ship's facilities for decontamination of wastewater by physical means" to replace the use of environmentally hazardous chlorinated products.

In addressing the environmental problems of rehabilitation of coastal waters, on a priority basis a device protected by copyright patent, the principle which is based on the use of energy waves, while deep mixing and oxygenation of large water masses.

Formulated the concept of environmental hygiene anthropogenic and technogenic influence of water transport in the natural sites, and recommended urgent action phased recovery of marine water system management load fleet and shore facilities in the reservoir by methods of mathematical modelling and forecasting for ports, shipyards and means of water transport.

To create an enabling environment for the future of water use need to implement the basic requirements:

- hygienic and toxicological data on chemicals polluting water bodies, which are developed on the basis of normative values, consisting of a set of legislative, regulatory and methodological instructional documents;
- organization of public health surveillance for the current implementation of water sanitary legislation;

In general, the integrated system can be effective only if the combination of components that should be taken into account in the organization of preventive and curative measures.

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EVALUATION OF PODLASKIE PROVINCE NURSING CARE STUDENTS' KNOWLEDGE ON TROPICAL MEDICINE

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Introduction: According to current data from the World Tourism Organisation, over 150 million travellers have visited the developing countries annually in recent years. Therefore, specific medical problems have emerged, associated with overseas journeys and stays in the countries with diverse climatic and sanitary-epidemiological conditions, leading to the increased incidence of imported diseases. Therefore, more attention should be focused on travel-related problems and the patients should be approached with greater accuracy both by nurses and doctors in order to make the proper inferences about the nature of the patient's illness and make an accurate diagnosis.

Aim: The aim of the study was to evaluate the level of knowledge on tropical medicine of Nursing Care students in the Podlaskie Province.

Material and methods: The study was conducted based on a survey questionnaire among 500 Nursing Care students.

Results: 62% of the respondents showed an interest in further education in tropical medicine. According to 52% of the respondents, Nursing Care students' knowledge on tropical diseases is insufficient. Over 64% of them believe that it is necessary to provide education in that scope to nurses, and 44% of the questioned students declared their readiness to attend an educational course. The vast majority of students (90%) haven't participated in patient education in the scope of tropical medicine. According to half of the respondents, patients should be educated in tropical medicine by an Epidemiological Nurse, and 37% of students believe that patient education should be provided by every nurse. The prevention of tropical diseases is a dominating issue the students would like to learn about.

Discussion: Papers published by many authors confirm the existence of a clear correlation between the incidence of parasitic diseases in a hot climate zone and the negligence of the basic principles of hygiene and prevention aimed at morbidity risk reduction. The present study indicated that the majority of students (90%) have never participated in patient education in the scope of tropical medicine, and the remaining 7% participated only sporadically. That may be explained by the fact that over half of the respondents believed that further education in tropical medicine-related issues was necessary, as they thought their knowledge of the topic was insufficient.

Conclusions:

1. Nursing Care students' knowledge on tropical diseases is insufficient.
2. Nursing Care students are interested in broadening their knowledge in tropical medicine.