



International Silver Watch



Aim

To initiate a joint research initiative between health and environmental actors to achieve and investigate a holistic and multidisciplinary approach on potential silver threats due to increased and novel uses of silver in Health Care and Society. An approach involving both the medical and environmental aspects are necessary since both are affected through the novel silver usage.

To raise the awareness of negative effects of silver among the public in general and especially among present and potential future users of silver globally. The two most important target groups are purchasers and users. We plan to analyse how silver is introduced into different markets and objectively inform about silver usage and related health risks to health and environment based on scientific knowledge without commercial interests.

The ultimate aim is to reduce excessive silver use in Health care and Society. Silver is a toxic threat to health and environment.

Summary of state of knowledge

Silver is a rare but naturally occurring element, whose properties have been used in a wide variety of applications. Its antibacterial effect has been noted for centuries, but the scientific documentation of its toxicity, mechanisms of action and clinical usefulness is still limited. With the emergence of multiresistant bacteria, the interest in silver has increased. So far, the photographic industry has been the largest consumer, but now a new market is developing.

Silver has quickly spread from soaps to full room concepts in hospital wards. Silver is used in textiles, ceilings, walls, floors, furniture, clothes, shoes, telephones and accessories. It can be found in almost any medical device. The estimated yearly growth of the antimicrobial market is 40%, and silver is marketed as an alternative to antibiotics. However, bacteria can become resistant to both silver and antibiotics, and the use of silver can actually mediate the antibiotic resistance.

Silver accumulates in the body tissues, an example of this is the chronic silver intoxication called argyria where the skin turn grey. This is usually caused by use of colloidal silver. Silver sulphide deposits have been identified in the region of cutaneous nerves. Research also indicates neurological damage due to silver usage. There are cases that support the hypothesis that silver may cause convulsive seizures as a result of systemic poisoning. Among the metals used in nanotechnology silver is at present showing the highest increase. Side effects of silver usage are thus an emerging problem and a coming medical challenge.

Swedish pharmacies ban silver band- aids

On April the 20th April Swedish pharmacies decided to stop selling band- aids containing silver. The decision was influenced by an article in *Miljöaktuellt* nr 3, April 2006. This certainly proves that committed people and information can make a difference to Health Care.

Project description

To combine investigations on both the medical and environmental sides is necessary since both health and environment are affected through the novel silver usage.

The importance of heavy marketing strategies in the public sector is a problem.

The Research group is a joint research initiative between the Department of Clinical Microbiology (University Hospital) and Department of Earth Sciences (Uppsala University) to achieve and investigate a holistic and multidisciplinary approach on potential silver threats due to increased and novel uses of silver in Society. The group started to work together in early 2006 and has since then participated in three international conferences where the issue of silver as a toxic threat to both health and environment has been presented. The group aims to provide research on the effects of silver on bacteria and antibiotic resistance. The group also aims to inform about the risks and minimize silver usage in society as a whole.

International cooperation

Our research team is a member of two large international networks. HCWH Health Care Without Harm with its seat in Prague and HEAL Health and Environment Alliance with its seat in Brussels. The group has participated in three meetings on Environmental health organised by the Commission. Our network International Silver Watch has helped in producing a fact sheet on nanotechnology for the Commission. Many countries are involved in this network cooperation where we also have a common research interest to pursue. Armenia, Australia, Brazil, Germany, India, Japan, Latvia, Macedonia, and The Philippines are some of these countries that have explicitly expressed an interest in the issue. Doctoral students are involved in this work both in Japan and Latvia. The international network disseminates information about products which contain silver and spread research results on the medical usage of silver and related environmental effects.

Ethical aspects

Silver is a product which is not needed in health care at the present level of usage. This excess usage of silver in conjunction with the health and environmental risks and the high costs for the public sector needs to be investigated. To market products with toxic effects on humans and our eco system is unethical. Silver is not a safe material for medical devices or household appliances.

Gender aspects

Most advertisements are directed to women as house keepers with the main responsibility to keep germs away from our homes. Silver is included in washing machines, refrigerators, panty liners and pacifiers. Women are seen as safe keepers of the health and general well being of the family and silver is launched as the means to help them ward off bacterial threats to their nests. There are a wide range of products containing silver directed to the consumers. Most of them are not needed. In addition they are expensive and toxic.

Preliminary results

At present, research is done on silver and bacterial resistance. The results are interesting and point in one direction; it is quite easy to induce silver-resistance in bacteria, but more research is needed. We hope to be able to publish some of the results in the coming autumn. The group has been very active in discussions with Samsung regarding its launch and sale of their Silver Washing Machine. Protests have been delivered to the company both for medical reasons as well as environmental. The research group is also investigating products containing silver

which are for sale at health stores. Solutions containing colloidal silver are said to cure all kinds of disease and prevent infections. Information to warn retailers have been passed around. Examples of such products are Ionosil for drinking and MSM a cream for the skin. But hospitals are the main users of silver.

When markets disappear the need to find new outlets increase for the producers. Many of these markets appear in the South. Colloidal silver, which is sold in health stores in Sweden and the rest of Europe, and on the internet, is said to improve the immune system. The products are heavily marketed and since they are said to strengthen your immune system they are now used in projects in Africa to cure HIV/AIDS. There are no data what so ever to confirm this claim.

Relevance of International Silver Watch

Antibiotics are toxic to bacteria. Toxic heavy metals are also toxic to bacteria. The mechanisms bacteria use to protect themselves against these substances are, to some extent, the same: they alter their cell wall or cell membrane and expel the toxic substance via so called efflux pumps (Li 1997, Rose 1999, Melhus, manuscript) When the bacteria alter their cell walls or cell membranes to protect themselves against silver, this may render one of our most important antibiotic groups ineffective. This group is called beta-lactams. The cell walls are its modus operandi and this group represents 50% of antibiotics consumed. Efflux pumps may be aimed at pumping out one or a few substances but there are also multi-drug pumps. The latter kind is able to expel toxic heavy metals, disinfectants and antibiotics. Research on silver usage in the health sector is therefore of relevance for Swedish health care in general.

Environmental effects of economic activities are central and direct all public activities in Sweden today. They are an important aspect of silver usage in Health care.

Bacterial infections are a threat to mankind and, irrespective of geographical, cultural, gender or age factors, bacteria have always been a major cause of morbidity and mortality. The introduction of antibiotics during the Second World War changed the picture radically and today antibiotics constitute the group of pharmaceuticals with the highest consumption worldwide. However, the use of antibiotics is not without problems. It is only relatively recently that we have started to realize how complex and serious the consequences are, not just for the individual patient but also for Health care in general.

Contacts:

Åsa Melhus, MD, PhD, Associate professor
Department of Clinical Microbiology
Uppsala University Hospital,
S-751 85 Uppsala, Sweden
E-mail: Asa.Melhus@akademiska.se
Phone: +46 (0)18- 611 93 88
Fax: + 46 (0)18- 55 73 01

Lars D. Hylander, PhD, Assoc. Prof.
Uppsala University, Department of Earth
Sciences, Air & Water Science.
Villavägen 16, S-752 36 Uppsala, Sweden.
E-mail: Lars.Hylander@hyd.uu.se
Phone: +46--(0)18-471 22 65 and +46--(0)18-14
84 06, Fax: +46--(0)18-55 11 24

Eva Haxton, Coordinator, Information Officer
Department of Clinical Microbiology, Uppsala University Hospital, 751 85 Uppsala, Sweden
E-mail: Eva.Haxton@medsci.uu.se. Phone: + 46 (0)18 611 90 97, Fax: + 46 (0) 18-55 73 01