Workshop report

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Health Care Without Harm

Biocides and increased silver usage in Health Care
2009-11-24
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An educational activity directed at all staff within health care who are in contact with biocides such as silver, disinfectants, antibacterial medical devices.

The meeting started with **Dr Åsa Melhus from Uppsala University Hospital** giving an overview on what nano particles are and also reporting about the way the issue is handled within the EU, the various directives, investigations and regulatory framework. See SCENIHR. Then followed an extensive report from the Nanosafety for success dialogue in Brussels 3-4 November.
Some argument given by a speaker from the industry was especially commented upon. Car seats with silver is yet another addition to not needed consumer goods. One of the speakers who caught our interest was Mr Hanselmann (Sarastro). He showed several slides of how dangerous a taxi can be due to microbial contamination. This is old news, and none of the cultures contained anything out of the ordinary. From this visual message, the speaker jumped to the conclusion that there was a need for preventive measures and the best agent for this task was silver. Silver has certainly antimicrobial activities, but these activities have hitherto only been shown to take place if there is also water present. This essential detail was not mentioned nor the consequences for the environment and the public health if silver is used everywhere to combat something that has been around for approximately 3.5 billion years.

Washing machines with silver were referred to as a silver product that would benefit the environment. Although energy might be saved, the toxicity issue of silver for water-living organisms and the fact that bacteria are the only “cleansers” at sewage plants have to be addressed.

In clinical settings, few silver catheters have been shown to reduce the number of infections. If there is an antimicrobial effect, it only lasts two weeks for urinary catheters, which are usually drawn within two days or changed every three months. The cost benefit can therefore be questioned.

The most remarkable argument was, however, that silver socks can prevent wound infections in the diabetic foot. Later amputations and a lot of suffering for the diabetic patient can thereby be avoided. So far, there are no published studies dealing with this topic. There are studies dealing with silver-based wound dressings and chronic wounds in diabetics. None of

them are of high quality, and none of them have showed a better healing, that infections can be prevented or that amputations can be avoided.

Edda Hahlbeck from KEMI talked about the evaluation of silver that the Chemical Inspection Agency is doing for the Commission. Silver is a pesticide if it is used to an antimicrobial purpose. Disinfectants are biocides.
Biocides hide behind statements such as; treated against odour, free of bacteria, For lasting freshness, prevents mould, prevents discoloration, stops growth of algae, Hygienic protection, Sustains the natural bacterial balance etc. Only approved biocide products are to be let into the market within the EU. The terms are that at normal usage they must be efficient enough and have no unacceptable effects on recipient organisms, humans or animals or the environment. Check webpage www.kemi.se for national directives. There exists a European Silver Task Force where producers and importers of products containing silver cooperate. Silver is widely used in society not so much in Biocides but it is increasing. Some biocide products are outside the directives they are food products, food packaging, medicines, cosmetic products and medicine technical products. Silver ions easily get tied to particles and sediment. At the moment investigations are ongoing as to how dangerous for your health Silver is. It is however certain that silver put into clothes comes out in the sewage. The investigation faces many challenges. A wide market, many sources, the appearance and availability, spread in the environment, nano and silver is not alone there are also copper, zink etc. And the issue of the possibility of development of resistant bacteria.

Karin Rydin from SBU that evaluates health technologies is the Project leader for the investigation of silver wound dressing for chronic wounds. The purpose is to produce impartial and scientifically based material for decision making. These may be decision makers, patients, media and other organisations. Around each subject to be treated an expert group is created.
Silver dressings free positive ions when the come into contact with liquid in the wound. It has been hard to determine from the various studies some indicate that the wounds get smaller. The results of the studies are not certain. How ever the majority of the users were positive. But they missed guidelines concerning the usage of silver wound dressings. The expert group will present its results in February 2010.

Wing Cheng gave an elaborate expose of rules and the workings of the **Medical products Agency (MPA)** concerning the medicine technical appliances. He spoke about the regulatory framework concerning medicine technical products. He gave a short list of medical devices products, equipment for diagnostic radiology, surgical instruments, wheelchairs, glasses, band-aids, condoms, pace makers, pregnancy tests. A new approach now is to put more responsibility on the producer. CE marking is central. Borderline products are a problem. But it is the working substance that is central. The monitoring responsibilities are divided between authorities. Medical products Agency is responsible for the monitoring of medical devices and their producers. The National Board of Health and Welfare (Socialstyrelsen) is responsible for the usage of medical device products. If accidents occur the care giver must report to the producer with a copy to MPA or to the National Board of Health and Welfare concerning medical device produced by them. Please see MPAs home page for more info. www.lakemedelsverket.se

Michaela Truppe from INGES and HCWHE introduced INGES and HCWHE. She then went on to talk about the Vienna Hospital association and other Austrian Hospital

Associations. Michaela gave an extensive over view of the silver situation in Austria at the moment characterised by no restrictions and low awareness. There are a multitude of products on offer not only for ordinary consumers but also for specific usage at hospitals, cleaning products, hand hygiene products and curtains with silver and of course silver wound dressings. A new area of usage is as water disinfectant. For a future perspective silver and nanosilver in medical and consumer products will hopefully be evaluated within the next year. What are the risks and the benefits from these products? We need to examine these carefully.

Daniel Heimer senior consultant in Hygiene medicine at Västerås hospital, Sweden. Dr Heimer talked about the outburst of VRE in 2008 and ESBL in Västerås summer 2009 when 3 premature infants died. The reality we live in consist of dangerous bacteria such as MRSA, ESBL and VRE. Invasive VRE-isolates are spread all over Europe. Some countries are harder struck than others. VRE and ESBL are often found in the intestines, does not necessarily give symptoms. They may cause urinary infections, wound infections or sepsis, spread via contact. In 2008 in April Västerås hospital had 11 patients with VRE and intensive work to find the source and the contamination ways was started. VRE has super ability to spread, to attach to surfaces, to survive and to resist eliminatory measures.
Important measures are disinfection. Identified areas of risk is a jig saw consisting of many pieces; Hand hygiene, patients, over booked rooms, deficient localities, cleaning routines, buffets, lack of knowledge among staff, indistinct leadership, antibiotics. No caries found in a clean tooth and no bacteria are spread with clean hands. Hand hygiene for patients and visitors is central. Good examples are important. Basic hygiene routines are central , education and training, individual responsibility, and of course monitoring.
Antibiotics Yes but at the right moment, the right kind and for the right duration of time. Where can you find VRE. Look at this treatment room. And look at the spots the dark spots indicate VRE findings. So clean hands. Does cleaning practices have an impact? Yes, they have. Cleaning and disinfection of toilettes and patient close surfaces is important. Mechanical treatment, scrubbing at disinfection, Systematic measures and setting up of cultures with a feed back of the results to hospital staff. Avoid textiles on hospital furniture use artificial leather or leather.
ESBL-outburst at Västerås hospital summer 2009. Three premature infants died because of resistant bacteria. An additional four carried the bacteria but showed no symptoms. Several of the children were very small around week 24. Many transfers were made of mowing the children. Complications are usual and the children are very sensitive and receptive to contamination. Important measures: Disinfection. And once again have a look at the jig saw of the identified areas of risk. Within neonatal care you have no margins, the parents all need to be informed, you keep them in incubators, you are in permanent contact with other specialities and media interest is ripe. But you can affect the future and decide which direction you want to take. Improve hygienic measures.

Professor Hilpi Rautelin, Uppsala University, then spoke about the hyper virulent bacteria *Clostridium difficile* which is also giving us an increasing problem globally. In Finland there are as many as 500 cases a year now. The growing field of zoonosis, bacteria transferred from animals or food to humans is an area of growing importance and interest. *Clostridium difficile* is the most important cause of diarrhoea in connection with antibiotic treatment. CD has been known since 1935 in the bacterial flora of newborns. In 1977, a toxin producing CD was found in patients after they had received kindamycin treatment. The normal bacterial flora in the intestines is disturbed after antibiotic treatment. It is the most common cause of antibiotic related diarrhoea (AAD) CD can be found in soil and in water and in the intestines of animals. In pigs and calves, in meat products, not yet any proofs that CD contaminated food products

have caused clinical infections in humans. But the area of zoonosis is an important field of research. She spores are created inside the bacteria, they are resistant to alcohol, heat and aridity. They survive along time in the toilette and on hands. The staff may easily spread the bacteria. The spores survive in the environment around the contaminated person. Alcohol does not kill CD Soap and water is better and then disinfection with alcohol. CD is part of the intestinal flora of 3% of healthy adults of up to 80% of infants, 20-40% of hospital patients. The longer they are hospitalised the higher is the percentage. Risk factors for CD. Old age over 65 years old, hospital treatment, antibiotic treatment, other disease such as malignity, kidney failure, inflammatory intestine disease, reduced immune defence, PPI, surgery in the gastro intestinal tract. The new variant of *Clostridium difficile.* During later years there have been reports of an increasing number of CD cases, the cases are more difficult, and the mortality is higher. The new variant of CD is more aggressive it is hyper virulent, has an increased capacity to produce toxins up to 20 times as much, ability to produce binary toxins, increased spore producing ability, and resistance to flouroquinolones. More severe cases appear which need hospital treatment.

Mats Walder MD Malmö University Hospital spoke about chemical disinfection. Chemical disinfection causes physical denaturation of micro organisms. Chemical disinfectants pass passively into the cell. Micro organisms may only block substances that use the transport system of the cell or specific bonding places like antibiotics. Consequently micro organisms cannot develop resistance to disinfectants. The cleaning effect of alcohol varies with its percentage. Per acid has a wide and forceful effect. A documented affect against vegetative bacteria such as virus and fungus. Myco bacteria in particular Peroxyacetic acid CH3CO2OH.. Spores of *Clostridium difficile* only Peroxyacetic acid. Chemical disinfection of surfaes. Desinfection of clean surfaces for instance stainless steel. Alcohols isopropanol 42 – 70 %, ethanol 70 %. Local disinfection of surfaces whre there has been organic material including blood: Alcohol isopropanol 42-45%, Substances which oxide, halogenes, persic acids (persyror).

Anne-Marie Vass from the Karolinska hospital, Stockholm, high lighted some environmental aspects on disinfectants and listed products which are approved and not approved based upon environmental criteria. She started with giving the audience a short history of disinfectants staring with Semmelweis in 1847. There are clear systems of classifications concerning the characteristics of various products. One indication is how dangerous the product is to water living organisms if it has short term or long term effects. Biocides have various functions such as disinfection, sterilisation and cleaning. Alternatives to chemicals are heat and radiation. Most products contain active substances, additive substances and water. Concerning hand and skin disinfectants active substances that are also environmentally approved are Ethanol and Isopropanol. Klorhexidin and PHMG are not approved. Then followed a list of additive substances where the ticked boxes referred to approved substances. The same system for surface disinfection and again Ethanol and Isopropanol were approved. The Surface disinfectant Virkon was looked upon through the same system and also Instrumental disinfectants. Anne-Marie finished with giving a list of some other approved disinfectants and summarised that biological capacity to be broken down has been used to validate environmental affect of disinfectants. There do exist substances that are hard to break down in modern disinfectants. Be sure to control new products and watch out for the additive substances.

Pirkko Hooli from Uppsala County Council's purchasing department high lighted What can the purchasing department do? In Uppsala county council there is a regional cooperation

between five county councils Dalarna, Sörmland, Uppsala, Västmanland (largest city Västerås) and Örebro. The environmental policy council has given new directions in 2008 concerning wound dressings. The product shall be free from silver both in its metallic form and as a fusion. The sole exception is for serious burns. When they are to be purchased this policy criteria may be ignored. Silver dressings purchased until September 2009. Acti coat, Acticoat 7, nano cristallit silver. Actosorb Plus 25, Aquacel AG, Contreet, Contreet cavity. For instance the amount of Acticoat purchased in the period 200810-200909 has been reduced to a quarter compared to the period 200705-200804.. The difference is less concerning Actisorb Plus 25. Larger for Aquacel AG and less for Contreet. All in all the value of purchased silver products between the same periods has decreased from 1 268 710 SEK to 915 384 SEK. The silver dressing remaining and purchased between 200909 to 201208 is Aquacel AG. This development is due to information from Clinical Microbiology and the Silverwork done there and information supplied by our group.
Environmentally adapted purchasing for Varuförsörjningen (Purchase dept) for 2009; products that contains silver for a antimicrobial purpose shall be purchased with restriction and only when very clear medical indications are at hand. Silver in nanoparticle form should be completely avoided. Pirkko Hooli then ended by giving examples of old and new ingredients in dressings PHMB Polyhexamethylene- Biguanide) iodine and honey.

Participation and activity
120 persons registered and most of them were nurses, many also environmental ombud at their wards and clinics. Material consultants and purchasers also participated. Six doctors registered but we had wished for more.
The national spread was fine, Uppsala mainly but also from Stockholm, Enköping, Tierp, Göteborg,Vänersborg, Karlstad, Falun, Västerås, Norrköping, Växjo, Gävle, Jönköping and Östersund.
During the day there were many persons from the hospital that came in and listened during particular lectures of interest to them. The arrangements were well organised and the invitations hade been widely spread through mailing lists and contacts in addition to being on the Uppsala University Hospital web and the Clinic of microbiology web. All HCWHE members in Sweden had been informed of the event and a few of them participated in the meeting.
Material about HCWHE and the latest Newsletter, sent by Paul Whaley was copied and distributed. Participants also signed on lists to receive more information and mailings from HCWHE.

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