

Abstracts

Kurzfassungen der Vorträge

CleanMed Europe Partner



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*Institut für Nachhaltigkeit im Gesundheitswesen
Institute for Sustainable Healthcare*

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Green and Healthy Buildings

The design of buildings is of great importance for the well-being of patients, staff and visitors. And the design also largely determines the environmental impacts. This special conference for architects, planners, contractors and other interested persons addresses concepts and principles of ecological construction in the healthcare area, building materials, indoor environment, and energy-saving construction techniques.

Green by Design: Architecture – Concepts, Design Principles, Case Studies

Robin Guenther, AIA, Guenther 5 Architects, New York

„Green by Design“

Document can be downloaded at www.noharm.org/details.cfm?ID=899&type=document

Kate Trant, CABE Commission for Architecture and the Built Environment, London

“Radical Improvement in Hospital Design Necessary for Healthy Hospitals”

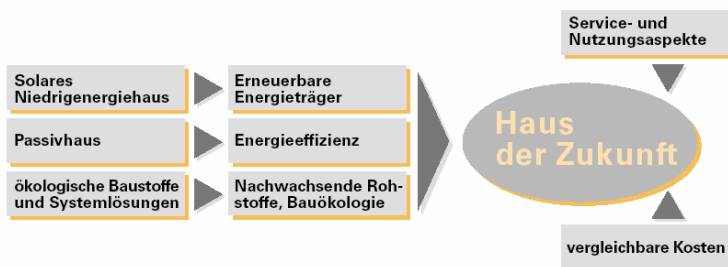
The Commission for Architecture and the Built Environment’s (CABE) ongoing Healthy Hospitals campaign calls for radical improvements in healthcare design and challenges us all to think again about the importance and value of good design in hospitals. The UK Government is undertaking the largest healthcare building programme for a generation, including over 100 new hospitals by 2010. By the time the current hospital programme is complete, CABE estimates that one in four nurses and one in four patients in the UK will be affected. CABE believes that improving the design of public buildings is fundamental to improving public services and that well-designed healthcare buildings can lead to better health outcomes.

CABE will outline the Healthy Hospitals campaign, now a year old, and present the results of a recent research study looking at the impact of the design of hospitals on the people who work in them. The study explores the increasing recognition that staff well-being impacts positively on patient welfare and therapeutic recovery. While the study focuses on nursing staff, many lessons can be drawn from the work that can be applied across the board to all staff groups. Particular issues include the ways in which the design of the working environment affects how valued nurses feel, and the importance of real consultation with staff on the design and organisation of their workplace.

Elisabeth Huchler, Federal Ministry of Traffic, Innovation and Technology, bm:vit, Vienna, Austria

The subprogram “Buildings of Tomorrow” by the Federal Ministry of Traffic, Innovation and Technology (bm:vit)

Die Programmlinie „Haus der Zukunft“ baut auf den beiden wichtigsten Entwicklungen im Bereich des solaren und energieeffizienten Bauens auf - der solaren Niedrigenergiebauweise und dem Konzept des Passivhauses. Für die Programmlinie „Haus der Zukunft“ werden diese „energieorientierten“ Innovationen um ökologische, ökonomische und soziale Anforderungen erweitert.



Unter „Haus der Zukunft“ sind Neubauten und sanierte Altbauten zu verstehen, die im Vergleich zur derzeitigen Bau- und Sanierungspraxis folgende Kriterien erfüllen:

- Deutliche Reduzierung des Energie- und Stoffeinsatzes
- Verstärkter Einsatz erneuerbarer Energieträger, insbesondere Solarenergie
- Erhöhte und effiziente Nutzung nachwachsender bzw. ökologischer Materialien
- Berücksichtigung sozialer Aspekte und Erhöhung der Lebensqualität
- Vergleichbare Kosten zur herkömmlichen Bauweise und damit hohes Marktpotenzial

Ziel der Programmlinie „Haus der Zukunft“ ist die Erforschung und Entwicklung von marktfähigen Komponenten, Bauteilen und Baukonzepten für Wohn-, Büro- und Nutzbauten, die den oben genannten Kriterien in hohem Maße entsprechen. Im Sinne der angestrebten Umsetzung und Verbreitung der Ergebnisse kommt erfolgreichen Demonstrationsprojekten eine hohe Bedeutung zu. Ausführliche Informationen zur Programmlinie sowie Kurzbeschreibungen zu allen Projekten und Endberichte als Download finden sich unter www.hausderzukunft.at.

Bernhard Lipp, IBO - Austrian Institute for Construction Biology and Ecology, Vienna “Criteria for Healthy and Environmentally Sound Hospitals – Best Practise Case Studies”

In den vergangenen Jahren zeigten viele Hochbauprojekte das enorme ökologische Verbesserungspotential auf, dass durch den Einsatz von neuen Erkenntnissen der Behaglichkeitsforschung, moderner Technologien sowie neuer Baustoffe und Bausysteme erschließbar ist. Der überwiegende Teil dieser Vorzeigeprojekte sind Wohnbauprojekte, nur ein kleiner Teil befasst sich mit Nutzgebäuden wie Krankenhäusern. In Krankenanstalten wäre jedoch ein möglichst rascher, breiter Einsatz besonders wichtig, da die Behaglichkeit mit ihren vielen unterschiedlichen Fassetten für das Wohlbefinden und den Heilungsprozess der Patienten von wesentlicher Bedeutung ist. Weiters sind Krankenanstalten sehr große Energieverbraucher. Zentrale Kriterien für Behaglichkeit in Gebäude sind u. a. thermische Behaglichkeit, Innenraumluftqualität, Schallschutz, elektromagnetische Qualität, Helligkeit. Diese sind auch in Gebäudepässen wie Ökopass und TQ verankert.

Gleichzeitig würden bessere Standards bei Energie- und Wassermanagement auch Betriebskosten und Umweltbelastungen reduzieren helfen. Aktuelle Untersuchungen zeigen, dass Krankenhäuser die öffentlichen Gebäude mit dem mit Abstand höchsten Energieverbrauch sind und vielfach ein sehr hohes Einsparpotential aufweisen. Da ein beträchtlicher Teil der Krankenanstalten in öffentlicher Hand sind (in Österreich ca. 50 % aller Krankenhausbetten), kommt hier Bund, Länder und Gemeinden eine besondere Bedeutung zu. Eine Aufgabe, welche die Bundesländer etwa bei der Wohnbauförderung bereits aktiv durch Kriteriensetzung für Ökologie und Wohnbehaglichkeit, umsetzen. Die Studie soll einen Impuls für mehr Ökologie, Behaglichkeit und Energieeffizienz in Krankenhäusern setzen.

Zu folgenden Themenbereichen wurden Good Practise Beispiele von Krankenhäusern gesammelt und dokumentiert:

1. Behaglichkeit: Thermischer Komfort, Farbkonzepte, Licht, Akustik
2. Energie(effizienz): Raumwärme, Lüftung mit Wärmerückgewinnung, Kühl- und Klimatechnik, Warmwasserbereitstellung, Elektrogeräte, Auswahl Energieträger
3. Innenraumluft: Belüftung, Möbel, Baustoffe, Bauchemie (Kleber, Farben,..)
4. Ökologie der Baustoffe und der Ausstattung: Baustoffauswahl, PVC-frei, HFKW-frei, SF6-frei, Logistikkonzepte für Abbruch und Sanierung
5. Wasser: Wassereffizienz, Wassernutzung, Grünraum- bzw. Freiraumkonzept(Versiegelung, Regenwasserversickerung,..)

Durch Analyse erfolgreicher Beispiele („Good Practise Beispiele“) im deutschsprachigen Raum (Österreich, Deutschland, Schweiz) sollen die wichtigsten Kriterien anschaulich gemacht werden und ein Impuls für die Umsetzung in anderen Krankenhäusern liefern.

Bruno Klausbruckner, Vienna Hospital Association (KAV) “The KAV Strategy for Green and Healthy Buildings”

Der KAV sieht es als Verpflichtung an, auch im Bauwesen Materialien einzusetzen, welche die Menschen nach heutigen wissenschaftlichen Erkenntnissen so gering wie möglich belasten. Nachträgliche notwendige Sanierungsmaßnahmen zur Herstellung zumutbarer Raumlufbedingungen liegen erfahrungsgemäß immer vielfach über möglichen Mehrkosten für ökologisch einwandfreie Baumaterialien. Da es entsprechende politische Aufträge zur Umsetzung ökologischer Baumaßnahmen gibt, ist die Diskussion, ob ökologische Kriterien anzuwenden sind oder nicht, müßig. Bei der stets erforderlichen Festlegung von Standards bei Ausschreibungen können in Hinkunft nur mehr einwandfreie, für den Menschen so wenig wie möglich belastende Materialien berücksichtigt werden. Die lückenlose Einhaltung der ausgeschriebenen Standards wird durch Innenraumlufmessungen im Sinne der Qualitätssicherung durch unabhängige Messinstitute überprüft.

Interior / exterior, Building Materials

Thomas Belazzi, bauXund, Vienna

“Building PVC- and Solvent Free for a Healthy Indoor Environment”

Der Wiener Krankenanstaltenverbund (www.wienkav.at) bekennt sich seit vielen Jahren zum vorsorgenden Umweltschutz und damit auch zur Vermeidung von PVC und anderen umwelt- und gesundheitsschädlichen Produkten und Substanzen. Im Rahmen eines Pilotprojekts wurde von 2002-2004 bei der Generalsanierung des Pavillons Austria im Otto Wagner Spital ein ökologisches

Vorzeigebauprojekt umgesetzt. Die ökologische Beratung und Begleitung dieses Projekts wurde durch bauXund durchgeführt. Diese Beratungsleistungen wurden vom Ökokauf Wien Programm der Stadt Wien finanziert (www.oekokaufwien.at).

Im Zentrum der Aktivitäten stand

- die Vermeidung von PVC bei allen Baumaterialien (Fenster, Rohre, Boden- und Wandbeläge, Elektroinstallationen etc.),
- die Vermeidung von klimaschädlichen HFKW (teilhalogenierten Fluorkohlenwasserstoffe) in Bauprodukten
- die Minimierung des Einsatzes der organischen Lösungsmitteln in Bauchemikalien wie Klebstoffen, Farben, Lacke

Nach der Fertigstellung der Bauarbeiten wurden Innenraumlufmessungen durchgeführt, die den Erfolg der gesetzten Maßnahmen der Schadstoffvermeidung durch die erreichte gute Innenraumluftqualität belegen.

Im Rahmen von drei weiteren Sanierungsprojekten des Krankenanstaltenverbundes werden die gewonnenen Erfahrungen des Pavillons Austria bei gleichen Zielvorgaben (PVC-frei, HFKW-frei, Lösungsmittelminimierung) erneut umgesetzt.

Markus Treichler und Rhoda Born, Filderklinik, Stuttgart, Germany

“Effect of Anthroposophic Clinic Design on Patients and Staff by the Example of the Filderklinik”

Teil 1 (M. Treichler): Einführung in die Filderklinik, ein anthroposophisches Krankenhaus im Bettenbedarfsplan des Landes Baden-Württemberg für die Grund- und Regelversorgung im Süden Stuttgarts. Gesichtspunkte zur anthroposophischen Architektur im allgemeinen und zur Klinikarchitektur der Filderklinik im besonderen mit Bildmaterial.

Teil 2 (R. Born): Mit einem kurzen „Architekturfragebogen“ werden in Interviews mit Mitarbeitern und Patienten verschiedene Merkmale der Klinikarchitektur abgefragt. Die zusammengefassten Kategorien beinhalten Aussagen zu Raumatmosphäre, Farbe und Material der Filderklinik. Vorgestellt werden auch Unterschiede zu anderen Kliniken sowie Äußerungen zur baulichen Kritik und Änderungswünsche. Die verschiedenen Merkmale werden anhand von Bildmaterial der Filderklinik präsentiert, durch Zitate der befragten Personen unterstützt und erläutert.

Low Energy Buildings

Patrick Jung, Jung Ingenieure, Cologne, Germany

“Examples for successful energy efficiency concepts in German clinics”

Einsparpotentiale für den Betrieb von Kliniken wurden durch unser Büro in vieler Hinsicht erarbeitet. Dabei konzentrieren sich die Bemühungen auf Bereiche, in denen Patienten untergebracht oder behandelt werden. Im Entwurf von energiesparenden und umweltverträglichen Bettenzimmern, Monitoringstationen und Behandlungszimmern wurden gute Erfahrungen gesammelt. Hier liegen häufig Anforderungen vor, die sich reibungslos mit modernen Niedrigenergiekonzepten vereinbaren lassen. Zentrale Ansatzpunkte für Energieeinsparung ist zuerst die Überprüfung der geplanten Raumluftechnischen Anlagen auf Einsparpotentiale. Folgende Maßnahmen sind dabei Erfolg versprechend: Reduktion der Luftleistung, Einbau von effektiven Wärmerückgewinnungsanlagen, Ersatz von Klimatisierung durch stille Kühlung, Nutzung von Umweltwärme und Kälte in der Lüftungstechnik und in der stillen Kühlung, Nutzung des Tageslichts zur Beleuchtung.

Um die Potentiale zu erschließen, ist eine grundsätzliche Entscheidung bezüglich der Architektur zu fällen. Tageslichtorientierte, unklimateisierte und angemessen belüftete Raumkonzepte verlangen eine aufgelockerte Bauweise, eine Abkehr von hohen und kompakten Baukörpern, in denen Kunstlicht und Kunstklima eine technisch kontrollierte Atmosphäre bilden. Der Gegenentwurf, der inzwischen deutlich bessere Akzeptanz in der Bauherrenschaft findet, nutzt Innenhöfe, Atrien und Fassaden mit einem verglasten Flächenanteil von ca. 50%, um einen stärkeren Umweltbezug herzustellen. In diesem Fall lässt sich die natürliche Lüftung und Belichtung nutzen, oder eine auf das Minimum reduzierte technische Belüftung. Sind mit Hilfe der Architektur die Grundlagen gelegt, so lassen sich auf technischem Wege erstaunliche Einsparungen erzielen.

So können z. B. im Albertushaus in Mönchengladbach alle insgesamt 24 Behandlungsräume mit Stromkosten von nur 300 EUR (statt konventionell 2.700 EUR) pro Jahr auf 27°C gekühlt werden. Das Haus nutzt dabei direkt die Kühle des Grundwassers an den Fundamenten und transformiert diese in die nicht abgehängenen Betondecken. Die Beheizung der Räume verläuft mit Hilfe einer Wärmepumpe nach dem gleichen Prinzip.

Im Neubau der HELIOS-Kliniken, Berlin Buch, werden Atrien zur Tageslichtnutzung und natürlichen Belüftung genutzt. Diese Atrien erlauben eine flächenwirtschaftliche Bebauung bei gleichzeitigem Umweltbezug für die Ärzte- und Behandlungszimmer. Die Atrien erhalten Zuluft aus einem betonierten Kanal unterhalb des Gebäudes, der so ausgeführt wird, dass die Außenluft im Sommer vorgekühlt und im Winter vorgewärmt wird, ohne weiteren Energieeinsatz ausschließlich über die regulierende Erdoberflächtemperatur. Auf eine Klimatisierung von ca. 5000 m² an Behandlungs- und Arztzimmern konnte so vollständig verzichtet werden, was schätzungsweise Investkosten von 750.000 EUR und Betriebskosten von jährlich 3.600 EUR für Kälte einspart. Für Beleuchtung sind zusätzlich 40%, d.h. 8.000 EUR Betriebskosten eingespart worden.

Für den geplanten Neubau der medizinischen Kliniken in Darmstadt ist der Energiegewinn gleichzeitig Komfortgewinn für die Patienten. Hier wird den Bettenzimmern eine verglaste Loggia vorgesetzt, die viele Funktionen zugleich erfüllt. Sie schützt die Patienten vor dem Schall der nahe liegenden Bundesstraße, sie reduziert den Windangriff auf die frei öffnenden Fenster und sie erlaubt den Aufenthalt in einer Zwischenzone zwischen drinnen und draußen. Dies ist sehr wichtig, da die Patienten nicht in der Lage sind Spaziergänge draußen zu unternehmen. Die Loggia bietet nahezu ganzjährig eine zugfreie, lichtdurchflutete Zone, die ihre eigene Privatheit hat. Die Loggien sind durch lamellenförmige Glaselemente stufenlos frei zu belüften, um die Temperaturen ganzjährig auf simple Weise steuern zu können. In diesem Fall können - als Zusatznutzen - die Heizkosten um etwa 20% gesenkt werden, da die Loggia im Winter als thermische Pufferzone fungiert.

Abschließend stellen wir ein Konzept in Entwicklung vor: der Neubau einer Monitoringstation für Epilepsie-Patienten in Kleinwachau bei Dresden. Hier wird das Energiekonzept konsequent optimiert. Die zentrale Lüftungsanlage wurde um 80% verkleinert und durch spezielle dezentrale Geräte ergänzt. Diese dezentralen Geräte ermöglichen eine kurzzeitige Stoßlüftung mit Wärmerückgewinnung. Die Grundlüftung läuft dagegen auf einem - durch TÜV-Messungen abgesicherten - Low-Level. Dadurch werden Investkosten gespart, die in einen hoch effizienten Wärmetauscher investiert werden, welcher 40% mehr Energie zurückgewinnt als gebräuchliche Fabrikate. Zusätzlich wird ein Solekollektor in das Erdreich um den Baukörper herumgeführt, der einfach in die vorhandene Baugrube mit eingelegt wird. Dieser Kollektor besteht aus 150 Meter PE-Rohr, in welchem ein Wärmeträgermedium - die Sole - auf Grundwassertemperatur erwärmt wird. Im Winter kann damit eine Anwärmung der Außenluft von -10 auf -2°C erfolgen, im Sommer eine Abkühlung von 32°C auf 24°C. Wenn man bedenkt, dass damit die Verbrauchsspitzen im Wärme- und Kältebedarf gekappt sind, wird klar, welches Einsparpotential damit verbunden ist. Der gesamte Neubau wird durch eine optimierte Bauqualität den so genannten Passivhausstandard erreichen und ist in diesem Sinne eine weltweite Premiere.

Die vorgestellten Konzepte sollen den Anstoß geben, durch eine interdisziplinäre Zusammenarbeit zwischen Medizinnern, Bauphysikern und Energieexperten bislang ungenutzte Einsparpotentiale zu erschließen. Die gezeigten Beispiele belegen, dass dies keine Mehrkosten in der Bauphase verursacht und dass die Energiekosten und die durch den Energieverbrauch verursachten Umweltbelastungen um 20 bis 75% gesenkt werden können.

Olaf Bruun Jørgensen, Esbensen Consulting Engineers A/S, Copenhagen, Denmark

“Energy - efficient European Hospital and Health Care Buildings - Case Studies from Denmark, Germany, Italy, Netherlands and Poland”

In 2002 an energy conscious European R&D project within the health care sector was initiated with support from the EU. Five countries (DE, DK, I, NL, PL) with a demonstration project in each of them participate in the HOSPITALS project. The project shall solve a number of key problems regarding high energy demands, poor indoor climate and air quality conditions, which is lately recognised in the European health care sector.

HOSPITALS aims to demonstrate the significant reduction potential of the total energy demand in the European health care building sector through construction of 5 exemplar energy conscious and sustainable health care buildings. The objectives are:

- To implement and demonstrate innovative energy efficient designs.
- To introduce the use of the Integrated Energy Design Process and the use of innovative renewable energy technologies.
- To obtain significant decreases of energy use and CO₂ emissions.
- To ensure large improvements of the thermal and visual indoor climate for patients and employees.

Expected energy savings + CO₂ emission reductions between 24-62% are demonstrated in 5 buildings using various designs and concepts: Energy efficient HVAC systems, hybrid ventilation, building integrated solar thermal systems, multifunctional PV-systems, light ducts, roof lights, double skin facades, high performance glazing and transparent insulation.

Having demonstrated, monitored and evaluated the projects, a wide dissemination/results exploitation is carried out through the networks of the partners and through handbooks and web sites (www.eu-hospitals.net). More detailed descriptions of the individual projects will be presented.

Günther Pfeifer, Freiburg, Germany

„A “Passive-House” Energy Standard for a New Building at the “Klinikum Freiburg”

Kybernetik bezeichnet die Wissenschaft von der Kontrolle und Information, gleichgültig ob es sich um lebende Organismen oder Maschinen handelt. Ökologische Systeme sind geregelt. Sie stehen in direkter und indirekter Beziehung zueinander und bilden ein Netzwerk gegenseitiger Abhängigkeiten. Ökologisches Bauen bedingt ein vernetztes System verschiedenartiger Funktionselemente, die untereinander in Wechselwirkung stehen. Dass dabei alle Elemente in die Vernetzung integriert werden, also auch Konstruktion, passive und aktive Elemente versteht sich von selbst. Aber sie bildet eben auch nur Teilsysteme auf einer untergeordneten Ebene. Das kybernetische Prinzip des ökologischen Bauens besteht aber aus einer Vielzahl von Systemelementen,

die in unter - bzw. übergeordneten Ebenen untereinander vernetzt werden müssen. Das ist der eigentliche Ansatzpunkt des kybernetischen Denkens und des Entwickelns und Vernetzens entsprechender Planungswerkzeuge.

Schwerpunkt dieser Betrachtungen ist es, dieses kybernetische Prinzip von Beginn an in jeden Bauentwurf zu integrieren, somit den eigentlichen Denk - und Planungsprozess schon mit der Frage beginnen zu lassen, wo und wie denn alle Elemente und Erkenntnisse diesen Prozess a priori bestimmen und begleiten werden. Die Fortschreibung des architektonischen Anspruchs wird sich zukünftig nicht allein aus funktionalen und ästhetischen Determinanten zusammen setzen, sondern aus der Einsicht, dass Architekturen zu entwickeln sind, in denen das Verhältnis zwischen dem Teil und dem Ganzen kybernetischer Natur ist. Also darauf hin angelegt, die strukturellen Eigenarten aller beteiligten Systeme - physikalischer, biologischer und technischer Art - so zueinander in Beziehung zu setzen, dass sie sich in ihren Wirkungen ergänzen.

Energieeffizientes Entwerfen baut auf den Grundlagen bioklimatischer Bedingungen auf. Es bezieht die Wechselwirkung zwischen Mensch und Umgebung ebenso mit ein wie die physiologischen Regelmechanismen, die Einflussgrößen auf das thermische Empfinden, die thermophysikalischen Eigenschaften von Baustoffen, die Gebäudeorientierung für die solare Einstrahlung und deren Einfluss auf das Raumklima sowie die physikalischen Grundlagen der natürlichen Lüftung und Kühlung.

Im Vordergrund der Entwicklung stehen entwerferische Strategien und Grundlagen, die den Einsatz regenerativer Energien mit möglichst geringem technischem Aufwand realisieren lassen.

Energetische Entwurfsprinzipien orientieren sich an der Gebäudezonierung, Materialwahl und Konstruktion und werden in enger Abstimmung und Koordination mit kybernetischen Optimierungsstrategien mittels Rechenprogrammen entwickelt. Am Beispiel des Laborgebäudes des Instituts für Umweltmedizin und Krankenhaushygiene für die Universität Freiburg werden die einzelnen Planungsmodulare und deren Verknüpfungen vorgestellt und erläutert.

Green Procurement I

The production, delivery, use and disposal of the numerous products used in healthcare have significant impacts on the environment. Buying environmentally preferable and safe products and services can drastically improve the environmental performance of healthcare facilities.

Learn about the experiences with green procurement in Austria, Denmark, Germany and Sweden.

Ekkehard Philipp, City of Vienna

“Ökokauf – The EcoProcurement Initiative in Vienna”

The project EcoPurchase Vienna (ÖkoKauf Wien) is part of the Viennese Climate Protection Programme (KliP Wien) and has an interdepartmental structure. Ecological criteria are developed and upgraded by a total of 18 working groups. A steering team combines the findings of the working groups in criteria catalogues and submits proposals to prepare a legal basis of the catalogues. The Vienna Hospital Association is member of the steering team as well as of most of the 18 working groups. In Viennese hospitals several pilot projects are conducted-dealing with different topics like renovation measures and the usage of cleaning products. Also lots of work is done regarding the introduction of organic food.

www.oekokauf.wien.at offers detailed information (in German only) about the structure, goals and results of the project.

Anne Ipsen, Ökopol, Germany

“Quality Management as a guarantor for more efficiently and less effects to the environment”

German hospitals spend about € 7.5 billion on medical equipment compared to approximately € 1.5 billion on drugs. In fact, medical products accounts for 50 percent of the costs of running a hospital in Germany. In addition medical products produce about 2 kg trash per day and patient.

From 1999 till 2002 the Hamburg Hospital Association commissioned a study to evaluate nursing products according to their hygienic properties, costs, and environmental friendliness. Oekopol, the Institute for Environmental Strategies from Hamburg, Germany, was the scientific adviser of the project.

Products that were tested and evaluated in hospitals included everything from scalpels, gloves, plaster, diapers, catheters, electrodes and cushions -no drugs– about 150 different product groups in all.

The experience of the project was that most hospitals don't really know how much they spend. Often hospitals have any cost to benefit management, but more and more people in health care are questioning what products really do and what benefits they offer.

The aim of the project was to get hospitals to operate more efficiently, the results of the project show that German hospitals could save anywhere between € 500 to thousands per product group per year by using more efficient products and more environmental friendly products. The lecture will give an overview of the method, the results and possible consequences, e.g. for an environmentally friendly public procurement or for procuring agencies.

Charlotta Frenander, Sweden

“Green Procurement Activities in Sweden”

The Swedish Instrument for Ecologically Sustainable Procurement: www.eku.nu

The EKU website is a resource and a tool for imposing environmental requirements on public procurement. Here can be found environmental requirement specifications, criteria documents, and related information for the goods and services that are most commonly purchased within the public sector. The objective with the instrument is to help purchasers to identify “green” products that are not having negative effects on other important aspects of the purchase. EKU is run by the Swedish Environmental Management Council (SEMCO).

Bo Jonoe, Sønderborg hospital, Denmark

“Green Dialogue – A Database for Green Purchasing”

The hospital in Sønderborg completed a conference with participation of producers, suppliers and hospitals in Denmark. The objectives were to establish a dialogue between the participants and to discuss “Environmental requirements to suppliers” in connection with purchasing of products and articles to the hospital sector.

Based on the conference, the hospital worked out a guidance, which focused on the role of the hospitals and how the suppliers are able to support them. What can the suppliers do, in order to ensure that products and articles, consumed in the hospital sector, do

minimize the pressure on the environment and the health. The guidance includes the product, the packing, the working environment at the consumer (focus on hospitals) and the transport of goods.

In the enclosure to the guidance, there are suggested four formulas. The formulas contain a number of questions, which will ensure a high environmental knowledge about the products and articles. Using these formulas, the hospitals purchaser will achieve important environmental knowledge and be able to select the best environmental conscious products and articles. The guidance respects the EU public procurement.

The Danish Ministry of Environmental Protection has decided to support a translation of the guidance "Environmental requirements to suppliers" and it will be available on CleanMed in October.

This presentation will focus on the "Environmental requirements to suppliers" and the co-operation with Green Dialog, who has designed an Internet database, which can support hospitals worldwide with important environmental knowledge about products and articles.

Late Lessons from Early Warnings

David Gee, European Environmental Agency, Copenhagen

The growing innovative powers of science seem to be outstripping its ability to predict the consequences of its applications, whilst the scale of human interventions in nature increases the chances that any hazardous impacts may be serious and global. It is therefore important to take stock of past experiences of hazards, and learn how we can adapt to these changing circumstances, particularly in relation to the identification of early warnings and the use of information in taking both precautionary and preventive action. The EEA report, 'Late lessons from Early Warnings: the Precautionary Principle 1896-2000' is about the gathering of information on the hazards of human economic activities and its use in taking action to protect both the environment and the health of the species and ecosystems that are dependent on it, and then living with the consequences.

Fourteen case studies (arranged chronologically according to the first date of early warning) have been chosen from a range of well-known hazards to workers, the public and the environment, where sufficient is now known about their impacts to enable conclusions to be drawn about how well they were dealt with by governments and civil society. Such conclusions are based on 'the spirit of the times' and not on the luxury of hindsight.

Eight of the case studies involve chemical or pharmaceutical substances (eg. sulphur dioxide, halocarbons, MTBE and Great Lake contamination) and four are particularly relevant to the endocrine disruptors issue: TBT, PCBs, DES and benzene. Others are also particularly relevant to health eg asbestos, medical X-rays, hormones in beef, antibiotics in animal feed, and BSE. In most of these case studies reasonable, scientific grounds for concern was available to support precautionary action many years before such action was taken.

The case studies in the EEA report yield 'twelve late lessons' that are relevant to the management of current and future hazards, especially in the context of scientific complexity, ignorance, high stakes and the need for 'collective learning'. Such lessons include 'responding to ignorance as well as uncertainty and risk'; 'providing adequate long term environmental and health monitoring/research'; and 'avoiding paralysis by analysis by acting to reduce potential harm, where there are reasonable grounds for concern.' Acknowledging the different goals of "science" and "policymaking" and their use of different levels of proof is also important. The report notes the importance of trusted and shared information for effective policy-making and stakeholder participation in decision-making, public acceptability of risks requires public participation in the decisions that create and manage such risks, including the consideration of values, attitudes and overall benefits. Sound public policy-making on issues involving science therefore requires more than good science: ethical as well as economic choices are at stake.

There are immense challenges and opportunities in understanding complex and emergent systems while meeting human needs with lower health and ecological costs. Many of the case studies suggest that wider use of the precautionary principle can help stimulate both innovation and science, whilst reducing overall costs.

Environmental pollution and health

The increasing destruction of our ecosystem not only affects nature but more and more the health of people. Beside well-known pollutants new low-dose but permanent impacts are occurring. And we know little yet about their long-term effects. A challenge for all working in healthcare as their voice and commitment are very important on the way towards a healthy, green future.

Learn about the links between environmental pollution and public health and the need to work for ecologically sustainable healthcare system.

Vyvyan Howard, University of Liverpool

“Environmental Pollution affecting Health - the Responsibility of Healthcare Professionals”

Over the past 70 years mankind has been exposed to an increasingly complex mixture of manmade chemical pollutants, which currently consists of hundreds of chemical groups. If these groups are broken down into individual compounds, then there are tens of thousands of individual chemicals in the mixture. We do not possess the toxicological tools to analyse such complex mixtures. Most of the chemicals of concern, which include phthalates, alkyl phenols, bisphenols, some pesticides, organo-metals, organochlorine POPs and other chemical groups, have relatively low molecular weights and do not have difficulty crossing the placenta to reach the fetus.

The formation of the micro-architecture of organs, throughout the developmental period is a delicate process. Some of the factors exerting control during organ formation are known but most are not fully understood. While there are many naturally occurring cell signalling molecules that are of significance, it is known that some hormones are directly involved in the control of organogenesis and are bioactive in concentrations in the low parts per trillion. The majority of the population are carrying body burdens of xeno-chemicals, many of which may mimic hormones, in concentration in the parts per trillion range, in a complex mixture.

However, a recurring argument against a causal link between environmental exposure to xeno-chemicals and human health effects is that such pollutants are simply not present in sufficient concentrations in the body. Such conclusions, however, are usually based on a consideration of adult toxicology. They also ignore the biological mechanisms that have evolved to minimise the bioavailability of naturally occurring hormones to the fetus. For example when a woman becomes pregnant, the blood levels of the protein that binds her natural oestrogen increase. Xeno-oestrogens do not usually bind efficiently to such proteins. The most vulnerable stage of life to the negative effects of hormone disruption is the fetal period.

There are a number of pieces of experimental and epidemiological evidence which indicate that tissue dysgenesis syndromes are a) increasing and b) can be associated with exposure to low levels of hormone disrupting chemicals. Dysgenic tissues are associated with functional deficits in adulthood and an increased likelihood of the development of cancer. This paper will review the current literature on diseases associated with cell signalling disruption and discuss the likelihood of changes in the pattern of human of human disease observed over the past several decades could be causally linked to recent changes in the chemosphere.

These observations will be placed in the context of the past history of pollutants produced by health care facilities.

Gavin ten Tusscher, Netherlands

“How Pollutants affect Health - Children’s Early Dioxin Exposure”

Over the last 35 years much has been learned about high concentrations of exposures to dioxins and the resulting health effects in adults and far less so in children. Over the last ten years studies have shown dioxin-related effects in children perinatally exposed to background levels of dioxins. However, the later childhood (and adult) effects of this exposure are still largely unknown. With this paper an attempt will be made to summarise the data, known from literature and from the Amsterdam/Zaandam cohort longitudinal study, about the effects on children perinatally exposed to dioxins. The paper will elaborate on effects seen perinatally, in childhood, adolescence and adulthood.

Dioxins belong to the group of most toxic substances known to man. With the exception of small amounts for research purposes, they are not intentionally manufactured by industry. Dioxins are formed as waste products of combustion processes and municipal and medical incinerators are amongst the primary sources of these compounds.

Dioxins have been associated with congenital malformations. While it remains a formidable task correcting for numerous confounding factors there would seem to be a relation between midline birth defects and dioxin exposure. The EuroHazCon and epispadia studies have shown increased incidences of midline defects amongst populations living in the vicinity of waste sites. The open chemical combustions in Zeeburg, Amsterdam, The Netherlands, during the years 1961 up to and including 1969, possibly resulted in a local increased incidence of orofacial clefts during this period. A higher incidence of orofacial clefts was found amongst the offspring of Vietnam-war veterans (American and Vietnamese) exposed to the dioxin-contaminated defoliant, Agent Orange. Thrombocyte counts were found to be persistently significantly decreased, in relation to increasing postnatal dioxin exposure. The number of granulocytes was reduced in relation to prenatal dioxin exposure and an increase in infectious diseases, such as otitis

media and chickenpox have been reported. Disturbances in thyroid and liver functions in infants exposed perinatally to dioxins have been seen.

A Finnish study showed that breastfed children exposed to higher dioxin concentrations, via their mother's milk, exhibited more mineralisation defects in their permanent first molars than their lower exposure counterparts. A decrease in lung function was seen in prepubertal children following perinatal exposure to background levels of dioxins. Furthermore, an increase in behavioural problems was seen in relation to both prenatal and postnatal dioxin exposure. An increase in latency time and amplitude of certain EEG components was seen, amounting to a retardation in neurological development of a few years. This may be linked to the behavioural disturbances.

Concluding, perinatal exposure to dioxins have been associated with negative health effects on various organ systems, seen in the perinatal period, but also in childhood, adolescence and possibly adulthood. Will we learn from our mistakes or are we destined to repeat them?

Gary Cohen, HCWH

“Building a Worldwide Community for a Healthcare without Harm”

Health care professionals take an oath to 'do no harm'. As scientists have now begun to reveal the profound ecological and public health impacts of our toxic chemically-addicted society, the healthcare sector has a special responsibility to show by its practices that environmental protection is equivalent to preventative medicine writ large. Over the last decade, Health Care Without Harm and related healthcare allies have made major progress in both persuading hospitals to "clean up their house", as well as using the enormous purchasing power of the healthcare sector to drive more environmentally preferable products into the marketplace. We will review what has been accomplished and what challenges and opportunities lay before us.

Green Procurement II

Learn about more examples and experiences with green procurement in the US, UK and Austria.

Gina Pugliese, Premier, USA

“How U.S. Purchasing Organisations responded to the Demand for Green Products”

The Health Industry Group Purchasing Association describes a group purchasing organization (GPO) as “an entity that helps health care providers—such as hospitals, nursing homes and home health agencies—realize savings and efficiencies by aggregating purchasing volume and using that leverage to negotiate discounts with manufacturers, distributors and other vendors.” The General Services Administration, which purchases goods and services for the federal government, is the largest group purchaser in the United States, and represents one of the largest hospital GPOs with the best overall pricing via the Veterans Health Administration.

The advantages of scale for purposes such as group purchasing of supplies and services are being used by GPOs to improve the environmental performance of products produced for the health care sector that protect the environment and human health. Over the past few years, the GPOs have taken dramatic steps toward the vision of environmental sustainability by adopting environmentally preferable purchasing (EPP) programs that consider specific environmental criteria in the requests for proposals and selection of vendors and contracted products. In addition, GPOs have launched resources and other initiatives to support their EPP programs, including executive briefings, member and staff newsletters, electronic catalogs and EPP contracted product lists, Web-site resources, and policy statements in support of legislation that requires disclosure of content of medical products and packaging.

This session will provide examples of GPO initiatives from the perspective of one GPO, Premier Inc, the first GPO to receive the Champions for Change award from the Hospitals for a Healthy Environment (H2E) in 2003 for its environmental leadership.

Darian McBain, NHS Purchasing and Supply Agency, U.K.

“Green Purchasing Initiative”

To achieve better health and a better quality of life, the National Health Service (NHS) must actively seek to support sustainable development and make it part of their core business and delivery targets. Health cannot be improved if environmental degradation, economic inequalities and social exclusion are the result of health service activities. The NHS Purchasing and Supply Agency (PASA) has embarked on a program to integrate sustainable development considerations into its purchasing initiatives, with a particular focus on environmental issues. The environmental program has been going since 2000, when PASA achieved ISO 14001 certification of its environmental management system covering estates management and purchasing activities.

Since then, numerous initiatives have been implemented. A green risk methodology was developed, to highlight the areas of greatest environmental impact to prioritise the focus of work and help highlight key environmental issues. Environmental purchasing work-

shops were provided to buyers, as well as developing supporting policies and procedures. To assist staff in the NHS who purchase items but are not procurement professionals, a green flagging system was developed to highlight catalogue products with high environmental credentials. Supply chain development is also important, and work is ongoing to improve the environmental performance of the supply chain. Supporting this, an online environmental questionnaire for contracted suppliers has been developed. PASA is also looking at the sustainability of products, such as recycled paper and timber from sustainable sources.

The green procurement initiatives are now being complemented by a range of wider sustainability influenced projects. These include sustainable procurement training, sourcing of sustainable food, working with small to medium enterprises and encouraging environmental innovation. The work program is designed to help the NHS behave as a good corporate citizen and get the maximum benefit.

Ines Oehme, ICLEI Local governments for sustainability "Procura plus Purchasing Initiative"

The Johannesburg Plan of Implementation, in the paragraphs discussing Changing Unsustainable Patterns of Consumption and Production calls to "Promote public procurement policies that encourage development and diffusion of environmentally sound goods and services" (Implementation Plan, Paragraph 18).

The Campaign Procura+ aims to achieve a breakthrough in making sustainable public procurement a mainstream practice throughout Europe. It is designed to complement other existing activities through pursuing the following aims:

1. To create political momentum at local, national and European levels to promote the concept of procurement as a powerful governance instrument and to achieve wide-spread commitment to implementation.
2. To provide a framework for easy-to-start and step-by-step implementation of sound procurement for public authorities, giving priority to a broadly applicable approach rather than to a broad range of products and criteria.

This activity aims to achieve tangible improvements for the global environment, based on the targets that local political decision-makers set for their administration. When joining this campaign, it is foreseen that the political decision-making body sets targets on when to achieve which share of green products for a given product group (e.g. 20% Green electricity by 2008). The campaign has been launched by ICLEI and is supported by national partners in 13 countries. The campaign started in spring 2004 with 17 European founding authorities (in meantime 20) and the following six product groups, and will seek to expand and update this list continuously:

- *Energy-efficient electronic equipment*: with stand-by modes according to energy star standards and highly efficient active mode electricity use.
- *Demand-oriented cleaning services*: excluding toxic and unnecessary substances.
- *Organic food*: where applicable from fair trade and sustainable fisheries.
- *Buildings*: meeting the highest heating and cooling efficiency standards (passive-house), manufactured from materials with low grey energy and excluding harmful substances.
- *Quality-oriented public transport services*: with low-emission vehicles meeting EEV emission and high noise standards.
- *Green Electricity*: electricity exclusively from renewable resources stemming from additional capacities.

For more information see: www.procuraplus.org

Environmental Management Systems

Hospitals throughout Europe have established Environmental Management Systems (EMS) according to the EMAS regulation and the international standard ISO 14001 to secure a continuous improvement of their environmental performance and to establish common procedures, guidelines and tools throughout the entire organisation.

Learn and discuss the benefits and drawbacks, the achievements and open challenges with EMS and the experiences with new concepts and approaches.

Stefan Gara, ETA Environmental Management Consulting, Vienna "EMAS and ISO 14001 in Hospitals – Benefits, Drawbacks and Perspectives for the Future"

Umweltschutz ist ein wesentlicher Beitrag zur Gesundheitsvorsorge. Ein glaubwürdiges Engagement für vorsorgenden Gesundheitsschutz bedingt daher auch, sich für die Reduktion der Umweltbelastungen im Krankenhaus zu engagieren.

Gemäß dem hippokratischen Grundsatz, alles zu unterlassen, was den PatientInnen schaden könnte.

Umweltschutz mit System

Das Umwelt-Management-System (UMS) ist ein Instrument, das einem Spital helfen kann seine ökologische Orientierung

in allen Bereichen systematisch zu gestalten und damit die Umwelleistung kontinuierlich zu verbessern. Zwei Regelwerke stehen dafür zur Verfügung: die europäische EMAS-Verordnung und die weltweit gültige ISO 14001.

Österreich war Vorreiter mit dem LKH Tulln, das 1996 als erstes Krankenhaus nach ISO 14001 zertifiziert wurde. Das Preyer'sche Kinderspital in Wien ist seit 1990 Österreichs erster Gesundheitsdienstleister mit EMAS. Derzeit gibt es europaweit ca. 90 Spitäler mit einem UMS nach EMAS.

Das UMS stellt sicher, dass die „ökologische Frage“ in den organisatorischen Abläufen (z.B. Einkauf) verankert wird und damit systematisch eine Verbesserung der Umwelleistung vorangetrieben werden kann, positiver Nebeneffekt sind Verbesserungen, die auch in andere Bereiche des Spitals wirken. Wesentlich dabei ist der Rückhalt durch die Anstaltsleitung. Ist diese Unterstützung nicht (mehr) gegeben, werden Managementsysteme zum Ballast.

Eine weitere Herausforderung ist die Beteiligung der Mitarbeiter aus allen Berufsgruppen. Während beim Aufbau eines UMS durch regelmäßige Teamtreffen meistens eine Gruppendynamik entsteht, die sich positiv auf die Umweltorientierung auswirkt und zu zahlreichen Verbesserungsmaßnahmen führt, reduziert sich die Fortführung des Umweltmanagement-Systems oftmals auf wenige Interessierte. Der enorme Kostendruck im Gesundheitssystem und damit verbundene Personalengpässe tun ihr übriges und stellen die Fortführung der Umweltmanagementaktivitäten in Frage.

Managementsysteme sind Instrumente, die einer Organisation helfen sollen Abläufe systematisch und effektiver zu gestalten. Die Herausforderung und Perspektive liegt in einer Vernetzung der Instrumente um Parallelaktivitäten zu vermeiden, um den wachsenden Anforderungen gerecht zu werden.

Im LKH Mürzzuschlag wurde auf der Basis von EMAS ein zukunftsweisender Ansatz eines integrierten Managementsystems verfolgt, bei dem Umweltschutz, Gesundheitsvorsorge und Arbeitssicherheit, sowie Qualitätsmanagement vernetzt sind.

Karl Purzner, Hospital Baumgartner Höhe, Vienna

“A Comprehensive Environmental Policy as a Strategic Framework for Environmental Management

The Social Medicine Centre Baumgartner Höhe in Vienna is part of the Vienna Hospital Association. Built in pavillon-style at the beginning of the 20th century in the western part of Vienna, today it consists of several clinical and nursing competence centres. Being situated within a big park, which was used from the beginning of the institution as a recreation area for patients, staff and the population, environmental topics of course have always played a big role and many projects and activities have been and are being done.

Several years ago nevertheless there was dissatisfaction among the actors responsible for the environmental field: complaints about a lack of orientation arose although many excellent projects were on the way. The staff members suffered from confusion by the variety of manifold topics and projects and by not really knowing in what direction the system as a whole was moving. This was the reason why we then decided to set out for the development of a comprehensive environmental policy as a strategic framework for our activities.

What followed was a fascinating social process, where we all learned several lessons about the preconditions, chances and risks, effects and consequences of a successful and participative strategic work (not only within environmental management but in general). Starting out to develop a policy and strategy for our environmental work, at last we landed close to having set up an environmental management system. Such a social process with all its learning effects will probably make it easier for our hospital managers to accept environmental management systems, that are already on the market – which still is a problem in health care systems as a whole and especially in hospital management. “Knowledge management” in the field of “management knowledge” has then to guarantee the transfer of our important learnings.

Kristina Mårtensson, Sweden

“Environmental Management Systems – an appropriate Approach for Swedish Hospitals?”

Environmental certification started in the late 1990's in the private sector, driven by economic factors, market demands and by public purchasing demands on the producers to have an EMS.

The Swedish government recognized EMS as an important tool to achieve sustainable development both in the private and in the public sector. The driving force for EMS in Swedish hospitals is a political will, from the governmental level and from the Swedish Counties/Regions. The Swedish Government's use of the systematic approach in EMS to achieve national political goals has set an example for the whole Swedish public sector.

EMS could be used as a tool also to achieve regional environmental goals, with common key-figures for a region.

Today only about 6 Swedish hospitals/health care organisations have certified EMS. Many Swedish hospitals are implementing an

EMS. Clear-cut and time-scheduled council-decisions of County/Regional EMS certification are needed to get more hospitals certified.

EMS adds positive values to hospitals: a standardized and systematic approach and a tool for continuous improvement. A successful EMS implies top management engagement, whatever the driving force is. - But this is also true for other organisations and companies using an EMS, and not unique for hospitals.

What is unique and makes EMS an appropriate tool in a hospital, Swedish or non-Swedish, is the fact that the health care professionals are committed to do no harm. What is unique is also the obvious interaction between health and a good environment. The content/ key aspects of the EMS should have an obvious connection to health and environment in order to get professionals devoted. Therefore, if you can combine mind and heart in a hospital EMS, you will also have a durable EMS.

Hubert Veitschegger, Mürzzuschlag Hospital, Austria

„Environment, Quality and Safety – Experiences with an Integrated Management System“

Das LKH Mürzzuschlag ist ein öffentliches Standardkrankenhaus mit einer Medizinischen Abteilung, einer Chirurgischen Abteilung und einer Abteilung für Anästhesiologie und Intensivmedizin, mit 124 Betten, 10.900 m² Nutzfläche, etwa 37.000 Belagstagen und ca. 270 Beschäftigten. Neben dem medizinisch-therapeutischen Bereich gibt es auch infrastrukturelle Einrichtungen wie Verwaltung, Technischer Dienst, Hausdienst, Anstaltsküche, Zentraler Reinigungsdienst, Medikamentendepot, Zentralmagazin und Wäscheversorgung.

Das LKH Mürzzuschlag beschäftigt sich schon seit dem Jahr 2000 intensiv mit dem Umweltschutz, so wurde mit der Ernennung eines Umweltbeauftragten sog. Lokaler Umweltkoordinator, der Implementierung eines Umweltteams (11 Personen – Erweiterung 2003 auf 26 Personen) und deren Ausbildung über eine externe Beraterfirma, der erste Schritt im Umweltschutz gesetzt. Mit der Teilnahme am Projekt ÖKOPROFIT (Ökologisches Projekt für Integrierte Umwelttechnik) Obersteiermark und damit verbunden die Ausbildung des Lokalen Umweltkoordinator wurde ein weiterer Schritt in Richtung vorsorgender Umweltschutz getan.

Die Teilnahme am Österreichweiten Projekt Integriertes Management Kosten-/Nutzencheck im Jahr 2002 war der Start zum Aufbau eines (Umwelt)Managementsystems in unserem Haus. Die Ziele des von AUVA, dem Bundesministerium für Verkehr, Innovation und Technologie, dem Lebensministerium sowie dem WIFI Österreich initiierten Projektes waren

- der Aufbau eines nach EMAS/ISO 14001 zertifizierbaren Umweltmanagementsystems, unter Berücksichtigung von Elementen der Arbeitssicherheit und des Qualitätsmanagements,
- die Entwicklung und Erprobung einer Methodik um Kosten, Nutzen und Verbesserungspotenziale in diesen Bereichen zu ermitteln,
- die Ableitung von Kennzahlen aus dieser Kosten/Nutzenermittlung für den internen und externen Betriebsvergleich,
- die Integration betriebsspezifisch relevanter Kosten und Nutzenarten in das betriebliche Rechnungswesen.

Neben der Teilnahme an diesen Projekten wurde ein Vielzahl an Verbesserungsmaßnahmen durchgeführt. So wurden seit dem Jahr 2000 63 Projekte in den Bereichen Abfall, Desinfektion, Reinigung, Strom, Fernwärme, Wasser, Wäsche, Einkauf und Transport durchgeführt.

Dadurch wurden z.B. folgenden Einsparungen (2000 zu 2003) pro Belagstag erreicht::

Restmüll –26% auf 0,97 kg; Abfall gesamt –30% auf 2,63 kg;

Reinwäsche –19% auf 3,15 kg;

Wasser –10% auf 334 Liter

Pro m² Nutzfläche: Flächendesinfektionsmittel – 17% auf 0,113 Liter, Bodenreinigungsmittel –46% auf 0,085 kg

Environmental hazards of pharmaceuticals

Pharmaceuticals have an important characteristic: They are “resistant”, which is important in order to reach the intended area of the human body. On the other hand they pass through water treatment plants and stay in the aquatic environment for a long time. They affect animals and return to humans through the food chain.

Learn and discuss the scientific knowledge about environmental and health impacts of pharmaceuticals, the new legislative demands and approaches to consider environmental aspects in drug development.

Jan Koschorreck, Federal Environmental Agency, Germany

“New Legislation for Pharmaceuticals in the EU and New Guidelines for its Application“

The environmental risk assessment (ERA) of pharmaceuticals is a new field of ecotoxicology. During recent years, a rapidly growing number of medicinal products have been found in effluents of sewage treatment plants, surfacewaters, groundwater and agricultural lands alike. However, as yet, only little is known about the impacts these compounds can have in the environment.

Compared to chemicals and pesticides, the regulatory demands in the EU regarding the environmental safety of pharmaceuticals are still in a fledging state. This year, an important step forward is taken with the review of the EU pharmaceutical legislation catching up on environmental aspects and new guidance documents becoming available for the environmental risk assessment in authorisation routine.

The legal basis of the ERA of veterinary and human pharmaceuticals was established with the EC Directives 81/851/EEC and 93/39/EEC, respectively. This year, the European review of the pharmaceutical legislation resulted in two amending Directives, 2004/27/EC and 2004/28/EC, setting new standards for the environmental safety of human and veterinary pharmaceuticals. The EU adopted a straight forward approach for veterinary pharmaceuticals, where potential environmental effects have become part of the concluding risk-benefit analysis of the product. However, for human pharmaceuticals the environmental risk arising from the use of the product is outside the risk-benefit analysis. Nevertheless, any authorisation of a new human pharmaceutical has to be accompanied by an ERA and risk reduction measures are indicated in case of environmental concerns.

In practice, an assessment of the ecotoxic properties of veterinary pharmaceuticals started in 1996, when the first guideline for the ERA was released. For human pharmaceuticals, the process is much slower with only a few member states assessing the ecotoxicity of selected pharmaceuticals, as yet. This drawback will be overcome soon: After more than ten years of development within the EU, the guidance document for the ERA of human pharmaceuticals is expected to be released by the end of this year.

A major obstacle remains for a comprehensive assessment of the environmental fate and effects of pharmaceuticals: Only new medicinal products are assessed. The ecotoxicity of 'old' products, representing certainly the majority of the medicinal products available on the market, remains unknown ...

Klaus Kümmerer, University of Freiburg

"Excretion and Environmental Fate of Pharmaceuticals following Use and Disposal"

Pharmaceuticals are important to cure patients. After their administration they are excreted more or less unchanged and they reach sewage with urine and faeces. Remnants of unused or outdated pharmaceuticals are disposed of in landfills with household waste or poured into the drain. Therefore, some questions related to this input of pharmaceuticals into the environment arise. What is the fate of the compounds in the environment? Where will they end up? Are there any effects on aquatic organisms? Will the active compounds reach humans? What are the risks? These questions will be addressed in the lecture.

Andreas Hartmann, Novartis Pharma AG, Switzerland

"Environmental Aspects in Human Drug Development"

Recent years have seen an increasingly detailed view on the occurrence and effects of human and veterinary pharmaceuticals in aquatic ecosystems. From both available tonnage information as well as from measured environmental concentrations it is emerging that pharmaceuticals are a new class of anthropogenic contaminants of year-round occurrence and at generally low levels in the environment. Regulatory approaches have started to take this aspect into account. For high-volume pharmaceuticals, environmental loads can be assumed to be comparable to certain pesticides. In general, pharmaceuticals differ from industrial chemicals in several aspects, e.g.

- Designed for interactions with receptors
- Sometimes highly active, most often highly specific
- Extensive knowledge on mode of action, target receptors, mammalian toxicity
- Unique physicochemical properties: often non-neutral, ionizable or amphiphilic

Hardly any other class of chemicals has been tested to a similar extent in biological systems (mostly mammalian, sometimes others) before reaching the public. By taking pharmaceuticals through time and cost intensive *in silico*, *in vitro* and *in vivo* tests, many unwanted toxicological and pharmacological side effects can be excluded by the time a drug reaches the market. Even interactions with other drugs (DDI= drug-drug interactions) are being assessed during those screening activities. Out of these considerations, it seems self-evident that a sensible environmental risk assessment of pharmaceuticals should take these data into account.

For new pharmaceuticals, the development of a "green chemistry" concept has been suggested, aiming at yielding "environmentally optimized" drugs. However, there are still significant obstacles that need to be overcome and there are good reasons why biodegradability and photolability are of rather low priority in current drug design: Unfortunately, both metabolic and photochemical instability have been responsible for a number of very serious drug side effects. In fact, the cause of most drug related cases of idiosyncratic hepatotoxicity in man is caused by reactive metabolites generated by oxidative CYP450 metabolism.

Ultimately, the medical benefits of pharmaceuticals have to be taken into account and weighed against any possible detrimental effect on ecosystems. The goal should be an optimal availability of pharmaceuticals to the global community while assuring global ecosystem health.

Green Chemistry - Products of the future”

Hans Werner Mackwitz, Alchemia-Nova, Vienna

No doubt, too many chemicals are dispersed yet. Over 100,000 synthetics are currently registered for sale in the European Union. Human health and environmental impacts of only a small percentage are known. Experiences of the last decades suggest a significant potential of risks. Unfortunately, most of our “xenobiotics” do not fit into the natural material cycles and thus cannot be neutralized by nature. They hang around in the ecosystems like pvc and nobody has a convincing strategy how to get rid of it without worsening the situation.

Previous attempts to deal with hard chemistry have been inadequate. A new orientation is necessary: green chemistry, which is oriented to the principles and materials of nature and creates products which fit into the natural carbon cycle.

The fundamental design principles of eco-effectiveness and Green Chemistry are:

- Waste equals food (in fact “waste” will become an obsolete concept in a few years)
- Use current solar income (not only energetically, but also substantially on a material basis)
- Celebrate diversity (because evolution gained 4 billion years of experience)

The key to sustainability is making the market work for the environment instead of against it. For too long, capitalism has not put proper value on the services nature provides, such as water supply, climate control and huge streams of biospheric and evolutionary elaborated biomatters derived from the overlapping photosynthetic pathways.

But things change from day to day. A closer look demonstrates that a paradigmatic shift is already underway.

- *Cradle-to-cradle* - Cradle-to-cradle design means literally designing waste right out of the lifecycle of the package. The originators of this concept, architect William McDonough and chemist Michael Braungart, recently published a book on the subject called *Cradle to Cradle: Remaking the Way We Make Things*. We follow these arguments, because they are very convincing.
- *Mimicking* - Mimicking nature, a package is designed to be either a technical nutrient that can be reused, or truly recycled in a tight, closed-loop process with zero loss in material performance, or a biological nutrient that can safely break down into the soil.

Cargill Dow, a joint venture by the agricultural giant (Cargill) and the chemical company Dow, is manufacturing biodegradable and truly recyclable plastics from corn sugars. The company already makes environmental friendly packaging for Sony products and pillow stuffing Pacific Coast Feather. “Our fate is tied to how many products we can make from renewable resources,” this sounds like an interesting commitment from Cargill Dow. The bioplastic PLA fits all modern disposal systems and is compostable. Besides, with the proper infrastructure, PLA can be easily recycled back to a monomer and again into new polymers.

In his lecture, Hanswerner Mackwitz will explain examples and R&D-strategies how Green Chemistry and renewable resources may assist to backup our future.

Avoiding waste, saving money

Pollution prevention means avoiding and reducing waste through careful use, modified processes and better products. The result: less consumption of materials and energy. This approach waste but also money. Ecological and economical benefits are complementary terms. Learn about the manifold opportunities for pollution prevention in healthcare facilities.

Harry Oosterbeek, Valkensward, Netherlands -
“Waste Minimisation Schemes in Hospitals and Laboratories”

Ecological and economical issues are not each others opposites, but it needs a broad view. If somewhere in the cycle “production – use – waste – waste disposal” an environmental problem occurs, someone has to pay the price for the solution and will encounter a cost increase. However somewhere else along the line somebody benefits. It needs a broad (management) view to bring these two entities together and level the cost structure on the entire cycle. This can be done on corporate or on national level. In almost all cases environmental issues can be solved together with substantial cost benefits. The key elements to obtain economical benefits while solving ecological problems are:

- Cost awareness (opposite price awareness).
- Total picture.

There always is a way to economically benefit from environmental sound behaviour.

Nikou Ghassemieh, DIAM (German Association for Promoting the Quality of Reprocessing of Medical Devices), Berlin, Germany, "Reprocessing of Medical Devices: A Balance between Ecology and Economy"

Each year, hundreds of millions of Euros are lost because hundreds of thousands of fully functioning medical devices are disposed after a single use. These products range from simple diagnostic items to highly complex instruments for cardiology or micro-surgery. However, these valuable devices can now be reprocessed without any reduction in quality and reused with precisely the same level of confidence as new products. This method does not only cost significantly less, it also bears convincing ecological benefits. In brief, the reprocessing of medical devices is a sustainable practice of reducing waste, saving energy and resources.

The main objective of DIAM (German Association for the Promotion of Quality in Medical Device Reprocessing) is to further professionalize medical device reprocessing.

DIAM has contributed to the discussion of pertinent regulations and quality standards in Germany and provides assistance when it comes to implementing these standards in practice.

The paper, among others, discusses the contribution of high-quality industrial reprocessing of medical devices to saving scarce economic and ecological resources and providing high-grade patient treatment.

**Sue Tarr, RCN (Royal College of Nursing), UK
Preventing Harm the UK perspective**

The Royal College of Nursing represents over 370,000 nurses, midwives and health visitors in the UK. This membership group has collectively a significant impact in many areas of health delivery. The emphasis for nursing has been gradually moving away from acute health intervention towards improving public health and prevention of disease. The impact on the environment and more particularly public health is an area that is generating significant interest in the UK. The RCN and its members are aware of areas of good practice in the UK but there is no strategy for ensuring a consistent approach to sharing this good practice and building upon this work. The RCN will be working with key stakeholders in the UK to secure a more long term and co-ordinated approach to this issue.

Organic food

Organic food is healthier - for people and for the environment. Moreover, it is affordable for healthcare facilities.

Learn and discuss the advantages of organic food and how two major healthcare providers have successfully introduced organic food into their kitchens.

**Bernhard Freyer, University of Natural Resources and Applied Life Sciences, Vienna
"Environmental Impacts of Food Production in Europe and Developing Countries"**

The central theme of an extensive closed nutrient cycle in an organic farm organism means, that the used expedients are site adapted and utilized in a sustainable way. The yield of those farms is based primarily on their own energy and nutrients. Health and environmental sustainability is a result of the promotion of system internal regulation mechanism, risk reducing by diversity and a site adapted farming intensity. This central theme is also followed in the provision of equipments, industrial produced fodder or organic manure or medicine, as well as transport, processing and the commerce of products. In human nutrition the idea is also mirrored. The diversity in human eating habits corresponds with the diversity at the organic farms. E.g. the meat consumption is orientated according to the quantity produced at organic farms in a healthy way. The lecture therefore is focussing on mechanisms and qualities in organic farming, environmental and economic impacts and refers to thinkable parallels and interrelations to human nutrition and health.

**Bruno Klausbruckner, Vienna Hospital Association, Vienna, Austria
"Introducing Organic Food at the Vienna Hospital Association"**

Als das Projekt der Einführung von Bio-Lebensmitteln im Wiener Krankenanstaltenverbund (KAV) im Jahr 1996 begonnen wurde, existierte im KAV weder viel Wissen über mögliche Mehrkosten von Biolebensmitteln beim Einsatz in Großküchen noch über zuverlässige Lieferanten. Auch die Bioverbände hatten anfänglich große Probleme die Anbieter und Abnehmer zusammen zu bringen.

Einer der wesentlichsten Antriebe das Projekt zu starten, war der Tierschutzgedanke, weil in der biologischen Landwirtschaft die Tiere artgerecht gehalten werden. Die Gentechnikfreiheit und der Verzicht auf Herbizide und Pestizide im Biolandbau war ein weiterer wesentlicher Gesichtspunkt. Auch soziale Fragen sowie die Sicherung der Böden spielten eine wesentliche Rolle.

Im Neurologischen Krankenhaus Rosenhügel wurde durch die konsequente Arbeit der dortigen Küchenregieleiterin nach und nach ein Problemfeld nach dem anderen aufgearbeitet, unterstützt vom ebenfalls überdurchschnittlich engagierten Oberkoch.

Mittels einer Machbarkeitsstudie wurden die Grenzen des Einsatzes ökologischer Lebensmittel und die zu erwartenden Mehrkosten aufgezeigt. Die Studie machte klar, dass es möglich sein musste, mit akzeptablen Mehrkosten den Bioanteil auf ca. 50% anzuheben. Die parallel angestellte Marktanalyse zeigte, dass die meisten der gewünschten Bioprodukte auch lieferbar sein würden, d.h., dass zumindest die produzierten Mengen ausreichen würden, um den Bedarf der Großküchen des KAV zu befriedigen.

In weiterer Folge galt es nachzuweisen, dass die Prüfverfahren zur Sicherstellung der biologischen Qualität absolut zuverlässig waren und keinen Spielraum für Schwindel boten. Neben den Kontrollen durch unabhängige Kontrollstellen, deren Zuverlässigkeit nicht in Frage zu stellen war, schuf der KAV ein eigenes Prüfinstrument auf Grundlage der Bioresonanzmethode, die eine sehr zuverlässige Aussage über Bioqualität oder über konventionell erzeugte Lebensmittel erlaubte. Damit konnten die Kritiker beruhigt werden, die unter der Bezeichnung „Bio“ nur einen Vorwand für höhere Preise sehen wollten.

Nachdem diese Grundlagen geschaffen waren wurde das Projekt auf weitere Spitäler ausgeweitet.

Im März 1999 wurde im Rahmen des neu gegründeten Projektes ÖkoKauf Wien die wien-weite Arbeitsgruppe Lebensmittel gegründet, die zur Aufgabe hatte, die bereits gemachten Erfahrungen mit Bio-Lebensmitteln auf andere Institutionen auszuweiten und deren Aktivitäten zu koordinieren.

Im November 1999 erfolgte ein Beschluss des Wiener Gemeinderates, der u.a. auch eine Erhöhung des Biolebensmittelanteiles in den öffentliche Einrichtungen der Stadt Wien auf 30 % bis zum Jahre 2005 vorschrieb.

In der Folge stellten die Wiener Pensionistenwohnhäuser, die Kindergärten und Kindertagesheime und die Schulen Teile ihrer Essenversorgung auf Biolebensmittel um.

Die anfangs sehr skeptisch beurteilte Einführung von Biolebensmitteln ist mittlerweile in Routine übergegangen. Wesentlich erscheint, dass die angespannte finanzielle Lage nicht dazu führt, das Projekt zu unterlaufen. Der konstante politische Wille zur Umsetzung bleibt die Grundlage für die erfolgreiche Weiterführung.

Sehr wesentlich erscheint, das Projekt auch in Richtung des Einsatzes fair gehandelter Waren konsequent zu erweitern, um zumindest ansatzweise zu versuchen, die empörende Ausbeutung von Entwicklungsländern zu verringern und in Form einer fairen Partnerschaft mit ihnen zu kooperieren.

Susannah Senior, Sustainable Development Commission, U.K.

“Organic food and sustainable food procurement in the UK”

The UK's National Health Service (NHS) serves around 300 million meals a day and its annual shopping list includes 1.3 million chicken legs, 12.3 million loaves of bread and 13.5 million kg of potatoes. At the same time poor diet is costing the NHS over £2 billion a year and obesity is becoming a growing problem, the amount of food being transported longer distances is growing contributing to greenhouse gas emissions, and there is growing concern about pesticide use in farming. These worries, among others, have led to an emerging approach to food in the NHS. There is growing interest in promoting sustainable food procurement.

This presentation sets the policy context supporting sustainable food procurement in the NHS and explains how the NHS stands to gain from a sustainable approach towards food. Promoting organic food plays a part in this, but there are many other elements to consider. Decisions made in hospitals about food purchasing will have wide reaching impacts beyond the hospital walls and significantly play in to the public health agenda.

This presentation illustrates the move towards sustainable food procurement and the growing interest in promoting organic food with the use of two examples, one based in London and one in the South West of England. In London four major hospitals have come together to form a project which aims to increase the amount of local and organic food served to patients. The Cornwall Hospital Trust is leading a project to ensure that the purchasing power of local hospitals impacts positively on the local economy, environment and communities, by promoting local sustainable food.

Alternatives to PVC products

PVC is widely used in a variety of medical devices. PVC is harmful to the environment and endangers patient safety. The PVC softener DEHP, a reproductive toxicant, leaches into the patient's body during certain medical procedures.

Learn about and discuss the harms of PVC and how safer alternatives can be substituted for PVC products in most cases

Ted Schettler, HCWH, USA

“DEHP Exposure and PVC Risks”

Polyvinylchloride (PVC) plastics have been widely used in medical practice for more than thirty years. Medical-use PVC is softened with a phthalate plasticizer, diethylhexylphthalate (DEHP), known to leach from bags and tubing causing direct patient exposures. Periodically concerns about the safety of DEHP use in medical applications arise, in the past because of potential cancer risks. Now DEHP is recognized as a reproductive and developmental toxicant, causing damage to the developing male reproductive system in test animals at exposure levels close to or actually experienced by some patients. This presentation will review DEHP's toxicity and

exposure levels in the medical setting. The response of the US Food and Drug Administration and strategies for reducing exposures, including replacement of DEHP-containing devices with alternatives, will also be discussed.

Mark Rossi, HCWH, USA

"The PVC Market and Alternative Products"

Concerned with the life cycle problems posed by flexible PVC (polyvinylchloride) medical devices, hospitals are switching to safer alternatives. Alternative plastic products are available for the majority of flexible PVC products used in hospitals, including medical devices and building products. Spurred by the Food and Drug Administration's (FDA's) public health notification against the PVC additive DEHP, major health care buyers in the U.S. and Europe are moving away from PVC products. They are demanding product labeling for material content, writing requests for product bids that prefer PVC-free products, and buying PVC- and DEHP-free products.

Andreas Lischka, Children's Clinic Glanzing, Austria

"Glanzing - A PVC free NICU"

Polyvinylchloride (PVC) plastic is a synthetic polymer resin, originating by polymerisation of the monomer vinylchloride (VCM) with the formula $CH_2=CHCl$. 57% of the weight of the polymer resin is caused by chlorine. Pure PVC is a stiff material, mechanically resistant. The mechanical properties of PVC can be altered by the addition of low molecular substances to PVC, mixed with the polymer matrix. The mostly used softeners are ester of organic acids, mainly phthalates and adipates.

Medical concerns against the use of PVC are based on the migration of the softener DEHP (Di-(2-ethylhexyl) phthalate). DEHP is soluble in fat-containing liquids like blood and may cause liver diseases, diseases of the skin and the cardiovascular and reproductive system and show potentially hormone function. EU-directive 2001/59/EC from August 6, 2001, classifies DEHP in category 2 as "dangerous for reproduction". Actual measurements of the British ministry of health show high values of PVC softeners in umbilical cord blood of newborns.

PVC medical products contain between 12 and 80 weight-percent DEHP. It is very volatile and can come from the inner surface of the PVC tubes in respectively concentrations into the lung. DEHP therefore can damage the lung tissue.

The use of PVC in neonatology and in dialysis is considered to be very dangerous. Repeated blood transfusions are of special risk for children. During transfusions or during parenteral nutrition in premature or newborn babies DEHP can cause heavy burden for the immature organs.

Four main manufacturers dominate the medical product market in Europe:

Fresenius, B. Braun, Baxter/Clintec and Pharmacia. Baxter, the world largest producer of medical products announced the stop of PVC use, starting with infusionsvax.

PVC-free products are produced by Codan, Ohmeda, Clinoco, Plasti Medical, Baird, Corpak and Asta Productos Medicos. According to the EU-medical product guideline 98/79/EWG PVC-free products should be used for infusions and application of medicaments so that patients are not contaminated with DEHP.

A reduction of PVC in medical waist of the Children's Clinic Glanzing in the year 2003 could be achieved to only 0,37 % (concerning weight). In 1990 it was 10% and in 1995 still 2,5%.

PVC in medical products was 4,6% in 2001 and 3% in 2003, respectively. The number of PVC containing products used per year in our neonatal intensive care unit (NICU) was 15,9% in 2001 and 5,4% in 2003, respectively.

Attempts of several hospital organisations should be done to make pressure on the industry to increase the production of PVC free medical products and to lower the price, so that complete avoidance of PVC containing (medical) products will be reached as soon as possible.

Anne Marie Vass, Sweden

"PVC Phase out Policy at Karolinska University Hospital"

In 1997 Stockholm County Council (SLL) decided to replace the soft PVC products in the health care sector by better alternatives. Since then, the level of activity in replacing PVC has varied over time and between the hospitals in the region.

In the beginning of 2004 Karolinska University Hospital and SLL started a project in cooperation with Health Care Without Harm to make an inventory of the use of soft PVC products. The project is still going on and is planned to be finished in 2005. The main purpose is to find better alternatives to the soft PVC containing phthalates and replace such products where appropriate alternatives are available. Preferably priority will be given to the replacement of soft PVC products for internal use and products in use during a long time and for the most exposed groups of patients such as newborn children.

Inventory

The inventory gives us important information about the amount of PVC products that are used in different parts of the hospital. Data from the suppliers are the main information source, while visits and interviews at selected departments at the hospital will give supplementary data.

Purchase and procurement

We strive to consequently put environmental demands on all our purchases. In every new procurement commission, at the hospital or in the County Council, demands on PVC, plasticizers or other additives are included if they are assessed to be relevant. Only by stopping the use of vinyl gloves containing phthalates the use of phthalates can be reduced by 40 tonnes per year at the hospital, beginning from June 2004.

Product information

The health- and environmental issues related to the products we use in the health care sector are seldom known by the users. Information and labelling of medical devices and other products are thus important. We have started a discussion with our suppliers in order to find ways to improve the written information related to the products we use in our organisation, i.e. environmental information in product catalogues and in the data systems for purchasing products etc.

Towards sustainable healthcare facilities

Healthcare facilities have a special responsibility in this regard. On the one hand they ought to perceive and communicate the relation between environment and health; on the other hand, they ought to carry out their work in a way that causes no harm to public health and the environment.

Franz Daschner, University Hospital Freiburg, Germany

“Do we need a Green Medicine?”

Ist unsere Umwelt krank und braucht sie deswegen grüne Medizin? Dies ist das Hauptthema meines Vortrages. In den letzten Jahrzehnten verbrauchte der Mensch den größten Teil der in Jahrmillionen entstandenen Rohstoffe. Wir verbrennen unser Haus, um für einige Minuten Licht und Wärme zu haben. Die derzeitige Zerstörungsbilanz eines einzigen Tages liest sich wie folgt:

- Täglich wird soviel Kohlenstoff verbrannt, wie in 1000 Jahren Kohle, Öl oder Erdgas entstanden.
- Pro Tag blasen wir 86.400.000 Tonnen Treibgas in die Luft.
- Täglich 3.000 Hektar weniger Regenwald, das sind ca. 4.000 Fußballfelder.
- Täglicher Flächenverbrauch in Deutschland 121 Hektar, das sind 160 Fußballfelder, davon 32 nur für Straßenbau.
- Täglich 20.000 Hektar mehr Wüste.
- Täglich 10 weniger Pflanzen- und Tierarten.
- Täglich 250.000 mehr Menschen auf der Erde.
- Täglich sterben 55.000 Menschen an Hunger.

Etwa 70% der landwirtschaftlichen Flächen in Deutschland werden für die Tierfutterproduktion verwendet, nur 30% für menschliche Nahrung. Die Landwirtschaft ist mit ca. 50% durch Überdüngung und Jauche an der Wasserverschmutzung beteiligt, eine Hochleistungskuh erzeugt im Jahr so viel Treibhauswirkung wie ein PKW auf 15.000 km. Wir geben 400 Millionen € für Arzneimittel in der Tiermast aus, zum großen Teil für völlig überflüssige Antibiotika.

Wir brauchen eine grüne Medizin, in deren Mittelpunkt wieder der Mensch steht, die sich der Kräfte der Natur bedient und sie gleichzeitig schont. Die Stiftung viamedica, die ich mit dem Preisgeld des Deutschen Umweltpreises gegründet habe, hat sich für die nächsten Jahre viel vorgenommen. Wir wollen Biokost in den deutschen Kliniken einführen. Wenn nicht in Kliniken, wo sonst sollen den Patienten die gesündeste Nahrung und schadstoffarme Nahrung angeboten werden? Wir wollen die Infektionsgefahr für Krebspatienten verringern und speziell für diese Patienten unnötige Hygienebarrieren abbauen.

In Kliniken wird immer noch viel zu wenig erneuerbare Energie eingesetzt. Es gibt zwar ein 100.000 Dächer-Programm für Solarenergie, es gibt ein Programm für Solar-energie auf Kirchendächern, wo gibt es aber ein Programm für Solarenergie in der Medizin? In der Medizin gibt es nicht 100.000 Dächer, sondern mehrere Millionen Dächer, die geradezu auf Solarenergie warten, um beispielsweise Patientenzimmer zu kühlen.

Die zunehmende Antibiotikaresistenz in Kliniken ist eines der großen Infektionsprobleme dieser Zeit. Wir müssen uns wesentlich mehr als bisher um dieses Problem kümmern, Ärzte schulen, weniger Antibiotika verordnen, Resistenzmechanismen aufklären, europäisch zusammen arbeiten, auch den Patienten besser vermitteln, dass ihr Wunsch nach Antibiotika häufig überflüssig ist. Wir brauchen in Zukunft eine wesentlich stärkere Zusammenarbeit zwischen Medizin und Industrie. Wir wollen ein Kompetenzzentrum zum Wissenstransfer zwischen Medizin und Industrie einrichten, um zum Beispiel zusammen mit Arzneimittelherstellern umwelt-

freundlichere Medikamente herzustellen oder mit Medizingeräteherstellern zusammen zu arbeiten, um Geräte anzubieten, die nicht zum großen Teil aus Einwegmaterial entstehen und daher weggeworfen werden müssen, sondern umweltfreundlich wieder aufbereitet werden können. Wir sind im Moment dabei, ein Zentrum für Naturheilkunde am Universitätsklinikum Freiburg einzurichten, in dem nicht nur Grundlagenforschung betrieben, sondern gezielt untersucht werden soll, bei welchen Erkrankungen welche naturheilkundliche Methode die bessere, wirksamere und möglichst auch noch kostengünstigere Alternative zur klassischen Medizin ist.

Bruno Klausbruckner, Vienna Hospital Association "The Environmental Strategy of the Vienna Hospital Association"

Umweltschutz ist Chefsache.

Nur wenn von der obersten Leitung ein Bekenntnis zum aktiven Umweltschutz besteht, können Umweltschutzprojekte mit Aussicht auf Erfolg umgesetzt werden. Es ist weiter unerlässlich, zum Abdecken der Belange des Umweltschutzes einen eigenen Bereich oder, in kleineren Organisationen, eine bestimmte Person, verantwortlich zu beauftragen. Die angestrebten Ziel sind in einem Umweltentwicklungsplan zu definieren, der auch den zeitlichen Rahmen und die Organisationsstrukturen vorgibt.

Herbert Schmalz, Styrian Hospital Association, Austria "Environmental Responsibility increases Credibility"

Mut zu neuen Visionen

Mit gutem Gewissen können wir behaupten, dass Umweltmanagement in unseren Krankenhäusern etabliert ist. Die Zielsetzungen haben sich weg von den Überlegungen der reinen Abfallentsorgung hin zu Verminderung und Vermeidung von Umwelt-Belastungen entwickelt. Umweltschutz heute: Vermeiden – Vermindern – Verwerten.

Durch den Verbrauch einer hohen Menge an Produkten, die aus Rohstoffen und Energie produziert werden, und schlussendlich zu den Krankenhäusern transportiert werden müssen, kurbeln wir selbst die Verschmutzung an. Auch unsere Mitarbeiter haben mit ihrer Fahrt zur Arbeitsstelle Anteil an jener Staubbelastung, die uns nachweislich krank macht:

UMWELTSCHUTZ = GESUNDHEITSSCHUTZ

Haben wir bei dieser Betrachtungsweise aber nicht den Sinn für ganzheitliche Lösungen übersehen?

Leider betreiben wir, wenn wir es ehrlich betrachten, immer noch „end of the pipe“ – Umweltschutz.

Nur wenn sich das Gesundheitswesen zu dem entwickelt, was es vom Namen her sein soll, die Strategien des Umweltschutzes aufgreift, und die Begriffe: Verhelfen zu einem allgemeinen Wohlbefinden - Verhindern von Krankheit - Vermindern von Leiden lebt, wird es gelingen, die absoluten Emissionsbelastungen zu reduzieren.

Zur Zeit ist diese Entwicklung, infolge des erreichten hohen Standards in der Medizin nicht erkennbar.

Der beste Beitrag, den jeder von uns für einen positiven Umweltschutz beitragen kann, ist, alles zu tun, seine eigene „stabile Gesundheit“ zu erreichen und zu behalten. Das heißt, wir müssen uns ernsthafter mit der neuen Visionen auseinandersetzen und die notwendigen Maßnahmen für uns entwickeln!

UNSERE EIGENE STABILE GESUNDHEIT IST UMWELTSCHUTZ!

Options for improving environmental performance

There are many opportunities to improve the environmental performance of healthcare facilities. Most of these have already been tested in practice.

Benefit from the experience of others and inform yourself about successful environmental measures.

Martin Scherrer, University hospital, Freiburg, Germany "Incentives for Employees to use Environmentally Sound Means of Transport"

Freiburg University Hospital is well connected to the public transport network by a city railway, a tram and 4 bus lines. A survey revealed that 38% of the staff cycle to work a further 29% use public transport, 5% come on foot and 27% by car. The parking situation has become quite precarious because of construction work on hospital parking lot property. Therefore, a working group was formed to produce incentives for staff to change to environmentally compatible travel. First, we analysed where the staff live, how they travel to work and the difficulties encountered, especially when using public transport. Based on these analyses the following measures were introduced:

1. Connection to public transport systems, especially arrival and departure times were optimised in cooperation with transport companies to avoid long waiting times.
2. A station was financed by the hospital to enable use of the city railway.

3. Departure and transfer times were compiled by place of residence to facilitate choice and at the same time to encourage people to use public transport.
4. To facilitate use of bicycles, routes were compiled and published by place of residence.
5. An analysis was carried out on the bicycle parking lot situation and an improvement plan was drawn up.
6. Remaining parking lots are now managed, i.e. staff pay a fee of 0.50 € per day, and the income is put toward financing the so called "job ticket", i.e. commuters receive a subsidy toward a monthly or annual bus or rail pass. Cyclists and pedestrians receive a bonus. Whoever chooses to use one of these possibilities and still comes to work by car pays a higher parking fee of €3 per day. In 2003, 3500 members of staff chose to use the job ticket.

The City of Freiburg presented the University Hospital with the Eco-Transport award for its efforts toward use of environmentally friendly transport.

Hans Daxbeck, RMA, Vienna

"Connector – A Tool for Efficient Waste-, Environmental - and Resource Management"

Input-output analyses are an important prerequisite for implementing waste management and environmental concepts. Whereas purchase orientated tools, such as cost control, have been established long ago, waste management decisions are often to be made intuitively, without a sufficient systematic base. Relating to cost control, a method has been developed that allows for tracing mass flows through an enterprise with an affordable effort. An association with the cost control permits to track down the path of single products or product groups along one or more cost centres or within the entire enterprise. With the Connector, a software tool is offered to the waste management that provides for a direct effect on the generated waste in the enterprise by means of targeted measures within the purchase sector. Out of the cost control data, the Connector calculates the resulting waste flows by considering also the characteristics of the articles. This flexibility enables practice-oriented and enhanced solutions for waste management questions.

The Connector allows for:

- *A better assessment of the current state:* Knowledge of the target state enables you to assess the current state of the waste management in your enterprise.
- *Prioritising:* You are able to identify those sectors that offer the greatest saving potentials.
- *Efficiency control of implemented measures:* The Connector offers you a descriptive controlling tool for optimising the waste management in your enterprise
- *Cost reduction:* By offering scenarios, the Connector demonstrates to you those variants that result in the most efficient cost savings.
- *Development of balances of goods and substance:* You dispose of a support utility for an efficient corporate waste, environment or resource management.

Monika Schaffer, Risk Prevention Officer of the hospitals of the Vienna Hospital Association

"Effective Management of Waste and Hazardous Substances"

- *Effektives Abfallmanagement*

Alle abfallspezifischen Projekte stehen unter dem Motto der Umweltschutzabteilung des Wiener Krankenanstaltenverbundes: „Umweltschutz bewahrt die Gesundheit und spart Geld.“ Auch der strategische Schwerpunkt zur Abfallvermeidung im Krankenhaus. Die Möglichkeit Abfälle zu vermeiden ist jedoch begrenzt. Hier setzt ein weiteres wichtiges Vorhaben an, nämlich der verstärkte Einsatz von kreislauffähigen Materialien aus biopolymeren nachwachsenden Rohstoffen.

- *Krankenhausspezifisches Gefahrgut-Management*

Mehr als in jedem anderen Unternehmen, stehen in einem Krankenhaus durch die Komplexität der zu erfüllenden Aufgaben verschiedenste Gefahrgüter in Verwendung oder werden versandt. Klinische Abfälle, Probentransporte, Strahlenquellen, Zytostatika usw. Die fehlerfreie Einhaltung der Bestimmungen ist ohne fundierte Kenntnisse der Vorschriften nicht möglich.

Der Gefahrgutbeauftragte als Partner der Unternehmensleitung etabliert Abläufe, die es den Mitarbeitern ermöglichen, die bestehenden Verpflichtungen für einen sicheren Gefahrguttransport einzuhalten. Zusammenfassend übernimmt der Gefahrgutbeauftragte somit Aufgaben als Trainer und Kontrollinstanz der Ihre Mitarbeiter optimal schult, sodass eine reibungslose Abwicklung aller gefahrgutrelevanten Abläufe der täglichen Praxis gewährleistet ist und Sie damit beruhigt einer gesetzlichen Überprüfung entgegen sehen können.

Gina Pugliese, Premier, USA

“Reusable Sharps Containers - a Waste Reduction and Worker Safety Strategy”

Traditional disposable sharps containers account for a large portion of the medical waste stream in the United States. Any opportunities to reduce the amount of waste associated with sharps disposal, including the use of reusable containers or containers made with recycled materials can significantly reduce the amount of medical waste that is generated in health care and the associated costs for disposal.

Recent reports have indicated that a reusable sharps container system can eliminate 70 pounds of plastic from the waste stream per hospital bed per year. In the United States, this equates to 3.5 tons of waste for every 100 beds. In addition to reductions in medical waste and related costs, one research study documented a reduction in needlestick injuries associated with the specific design and use of a reusable sharps container system.

Another option to contribute to overall waste reduction is the use of disposable sharps containers that are made with up to 25% of recycled plastics, some derived from processed medical waste sharps containers. These containers bring back a portion of the medical waste stream back into the hospital as a usable product.

Consideration of any sharps disposal system should include its ability to reduce medical waste and associated costs and reduce worker risk of exposure to sharps injuries and other blood and body fluid exposures. Sharps disposal containers must also meet relevant regulatory requirements for size, design, characteristics, labeling, placement, disposal, transport and reprocessing to reduce any risk to patients, workers, and the environment.

Information and Training

The foundation for environmentally sound behaviour is knowledge about issues, goals and possibilities and obtaining the necessary skills. Creating awareness, information and training are therefore essential success factors for environmental activities.

Learn about successful information campaigns - tools, training programmes and environmental reporting.

Laura Brannen, H2E, USA

“The ‘Hospitals for the Environment’ Initiative”

The Hospitals for a Healthy Environment (H2E) Program is a voluntary program that is assisting healthcare facilities across the U.S. address a wide range of environmental issues including compliance, source reduction and pollution prevention. H2E provides a comprehensive website with tools and resources, a listserv for colleagues to share information, free teleconferences and support to help healthcare facilities do this important work. The workshop objective is to share the successes and challenges of the H2E program as a potential model for the EU.

Peter Ohnsorge, European Academy for Environmental Medicine, Würzburg, Germany

“Perspective of a Common Education System for Environmental Medicine in Europe”

Die zunehmende Umweltbelastung hat zu anwachsenden gesundheitlichen Problemen mit epidemiologisch nachgewiesener Inzidenz von 30% der Bevölkerung geführt. 4% sind danach bereits schwer erkrankt. Die Ärzte in Europa stehen dem weitgehend noch hilflos gegenüber. Die medizinische universitäre Ausbildung, die neue Wissenschaftsbereiche wie Umweltmedizin bislang nicht vorsieht, kann zur Zeit dieses Wissen noch nicht vermitteln. Studentische Ausbildung muss rasch aufgebaut werden. In deutschsprachigen Ländern wurde bereits ärztliche, berufsbegleitende, umweltmedizinische Weiterbildungen durchgeführt. Im übrigen Europa haben die Ärzte in der Regel bisher weder in der Diagnostik noch in der Therapie von Umwelterkrankungen spezifische Aus- oder Fortbildung erhalten.

Der 1999 begonnene, sog. Bologna-Prozess fordert Gleichrichtung der universitären Ausbildung in Europa. Die Deklaration der Konferenz der europäischen Umwelt- und Gesundheitsminister in Budapest im Juni 2004 unterstreicht die Notwendigkeit, einer formalen europäischen Weiterbildung umweltmedizinischer Professionen.

Die im deutschsprachigen Raum validierte, ärztliche, curriculare umweltmedizinische Weiterbildung soll modifiziert für eine allgemeine „europäische Weiterbildung Umweltmedizin“ herangezogen werden. Diese führt zu einem post graduierten Zertifikat „Umweltmedizin“. Schließlich soll ein einheitliches Curriculum für Europa entwickelt werden.

Eine multizentrische, universitäre umweltmedizinische Weiterbildung auf hohem Niveau, mit dem Ziel eines „Master of Environmental Medicine“, wird langfristig etabliert. Durch die europäische Vernetzung mit einheitlichen gleichen Weiterbildungscurricula gelingt ein schneller Wissenstransfer. Gleichzeitig etabliert sich, berufsbegleitend und rückgekoppelt zu forschenden Universitäten, eine „Europäische Umweltmedizin“. Hierdurch bekommt Europa die Chance in der wissenschaftlichen Forschung und in der ärztlichen Betreuung umwelterkrankter Patienten führende Positionen zu erlangen.

Pawel Gluszynski, OTZO, Poland
“Staff Training for Waste Prevention”

In the last two years, Waste Prevention Association "3R" (WPA), in co-operation with Polish Association of Epidemiological Nurses (PSPE) and the Polish Hospital Infections Society, provided trainings for 236 hospitals, sanitary inspection and other institutions from seven out of 16 regions of Poland.

WPA issued two publications devoted to the drawing up and implementation of programmes for waste management in the health service sector: "Medical Waste Management" and "A Guide to the Classification and Segregation of Wastes Originating in the Health-Care Service". Both publications have set standards for medical wastes management in Poland.

In 2003, OTZO developed a programme for the neutralisation of medical wastes for the Warminsko-Mazurskie Voivodship (region). Full programmes of waste reduction were developed and put into practice in the Hospital of the Brothers the Order of St. John of God in Cracow, and County Hospital in Wolomin.

Six other hospitals which reported details of the programme progress after the first training organised in 2002, achieved in the first year reduction of hazardous medical waste by 82 tonnes, and waste management costs by EUR 47310.

Martin Mühlich, IUK Universitätsklinikum Freiburg
“greeninghealthcare.net – an Information, Communication and e-learning-Programme for Environmental Management in Hospitals”

The possibilities of new media channels for educational programmes are finding increasing acceptance within organisations. This project “e-Learning and Environmental Protection in Hospitals” examines the opportunities and risks of e-Learning within the special conditions of hospitals, and tests its usefulness for vocational training and further educational programs in the area of environmental protection.

The main goal of this project is to develop a web-based training course on environmental protection in hospitals. The expert course on environmental management provides the participant with a personal qualification to perform comprehensive tasks within environmental management. A certificate qualifies the participant as an environmental manager within the healthcare sector.

The basic course raises awareness about environmental issues, including the hospital as a final cause of huge pollution within the healthcare industry, the areas of concerns, and the potential solutions for improvement. The course is useful for the entire staff, but particularly for people in management positions who would then play an important role in the implementation of the environmental strategy.

The e-Learning educational programme is part of the Internet platform greeninghealthcare.net. From greeninghealthcare.net the user can assess the e-Learning courses, the knowledge section, a news site and several news groups. The knowledge database contains comprehensive subject-specific information. It serves as an encyclopaedia for targeted queries as well as for supplementary specialised training. The "good environmental practice" database XCHANGE contains successful projects and case studies from the whole of Europe.

Alternatives to Medical Waste Incineration

Incineration used to be the method of choice for most hazardous health-care wastes and is still widely used. However, recently developed alternative treatment methods are becoming increasingly popular.

Learn and discuss about the negative impacts of medical waste incineration and about alternative waste treatment technologies.

Ted Schettler, HCWH, USA
“Environmental and Health Effects of Incineration”

The potential health and environmental impacts of emissions from waste incinerators depend on incinerator design, operating conditions, and the composition of the waste stream. In many cases, waste incinerators are significant emitters of a number of toxic substances, including dioxins and furans, mercury and other heavy metals, and particulates. Moreover, all incinerators produce ash laden with toxic compounds that must be disposed of. Incineration as a means of dealing with material waste remains popular in many parts of the world, although support for alternatives is growing. This presentation will discuss the hazards of emissions from incinerators and consider the current context of materials manufacture, use, and disposal.

Cestmir Hrdinka, HCWHE

“Overview of Alternative Hospital Waste Treatment Technologies”

The International Convention on the Elimination of Persistent Organic Pollutants (POPs), which was ratified in May 2004 lists medical waste incinerators among the main dioxin sources in the environment. However, medical waste incinerators emit a wide range of pollutants besides dioxins and furans. It's scientifically proven that pollutants coming from incinerators can have serious negative impacts on the health of incineration plant personnel, the public and the environment. Besides air emissions, incinerators generate highly contaminated ash, which is also potentially hazardous to human health.

To avoid creating POPs, which are inevitable formed during incineration, HCWH supports the introduction of non-incineration methods for treating medical waste. In order to maximise the benefits of non-incineration technologies, a basic concept is presented of which the underlying elements are waste minimisation and segregation.

Four basic processes are used in alternative medical waste treatment: thermal, chemical, irradiative and biological. Thermal processes rely on heat to destroy pathogens. The low-heat processes utilise moist heat (usually steam) or dry heat. Chemical processes employ disinfectants to destroy pathogens or chemicals to react with the waste. Irradiation involves ionising radiation to destroy micro-organisms while biological processes use enzymes to decompose organic matter.

For thermal and chemical processes, an overview and principles of operation are presented along with specific examples of technologies in operation in Europe.

Steam disinfection, a standard process in hospitals, is done in autoclaves and retorts. More recent designs have incorporated vacuuming, continuous feeding, shredding, mixing, fragmenting, drying, chemical treatment and/or compaction, to modify the basic autoclave system. Examples of these so-called advanced autoclaves are: Ecodas, Hydroclave, Sterival, STICHEM Clav, STS, System Drauschke.

Microwave technology is essentially a steam-based low-heat thermal process where disinfection occurs through the action of moist heat and steam. Ecosteryl, Sanitec, Medister, Sintion, Sterifant, Steriflex are examples of large and small microwave units, respectively.

Chemical technologies use disinfecting agents in a process that integrates internal shredding or mixing to ensure sufficient exposure to the chemical. Until recently, chlorine-based technologies (sodium hypochlorite and chlorine dioxide) were the most commonly used. Because of some controversy regarding possible long-term environmental effects associated with the use of chlorine based technologies, especially of hypochlorite, non-chlorine methods are getting increasingly support. Some use peroxyacetic acid, ozone gas, lime-based dry powder, metal catalysts, or biodegradable proprietary disinfectants. The alkaline hydrolysis technology is designed for tissue and animal wastes as well as fixatives.

Brendan McGrath, Department of Health and Children, Ireland

“Experiences of Treating Healthcare Risk Waste in Ireland Using Non-Incineration Technology”

Non-incineration technology has been used successfully in Ireland for the past four years. Nearly 97 % of all hospital healthcare risk waste is now treated in this way.

The introduction of the new technology was just one component in a process which began in the early 1990's. Up to then, every hospital operated its own incinerator. These were out of date and were not capable of meeting modern emission standards. Their replacement was problematic and this led to a review of options and practices in the generation and management of waste which culminated in the introduction of a new management system and the processing of healthcare risk waste using non-incineration technology.

The review found that there was considerable scope for improvement in waste generation and management work practices and to this end a health services waste policy was developed.

The review also considered the means of disposal. The relatively small total volume of waste material involved (6,000 tonnes/year) raised serious doubts about the economic and technical viability of incineration as an option. These doubts, together with the unpopularity of incineration, led to a strategy for treating the clinical or healthcare risk waste using non-incineration methods. The waste, once treated, could then be safely disposed of by the commercial/ municipal waste disposal route – which in Ireland is landfilling – but crucially, the treated waste, along with all of the non-risk waste, would be available for recycling as and when such recycling became viable.

The board responsible for implementing the strategy invited tenders based on a performance specification rather than on a specific technology. The novelty of the solution meant that the whole process - research, procurement, licensing, installation and testing - took over 5 years to complete.

The technology employed by the successful contractor involves the use of the STI Series 2000 steam disinfection unit. Experience has also been gained in Ireland of several other treatment technologies. These include semi-mobile microwave plants, a unit using a hot oil auger system and a Rotoclave™ autoclaving plant currently supplying a service to industries and a number of hospitals and laboratories.

The experience with all of the permanent plants has been quite satisfactory. The plants have been meticulously licensed and are subject to a rigorous monitoring and reporting regime by the Environmental Protection Agency. Other related but significant issues which had to be resolved as part of the better management of the waste simultaneously with the introduction of the new technology included:

- Consistent packaging and containment standards
- The transportation and handling of the waste
- Waste unsuited for treatment by the disinfection process