BETTER PRACTICES

GUIDELINES FOR THE HEALTH SECTOR

SUSTAINABLE DEVELOPMENT

2012

c2ds committee for sustainable development in healthcare

CAHPP | consulting and referencing for the hospital world

A few figures about the sustainable development department

- 2 051 paper catalogues replaced by their online counterpart, amounting to 1.2 million standard sheets of paper saved, thanks to the results of our "paper vs. e-catalogue" survey ;
- 800-strong audience at the national managers' meeting dedicated to sustainable development in the health sector ;
- 500-strong cumulated audience at sustainable development informational meetings ;
- 500 suppliers asked about their sustainable development strategy ;
- 10 interviews given in newspapers, on the radio and TV ;
- 8 sustainable development committees created ;
- 5 sustainable development products and services currently being tested by private hospitals in our committees.

CAHPP's endeavours

- Developing management tools to help sustainable purchasing.
- Helping our members writing out their sustainable development strategy.
- Listing new products and services compliant with the issues of sustainable development in the health environment.

CAHPP's achievements

- Currently developing an online tool to evaluate the sustainable development performance of suppliers and their products.
- First carbon dioxide footprint assessment and commitment to reduce our CO_2 production by 2% per year for ten years.
- Committees become Sustainable Innovation and Studies Labs testing new products and services in private hospitals.

20/22 rue Richer - 75009 Paris
Tél. 01 55 33 60 00
Web www.cahpp.fr
Blog www.proachatsante.fr

an original look
on sustainable development

BETTER PRACTICES, GUIDELINES FOR THE HEALTH SECTOR
COMPILED BY THE C2DS ASSOCIATION (ALL RIGHTS RESERVED)
AND BVM COMMUNICATION

Editor directors: *Véronique Molières, Olivier Toma*
Author: *Dorothée Fraleux*
Interviews: *Dorothée Fraleux, Magali Bonelli-Bassano, Daniel Ronner*
Editorial secretariat: *Rachel Billod-Mulalic, Lucie Kostmann*
Translation: *Christie Martelet*
Drawings: *Julien Pacaud*
Photographs: *Getty Images, Fotolia.com, front cover: Blois Polyclinic*
Graphic design: *Alain Chevallier and Corinne Majoulet*
Editor: *C2DS*
Printer: *Corlet, 14110 Condé-sur-Noireau*
september 2012, C2DS

IMPRIM'VERT®

C2DS
President and founder: *Olivier Toma*
Head office: *C2DS 79, rue de Tocqueville, 75 017 Paris, France*
Tél/fax : +33 (0)2 47 30 60 34
www.c2ds.eu

C2DS - association under the French law of 1901
Company French registration number: 507 428 67000016
Training provider registered under n° 43458 11 75 75
and not worth approval of the State.

Price: 50 euros - free to C2DS members

The C2DS would like to thank the advertisers for financially contributing to the publication of this guide. However, health professionals, who are sole pilots of the C2DS, ensure the independence of mind, of work and speech of the association. The C2DS welcomes critical thinking and shares its founding values: passion, innovation, professionalism and precaution.

This guide was first published in 2009: at the time it was the result of a vast enquiry into better practice in French health establishments. Things were moving forwards. Numerous subjects were covered, green housing, management, sorting waste, energy saving, purchasing, sustainable health... But environmental issues do not have borders. It was therefore necessary to extend our research to an international scale and to discover which problems are different or on the contrary identical. In 2010, the guide was the result of a journey, meetings between motivated professionals who were prepared to change behaviour and attitudes to make their working methods sustainable. Now, this guide has been translated into English to make it accessible to everybody.

summary

SUSTAINABLE MANAGEMENT 7

ECOCONSTRUCTION: THE VISIBLE SIDE OF THE SUSTAINABLE DEVELOPMENT ICEBERG 26

SAVING ENERGY AND WATER 51

PRESERVING THE ATMOSPHERE 69

SUSTAINABLE BUYING 81

SORTING, RECYCLING AND RE-USING 102

SUSTAINABLE HEALTH 118

The Saint-Pierre Institute
in Palavas-les-Flots, France.

We believe that Sustainable development must become the focus of health policy in France and more generally in Europe. This is the major challenge for the twenty-first century. Together, we encourage audacious and innovative environmental health dynamics geared to the hospital, medical and social sector to create a new sustainable and supportive approach to healthcare. Our action is motivated by the historical warning issued by scientists as well as the need to restore a sense of meaning to healthcare professions and a civic commitment to the international dynamic, Agenda 21. The hospital is becoming increasingly involved in the virtuous circle of Sustainable development and is gaining awareness that it can accomplish its noble mission of Public health in a fairer and more lasting manner. The hospital is a polluter, producing masses of liquid and solid waste. The impact of care on patient's health, carers, service providers and the local population is not harmless. What if the hospital was creating tomorrow's illnesses? Unrestrained use of medical care, where allowed by the system and the priority given to a curative rather than preventive logic weaken the social and financial balance of our countries. How will future generations be cared for? The Health sector generally represents 10% of the GDP. How can this spending be optimized and how can it become a source of economic, social and scientific progress? How can it play its educational role in the health system for whom it acts as an expert in the first place? Hospital managers and healthcare professionals are taking action all over the world to make the hospital greener. From fashionable trend to ethical commitment, everyone has their reasons: caring without harming, responding to civic and social expectations, managing and saving in the long and short term. We went to meet these pioneers. Far from being utopian, these staunch supporters advance step by step and find ways to take measures. The C2DS is a proactive, independent body of research. It is a source of practical tools and ideas. Above all, it is inspired by fierce determination and commitment to Sustainable development, the first and foremost condition. We firmly believe in our cause and we are intending to win people over by setting the example and sharing our desire to get things done. That is the purpose of this guide! We pursue this ideal with tenacity and reason…to lead people towards a better and more sustainable world.

Olivier Toma
President

François Mourgues
Vice-president

c2ds comité développement durable santé

SUSTAINABLE MANAGEMENT

According to the World Health Organization, the environment is currently responsible for a quarter of all diseases and the mortality rate. With environmental catastrophes such as the explosion of the nuclear power station in Fukushima in 2011 or the oil slick of four million barrels spilt by BP into the Gulf of Mexico in 2010, the interdependence between degradation of the environment and health risks has become a brutal reality in current affairs. However, health and Sustainable development are also closely linked by another means: the idea of generational interdependency which is at the very heart of Sustainable development. This is the main idea on which the funding of all Public Health systems is based. In other words, we need to consider the consequences of our investments and our patterns of consumption, in order not to mortgage the planets' resources or medical treatment for our children either on a social, environmental or financial level. 'Sustainable development' must allow current generations to satisfy their needs without preventing future generations from doing the same, according to Gro Brundtland, first Sustainable Development theorist. The equation is simple: whether in terms of environmental resource management or health services, the way in which we consume today does not respect this principle. According to Joël de Rosnay, biologist and consultant professor at MIT (Massachusetts Institute of Technology), "current lifestyles are not compatible with Sustainable development because we have chosen economic growth and unlimited material growth in an environment that has its limits." In our sector, the human being is at the heart of our job. For Olivier Toma, founder of C2DS in France, "Sustainable development and health go hand in hand. "First, do no harm" is part of the Hippocratic Oath. Yet, when

"You do not inherit the Earth from your ancestors: You borrow it from your children."

Ameridian popular wisdom

The Paoli-Calmettes Institute, in Marseille.

the hospital itself uses carcinogenic substances, disposes of toxic waste and places the environment and natural resources at risk, we step outside the framework of 'healthy' medicine." What are the better practices and ideas that make a hospital sustainable, in France, Europe or the United States? How can a sustainable or ecological establishment be managed? How can green housing be built? How can we save energy and water? How can the carbon footprint be managed? How can toxic substances be identified in buildings or in everyday actions in healthcare? How can the hospital be saved from toxic effluents and medical refuse? How to sort waste and respect the environment? How to take better care of employees and patients? According to Luc Montagnier, winner of the Nobel Prize for medicine in 2008: "Sustainable development, with mankind and his health at heart, will be the major issue of the 21st century. The countries which play a major role will probably be those who have already made important investments in this sector. Health will be a considerable source of economic and human wealth in the decades to come."[1]
The sustainable hospital is a challenge. In this third publication of the guide to virtuous practices in Sustainable development, we present testimonies and practical ideas to get ahead and anticipate the future in a positive way.

1. *Le Monde*, 14th of March, "Anticipating the passage of a curative medicine to a predictive medicine", Luc Montagnier, Frédéric Bizard.

Sustainable development with human beings and their health at heart, will be the great cause of the twenty-first century.

AN INDISPENSABLE PRINCIPLE: SUSTAINABLE MANAGEMENT

A plethora of theories has appeared over the past years, often with a purely marketing approach. How can management make an efficient contribution to Sustainable development? In English, the term sustainable implies that the economy, ecology and human beings are capable of supporting the system which guarantees their resources, whereas in French the translation only insists on the longevity of the system. How can this aim be translated into a universal, holistic and operational language for a health establishment?
Management and quality control techniques at the end of the 1950s' are the first leads. In France, from 1992 onwards it was officially possible to make a commitment to quality. The Deming Wheel, named after the American scientist considered to be one of the fathers of modern management, is a very broad tool, but essential to the quality approach of a product, a service or a project.
The Deming Wheel lists four simple stages: "Plan", for developing specifications and schedules; "Do" the delivery stage; "Check" is the auditing stage using existing control systems and performance indicators. "Adjust" is the adjustment and improvement stage. The Deming Wheel is adapted to the hospital environment and is a good basis for management.
For Olivier Toma, quality commitment is prolonged by Sustainable development. What does this mean to managers? To avoid managerial green-washing, we propose a model which works with five branches: motivate, link, train, validate and communicate. Each branch has a centrifugal and centripetal movement towards the inside of the establishment and towards the outside.

MOTIVATE

THE VITAL PREREQUISITE

"Sustainable development cannot exist without motivation," explains Véronique Molières, cofounder of C2DS and director of the BVM communication agency based in Berlin, "we need to learn how to communicate with all parties concerned, in

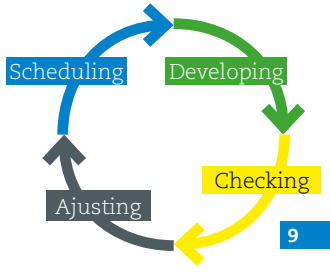
substance and form in an extremely positive manner. Sustainable development is not a gadget. However, it can only work if we make it attractive and interesting. Our challenge is to make it appealing even under the pressures of daily life". Even though the constraints are serious and omnipresent, hospitals are overstretched 365 days per year 24 hours per day, resistance to any change is very strong in health establishments. One of the challenges of sustainable management is to show that changes in practices bound to sustainable practice do not necessarily mean doing things differently but learning a better way to do them.

BOTTOM-UP, TOP-DOWN

It is essential to motivate employees at all levels of hierarchy! Above all, intermediaries must be found in your hospital. In Karolinska, Sweden, Charlotta Brask is responsible for chemical risks. For her, sustainable management's main challenge is to identify competent and motivated staff within the hospital. Why? Because, it is impossible to make progress without motivation. "We relied on those directly involved for our toxic restriction policy: those who work directly in the analytical laboratories, the Environmental Managers and risk controllers... These are the people who are best informed. They can say: I think that in two years time we will find an alternative to this toxic substance. Or, we have tried ten different substitutes but nothing works and in twenty years time we still won't find anything better. Our list must be realistic. We can't really ask a laboratory which specializes in lead-based anti-cancer treatments to stop using it." Communication works better in establishments where the management team is sensitive or has committed itself to environmental issues. It's often the case of people who have chosen to work in healthcare. In France, Marie-Alix Gilli, commander at the Bégin Military Hospital in Saint-Mandé near Paris pilots the Sustainable development committee at the hospital, which began in 2008. She has invented a pyramidal system: "our committee meets regularly and we have set up environmental correspondents in each department. This wasn't always easy: you need to find the right words; otherwise Sustainable development is just politics. We talk about what can be accomplished in all departments. The correspondent goes backwards and forwards between the ground and the summit to multiply ideas." Similarly, José Vicente Bon at the General Hospital in Valencia, Spain runs a "green office". He tells us that, "in 2003 a group of employees who were worried about the environment decided to take action. We launched the first environmental day..." The green office was named as soon as it was put together! José Vicente directs this 5 strong unit which is partly responsible for collecting and recycling waste. At the AP-HP in France, the Parisian hospitals flagship in the public sector with nearly 90 000 employees, it was management initiative that led Jean-Rémy Bitaud, the environmental representative to take action. "We have included a sustainable management section in the AP-HP strategic plan for 2010-2014. We set up training sessions on no-discrimination, domestic risk prevention, road safety and cancer prevention. We try to go beyond the statutory". Creating a Sustainable development committee is often an efficient first step. At the Saint-Roch Clinic, Cambrai, France the Sustainable development committee is made up of six people who agree on a one year plan and choose a leader who is responsible for the project's progress. The Pasteur Clinic, Toulouse, France has chosen a more thematical approach: four commissions, "energy and carbon", "effluent and waste", "social health safety" and "purchasing", are piloted by the Sustainable development committee. "The purchasing committee is made up of 20 people, the waste team only 5 or 6," specifies Olivier Collet, technical and safety representative.

WHAT ABOUT THE WHITE COATS?

On the whole, white coats are the black sheep of Sustainable development in the health sector. With their staggered working hours, ever increasing responsibilities and workload they are reticent to take time to become involved in environmental



Charlotta Brask, in charge of chemical risks, Karolinska Hospital, Stockholm, Sweden.

Sustainable development meeting, Montréal Polyclinic in Carcassonne, France.

health. In Sweden it is also quite difficult to motivate practitioners to participate in environmental programs. "Doctors are focused on caring, but they are often vague about the link between the body and the environment. Nurses become involved more easily. I feel that their feet are more firmly on the ground," comments Charlotta Brask. "At Saint-Mandé, two surgeons have joined our Sustainable development committee!" enthuses Marie-Alix Gilli, "mentalities are beginning to change!"

ALL TOGETHER!

Ana Cabrero is head of the Department of Engineering and Technical Services at Fuenlabrada Hospital in Madrid. For her, Sustainable development is everyone's concern. She is introduced as the 'soul' of Sustainable development initiatives; she coordinates the sustainable hospital program which began in 2006. "Sustainable development is not a question of monitoring staff. Everybody must show common sense and be aware of the consequences of their daily actions. It's the only way we can improve the quality of waste sorting, energy consumption, make them vigilant in the choice of products they buy... To this effect we are constantly sensitizing, communicating and training", she explains. Her department organizes internal visits within the hospital for staff. The aim is to inform everyone on the way their institution works and what the consequences of their acts are. "Sustainable development can only work if it is global. Everybody must play their part." As a result, Sustainable development has been put into practice. In order to set up SD projects, the hospital in Madrid uses methodology which relies mainly on common sense: "We ask ourselves what we are doing efficiently, then what can be improved, firstly without making any investment and finally which investments it would be wise to make." Similarly at the San Carlos Hospital in Madrid, Manuel Carmona Calva has fourteen years experience of Sustainable development to his credit owing to the staff's close involvement. "We have created a group of SD supporters made up of highly motivated people. They give us feedback on our initiatives, to see what the reactions have been. In the same way we have a bi-monthly health and environment electronic newsletter. Every member of the staff staff receives it. This newsletter mainly deals with SD issues in regarding the hospital but also in more general terms. Moreover, every three months we create events, exhibitions, round tables. We set up theme days, water day, national SD day, etc." Another side effect, Sustainable development is also aimed at patients: "All the documentation is available in their rooms. This allows us to open a dialogue: they ask questions and are questioned about the environmental management of the hospital in satisfaction surveys."

TREVOR PAYNE, DIRECTOR OF ESTATES & FACILITIES AT THE UNIVERSITY COLLEGE HOSPITAL LONDON, ENGLAND

Carbon Oscars at the hospital

"We have 60 energy champions: particularly motivated members of staff who have followed a three or four hour training module on energy saving. As well as doing their job, they commit themselves to promoting better practice and keep an eye on electricity and water consumption and waste sorting. When their results are outstanding, we give them a carbon Oscar. Last month we sent a brochure to 6000 hospital staff and 8000 citizens with an interest in the hospital. We also organize visits to primary schools to talk to children about carbon emissions and how habits can be changed. We hope that the term "carbon footprint" will stay in people's minds."

BACK TO THE FUTURE: BACK CASTING

In the United States, professionals are often employed to motivate the staff. At OHSU, the University Hospital in Portland, Oregon, Skai Dancy, Logistics Manager, has a motto: "Sustainable development must be given long-term consideration. It's as simple as that." And that's why, when OHSU

At the Tivoli Clinic in Bordeaux, France.

began thinking about Sustainable development, the hospital organized a back casting. “A ‘back casting’ allows us to break down the obvious by thinking backwards. First we define our objective, and then we question different actors about their proposals to achieve these results,” explains Skai Dancy. This method which was used following the first American petrol crisis in the 1970’s is part of the Soft Energy Path, soft energy management, defined by Amory Lovins, researcher. According to him, the petrol crisis created awareness of the fact that producing energy is not an end in itself. Lovins said that energy must be at the service of consumers’ needs, we must begin by understanding. The Soft Energy Path reintroduced the notion of efficiency into the heart of energy politics, the use of renewable energies and evaluation methods... This is the context in which back casting was introduced as a management tool. The OHSU’s back casting was a success. “We invited architects, engineers and people who use the buildings, and asked them the following questions: what is important for you in a building? Imagine yourself in thirty years’ time. What would you like to be proud of today? What do you think you can change for the future? It was very interesting for me to see the variety of input. The answers enabled me to highlight concerns which would have been neglected without the back casting. For example, a number of people we questioned spoke about the links with the neighbourhood. It was very important for them that the neighbourhood should be involved in the life of the building.” The area of Portland has been strongly affected by deindustrialization. Portland has thousands of square meters of industrial wasteland, testimony of a time when industry was flourishing. There are numerous rehabilitation programs underway for the abandoned sites and new building projects must take these considerations into account. In Newberg, also in Oregon, the small town hospital is an ecological showcase for the Providence Group. “It is the greenest hospital in the country!” advertise the flyers for this 40 bed structure, built in 2003. “We began Sustainable development with a pioneering mentality. The words “green”, “environment” entered

our vocabulary in 1994. I was one of the first people to be hired as an Environmental Manager in the United States," Richard Beam says proudly. "There are two concomitant phenomena: on the hand we became aware that Sustainable development has a dimension of economic efficiency and on the other hand round about 1990 we started to realize that the hospital pollutes: toxics in the building, waste management, the fact that hospitals are great energy consumers....At the Providence Group, we were brimming with desire to start a real green project!" Motivation is the basis of Sustainable development in the hospital. However, all the motivation in the world would be useless in an autistic hospital, without involvement, cut-off from the world.


CODE DE DÉONTOLOGIE DES DIRIGEANTS D'ETABLISSEMENT DE SANTE, D'ETABLISSEMENTS MEDICO-SOCIAUX ET D'EHPAD

produit par le c2ds

CONSCIENTS QUE L'EXERCICE DE LA PROFESSION AUTANT QUE LEUR CRÉDIBILITÉ MANAGÉRIALE EN DÉPENDENT, LES DIRIGEANTS D'ETABLISSEMENT DE SANTÉ, D'ETABLISSEMENTS MÉDICO-SOCIAUX ET D'EHPAD S'ENGAGENT À :

GIVING MEANING TO THE PROFESSION

Being director of a hospital establishment has a highly ethical dimension. In France all practitioners who work in hospitals are subject to a code of conduct and bound by the Hippocratic Oath. Physiotherapists, nurses and chemists are bound by professional secrecy. However, hospital directors do not have, at present, a common code of conduct. This is why the Committee for Sustainable development in Healthcare (C2DS) piloted a working group made up of hospital directors, academics and carers to elaborate the first code of conduct for the use of healthcare establishment managers, socio-medical establishments and EHPAD (longterm care retirement homes). In France, this unprecedented code of conduct obtained more than eighty signatures from hospital directors within a few months. For Marie-Antoinette Banos, Director of the Princess Clinic, in Pau, France. "The code of conduct gives a line to follow, we've got it directly under our eyes.... this gets staff involved: everybody is responsible for a criterion. Everybody is concerned." It's the first stage in a more global approach involving healthcare actors to define a precise framework for the profession and its responsibilities towards the patients, staff, establishment, environment and society as a whole.

BONDING

THE HOSPITAL IN A WORLDWIDE CONTEXT.

The hospital must be part of a regional, national or international territory with a network of partners to make management initiatives possible and to stabilize them. The first thing to be taken into account is the physical environment of your establishment.

A CULTURAL HISTORY

The small town of Hackensack is located in the United States, about an hour away from Manhattan. Its history is closely linked to a scandal: its river is famous for having the highest level of pollution in the United States. Its ecosystem has been irremediably altered and the wildlife has been decimated. According to Tim Woodward, the hospital health officer: "Let me be clear, Hackensack is built on top of a rubbish dump. Let's be positive: what is the best way to put a stop to the use of toxic substances?" As a result, this particular context has initiated good non toxic ideas. Managing a hospital also means taking a regional context into account. In Switzerland, good initiatives often go back to cantonal level associations. "In the 1990's, the ecological stimulus clearly came from Zurich

The Hackensack University Medical Centre in New Jersey, USA, has started crusading against toxic substances.

hospitals," explains Reinhard Voegele, spokesman for the Hospital Federation H+. "But Switzerland is made up of 26 cantons. This means 26 different health systems." The Swiss hospital system is a crossroads consisting of different language and cultural communities, with three official languages, French, German and Italian: all official documents and governmental requirements have to be translated and all those involved must remain actively in contact with one another. Sometimes, it is difficult to ensure links between parties owing to geographical location: imagine for instance that the hospital is situated on an island? David Vélasquez, quality and environment manager at the Santa Cruz Hill Hospital, Tenerife in the Canary Islands says," We feel the distance, we are a long way from major suppliers and institutions, and everything always arrives a bit late... It is a handicap to be at this southern point of Europe." But for the Environmental Manager, this geographical location is a challenge, "we have had to learn to share information and implicate ourselves. We ask lots of questions, and it is true that we never hesitate to ask other hospitals!" Whether it is to optimize purchasing, to set up common policies or to relay Sustainable development information. Collaboration between establishments is a reality of Sustainable development management! Another challenge: high urbanization. It isn't easy to create space for Sustainable development in a metropolis like Paris where every square meter is counted and where the smallest delivery becomes a problem. Since 2007, the Turin Clinic in heart of the 8th district of Paris has faced this challenge on a daily basis.

HOSPITAL NETWORKS

At the San Carlos Hospital in Madrid, the Oligopsonio network meets several times per year to review the situation of each of its members... "And to help the one that is falling behind!" declares Manuel Carmona Calvo, Director of the environmental management department. The Group is called Oligopsonio, power through dreams, we're not afraid of words...These networks which have been created by healthcare professionals have the advantage of being close to on-site realities. Elizabeth Izquierdo, of the Del Mare Hospital Group in Barcelona, evokes Health Promoting Hospitals (HPH) the network of health provider hospitals to which Catalonia belongs, "We associated with other Catalonian hospitals and we are currently working on a guide for sustainable building. We are combining our experience to create a useful manual. But this is not the only subject we deal with; we also pool our knowledge on how to obtain grants." Comparative analysis is very practical! Similarly, in Lund, Sweden, nearly ten hospitals collaborate to identify areas where sustainability can be improved. Daniel Erikson, Director of the TEM Foundation, "This model of inter-hospital cooperation works like the Swedish multi-layered sandwich, filled with good practical ideas for Sustainable development in the health sector!"
In France the C2DS group counts 270 member establishments and represents a real horizontal health platform from one establishment to another. The waste working-group is an example. It's a real platform for exchange between 21 member establishments who are particularly motivated by the reduction or sustainable management of waste. They meet every month to exchange their experiences and successes but also the problems to avoid in waste management, analysis of statutory texts, appraisal of service providers and exchange of good ideas. Another stage of the C2DS development: measure of its involvement in an international context. This was the role of the guide published in 2010 and even more so in this one. Open to the world, the C2DS proposes to introduce you to the good sustainable practices of your peers, in France, Europe, the United States and Canada.

YOU CAN WIN BY GOING INTERNATIONAL!

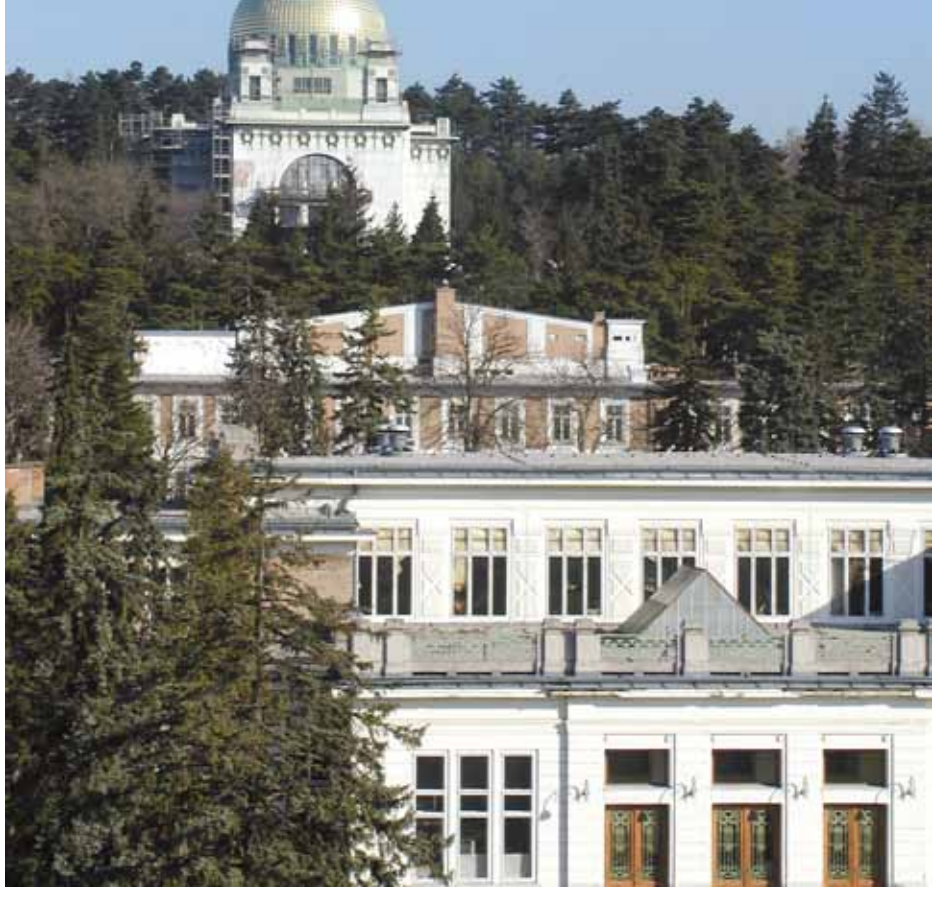
The biregional cooperation between the provinces of Huelva and the Algarve in Portugal is a quantified reality: The European Union has invested up to 4 million euros for combined projects between health services. Similarly OMARS (the Observatory for the social responsibility of businesses in the environmental health sector) based in Granada,

www.synergiesante
environnement.org

Spain, has set up networks of dedicated hospitals and is open to French, German and Catalan experiences.
In 2011, on this impetus the C2DS held its summer University in Barcelona and created the "Charter of Barcelona" which commits signatures in a shared and sustainable impetus for international projects and meetings. Not only Spain! The C2DS also has an exchange program and cooperates with the Canadian Association SSE, Synergy Health Environment.The C2DS is also highly involved in another project, RES Hospitals, whose aim is to achieve zero carbon emission. Sixteen hospitals from eight European countries combine their knowledge and experience in order to produce European guidelines for reducing the use of fossil fuels. Four pilot hospitals are going to draw up a guide. The importance of European benchmarking! While anchored in a regional, intra hospital and international context, hospitals must also be linked to institutions and the legislative framework of their country.

INSTITUTIONS AND LAWS, DEMANDING PARTNERS

In Switzerland, 370 establishments are grouped under the banner of the hospital Federation H+, in this heterogeneous country it is a bonus to be able to rely on a Federation: in 2004, the Zurich Ecology Commission, which gave the first impetus to Sustainable development in the Swiss hospital sector has joined Federation H+. "Today, the Ecology Commission has representatives in different regions and we meet four times a year." For heightened efficiency! In Stockholm, hospitals are closely linked to institutions: in the Swedish capital, Sustainable development passes through the County Council, the Town Council and the Regional Council of Stockholm (SLL). In the Swedish capital, the independent management of local authorities is based on a long tradition which strengthens the previous law on local authorities which came into force in1992. The Town Council is a real authority, decentralized from the State and responsible for two sectors, transport and health. With 2 million inhabitants, Stockholm is both a town and a region and the most highly populated area of Sweden. With 2 million inhabitants it naturally has an accrued importance. The Town Council employs 43000 people and has a budget of 6,6 billion euros. It generally sets hard targets. The environmental department, situated in Fleminggatan on the Island of Kungsholmen, the administrative area, is no exception. "At the Town Hall, we set objectives for the hospitals. Every year they tell us if they have reached them or not. We record statistics and publish them annually", concludes Charlotta Brask. Similarly, the city of Vienna, Austria, involves all Public Hospitals in the "Green Purchasing Vienna" (Ökokauf Wien), initiative. This represents 23 working groups in all sectors of activity in the city. Hospitals have combined to reflect upon their purchasing



Vienna hospitals, Austria, have carried out a pilot work about Sustainable development.

policy to reduce the environmental impact of the Austrian capital. Effective collaboration with the Municipality!

In terms of legislation, even if there are considerable divides between countries, the Sustainable development initiative has been launched. It is not a surprise that Canada has understood the urgent need to include Sustainable development in its health establishments. Laws provide a framework for environmental requirements for hospitals whether ruled by the Federal Government or the Government of Québec. Québec was also a forerunner, with the first "Sustainable development Plan", which was presented to the population in autumn 2004. Claude Béchard, Minister of Sustainable development, Environment and Parks in 2006, proudly declared that Québec was at that time one of the rare political entities, alongside several American States, Manitoba, Luxemburg and Belgium that had specific legislation for Sustainable development. At the Federal level, we note the Federal Law of Sustainable development (LFDD) which came into force in June 2006, which obliges Ministries and Federal Organizations to develop Sustainable development strategies.

The framework of legislation concerning Sustainable development in healthcare is guaranteed by several authorities that are attached to Health Canada, the equivalent of the Federal Health Ministry, such as the Canadian Institute for Health Information or the Public Health Agency of Canada, which has examined problems associated with human resources in public health. This concern is shared by numerous Canadian organizations, which regularly alert public opinion on the necessity to train health management staff in Sustainable development.

The Québec Office for the French language and the Ministry of Sustainable development, the Environment and Parks have even published a glossary of Sustainable development with anglicism translated into French. The aim is to structure knowledge in the area of Sustainable development to allow everyone to communicate with one another using the same vocabulary.

In France, Sustainable development was legislated upon in a Constitutional Charter (2006) which focused on the environment in public policies. And in 2006, Sustainable development became part of the French Constitution: the State published a reference chart for Sustainable development territorial projects and the Agendas 21. However, there is still a risk to avoid: that legislation lies dormant at the bottom of a pile of papers. The failure to apply environmental legislation has been estimated at 50 billion euros per year in healthcare and direct costs for the environment. "Our environment is protected by some 200 acts of legislation which are not always enforced as they should be. This not only has harmful consequences for the environment and human health, but it also creates legal uncertainty for businesses and undermines the functioning of the single market. In this period of crisis, these are costs which we can ill afford," stresses Janez Potocnik, European Commissioner for the Environment.

In the United Kingdom, the Sustainable development cell at the National Health Service (NHS) employs eleven people and is supported by a regional network of partners who work specifically on carbon footprints. According to the Director, Sonia Roschnik, "The environmental factor must be a fundamental principle of the NHS' development plan."

Working in networks with regions and institutions is one thing. Sustainable management also relies upon the strengths within an establishment while finding missing competences elsewhere.

INVOLVING ALL THE STAKEHOLDERS

The stakeholders are the basis for Sustainable development in the hospital. Without an all-round vision, which takes all partners into account, a hospital cannot be sustainable. In Madrid, Manuel Carmona Calvo works along these lines: "For purchasing, for example. First of all we discuss the purchase of SD products, then we organize a day with manufacturers to talk about sanitary affairs. What is our purpose? To raise awareness, to emphasize the fact that environmental impact must be taken seriously into account from the

beginning, from the design and manufacture of products and systems through to their distribution." For Daniel Eriksson in Malmö, discussion is a real part of Swedish culture: "We really want hospitals and businesses to work together," he adds. "This valorizes both the local green economy and research and development. In short, it allows us to be efficient." In Austria, it is current practice to combine competences and seek new resources outside the sphere of the hospital. "In 2006, three scientists knocked on our door with a transdisciplinary project for our hospital", explains Dr. Karl Purzner, Sustainable development Project Manager at the Department of Social Medicine at the Otto Wagner Hospital in Vienna. "There was an economist, a researcher in social sciences and an environmental specialist. We have always communicated about our interest in Sustainable development." They wanted to test their project in our hospital. This is how the hospitals in Vienna began trials on Sustainable development as a whole. "We worked on a basic principle: to make an economic, social and environmental synthesis on the scale of our hospital. We began with the principle that it is the only price at which sustainable actions could be operational. The clinical units work on a reorganization based on three principles: economy, humanity, and environment. We always have the use of resources in mind, we no longer talk about saving money but on how to make better investments. It is a whole new pattern." The Vienna Hospital has also carried out a comprehensive management workflow identification program. "In our Cardio/Pulmonary Department, for example, all patients were treated in the same way. We have introduced a system of advanced diagnosis and we organize the flux of patients according to the seriousness of their case. This has allowed us to reduce the cost of the use of equipment and to better adapt treatment to our patients." The Cardio/ Pulmonary Department has invented a real model for Sustainable development by including a reflection on purchasing. "We have worked on the objectives of each department. We asked them to define the content of their work." The results are sometimes surprising but always valuable. For instance, in the Cardio/Pulmonary Department, staff preferred rapid initial diagnosis over bed occupancy for patients who sometimes have to wait up to ten days to find out if their tumour can be operated on, or a focus on palliative care. "It's only through comprehensive thinking that we can achieve sustainability", notes Dr. Karl Purzner. Currently, The Otto Wagner Hospital has been registered under the EMAS regulation. German speakers can consult his work on management on www.das-nachhaltige-krankenhaus.at. In April 2010, the establishment received a special award from the Ministry of Transport, Innovation and Technology.

TRAINING

KNOWLEDGE IS POWER

Sustainable development reinvents itself from day to day... But training is primordial to become and remain efficient. After a quiet period in terms of specific training for Sustainable development in healthcare, things are beginning to change. "For a long time, health and Sustainable development were independent sectors. Training existed in both areas but they weren't mixed. After a long empty period, things are starting to change," explains Christine Belhomme, Director of Terre de Santé organization which is in charge of training modules for C2DS. C2DS gives training courses on the following subjects: general introduction to sustainability, how to fulfill Sustainable development criteria for mandatory certification by the Higher Health Authority for all French hospitals, sustainable management, waste and effluent, solid waste management, how to be involved as a nurse or carer, etc. Christine Belhomme notes real progress in this field, which echoes the general tendency: "I notice a change in individual profiles. Expectations are changing: until early 2009, we were faced with pioneers who came through personal conviction. Today, they come for compulsory certification (8 criteria have been established for Sustainable development). They know that between 2012-13 their establishment will be ground by the SD mill!" In January 2011, the University of Montpellier 1 and the C2DS/ Primum Non Nocere started the

The Mollet Hospital in Spain.

first University Diploma (DU) All the more so as a partnership framework has been signed with the University Hospital of Montréal in Québec. “Law and sustainable management in healthcare.” The first step to professionalize Sustainable development in healthcare.
Professionalization in Sustainable development is a real advantage. It is also a necessity to provide internal training in Sustainable development. In this respect, Spain is a pioneer. According to Juan Antonio Ortega Garcia, several initial and further training courses are specifically orientated towards Sustainable development on the Iberian Peninsula. “Nurses at the Catholic University of San Antonio in Murcia can follow courses on breastfeeding, but also learn about the actions we take at the Centre for Environmental Paediatrics. In medicine, we have a course which teaches how the human body evolves and adapts to the environment. Finally, there are environmental management classes for the management teams from medical centres throughout the region. The idea is that there is an involvement, an institutional commitment.”

AT THE WORKPLACE

At Virgen de la Arrixaca University Hospitalin in El Palmar, Spain, the environmental paediatrics unit also gives internal training: every year, it publishes a report on environmental management. It’s a real tool for information and sensitization, the report is posted on internet. “For me, the key to Sustainable development is training staff. Environmental and sanitation questions must be linked, Sustainable

To “professionalize” in the area of Sustainable development is also a real asset. The SD has been part of the compulsory certification in France since 2012.

development must be an integral part of training for healthcare professionals," suggests Dr. Juan Antonio Garcia, head of the Paediatrics Unit. For her part, Elena Bunet, Environmental Manager for the Empordà Hospital Group, Figueras, Catalonia, raises the question of difficulties encountered for internal Sustainable development training. These are related to the high level of staff turnover. "A lot of emphasis needs to be placed on it! For the moment, waste sorting is one of our major themes. It also gives us the opportunity to make our environmental management known... But it's difficult! There is such a big turnover, summer staff, people who work night shifts and those who leave for good. We greet the summer staff with a welcoming class during which we approach the question of Sustainable development." For his part, Agustin Ortega, head of environmental management at the Juan Ramón Jiménez Hospital in Andalusia has been able to measure the importance of training in the workplace. "As early as 1999, we realized that we had made the mistake of training staff in environmental management in classrooms. The most productive training courses are clearly those which take place at work." And nearer! Virgen de la Arrixaca University Hospital in Murcia, has managed to finance health and environment training by the Spanish Ministry of Health. These courses are mainly followed by healthcare professionals but have also attracted students from other disciplines. "Biology students and environmental science students come to these classes because, as far as I am concerned, they are healthcare professionals in the same way as doctors. Health and environment have become synonymous", Doctor Juan Antonio Ortega Garcia gets carried away. Motivated, related, trained, Sustainable development actors must also learn to evaluate their involvement!

MARGOT MATO LOPEZ, GENERAL SERVICES DIRECTOR AT JOSEP TRUETA HOSPITAL, GIRONA, CATALONIA, SPAIN

Training for each department!

"We have set up a training course on waste sorting. But as departments do not produce the same sort of waste, we have had to adapt. As a result, we go to each department for really adequate waste sorting training. Our interventions never last more than 30 minutes, and every employee can, at a given moment, stop working for 30 minutes to listen to advice, ask questions, submit proposals or make criticisms!"

TESTING AND CERTIFICATION

A CRUCIAL STAGE

To reinforce and acknowledge your good SD practices, the next stage is certification. There are many labels, each one has its own specificities: ISO 14 001, 9001, 26000, EMAS, LEED, BREAM. Making a commitment to certification might appear restrictive, but it's a real guarantee for efficiency.

WHICH FRAME OF REFERENCE SHOULD BE CHOSEN?

ISO are the familiar initials of the International Organization for Standardization. The ISO 9 000 illustrates an international consensus on better practices of quality management and the ISO 14 001 is its environmental equivalent. Dominique Pon, Director of the Pasteur Clinic in Toulouse has recently experienced the impact of such certification on his staff, "it's recognition for good work done for those involved", he explains. The certification has to be renewed every year. A real long-term policy is being implemented. In France, only nine establishments have obtained the ISO 14001 certification: the Delay Clinic in Bayonne in 2009, the Anjou Clinic, Angers, the Pasteur Clinic, Royan, the Navarre Polyclinic, Pau, 2010, the Saint-Gatien Clinic, Tours (also ISO 9001) and in 2011, the Pasteur Clinic in Toulouse, the Béarn Dialysis Centre in Aressy and the Léon Bérard Centre, Lyon It's never too late! In Aressy, the Dialysis Centre introduced its certification in 2010. "Not in the whole establishment but on three themes." specifies José Lalanne, its Director; the environmental

aspects which cover the physical elements of the establishment, energy and finally waste." In October 2011, the certification of his establishment became reality." The certification validates our common sense and rewards our intentions towards the environment. It has brought us real advantages, made substantial savings to running costs, savings in water, energy, consumables, but it also lightens tasks for our employees. I can only encourage colleagues to participate in the ISO 14 001 adventure, even more so because the requirements of the High Health Authority coincide on numerous points in terms of quality and standards. In the end, doing things well and making them beautiful isn't any more expensive than doing them badly and making them ugly!" Yvan Saumet, CEO at the Blois Polyclinic called for an external audit. "I wondered if it would be better to obtain the 14 001 or to work towards the requirements of the AFAQ 1000 NR before preparing the AFAQ 26000, the French version of the ISO 26000." The Blois Polyclinic finally chose this option. This new standard, which focuses more on the community and which came into effect in november 2010 establishes performance levels on questions concerning social responsibility on a scale of 1 000 points. "The 26000 standard proposes 1000 points for new responsibilities," explains Carine Raffin-Peyloz, Executive assistant at the Blois Polyclinic. "Two auditors spent four days with us and with all the sphere of influence of our establishment on its environment. Our self-evaluation was efficient, but we did a lot of work in advance!" The Blois Polyclinic was the first French establishment to obtain the 26 000 certification. Other choices are possible, such as the Agenda 21. This initiative makes it possible to establish a Sustainable development diagnostic by filtering all sectors of the hospital (travel, purchases, management...) then to develop a strategy and action plan. Corinne Praznoczy, research officer at the Regional Health Observatory, Île de France is the author of the study "The Health Aspects of the Agenda 21, a lever for local Health Policy." For her, the Agenda 21 reveals the profound connection between Sustainable development and health. Health and Sustainable development have common targets: they aim to ensure a fuller and healthier lifestyle for humanity by controlling and improving all the factors, which weigh on the present and the future. In many local Agenda 21 the emphasis is placed on active mobility (cycling, walking...) uniquely for the purpose of lowering the greenhouse gas effect. However, the advantages to health due to an increase in physical activity are also undeniable! Another reason to become involved with the Agenda 21? "Becoming involved with the Agenda 21 enables us to get away from the "sanitary" approach to health in favour of a global approach, as recommended by the WHO." At the Esquirol General Hospital in Limoges, management has set up more than thirty working groups which bring together all the staff on several lines of research, for example: building, waste, consumption management, renewable energies, business travel plans, staff conduct, well-being, safety, participatory democracy, reception of users, accessibility, cooperation, and solidarity. They set objectives on the short, medium and long-term. A pilot committee which associates management and the unions validates or overturns the proposals and follows the dossiers. 33 actions have already been undertaken. Moreover, a training course on Sustainable development and the Agenda 21 have been suggested. Finally, let's take note of the THQSE® certification (Very High Quality Environmental Health) developed by the C2DS/ Primum Non Nocere, which guarantees a very high level of requirement for all of those in an establishment, business or community. The THQSE® requirement voluntarily incorporates ecological and social concerns into its activity and its relations with all stakeholders.
Over the next three years, all health establishments in France will be obliged to meet the criteria required by the Higher Health Authority to obtain the V2010 certification which is compulsory in France! The V2010 is based on the organization and general running of establishments as well as dispensed treatments and information towards patients. All the hospitals activities are examined under a magnifying glass. The V2010 scrutinizes all activities which

The 8 Sustainable development criteria for the HAS certification.

Criterium 1b: commitment to Sustainable development

Reference 3 Human resources management

Criterium 3d: quality of work life

Reference 6 Management of logistics and infractructures

Criterium 6f: ecoresponsible purchases and supplies

Reference 7 Environmental quality and safety

Criterium 7a: water management

Criterium 7b: air management

Criterium 7c: energy management

Criterium 7d: hygiene of premises

Criterium 7e: waste management

are associated with patient management: clinical, administrative and logistic services...
The end result is a report and the award of level of certification. And beware! The new version the HAS entails 8 Sustainable development criteria "No health establishment will be able to avoid it. This is a worry for more than one institution." Christine Belhomme became aware of this when teaching, "With the V2010 we encouraged the subject on the field because all establishments are concerned. They are asking themselves a lot of questions. Some look ahead: people whose institution is going to pass the certification in 2013 began training as early as 2009! The V2010 is really seen as a restriction and now Sustainable development is attached to this heavy process."
In the Czech Republic, the Arnika Association is working on a project entitled: EMAS for hospitals, to encourage environmental waste, energy and chemical product management within healthcare establishments in the Czech Republic. The EMAS requirement (Eco-management and Audit Scheme), is a European requirement founded in 1995 by the European Union to provide a framework for voluntary eco-management initiatives using an environmental management scheme. It was revised in 2004, it allows every business, community or organization to evaluate, improve and account for its environmental performances in a recognized, standardized, and credible environmental management system. The Paoli-Calmettes Institute in Marseille is the only one in France to be registered EMAS. Will more establishments soon be involved? The Ministry of the Environment has requested the C2DS to invite applications to further EMAS registration: 17 public or private and medico-social health establishments have replied. "Support for the implementation of this European requirement is financed at 50% by the State. It is based on environmental analysis", explains Olivier Toma, President of the C2DS. "Meetings between the 17 establishments are arranged every 4 months to refine their tools for analyzing the environment and creating synergies. There is no competition between establishments, rather constructive and collegiate benchmarking"

HEQ building of Alès General Hospital, France.

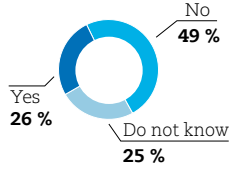
In the end, the C2DS will publish a methodological guide to EMAS registration. "The EMAS registration notably defines SD indicators with regards to water and waste. It allows better management of fixed consumption costs. It is also beneficial to the image of the establishment!" In January 2013, 18 establishments will be registered EMAS.

WHEN ECOLOGY SPILLS OIL

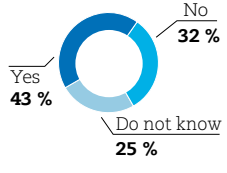
On the other hand, in Spain, no less than thirteen hospitals are already registered EMAS. In Grenada, the Virgen de la Arrixaca University Hospital, in an area of Andalusia which is reputed for its beauty, has been one of the Spanish pioneers to make a commitment to Sustainable development. In 2000, the hospital obtained the ISO 14000, the EMAS in 2003 and ISO 14 001 in 2004. At the time it was certified ISO 14000, the hospital joined a natural gas cogeneration power plant. "We considered EMAS and ISO like two management tools", says Martin German Blanco Garcia, former Technical Director of the Andalusia School of Public Health in Grenada. "These tools have allowed us to develop our own system of environmental management." This system of management is also linked to the "general system of environmental management" of the Andalusia Junta (SIGA SAS). The Spanish hospitals' real fight goes further than certification: they have committed to a global system of environmental management, which takes into account quality, risk prevention and the environment. Agustin Ortega at the Juan Ramón Jiménez Hospital in Andalusia charts the chronology which began in 1998. "As is often the case, we started by investigating Infectious waste management in all the hospitals in our area." At the end of the year, the Andalusian Directorate-General of Health Management had incorporated a system of environmental management. A year later, it was extended to all hospitals in the Huelva region and then to the neighbouring province, Sevilla. From 2001 onwards, the Juan Ramón Jimenéz Hospital was certified ISO 14 001. A year later, it was the first European hospital to be certified EMAS. "Between 2001 and 2011, all the Andalusian Hospital Centres

WHAT DO YOU SAY ABOUT SUSTAINABLE MANAGEMENT?

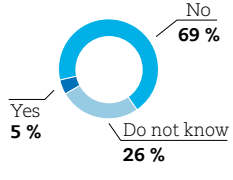
Have the managing director and the management team been trained in sustainable development?



Is this policy part of the establishments' project?



Do you published an annual report on sustainable development?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

have obtained the ISO 14 001 certification!" Agustin Ortega is proud to say. "I remember that in 2002, the Director General of AENOR, the Spanish body of certification, asked me if I thought it possible to incorporate, quality, risk management and the environment into one management system. I said: yes! He replied: I think it will be difficult. Today nobody questions it!"
In Newberg, Oregon, the environmental services of the Providence Group became interested in the Green Building Council of the United States and began to comb through the specifications of LEED, in partnership with the architectural firm Mahlum. "At that time nobody thought that the LEED standards were realistic for hospitals: too demanding, too difficult to maintain. Nowadays, they are taken as a norm and no hospital can ignore them. When we began, we were aiming at the basic certification. But finally, when inspectors came, we were in a position to be given the "gold" award. We were the first to be surprised." LEED, ISO 14 001, EMAS. It's up to you to choose the certification which corresponds to your strong points....or to what you want to improve.

PROGRESS INDICATORS

For Agustin Ortega, General Services Director at the Juan Ramón Jiménez Hospital, Andalusia, the creation of valid and comprehensive indicators is a necessity to put an efficient Sustainable development policy into practice. "The creation of indicators is like the weather forecast: we combine an incredible amount of data, temperature, rainfall, degree of humidity, atmospheric pressure from around the world and from different layers of the atmosphere. All this data is in fact mathematical series. We can model them in a multidimensional space in which all the variables compete amongst themselves. It is only at this moment that we can start to imagine a solution. A strong database must be created founded on efficient registers which generate indicators. These mathematical models enable us to look ahead. That's what we're missing at present. It is very difficult to make comparisons between hospitals." For Elizabet Izquierdo of the Del Mare Hospitals, "'benchmarking' is primordial". We try to establish energy consumption ratios. For example, I can say that in my hospital each bedroom has an xkW electriciy consumption and compare it with other hospitals."

IN SEARCH OF AN AVERAGE

The Sustainable development Health Indicator (SDI Health) developed by the C2DS is a tool for self-diagnosis which is specifically adapted to the hospital sector. It is the outcome of the work of establishment directors for their peers. It allows the environmental, economic and social performance of a health establishment to be calculated in a Sustainable development initiative. The SDI Health translates the willingness of the health establishment to make a commitment, relying on criteria which characterize specific Sustainable development initiatives in the health sector. The questionnaire is divided into eight parts and 350 questions. Anonymous responses supply information for a national observatory. Averages and benchmarks are established, allowing everybody to evaluate their situation. "It's the record of a starting point, from which teams will be able to identify priority actions and develop a much more sustainable commitment. There are no good or bad students, just a dynamic for improvement which is both relevant and has parameters," enthuses Véronique Molières, cofounder of the committee. At the end of February 2012, almost 950 establishments had already taken the time to fill it out. An international SDI Health is envisaged in the near future, which will create a real European benchmark. In the Basque Country, the Zumàrraga Hospital is situated in a rural zone, at the heart of the Goierra and Urola de Gipuzkoa valleys, "approximately 500 people work at the hospital. Up until 2002, our management system was very bureaucratic, traditional and hierarchical", explains Francisco Jose Eleatruiz, environmental technician at the Zumarragà Hospital. "Then we introduced a type of Process Management, using the EFQM model (European Foundation for Quality Management). From this initiative we began to set up a system of

environmental management. We began with the public company which manages the department of the environment, agriculture and fishing, the territorial organization for the Basque Country, the IHOBE. They audited the hospital to see where we stood, what we needed to do. By acting in this way, we received our first local certification, delivered by the IHOBE. From this moment on, our initiative was launched: in 2004 we obtained the ISO 14 001, which has since been renewed." Giving your establishment the chance to be certified is the first step in giving visibility to your work in sustainable management. But learning to communicate about your success is another essential stage.

HOW TO COMMUNICATE

OR HOW TO MAKE THINGS SEEN AND UNDERSTOOD.

Freiburg is known to be one of the most ecological towns in Germany. 400 tramway train sets, a completely car-free town centre, photovoltaic equipment that provides 31,3 Watts per inhabitant. It has the first environmentalist mayor, Dieter Salomon, elected in 2002. Freiburg is a small green paradise, where everything has been planned to reduce energy costs and carbon emissions. The hospital, of course, is no exception to the rule. It has received both the IS0 14001 certification and the EMAS. For Armin Schuster, Safety and Hygiene Manager at the Freiburg University Hospital," The creation of a Sustainable development Commission was a determining factor. In the hospital there is a place where we exchange ideas on environmental themes."

HOLLAND

The ISO isn't guaranteed for life

In Amsterdam, the Slotervaart hospital experienced a hard blow with regard to Sustainable development. Certified ISO 14 001, it nevertheless went bankrupt. And the buyer didn't follow in its footsteps. The previous team's work was reduced to nothing. Let's hope that there will also be a taker for the environmental torch! In Holland, two hospitals are certified ISO 14 001: Maastricht University Hospital and Utrecht University Hospital. Keep it in mind that the ISO is never guaranteed for life and must be part of strategy for improvement!"

THE JOY OF BEING GREEN

During the autumn of 2009, the Freiburg University Hospital asked an independent institute, Picker, to carry out a wide survey into the working conditions of its employees. The answers were anonymous and almost 60% of the staff replied, more than 5 000 people. 70% of the doctors declared that they were satisfied or very satisfied by their work. "The success of our hospital is intimately related to the degree of satisfaction of the people who work here. Through this very precise survey we were able to better establish the strengths and weaknesses of our daily organization. We are going to be able to develop strategies for improvement!" declares Pr. Wolfgang Holzgreve, Medical Director at the hospital and member of the executive board. "A green Policy can also influence the satisfaction rate of those who implement it!" At the Poitiers University Hospital, self-evaluation for Sustainable development was carried out on almost 700 people, with two parallel axes: personal interviews, conducted with the professionals involved, and a survey on the perception of Sustainable development and the expectations of staff. At Virgen de la Arrixaca University Hospital in Spain, a sustainable management post has been created.

THE GREEN GUARDIAN, A GIANT IN SD ORGANIZATION

The Green Guardian is directly concerned with the running of the building: he helps staff to improve the management of healthcare waste, saving water, paper and energy. His job is to identify black spots in the hospital, where the environmental footprint is at its' highest. He relays information to the hospital staff on how to improve their everyday actions.

The green guardian in Murcia.

He takes part in internal audits and the update of environmental management system registers. "To support Sustainable development, European hospitals must first create jobs, dedicate staff, and incorporate Sustainable development in healthcare, in order to introduce better practice in the hospital." Furthermore, the Green Guardian participates, organizes and helps to develop environmental education which was introduced in the hospital in 2008. In Catalonia, Margot Mato Lopez's team, (General Services Director at the Josep Trueta Hospital) goes even further: "we want to provide accessible and interactive tools for our staff. We have set up an FAQ, and even a telephone (hotline) service. An answering service is available to ask questions, or share opinions. My colleagues and I answer in person. But for the time being direct communication is better..." To begin with, at the Pasteur Clinic in Toulouse, France, a graphic charter was created to unify all the Sustainable development initiatives taken. "We had an achievable target: involve patients, visitors and staff in Sustainable development. We published documents on good practice for professionals and made a short film: to great effect! That's to say: even the unions liked it! In my opinion, this is due to the fact that everybody expresses their views", explains Olivier Collet, Technical Manager. Sustainable development communication is not always initiated by management.

Similarly, in Murcia, Spain, the first Paediatric Environmental Health Specialist Unit PEHSU, directed by Dr. Juan Antonio Ortega Garçia communicates, "via radio, press and scientific journals!" he explains, "we follow the statistics to see who consults our website. It is mainly the United States (27%) followed by Mexico (15%) and Spain (13%). This shows that the American continent, where environmental health units are very advanced knows our Spanish website!" In Europe, only France, England and Sweden have used it.

VIRTUOUS PRACTICE IS CONTAGIOUS

In France, *L'Express*, the leading current affairs magazine publishes a classification of hospital establishments every year. In 2011, sensing a public interest for Sustainable development in healthcare, it decided to work with the C2DS. The first mapping of green establishments was posted on the magazine's website. Patients can now choose their hospital with regard to the safety and quality of care and also by Sustainable development indicators. At C2DS we believe in the strength of setting examples. The Committee, and this is the essence of this guide, communicates on the good practices of the 269 member hospitals and valorizes them. We pool the establishment's initiatives for example, at the SERD European Waste Reduction Week (17 establishments were involved in 2011) or through events, theme days, conferences and meetings with interested authorities. This enables us to bring to light the work that has been done all year round. Establishments compete for ideas... It's a big morale booster for our troops. It's an excellent way of increasing motivation and good ideas. The annual press review published by the C2DS, made up of about 200 articles (without counting radio and television!) testifies to this dynamism. Motivate, relate, train, validate and communicate are the five branches of the sustainable management star. For a concrete example, let's fly to the United States for a report (read the following page).

SD CHECK-UP !

- ☐ Do you have a job or department devoted to Sustainable development in your establishment?
- ☐ Are you convinced of the necessity of putting a SD Policy into practice in your establishment? (Without motivation, nothing works!)
- ☐ Do you provide Sustainable development training modules?
- ☐ Have you considered a certification procedure to organize and validate your sustainable management initiative?
- ☐ Are you part of a network of hospital establishments implicated in Sustainable development?
- ☐ Are you part of an international hospital network?
- ☐ Have you identified the Sustainable development relays in your departments?
- ☐ Have you thought about the best ways to make your actions known? Within your establishment? To other institutions? To your service providers? To the media?

UNITED STATES

OLYMPIA, WASHINGTON

OLYMPIA'S UNBEATABLE TEAM: AN ECO-SUSTAINABLE LEADERSHIP

At the St-Peter Hospital, Olympia, State Capital of Washington, Sustainable development is bicephalous: a prime contractor and a coach.

"Sustainable development in Olympia began with economics. In this way we were taken seriously. From 2004, we committed ourselves to using healthy products, reducing energy consumption and promoting Sustainable development to other hospitals", says Geoff Glass, Logistics Manager. However, the St-Peter Hospital quickly realized the limits of it's energy policy. Geoff Glass understood that, "The main thing is to motivate people". He began to work with Keith Edgerton on this basis. "More than being a trained architect, Keith has the communication skills necessary for Sustainable development."

DO SAVINGS ADD UP?

With his West coast surfer's necklace and his friendly smile, Keith has managed to pass on the message. "We don't necessarily imagine that it is necessary to create a job to say to people, switch the light out when you leave the room or lower the heating when you leave...however, savings add up. Management realized that it was more profitable to employ someone like me than to produce more energy. I have become a sort of hospital caretaker," he says smiling. He aims to make savings by changing practices, a 35% energy saving has been made in ten years. What is his secret for motivating people?

ORGANIZING ECODURABLE LEADERSHIP

"There are always people who refuse to change. My first attitude is to ignore them. I don't waste my time with them. I seek out the people who want to change. There are lots of them! They are the ones who relay good practices. The others come back once the fight is over." When he started his job, Keith Edgerton wasn't really aware of this human dimension of sustainable management. "I thought I was going to have to track down surplus spending....But I quickly realized that all my good ideas had already been put into practice by Geoff. I noticed everything he had managed to change!" Consequently, Keith Edgerton changed his position. "I try to make things nice and pleasant. Staff come to see me and say: up until now I have never recycled anything, why should I start? I explain to them that it's a question of money: spending 60 000 dollars per year on waste processing can be avoided, it would mean increases in salaries, hiring new employees… Beyond that, everyone is concerned by Sustainable development. On the West Coast a lot of people are ecologically sensitive, but they do not necessarily know how to put it into practice in the workplace. I give them tools: bins for sorting, I suggest they bring their own cup to the office and I show them the amount of waste that can be saved by this simple gesture! Sustainable development is not just what is written on paper, it's about the way we behave, our awareness of others and the world: and finally, they explain waste processing to the patients!" Another example, the way cleaning teams work. "Up until now nothing indicated where the cleaners had been." Once the rooms had been cleaned, the environmental department decided to reduce their energy consumption. The cleaning teams had to close doors, switch off lights and turn the heating to 17° C. "At the end of the day, this makes extra work. But we hang up a small panel on which is written everything that has been done during the day. Energy is saved and the staff notes that their work is respected. It has a deterrent effect: nobody goes into the clean rooms". For Geoff Glass, "In less than a year, Keith made himself invaluable"." But it is only because you did the ground work," protests the interested party. Having a prime contractor and a kind organizer, or a head of department and a project leader seems to be an efficient working partnership to promote green ideas. Is this a good idea to import?

ECOCONSTRUCTION: THE VISIBLE SIDE OF THE SUSTAINABLE DEVELOPMENT ICEBERG

The conception and construction of new buildings are the moments when establishments have the most leverage to become sustainable: green building site management, energy policy, reduction of greenhouse gas emission, use of natural light, the organization of the flow of patients, reflection on sound... These are all the necessary levers for activating a sustainable policy. Ecoconstruction has become a key part of reflection and action for Sustainable development. Bear in mind that CO_2 emissions linked to the building sector have grown by 24% in the world over the last 20 years entailing dramatic consequences for global warming. The margin of improvement for the building sector is very promising: certain international architectural firms were not mistaken and compete to find the most creative, skilled and efficient solutions to put forward sustainable solutions. Don't miss the boat: tomorrow's hospital building will be sustainable!

ECOCONSTRUCTION MOVING AHEAD

Sustainable buildings are profitable. They are better isolated, more functional, pleasant to live in and healthier. The initial investment, however, is often higher. Between a short term investment and a medium or long term profit, it is often necessary to deploy careful persuasion to lift the last financial reserves and to have the notion of global cost considered. This is why, before ecobuilding, the decision-making phase is a decisive moment.

DECISION-MAKING

Spend more to spend less, this is the paradox...and the dynamic of hospital ecoconstruction. The path towards ecoconstruction is not always an obvious choice: it is often the most expensive. In a situation where budgets are restricted, ecoconstruction or ecorenovation may appear to be superfluous, even impossible. It is however the only rational choice for medium or long-term savings, if global cost is taken into account. This notion appeared at the end of the 1990's. It is based on the awareness of the importance of different costs in a building. Several American and European studies show the whole cost generated by a building during its lifecycle. Over a thirty year period, the initial investment represents only 25% of the total expense generated by the building. 75% of the costs are linked to the

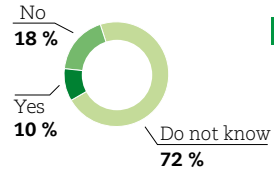
running of the building: maintenance, repairs, water and energy consumption, insurance, bank loans, changes, etc. The idea of global cost enables us to balance the costs of investment against savings which will be made during the life of the building. High environmental quality buildings HQE, passive or low-energy buildings, can often be more expensive to build, but in terms of global cost they are generally more sober and economical. The cultural adaptation is huge: going from a builder's logic, price per square meter to that of a global cost manager. At the Pasteur Clinic in Toulouse, France, Olivier Collet recognizes the fact that initial investment costs are 20 to 30 % more expensive. "But over a ten year period, 80% savings can be made." To swing the balance towards ecoconstruction, it is essential that all parties concerned take the time factor into consideration. In France, the standards imposed by Grenelle 2, an ongoing environmental law will incur a colossal investment. Several billion euros invested by the hospital sector will raise awareness and speed up the pace.

CHEERLEADERS

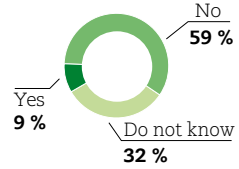
Portland University Hospital (OHSU), the first public hospital in the State of Oregon, employed developers with a clear objective: motivate management in favour of ecoconstruction. Gerding Edlen Development and Ethos Development are specialized in the changeover towards greener buildings. "They had the determining discussion with the decision-makers," explains Skai Dancy, logistics director. "They began to promote sustainable building to the directors long before the decision had been made to construct a new building, or even to renovate the old one. Their scale of motivation was very high. The developers were as much "cheerleaders" as technical experts!" And when the engineers came to evoke the additional construction costs, the directors of OHSU were already familiar with the notion of global building cost. "We are a public institution. The life expectancy of our building is longer than that of a private building. A private developer thinks 20 years ahead. We think about fifty years ahead. The returns

WHAT DO YOU SAY ABOUT ECOCONSTRUCTION?

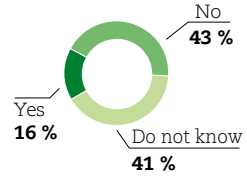
Has this project been considered within the requirements of the HEQ?



Has an analysis of the quality of indoor air been carried out in all the areas of the establishment?



Has a system of double evacuation been designed for the recovery of effluents?



Source: C2DS Observatory of Sustainable development in Health, 2012.

on investment should be made after 15 or 20 years at the latest. For an investor, this seems like an eternity." But even in the United States, a hospital can find ways to reimburse itself. "In Portland, the State of Oregon has programs, tax relief, compensatory mechanisms... For example, our building treats wastewater itself, so we have saved money from linking it to the town sewer services. Of course, respecting the environment when building engenders additional costs. But when it comes to paying the bill, we always end up earning money". The healthcare centre in Portland cost 145 million dollars. OHSU chose to make a detailed examination in order to gather good ideas and ensure the motivation of the different SD actors. Economical solutions exist. It is just necessary to know about them. The Hospital of Alès' new building, in the South of France is entirely ecoconstructed; it only cost 5% more than a normal building. "And this is due to the number of patios which have increased the building base," specifies François Mourgues, director of the Alès Hospital. Ecoconception creates a new vision of building and logic of long-term return on investment. François Mourgues started thinking about ecoconstruction in 2002, for a building which opened its doors in 2010. Generally, building a hospital out of nothing is rare. It is more often a question of renovation or restructuring. Often hospital managers feel as though they are inheriting quasi-historic problems: during the last thirty years, when oil was flowing nobody was really concerned by the energy performance of a building. David Leif Keelty, logistics director at the Fletcher Allen Hospital, Burlington in the North of the United States tells us, "If the oldest building dates from 1879, the majority of 'campuses' were built between 1945 and 1980. It was the "baby boom" era. Things had to be efficient, mass management, and energy was thought to be inexhaustible." In 2005, Fletcher Allen therefore decided to completely renovate the main building. "We wanted to give a new sense to the space: the building was to be used intuitively, transfer emotions." What is true in the United States is also true in Europe. Hospital buildings bear the marks of history and ideologies concerning energy consumption. In Spain at the San Carlos Hospital in Madrid, Manuel Carmon Calvo, the Environmental Manager says, "Our buildings are 130 years old! Today we are in the middle of renovating the North Wing and we hope that it will have a beneficial impact in terms of Sustainable development." The North Wing of the Madrilenian hospital has 400 rooms and operating theatres which will be replaced at a later date. "Architects and builders must follow the Spanish code of building construction, a standard which applies a 1999 building law detailing what must be done in terms of environmental protection." Making the decision to build sustainably is often a long and fastidious process. For Peter Woelfl, Project Manager at the North Hospital, Vienna, this can easily take several years. "We began to consider sustainable building in 2010. The hospital will open its doors in 2016."

LABELLING

Once the decision has been made in favour of ecoconstruction, the question of labelling must be examined: LEED, BREAM, HQE, ISO 14001 or labels that are more focused on energy consumption like Passiv Haus, BUND Gütesiegel or Net-Zéro. How can we find our way round this jungle of initials and certifications? If most of the ecological labels take into account the system of environmental management as a whole (ISO 14 001, EMAS), others only consider their energy performance (Passiv, Haus, Net-Zéro, BUND Gütesiegel).

WHO DETERMINES ECOBUILDING?

In France, the reference in terms of construction is the HQE (High Quality Environment). Established in 1996 by the association which gave it its name, the HQE standard has two main objectives: the control of the impact on the environment and the guarantee of a satisfactory interior environment. The Alès Hospital, 40 000 m² of buildings, is a very good example. In 2010, it was the first healthcare establishment to be entirely certified HQE. The director, François Mourgues reviews the progress

View from the fourth floor over the garden, Blois Polyclinic, France.

made over the last few year. "Owing to the positive feedback from the Alès establishment, the HQE became enforceable to healthcare establishments in 2009." In France, the Grenelle Environment Forum is a set of political meetings organized in September and October 2007, aiming to make long-term decisions concerning the environment and sustainability. The objective is unquestionable: "All new buildings must include HQE criteria, set low energy consumption objectives or very high energy performance for tertiary activities, while respecting the specifics linked to healthcare." Another project began in Alès during the first quarter of 2010 for an 8000 m^2 ecobuilding with zero energy consumption. According to Michel Prat, director of logistics and technical resources, "Between the two buildings, there are 50 years progress in energy and insulation management." The pioneers have set the ball rolling: the Hospital Centre in Dieppe is finishing the construction of a 5 000 m^2 psychiatric unit which has achieved the BBC standard, (low energy consumption building) and a 171 bed medicine facility, with dialysis and consultations, equally BBC standard in a HQE initiative.

Similarly, the new hospital in Orleans which is due to open in 2015 will also be ecobuilt.

The edifice will extend over 205 000 m^2, and will respect the precepts of bioclimatic, ecological and economical architecture. For the director, Jean-Pierre Gusching, it's the culmination of seven year's work and several hundred meetings. The Regional Hospital Centre, Orleans set its priorities: harmonious relations with the local community and the immediate environment, energy management (objective -20% in relation to 2005) caretaking and maintenance... It fulfills the 14 HQE requirements. It's rare enough to be noticed! This is the problem of HQE labelling: if the HQE label has been chosen by the French government, it is often considered outdated by numerous protagonists involved in the sector. The HQE means 14 targets or 14 objectives to attain. With the exception of a few particularly motivated establishments, such as the Regional Hospital Centre, Orleans, most only respect the

SOME EXAMPLES OF FUNDING

Here are some examples of financial help when undertaking a rehabilitation or a construction project.

- In France, the Agency for the Environment and Energy Management (ADEME) offers services to help you set up your projects related to the environment and the control of energy, by using its own funds or by using funds from its regional offices.
- The fund «heat», from the French environment Grenelle, funds projects based on renewable energy. French Regions can also contribute to the financing of ecoconstruction projects .
- Even more interesting is the European Regional Development Fund (ERDF), which can fund projects of ecoconstruction in the hospital sector. The decentralised cooperation programs also offer funds to hospitals committed to transnational partnerships.

Ecoconstruction labels

For German speaking countries: www.energiesparendes-krankenhaus.de

four minimum targets needed to meet this 'soft law' label. The American label LEED and the British label BREAM are much more demanding than the French label HQE. LEED is attributed by the U.S. Green Building Council, USGBC. It is a group/pool of businesses, builders, academics and government members, NGOs and local communities who work together to promote more ecological buildings. With the LEED certification (Leadership in energy and environmental design) an independent body gives points according to a very precise scale. It is both a platform for reflection and a measurement tool; LEED is a good matrix to understand green building. This label, inspired by the British BREAM certification, consists of 32 specific and operational points. This system has been retained at a national level. Further information can be found on the website: www.usbgc.com
For Philippe Pellicier, President of the Strategic Committee of the Grenelle Building Plan in France, "The next step is 2021, when we have decided that buildings will run on positive energy, this means that they will produce more energy than they use."

CHOOSING THE APPROPRIATE LABEL

It is better to consider the type of label we want for our establishment at the building stage. At the OHSU in Portland, everyone began by seeing what they could contribute to improve the new building with regard to his competences. "We all have our favourite themes, "hot buttons", we call them here: we have an engineer who is passionate about water..... For me, it's energy," explains Skai Dancy, smiling. "We then compared our progress, our research with the LEED criteria." For Roger Cole, Logistics Manager, LEED is not sufficient, but it's a good beginning. "There are fine sub-divisions which are a good working tool" he admits. The LEED label has also been retained for the new building of the University Hospital of Montréal, Canada, the CHUM. According to Christian Paire, Managing Director, «above all it's a building with a human dimension». In London, the precepts of the BREAM standards (Building Research Establishment Environmental Assessment Method) have been retained. It is a certification arising from the organization for research in building (BRE). This standard imposes a "green code" of energy consumption in buildings. Trevor Payne, Director of Estates and Facilities at University College London Hospitals, says: "in accordance with the BREAM recommendations, the design of our new oncology centre will use daylight and the hospital will generate its own energy, which will combine heat and electricity. In addition there will be a vegetalized roof covered with solar panels and interior and exterior gardens." The centre will open in 2012. In Germany, BUND, an ecological association has created an award, Gütesiegel for the best hospital energy performance. BUND checks the energy bills with German suppliers such as Vattenfall. It is impossible to cheat! The Gütesiegel distinction is valued all the more. The C2DS collaborates with BUND, a French version of the label is envisaged for members!
When you start ecobuilding, be sure to choose the right label, unless you choose to combine several labels like the New Karolinska Solna University Hospital in Sweden. It was not just satisfied with the ISO 14 001 certification; it will also be certified by LEED and by the European program, Greenbuilding.

THE SITE, CHOICE AND/OR CONSTRAINT

You have decided to build sustainably and you have chosen a label? You now have to take into consideration the site on which your building is to be built. Which way do the bay windows face? A building which faces south naturally stores heat. What is the height to respect in the construction zone? In Burlington, Vermont, the determining factor was the height of the building. "We were situated on a mound; we could therefore not allow ourselves to construct tall buildings, which would be too imposing for the surrounding housing. We didn't want to give the impression that the hospital was a fortress." Fletcher Allen therefore refocused the tallest buildings towards the centre of the hill, to the great pleasure of the inhabitants of the adjacent houses. "We also tried to ensure that patients and visitors do not feel cut off from the beauty of our countryside."

Hanging bridge at the Portland OHSU, Oregon, USA.

In Italy, the Meyer Paediatric Unit is set in the heart of the 72000 m² park of the antique Villa Ognissanti, at the foot of the Careggi Hills, one of the most beautiful areas in Florence. This imposes respect for the countryside and a certain architectural research in the building. When it became necessary to renew the Solna site in Stockholm, in the Northwest part of the city, the first step was to analyze the site. The vast site, dedicated to healthcare grouped 46 buildings of which a certain number were more than 40 years old. A committee of experts decided that new more sustainable buildings should replace structures that were too old or dilapidated. In Portland, United-States, the OHSU Hospital is built on Marquam Hill, just above the river Willamette, and at the beginning of Oregon's rainforest. The fact that the geographical location is not very urban won them points for the LEED certification, but it is also a constraint. "The space is limited to the plateau, it's difficult to construct new buildings," explains Skai Dancy, Logistics Manager. The OHSU buildings are tall, and linked to one another by a ingenious system of hanging bridges. "Climbing up to our hospital every morning is not easy. We have to avoid traffic jams at rush hours, the carbon peak at the end of the day... So, in order to reduce the greenhouse gas effect, we built a cable car." This is how the staff at OHSU goes to work every morning, in the air. Thinking about the construction site, also means taking climate change into account. In France, it was only in 2009 that Chantal Jouanno, who was at that time Minister of Ecology, set up a national strategy for adaptation to climate change to prepare citizens for life changing climates. Future constructions must therefore anticipate the extreme weather conditions predicted by scientists: carbon peaks, seismic zones, rising sea level...These proven facts must be given serious consideration.

ECOCONSTRUCTION A DVD PRODUCED BY THE C2DS
The ecobuilidng of healthcare establishments, 62 minute film produced and directed by the C2DS in 2011. How can the life of a healthcare establishment be taken into account in its entirety? A journey into the heart of good practice in ecobuilding in Europe! Please refer to the following website www. C2DS.eu

INTEGRATED DESIGN

The next stage involves the design of the building. For Norbert Chautard, architect and former Professor of Architecture at the School of Architecture, Montpellier in the South of France, the importance of architecture in the medical world is often neglected. For him, the field of medicine should question it's relation to architecture and develop a common vocabulary: "I asked twenty students in their third cycle of studies to go and visit three doctors and to ask them if there was a relation between architecture and health. Out of the 60 doctors who were interviewed, 59 answered: there is nothing to see here. We'll care for people, you design architecture." This is possible with integrated design, contrary to traditional methods of conception, whereby participants become involved one after the other and have to adapt themselves. Integrated conception favours collaboration from the beginning of a project. This method enables us to identify major points from the outset and to consider and treat them using approaches and techniques issuing from different specialist sources. Buildings must allow concrete integration of a hospital establishment project in its premises.

SIMPLIFYING SIGNPOSTING

"For us, the hospital should be a place for well-being, rather than a place for diseases," confides Anne Schopf, architect of the Newberg Hospital. The building has glazed facades, looking over the misty forests of Oregon. "We wanted patients to feel comfortable when they visit the doctor. The first door looks like the entrance to a small hotel, as if the employee behind the desk was a concierge. We have simplified the signposting as far as possible to create a feeling of calm." The building is clearly separated between care and administrative services. It is easy to find your way around, even more so because the hills, which can be seen through the windows, serve as a mainstay.
Another constraint: the building was destined to be extended. "In our specifications, we had to think about how to reserve space. This is how we came

DIANE SHINER AND ANNE SCHOPF, MAHLUM ARCHITECTS, ARCHITECTS OF THE NEWBERG HOSPITAL, OREGON, USA.

All stakeholders must get to work!

"For the creation of the Newberg Hospital, we didn't conceive the architectural project on our own. We created synergies with all those involved in the hospital to find ways to reduce running costs, improve environmental aspects. To be precise, we had a long series of meetings! We concentrated particularly on the flow of patients to optimize movement around the hospital."

The THEREA project, Blois Polyclinic, France.

upon the idea of care gardens. To begin with we wanted to save space. Now they are irreplaceable. This hospital is a machine!" adds Diane Shiner, her colleague. "There are advanced diagnostic systems and emergency surgery, this creates a lot of stress, but we managed to orientate all the waiting rooms towards the gardens. "The architects cut the building in the middle to introduce vegetation: a terraced garden which naturally filters rain water". "I like the idea that we are minimizing our impact on water and that rain returns to Mother Nature as pure as it was to begin with," enthuses Richard Beam, Logistics Manager. At OHSU, the treatment of rain water was planned during the conception of the building: a string of small hanging gardens, one above the other are used as a natural purifier of storm water. "Water flows from one cascade to another and each time it comes out purer through a natural filtration system." explains Roger Cole, Environmental Manager. "Part of it is absorbed into the ground and the rest goes into our rain water recycling pool." OHSU then discharges the purified water into the rivers.

FORGETTING THE HOSPITAL

In Italy, at the Meyer Paediatric Unit, inaugurated in 2007, the architectural project is inseparable from the project of the establishment. They are both innovative, their starting point is the children's needs. "There isn't a single room which hasn't been thought out for children and their family. They are the main protagonists of the paediatric unit", explains Cristina Donati, the architect of unit Meyer. "We based our work on a national study of the perception of healthcare spaces and the psychological mechanisms of the child and the teenager." The contact with nature, artwork, play areas and the importance given to the presence of families during the stay in hospital were then emphasized. "The entrance to the centre is through a mansion house, the Palazzina which minimizes the administrative atmosphere and the stress of being admitted to hospital." The architectural codes remind us of the Ospeladino, the small hospital which was the first Florentine institution to treat tuberculosis in 1930 and well-loved in the Italian capital of art. "We use a lot of wood, glass. The turquoise colour of the roof is created by peroxidized copper," Cristina Donati explains in detail. The sinusoidal corridors are another innovation. "The sinusoidal shape reduces the feeling of anxiety generated by classic hospital corridors". It allows an open plan organization and a greater feeling of intimacy: "rooms are not one on top of the other." The rooms have two beds and are organized so that the young patients can talk to each other easily. A screen allows them privacy if they wish. For Mrs Frasinetti, Health Manager of the paediatric unit, "the rooms create the impression of a small house." The Meyer Paediatric Unit has had a prototype bed made which blends into its innovatory design.

A nurse on a scooter, in Karolinska Hospital, Sweden.

AT LENGTH AND BREADTH

In Sweden, one of the major characteristics of hospital architecture is to prefer buildings that are spread out rather than tall buildings in which it is more difficult to regulate energy consumption. The Huddinge site in Stockholm groups the Hospital and the University in one building. The long transversal alleys which characterize it can be up to a kilometer long. The traffic is heavy in these long, endless corridors. Patients, families, students...and nurses on wheels. They ride around on orange or green scooters according to their specialty....they race zealously from one department to the next. "This stops us from getting too tired, walking along kilometers of corridors", explains Britta L, a nurse. Studying the flux of patients, the heart of the profession, working with all those involved is essential to an ecoconstrucion project.

DAVID KEELTY, FLETCHER ALLEN, BURLINGTON, VERMONT, USA.

The connected hospital

Instead of many different entrances which was a common feature in the 60's, we designed one big open entrance with large windows. Patients intuitively know that it is our main entrance. Before, the average length of a hospital stay was between 6 and 7 days, now it is on average 3 days. It was necessary to construct a building which would take this evolution into account so we placed the emphasis on internal connectivity: a system of underground corridors links the different hospital buildings and the University. When the thermometer reads –17°, this is very efficient!"

THE CONSTRUCTION SITE

An important stage, the construction site, is often neglected. The ZERI Foundation, (www.zeri.org) supported by the UN, is working on building methods which fully respect nature, based on a concept which calls for zero waste during the entire lifecycle of the material's used. Construction produces enormous quantities of waste, rubble and all sorts of residues. To give an example, the construction of the new hospital in Cannes, South of France, that opened in April 2011 represented 180 000 m^3 of extracted rock, 87 500 tons of poured concrete, 900 tons of steel, more than 300 companies and up to 300 workmen simultaneously on the site. At the University Hospital of Fuenlabrada, Madrid, building a new entrance gave rise to massive recycling. "During the construction of a new entrance to decongest the hospital, we had to level the ground. As a result, we found ourselves with a lot of earth. Instead of dumping it, we built a small mountain! It separates us from the main road and creates a sound screen. Then, with the council, we organized a 'Tree Day'. Children from neighbouring schools came and planted trees which we had been given and we now have a small wood," explains Ana Cabrero, Head of the Department of Engineering and Technical Services.

WHY ECOCONSTRUCTION?

The main target of ecoconstruction is energy control. It is both an ecological and economical lever, and this is the primary interest of hospital directors. However, an ecobuilt structure must also be a pleasant place to live!

MAINTAINING ENERGY

In France, the 2004 Climate Plan set an ambitious goal: to improve the energy performance of new buildings by at least 15%, with a perspective of progress every five years to reach at least 40% in 2020. The Grenelle 2 heat regulations, voted in July 2010 are ambitious. Their objective: primary energy consumption limited to 50kW/m^2/year from 2012 onwards, priority to the quality of building

The HEQ gymnasium, Saint Roch Clinic, in Cambrai, France.

conception and a balanced panel of energies. It is intended for new buildings (or extensions), to residential or non-residential (tertiary constructions, notably health establishments). In order to respect these energy consumption and temperature coefficients, several solutions are possible: good interior or exterior insulation, optimized positioning of the buildings to make the most of natural light, trees and hedges to retain heat, or a vegetal roof or walls with sensors. In Karolinska, Sweden, the new University Hospital building should reduce energy consumption by 50% compared to the actual buildings. At least 50%? "And even more, if we choose to opt for heat pumps and biofuel heating," explains Anders Göransson, Project Manager. "In this case, the building would use only 110 kilo watt hours by m^2." And furthermore, it would come uniquely from renewable sources. Even backup generators will have to comply. "90% of the heat comes from heat pumps, and the rest from a combination of solar panels and oil–heating. For us, the most complicated thing to do isn't the heating but the cooling of the building. It's the biggest energy consumer: medical equipment

FRANCISCO JOSE ELEATRUIZ, ENVIRONMENTAL TECHNICIAN AT THE ZUMARRAGA HOSPITAL, BASQUE COUNTRY, SPAIN.

Maximal transparency for service providers, big or small!

"Following standards has become the rule for all major building work because it is contracted through calls for tender...but hospitals always need minor jobs to be done which slip through the net. From now on small businesses must also sign the new annexe to the contract and reply to the conditions required in terms of environmental protection, safety, information and transparency. They must supply a detailed copy of the source and the outcome of their materials, waste and rubble management, etc. We reserve the right to intervene at any moment during the building work...We demand complete transparency!"

and people produce a lot of heat," explains Anders Göransson. Part of the cooling system will use water directly from the sea, which will reduce / cut (even) further the electricity expenses. This 800 bed hospital will have between 1600 to 1800 visits per day. The cost is estimated at 1,3 billion euros and it will open its doors in 2015.

The San Carlos Hospital in Madrid pursued thermal bridging during the renovation of the North-Wing, in order to reduce energy consumption. A lot of heat is lost through windows. "In our North Wing, they were always closed. We are currently thinking about how to get rid of unnecessary thermal bridges." Other essential points are performance measurement indicators. A building which can give precise information concerning its energy consumption is a building which is capable of making considerable savings. It is important to consider measurement indicators during the conception of the building. "In our new wing, the piping will be sectorized and I will be able to measure water consumption from one floor to another or between units. Following this, I will be able to set up relevant training modules for saving water" recounts Manuel Carmona Calvo of the San Carlos Hospital in Madrid. In France, at the Béarn Dialysis Centre, argon circulates in the windows. This gas which is one of the strongest insulators is diffused between the windows. The windows provide sufficient insulation but let light through.

The Saint-Pierre Institute in Palavas-les-Flots, France.

TUNDRA HEATING

There is a simple and efficient way to improve insulation: vegetal roofs. At the Meyer Paediatric Unit, Italy, highly insulating acoustic and thermal vegetal roofs have been installed. “They are very important for insulation… And they also create a small park which is used by patients and staff. It’s very pleasant to wander around there, and it is also plays a positive role on the patient’s state of mind,” says the architect Cristina Donati. In order to conserve as much energy as possible, the Meyer Unit pays particular attention to the insulating capacities of its roofs. “We use several strata for drainage and vegetation. This maximizes comfort inside the building and reduces the energy bills: during the summer, we lower the temperature by 3-4°C.” The Newberg Hospital, Oregon has also placed insulating vegetal roofs almost everywhere.”Not only do they provide insulation, but they are very attractive and the patients have a view on the garden”, says Anne Schopf. In France, the Delay Clinic in Bayonne is heated by tundra. Situated on the roof of the building, a vegetalized roof cools down the atmosphere in summer and retains gentle warmth in winter. This will also be the case at the Polyclinic in Blois in the new SSR, THERAE building. In Vienna, Peter Woelfl, Project Manager of the New Northern Hospital, “The vegetalized roof doesn’t need a lot of maintenance, it survives with rain…and it enables us to save rainwater and not have to discharge water through the pipes.” The Hospital Centre in Alès has a vegetalized roof measuring nearly 4 000 m^2 out of the 35 000 m^2 which form the administrative building. Feedbacks from establishments who have chosen to a have a vegetalized roof coincide: there is nothing better to improve insulation ecologically. In Portland, however, their implementation had unexpected consequences. “Vegetalized roofs are marvelous for insulation… But we have had to learn how to use them: during the first few months we had water leaking from the roof into the grey water system. The water in the toilets was full of earth… It’s not quite what we expect in a hospital! The other problem is maintenance, because some require acrobatics to

access them. But we don't regret anything, because their insulation performance is simply excellent," says Skai Dancy, logistics director at OHSU.

INSULATING FOR BETTER HEATING.
In France, contrary to Northern countries and Germany, insulation is a relatively recent issue. After ten years, the Sèvres Hospital finished renovating its facades in September 2011. The hospital intends to reduce its energy costs by 50% by using external thermal insulation (ITE). The majority of the facades were insulated with mineral wool covered with white Carea siding. This mineral siding does not need a lot of maintenance: "they clean themselves when it rains." The south facade has been thermally insulated with 12 cm thick polystyrene panels coated with (RPE). The insulation and vegetalization of all the terraces naturally lowers the temperature of the building when the weather is hot. The savings made on air-conditioning are substantial in an area where it can be very hot during the summer. Similarly, the Saint Roch Clinic in Cambrai has chosen a two in one solution. "Our insulation uses plaster board which has photo-catalytic properties which absorb volatile organic compounds", explains Dr. Cliche, Director. A good idea sometimes doubles as one, insulating and lowering VOC emission at the same time.

Denim, an unexpected insulating material.

SUZEN HEELEY, DIRECTOR OF DESIGN AT THE HACKENSACK HOSPITAL, NEW JERSEY, USA.

Denim therapy

"The Hackensack Hospital insulates its building with recycled jeans. In this way we avoid asbestos and formaldehydes which are always used in classic insulation. Recycled denim insulation is a pure cotton insulation which avoids skin, nasal throat and lung irritations which can arise in contact with traditional glass wool. We have a sufficient quantity of jeans in the United States, and our insulation system guarantees them a second lease of life!"

Giving thought to the site, the type of energy used, anticipating measurement indicators, and considering insulation are all part of the ecoconstruction process. Another key objective is the choice of materials.

THE CHOICE OF MATERIALS
A hospital is a living space. Even if the length of hospital stays tends to be shorter due to the growth of outpatient surgery, members of staff and some patients spend a lot of time there. It is therefore essential to use healthy materials. In the United States, Suzen Heeley, design director at the Hackensack Hospital, New Jersey chose to focus on a healthy building. "We realized that by concentrating on one area toxic substances, we became more efficient on overall Sustainable development. We have to be more demanding about our purchases, so naturally we thought about carbon emission, energy, etc." Some building materials are far from healthy. In Austria, the Steiermark Public Hospital Group has launched a big cleaning up program: a total of 24 tons of PVC, 12 tons of plasticizers and 46 kilos of lead were taken out of hospitals belonging to the group.
In Hackensack, particular care was taken to use healthy building materials. "Almost 97% of the building's metallic structure is made of recyclable steel," says the young designer. There again, PVC has been eliminated everywhere. Really everywhere? "It's true to say some pipes do still contain PVC, but rigid PVC, without phthalates to soften them," specifies Suzen Heeley. The window frames don't contain any more than the natural rubber flooring. Made from recyclable materials, this material does not contain heavy metals, PVC, plasticizers or formaldehydes. "Vinyl is produced from petroleum derivatives, a fossil resource. We must now begin to think about alternatives." The paintwork in the building does not contain volatile organic compounds, skirting boards, topcoats and adhesives. All the furniture comes from certified forests, which grow quickly renewable species. The use of healthy materials goes as far as the toys given to children. They are made of

Doctor Gotemba's Clinic, Japan.

renewable wood and are not covered in toxic paint. In Japan, wood is very rightly a part of the hospital environment.

ALL AVAILABLE WOOD

The small Clinic in Gotemba City in the Prefecture of Shizuoka in Japan is made of wood. Everything began with a project imagined by Dr. Maeda, a neurosurgeon. He dreamt up an ecological and humane clinic, in direct contrast to cold buildings made of concrete and steel. In January 2009, the first clinic to be built out of solid wood opened its doors in Gotemba City. It is entirely built out of Scots pine transported from Finland. Dr Maeda's clinic is a pioneer in hospital construction. The walls, roofs and 134 mm thick beams are made of solid wood. Only the flooring and some rooms such as operating theatres are covered with siding for hygiene and maintenance, and to comply with medical regulations. All this gives the impression of being in a chalet in the mountains. Scots Pine is an exceptionally sustainable material. The production cycle can be followed from the woodcutting through to reprocessing at the end of the building's life. It is also an excellent insulator. And moreover, it has a big advantage in a seismic area. It is exceptionally resistant to fire and earthquakes because it does not crack. In a hospital, wooden walls, warm and natural materials reinforce the impression of a comfortable and healthy environment. In the case of prolonged hospitalization, it also improves the patients' state of mind. However, there is a downside. Wood imported from Finland necessarily causes high carbon emissions! The Hospital for Children and Teenagers, in Nantes, France (ESEAN) is the biggest European hospital structure to be built out of wood, with a 6 600 m^2 surface area, for a 55 bed establishment. It was inaugurated in 2010 at a total cost of 17,49 million euros. At the Saint Roch Clinic in Cambrai, the HQE gymnasium which is soon to open has exterior cladding made from Robinia. "It's a local species which is quasi-imperishable and the carpentry is made of larch wood," explains Fabien Leloir, Quality Control Manager.

BAMBOOS ARE 100% ECOLOGICAL

The trees regenerate quickly.. It takes less than 5 years to develop a Bamboo grove and they are cultivated without fertilizers or pesticides. Bamboo is more and more frequently used in construction, it is both natural and resistant, of a natural beige colour which becomes light grey over time. It should perhaps be considered to warm up the atmosphere of a hospital?

"FRENCH TOUCH MATERIALS"

In France, a law which rules the labelling of construction materials has been anticipated in the National Health and Environment Plan (PNSE). It came into force on the 1st of January 2012. Good ideas have followed since then. The Vierzon Hospital Centre has chosen to use Vegecol for the EHPAD's exterior promenade. It's a colza-based substitute for asphalt, and therefore completely natural. It is non-polluting, has no petrochemical derivatives and emits a low level of volatile organic compounds. It does not heat up in the sun or pollute run-off water. Similarly, the ecological nursery in Béthune uses wood which comes from labelled forests which means that the renewal rate is respected. It takes in the children of members of staff and was opened in January 2010. The 450 m^2 building is constructed entirely of wood, with Fermacell insulation, a cellulose-based material that replaces the plaster partitions once compressed. All the furniture is made out labelled wood from a renewable forest. Bed linen is of course made from organic cotton. Natural linen is used to cover the floor, walls are painted with water-based paints and windows have triple glazing. At the General Hospital in Alès, scrupulous attention has been paid to adhesives. Our carpets are phthalates-free and do not contain toxic substances. Otherwise, everything else is made of inox and steel", concludes Michel Prat.

DAY-TO-DAY COMFORT

A building is a living space and it must take into account the quality of air, colours and acoustics.... The ergonomic quality of a healthcare centre can change the lives of patients and staff. Here are a few ideas for a workplace which does not make people want to run away from their office or unit...

A BIT OF FRESH AIR!

Nowadays, between twenty and thirty per cent of the population suffers from allergies. This percentage could reach 50% by 2030. The materials used have an impact on the quality of air in the establishment. In a closed environment, interior and exterior pollution are combined but they can also interact and create new pollutants. The quality of air is rarely measured in risk areas such as sterilization services and operating theatres. Following a call for participation from the C2DS, 16 member hospitals took part in a campaign to measure formaldehyde in the indoor environment. The results of the analysis, which was carried out free of charge by the Ethéra Company (www.ethera-labs.com), will be published anonymously during the summer 2012.
In Toulouse, France, the Pasteur Clinic has gone further than these two components to reduce the emission of VOCs. From 2013, the clinic has set itself an ambitious objective: reach maximum VOC emissions of 300 ppb. This is the rate considered to be "without impact to health by the Federal German Agency for the Environment. To be certain not to expose the patients, Joël Cliche, director the Saint Roch Clinic in Cambrai uses Greywolf probes. "These machines measure the rate of VOCs in the air. In this way, we know what we can improve." Similarly, at the soft maternity Unit in Evry near Paris, real toxic research concerning the materials used and potential risks has been implemented to prevent babies from

The Ecoresponsible hospital guide can be downloaded from www.ch-ales.fr

The Saint-Roch Clinic, France, gymnasium uses slabs made of the local wood, Locust.

breathing chemical products! Since January 2012, the products used for decoration and building must show their level of harmful pollutants. The hospital can also help patients to better understand their symptoms and allergies.
In 1991, Frédéric de Blay, Head of Pneumology at the Civil Hospital in Strasburg created the post of Interior Environment Advisor at the Faculty of Medecine (IEC). The IEC audited the quality of the air and measured suspected pollutants in medical diagnosis. At present, there are 35 IECs in France who can intervene on medical prescription to control interior air quality in private homes. In 2009, Chantal Jouanno, who was at that time Secretaty for Ecology, took the initiative of budgeting 1 million euros to a regional call for projects to create jobs for CEI advisors who can intervene on request in any suspected pathology linked to an interior environment (dust mites, domestic animal allergens, mould, formaldehyde, VOC...) 11 FTE posts (Full-time equivalent) will be financed by the Ministry until 2013. The IECs go directly to patient's homes to help them improve their interior environment. According to Martine Ott, IEC at the University Hospital of Strasburg, "Going to patient's homes gives me an all-round vision. The aim isn't to make families buy gadgets but to find ways to eliminate allergens efficiently." Without a medical prescription, a home visit costs between 150 and 300 euros.

JOSE LALANNE, DIRECTOR OF THE BEARN DIALYSIS CENTRE, ARESSY, FRANCE.

Green light

When somebody is attached to a hemodialysis machine for 4 hours, a pleasant and luminous environment isn't a novelty. We have optimized the use of natural light in our rooms. We are members of the "Green light program", whose aim it is to consider light and energy savings."

PREFERENCES

It may appear superficial to give thought to colours used in hospitals. However, colours are with us on a day to day basis. At Newberg, in the United States, they have been used in such a way as to sooth patients and help them forget the confrontation with disease. The colours are soothing, shades of grey, brown, taupe and beige. A soft, subdued palette that is not often seen in European health establishments. "Colour coding in hospitals is profoundly cultural," forwards Richard Beam. "In Scandinavia, I was astounded by the bright colours used in hospitals. Bright reds! Bright blues!" Architects have introduced a visual language adapted to paediatrics. At the Pôle Meyer, in Italy, the colours are bright, this is a major innovation in the world of Italian healthcare. "And they do not contain volatile organic compounds!" specifies Cristina Donati. The Feminæ Institute in Metz, eastern France is committed to women's healthcare. Inside, patients are greeted by varying shades of vivid pink, which are coherent with the establishment's project.

LET THERE BE LIGHT

Similarly, the use of natural daylight is of the utmost importance! In Italy, the Meyer Paediatric Unit has made an innovation. "We decided to install 47 Raybender solar tubes (Raybender technology and Light intercepting transfer device (LITD)). These skylights with polycarbonate casing are secured to the roof. They direct the sun rays into the interior of the building using mirror angle reflection. We have managed to achieve new heights in solar capture, the rooms are almost entirely lit by daylight!" Bathed in Tuscan sunlight, the effect is compelling. In Portland, the first thing which strikes you when you wander around the biomedical research laboratory at the OHSU, certified LEED silver in November 2007 is the way in which light has been treated. 75% of the spaces have been placed in directions which make the most of natural daylight. The corridors lead to enormous windows with a breathtaking view of the mountain or the forest. The Cascade Mountain Range can be contemplated

TO GO FURTHER:
www.oqai.fr
the Observatory site of the indoor air quality is a mine of information.
www.buldair.org
The ADEME website presents in an educational way the various problems regarding the quality of the indoor and outdoor air and provides access to summary information on these subjects.
www.prevair.org
The site prev'air allows you to view the outdoor air pollution in Europe, focusing on the nitrogen dioxide and the ozone.

from the resting areas. Lighting has thus been reduced by 50 to 80%.

MAKING NOISE!

After eyes, come the ears... Auditory comfort in healthcare establishments is primordial. The Blois Polyclinic, in France has chosen a textile covering which corrects noise pollution in the entrance hall and places where people circulate: thin pile carpet. The carpet is cleaned by steam. This also reduces noise, eliminates the use of detergents and creates a hushed atmosphere! At Newberg, in the State of Oregon, special attention has been paid to the acoustics. "It's an integral part of the design. We opted for thin pile carpet to create a peaceful atmosphere. We have kept away from PVC flooring. Of course the carpets don't shine like polished floors but noise is attenuated, softer," explains Richard Beam. Legislation on noise pollution in buildings is also very strict in Vienna. "We had to take this into consideration while planning the new building", confirms Peter Woelfl, Project Manager at the North Hospital.

HOW TO LIVE WITH ECOLOGY

An ecobuilt construction is a place which is lived in. It is often more comfortable, lighter and healthier. It takes time to learn how it works. "We constantly try to answer a very simple question: how should a building be managed in the era of Sustainable development?" says Manuel Carmona Calvo at the San Carlos Hospital in Spain. "After the building's finished, you must remain vigilant! We must constantly check the state of our installations." This updating dynamic has been set up because we are certified EMAS, but it's a mammoth task! "We received the authorization to start operating the building the day before it opened!" "The plans which had taken months to put together had to be implemented very quickly and our teams took some time to familiarize themselves for example with the heating system." But apart from these inconveniences at the beginning, the staff now appreciates the new hospital. At Alès, in France, the Hospital Centre has published a guide for staff, to learn how to live in an ecobuilt construction. Skai Dancy, who followed the LEED certification process in the two main buildings of the OHSU in Portland, Ohio, the LEED "silver" certified biomedical research laboratory and the Health and Care Centre LEED "platinum", the most prestigious in America, is formal: staff do not occupy the two buildings in the same way. "The people who work in the Health and Care Centre, the platinum building, bore the project from the beginning. Today, they are very proud and happy. However, as far as the biomedical research laboratory is concerned, we became involved in the project at a later stage. We felt as if we were running after a venture which had already started, to force it to be more sustainable. The result is clear: people don't occupy it in the same way. With Sustainable development, everything is a question of motivation. In the biomedical laboratory, we are regularly called in because lights switch off on very sunny days." "How does the light switch back on? It isn't switched back on, energy is saved! People need to be educated to live in a green building." Being sustainable means finding a balance between technical expertise, natural and human resources: managing an ecological building necessitates more staff. "Sustainable buildings are very simple. They go against the current trend of replacing people by machines." Are the Sustainable development supporters in Portland a little bit Luddite? "It's not a question of rejecting technology: its technological excellence itself which turns things round to humans. Sustainable buildings are once again managed by people." A sustainable building requires a whole series of adjustments: you must accept wearing another pullover on a cold day or to take it off on a sunny day behind the vast windows. It's a real revolution in a country where we like to increase or lower the temperature at the push of a button. The first satisfaction surveys indicate that things are going well. "People are logically happier working in a place where there is fresh air, natural daylight, a comfortable environment... Working in a really sustainable environment heightens the sense of

The Saint-Pierre Institute in Palavas-les-Flots, France.

community, because people must get more involved. If I had to be proud about something, it would be that: changing people's mentality."
Ecoconstruction is tomorrow's building site in terms of hospital structures. Construction is the crossroads between the three main components of Sustainable development, ecology, economy, society: minimizing the ecological impact of a building means we are not mortgaging the natural resources for future generations, controlling energy costs and ensuring the economic viability of a project and finally, improving operational comfort, fulfilling societal criteria.

SD CHECK-UP !

- ☐ Have you thought about surrounding yourself with environmental specialists?
- ☐ Have you given prior consideration to your project?
- ☐ Do you think in terms of global cost?
- ☐ Have you considered internal and external communication about your sustainable building project?
- ☐ Have you reflected upon the ergonomics of the building?
- ☐ Have you taken into account the flow of patients?
- ☐ Have you got a "healthy materials" policy to avoid toxins?
- ☐ Have you considered asking about the environmental and health characteristics of the materials used to build your future building?
- ☐ Do you realize that the choice of materials influences the choice of cleaning products?
- ☐ Have you thought about interior air quality?
- ☐ Have you thought about insulation?
- ☐ Have you planned measurement indicators for energy and water costs?
- ☐ Have you installed vegetatlized roofs?
- ☐ Have you planned to get rid of thermal bridges?
- ☐ Can you guarantee natural light in all the rooms in your establishment?
- ☐ Have you thought about the colours used in your hospital?
- ☐ Have you considered the acoustic atmosphere in your workplace?
- ☐ Have you planned training modules to teach people how to live and work in a sustainable building?

SPAIN

Barcelona

LAND OF LIGHT

Between energy savings and staff comfort, the Mollet Hospital has found the formula for sustainability.

The Mollet Hospital is a masterpiece in terms of hospital ecobuilding. It has been erected in the middle of a National Park in the municipality of Barcelona surrounded by a haven of greenery, in the middle of vines. The 27 000 m² health establishment blends into the scenery. "The council allocated a vast space in a natural reserve, right in the middle of organically farmed fields. We had to eco-conceive our hospital" explains Dr. Jaume Duran, Director General. Building lasted three years and the result is captivating. When you enter the hospital, the entire structure bathes in the oblique light of southern Europe. It feels more like a designer hotel than a hospital where you are coming for treatment.
The hospital was conceived like a vessel, surrounded by alleys with different purposes: the first part is reserved for families and patients and preserves their intimacy. Healthcare professionals circulate and treatment is administered exclusively in the second part. These two windowed alleys border the establishment, connected by transversal corridors in the centre of the building. "This is where contacts between patients and carers take place: and it is where our architect had a fantastic idea: convert these transversal corridors into open patios which capture light for the entire hospital." On the first floor, there is a promenade area reserved for patients and people accompanying them that is bathed in light. The light fuses in the ceiling, through a system of skylights that run the whole length of the building. "In the corridor, no light is switched on, we only use natural daylight." Owing to this purely architectural solution, the cost spent on lighting at Mollet amounts to 12,4% against 20% in a classic hospital. Thanks to the depth of the patios, even the technical zone on the second basement floor is lit by

CONTINUED ON PAGE 46

"In the naturally lit hallway there is no need for artificial light"

Doctor Jaume Duran,
Managing Director of the Mollet Hospital,
Spain.

CONTINUED FROM PAGE 44

natural light. The technical zone also benefits from a view of the garden. “We chose to plant bamboo trees which were more than fifty years old. With these plants, we wanted to create the feeling that we were contributing to a long-term effort, to take root in our institution.” Moreover, the garden is self-regenerating with natural recycling and filtering of rainwater. This is only the tip of the iceberg. There are also four geothermal collectors in the garden. “The building is constructed on more than 20000 meters of underground piping which recuperate heat or cold at more than 146 meters below ground”, explains David Barrachida, general services director. “We have more than 148 wells, linked to four collectors which allow us to modify the temperature and provide air-conditioning for the hospital.” The savings are significant: minus 197000 thermal kilowatt hours per year on the electricity bill! For Dr. Jaume, after nine months, the ecobuilt hospital has proved to be very convincing in two ways: energy savings and improved working conditions. “We have made 25% net savings on our running costs. Improvement in working conditions has allowed us to make indirect savings. The number of accidents at work has been reduced.”

For Mireia Vicente, nurse in charge of the hospitalization unit, an ecobuilt hospital improves the quality of care. “Everything is linked! If we feel better in a building, we provide better care, and the patient feels better as well. The level of stress is lowered.” Dr. Eubald Balcelis who works at Mollet adds, “My experience as a doctor is the following: some medical buildings which date from the last century are “sick”. This one is healthy, and everybody can benefit from it.”

"Some buildings from last century are ill... This one is healthy and everybody takes advantage of it"

Docteur Eubald Balcelis

nora® floor coverings in healthcare facilities Creating sustainable, safe and hygienic environments.

nora systems GmbH
Höhnerweg 2–4
69469 Weinheim · Germany
Phone: +49 - 6201 - 80 6633
E-Mail: info@nora.com
Internet: www.nora.com

nora®
All About Flooring. **All About You.**

The world leading conference on sustainable healthcare

Welcome to

CleanMed Europe 2012

Creating Healing Environments

26th 27th 28th
September 2012

Learn more and register on the official site
WWW.**CLEANMEDEUROPE**.ORG

26th 27th 28th
September 2012

More information

For regular updates on the conference, please register your e-mail adress at:

www.**cleanmedeurope**.org

JOIN US FOR CLEANMED EUROPE 2012 in Malmö

Health Care Without Harm Europe (HCWH Europe) and Region Skåne invite you to participate in CleanMed Europe 2012. CleanMed is the world's leading conference focusing on sustainable healthcare. During 26-28 September 2012 the conference will be coming to Europe for the third time in its history. CleanMed 2012 will provide you with a holistic view on the impact of healthcare on society – at both global and local level. We look forward to offering a wide spectrum of current topics presented by leading international experts and organisations.

About Malmö, Region Skåne, Sweden

The conference will take place in Malmö, the capital city of Sweden's southern most region Skåne, only a 30-minute train ride from Copenhagen Kastrup airport in Denmark. Malmö is also easily accessible by train from both Scandinavia and the European continent. The hotel and conference facilities for CleanMed 2012 are located in the city centre of Malmö, right next to the central railway station. Region Skåne is one of the leading regions in Europe for green technology, hosting a number of examples of best practice in sustainable healthcare.

Green Tech visits

Conference delegates will be offered the opportunity to sign up for Green Tech visits. During these visits, which will take place between 25-28 September 2012, a number of world leading solutions and facilities will be presented to interested visitors from around the world.

For questions regarding sponsoring, exhibiting and other types of cooperation please email info@cleanmedeurope.org
or contact project manager
Daniel Eriksson +46707944213

Also visit www.cleanmed.org for more information on CleanMed in 2012 in the US and past conferences both in Europe and the USA.

Organizer	Local host	Executing agency	Greentech Visit organizer
Health Care Without Harm	Region Skåne	TEM at Lund University	Sustainable Business Hub
www.noharm.org/europe	www.skane.se/miljo	www.tem.se	www.sbhub.se

AIA ASSOCIÉS

EUROPE'S LEADER IN ECOCONSTRUCTION AND IN HEALTHCARE ARCHITECTURE

AIA Studio ENVIRONNEMENT

540 EMPLOYEES / 23 PARTNERS / 40 ASSOCIATES
180 ARCHITECTS / 280 ENGINEERS / 80 PROJECT MANAGERS
OFFICES IN PARIS, NANTES, LYON, RENNES, ANGERS, LORIENT, TOURS, BORDEAUX & BEIJING

AIA Associés leads the way in Europe with its full-fledged sustainable development team of in house experts through a new process that integrates all disciplines of concept, design and project management for most State Certifications such as HQE®/BBC/Effinergie (France), BREEAM®, LEED®.

AIA Associés is a confirmed European leader in Sustainable Development Architecture and Engineering thanks to its R&D and design structure, AIA Studio Environnement. Its proven track record aims at providing outstanding services and delivering unique green buildings to clients worldwide, like the new full wooden-frame French Health Watch Authority headquarters in Paris or the upcoming sustainable hospital of Carcassonne.

AIA Associés and AIA Studio Environnement are committed to helping and protecting our planet through well-conceived, sustainable ecoconstruction.

INVS – FRENCH HEALTH WATCH AUTHORITY HEADQUARTERS - PARIS

Contracting Authority InVS
Lead architect AIA Associés
Environmental expertise AIA Studio Environnement
Structure ICM Bois (an AIA Associés Wood company)
Surface area 4,331 m²
Delivered March 2012

CARCASSONNE HOSPITAL: A SUSTAINABLE HOSPITAL

Contracting Authority Centre Hospitalier de Carcassonne
Lead architect AIA Associés
Environmental expertise AIA Studio Environnement
Certification HQE®
Surface area / Capacity 55,000 m² - 482 beds and spaces
Delivered end 2013

PARIS
AIA Associés
23 rue de Cronstadt
75015 Paris
Phone : +33 1 53 68 93 00
Fax : +33 1 53 68 93 11

BEIJING
AIA Associés
Guang Hua Soho
No.22 Guang Hua Road
Chaoyang District, 100022 Beijing
Phone : +86 (10) 59 00 64 50

CONTACT
Eric Bussolino, AIA Partner, Head of AIA Studio Environnement
CHEDD® (Sustainable Development Higher Studies) certified,
HQE® auditor (CERTIVEA)
T. +33(0)2 40 38 13 08
E. e.bussolino@a-i-a.fr

WWW.A-I-A.FR

SAVING ENERGY AND WATER

"The best energy is energy which we don't use," Nathalie Kosciusko-Morizet used to say (former French Minister of Ecology, Sustainable development, Transport and Housing). Today, fossil fuels are running out. If time-frames vary according to different scientific studies, it is unanimous that a major reflection on renewable energy is necessary. Health establishments are also partly responsible for this voracious use of energy. They represent an average of 11 to 12% of all energy consumption in the tertiary sector in Western democracies. And according to the German program Klinergie, a hospital bed consumes as much electricity and heating as two households. So in order to be clairvoyant, it is better to trigger a reflection whitout delay on energy reductions and green energy sources. In France, the law of 13th June 2005 that established guidelines for a 2% energy drop from 2015 and an annual 2,5% drop by 2030. By 2020, 23% of energy costs should stem from renewable energies. And finally, in 2012 thermal regulations disrupted energy management in healthcare buildings. From now onwards, new buildings must be built to low energy building standards (BBC). That's to say, a maximal primary energy consumption of 50kWh/m²/year. (At present, a hospital's energy consumption can be as high as 350 kWh/m²/year).[1] From 2020 all healthcare buildings should have a positive energy balance (BEPOS). A hospital will have to produce more energy than it consumes. The legislator has taken things in hand. And what about Europe?

THE TRUTH ABOUT CONSUMPTION

In France, the Environment and Energy Management Agency (ADEME), whose vocation it is to favor

1. The Francophone Institute of Energy and the Environment (IEPF)

France consumes 2.5% of the world supply of primary energy, but its fossil reserves constitute only 0.01% of the world's known reserves.

renewable energies, energy consumption represents 1,5% to 5% of the budget of a healthcare establishment. The main sources of energy consumption are the kitchen, laundry, sterilization, radiology, laboratories, operating theatres, air-conditioning and heating. The first step is clear: it is necessary to carry out energy analysis and define a policy for energy management and spending. In France, a report by the School of Higher Studies in Public Health, established that heating and air conditioning weigh down energy bills in healthcare establishments (65%) followed by water costs (11%) and lighting (10%). The first important step is to assess the energy situation in your building in order to set up an energy savings policy. Before taking action, it is necessary to establish which units, equipment and procedures consume the most energy.

DIAGNOSTICS AND LABELS

Certain labels are known to target energy, problems more specifically. Switzerland, for example privileges the Swiss label Minergie, which focuses on energy performance. This demanding label is beginning to be exported and it adapts well to the hospital sector. The Swiss Commission for Ecology also works with the association Energho. At the time it was created in 2000, Energho was a State program which aimed to drastically reduce energy consumption in public institutions. The association then became an independent organization which works with cutting edge engineering. Energho audits many hospital buildings in need of renovation and sets itself the aim of reducing the building's energy consumption by at least 10%. "We are perpetually in contact with them, we work hand in hand on energy questions", explains Reinhardt Voegele, spokesman for the Federation H+.

A CERTIFICATE FOR ENERGY SAVING HOSPITALS

In 2001, the German association BUND created a label called energiesparendes Krankenhaus, for energy saving hospitals. Hospitals which set up programs to reduce energy costs and greenhouse gas emission are distinguished by a certificate for good practice. For Annegret Dickhoff at BUND, "Hospitals are places where people transit, they must be exemplary. It's important to lend visibility to what they set up for the environment!" To be awarded the BUND certificate, a hospital must have succeeded in reducing its carbon emission by 25% over the last five years, to prove a significant reduction in its energy consumption (in proportion to its size), and testify to the existence of real energy management. 4 criteria for high technology have been defined, but this is the price to pay for the BUND label! In 2012, only 24 German establishments were deemed worthy of this distinction. Financed by the Via Medica Foundation, the Klinergie program proposes energy analysis and solutions. Similarly, in the United States, the Energy Star program measures the energy performance in hospitals. The ecological footprint of a city may also be an argument to accelerate awareness. Introduced in the 90's, it calculates the surface (in hectares) of the natural resources necessary for a human being or for an activity to be operational. Enough to send shivers down the spine.

GREEN LIGHT: LET THERE BE LIGHT…

This European program proposes different solutions for measuring energy savings and reducing them. It lasts over a five year period. In Granada, Spain, this program was chosen by Martin German Blanco Garcia's team at the Virgen de la Arrixaca University Hospital. "We have completely changed our lighting system; we have equipped the hospital with movement indicators to switch lights off automatically... By using the measurement model supplied by "Green Light", we can assess our savings: in 2009, they amounted to 70 000 kilowatt-hours." In France, José Lalanne, Director of the Dialysis Centre in Béarn also received the "Green Light" award in 2010 for his work on light and lighting, as well as the energy management implemented in his buildings. "Natural light is omnipresent via the patios, bay windows,, light wells and light tubes everywhere, creating a feeling of openness. We have reduced electricity consumption by 53% even though the

The Béarn Dialysis Centre, Aressy, France

surface has been doubled (4 400 m²). We benefit from the advantages of natural light. On a daily basis, this is apparent in the feelings and behaviour of both the patients and the professionals. It's a great success!"

WILD SAVINGS

Evaluation is therefore the basis for any system of energy management. High quality assessment is the first step. It is then necessary to reflect upon sustainable alternatives. Support from a wind farm? Installing solar panels? Or opting for wood-burning heating? We are going to give you some advice to find your way around renewable energies.

Financing
See the European Commission site for the possibilities of grants or aid from the European Union (www.ec.europa.eu).

IN THE RENEWABLE ENERGIES JUNGLE

Wood-burners, biomass heating, heat pumps (HP), geothermic, solar energy or cogeneration... Here is what people directly involved have to say.

THE NEW ERA OF THE BOILER

According to Eric Notebaert, joint Professor at the University of Montréal and accident and emergency specialist at the Sacré-Cœur Hospital, Montréal, 50% of the ecological footprint of Canada healthcare Centres comes from energy consumption and 62% of this consumption can be attributed to heating and air conditioning. Let's remind ourselves: a reduction of 1 degree in the heating of a building will bring

PETER WOELFL, PROJECT MANAGER AT THE NORTHERN HOSPITAL, VIENNA.

Energy Benchmarking

Before we started, we met international experts and organized a day with up to 40 specialists. Heads of projects travelled all around Europe visiting energy efficient healthcare buildings. We went to Sweden, England. "It was important for us to take things into consideration at an early stage of the project because when building work begins, a lot of things are no longer possible."

Ecoenergy light at the Béarn Dialysis Centre, Aressy, France.

about a 7% drop on total energy consumption. Catherine Scrève, Quality Manager at the General Hospital Philippe Pinel in Amiens, France, has chosen to install a wood-burner in his establishment. "We inaugurated the boiler in November 2009. We have a local supply channel for wood, this is why several establishments in the area have made this choice. We predict a CO_2 reduction of 1 600 tons per year! We use the boiler for heating and hot water for a surface measuring 35 000 m^2. It will cover 95% of our needs." Olivier Dukoninck, senior technician at the General Hospital, Amiens dealt with the funding and installation of the wood-burner: "The General Council approached us; they wanted to develop the timber industry in the Somme region. Following this, we carried out a pre-feasibility study at the hospital and we saw that this system would be profitable." In total the furnace-room cost 1 million euros, but the hospital did not have to invest anything. The supplier of wood for the furnace-room paid 50% and the rest was covered by the ADEME (35%) and by the General Council (15%). The installation of our furnace-room creates jobs in the wood supply chain because our consumption is very high, one trailer truck per day! "In Alès, François Mourgues, Director has opted for a sustainable energy development centre to heat the 40 000 m^2 of his new building: a wood-burner completed by solar and photovoltaic energy. "This will allow us to save 2 500 tons of CO_2 per year and to reduce the energy budget by 40% compared to a classic heating system." The biomass boiler is the high point of the energy development centre at the General Hospital in Alès. "The boiler is supplied by a large silo which contains about 300 m^2 of wood," explains José Molina, the Technical Director. "We use packets of crushed wood which is automatically taken to the boiler on conveyor belts." During the summer, oil and gas-burners take over, but during the course of the year this 1 600 kWh boiler covers 80% of the hospitals needs in heating and hot water. But beware: the boiler needs no less than 3 000 tons of wood per year. Be careful to use the right filters, because fine wood particles, are also pollutants! Wood is part of biomass but it also uses forage or straw for combustion, whereas cereals, beet or again colza will be transformed into biofuel.

The cooling unit of the heat pump at the Pasteur Clinic in Royan, France.

DAVID VELASQUEZ, HEAD OF ENVIRONMENT AT LA COLINA HOSPITAL, TENERIFE, SPAIN.

The art of recovery!

"We realized that the refrigeration tower used for air conditioning generated heat. We decided to take advantage of it! We recover heat and transform it into energy used by the boilers. We installed the boilers in the same place as the air conditioning system, so that the water which enters the boiler circuit is already warmed up. Therefore, the boilers consume less fuel. The project began in 2009 and, since then, the monthly fuel consumption has dropped by 500 liters from 1 200 to 1 000 liters per month."

AT FULL SPEED!

Steam is another source of renewable energy. The boiler at the Newberg hospital, Oregon has chosen steam. It covers almost all our water heating needs in the hospital. "Our boiler produces a very small amount of carbon emission", explains Richard Beam. The boilers can be used for extra heating. In Freiburg, Germany, a system of water vapour recuperation for the air conditioning system also enables us to make enormous water savings. "Before, we used tap water. Now it's a closed circuit which respects standards and fights nosocomial infections," explains Armin Schuster. Similarly, at the Pasteur Clinic in Toulouse, the boiler which was nearing the end of its life was replaced by a condensation boiler. "The return on investment is good already: - 40% on our gas bill," enthuses Olivier Collet. Moreover, the General Hospital in Pau has chosen to limit the energy consumption of its steam generators. In order to do this, variable speed drives placed on the motors of the steam generators enable constant adjustment to be made to extraction and ventilation of air as needed. Watertight plate heat exchangers enable to combine the hot air extracted with the air blast

The energy pole at the Alès General Hospital, France.

device, this allows 60% energy recuperation and saves as much on the cost of air handling.

HEAT PUMPS

The centre of the earth conceals almost limitless resources of heat. The heat pump is an easy and economic way of using thermodynamic principles to collect heat from the earth, water or air. Here is a little test to demonstrate. When we blow air onto our hands, mouth wide open, the air coming out is warm. Now try to blow air out, but this time squeezes your lips tight and you'll see that the air coming out is cold. This is because the air is compressed by your lips. Refrigerators and heat pumps work on the principle of compressed or dilated air.

Although frequently used for refrigeration, this process hasn't been widely used for supplying heat, simply because fossil fuels were once very cheap. Heat pumps have had an exponential success ever since the cost of natural gas and fuel has increased. They are commonly used in Switzerland. Since 1938, Zurich City Hall has been heated by a heat pump which collects heat from the Limmat River. For the first time, in 2007, sales of heat pumps exceeded those of oil-fired and gas boilers. In the country of gruyère cheese, the State also supports pump installation schemes. The most effective pumps supply five times more energy than they use in electricity.

The heat pump is only the first level of use of thermodynamic principles. Aerothermodynamic heat pumps which draw heat from the ambient air also exist. Whether it is indoors or outdoors, geothermal pumps draw heat from the ground or from water tables. Geothermal power plants collect heat as far as 5 kilometers below ground, crack deep rock to make water circulate and pump water at temperature of 200 degrees Celsius. However, installing these pumps can be problematic, particularly in water table zones.

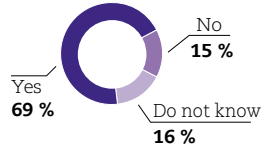
This is what the geopower engineering team learnt at its expense in 2006. The deep heat mining project began in 1996 and aimed to supply part of the electricity and heating for Basel Hospital, as well as all heating for 27 000 households and the electricity of 10 000 Basel homes. At its launch, the geothermal power plant caused an earthquake measuring 3,4 on the Richter scale, and some of the buildings in the city showed signs of cracks. Nowadays, drilling takes place further away from cities, and projects for geothermal power plants continue to flourish.

In Sweden, geothermal science is part of their culture. "The entire Swedish electrical energy system does not harm the climate in any way," explains Daniel Eriksson, Director of the TEM foundation at Lund University, on the West coast of Sweden.

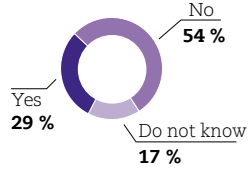
In Canada, geothermal science is also a norm. For Nicolas Demers, engineer in charge of the

WHAT DO YOU SAY ABOUT SAVING ENERGY AND WATER?

Is the use of low energy consumption light bulbs part of your energy reduction policy?



Have members of staff been made aware of your energy program?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

geothermal science project at the Montreal General Hospital, "geothermal science is above all a free source of heat. For years, solar energy has accumulated in the ground and we get it back by drilling." It is not easy to set up a drilling site in the middle of a capital city. "We have to pay attention to noise pollution and check that we are not going to damage the foundations of historic buildings surrounding the hospital..." Saint Jérôme's Regional Hospital has 75 geothermal wells, 600 feet below ground level! As much as 500 000 dollars are saved per year on heating.

SUNSHINE IN YOUR BILLS!

More and more institutions choose solar energy by using photovoltaic panels. The efficiency of this system depends on the exposure of the building because sunlight determines energy yield. This type of energy can provide between 20 to 40% of annual energy needs. A service provider can also produce energy made from photovoltaic power plants. This is the case of the Barcelona Hospital where a solar heating power system was installed to raise the temperature of the hydrotherapy swimming pool. QED!

JOSE LALANNE, DIRECTOR OF THE BEARN DIALYSIS CENTRE, ARESSY, FRANCE.

How will photovoltaic panels be reprocessed in 20 years time?

"I can see a downside to photovoltaic technology. We still had 300 m² of photovoltaic panels to install on part of the building. Despite financial support from ERDF funding, that I am going to return, I rejected the system. We do not yet know how panels will be reprocessed in 20 years time. Today, I would rather bet on energy consumption savings. We will soon install a German system of electromagnetic coils (induction heating) that can help us achieve 30% energy savings."

The Pasteur Clinic in Toulouse, France.

Another focal point of solar electricity is that surplus production can be resold to leading energy players such as EDF (French Electricity Group). Switzerland depends on numerous public/private partnerships for its electricity supply, with companies using solar energy for example. In Switzerland, the State strongly supports the use of photovoltaic energy, particularly since the beginning of the financial crisis. "The influence of photovoltaic energy is getting bigger and bigger," says Reinhard Voegele. Over the last couple of years, a Swiss Confederation program has given support to both public and private companies which install photovoltaic panels.

MANAGING THE AESTHETIC ASPECT

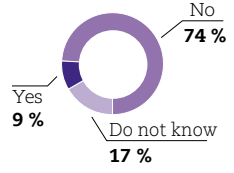
At the Oregon Health and Science University of Portland, photovoltaic panels are hidden in the blinds! The 15th and 16th floors of the south facade of the building have a Trombe wall, after the Frenchman Félix Trombe, who popularized this technique which passively accumulates heat in the material, preserving it and restoring it during the night. The solar panels which produce electricity are also used as blinds to provide shade indoors! At the Meyer Paediatric Pole, Italy, well-being, stress-elimination factors and a holistic approach to care have become part of the architectural language. Solar panels offer both efficiency and aesthetics. "Thanks to laminated wood, the design of the pillars is reminiscent of trees and surrounding vegetation. These pillars are also the anchoring structure of our photovoltaic panels." With the play of light and shadow, the solar panels nicely cover the ground and the greenhouse walls while transforming the facade into a real solar energy power plant with a 31 kilowatt per hour capacity.

PANEL EXPOSURE

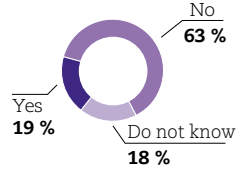
In 2012, the State of the Vermont will be the first American state to say no to nuclear power: its power plant will close, strengthening its' dependency on Quebecs' hydropower. "To supplement and cover about 2% of our energy needs, we would like to install solar panels on the roof of the new building,"

WHAT DO YOU SAY ABOUT SAVING ENERGY AND WATER?

Does your establishment use the new and renewable energy?



Do you know your kwhep/m²/year ratio ?

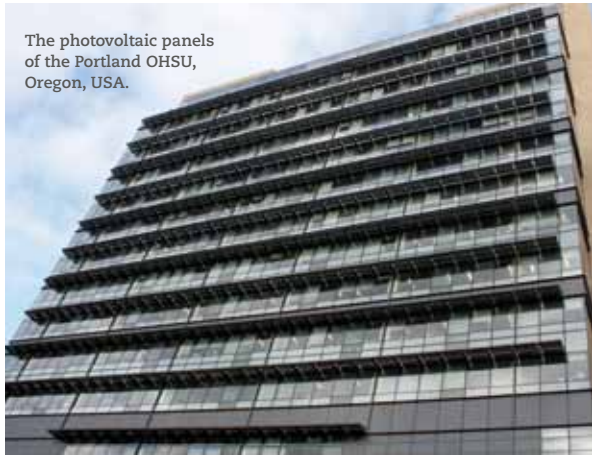


Source: C2DS Observatory of Sustainable development in Heath, 2012.

explains Dave Keelty. Fletcher Allen's roofs have plenty of space, but are often badly exposed. "The best exposure is on the West side. Otherwise, the orientation is north-sided. It must be said that Vermont is the second cloudiest State in the United States".
Investing in solar energy is not that simple in the United States. In Newberg, the Providence Group took advantage of a complex financial plan with the Sun Edison Company to equip itself with photovoltaic energy. "Sun Edison invested 34 million dollars to install solar panels in Newberg. In exchange, we are going to buy electricity from them for the next 20 years." Sun Edison has also benefited from Newberg carbon credits, and from State of Oregon tax reliefs for promoting renewable energies. Today, Newberg's panels cover between 5 and 15% of the energy needs of the establishment.
We will carry on equipping the remaining space on the roof. In the long term, a third of the building's energy will be provided by photovoltaic panels.
Similarly, in Madrid, "Spain... imports 90 per cent of its energy production," explains Ana Cabrero, "renewable energies are de facto the object of particular attention." Evidently, the Hospital of Madrid has been equipped with solar panels to heat water for the building.

COGENERATION: SIMULTANEOUS PRODUCTION OF HEAT AND ELECTRICITY

Cogeneration consists of producing thermal (heat) and mechanical energy at the same time with the same installation. Thermal energy is used for heating and for the production of hot water using a heat exchanger. Mechanical energy is transformed into electrical energy with an alternator. It is then sold or consumed by the installation. This system has already been used for a dozen years in France and has reduced the energy bill of many health care facilities. "Trigeneration" is an even more successful system of energy production.
Trigeneration is still not widely used. A third form of energy is added to cogeneration, produced from a primary energy source (fossil or renewable). Three



The photovoltaic panels of the Portland OHSU, Oregon, USA.

secondary energies are combined with a primary energy that is more often natural gas. Heat, cold and electricity are then obtained. Ignacio Micó, head of engineering, work and maintenance at the General Hospital of Valencia in Spain is very proud of the exemplary cogeneration system used in his establishment. "Electrical energy is produced through two gas engines each measuring one megawatt (1 MW). Electricity is produced with natural gas and this energy is used in the hospital. The surplus energy product is resold to the electricity company."
"In addition, we produce cold water for the hospital's air conditioning system with the heat of refrigeration from the gas engines. With the smoke that escapes from these engines we pre-heat our water heating system. Therefore, we really make the most of all the energy! Our initial estimates suggested monthly savings of 20 000 to 30 000 euros in electricity consumption." This is enough to break down any reticence. At OHSU (Oregon Health and

The Pasteur Clinic in Toulouse, France.

Science University) in Portland, the natural gas cogeneration plant situated at the foot of the cable car produces 35 per cent of all energy consumption in the building using micro-turbines. This is a record for the State of Oregon.
The alternatives for reducing energy bills are numerous… Boilers, solar energy, wind, geothermal energy, insulation, green electricity… However, the simplest solutions are often the best: learning how to save energy is the basis for a true energy consumption policy.

ECONOMICS ENCOURAGES SAVINGS

Even the most sophisticated systems will fulfill the requirements of Sustainable development if we use common sense.
Sustainable development is a mix between simple principles and high-tech solutions. It is by harmonizing a classic sense of economics with a taste for innovative scientific solutions that we can enter the sphere of sustainability. Savings made from electricity, particularly in the treatment of air and water are essential.

UNDERSTANDING IN ORDER TO CUT DOWN COSTS

Tracing energy leakage is essential but we must not forget to follow consumption closely. Centralized technical management manages water, electricity and gas consumption at the same time. In France, the Institute Saint Pierre, Palavas-les-Flots has software that records energy consumption in real time: as a result, the most consuming devices are used in shifts and light bulbs have been replaced by LEDs. Following an energy audit, the Anjou Clinic, Angers has set up a self-regulating thermal system: from 8pm onwards, the temperature of the ambulatory premises is automatically lowered. Similarly, at the Regional University Hospital in Lille, the analysis and monitoring of energy consumption are recorded by the hour and an SMS alert is immediately sent when consumption exceeds the average. Precise consumption tracking led to the first steps of energy reduction at the Fletcher Allen Hospital in Vermont, U.S. All the lights of the hospital are controlled and switched off automatically when there is no activity in a room. “It is very simple but this has allowed us to reduce the energy problem in a meaningful way.” Centralized technical management has helped highlight potential savings.

FRANCISCO JOSE ELETARUIZ,
ENVIRONMENTAL TECHNICIAN AT THE ZUMARRAGA HOSPITAL, BASQUE COUNTRY, SPAIN.

Lighting… Oops!

“To reduce our consumption of electrical energy, we put presence detectors in lots of corridors. This has proved to be counter-productive since they are neon lights! Constantly switching lights on and off increases our consumption! We must therefore change our lighting system…”

"We found devices, which were switched on at all times, although we only needed them sporadically, transformers, for example. We did a little bit of design work to reorganize our energy chain," says Louis Dinneen, Logistics Manager. Apparently, there was a lot to be done: "There was an enormous tower in our air conditioning system in the main building which had not been renovated for 12 to 15 years. We realized that it was running all the time! Worse, if a patient was complaining of a bedroom being too cold, the staff set the air conditioning a degree or two higher. However, this did not only raise the temperature of the patient's room but the whole building! 35 000 m^2!" By changing practices, Fletcher Allen saved a million kilowatt-hours for this building in only one season.

Elena Bunet, Environmental Manager at the Emporia Hospital Group in Figueres, Catalonia also led a campaign to partially centralize the technical management of the air conditioning. "Air conditioning is one of the largest features of energy consumption. In order to improve its management, we have installed a computer system that centralizes the controls. During the weekend, for example, we can disconnect the air conditioners centrally in unused areas such as external consultation offices or the archives. There is of course a human factor. Many areas are managed manually and people can forget to switch things off. We need to raise awareness." Beyond the water eco-aerator, mixers and other water-saving devices that have been installed, simple checks are organized to make sure that all taps are closed at the North Parisian Private Hospital. David Vélasquez, quality and environment manager at the Colina USP Hospital in Santa Cruz de Tenerife also believes that human beings are primordial. As early as 2008, his establishment defined some clear environmental objectives. "Since 2009, security agents have had an additional responsibility: when they do their rounds, they must monitor and turn off air conditioners, computers, copiers, lights... and so on."

There is also another possibility. An independent contractor can be asked to control the energy

The boiler room of the Newberg Hospital in Oregon, USA.

consumption of an establishment. Yvan Saumet, CEO at the Blois Polyclinic has entrusted the management of its consumption to Cofely, a subsidiary of the Suez Group. Energy consumption has been reduced by more than 50 per cent, the service provider shares the savings made with his client. Schneider-Electric and Siemens also provide solutions to lower energy consumption in buildings.

SWITCH OFF THE LIGHTS

Renovating equipment is important, but so is installing sensors, low energy consumption bulbs or even ventilation regulators. For Olivier Toma, president and founder of C2DS, "thinking about different lighting modes for day and night is important because electricity requirements differ." A whole new area to be explored! In answer to this, Elizabet Izquierdo, technology and services manager of the Del Mar Hospitals in Spain describes the comprehensive lighting revision which has been implemented in her institutions: "We have installed new lighting circuits. Our premises are very old and it wasn't possible to have only one light on in the lobby for instance. The entire lobby had to be lit. Since the new installation, we have been able to switch off one light out of two during the night." The Del Mar Hospitals have also decided to put detectors in more obvious places, such as toilets, shops and storage areas. Health care services know how to blend into their environment: "The Centre Forum (one of the establishments) is very bright," she says. "We have therefore installed electrical photocells which detect external light." Lights are only turned on when necessary. The same thing applies to the Palamos Hospital. "In areas which benefit from direct sunlight, such as the dining rooms, we installed a new lighting system that adapts to the brightness of the room. Detectors modulate the lighting according to needs," says Núria Vidal, technician.
For better lighting management, the Del Mar Hospitals sectorized circuits. The outpatients' clinic theoretically closes at 5pm so only one light out of two stays on. The Palamos Hospital has noticed that patients, "often fall asleep in front of the television,"

says Nuria Vidal, "televisions which are switched on = televisions which consume electricity. Our televisions are equipped with timers that automatically turn them off, preventing them from being left on all night!"
At the London University Hospital, Trevor Payne also has a few unbeatable tricks to save energy. "The computers in the administrative buildings all switch to "standby mode" as soon as the keyboards are no longer used. Bulbs are replaced by low energy consumption light bulbs. Infrared sensors turn off lights if there is no movement in public areas and offices for more than ten minutes. In the lobby, a giant screen displays water and energy consumption in real time to our visitors. Finally, all taps have been replaced by water-saving taps!" In Vermont, United States, Louis Dinneen began by changing light bulbs. "We replaced the 80 watts by 28 or 32 watts bulbs, which give sufficient light." The most effective thing to do is to mobilize the staff. "We have challenged all our departments to reduce energy consumption by a million kilowatt hours, regardless of whether the energy comes from gas or electricity." By simply changing the way we use apparatus (transformers, radiators, air conditioning) the hospital has saved, not a million kilowatt hours, but three million. In Madrid, the hospital has also launched a "lighting" project.

ENERGY SAVINGS AND COMMON SENSE

European lighting standards correspond to countries where the intensity of light is much lower than in Spain. "Obviously, light is not the same in Lille, northern France as in Madrid, southern Spain. And yet, standards are the same. We are asked to provide a certain light intensity by m^2 without taking sunlight into account. By taking advantage of sunlight, we have been able to reduce our use of the lighting system by a third!" says Ana Cabrero enthusiastically, head of the department of engineering and technical services. Before looking into alternative energies, the Hospital of Madrid uses the following method, we ask ourselves, "What are we doing?" and then, "What can we do?"

WATER, A FINITE RESOURCE

Hospitals use vast quantities of water. According to the C2DS Observatory between 300 and 750 liters of water per day and per bed are used in an average hospital which practices medicine, surgery and obstetrics. There are several reasons for this endless consumption: hygiene, the fight against nosocomial disease, hospital beds, the dilution of chemical substances and sterilization. "The daily attendance at our hospital, in Madrid, is comparable to that of Formentara in the Balearic Islands," explains Ana Cabrero, or approximately 20 000 to 25 000 inhabitants. We consume as much water as a grand hotel, with 400 rooms, 2 kitchens and 2 restaurants. To be consistent with our caring mission, we have the moral and social obligation of reducing our impact on the environment," concludes Ana Cabrero. Devices and solutions must be developed in this field; installing water-saving taps, small appliances which cut water consumption by 30 per cent, ultra-violet filters to eliminate bacteria responsible for nosocomial diseases or restoration of a former well to provide water for parks rather than using the town water supply.

A WHOLE PROGRAM

In Spain, the Del Mar Group is once again at the forefront. Elizabet Izquierdo, Technology and Services Director of the Del Mar Group explains, "we have installed water-savings devices on all our taps: the device consists of a component which is adjusted onto each tap and reduces water pressure. This alone has reduced water consumption by 40 per cent in our hospital network. We took advantage of the very restrictive tap maintenance protocol for preventing legionnaire's disease by installing devices on all the taps and showers in our centres. At the Esperance Centre, for example, we have installed a pressure-reducing valve on the building water inlet. These savings can be added to those made from the taps. For the purpose of hygiene, we are also currently in the process of generalizing the installation of photocell taps. When a nurse has dirty hands, she touches a tap where bacteria remain! Generally, this

Eco-aerator
at the Navarre Polyclinic
in Pau, France.

The refrigeration system of the Fletcher Allen Hospital in Burlington, Vermont, USA.

solution allows us to respond to the environmental preoccupation of saving water and to prevent bacterial transmission. That is what sustainable means! But photocell controls are costly, so we have installed them primarily in care units and public toilets."

THIRSTY HOSPITAL EQUIPMENT: AUTOCLAVES, HEMODIALYSIS, LAUNDRY

Autoclaves or washing booths are also big water consumers. However, Christophe Lambert, pharmacist at the Chambery General Hospital in eastern France has managed to reduce the water consumption of the sterilization unit, "washing booths use 120 liters of water per phase (an autoclave consumes 200 to 250 liters per cycle). But when you order the equipment, it lasts for 15 years. The manufacturers do not provide new programs for existing hardware but they sell new equipment that consumes less than the old ones. We will have to wait until 2020 for the next order!"

The Pasteur Clinic in Royan has made the right choice by installing new autoclaves which use 120 liters instead of 250 liters. Similarly, the 3 new autoclaves at the Anjou Clinic in Angers save 170 liters of water per cycle. At the Sarrus Teinturiers Clinic in Toulouse, the autoclaves have operated in closed circuit since 2006: water from osmosis is recollected using an additional circuit. "Waste is reduced, and we save up to 20 000 euros on our water bill!" says Gérard Reysseguier, Director. Haemodialysis is another thirsty activity. "Our biggest scheme is the recovery of water from our hemodialysis unit which is also the main post of water consumption!" explains David Velasquez, responsible for quality and environment at Colina USP Hospital in Santa Cruz de Tenerife. "All the water rejected by osmosis will be recovered to provide water for toilet flushing, whereas today it is directly discharged without being reused. After osmosis, the water will pass through a tank to decrease its salt concentration and will be directly routed to the toilet flushing system. Toilet flushing is driven by temporized taps, of course!" Laundry is also a major post of water consumption. In Tours, the Regional University Hospital (CHRU) has succeeded in dividing the consumption of water per liter of linen: 5.5 kilos instead of 12 liters, thanks to water recycling. The waste water is used to heat tap water by thermal exchange, and allow power consumption savings. The hospital halves effluent discharge and savings amount to 40 000 euros. At the Saint-Gatien Clinic, the team has implemented a low temperature laundry, and has raised staff awareness to avoid half-loaded autoclaves and washing machines. The staff also knows about the hazardous nature of the effluent and will raise the alarm in the event of leakage!

WATER RECYCLING

Saving water is essential, but we have to think about what happens to it once it has left the hospital. According to Philippe Perrin, Consultant and Eco-Nurse, the hospital has successfully managed to revolutionize solid waste recycling, or at least the perception of the problem. However it is just the beginning for effluents. Drips are poured down the sink and forgotten. To remedy this situation, the Housing Establishment for Dependent Old People (E.H.P.A.D), Bourges has installed a lagoon treatment plant outside the city. It is a natural water recycling technique using micro-organisms, algae and aquatic plants. The water trickles down between the roots of trees and reeds and is naturally purified in a treatment basin. The new building at the Lauriers Roses Convalescence Centre, Nice will be certified with the high energy performance label BBC. The preliminary project includes macrophyte water recycling lagoon system. With the help of the CNRS and the Lyonnaise des Eaux, the establishment has actively confronted the problem of effluents. "The waste water from our clinic contains a lot of antibiotics and anti-cancer drugs...therefore some mutagenic substances..." explains Daniel Bonnotte, engineer "the time had come to think about ways to eliminate drug rejects. There are two types of solutions: either intensive systems with bioreactor membranes, or extensive systems with dry macrophyte plant basins. We opted for the second solution. Macrophytes treat all kinds of water, including those containing organic materials. The only downside is that a lot of space is necessary." Such an expanse of space preserves biodiversity: toads, egrets, and dragonflies are part of the ecosystem of the macrophyte basins.

A BIO-DIGESTIVE MEMBRANE

In Portland, United States, the Healthcare Centre has opted for a bio-digestive membrane. "Water leaves the building and solid particles are filtered. It then flows into a large tank containing an organic filter, or a bio-digestive membrane," explains Skai Dancy, Logistics Manager. This method is used in Japan.

The autoclave at the Pasteur Clinic in Royan, France, uses between 20 and 25 liters of water instead of 250 liters.

The most complicated part is to test that the water that comes out of the device reaches the standards required for drinking water. We then use it as "grey water", for toilet flushing and air-conditioning towers. This is a perfectly clean system. "The water collected from thunderstorms is also reused for the same purposes and almost all the roofs in the hospital are vegetal.

COMBINING THE BENEFITS OF GROUNDWATER

Aad Bijl is Director of Deerns Consulting Netherlands, a thermal energy storage audit firm in Deventer, Holland, "Our creed? The "energy triad". This means that we must simultaneously limit energy requirements (by focusing on insulation for example); Consider the use of renewable energy; Optimize the use of fossil fuels."

In accordance with this principle, the hospital heating management system is based on a long-term energy storage system. During the summer a network carries cold water from a groundwater source and during the winter hot water is supplied from another source. During the cold season, hot water arrives in the network at 18 degrees and is transported through seven underground stations that diffuse the heat via an air treatment system. Each underground station is equipped with a heat pump and a boiler. In combination with the heat pump, the groundwater system provides 80 per cent of the hospital's heating. The boilers adjust the remaining 20% if the outside temperature falls below zero. They run on natural gas. The groundwater temperature is roughly 8 degrees. The water is stored to cool the building during summertime; this makes any other air conditioning system unnecessary. Each underground station is equipped with a steam generator which runs on natural gas. The steam is used to calibrate the rate of moisture in the air. There is another underground station below the main sterilization building, the pharmacy and the kitchen. This installation is also used to provide hot water. The total investment in this system was 1.2 million euros more expensive than other types of heating. "The costs are very heavy," admits Aad Bijl, "But savings on natural gas represent 75%. 40 per cent of the total expenditure on energy simply disappears." The return on investment is expected within only six years. The European Union funded up to half a million euros for the project. Similarly in Vienna, Austria, groundwater is used for heating and air conditioning. "We are also connected to the district heating network of Vienna," explains Peter Woelfl, Project Manager, "in addition, we use a remote cooling network, which comes from waste combustion."

Fossil energy and water management are the main challenges we will have to face over the next few years. We might as well plan to reduce energy consumption straight away. The difference will show in the medium term.

SD CHECK-UP !

- ☐ Have you thought about doing an energy audit?
- ☐ Do you have clear indicators to assess your energy consumption?
- ☐ Do you communicate these indicators to staff and patients?
- ☐ Do you have a green roof?
- ☐ Do you use the geographical properties of the site on which you are located?
- ☐ Do you have a system for reprocessing waste water?
- ☐ Do you use a wood-fired or biomass boiler?
- ☐ Do you use an alternative means of energy (photovoltaic panels, wind energy, geothermal energy, heat pumps)?
- ☐ Do you use cogeneration?
- ☐ Do you have centralized technical energy management?
- ☐ Do you have technical measures and awareness campaigns for your staff to help them save energy and water?

GERMANY

Hamburg

GERMANIC ENERGY

In the port city of Hamburg, the Barmbek Clinic deploys a whole arsenal of environmentally efficient energy solutions.

In the Hanseatic capital, the Barmbek Clinic is a 688 bed academic institution. It is part of the Asklepios private group of hospitals, named after the Greek god of medicine and employs nearly 1 300 people."The Clinic has existed since 1913" explains Mathias Eberenz, Press attaché for the Asklepios group, "But when it integrated its new buildings in 2005, it had the ambitious goal of being one of the most efficient hospitals in Europe." For Stefan Tefke, technical manager, the clinic was built on an idea: to standardize hospital space, to remove a little of its medical specificity and to make it a convivial place. When entering the building, visitors are led to a huge airy and brightly lit Atrium, which hides a secret. "When the outside temperature is too high, we can open the glass panels and let air circulate. Therefore, the outside air refreshes and oxygenates the indoor space. For me, it is as if people were airing their home. "Thanks to this very simple mechanism, the clinic has dropped plans to acquire an air conditioning system. Another advantage of this Atrium is that it operates as a huge light well at the centre of the building: there is no need to turn on the lights in the rooms that are sufficiently well-exposed. This is a construction solution, which has an immediate impact on energy consumption. To review its electricity bills, the Barmbek Clinic has also opted for LED lighting. "The decision-making process has been long, because, above all we wanted to ensure that the lighting would suit staff.

"For two months, two types of bulbs were tested simultaneously in the corridors. "We used economical traditional halogen and LED bulbs at the same time. Both lighting systems are similar in terms of colour and light intensity. They are almost identical. But LED energy efficiency is more significant than hallogen lighting. Led lighting lasts 50 000 hours, or seven to eight times longer." explains Stefan Tefke. Three criteria were taken into consideration: lighting quality and the price and lifetime of bulbs. Today, changing the lighting can be put into figures: "Our clinics are lit 24h a day... By simply replacing bulbs we can avoid emitting 150 tons of CO_2 into the atmosphere every year. In Barmbek, this means saving 25 000 euros on the energy bill! "And thanks to all the measures taken to make the hospital more sustainable, the Barmbeck Clinic has saved no less than 100 000 euros per year.

LED bulbs last 7 or 8 times longer than ordinary light bulbs.


49

PRESERVING THE ATMOSPHERE

In the course of the last century, the average temperature has increased by 1 degree centigrade. If nothing is done, it will to continue to increase by 1.4 to 5.8 degrees centigrade by 2100. This phenomenon will of course have a large impact on the climate, ecosystems of the planet and on human health. The Durban Conference on climate change in December 2011 highlighted the deep divides between the international community regarding greenhouse gas emission. Promises made by States to reduce emissions guarantee only 60% of the effort needed to maintain global warming below the threshold of 2 degrees by 2100. The Durban Accord, signed 36 hours later than expected, is not legally binding and it relies on a Green Fund for which finances had not been clarified at the time. At the World Health Summit held in Berlin in 2011, Dr. Maria Neira, Director of the World Health Organization for public health and environment, also established a direct link between health and climate change. According to her, health is the primary motivation to commit to an environmental dynamic. *"Health and the economic benefits of a healthier population is the key to motivate policy makers to face up to environmental problems and climate change."*

CARBON: TIME TO TAKE STOCK

The first step to tackle CO_2 emissions is to know as much as possible about them. For several years, hospitals have had the opportunity to carry out analytical audits to adjust and lower carbon dioxide emissions. In September 2010, in the French Pyrenees, Dr. Zaluski, ophthalmologist at the Saint-Roch Clinic at Cabestany, calculated the carbon cost of a cataract operation, it being one of his daily medical acts, with the support of the C2DS. "The eye is a two centimeters long organ, in which measures two centimeters, in which the crystalline lens occupies an even smaller place, and yet, when a cataract operation is performed, several huge bags of waste leave the operating theatre. "He has scrupulously evaluated the environmental cost of a cataract operation, multiplied it by all the operations carried out: 3 093 tons of CO_2, or the equivalent of travelling in a plane round the earth 400 times, or the equivalent to the energy consumption of 1 500 household for one medical act.

LET'S GO THE UHG!

In Switzerland, the University Hospitals of Geneva (UHG) wanted to accelerate Sustainable development. There is nothing better than a carbon audit! "The UHG consumes as much energy as a European city of

16 000 inhabitants and produces as much pollution as a city of 10 000 inhabitants with approximately ten tons of CO_2 per capita," explains Dominique Peyraud, Chairman of the environmental management group at the University Hospitals of Geneva. To tackle this problem, a working group consisting of doctors, carers, administrative and logistics staff was created in September 2008. First step: to obtain a quantified assessment of the UHG's consumption or an eco-balance. Also known as life-cycle analysis, an eco-balance takes into account the entire environmental impact of a product during all stages of its life-cycle, from the extraction of raw materials, through manufacturing, transportation, distribution, use and disposal. To quantify the results, two indicators were selected: the emission of greenhouse gases (GHG), measured in tons of CO_2 emission, the combustion of fossil energy sources, as well as the consumption of non-renewable primary energy measured in gigajoules, calculating the amount of non-renewable energy (fossil fuels, uranium, iron, etc) extracted from the earth. The study highlighted three major consumers. First of all, the materials and the incoming products: they represent 40% of total carbon emission, the two main sources being the drugs and textile objects purchased. Then, the energy consumption of buildings and particularly the consumption of natural gas represent approximately 25 per cent of the impact of HUG. And finally, transport: it makes 25% of all greenhouse gas emissions. Movement of employees, visitors and patients... The infrastructure (buildings) and the treatment of waste are responsible for the remaining 10 per cent. It is only once this work has been carried out and that it will be possible to monitor carbon emissions and reduce them. To attain this, two levers are necessary: transport management and a modification in the functioning of the hospital.

TRANSPORT, A COMBINED EFFORT

How can we travel around, transport goods and minimize greenhouse gas emission? Many good ideas have already been tested, joining an urban network, carpooling, hybrid cars or bikes!

The cost of climate change In 2010, the British economist Nicholas Stern held the annual chair of Sustainable development at the Collège de France, the most prestigious higher education and research establishment. Stern became famous through his report on the economics of climate change published in 2006, where he worked out the cost of climate change. According to him, the loss of biodiversity may cost 7 per cent of global GDP per year. A sustainable policy on greenhouse gases reductions would bring this figure down to 1%.

The voluntary commitment campaign "Two For Ten®" scoped by the C2DS/ Primum. The objectives of the Kyoto protocol would be fulfilled by the application of a transitional measure of 2% per year to reduce greenhouse gases. The campaign "Two For Ten®" is pragmatic and starts with 10 responsible attitudes to adopt towards greenhouse gas emission.

CONNECT HOSPITALS TO THE CITY

The Regional University Hospital of Tours, France, has set up a hospital travel plan (EDP specific to healthcare institutions) to facilitate the flow of people, promote green modes of transport and thereby improve working conditions, while reducing greenhouse gas emission. Three years after starting its travel plan, the UHC of Bordeaux has published the results of an assessment survey carried out in 2010 amongst healthcare professionals. The number of motorists has fallen by 17 per cent, almost 1 600 less cars on sites, 650 new cyclists, and 2 700 public transport users. Consequently, the total reduction of travel-related greenhouse gas emission over a period of eighteen months amounts to 3 000 tons of CO_2.

The Poitiers University General Hospital viewed from the air.

KNOWING HOW TO PARK

To improve internal and external transport conditions, accessibility, safety, solve parking problems or simply move round hospital grounds, company travel plans have many fields of action. It can also mean how to better connect the hospital to the local city centre, through partnerships with local public administrations. Following the EPD, the University General Hospital of Rouen conducted a survey among its 10 000 employees. Following the results, an action/ initiative fact sheet was created. The University Hospital will also develop a post dedicated to eco-mobility and cross-site parking with strong access restrictions. In Burlington, near the Canadian border, David Leif and his team have built four car parks at the foot of the hill where the hospital has been built. A bus service transports employees to the hospital buildings.

HOSPITAL STOP

Being part of an urban transport network is also essential. In Germany, the Hospital in Freiburg has its own railway station. "The city has a good public transport network. We use it a lot to connect the hospital to the city"! The hospital employees also get discounts on their travel card", explains Armin Schuster. Similarly in Tours, the hospital funds half of its staff's travel card. As a result, 300 people benefit from this initiative which reduces carbon emission! The hospital has also helped improve public transport services to hospital sites.

GREEN MOBILITY OF STAFF AND PATIENTS!

More and more healthcare institutions act as a bridge to raise awareness about carpooling amongst their staff. Above all, information must circulate via flyers or websites. This is not always an easy task because staff 'schedules vary. A real carpooling service significantly reduces carbon emission. In Freiburg, the hospital intranet service is frequently used for it's carpooling section. "We have made driving to work more expensive than using public transport, and we have let people know!" In 2009, the Hospital of Freiburg won the prize for mobility management. At the Zumàrraga Hospital, in the Basque Country, two surveys were conducted, internal and external, to set up an Internet platform to organize carpooling. "We are located right in the centre of the Basque Country, in a fairly rural area, and the vast majority of staff comes from the large cities of Bilbao, San Sebastian and Vitoria…, "explains Francisco José Eletaruiz, environmental technician. "Promoting carpooling makes sense, even if shift work and other timetable constraints don't simplify matters!"

SHARING AMBULANCES…

For the last couple of years, in Aix-en-Provence, France, the Parc Rambot Polyclinic in partnership with the National Federation of Health Carriers has gone even further: it has set up a real carsharing program for its patients. Thierry Schifano, the CEO at A13 says "patients often share rooms, healthcare, swimming pools… only their journeys are individualized." During the morning rush hour, at about eight o'clock it takes nearly an hour and a half to travel from the centre of Paris to the suburbs. At 9.30am, after the rush hour, it only takes half an hour. The transport company has therefore taken care of schedules and adapted them… For Thierry Schifano, we need to drive less but better! In Aix-en-Provence, the Parc Rambot Polyclinic has reached a 40% carsharing rate with its radiotherapy clinic by coordinating appointments, schedules, information about the local road traffic and by replacing cars. A post has been created to manage patient flow logistics. Patients who have tried carsharing have found it quite nice. It reduces care-related stress and is user-friendly. Ambulances must not carry more than three people at a time; ensure the health status of patients as well as their agreement to share. "These are common sense measures: for example, if patients need transport, the Health Insurance only pays 36 Euros for three people instead of 60 Euros if they are transported individually." If this system is applied all over France, the CPAM or French Health Insurance Fund would save between 30 to 40 million Euros (estimates the French national association of ambulance services). Another way of lowering carbon emission is by using greener cars and greener fuel.

The carbon tax

In France, implementing a Carbon Tax to conform European legislation was highly complicated. The government is going to create an exceptional tax therefore on the duty-free turnover of the entreprises submitted to the quotas of CO_2, with a rate understood between 0,08% and 0,12%. The tax will be aquitted by the entreprises who received quotas of emissions of gas to greenhouse effect for at least 60 000 tons of CO_2 on the period 2008-2012, what exonerates the small polluters of it. She/it should be acquitted in 2012 by about 400 enterprises. For example, for EDF the contribution will be the order of 35 millions of euros for 2012 and this measure should return about 200 millions euros in the state.

DECLARE WAR ON EMISSIONS; THE HYBRID CAR!

Hyrid engines reduce $C0_2$ emissions by 10-30 per cent and cut the costs of petrol bills. Will we see more and more hybrid vehicles in hospital car fleets? Perhaps, but not yet. Such initiatives are still rare. Patience! The Nottingham University Hospital in England has a good record. 90% of cars used by doctors and nurses run on ethanol or biogas, and are on a rental contract.

YELLOW AMBULANCES

Biogas is a renewable form of natural gas, fossil energy. It is produced naturally, in marshes or landfills containing organic waste. It can also be produced in digesters. In Sweden, the environmental department at the City Council which is in charge of health has thought of designing an ambulance that could work with biogas in order to reduce carbon emission. This idea brings together two major authorities from the City Council: health and transport. "We started the project in 2006. A year later, we launched a detailed call for tender to all manufacturers. In 2008, we chose a producer and began the work," explains Åke Wennmalm, physicist and cardiovascular surgery researcher, who was also president of the Healthcare Without Harm Association, and president of the environment section of the City Council for many years. The following year, a new ambulance model saw the light, which met specifications for loading, fuel and provision. The traditional yellow Swedish ambulance will be very green: its tyres do not contain toxic oils, the famous polycyclic aromatic hydrocarbons which reinforce the adhesion of snow tyres, will be nonetheless adapted to snow. All the chemical components used for the manufacture of the ambulance will be specified, the seats do not contain PVC. Glues used for cables will be free of volatile organic compounds (VOCs). The reduction of greenhouse gases is therefore consistent. Electrical vehicles are not yet widely used on the road network, although they are extremely practical for travelling distances within spaced-out infrastructures and therefore perfect for hospitals!

In 2010, in Valencia, Spain, a homecare unit was endowed with a fleet of 13 new generation cars or smart micro-hybrids. "Amongst other things, this model has a start/stop function which cuts petrol costs by 8 per cent when you stop at a red light, for instance" says José Vicente Bon, responsible for the green service at the General Hospital of Valencia. "This is a very ecological vehicle, with a CO_2 emission of 86 g/km (against 135 g generated by the former green cars in the hospital) and a consumption of 3.5 L/100 km."

In 2009, the activity of the homecare unit at the Hospital of Valencia represented 18 075 visits and 108 180 miles travelled! "The idea is to carry on reducing the environmental impact and the use of Smart contributes to it. "We hope to achieve savings of 442 kg/$C0_2$ per vehicle. We have also paid attention to the Smart manufacturing process. As it happens, it also respects the environment. For example, the plastic bodywork does not contain any solvents and is fully recyclable." To reach zero carbon emission, riding a bicycle is still the most efficient way to travel.

CYCLING TO HOSPITAL: A DYNAMO FOR IMPROVEMENT!

In 2006, to improve travel to and from the hospital, thereby reducing greenhouse gases, the hospital in Granada joined a program called 'Pedal to Hospital'

Carbon-free hospital "chicks"

The General Hospital in Vierzon has equipped itself to fight GHG emissions. Its management has invested in the hybrid engine petrol/electricity Prius cars, which have brought success to Toyota in recent years, and have helped to reduce carbon emission. The GH of Vierzon has also invested in an electric truck, Fiat Panda cars which run on town gas, and are refilled at its CNG stations. These flashy yellow cars give a positive image to the hospital!. They have been nicknamed the "hospital chicks".

The Esquirol General Hospital: anything to make the carbon drop... electric car, swapping car keys for bicycle locks! Limoges, France

and in partnership with the municipal organization in charge of transport and the town hall. The scheme connects the hospital to surrounding bus stations via cycle lanes. Hence, it will be possible to take bicycles on a bus and cycle to hospital. Cycling is one of the greenest means of transport! Sometimes, nothing is easy: the OHSU in Portland, Oregon, is located in altitude. To reach the hospital, hairpin bends succeed each other with almost 500 meters difference in height. “We are trying to promote cycling”, jokes Roger Cole, the Environment Manager, laconically. “Here, it is very sporty”, he drenches his shirt cycling when he has time to do so. “But not every day!”, he laughs. To promote cycling in Freiburg, the hospital is also connected to cycle lanes. Cycling days are organized, where it is possible to get bicycle repairs for next to nothing. The Regional General University Hospital of Strasburg has a large fleet of bicycles provided by the local public transport services. The health establishment has created a secure bike park, cycle lanes, and even experiments with electric bicycles! In Tours, the Regional General University Hospital encourages its employees to use the local bicycle rental network, named Vélocité. Bicycle parks have also been created and the hospital bought some bikes for the gardeners on one of its sites. Similarly, at the University Hospital in Nottingham, there is a system which allows hospital staff to purchase bikes and cycling accessories such as helmets and lights at a discount. Royal, the Leon Berard Oncology Centre, Lyons has given a 218 euros voucher to staff to purchase bicycles to go to work and give up using their car on an everyday basis. More than sixty people have signed up for this program.

CYCLISTS GO AND HAVE A SHOWER!

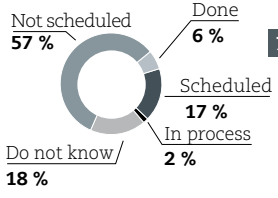
The University Medical Centre in the United States can be reached by bus, train, and of course by bike. However, arriving at work drenched in sweat is not an attractive proposition. The hospital has taken note and provides showers for cyclists before they start their working day. Cycling is also good for health!

A WIN-WIN SITUATION

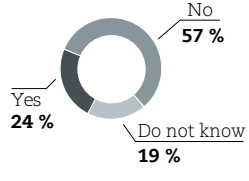
In Sweden, Uppsala University General Hospital has set up a program to encourage staff to go to work on a bike. “We had 400 participants,” says Lars-Eric Roxin, Environmental Manager in the academic Hospital of Uppsala, “After a year of pedaling, we tested the participants’ health. It was no great surprise to find that they were in much better physical condition than at the beginning of the year!”

WHAT DO YOU SAY ABOUT PRESERVING THE ATMOSPHERE?

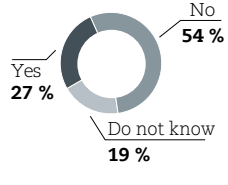
Has your establishment carried out a carbon footprint?



Is carpooling been encouraged?



Are bicyles at disposal on your site?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

RUNNING A HOSPITAL AT LOWER CARBON COST...

The fight against CO_2 emission is also going on in hospital grounds by promoting green spaces, thinking about ways of heating and supply chains, digitalizing paper files and communications... There are many ways to reduce the carbon footprint.

PROMOTING GREEN SPACES

Without necessarily being a skilled botanist, everyone knows that plants outweigh CO_2 emissions. Their use within an institution can work wonders. But plants must be carefully chosen as some plants need a lot of water! It is also necessary to take into account their possible allergenic properties. At the General Hospital of Valencia in Spain, all the trees around the hospital have been identified, listed and photographed. "There are more than 200 trees and no less than 35 different species!" says José Vicente Bon, Green Office Manager enthusiastically. "We gave each student from the nearby secondary school a young tree to plant and to look after." This is another way to fight the emission of greenhouse gases. The other point to consider is the supply chain.

THE LOCAL SUPPLY CHAIN!

Whether it is for the canteen or renovation work. "We are also trying to juggle with our purchasing policy to reduce carbon: our supply chain must be as short as possible," explains Skai Dancy, Logistics Manager at the OHSU in Portland. In Burlington, special attention has been paid to the origin of materials. "Throughout the building site, we kept in mind that our building has a 50 year life expectancy." The limestone used for the building comes from Ontarian quarries, very close to Burlington. "We have significantly reduced the cost of transportation for this material." And at the New Milford Hospital, in Connecticut, the canteen is supplied by local farmers.

BEWARE OF ENERGY SPENDING

The equation is simple: energy expenditure = CO_2 emissions. The energy policy of the OHSU, the platinum building in Portland, saves nearly 2 300 tons of CO_2 per year, and means the equivalent of 443 fewer cars on the US West Coast highways. It is also important to spend time thinking about heating. Fuel oil? No, it emits too much greenhouse gas and the indexed price of oil keeps rising. Propane? It is also a great transmitter of CO_2 and it is expensive. Natural gas or methane? They pollute less than fuel oil but give off a lot of greenhouse gases. Electric heating? One of the most polluting energies on the market! Wood heating? CO_2 emissions are minimal, but fine particles are ejected which can be very dangerous to health.
That is why François Mourgues, in Alès has invested in a particle filter. The University General Hospital in Amiens has chosen a wood boiler-room with a centrifugal filter.This burns all the wood particles. The heat pump is an interesting alternative that generates four times less CO_2 than boiler fuel. Following its carbon audit, the Korian Group found that 25 per cent of its overall emissions resulted from energy consumption (electricity, heating, hot water). Therefore, the group will invest 850 000 euros in more efficient equipment and thermal insulation work (roofs, windows, solar water heaters and wood heating). In Sweden, the importance of energy consumption in GHG emissions is no secret: the new hospital in Karolinska hopes to achieve a near zero emission rate. The use of heat pumps, organic oil generators, and electric vehicles should contribute to this. In addition, the hospital will be connected to the city by public transport and will have a battery charging station for electric vehicles. In Sweden, maternity wards are another source of carbon expenditure.

LAUGHING WHILE GIVING BIRTH: THE OZONE LAYER

In Sweden, the epidural during childbirth has bad press....the most common painkiller is laughing gas! Nitrous oxide (N_2O) is a cheap and effective euphoric.

Cycling to the Murcia hospital, Spain.

But it is also extremely pollutant. “Nitrous oxide has a global warming potential almost 300 times higher than CO_2, “explains Åke Wennmalm. “Birth is not exactly a time for laughing uproariously, but laughing gas is really effective” confirms Charlotta Brask. “It is inhaled and exhaled. The gas doesn’t stay in the mother’s body or that of her child. An epidural is also possible; the choice is left to the mother.” In 2001, the City Council buildings used nearly 40 tons of N_2O, mostly in maternity units.This is the equivalent, of 12 000 tons of CO_2 emission. The good news? Unlike carbon, which is very difficult to eliminate, nitrous oxide emissions can be significantly reduced. “We looked for means to collect and reprocess laughing gas anywhere in the world. The solution came from Japan. We ordered a machine from the Japanese company, Showa Denko. This machine reprocesses nitrous oxide as used in Sweden and connects to our existing system of gas absorption.” The machine named Anesclean, is now produced by a Swedish firm. It operates on two columns of gas absorption: one isolates the N_2O and the other splits it between tetroxide and dioxygene in order to reprocess it. It is destroyed by electrolysis, which produces energy... which is then reused is then reused to heat the building. Thus 90% of the nitrous oxide is eliminated. The Anesclean machines have a big effect on all the greenhouse gas emissions of Swedish hospitals. Naturally, the New Karolinska University Hospital will use them. “To me, everything has worked perfectly,” says Åke Wennmalm “First, we identified a need, impulsed R&D, and then we took action.” It is a particularly effective it in terms of Sustainable development!” Taking time to do a carbon audit, make a Corporate Commuter Plan (CCP), considering carpooling, hybrid cars, bikes, thinking about purchases and energy consumption, are the best ways to trigger process improvement! If there is one country which has declared war on carbon emission, it is England.

SD CHECK-UP !

- ☐ Have you done a carbon audit?
- ☐ Do you have an energy conscious awareness policy?
- ☐ Does the local transport network have “Hospital” or “clinic” stops?
- ☐ Have you promoted cycling?
- ☐ Do you have a carpooling policy for staff?
- ☐ Do you use electric vehicles and charging terminals?
- ☐ Do you use hybrid vehicles?
- ☐ Have you considered replacing cars by low emission vehicles?
- ☐ Have you developed a Corporate Commuter Plan?
- ☐ Do you have any green spaces?
- ☐ Have you thought about virtualizing journeys?
- ☐ Have you given thought to the purchasing policy of your supply chain?

London

ENGLISH CARBON SENSITIVITY

In Britain, the reduction of greenhouse gas is a popular theme.

Anyone who has already tried to drive in London would know about the congestion charge for driving in the city centre. This charge aims to turn the British capital into a low greenhouse gas emission.
The 10:10 incentive campaign which began in England targeted private companies and public institutions. Its aim was to reduce carbon emission by 10 per cent in 2010. This seems obvious, doesn't it? The slogan was: why worry about the climate? The answer: why should we worry about getting out of the way of a speeding car driving straight at us? The 10:10 campaign resonated in Britain and emissions have dropped by 14%. The campaign has continued at this momentum in 2012.
In the Health sector, the 10:10 campaign has raised many good ideas. The National Health Service (NHS) is the convergence of the four public health systems in the United Kingdom: Scotland, Wales, Northern Ireland and England. In April 2008, the NHS opened its Sustainable development unit. "We are a small department manned by seven people and we want the NHS to become the main public body involved in Sustainable development and climate change," explains Sonia Roschnik, Director of the National Health Service Operational Sustainable development Unit. The NHS is one of the largest employers in England and a major buyer of goods and services. Accordingly, it has a huge carbon footprint, 18 million tons of CO_2 per year.
"Fighting greenhouse gas emissions is one of our main vocations: CO_2 threatens health and we are here to serve our patients. The gas emission from our hospitals comes from energy expenditure (22%), travel (18%) and purchases (60%)." The first step in the plan of action was to consult all members of the NHS. "We couldn't believe it, we obtained a 66% response rate, and 95% are in favour of a campaign to reduce greenhouse gases." The NHS then set itself an ambitious target: reduce carbon emissions by 26 per cent by 2020, 80 per cent by 2050 and, by 10 per cent in 2015 on the shorter term compared with 2007.
"Not only must our current emission rates drop, but we must also set a virtuous dynamic to reach our future goals." Under the NHS banner, an array of initiatives against carbon has appeared in England. In London thinking about carbon emissions has given hospital managers the opportunity to consider the transport of goods and their flow. "Purchases are responsible for about 76% of the health sector's carbon footprint in England," says Trevor Payne, Director of Facilities at UCLH, or hospitals of London.
"The 6 UCLH hospitals of London often use the same suppliers, but have an individual purchasing policy, with a lot of useless transportation of goods. Previously, nearly 100 different delivery points were used! We therefore set up a warehouse for all London hospitals, whereby supplies are centralized and redistributed by electric vehicles." Similarly, the University Hospitals of Nottingham thought about passenger flow. "When the Nottingham Public Hospitals and the Queens Medical Centre merged in 2006, it created transport flows between the two structures throughout the city" explains Alberto Rodrigues Jaume, Environmental and Sustainable development Manager, "the two sites are a dozen kilometers apart. Now, there is a free bus service for patients, staff and visitors: 14 buses, all accessible by wheelchair, run every 10 minutes. Approximately 1.2 million passengers use this service every year. If this service did not exist, the journey between the two sites would generate 300 000 car trips. 14 buses instead of 300 000 car trips is a significant reduction to the carbon footprint, isn't it?"
According to a NHS study entitled "Fit for the Future" which explores «What if» questions for the English health system by 2030. A NHS with a lighter carbon footprint is also a more efficient NHS. "Facing the efficiency challenge implies in-depth organizational questioning. That's how we invest in the future" concludes Sonia Roschnik. The ball is rolling!


Wilkinson St P&R
QMC
Queen's Drive P&R
911
every 10 mins
medilink
free service
proud


Save the Date
Follow us to Oxford September 17/18/19th
for CleanMed 2013
www.cleanmedeurope.org
Oxford 2013
CleanMed
Creating Healing Environments
Europe
2013

SUSTAINABLE BUYING

What is the meaning of the Hippocratic oath, if hospitals use substances which harm health on a daily basis and that the activity of care creates the diseases of the future? Out of 100 000 chemical substances used, only 30 000 have been tested exhaustively.[1]

Whether getting rid of toxic substances or reducing waste or energy consumption or even decreasing greenhouse gas production, purchases are a strategic kingpin of Sustainable development. Worldwide, hospital purchases represent 450 billion Euros per year. It is an sufficiently important economic lever to stimulate the process for dynamic change. How can we convince hospitals to buy sustainably? How can we invest today to save for tomorrow? To what extent must responsible purchasing be one of the priorities for a health establishment?

Development units to invent products which are more effective, greener, healthier, better packaged, produced in decent working conditions and better dispatched. Today, environmental products and more responsible purchasing are reputed to be more costly. Yet, if overall cost is taken into account, it is rather the opposite that is observed. According to WHO, the initial investment in healthy products is more significant today whereas non-infectious diseases, related to hereditary or to environmental factors, are in full expansion. These are responsible for 60 per cent of global mortality. Supervising toxicological and environmental risks and considering substances used is a priority. Every institution bears the responsibility of pressurizing industrialists to create Research and significant, future savings are then also more consequent. To give an idea of products used on a daily basis within health institutions, here is an overview of hospital toxins. We will then suggest a few good ideas to organize your responsible purchasing policy, such as improving your knowledge on toxic substances, working with environmental

Out of 100 000 chemical substances, only 30 000 have been tested exhaustively.

1. 30000 Substances are evaluated in the framework of the European REACH regulation

services, using alternative products and always taking into account the overall cost of products. Finally, do not hesitate to pressurize industry to develop greener products.

TOXIC SHOCK

The use of toxic products in the hospital is a real time-bomb. In France, the legal framework only dates back to 1967. "We found about 5 000 hazardous chemical agents in the hospital, of which 96 per cent are not mentioned in the 67 directives," said Philippe Parvy, former Chemical Hazard Manager at the AP-HP. "This means that our knowledge about the toxicity of 96% of the products that we use is approximate! On this basis, assessment of risks to the environment and people is difficult." Gilbert Barbier, Senator and author of the endocrine disrupters report, 'Time for precaution', published in July 2011 also stigmatizes the lack of epidemiological data: "The studies are difficult to obtain and can naturally be challenged by industry. Are the positive experiences found in the natural environment or in animals transferable to man? Observation projects (cohort Elf) on tens of thousands of children will provide us with better understanding of the impact of endocrine disrupters on the body in about 20 years time, maybe less."

SENSITIVE TARGETS

In France, the National Health Environment Plan 2009-2013 has taken the question of toxic substances very seriously. Chapter 2 of the PNSE II grants specificity to the health and environment of vulnerable people such as pregnant women and children. It advocates an assessment of "the exposure of children to certain chemical substances in order to suggest measures to reduce these exposures." The C2DS reminds us that protection must begin at conception and take into account the exposure of the fetus via the mother. "With regards to endocrine disrupters, there is not only a problem with products but also with targets, some of which are much more fragile" recalls Gilbert Barbier. "We must warn against or even prevent pregnant women or children coming into contact with these products. I was a paediatric surgeon for a long time and I was aware of these topics following the Distilbene and Chlordecone scandals. I think it is a warning signal. It is necessary to apply the precautionary principle. The bisphenol A used in car bumpers is certainly not very dangerous for the human race, but the one found in premature babies' infusion bags is certainly much more dangerous." In Montpellier, the team of Prof. Charles Sultan, an endocrinologist, has carried out a study on the incidence of genital malformations and particularly of hypospadias (anomaly of the penis) among the children and grandchildren of mothers treated with Distilbene[2] during their pregnancy. In this group, the prevalence of such an anomaly is found to be 30 to 40 times greater than the expected rate. The trans-generational effect of Distilbene is proven. This epidemiological data also raises awareness of the potential risk of transmission of endocrine disrupters (PE) and pesticides in particular to several generations
The C2DS regularly asks the Ministry of Health and the public agencies involved to obtain data, reports, and trends and to communicate them to health institutions. The subjects of concern are numerous and so are communications. Hospitals can become healthier places with a combined effort between public authorities and industrials.

BIOCIDES WARNING

Cleaners and disinfectants must also be watched very closely, including their labels. "I started becoming interested in toxic products when I saw the hands of staff working in my clinic," explains Olivier Toma, founder and President of C2DS. Health facilities are subject to the imperatives of drastic hygiene. The staff is contact with microbial organisms, bacteria, viruses and should clean and disinfect daily. But the cure is sometimes worse

2. The Diethylstilbestrol of bisphenol A is a synthesis to the properties ostrogeneric prescribed for pregnant women to prevent miscarriages, before being removed from the market in 1983, after that its repro-toxicity and its capacity to produce genital malformations have been highlighted for the children

**Lagny General Hospital, in France.
In 90 minutes, copper can get rid of an entire population of staphylococcus aureus bacteria resistant to the meticiline.**

than the disease. Biocides, rejected into the effluent of the hospital every day have a detrimental effect on the atmosphere and air quality, when they do not reinforce the resistance of future bacteria. To clean and sanitize the hospital, it is also possible to use water vapour. Cleaning is as successful as with products derived from traditional chemistry. The Medical Clinic of Le Mas Ratchet in Castelnau-le-Lez has also opted for steam cleaning. In the Lagny-sur-Marne General Hospital, once a patient has been in hospital for 15 days, the cleaning passes to level 2: owing to the presence of multidrug-resistant bacteria, all the equipment which has been used is then thrown away: a loss of 150 Euros per room for each cleaning. "Previously, the company sprayed a product based on alcohol and formalin. We had to wear masks!" says Marie Laure Balança, Hygiene Officer. The General Hospital has chosen a machine that sprays a solution of oxygen peroxide, either oxygenated water or a little bit of silver nitrate.

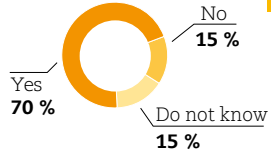
"After half an hour everything is disinfected. A patient's room is ready in 30 minutes and it does not smell and it isn't toxic". In the long corridors of the Karolinska Hospital, in Sweden, you might come across small vehicles, which look like those used to mow lawns, going back and forth, leaving the floor clean behind them. Thanks to them, it is possible to circulate without transition between the university and the hospital. There is no olfactory difference between the two institutions.
"The inseparable smell associated with French hospitals is due to the chlorides that are used to disinfect them. We have banned them! We clean the floors with hot water and only disinfect the rooms of patients with infectious diseases, on a case-by-case basis, with an emphasis on products without odoriferous substances," explains Anne-Marie Vass, Environment Manager.

CLEANING AND NOSOCOMIAL INFECTIONS

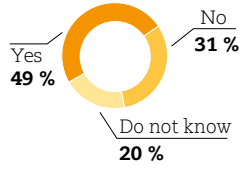
There is no Federal concerted program to lower the rate of nosocomial infections in the United States. To keep health establishments mobilized, the formula is simple: it is their responsibility to bear the direct costs of contamination. "It is a way to urge hospitals to be responsible. We have had a few cases of nosocomial infections, with Clostridium Difficile. We have decided that it will never happen again." Crystal Vestrand and Penny Thompson, both Environmental Managers, were determined to get rid of the bacteria. "We had to reconsider the basis our cleaning system" says Penny. and equip the hospital with microfiber mopping cloths. "These absorb the entire contents of a bucket of water at once and reduce the use of disinfectants, and water consumption! The bucket is only filled only once." The microfiber mopping cloths have also helped to decrease use of disinfectants by 33%. This represents savings of $21 000 on the purchase of a single product. Thanks to all these initiatives, the Fletcher Allen Hospital has received a special award from the Practice Green Health Association. Only two American establishments have been awarded this distinction.

WHAT DO YOU SAY ABOUT RESPONSIBLE PURCHASING?

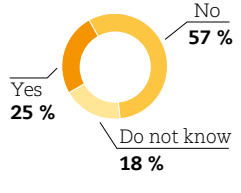
Does a purchasing policy exist in the establishment?



If yes, does this policy allow a approach in overall cost?



Are buyers informed of the existence and of the evolution of labels?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

GOLD MEDAL FOR COPPER!

The antibacterial properties of copper have been well known since ancient times. Why not install copper switches in hospitals? Rooms are in regular physical contact over the course of one day, favouring the transmission of germs. A protocol has been set up at the Wandsbeck Clinic in Germany. According to Prof. Jörg Braun, "The quantity of germs on copper switches is half the amount found on normal switches. We have been able to show that the transmission of viruses, such as gastroenteritis could be significantly reduced through copper switches."

THE INFLUENCE OF PUBLIC FIGURES

At the Hackensack hospital, in New Jersey, the Deidre Imus Centre is dedicated to research on healthy cleaning products. Deidre Imus is also the wife of the very popular radio broadcaster, Don Imus. Ex-actress, she decided to take advantage of her husband's popularity to spread real messages. In 2004, the Body Burden study published the alarming results of analyses performed on the umbilical cords of newborn babies. Out of the 413 toxic pollutants listed in the United States, 287 were present in the umbilical cord of the children tested. Perfluorinated Acids (present in carpets and teflon saucepans), polybrominated diphenyl ethers (contained in flame retardants, foams in furnishings, computers and televisions), metals (lead, mercury, arsenic), and chlorine dioxide, all these toxins threaten the infant's environment before its birth. This was a real shock for Deidre Imus, who is a young mother herself. Horrified by these results, she decided to counter-attack. "We saw her arrive at the hospital, with a healthy paediatric oncology project, only using green maintenance products" explains Bonnie Eskenazi, currently in charge of the Deidre Imus Centre. The young woman was credible and the hospital went ahead with her project. She published two books, one of which is a real handbook for "detoxifying" children's lives. It reached "The New York Times's best-sellers" list. Deidre Imus has created her own research centre for healthy disinfectants, within the hospital. The paediatric oncology centre bears her name, and the Greening the Cleaning program has started to spread to other hospitals in the United States. Greening the Cleaning is a commercial success and its cleaning products are selling very well. Perhaps, this is proof that the message is beginning to spread?

Deidre Imus

BEWARE OF VOCS!

According to a survey carried out by the C2DS, hospital staff, regardless of position or their affiliated unit do not suspect the impact of exposure to quaternary ammonium compounds, ammonia, alcohol, chlorinated agents and formaldehyde. Formaldehyde, which is still called methanol or formic aldehyde, belongs to the class 1 carcinogen group as defined by the International Centre for Research on Cancer (IARC). The carcinoma of the nasopharynx which it causes is recognized as an occupational disease. The VOCs or Volatile Organic Compounds are organic gases that evaporate at room temperature and are found in the ambient air. The VOCs are found in construction materials and in

The Deidre Imus Centre, New jersey, USA.

furniture, manufacturing: insulating foams, paints, carpets, synthetic floorings, paints, varnishes, glues, maintenance products (detergents, cleaners, cleaning fluids, paint thinners, rubbing alcohol, turpentine... wood and chipboard in aerosol sprays). Combustion appliances and cooking food also produce VOCs.
At the end of 2010, following the first campaign to measure the rate of volatile organic compounds (VOCs) in a dozen French hospitals, a plan of action was launched in collaboration with the C2DS concerning purchases, maintenance products and building design. Above all "we need to make an invisible risk visible" explains Olivier Toma, President of the C2DS. A large number of hospital rooms only have small or broken air treatment systems. Similarly, the unsealed or unsuitably sealed products available in hospital units often need decanting, leading to the evaporation of toxic vapours. The purchasing policy has a fundamental role to play. According to Véronique Molieres, cofounder of C2DS, "a thoughtful purchasing policy which takes into account the level of toxicity in the air avoids mistakes that will have an impact on the economy, environment and health." Today in France, hospitals are meants to measure VOC levels and will have to do so from 2023 (decree 2011-1728). The VOCs are not the only hazardous substances used in hospital buildings.
Products used for chemotherapy treatment are another example. A study published in August 2011 in the British Medical Journal and conducted by the Comprehensive Cancer Centre at Michigan University concludes that between April and June 2010, 17% of nurses at the outpatient clinic suffered from eye and skin exposure to toxic drugs during chemotherapy. The authors advised strengthening the safety of carers handling such highly toxic drugs (wearing gowns, gloves and other protective clothing). This situation is reinforced by the fact that those involved are rarely consulted on the purchase of these products. Anaesthetic gases are also highly polluting. They attack the atmosphere via nitrous oxide. Although this is better than halothane which was used until 1985, its liver and cardiac toxicity has led to its abandonment in human anaesthesia due to the probable risks of spontaneous abortion amongst female team members. The anesthesiologists and nursing staff are exposed to gas when patient's inhale and exhale.

IS THE NANOPARTICULATE FORM OF TITANIUM DIOXIDE A TIME BOMB?

Titanium dioxide, used as an opacifying pigment in many common products, such as sun creams, toothpastes or paints has inflammatory effects similar to those caused by asbestos, according to the findings of a Swiss /French research team. It is extensively used in hospitals for its antibacterial properties, particularly in the fight against nosocomial diseases. In the presence of UV radius, nanoparticular form of the titanium dioxide present, for example, in wall paints destroys bacteria and other pollutants in the atmosphere while not releasing water molecules and carbon dioxide. The C2DS alerted the Department of Health as early as August 2010 in relation to the massive use of products containing nanoparticulate form of titanium dioxide in hospitals and suggested the "implementation of a licensing procedure for putting hospital building materials onto the market." A later study highlights that particles of titanium dioxide (nano-TiO2) adversely affect a physiological barrier essential for the protection of our brain: the membrane blood-brain barrier. The ethylene oxide sterilization of infant's teats is another scandal which is currently emerging.

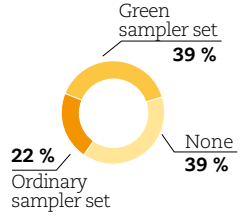
DANGER IN BABIES' MOUTHS

Ethylene oxide is a colourless gas with a sweetish smell. Although it is listed as a carcinogen (CMR level 2) to man, it is heavily used for the sterilization of medical devices, and especially for... bottle teats in maternity units. In French hospitals, millions of bottle teats, pacifiers and nipple shields available

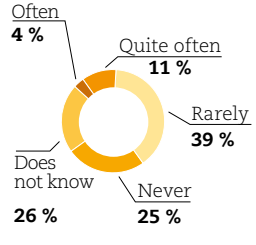
There is no obligation to measure the VOCs before 2023.

WHAT DO YOU SAY ABOUT RESPONSIBLE PURCHASING?

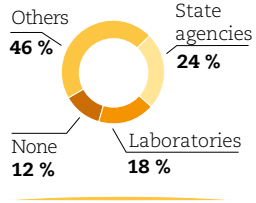
What type of baby gift sampler set do you distribute to new mothers in your maternity unit?



Are you approached by parturients about the health and environmental aspects of the cosmetics used in your unit?



If yes, what references do you use to reply to these questions?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

to mothers and their new-born were sterilized with this dangerous gas, whose toxicity was proven at the end of the 70's. This issue must be made transparent, not only regarding the teat's components, but also concerning their sterilization! New-born babies suck on pacifiers and nipple shields for several hours a day and it is the State's duty to shed light on ethylene oxide. However, the question surrounding pacifiers and nipple shields is only the tip of the iceberg.
This carcerogenicite[3] already proved in animals left in effect glimpse several signs of transposable to the man.
The C2DS has just warned the medias about the use of ethylene oxide for the sterilization of medical devices (catheters, probes, enteral feeding devices...), implants and prostheses (artificial breasts, orthopaedic implants, intraocular implants). Ethylene oxide is acknowledged to be toxic for pacifiers, however it is not yet considered as such for enteral feeding devices.
Knowing that ethylene oxide is toxic by inhalation, the use of cardboard packaging for medical devices sterilized with ethylene oxide and unpacking them in confined spaces must be brought to an end?

KEEPING BISPHENOL A OUT OF FEEDING BOTTLES!
The ban on manufacturing and marketing baby bottles containing BPA in the European Union since 1st June 2011 is the result of a struggle which started in 2007, when Canada prohibited the use of bottles containing this component. At that time, health authorities were passing the buck on a European scale, arguing different dosages between Canada and Europe. The lack of studies corroborates the hypothesis of possible toxicity. Today, experts have identified three categories of suspicious effects on human health, related to female fertility, cardiovascular disease and diabetes. Seven effects have been proven in animals, among which are early puberty, the increase in the occurrence of

3. In 2007, the International Centre for Research on Cancer (IARC) has reviewed the available scientific data on the titanium dioxide and has classified it as "possible carcinogen" (a carcinogen 2B).

ovarian cysts and lesions on the mammary gland, the alteration of sperm production… Therefore, the Acceptable Daily Intake (ADI), fixed at the European level of 0.05 milligram per kilogram of body weight per day for bisphenol A, does not constitute a sufficient protection threshold against the effects of the chemical compound. On the 12th of October 2011, a proposal for legislation was voted with governmental support prohibiting bisphenol A (BPA) in food containers from 2014, but by 2013 for food containers intended for children under the age of 3. This text, accepted unanimously by the committee, comes after a recent report by the French Agency for Food, Environment and Occupational Health and Safety which found it necessary to replace bisphenol A. It is used for the manufacture of many plastics, especially in materials which come into contact with food. The Environmental Health Network (RES), partner of the C2DS, has welcomed such a historic decision. Make sure you equip your maternity units properly!

PHTHALATES ARE OMNIPRESENT MOLECULES IN THE HOSPITAL ENVIRONMENT

According to numerous scientific journals, these chemical molecules are suspected to be harmful to health. Their effects have been measured in urine, the liver, and in the reproductive system. Phthalates are particularly unstable chemical elements and migrate very easily in their environment, i.e. in the atmosphere, blood and food supply. Phthalates are very inexpensive to produce, and are often used to soften plastic. Phthalates are also present in nutrition pockets and tubes, intravenous cannulas sets of PICC type, umbilical venous catheters, endotracheal tubes and enteral products, dialysis and oxygenation equipment and in many PVC coatings… That is why it is urgent to change purchasing habits! According to Shanna Saw, Director of the reproductive medicine centre in Rochester, and global phthalates specialist, “today, no child is born without a measurable level of phthalates” Among the phthalates, DEHP, a level 2 CMR, is particularly resistant. Its reproductive

toxicity has been demonstrated in rats. Since 2006, a European directive has banned the use of phthalates in toys for children under the age of 3. "The use of certain phthalates in toys and childcare articles made of plasticized material, or with parts made of plasticized materials, should be banned, given that the presence of certain phthalates cause or could cause risks to children's health."[4] In France, on the 3rd of May 2011, the National Assembly voted, against all expectations, a law proposed by its member Yves Lachaud, aimed at prohibiting the use of phthalates. However, we continue to use them in catheters, intubation equipment and blood bags. Blood bags are an extremely porous medical device. It is essential to consider alternatives.
"The toxicological implications have been proven," storms Magnus Hedenmark, Swedish toxicologist. For DEHP, the first results of experiments carried out on humans by the American Kaiser Permanente foundation have highlighted problems with reproduction. Genital malformations have been found in children who have had contact with DEHP. "You must be aware that there is a real risk that DEHP is absorbed by the patient. It is both an additive and a non-reactive substance, which means that it migrates out of a solution very easily. Of course, better is the enemy of good but let's not be too radical. In the case of DEHP, it is very simple: the substance is toxic and it migrates very easily. Nothing can be worse," continues the toxicologist. "The next essential question is the issue of alternative substances. Replacing DEHP, yes, but with what? How can we be sure we are on the right track? It is essential to work on ideas for substitutions. Parliamentarians still have a lot of work to do," concludes Olivier Toma.

THE SLOW LEGISLATIVE WEAR AND TEAR AROUND DEHP

At present, DEHP is just a candidate for REACH. This is the first step in the right direction: and at this stage, it means everyone has a right to know if a

4. Directive 2005/84/EC of the European Parliament

The Essonne Clinic in Evry has opted for a gentle maternity unit.

product contains DEHP. DEHP is also on the waiting list for products that are subject to authorization. "We have been waiting for this list to be validated for several months," notes Lisette van Vliet from HEAL, in Brussels. "The use of DEHP in medical devices is an exception, since it follows a directive which is specific to medical devices." This is due to the way European legislation works. It carefully avoids jurisdictional conflict and the lobbying of the Medical Devices Industry Association.

THE SWEDISH ANTI-TOXIC CRUSADE

Sweden has tackled the problem of toxic substances actively compared to the relative immobility in France. The global Convention on persistent organic pollutants was held in Stockholm in 2001. It was signed by many industrialists, and by more than 126 countries, one of which was the United States. The aim was to eradicate as many toxic substances as possible from production methods. Margot Wallström, environment commissioner on the Prodi Commission from 1999-2004 attracted attention to the issue of toxins. She remembers the work she did on chemical regulations: "In 2003, samples of my own blood were analyzed to see if chemical substances were present. The result was surprising, especially for me! No less than 28 toxic substances were detected in my blood. I didn't have the slightest idea how I could have come into contact with these products!" Such environmental awareness of toxic substances is an exception in the European Union. According to Per Rosander, Chemist and Former President of Healthcare without harm Europe, Chemist and Former President of Healthcare without harm Europe, it dates back to the 90's.
"At that time, the referendum on the question of nuclear power forged the environmental commitment of many Swedish people." It was followed in 1995 when Sweden joined the European Union. This reinforced the commitment. "At that time, we were aware that environmental issues were cross-sectional and that there wasn't any need to be exemplary on our territory if all adjacent countries violated environmental precepts. In short, we began to understand the importance of Brussels."

MARTINE EUVRARD,
DIRECTOR OF THE ESSONNE CLINIC, EVRY, FRANCE.

Transparency is a requirement

"It all began with a request for information about the components used for readymade infants' feeding bottles (small bottles provided by maternity units). We wanted to be sure that they didn't contain toxic substances. After countless e-mails, calls and letters it was impossible to get an answer. So we changed to a supplier who is more transparent. In my opinion, our work has ony just begun!"

SECURING REACH

The REACH regulation came into effect in 2007. REACH (Registration, Evaluation, and Authorization of Chemicals) is a European Parliament regulation, which updates European legislation on chemicals, and implements a registration, evaluation and authorization system of chemicals within the European Union. Its objective is to improve the protection of human health, but also to maintain competition between businesses by strengthening innovation in the European chemical industry.
Are these objectives contradictory? Before REACH existed, chemicals were produced with relative indifference. For Per Rosander, "REACH is the outcome of a very long process. The European Commission itself disliked this dossier. It rejected anybody who broached the subject and the resources related to it. But when I look at what it has become today, given the pressures at that time, I am quite pleased. However, if REACH has a good legal architecture, I would say that it has been burgled. Someone introduced himself into the legal settlement and stole the furniture, ripped the tapestry off the wall and looted the silverware…The structure is solid, but it should be equipped with new furniture. And I hope that this will happen!" The REACH regulation has been taken very seriously in

Sweden although it mainly concerns industrialists and is not easily accessible to users. Nevertheless, not all chemical substances are concerned, but a change is in the air! Philippe Parvy, the former Head of "chemical hazards" at the AP-HP: "many products that are not currently labelled chemically hazardous will be. These products will therefore be bought, sorted and disposed of in different ways. There is a desire to act promptly, but in health establishments professionals are very confused by these new rules. The texts are intended for the industrialists who produce or import products but the impact on the daily work of health professionals must then be understood."

"In Sweden, four industrial companies (Haemotronic Advanced, Medical Technologies SpA, Totax Plastic, A/S, Wipak OY, Melitek A/S) represent a stage in the production of blood bags. The Jegrelius Institute of applied research for green chemistry and the Karolinska University Hospital are working together on a specific project: to produce blood bags without phthalates which fulfill all criteria. The production of the first prototypes of these blood bags was scheduled for July 2012 and a complete substitution program is planned for 2015. It is a challenge because the bags, like many other substances, are out of the field of REACH due to legal obstacles.

"The European directive only applies to products which were under no regulation whatsoever before 2006," explains Magnus Hedenmark. "This is not the case for blood bags, legislation has always closely followed." Today, the Swedish forensic toxicologist deplores an absurd situation. "Due to these very old and obsolete precautions, blood bags containing DEHP are still being produced!" Instead of protecting citizens, the legislation may also, in the case of blood bags, turn against them. PVC has also been overlooked by REACH. In 1997, when the first studies concerning the harmfulness of polyvinyl chloride were published, the city of Stockholm decided to eradicate PVC. The Swedish capital has been declared PVC-free. However, thirteen years later, PVC still covers many surfaces in the city, including the floor of the Huddinge Hospital. "PVC producers have done really well, "commented Per Rosander. "Some already offer 'green' PVC. But, I don't believe a word of it. Or more precisely, the chemist in me does not believe it at all. I have fought PVC for years, it contains chlorides, its conduction is very bad and the waste it produces is difficult to deal with. To me, this is the perfect example of something that it would be better to give up rather than hopelessly trying to improve, change, and patch. There are alternatives! "But PVC is a cheap solution for flooring or insulating windows. In addition, from the perspective of a planned obsolescence, it wears out quickly and needs to be changed often. Plasticizers are used to soften PVC with phthalates, among those the highly condemned DEHP. The issue of toxic substances in hospitals is not a small matter. It's a real priority, purchases are the first lever towards a healthier hospital.

Sign the petition on
www.pvcfreebloodbag.eu

WHAT CAN BE DONE?

For a truly effective purchase policy, the first thing is to know exactly which substances are used in the hospital. Then, take the structure of the purchasing department into consideration and think about the overall cost of products... There are many ways to conduct an eco-responsible purchasing policy. Finally, it is essential for industry to be receptive to hospital proposals, and for health establishments to put pressure on production lines and provide the necessary R&D.

KNOWING TOXIC SUBSTANCES

Know your enemy! A realistic CMR substitution program was implemented. In Sweden, at the Karolinska Hospital, in-depth knowledge of toxic substances in the hospital is everybody's concern. "In 1992, we launched a huge inventory of our products," explains Anne-Marie Vass, Environmental Manager at the Karolinska Hospital in Huddinge. "When the use of toxic substances in hospitals became an issue, we decided to scan the contents of our cupboards." The inventory took a long time. "The contents of disinfectants are incredibly complex." And worrying too. The hospital has established a list of 100 chemicals that must be abolished. "The most

Sweden is leading when it comes to concerted purchasing. Karolinska Hospital, south of Stockholm.

common mistake, when you realize the toxicity of substances is to try to get rid of them all at once," she adds.

SWEDISH PRAGMATISM

The recipe for Swedish efficiency comes from regular consultations between the hospital, the governmental authority of the City Council, and links with the NGOs as well as suppliers. "We are gradually eliminating toxic substances, and we will replace them as soon as the market permits it." This implies an impressive effort in communication and information to keep abreast of the market and a rigorous census. Every year, someone is designated in each unit to inventory products that were still in use the previous year. The person in charge of the inventory receives a bonus and overtime, this position has become almost honorary. "In the beginning, people were not very motivated. But now, people take real pride in doing the inventory!" says Anne-Marie Vass. This quality control engineer is well aware of the colossal task that has been accomplished at the Karolinska Hospital. "We now have a list of all chemical substances at our disposal, their properties, their dangerousness, and the ways to eliminate them." Due to the knowledge of substances used, the environment service is extremely efficient. "We are planning to eradicate all products containing PVC and phthalates. Our neo-natal unit no longer uses PVC. We can't get rid of PVC all at once, so we work by stages: we are going to be able to replace a whole segment of tubing before the end of the year." In Sweden, furnishings are questioned every year on the 13th of January, St-Knut's day. And every year, the contents of the chemical cupboards are checked, in order to reorganize them if necessary. That is the art of adaptation.

STRUCTURING AND SUBSTITUTION

One of the major obstacles to an efficient purchasing policy in a hospital is the fragmentation of internal and external purchases. Purchases can be divided between 20 interlocutors in a university general

hospital and just one in a small establishment. The role of "buyer" is emerging with difficulty: it relies on healthcare professionals (mainly pharmacists) as well as administrative, logistical and hotel staff. However, buying is a real profession and this is even truer today in a global economy.

THE CHARTER FOR RESPONSIBLE PURCHASING IN HEALTHCARE

From 2007 onwards, the C2DS collaborated with purchasing and referencing centrals to create a charter for responsible purchasing in healthcare. At the time, this charter specified nine actions considered necessary for sustainable consumption in the hospital. Sustainable development was not a big issue in France at that time, but referencing centrals still signed the charter.

PURCHASING CENTRALS: ONE FOR ALL, ALL FOR ONE

In France, hospital purchases are organized by purchasing and referencing centrals. Purchasing centrals buy on behalf of their client while referencing centrals list suppliers and products. Everybody negotiates, knows the market and some offer advice, audit and guidance to the hospital in order to optimize purchases. The CAHPP (Central of public and private hospital referencing) brings together 3 300 health establishments and is the market leader with a share of more than 80 per cent. In 2011, the CAHPP pioneered the creation of a green range. A first general evaluation to a Sustainable development approach has been carried out amongst 550 suppliers, covering the entire health market. The 60 per cent return testifies to a real interest. The CAHPP then developed a declarative questionnaire for industrials with 25 relevant indicators. Another questionnaire assesses the SD involvement of some targeted products based on 10 indicators, weighted via data analysis software. Beyond filling in questionnaires, industrialists and providers have to provide support documents for their declarations. The results obtained grade industrialists and some products are then "listed" and estimated in the CAHPP catalogues. This notation is dynamic because the CAHPP hopes to emphasize continuous improvement where notation is taken into account. The system is reassessed on a regular basis. No green washing or precipitation but sound pragmatic methodology and guidance for suppliers. Owing to the volume of its transactions, the CAHPP has all the keys in hand to make a gradual impact on the market. In 2012, the "listing" will be a further incentive, and the 2013 criteria for an approach to overall cost (packaging, transport, maintenance, waste…) will be integrated at all stages of negociations and referencing.

Official eco-labels guarantee product efficiency and the limitation of environmental impact for consumers.

THE GREEN RANGE!

In 2011, the C2DS succeeded in uniting purchasing centrals and suppliers, to sensitize them on the issue of toxic substances. Phthalates, bisphenol A, volatile organic compounds, medicines, packaging, transport… with, the draft of legisltion on medical devices, the implementation of criteria to reduce packaging, the information about the composition of products, the "content-containing" and the organization of meetings with the Club of health care product purchasers (CLAPS) to inform the experts, buyers, policy makers and industrials about chemical exposure.
In Figueras, Catalonia, Elena Bunet, the Environment Manager of the Empordà hospital group recounts: "In our group, purchases are made via centrals. It has worked like that for a very long time. There is a bidding system and it takes a long time to make changes! For some purchases, such as paper, the purchasing manager comes to see me and we discuss the potential suppliers. But it does not really apply to healthcare equipment for the moment. My participation in the purchase commission is still

under negociation." At the Palamos hospital, also in Catalonia, Nuria Vidal, technician for occupational and environmental risks sits on the purchasing Commission and can introduce green criteria to the bidding system. "We are now a green office because all our office materials have green labels!"

REFERENCE GUIDES CAN HELP

Official eco-labels guarantee product efficiency and the limitation of environmental impact (water, air, waste, energy) for consumers. At the Madrid Hospital, "new product commissions" are organized every month. "If we want to introduce a new product owing to its therapeutic benefit, it is possible to place an order with hospital management," explains Manuel Carmona Calvo, Environmental Services Manager. "The role of the purchasing commission is to check the accuracy of the advantages of each product. The commission then analyzes the impact of the product on hospital environment and makes a comparative study, if it is a substitute product. This new product Commission is strategic for our environmental department."

THE AUSTRIAN WAY OF BUYING

Public hospitals in Vienna are precursors of Sustainable development. Since 1996, purchasing analysis has been carried out by Vienna hospitals, in order to identify products considered hazardous to the environment. In no time at all, these pioneers of Sustainable development determined environmental criteria to regulate the bidding system for maintenance products. Between 1996 and 2000, the number of products suspected to be harmful to the environment went from 500 to 42. Among these 42 products, 20 are considered environmentally benign and 22 environmentally acceptable. Thanks to staff training, the number of cleaning products has dropped by 23%. And consequently, Vienna hospitals have saved 66 000 euros per year. "And that was ten years ago!" says Herta Maier, Environment Manager. In Austria, Sustainable development is part of the policy of the city. "We work directly with Vienna public buying, for the "Ökokauf Wien" project (Green buying Vienna). No less than 23 working groups from all sectors of the city reflected on purchasing policy to reduce the environmental impact of our capital. "Green buying Vienna" is at the crossroads of several environmental problems: water treatment, reduction of travel and greenhouse gas emissions, air quality, green space management, and waste management... "The hospital is a city institution and it was essential for us to take part in the program!"

Founded in 1993 by a non-governmental organization, the FSC (Forest Stewardship Council) identifies wood from sustainably managed forests and is an internationally recognized label.

The products marked PEFC, (Program for the Endorsement of Forest Certification) guarantee that wood comes from sustainable forests.

The European eco-label is awarded to a product for a specified period of time and complies with ecological criteria defined by the European Commission. The entire lifecycle of a product is taken into account, from production through to use and disposal.

The Möbius ring is made up of 3 folded arrows which form a triangle. Since 1970, the Möbius ribbon has been the universal logo of recyclable materials and designates recyclable as well as recycled products.

PLANS OF ACTION IN MAPLE SYRUP COUNTRY

In Canada, the ministries for Health and the Environment have combined their efforts to impose a Chemical Management Plan (CMP), which aims to assess inherent risks in all the chemicals covered by the Canadian environmental protection act by the year 2020. The CMP is subject to special attention on an international scale. It is considered to be more effective than the current system in effect in the European Union. It does not only target the chemicals that may be dangerous.

Another plan of action intended to ensure the safety of food and consumer products targets every category of product in all sectors of activity, including the hospital sector. The plan is based on three pillars: active prevention, targeted surveillance and reactivity. The first refers to actions taken to avoid as many incidents as possible and to collaborate with industry to introduce security concerns at an early stage of the production process. Targeted surveillance allows regulation bodies to monitor high risk products by demanding security testing during the entire lifecycle of the product. The third pillar, on the other hand, aims to enable the government to take dangerous products off the market very quickly.

PRIORITY FOR TRACEABILITY

In Sweden, Charlotta Edlund Brask participates in a recasting of the environmental program of the City Council. "We can privilege products which give real thougt to packaging." It is also an opportunity for thinking on an international scale, taking social responsibility into account. The Stockholm City Council only works with companies that sign their code of conduct and undertake a commitment to human rights, prohibition of forced or child labour, elimination of discrimination, good working conditions, and environmental respect. "For us, it makes no sense to have a very protective environmental policy on our territory, if we buy products whose red dyes irremediably pollute rivers in India." The traceability of purchases is a priority for the City Council. In Sweden, the city Council is present at all stages of the Sustainable development policy of healthcare establishments, as coordinator, controller, and prescriber. "We set goals, and institutions report back to us each year. If they are not able to reach their objective, they must be able to justify it. That is how we move forward!" This strong commitment to the State via the City Council has rationalized environmental objectives on a large scale. Structuring purchases is the first step to set up programs for substituting toxic substances.

In Lund, Sweden, mercury has been eliminated since 1983. Similarly, PVC and DEHP are no longer matters for concern: they are no longer used. Similarly, who would have thought that in Slovakia, the 330 bed Kosice-Saca Hospital with 1 000 employees is the second largest hospital in the country and the neo-natal unit is completely PVC-free. "We referred to the ISO 9001 and 14001 standards to improve our services." said Michaela Macikova, Environmental and Quality Manager. "We are particularly proud of using PVC-free materials in our neo-natal unit. We would very much like to extend this program to other units, but this is not yet financially feasible. The reality is that PVC-free materials are 5 times more expensive than ordinary materials."

In Vienna, Austria, Professor Lischka, professor of obstetrics and member of the executive board of the Glanzing Children's Clinic was one of the first to raise the alarm on the use of toxic substances in the hospital. "For several years we struggled to identify, provide an inventory and buy alternatives to PVC. We worked with a chemist. We established a list of unwanted products in our medical equipment. And then, we determined an order of priority for each medical instrument and the possibility of buying it PVC- free. When we started, there were already some alternatives. Companies have been aware of the problem for 20 years. But when we received the equipment, it was not the case. We had to keep a close eye on technical notes!" he explains.

DEHP WILL NOT BE USED BY PROVIDENCE

Keith Edgerton, Environment Coordinator at the St. Peter Hospital in Olympia, Oregon, has settled the

At the Fletcher Allen Hospital in Burlington, Vermont, USA.

debate on toxins: "It's bad for boys." Without doubt. If DEHP is harmful to the reproductive system of young boys, alternatives must be found. "There is no compromise possible. The vocation of a hospital is to heal, not to harm patients," he adds. Therefore, the Providence group no longer uses DEHP in catheters. According to his colleague Geoff Glass, "Providence substitutes all products which contain DEHP in their plasticizers." Providence therefore contacted suppliers who do not use phthalates. "When we asked purchasing centrals why they offered no alternatives to DEHP, the answer was that nobody requested them. So be proactive!" recalls Keith. DEHP has been eliminated in his hospital in all devices containing body fluids or that come into contact with the inside of a child or adult male body. According to Professor Lischka, "The first articles published on the risks of DEHP in tubing began to appear in the 90's. We must face up to facts. When a truly dangerous substance is discovered, the consequences must be drawn and action taken. This is the case of DEHP. In my opinion, the role of a neo-natal unit role is to save lives! At the beginning, our "green list" of PVC-free products was very short, but in the meantime, it has exploded. Nowadays, in Austria, products containing PVC have become the exception."
In Burlington, Vermont, the question of flooring has not yet been resolved. "The debate is open. Vinyl and carpets are cheap, but our ecological dream would be to have natural rubber. The problem is that natural rubber is nearly three times more expensive. We drew management's attention to the fact that we need to change the carpet every three years. This also entails a financial impact! Sustainable development is negotiable." This is all about arbitration, the choice between immediate spending and the calculation of overall cost. Fletcher Allen has been awarded the "gold" LEED certification.

TAKING GLOBAL COST INTO ACCOUNT

Thinking about the overall life cycle of a product, the way it was designed, by what type of company, who they employ and in which country, the means used for transport, how it is packaged, through which

sorting channels it passes…is therefore a long-term commitment, necessitating a global vision of the use of a product.

MEDIUM-TERM SAVINGS

In Newberg, in the United States, it was sometimes difficult to find appropriate green materials at the time the hospital was designed, in 2002. "The purchasing central simply did not supply a range of green products." Today, many American suppliers propose lines of products called EPP (Environmentally Preferable Purchasing). "We hope that one day EPP classified products will be compulsory. At the present time they are still more expensive to purchase." This is not always the case if you take into account the concept of overall cost, which also incorporates operational costs. According to Keith Edgerton, Environment Coordinator at St. Peter's Hospital in Olympia, member of the Providence group, it is even possible to save money by opting for green products. "This year, we saved $73 000, with premiums and operational costs, by buying EPP products. This is significant!"
Taking the overall cost into account is also synonymous with thinking about greenhouse gas emissions. Buying local, particularly food supplies earns sustainable point

CLOSE REGIONAL LINKS

Standing in a field covered with snow, turning her back to a farm built in red wood, could be associated with an episode of Little House on the Prairie, Marydale Debor, Sustainable development Program Manager at New Milford Hospital, Connecticut, is contemplating the annual production of aubergines for the hospital catering system. "Here is the Sullivan's farm. They keep a field for us." The farm and the hospital have signed a 3 year agreement over a field. The Sullivans supply the hospital with, lettuce, pepper, cauliflower, aubergine, celery, and radish. "We have taken the Charter of Health Care Without Harm very seriously. If we can't find a local product, we make our suppliers sign a charter. "Five farms have decided to play the game, each with its own way of doing business. There is a farm which supplies us with aromatic plants, and other specialties, such as Japanese aubergine, for example. Tomatoes come from another farm and the hospital also works with a dairy farmer, which produces milk without growth hormones. It is more difficult for meat." The Plow to Plate program has had a direct impact on the patients' satisfaction rate which has risen to 89%.

BUYING DIFFERENTLY

The approach is similar at OHSU. After signing the Charter of Health Care without Harm on hospital catering, "we tried to eliminate all dairy products from cows bred with growth hormones. We are working with a local company, Sunshine Dairies, which do not use them. Every year, OHSU buys half a million dollars worth of cheese. This makes us a relevant interlocutor on that subject," affirms Steve Hiatt, Nutrition Director. Oregon's specialties are numerous: blueberries, peaches, pinot noir. "The OHSU is a public institution, and the hospital is

MRS FRASINETTI, HEALTH DIRECTOR OF THE MEYER PAEDIATRIC POLE, FLORENCE, ITALY.

Milk bank looking for feeding bottles!

"When we opened the new milk bank, we had a strong wish to be equipped with bisphenol-A free feeding bottles made of recyclable glass. We thought about sterilizing bottles in autoclaves but we were unable to find sterilizable glass bottles on the market! They all had a plastic ring between the glass and the teat, which could not withstand the autoclave. We need a simple bottle teat that is directly attached to the glass container. While waiting for a better solution, we have single use bottles and are going to launch a new call for tender to find bottles that will resist the sterilization cycle."

Keeping milk in glass bottles is healthier.

subsidized by the State of Oregon. I feel obliged to buy local products," adds Steve Hiatt. That is good for the carbon footprint of the hospital!
In France, the concept of overall cost of was introduced by the new public purchasing code on the 1st of September 2006[5], and was renewed in May 2010. It takes into account all the costs related to services involved in the purchase of a product. They cover the whole lifecycle. With hindsight this concept is particularly useful. It helps reinforce the idea of the benefits of a long-term sustainable purchasing policy.

WEIGHING ON PRODUCTION

What if institutions from several countries pooled their purchases? What would be the manufacturers' answers? Here are a few examples of health establishments that have launched an attack to make their purchases "greener".

A PUBLIC AGENCY AIDS PURCHASING

In Sweden, the SEMCO government agency that specializes in sustainable buying, is also a key figure in the hospital market. The 16 environmental commitments which figure in the Swedish constitution hang on the walls of the Vasagatan Street offices in the heart of the Swedish capital. "What I love is that these environmental commitments do not use parliamentary terminology," says Eva Dalenstam, Green Purchasing manager for SEMCO. "They are written in poetic language and talk about the beauty of the mountains which must be preserved and the strength of the sea…" The environmental management agency SEMCO is a public purchasing agency which works with the government and businesses. In Sweden, it acts as governmental stimulus on the industrial

5. Article 53 of the Public Contracts Code, 2006 edition

Manufacturers do not produce if the demand is inexistant.

sector, by imposing greener criteria. In 2006, the Swedish government stipulated that environmental challenges were to be used as a financial lever to put pressure on suppliers. Swedish public markets represent 50 billion euros per year, according to www.msr.se, the SEMCO website. "This means that we meet suppliers every year, and we explain for example, what risks they could expose patients to by producing PVC catheters. We determine criteria, without setting unrealistic deadlines," explains Eva Dalenstam.

According to her, the most important thing is to be constant in our claims. "This is the way things change, by securing production segments one after the other, by layers." The Council is highly considered in Sweden nowadays. "Recently, a supplier called me directly to ask me to what extent he should consider alternatives," explains Eva Dalenstam. "For me, it was a great experience to see that suppliers don't hesitate to call me personally! Ideally, I would tell them: in two years, the same product must be non-toxic. Is this possible?"

Most of the SEMCO documents are translated into English, in order to help the green procurement policies in other countries, and suppliers in their international production. English documents can be downloaded on the site www.msr.se

In Newberg, the Providence healthcare group is very powerful: "We can really guide production, you need to be demanding," says Keith Edgerton. It is the only effective solution to substitute healthy products for toxic substances. "It's much easier nowadays. People want their hospital to be a healing and healthy place, where they are not trapped in small dark polluted rooms." For Professor Lischka, in Vienna, "It's not always easy to motivate fundamental research labs to work on these topics. Finding alternatives to PVC is not really spectacular. The effects of exposure to PVC are felt for years, even decades later. Fundamental research on alternatives to PVC attracts little media coverage, but the fact is that it is essential to public health. Industrialists are well aware of this. There was clearly a time when the balance was reversed and when companies began to say, okay, this has to be taken this seriously in order to remain competitive. Or at least, not to have the reputation of poisoning premature babies with phthalates or other substances contained in medical plastic. The prices will drop, this is the trend!"

Similarly, in Granada, the hospital is aware of its role as a stimulus in R&D. "We are trying to involve the business community in our think-tank to eliminate PVC from the hospital. We have listed 6 000 products that we use and which contain PVC. We have looked for alternatives on the market. We have transmitted this data to consultants who are specialized in medical techniques so that the quality of these products can be analyzed and finally, we have found viable alternatives. The next step is to produce advertising, to let people know that we are working in this direction. We will do this until suppliers understand that if they get rid of PVC from their products, they can count our hospital amongst their clients," explains Martin Germán Blanco Garcia, Environmental Manager.

In Utrecht, Holland, the University Medical Centre has decided to implement a plan of attack for green purchasing. "It not only considers the products, how they are made (no child labour, "fair trade", working conditions… etc.), but it also considers suppliers, and the criteria they have established in terms of Sustainable development. We demand proof that they are proactive on these matters," explains Wieke Lubbers, junior assistant at the Utrecht University Medical Centre. "Suppliers are well aware that the market is now changing. It is a two way process. We hope to increase sustainable purchases by 50% by 2013. There is green electricity in our entire building. By 2013, we aim to buy organic fruits and vegetables."

In Switzerland, the Ecology Commission also plays a role in Hospital Purchasing Policy. "We have prepared a list of products to promote, and we encourage the use of recycled paper. We promote the purchase of organic textiles and we also use social and ecological labels, prototyping greener disinfectants for example," describes Beat Hodel. Members of the ecology Commission are trying to pool their purchasing policies, but it is very difficult in the hospital sector. "We have tried to put pressure on industry for green baby diapers and incontinence pads, but we have not had much success. Switzerland is small fry for industry."

CONSORTING

Once again, in Sweden, Per Rosander, Director of Chemsec, a green chemistry specialist. "The aim was to create an independent organization that worked solely on chemicals and toxic substances, at the time when the European REACH regulation was being implemented," explains this chemist who worked for Greenpeace for a long period of time. Chemsec has a purpose: to change industrial policy in relation to chemicals. "We work with companies such as L'Oréal, Dell, Boots in the US, Erickson, Nokia… Who are key figures in the industrial sector, but who are not well known for being avant-garde in the treatment of toxic substances… We are trying to identify motivated people, sensitive to green rhetoric and we advise them. It's worth targeting the enemy directly," he says with a smile. And he is not the alone; the TEM Foundation and the Jegrelius Foundation are also involved in green chemistry in Sweden. Similarly, Magnus Hedenmark, toxicologist for an NGO has chosen to set up an independent label, Eco profits which evaluates the toxicological safety of medical equipment. Magnus Hedenmarks' organization defines the product safety criteria for subsequent labelling.

He will work on defining specifications for the new PVC-free blood bags. "I think that eco-labelling can be a solution when negotiating with industry. A label has a marketing dimension and is binding, which can incite industry to make improvements. We cannot cheat with chemical components. In Sweden, our chemical industry is very small and more open to suggestion than French or German giants. Therefore, there are grounds for negociation. "It is always the same thing," he continues, "Industry tells us: "it is impossible". And I keep on asking: "In what way is it impossible? Would it be impossible to sell because it would be too expensive? Or is it be impossible because it would take too long to produce? Is it a technical, financial or material impossibility?" Independent labels can adopt this stimulus role, pressurize purchases. And why not spread it all over Europe and the world? The path towards a greener and healthier hospital goes through an offensive, proactive and concerted purchasing policy. "We are at the beginning of a large venture," said Olivier Toma; Président of the C2DS. "However, progress is within our reach: the reduction of packaging at the source, the implementation of guidelines for sensitive or expensive packaging, the rationalization of transports, giving priority to local purchases, the readability of contents and containers on labels, reduction of the energy consumption of equipment, etc. It is necessary to adopt a step-by-step method!" The hospital prescription weighs heavily on the market and we must turn it into a strength!

SD CHECK-UP !

- ☐ Are you aware of the toxicity of substances you use?
- ☐ Do you have an internal toxic awareness information program?
- ☐ Do you have a substitution program for dangerous products?
- ☐ Do you use eco-labelled products?
- ☐ Do you systematically calculate the overall cost of products before each purchase?
- ☐ Do you collaborate with other hospitals?
- ☐ Do you liaise with industrialists about these issues?
- ☐ Do you have an environmental health unit in your establishment?

Stockholm

SWEDEN, THE KINGDOM OF COORDINATED PURCHASING

How a group of scientists, relevant public authorities and medias did pressurize industrialists to stop using phthalates in neonatal units…

In Sweden, the first success story of pressure on manufacturers dates back to 1991, when Åke Wennmalm, Manager of the Environmental Department at Stockholm County Council until 2010, organized "his" meeting in a neo-natal unit with all the medical tubing suppliers. The purpose of the meeting was to raise the issue of DEHP amongst manufacturers. In Sweden and all over Europe, DEHP is used to soften catheters for intubating premature infants. Neo-natal units are full of them. "In a neo-natal unit, infants weigh between 1 and 2 kilos and are extremely vulnerable to toxic substances," says Per Rosander, chemist and member of Health Care Without Harm.

POSITIVE IMAGING

"Åke took some new catheters out of their packaging and showed them to suppliers." The catheters were flexible. He then went on to show them catheters after they had been used to intubate a premature infant for two days. The catheters had become rigid. Why? Because the DEHP content in the tubing had migrated into the baby's body. "The shock of seeing these fragile children and witnessing the rigidity of the catheters was extremely upsetting," says Per Rosander. At the end of the meeting, the majority of industrialists present were convinced of the need to produce DEHP-free catheters. Yet, six months later, when the Environmental Department of Stockholm County Council organized another meeting with the same manufacturers, their attitudes had changed. "We expected proposals for DEHP alternatives. Instead, manufacturers pulled out their own new studies proving the safety of DEHP. The same people who, 6 months earlier, had come out of the neo-natal unit, vowing that they would no longer produce catheters containing DEHP had completely revoked their decision."

"Did acknowledging the toxicity of the DEHP in the tubing used in neo-natal units mean those important areas of production would have to be reconsidered? In this case, we would also have to reconsider blood bags and dialysis equipment which also contain DEHP? Initially, suppliers tried to avoid the issue, without counting on public opinion. "Our work had been widely relayed by the media. It was no longer possible to go back," comments Per Rosander. Governmental authorities finally made a decision and Stockholm County Council banned the use of DEHP in neo-natal units. It was a great success for the Environmental Department of Stockholm County Council.


KAROLINSKA INSTITUTET
Tandvård

SORTING, RECYCLING AND RE-USING

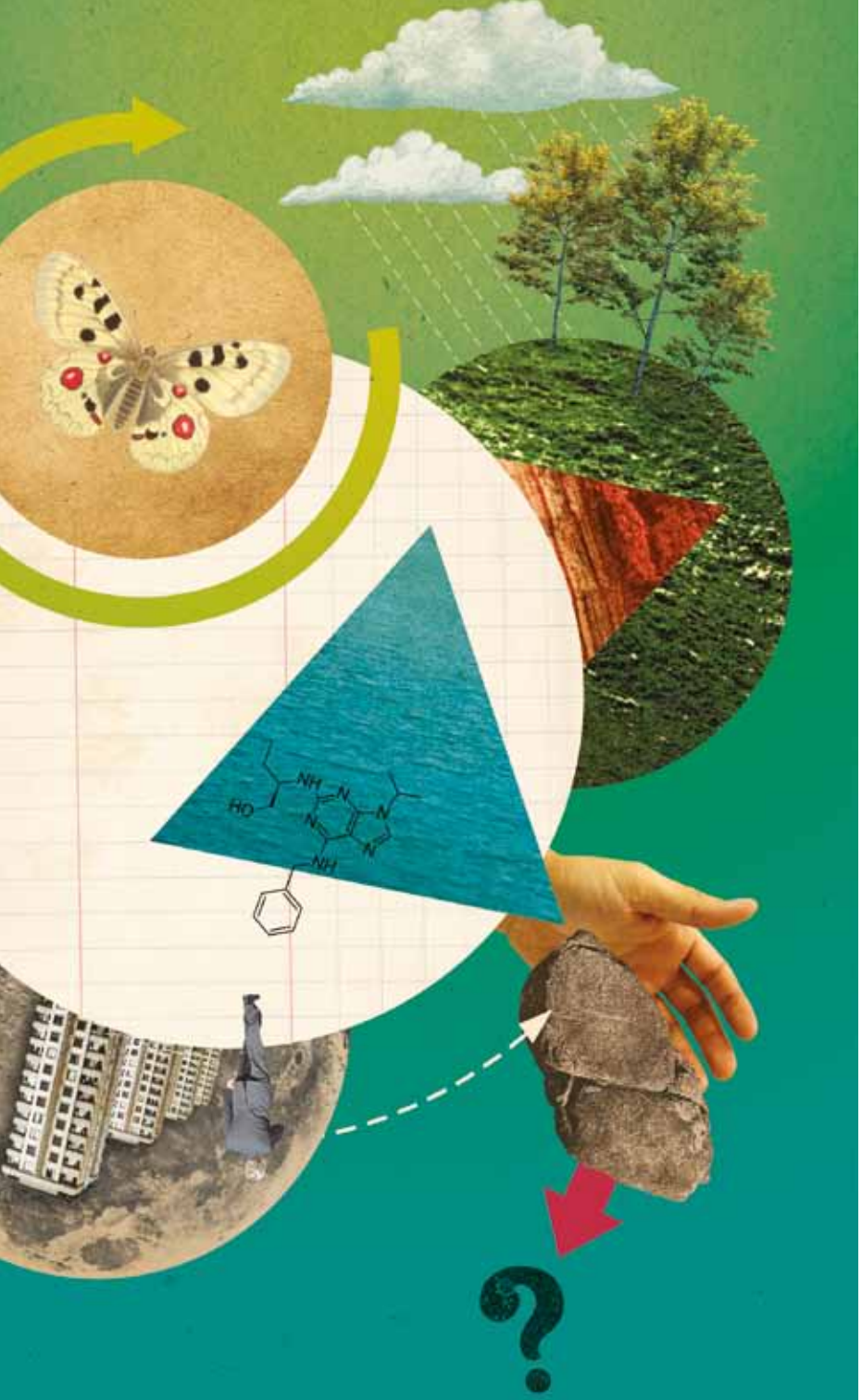
What if we stopped throwing money into our bins? The European Week for Waste Reduction opened with this question. This has been an annual event for last 6 years. The next will be held in the autumn. Each individual in autumn 2013. 27 countries of the European Union produces on average 522 kilograms of waste (541 kilos in France) per year. By 2030, the European Environmental Agency forecasts an increase of 33 per cent of municipal waste production between the 15 senior state members of the European Union. And within new member states, this growth could reach 66%. How can we raise awareness amongst hospitals and their staff about sustainable consumption and waste sorting, when the quantity of household waste has doubled in 40 years and increased from 1 to 2% per annum? In November 2011, the European Week for Waste Reduction was held in 21 locations in Europe. Nearly 2000 events took place, to remind everyone that the best waste is the waste we do not produce. And if it is too late, it must be recovered. What is happening in our hospitals?

SUPERVISING RISKS

WHAT ARE HOSPITALS DOING?

Hospitals play an important role in this exponential production of waste, to say nothing of the many toxic substances they reject into surface water, groundwater or via incineration residues (carbon, drug residues, volatile organic compounds...). Two major categories of waste come from hospitals: waste generated by the caring activity, generated by the caring activities (collecting waste from healthcare activities.... dental amalgam) and the waste generated collecting waste from healthcare activities involving a risk of infection, anatomical parts, radioactive waste, dental amalgam and the waste of economical activities. Treating waste is expensive. Paris Hospitals spend 13 million euros per year in the evacuation, the transportation and the processing of waste. Philippe Parvy, former Head of "chemical hazards" at the AP-HP has worked on this problem over many years. He provides training for hospital workers so that they make sense of European legislation concerning hospital waste and can consequently apply this knowledge to their daily tasks.

"For a long time, the arrangements made for waste slept peacefully at the bottom of European legislation. You need to gather texts and decrypt them. This is a tremendous job: we are not taught this at school! Awareness came at a late stage." In Switzerland, the question of waste was the beginning of green awareness. "20 years ago, we improvised on the matter of infectious hospital waste," says Beat Hodel, Environmental Manager at Federation H+, "we only had a few governmental "guidelines", but no real legislative framework. As a toxicologist, it drove me crazy!" Everything began on Swiss territory following the initiative of a small group of worried healthcare professionals from Zurich. Environmental issues met with public health concerns. "Even infectious waste



fell into a legislative gap. "We started by cleaning the Augean stables and established a commission to reflect on waste processing, define sorting protocols and establish a whole system."
The Ecology Commission of the Federation of Zurich Hospitals was the first to raise the alarm concerning infectious risks, pollutants, and hospital waste. Nowadays, hospital waste processing is strictly regulated both in Switzerland. The content of the legislation is nearly identical, but Swiss terminology varies from the French system. This enormous classification project has resulted in a manual which is now officially recommended. "We have updated our manuals with on-site feedback, in partnership with a large number of hospitals".

CHEMICAL RELEASES, UNKNOWN SUBSTANCES…

Until recently, only the 1967 European directive listed dangerous substances present on the market and was used as reference for the classification of toxic substances. Unfortunately for the planet, it only lists 4 per cent of the 5 000 chemicals used by hospitals. Chemical substances rejected by health institutions are a real danger, partly because the combination of chemicals they produce are a potential catastrophe. Nevertheless, Philippe Parvy remains optimistic: "regulations are evolving more quickly and there is will to take fast action with regards to this issue. You must enjoy reading because the texts are very long." There has been a lot of progress regarding the REACH regulation. Implemented in June 2007, it aims to quantify and classify chemical hazards on a European scale. By 2018, the objective is to control 12 000 of the 30 000 substances used in hospitals and households. "The regulation is becoming stricter, and it has become more difficult to decipher information. Many of the products which are not currently classified chemically hazardous will be added to the list under the REACH regulation. Therefore, these products will be sorted and eliminated. An increasing number of products will be classified hazardous and we are going to have to reorganize the way things work," Philippe Parvy continues.

The main synopsis for waste process developed by the C2DS working group "Sustainable Waste Management" will introduce, in accordance with European regulations, a list of potential waste produced by Healthcare institutions. Each category corresponds to a possible or compulsory channel where all necessary information regarding recycling procedures will be found.

The process consists of four levels:
Level 1: classification of solid and liquid waste potentially produced by hospitals.
Level 2: regulatory references.
Level 3: on-line referencing databases and directories to identify waste treatment contractors.
Level 4: Identification, by category of the most sustainable treatment currently available in France. This tool will be one of the most successful ways of sharing positive experiences in this area of Sustainable development.

EFFLUENTS; LIQUID POLLUTION

The hospital consumes on average 300 000 m^3 of water per year, and rejects many products through its conduits. The concentration of toxic products is therefore low due to dilution, but in the long term, these discharges could be problematic for public health. The report made by the French Academy of Pharmacy about the quality of French drinking water is alarming. Questions are being raised concerning the neurological consequences of exposure to these substances including the relation to diseases such as Alzheimer's or Parkinson's. "One of the emerging issues is the disposal of drug residues in water," explains Philippe Parvy. The 2008 report published by the French Academy of Pharmacy raised the alarm on drug residues. Up to that point, water discharged by the hospital was emptied into the urban water network, without any special treatment. However, after a bone scan for example, patient's urine contains radioactive elements. Drug residues are recurrent in the water used in care facilities. The European Commission has identified fifteen new molecules that it would like to see added to the list of the 33 pollutants already monitored and controlled in European Union waters. For the first time, three substances issued from drugs will be included on this list: 17-alpha-ethinyl estradiol (EE2), 17-beta-estradiol (E2) and diclofenac. Even if we are ahead regarding the widening of the legislative framework, we must be aware that prescriptions and taking medication have a direct impact on our environment. In Canada, numerous studies, such as the one published by Professor Sébastien Sauvé from Montreal University, show that pharmaceutical products such as antibiotics, antidepressants and hormonal compounds are not necessarily filtered by sewage plants. For Olivier Toma, President of C2DS, there is an urgent need to develop partnerships with the pharmaceutical and the chemical industry, sewage plants managers and health institutions to collaborate on this issue. "We must treat this issue as a whole," he explains. "We must deal with the problem from the prescription stage, by using a composite index of the drug, linking therapeutic efficiency with economic and ecological criteria." This is already happening in Sweden where drugs are listed according to their eco-toxicity. Reducing drug residues contained in the ground, air and water is one of the five environmental priorities set up by Stockholm City Council.

FROM PRESCRIPTION ONWARDS

In 2003, the environmental department began to classify drugs according to the potential environmental damage they cause. It launched the PBT index: P, for persistence, that is to say, the ability of the molecule to resist degradation in the aquatic environment; B, for bioaccumulation, i.e. the ability of the molecule to accumulate in the fatty tissues of aquatic organisms; and T, for toxicity, the toxic risk to aquatic organisms. Since 2005, the Swedish Pharmaceutical Industry Association has been responsible for toxicological risks. Each item is measured on a scale from 1 to 3, and the total equals the PBT index, a measure from 1 to 9.
In the long term, all drugs on the Swedish market will be listed according to the PBT index.
Stockholm City Council also carries out tests on water leaving the hospital. "Part of the problem is that it is difficult to get significant values in water. At the city sewage plant, it is hard to know what comes from the hospital. But the concentration of chemicals is sensitive in fish tissues." In Stockholm, the City Council has been working in partnership with the central wastewater treatment plant to find out what the hospital may reject in water. The concentration of antibiotics in water is also a matter of concern.
The consumption of drugs is the preoccupation of Åke Wennmalm, forme president of... "It is vital to change practices. Ultimately, it must be borne to mind that everyone is responsible for his/her own health. We must learn how to preserve health, rather than relying on pills, which we don't really know how to dispose of." Is this a message for France, the largest consumer of antibiotics in Europe? According to Benoit Roig, university professor at the chemical and microbiological analysis laboratory at the French School of Public Health (EHESP) in Nîmes, France

Recycling banks at the disposal of staff, patients and visitors at the Portland OHSU, Oregon.

which has just received an international award from the Swedish Recipharm laboratory for his research on what happens to drugs, "The presence of drug residues in water will not be reduced by avoiding medical treatment. Beforehand, we can work on how drugs should be used, inform patients, nursing staff and communicate about the consequences of drug usage and what drugs become once they have been prescribed." French hospitals are all linked to a treatment plant, with four levels of toxicity. However, there is no separate sewage network for hospital water.

FINDING PROPER SUBSTITUTES = ALLEVIATING WASTE

In Madrid, Spain, the San Carlos Hospital has decided to replace the reagent used in the laboratory for red blood cell numeration. "This reagent contained very small quantities of cyanide! "explains Manuel Carmona Calvo, in charge of the environmental management department. "We found a substitute product which has the same function and contains no trace of cyanide. Without cyanide, the lab waters can be rejected directly into the sewer system. It is important to realize that this simple substitution has had a positive impact at all levels: it avoids moving thousands of liters of reagent residue in carafes. We have therefore been able to avoid transferring liquids, even the possibility of an accident, a fall, and the cost of treatment. In total, we saved nearly 100 000 euros in just one year!" Currently, the San Carlos Hospital is working closely with the Virgen de la Arrixaca Hospital, Murcia, to find an alternative to formaldehyde.

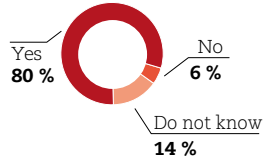
ELENA BUNET, ENVIRONMENTAL MANAGER AT THE EMPORDÀ HOSPITAL GROUP, FIGUIÈRES, CATALONIA, SPAIN.

Isolating formalin!

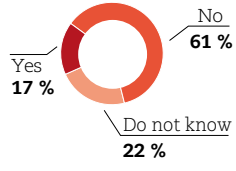
"Our first action concerning toxic liquids was to find an appropriate method to collect them. Of course, toxic products were highly diluted but they still went directly into sewers. Let's take the example of formaldehyde. Containers or any object with formaldehyde content were thrown away. This wasn't due to financial investment but simply a matter of time and awareness. We must maintain the pressure!"

WHAT DO YOU SAY ABOUT WASTE SORTING?

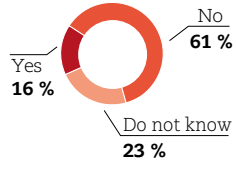
Is a selective waste collection implemented?



Do you have a policy of suppression of disposable packaging?



Can members of staff use the selective waste sorting stations of your establisment?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

BEWARE OF INFECTIOUS MEDICAL WASTE!

Special attention must be paid to waste generated by care activities.

This includes dental amalgam, domestic refuse, drugs residues, hazardous chemical waste, and the infectious medical waste. Normally, a specific sorting system has to be implemented for each of them, but this is not yet the case everywhere. Yvan Saumet, CEO at the Blois Polyclinic is rather satisfied: "infectious medical waste has decreased by 30 to 40 percent in the last two years." Where sorting is optimized: "We have set up a regular sorting audit which is done every three months." And it works! In addition, he regrets not having acquired incinerators which are better suited to large structures. Infectious medical waste must be incinerated according to strict guidelines due to its high toxicity. Incinerators must be capable of dealing with this sort of waste. They are manufactured by specialized companies and are used to reduce the volume of waste by nearly 80 per cent and also to decontaminate it. The toxicity of infectious medical waste is neutralized, it can then be disposed of in the conduits used for household and assimilated waste. It is not however authorized for composting or recycling. This system, although expensive, is well suited to large structures, but not always beneficial to smaller institutions.

OLIVIER COLLET, ENVIRONMENTAL MANAGER AT THE PASTEUR CLINIC, TOULOUSE.

Taking the time to define issues

"The first issue we dealt with was the optimization of the sorting system. With regards to medical waste with a biological hazard, we really felt that we were dealing with the three pillars of Sustainable development. In comparison with 2008, we have reduced our medical waste with a biological hazard by 40 per cent, as a result of a specific plan of action. As for waste, we made a diagnosis based on the precautionary principle. A ton of medical waste with a biological hazard is expensive and its treatment amounts to 500 euros per ton. We then had to work with the CLIN (Nosocomial Infection Control Coordination Centre) and hygienists. To start with, we spent time defining things such as: what is a medical waste with a biological hazard… We then had to give people training on these new practices. We had to work on sorting ergonomics and real waste flow logistics. We gave some thought to containers to avoid unnecessary trips for staff. This led to a lively period when everybody became deeply involved in creating new logistics. Nurses even began to think about new ways of providing care. At the end, we all pooled our ideas. It took quite a while, almost a year to integrate these new processes. But our medical waste with a biological hazard have decreased from 240 to 120 which represents 60 000 euros. By contrast, we had to manage an increase in the volume of our household waste, and had to refine sorting channels. So far, we have 25 sorting channels."

FOR OR AGAINST INCINERATORS?

In Switzerland, incinerators are not often used. The Commission has concentrated on setting up sorting chains to redirect waste to incineration plants. "Previously, some hospitals burnt their waste directly on-site, under certain conditions respecting security and protecting the air. These conditions were not always ideal," explains Beat Hodel. These incinerators have left bad memories. "We banned them thirty years ago. I was told that incinerators could break down… What do you do if that happens? It is a real question. And when we see how difficult it is to guarantee storage conditions for infectious medical waste which comply with regulations…" Since 2005, measures for the prevention and treatment of waste have become much stricter in Switzerland. In Canada, Montreal University has published a number of studies in favour of incineration. According to these studies, incineration causes additional emissions of dioxins, furans, mercury, acid and fine particles, which attack the respiratory and cardiac systems. The incineration of medical products such as thermometers, blood pressure monitors and dental amalgams is believed to be responsible for 2% of atmospheric mercury emission. Medical incineration may also be responsible for 16% of atmospheric dioxins, the second most significant source of this type of emission. Indeed, it appears that dioxins are responsible for various thyroid, liver, immune and cardiac problems. A recurring criticism

The Navarre Polyclinic in Pau, France.

reproves the "disposable mentality", because many products could be well disinfected and reused. Montreal University also considers that a hospital could make savings of up to $50 000 ($38 000) per year, by disinfecting rather than using throwaway products.

STERILIZING WITHOUT SPENDING TOO MUCH

At the Good Samaritan Hospital, a company called Sterecycle, which incinerates or puts waste through the autoclave according to its nature, treats infectious medical waste. "We have autoclaves to sterilize surgical tools. However, for infectious medical waste, we use another type of autoclave, much bigger this time, and waste is steamed for an hour." However, there is a drawback. This solution is a very high-energy consumer. The autoclaves run 5 times per day, which is equivalent to $100 worth of water per day, 5 days a week. "We considered solutions to alleviate the system, by grinding infectious medical waste, but our staff would have had to be in contact with the waste." Above all, the hospital seeks to avoid and minimize the risk of injury. "We are now considering another process from the Mark Costello firm, which uses a very low toxic chemical disinfectant, chlorine dioxide. In contact with the outside air, the chlorine dioxide disappears completely within 24 hours. With this new system, waste is stored in large wheelie bins that the machine dumps directly in its grinder, without any contact with staff. The machine crushes, dehydrates, and soaks them for 20 minutes with chlorine dioxide. Waste comes out in the shape of confetti, the volume is reduced by 90%. These large bins and the confetti produced are quite impressive… We are now in the final phase of funding."

RECYCLING AND RECOVERING!

From one hospital to another, the number of waste sorting channels varies from 1 to 3 depending on whether or not it is a priority. At present, the Angoulême General Hospital has 31 channels. This is a record! In Lund, Sweden, the hospital counts 27 sorting channels. Cardboard, every type of paper, flat glass, metals, rubble, food packaging and plastics, green waste, chemical waste, cooking oils, engine oils, dental amalgam, silver salts, electronic and electrical equipment, household waste, infectious medical waste, ink cartridges, light bulbs and neon lighting. For each type of waste, the hospital follows the lifecycle of a product from purchase (with constraints imposed on suppliers) through to removal or recovery. Valérie Moulin, doctor at the Oncology Unit at the General University Hospital of Poitiers, has influenced carers by creating a "recovery corner" intended to collect mobile phones, eyewear, plastic plugs, stoppers and wool to be given to charity.

In the entrance hall, large wicker baskets receive donations from everyone. Valérie Moulin hopes that the 6 000 people who enter the General University Hospital each day will leave their old mobile phones, eye glasses and their balls of wool. With this kind

of initiative we go from the status of user to that of a responsible citizen. Similarly, the Blois General Hospital has launched an operation to renew its electric beds. Old beds are dismounted and some parts are stored and reused for spare parts, instead of being discarded. "Before this operation, we invested in 150 new beds per year," says Elsa Livonnet Moncelon, deputy director of Blois General Hospital, "Thanks to these spare parts, we now only buy 50 beds each year. This allows us to save approximately 160 000 euros per year, enabling us to invest in other sectors, such as biomedical equipment." In the United States, the Good Samaritan Hospital is one of the oldest in Portland. The establishment turned 'green' approximately twelve years ago and has a gigantic waste warehouse behind the gymnasium. "Everything which can be recycled is brought here," says Bill Clark, waste sorting manager. Glasses, bottles, rags, computer parts, bin bags filled with paper… Here the hospital recycles 'clean' objects, which have not been in contact with patients. Containers are stacked over several tens of thousands of square meters. Disabled people sit at workbenches in the centre of the warehouse, they sort objects discarded by the hospital, coached by a young woman. "We have a contract with a reintegration unit, which gives work to mentally handicapped people. These people work between 2 and 4 hours per day and form a team of about 24 people. It works very well. People with disabilities love this work: they get away from their institutions for a while and it gives them some independence", says Bill Clark. Again, the social dimension has not been put aside. In Switzerland, sorting channels are left to the discretion of hospitals. Beat Hodel relates: "At the beginning, we also wanted to regulate the glass sorting channel, but finally, faced with the wide variety of solutions available, we decided to concentrate on highly dangerous waste, i.e. infectious medical waste. We classified waste according to its level of risk. The rest was left up to individual hospitals. They can choose to compost biological waste, on-site, to sort the glass…etc." In Switzerland, according to Beat Hodel, there is no real plastic sorting chain. "It is therefore difficult to motivate people. We understood that the future of nontoxic waste was still not very clear." What was his solution? Create a network with other hospitals. Regarding waste processing, one issue is often forgotten: packaging.

AN EVER-INCREASING QUANTITY OF PACKAGING

Single use equipment is often preferred in hospitals due to hygiene requirements. This can lead to an increasing quantity of unnecessary packaging creating an impressive volume of waste. "Some packaging is classified infectious medical waste. It is disposed of in the same way as infectious waste. But is this really what it is? It's worth asking the question to avoid rising expenditure," explains Olivier Toma. In addition, packaging must guarantee the traceability of products. "Sometimes, the fact that a medical device has been sterilized with ethylene oxide is printed on the box, but not on the tubing itself." In this case, it's easy to miss important information about toxic substances. "Why don't we imagine a packaging system which would work like a compulsory deposit system?" asks the president of the C2DS. It would also be very useful for eutectic packaging, used in pharmacy for maintaining the constant temperature (2 to 8 °C) needed for certain drugs. Eutetic packaging is composed of a gel made from a water mixture, additives and viscosifying agents, it keeps temperatures reached in a refrigerator or freezer stable. At first, the packaging is solid, and once used becomes a gel. Single-use eutectic plates and gels are part of the household waste circuit.
Promoting transport by refrigerated lorry and adapting reception conditions in order to avoid the use of eutectics may also be a solution. Otherwise, why not suggest that laboratories and suppliers produce reusable eutectics with a compulsory deposit system? In the same way, establishments can economize a significant amount of plastic by saving water bottles. Whether you opt for a reusable container or for water fountains connected to a

«Clean» waste which have not been in contact with patients at the The Good Samaritan hospital in Portland, USA.

drinking-water network, you'll make savings! And if you simply choose to serve water in larger 1.5 liter bottles, you can save 45 per cent in waste packaging compared to the same amount of water in three different bottles of 0.5 liter. In Spain, the private Nuestra Señora De Fátima hospital in Vigo, Galicia, has devoted a major part of its Sustainable development effort to waste sorting. This 300 bed hospital multiplied its sorting channels after being certified ISO 14001. "But we sometimes end up in momentary deadlock," says Pilar Prieto Morais, Environmental Manager, "This is the case for glass sorting as we need special containers for glass. The city of Vigo refuses to install a container near the hospital. I can't ask the hospital or cleaning staff to walk 200 meters with lots of glass rubbish! The hospital alone cannot make this investment because it is included in the price we pay for the municipal paper and glass waste collection…this gives rise to a deadlock. On the contrary, a van collects paper once every two days."
Hence the importance of good coordination with the urban network! The hospital has also produced a guide to good environmental practices on waste sorting, which is distributed to each member of the hospital. "There are even tips for the home!" adds Pilar Prieto Morais. Similarly in Madrid, members of staff can follow the entire waste sorting chain and see what happens when bins are badly sorted. "We don't want to pamper staff because we consider them to be responsible people. Sustainable development is a shared concern."

A RECYCLING INDEX

In Granada, the first hospital initiatives regarding waste sorting date back to 1990's. "Our commitment isn't new. Since 1990, we have been working to improve waste management and sorting in an orderly and structured manner. Today, we are much more effective. In 2009, we recycled 20 tons of paper and cardboard, 41 000 wood pallets, 900 kg of ink cartridges and toner, almost 4 000 liters of cooking oil and more than 200 kg of batteries!" For three years, the hospital has integrated the consumption suffix R (R like reduce, recycle and reuse) in its practices. Thanks to this index, 64 per cent of materials used in our hospital are recycled and reused," says Martin Germán Blanco Garcia.

PAPER: LESS IS BETTER!

Paper represents the first consumable item used in the office and 75 per cent of its waste. At work, consumption per person and per year amounts to 30 reams, which equals 75 kg. At La Charité Hospital in Berlin, the digitalization of paper documents is in full swing. The strict necessary is printed and educational measures taken by the establishment have resulted in savings of 650 tons of paper per year! For a 140 bed hospital, using 70 grams A4 sheets instead of 80 grams saves 7 tons of waste per year. Internally, it is also a good idea to change the way you print documents: by printing two pages per sheet, double-sided or even promoting draft paper prints, you can save paper! A shuttle envelope can be used several times instead of one single use envelop.
The new integrated oncology centre in Laval, Québec is a pioneer in terms of waste paper proceesing: paper is simply no longer a part of the administrative system. "From the beginning, we wanted to create a universe without paper," explains Marc Vachon at the integrated oncology centre in Laval, "all information concerning patients is kept on a program and the patient's electronic file follows throughout the care continuum." This considerably reduces the quantities of paper used in this highly consuming unit. "Everybody concerned has access to the files online, it's a really transdisciplinary tool!". Dolores Godoy Moreno, management and environmental quality director of Asepeyo,(an occupational accident and disease insurance fund specializing in hospitals) believes that waste sorting has taken giant steps in its partner health establishments.
"To improve waste sorting, we have organized training sessions, sorting panels, and codes of good

practice. Above all, we have made a detailed study of the legislation applicable to each of the hospital centres in the region. Our objective is to minimize waste which represent a biological hazard. For this we referred to various laws at our disposal. [EDITOR'S NOTE: in Spain, this means municipal rules, legislation depends on each independent community, national legislation and lastly, European legislation.] Regarding chemical waste for example, we have eliminated the use of liquid developers and fixers used for x-rays. They have been replaced by a dry developing process in each of the three hospitals. This equipment reproduces the image on different substrates, using light or heat, information or an image is transmitted by electronic means. Progressively, we are aiming to get rid of these products in all our centres! "

SIGNPOSTING IS MORE THAN A GIMMICK

In Germany, at the largest hospital in Berlin, La Charité, sorting waste very important. The hospital was initially built to accommodate plague-stricken patients from the outskirts of the city during the 1 710 epidemic. The hospital is now located in the heart of reunified Berlin. With 3 213 beds and 14 425 employees, more than 7 265 students and 17 institutes, La Charité Hospital is highly influential in the world of German healthcare. "In terms of sorting, the most important thing for us is signposting and mobility ", says Tide Voigt, Environmental Manager. Easily identifiable containers are all over the hospital. In Germany, waste sorting is strongly anchored in people's minds. It is rare to find homes, which don't have two, three bins or even four bins, if you opt for compostable waste. "We also have a mobile cart which has four different bin bags, black for compostable waste, blue for paper, yellow for packaging which contains plastic and green for glass." These carts can be transported anywhere in the hospital. It's hard to miss the paper containers: the hospital welcoming leaflet reminds patients and visitors that it is necessary to use these carts for throwing magazines away!

The Alexis Vautrin Centre in Vandoeuvre-les-Nancys, France.

What about food waste? In the United States, the Portland Hospital has put a practical panel in its cafeteria: there are five different containers where people leave their meal trays, waste can be sorted in each of them. "Most of the cutlery and plates are recyclable, but this is not the case for all plastic cups. We had to get organized and develop a system." Above the containers, two large signs explain the system. Most items are stuck on have a sample photograph on the bins. "A glance at the panel shows people which container they must use for each item of waste. This has become a habit in the cafeteria."

BE, LIVE AND BECOME...

When purchasing or ordering a product we have to think of the waste it will produce. You need to know beforehand which treatment system will be necessary and if it does not exist, an appropriate system must be created. It is now frequent practice for suppliers to take back or directly retrieve part of their equipment. Recycling paper or avoiding single-use products when possible are simple actions which now seem banal to Sustainable development Committees in health institutions. It is also necessary to avoid waste, both at home and in the workplace. Food waste can be the first step in health establishments. Hospitals are the largest restaurant operators in France and are open 365 days a year.
In 2007, at La Roche-sur-Yon, France, the General Hospital launched an operation called "pre-sorting your tray". Posters indicate what must be discarded, or left in the plate to be sorted later by kitchen staff.
In Sarcelles, at the North Parisian Private Hospital, only the staff's organic bio waste is sorted: Sodexo has installed sorting containers. Staff members use them after each meal. Waste is put into a dryer, reduced to powder, and then redistributed locally to farmers to enrich their nitrogenous fertilizers. Some health establishments, in Angoulême for instance, work with farmers and deliver leftover bread, to feed poultry.
In Montperrin, tests are being carried out: the hospital has a twenty-hectare park, which needs fertilizing. Why not use the waste from lawn mowing, or from the 1000 meals prepared every day? In France, hospitals have begun to think about composting. At the MGEN Alfred Leune à Sainte-Feyre medical centre, waste produced by catering is saved. Vegetables, ground coffee and green waste are used to make compost. This compost is made in the former water treatment plant, which has been rehabilitated. This operation began in 2011 and aims to limit the production and transport of household waste and to reduce the cost of treatment. After a few months, this operation shows a 5% decrease in the volume of household waste and savings of 2 000 euros. Compost is used by the hospital gardening department for mulch and contributes to a more pleasant hospital environment.
In the United States, the Portland Hospital composts waste produced by the cafeteria: "Our waste is taken care of by a firm specialized in collecting and transforming compost as part of a composting scheme. It is a highly scientific process: they measure temperatures of compost and supervise all stages of its transformation into fertilizer. Then, we reuse it to fertilize our gardens," explains Roger Cole, Logistics Manager. At the moment, the OHSU has only one compost collection point. Roger Cole is hoping to quickly establish other collection points in all the buildings. "People take coffee or tea away with them and so nearly 18 per cent of the waste disappears!"
With recycling terminals, the cafeteria should be able to recycle all of its waste. At Fletcher Allen, in Vermont, the cafeteria does not have a deep-fryer, but a salad bar. The entire cutlery is biodegradable, confectionery and bakery goods are trans-free, therefore containing no trans-fats. All seasonings, such as ketchup, mustard and mayonnaise, are distributed by large containers eliminating surplus waste from individual packaging. The hospital cafeteria composts all its organic waste. "The waste is composted here, and is then used to fertilize the land of farmers who supply us." Similarly, the Pasteur Clinic in Toulouse has delivered 10 tons of Ecocert labelled compost to the producer who supplies organic vegetables for the canteen. This compost is the result of a year-long collaboration between the

producer, clinic and the composting plant. The cycle is complete!
Similarly, a lot of maternity units are beginning to think actively about the way diapers are used. Disposable diapers have a longer life span than a child. It takes between 300 to 500 years for diapers to disintegrate. They contain dangerous substances such as sodium polyacrylate (suspected of causing serious allergies such as toxic shock syndrome, it was removed from periodic tampons in 1985), benzol (carcinogenic), furans and dioxins. In 2000, Greenpeace also detected tributyl tin (TBT), which disrupts the hormonal system. A child uses almost a ton of disposable diapers between birth and potty training. In 2009, shocked by these findings, the Schiltigheim General Hospital opted for washable diapers made from hemp and organic cotton. According to Christiane Metzger, Senior Health Manager, "The cost is irrelevant to the maternity unit because it is an ethical and ecological choice". With 3 000 deliveries per year, the Schiltigheim maternity unit will have saved 100 000 disposable diapers a year, once experimentation has been generalized. For rental and cleaning, the maternity uses an external service provider, who also provides services to private individuals. The company's highly pragmatic manager, Stephane Piette, has asked a vocational rehabilitation centre to manufacture diapers which will then be cleaned by a social reintegration centre. These diapers have been endorsed both by paediatricians and the Committee for the fight against nosocomial infections. At the Louis Pasteur Hospital in Dole, France, the maternity unit also gives washable diapers to new parents.
But Québec wins first prize for washable diapers! At the Cité de la Santé Hospital in Laval, 3,5 tons of waste diapers will be got rid of in September, when the establishment will start using washable diapers. Following a pilot project which began in May 2012, supported by the Lange Bleu Association, the hospital will simply no longer use disposable diapers. «It»s the result of everybody's involvement, Heads of Department, nurses,» explains Sarah Dahmani from Lange Bleu. «Washable diapers have always been considered archaic. On the contrary, we have designed a modern ergonomic prototype, with a doubled capacity of absorption which allows for drips to be placed.»The Cité de la Santé Hospital holds the natality record in Québec with 5000 births a year. «It's a strong message for all the other hospital structures!» enthuses Sarah Dahmani. Bill Clark, at the Good Samaritan Hospital in the United States is also considering waste recycling solutions, which, so far, have not been found.
The textiles used by American surgical units are called blue wraps and they are very difficult to recycle. Once they have been in autoclaves, they become clean waste which is hard to get rid of.
So far, on the East coast of the United States, no company has been found to recycle them. "Here, they are compressed into bundles that we stick on pallets. They are sold for $100 per ton."
"Another success: used car seats. Bill Clark has not only found a firm which can recycle them, but he has also created real recycling program for car seats in Portland. The hospital warehouse has become a hub for recycling car seats. "Members of the Safety Seats

Two instruction signs placed above bins (Portland OHSU, Oregon, USA).

Dehydrator of the Sarcelles HPNP.


Waste treatment at the Alfred Leure medical centre in Sainte-Feyre, France.

program collect used car seats and send them to us. The metal is sorted then the scrap metal is re-melted and plastic is reprocessed via recycling channels. A small percentage of waste remains, but the whole process is dealt with by a local company. We follow products until the beginning of their new life. We try to stop them being stockpiled in another country."

THINK ABOUT OTHER PEOPLE, EVEN IF THEY ARE ON THE OTHER SIDE OF THE WORLD

Considering the whole lifecycle of a product involves forming a small local network, with recovery firms. International channels have been created for used medical equipment in order to equip countries in the Southern hemisphere.

SD CHECK-UP !

☐ Does your establishment employ a sustainable waste manager?

☐ Have you implemented a waste reduction and recovery policy?

☐ Do you communicate waste sorting procedures to your staff?

☐ Do your staff receive waste process training?

☐ Do you have a detailed inventory of all products used (name, reference, quantity, dangerous properties…)?

☐ Have you identified the dangerousness or absence of danger/risk of all solid and liquid waste produced in day to day tasks?

☐ Is the separation of hazardous and non-hazardous waste guaranteed from the beginning of production?

☐ Are hazardous wastes sorted from the outset of production?

☐ Do you have channels suited to different types of hazardous waste (medical waste with a biological hazard, chemically hazardous waste, drugs, radioactive waste…)?

☐ Do you preprocess medical waste with a biological hazard? Do you sort non-hazardous waste (paper, cardboard, glass…)?

☐ Do you have more than 10 sorting channels?

☐ Do you regularly check the physicochemical conformity of the effluent rejected in the urban network by your health establishment?

Tours

MULTIPLE TRANSFORMATION

Waste sorting is a multiple reality at the Tours University General Hospital. Optimized sorting, waste conversion circuits… better waste management requires imagination!

There are 35 sorting channels at Tours University General Hospital! This a record compared to the 31 channels set up at the Angoulême General Hospital, in 2009. It must be said that waste has been taken seriously since 2001 by Loire Valley hospitals. At that time, Pascal Barat, Care Manager was made responsible for the interface between technical and care services. Very quickly, the issue of waste came to his attention. And in 2005, when the University General Hospital noted an increase in household waste, he asked a few questions. "Our tonnage was increasing: we wondered what we could do". Then we began to identify our overruns. The first step was paper. "Our first channel isolated paper, we then took care of plastic packaging…" The dynamic was launched. Cans, previously crushed in the kitchen, and then incinerated, are now dealt with by a partner in the local community. Sorting can also have a social dimension: "I am particularly proud of what becomes of used textiles: we collaborate with 'Sort37', an association whose purpose is to reintegrate unemployed people, particularly women. Thanks to 'Sort37', textiles are reused as wiping cloths in the car industry." Wooden crates used for delivering fruit and vegetables are transformed into heating granulate used in boiler rooms. Paperboard packaging, household glass, everything has a reconversion process. The question of bio-waste has not been forgotten by the 35 channel system. "To begin with, we were of no interest to reprocessing platforms, because we were too small: no one wanted to make the detour to our hospital." Never mind, the hospital used its own waste containers. "We studied costs and realized that we could benefit from re-internalizing household waste collection! We now do the journey ourselves with our small deposit of 25 to 30 tons of compostable waste." The University General Hospital recycles food that has been uneaten at the canteen, as well as remnants from the preparation of food trays. "The next step is to make canteen users do the sorting themselves, we will then think about recovering patients' bio-waste". The University General Hospital also works with a factory which recycles bottles of sterile water from operating theatres into polypropylene.

ADEQUATELY ASSESSING MEDICAL WASTE WITH A BIOLOGICAL HAZARD

"Compared with 2000, our medical waste with a biological hazard have dropped by 20%. That's a fact. But some years are less efficient. We are going to redesign a sorting poster." For Pascal Barat, we have to contest the idea that everything that comes into contact with patients should be classified medical waste with a biological hazard. "The medical waste with a biological hazard issue is closely linked to psycho-emotional risk. Single-use washcloths, for example; are often classified medical waste with a biological hazard, simply because patients have touched them. Is this good reasoning? Or again: the glucose serum pockets used in veins… couldn't we throw them into the bin?" Identifying medical waste with a biological hazard in the hospital environment is a question of debate, for Pascal Barat.

HERE IS THE LIST AND SORTING CHANNELS DEVISED BY TOURS UNIVERSITY GENERAL HOSPITAL:

1 Household waste
2 Infectious medical waste
3 Rubble
4 Green waste
5 Wood
6 Used pallets
7 Wooden crates
8 Vials of sterile water and saline solution
9 Bio-waste from the cafeteria and kitchen
10 Ordinary industrial waste (OIW)
11 Boxes
12 Cardboard, plastic bottles and cans
13 Paper
14 Scrap metal
15 Lead containers
16 X-ray films
17 Chemical and toxic waste (with sub categories)
18 Highly concentrated cytotoxic waste
19 Plastic film from packaging
20 WEEE (Waste Electrical and Electronic Equipment)
21 Air treatment filters
22 Used batteries
23 Pace makers
24 Used chargers
25 Liquids used for cooling
26 Aerosol sprays
27 Used textiles
28 Tin cans
29 Printing cartridges
30 Cooking oil
31 Household food
32 Asbestos-containing waste
33 Used lamps (neon lights and light bulbs)
34 Oil and diesel fuel filters
35 Anatomical parts

SUSTAINABLE HEALTH

In Europe, one person out of ten works in the hospital sector. This includes care staff, practitioners, in short, the full organizational chart of professionals who form the Healthcare establishment. Employees' social health must not be taken lightly. To be truly sustainable, the hospital must provide good working conditions. Mental health problems at work are increasing and affect 20 per cent of the personnel according to the OECD (Organization for Economic Cooperation and Development). Over the last decade, the proportion of workers exposed to stress or tension at their workplace has risen in all European countries. In addition, notes the organization, "the increasing precarious nature of employment and the increase of pressure at work could lead to a deterioration of mental health in the years to come." These indicators are to be taken seriously: the authors of the report note that according to a cautious estimate from the International Labour Organization (ILO), the cost to society for poor mental health (health problems, absenteeism, decreased productivity, etc.), represents 3 to 4 per cent of GDP in the European Union. We must anticipate risks at the workplace!

TAKING CARE OF EMPLOYEES

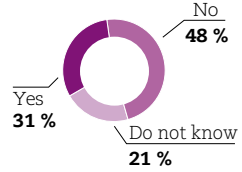
Care professions are vocational jobs. Do people work in the hospital sector by chance? A hospital is a wonderful hub of human emotion: birth, death, cries, pains, cures… quality requirement and, above all, safety, urging environment and financial regulations: all sufficient reasons for putting psychosocial risks at the head of priorities. According to Marc Wasilewski, president of Haute Vienne occupational health schemes in France, psychosocial risks represent approximately 40 per cent of threats to workers in the Health sector. "This might mean an excessive department manager or a nervously exhausted nurse who bully their department. You can quickly plunge into a nervous breakdown," he says. Breakdown, burn-out, nervous fatigue, taking care of workers also means anticipating risks. In the Health sector, handlers are also at risk of developing MSD (Musculoskeletal disorders). "Tendonitis is the occupational disease of the stretcher-bearer" confirms Marc Wasilewski. Moving patients and beds, carrying boxes of medicine, are circumstances for physical attacks which, over time, can cause chronic disorders. At the Taverny hospital for example, new washing machines are fitted in the catering service: less noisy, less heat-producing, they are much more pleasant for catering agents. In the U.S, at the Fletcher Allen Hospital, the purchasing department has decided to buy microfiber mops. "Everyone thinks that, these mops have really reduced the drudgery of work. This has even led us to revise our hiring criteria: before, to be employed by us, you had to be able to lift 15 to 17 kg. Now, 10 kilos are enough" explains Louis Dinneen.

A SCHOOL FOR "BACKS"

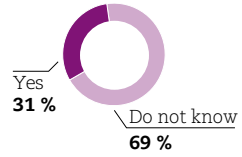
To fight musculoskeletal disorders, Tours University General Hospital has created a "school for backs". Here, we are taught the "gestures-postures "likely to reduce risks associated with a physical activity which, for caregivers, becomes all the more perilous once patients are elderly or dependent. Promoters of this "school for backs" also point out that non-care giving staffs (kitchen, laundry, sterilization) are also subject to a frantic work pace. They can also benefit from learning the right movements, to protect against premature fatigue at work. At the Taverny Hospital, a "gestures and postures" team consisting of three agents also sensitizes staff to bad working positions. In some departments, such as radiotherapy or chemotherapy, staff are likely to be in proximity to toxic substances. The regulation is evolving in the right direction. From 2010 onwards, occupational health has imposed an additional shift in some types of care to limit exposure. In Andalusia, at the Juan Ramón Jiménez Hospital, a real study was carried out to better identify absenteeism at work and to improve working conditions. According to Agustin Ortega, Environmental Director, "absenteeism is a very good indicator: improved working conditions means less absenteeism." The hospital has set up a commission for workstation adaptability for health, responsible for analyzing each individual case of sickness, and to adapt work according to the person's difficulties. "We prefer to have someone who can carry out 50 per cent of his/her duties than having someone who is off sick: we tailor posts to workers' health problems." This commission has existed since 1996. In Spain, after two years off sick, an employee is put into retirement, often on a very low pension. "At the beginning, our meetings created a lot of tension. But we all agreed on one point: to do everything to get the person back to work. We believe, a person does not have to be excluded from society, made dependent on State benefits due to a health problem. Being off sick also has psychological setbacks, such as depression. Our role is to keep the employee in the hospital and to do this, we adapt or change work. A disability does not always prevent

WHAT DO YOU SAY ABOUT SUSTAINABLE HEALTHCARE?

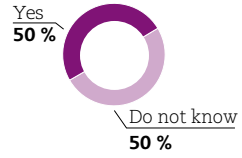
Do you implement measures to prevent and fight against psychological or sexual harassment?



Can members of staff benefit from a tobacco cessation program?



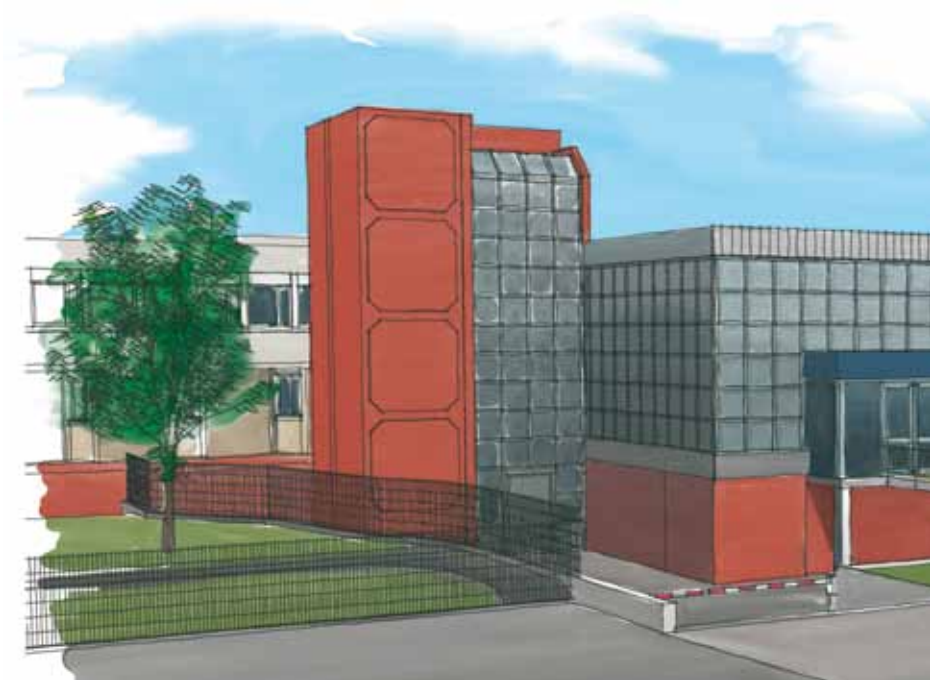
Is a MSDs prevention program available to your employees?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

people from working." The Juan Ramón Jiménez Hospital has also launched an exhaustive analysis of workstations to better identify the demanding nature of work. "We've analyzed absolutely all workstations in our hospital in terms of risk prevention and the demanding nature of work. This is something that must be constantly updated: the technology is improving and situations change… We must be attentive to any new element - a new machine, for example - which influences the way in which we work." The information is then placed in a management system. "We installed new irons and new dryers in our laundry. Although they facilitate work, these new technologies also produce a lot of heat. Staff had to withstand much higher temperatures, with high levels of humidity and neither the air conditioning nor the suction systems were sufficient to remedy the situation." Following the analysis of this workstation, the hospital reconsidered the whole air conditioning and air extraction system. The laundry has been expanded to increase the rate of air renewal. "This process took eight months, but today, everyone feels much better in the laundry. The working conditions have been optimized."
In 2010, the CFDT (French-union group) launched a wide investigation into working conditions in the Health sector. "We received 56 400 answers from people working in all areas. This phenomenal number of answers amazed us" explains Nathalie Canieux, General Secretary of the Federation. "The strange thing about the Health sector is that we witness firsthand the social irresponsibility. In healthcare, we are exposed to the excesses of the working world. We can observe how these excesses lead to health, social, and medico-social afflictions. A CSR or Corporate Social Responsibility and Sustainable development approach must be considered," she concludes.

MAKING WORKING CONDITIONS ATTRACTIVE.
Small practical initiatives taken by Human Resource departments can make a difference. At the OHSU, in Portland, the 16-storey building, eight levels are



CHARLES-ANTOINE BENHAMOU, DIRECTOR OF THE NORTH PARISIAN PRIVATE HOSPITAL, IN SARCELLES, FRANCE.

Reciprocity

Charles-Antoine Benahmou has made patients sign a positive practice Charter, which is displayed throughout the hospital. "Our Charter regards respect in two ways, patient's rights and the rights of health carers. We don't accept discrimination from either side. A doctor doesn't have the right to refuse a patient but a patient doesn't have the right to prevent his wife seeing a practitioner simply because he is a man."

The Sarcelles North Parisian Private Hospital, France.

Martine Payeur, "Sustainable caretaker".

devoted to medical imaging, surgery, and doctors' offices while the other floors house a Health club and physiotherapy centre with a gymnasium, swimming pool, balneotherapy centre and a spa. "These facilities are for patients, but employees can also take advantage of them," said Skai Dancy. Similarly, at the Good Samaritan Hospital in Portland, staff can have personal coaching and gym classes. At the Taverny Hospital, a free yoga session is given to employees every week as well as a 3 day introduction course to sophrology.

AESTHETICS ARE ALSO IMPORTANT!

At the Juan Ramón Jiménez Hospital in Andalusia, the visual impact of the facades, gardens, pedestrian zones and the car park is taken very seriously. "Every 6 months, we take photos and study the evolution, and following our assessment we do some renovation work, or make changes and improvements." explains Agustín Ortega, Director of the environmental department. "We've also got rid of architectural obstacles; this enables disabled people to get around without any problem."

IN SUPPORT OF THE "MAGNETIC HOSPITAL"!

The "magnetic hospital" is another good idea which comes from the other side of the Atlantic. This label, which is given to hospitals in the United States is based on a systematic study into nursing practices. The emphasis is placed on working conditions. The Magnet label is a quality indicator covering areas as diverse as involvement, professional autonomy, the working environment, prospects for professional development and training… In Canada, the label has been translated "établissement attractif" for French speakers. The ARIQ label is based on four criteria: the attractiveness of a hospital, its ability to keep staff, the involvement of nurses and the quality of care. Dominique Pon, Director of the Pasteur Clinic in Toulouse, was the first to create a "magnetic" hospital in France. "The "magnetic hospital" has enabled us to put into practice innovative and beneficial managerial concepts for our Healthcare staff," he says. "The "magnetic hospital" philosophy promotes the autonomy of nursing staff with decentralized management units. We are convinced that benefits will be visible in the long term, and we also hope that this will improve the quality of life and health of our carers in the short-term. Like any other establishment, we are fragile and we must remain very humble when we talk about results in the social sphere."

A SUSTAINABLE CARETAKER

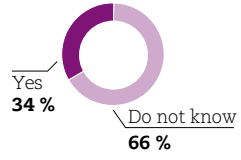
The Ambroise Paré Hospital in Marseille works with a sustainable caretaker to provide quality support for its employees. Martine Payeur, the caretaker works a three hour shift twice a week. She eases the logistics of hospital employees who lack time. The caretaker finds service providers for dry-cleaning, babysitting or housekeeping, ecological gardening, sewing, and a car wash service at the hospital. The caretaker chooses providers who respect working regulations and ensures the links between members of staff and providers. Services may be booked on-line or on a terminal in the establishment. "The word caretaker is the extras around the message: responsible consumption is possible, fun, and is not more expensive!" explains Martine Payeur. Staff eating habits is another matter for consideration; employees' daily lives can be improved on their plates. Particularly for those who work difficult night shifts and also must make do with cold meals or snacks. That is why some institutions have taken steps to provide their staff with balanced meals: "Employees who work nights can choose meals prepared during the day which are refrigerated in the canteen and served at night. This is a way to provide a balanced meal when nothing is available" explains Christelle Bracco, hygienist at the Aressy Medical and Cardiology Clinic.

WHAT IS ON PEOPLE'S PLATES?

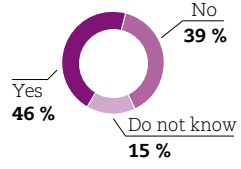
In 2010, the C2DS launched a national survey on the eating habits of people who work shifts or during the night. We must pay attention to the well being of staff who do shift work! The Brest University General Hospital carried out an interesting experiment: "We

WHAT DO YOU SAY ABOUT SUSTAINABLE HEALTHCARE?

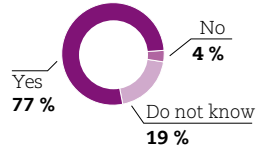
Do you implement measures to combat work related stress?



Do you propose a health prevention and education program to your patients?



Do you advise patients about their health before they go back home?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

set up a health food program, based on the study of the eating habits of 200 hospital employees. This study is a representative sample of institutional sociology. We observed dietary habits, with particular attention to shift workers. There is a lot to be done!" said Christelle Collec, Deputy Director of Brest University General Hospital. "Most night workers are concerned by the issue of food. Should I eat in the evening, or is it better to wait until midnight, would it be best to eat breakfast before going to bed? With the help of one of the art schools, we also planted a vegetable garden at the entrance to the self-service restaurant. After two years, we began to make a positive assessment of the impact of this program. Fruit and vegetable consumption has increased in the establishment. This increase is not overwhelming, but significant enough to conclude that staff are touched and everybody wants to continue the experiment!"

THE FAMILY WITHIN REACH

Jobs in care are commonly done by women and organized in shifts. It is not easy for mothers to combine shift work and childcare for their children when they are told at the last minute that they have to do the 7am shift or be on-call in the operating theatre. Steps to improve this situation are beginning to appear. In Echirolles, a suburb of Grenoble, the Cèdres Clinic has opened one of the first company nurseries in the area. It is called Les Petits Cèdres, and proposes unusual childcare schedules. The nursery opens at 6.30 am, a quarter of an hour before the first nursing shift, and remains open until 8pm. "We can take care of washing and dressing children in the morning as well as putting their pyjamas on in the evening!" explains its Director, Valerie Lamade. The 250 employees of the Cèdres Clinic know that they can use the nursery if necessary. There are many ways to take better care of hospital workers, anticipating danger, helping to reduce hospital violence, improving working conditions and combining family and professional life.

TAKING CARE OF PATIENTS

According to the medical Journal, Annals of Oncology, published in Oxford, approximately 717 000 men and 565 000 women will die in European Union countries from cancer in 2012. This represents a total of 1,3 million individuals for the current year. If deaths linked to the disease are declining as a result of carcinogenesis progress, the number of people suffering from cancer is exponentially rising. For a long time, this was attributed to the ageing of the population but this is not the explanationt. More and more young adults are affected, and childhood cancers are increasing at the rate of 1 to 1.5% per year. At the same time, thanks to medical discoveries and developments, the risk of death from cancer has dropped by 24%. Treatments are more effective, but the number of patients is higher: this is the inverted spectrum approach to Sustainable development in healthcare.

As always, this implies thought to understand causes of the rise in cancer and other pathologies in recent years. Instead of running head first in the frantic race to develop medical technology, perhaps it would be wise to question the correlation between the increase of certain diseases and the deterioration of the environment.

According to Lylian Le Goff, environmental doctor, "today, we see children with allergies, although they have no family history of allergy. The increase in obesity, diabetes and cancer now involves adolescents. And much worse: in 50 years, the sperm count rate of the human species has fallen by 50%. This is due to reprotoxic substances, contained in pesticides; our reproductive capacity has been halved!" New diseases have emerged such as multiple chemical sensitivity syndromes, a disease which is often the cause of working incapacity. People who are highly sensitive to chemicals and fragrances suffer from headache, nausea, and respiratory disorders. The Agaplesion Diakonie Hospital in Hamburg has designed two rooms for people with MCS and multiple allergies. For the first time ever, it is possible for people who suffer from environmental illnesses or severe allergies to be in a

The Aressy Medical and Cardiology Clinic, France.

hospital for medical treatment which is tailored to their health issues.

Today, the link between the increase of certain diseases, the decrease in sperm production and chemical pollution has become a public matter. On May 7, 2004, international scientists, doctors and representatives of environmental associations met in France at the Unesco to prepare the Paris Appeal. It was a historic statement concerning the health hazards caused by chemical pollution. The Paris Appeal was signed by French National Medical Board, two Nobel Prize winners, François Jacob and Jean Dausset, members of science and medical academies, Professors Jean Bernard, Yves Coppens, François Large, Lucien Israel, Luc Montagnier. Media personalities and humanists, such as Nicolas Hulot, Albert Jacquard and Boutros Boutros-Ghali also signed, along with 1 000 NGOS and approximately 200 000 citizens. This concern is real and it is time to take action. For Patricia Saraux, doctor and Urban Health Network Collaborator at the World Health Organization, it is the overall image of medicine that needs to change: "In France, it is considered that doctors are there to make prescriptions. Access to healthcare is important, but it does not solve everything! In Brest, we have an incredible care system but life expectancy in the region is not necessarily higher than elsewhere. Out-and-out cures are expensive, and the results are insufficient. We are coming to the end of a system." Health-care institutions must invent a new culture to achieve better awareness, accountability and therefore, better medical care.

PREVENTION AND TRAINING

PREVENTION

Therapeutic advances which fight cancer are not the only way to counter them. Prevention is an essential feature for Public Health. The war against addiction (tobacco, alcohol, and hard drugs), the improvement in nutrition and lifestyle, are subjects on which

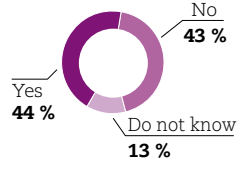
PATRICIA SARAUX, DOCTOR AT THE GENERAL UNIVERSITY HOSPITAL IN BREST.

Anticipating and collaborating

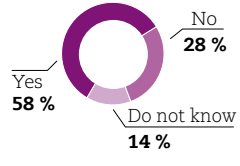
"In Brittany, we carried out a major campaign for suicide prevention, particularly in Brest where the percentage is very high compared to the national average. First, we hand out information through different training programs, mainly, in secondary schools and colleges. Our work was based on a wide survey of mental health. Our most effective action took place on 'Suicide Bridge'. We covered this powerful symbol with a protective cover, to stop people falling in the water. The results of the campaign were very good, but the hospital would never have been able to do this by itself! We had to build a partnership with the local road maintenance services to deal with this issue. This is the sort of necessary crosscutting for a real approach to Sustainable development."

WHAT DO YOU SAY ABOUT SUSTAINABLE HEALTHCARE?

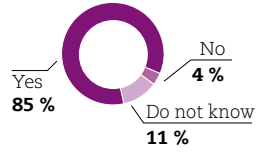
Is the National Health Nutrition Plan part of the objectives of your establishment?



Can patients order their meals from their bedroom?



Are nutritional advice given to patients according to their pathology during their hospital stay?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

healthcare professionals can relay information and reduce risks. Habits and living conditions or 'health determiners' account for 65% of good health, stresses the WHO. "For a long time, it was estimated that prescribing drugs was simpler and more rewarding than prevention," analyses Patricia Sarraux. "That was wrong. For me, it started with the arrival of AIDS. All of a sudden, we were faced with an incurable disease. The only lever to fight the epidemic was prevention. This was the birth of Public Health in France." Suddenly, the omnipotence of prescriptive medicine was shaken. Health professionals were forced to rethink their attitude to disease. That's how external partners, communication specialists, associations and well-known figures won legitimacy by undertaking joint actions with the hospital. Prevention starts early on. Detecting disease as soon as possible can often provide a better cure. Early screening for infant deafness and amblyopia are good examples of this. In France, the average age of diagnosis for severe and profound congenital deafness is still too high: over a year old. Worse still, medium deficiencies are detected between the age of 5 and 6, leading to school failures which could have been prevented. In the Languedoc-Roussillon region in France, professor Sarda and his team of the regional grouping of studies and prevention of metabolic diseases (GREPAM) were the pioneers in early detection. They have implemented systematic screening for infants as young as three days old. The technique is simple: you place a probe into the ear canal when the child is sleeping. The ear is stimulated by a sound and if the inner ear works properly, it emits a sound in return which is collected and analyzed by the probe. This test takes less than a minute per ear, and is totally painless. If a diagnosis is confirmed, support is immediately organized. In France, 2 to 3 newborn out of 1000 suffer from a hearing impairment. Similarly, paediatric ophthalmologists have done research into amblyopia, a visual impairment that affects 40 000 children in France. Amblyopia is a decrease in visual acuity due to a brain mechanism which neutralizes images received by the eye, without organic lesion. Diagnosed and corrected before 9 months old, amblyopia, also known as "lazy eye" which can cause strabismus, disappears completely. If treated before the age of two, eyesight can be totally recovered. Between the ages of 2 and 6, there is a 50% chance of recovery. Beyond this point, visual impairment is irreversible. Preventing amblyopia is therefore essential! For cancer prevention, healthcare facilities must show the example. At the Saint-Jean de Dieu Clinic, in Paris, doctors and employees participate in "The Parisian", a fund-raising event for breast cancer and cancer screening. The race takes place every year.

TRAINING

The hospital must not only prescribe drugs and treat patients. To be proactive in all the areas of Sustainable development, it must also accompany patients and provide information. In France, one

The Paris appeal
Article 1: The development of numerous current diseases is a result of the deterioration of the environment.

Article 2: Chemical pollution represents a serious threat to children and to man's survival.

Article 3: As our own health that of our children and future generations, is under threat, the human race itself is in serious danger.

The new Milford Hospital in Connecticut, USA, is brimming with sustainable healthcare initiatives.

person out of two walks into a hospital each year. Could a hospital stay be the occasion to follow a course to update their knowledge? Or could it be the opportunity for a patient to learn more about his/her health and his/her illness? Therapeutic education, which helps patients to live with disease, is vital.

TRAINING FOR CURATIVE PURPOSES

In Hanover, patients are going to school. This is the patients' university project, directly imported from the United States to the capital of Lower Saxony by Professor Schwartz from the Hanover school of Medicine.
In 2006, Professor Schwartz set himself the challenge of bringing back Dr. John Cohen's Mini Meds School concept from Colorado and to continue the transmission of medical knowledge in Hanover. Ever since it began four years ago, the 350 seat amphitheatre of the Patients' University is always full. "Academic medical knowledge is rarely accessible to the public and so we opened the doors of the university," explains Gabriele Seidel, in charge of communication at Hanover University. Where are organs, how do they work, what is chemotherapy, how can we prevent cancer? And of course, on a secondary level how can we make patients responsible for their health and treatment? That is the program we propose at the Patients' University. "The Patients' University was also intended to create a partnership between patients and doctors, to work together to fight disease." Courses are held from 6pm to 8.30pm and cost 9 euros 50. After a lecture, participants go to a small room where specially trained junior doctors await them, with modeled organs, and microscopes. "We also have prevention booths which we call "empowerment". Their aim is to strengthen the control of patients over their life and disease. We assume that someone who truly understands how a treatment works is someone who suffers less. "You don't need to be ill to attend these courses. They are open to anyone who could at some point, become a patient."
The patients' University courses are attended by the general public. However the majority of participants are over sixty. Although they have a high socio-cultural level, nearly half of those who attend have a direct experience of illness: they were or are suffering from a cardiological condition, diabetes… and 70% are women! What do patients do with their medical knowledge? "They understand treatments better, and are able to express positive criticism. It can lead some patients to change hospitals or specialist. Doctors appreciate patients who have attended the courses, they are on the same wavelength." The Patients' University is part of a dynamic evolution. The concept has followers; the city of Jena has opened its first Patients' University. "We hope other German universities will also follow our example!"

MARIE-JOSÉ CABANEL, DIRECTOR OF THE HOSPITAL CENTRE IN BETHUNE, FRANCE.

Avoiding overcrowding via therapeutic education

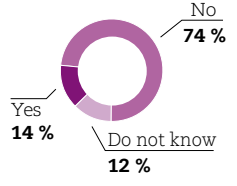
"We have sometimes experienced real bed shortages. With great numbers of patients, we had to give priority to seriously-ill patients and set others aside. This led us to think about and identify patients who come to hospital too frequently, mainly because they are unable maintain an effort once they return home. Professionals have therefore committed themselves to raise awareness and educate patients so that they fully benefit from their hospital stay when they go home. For respiratory disorders, doctors have organized 'effort' workshops."

A QUESTION OF EFFICIENCY

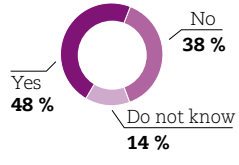
In order to give patient's opportunity to react to hospital care, the C2DS set up the HQO or the Hospital Quality Observatory. In 2011, 3 600 patients were interviewed by the OQS, six weeks after their hospitalization in a private or public institution, member of the C2DS. The first results are surprisingly good, 93 per cent of patients are satisfied with the support they received, while

WHAT DO YOU SAY ABOUT SUSTAINABLE HEALTHCARE?

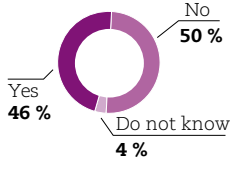
Do you evaluate and analyze the quantities of food returned on trays?



Is the establishment implementing a policy of reducing salt in meals provided to its patients?



Are you aware that the recommendation and the prescription of cosmetic products engage the medical liability?



Source: C2DS Observatory of Sustainable development in Heath, 2012.

97 per cent considered the care provided to be good, very good or excellent. More than 70 per cent were satisfied with the support they had regarding pain relief. “In the current context, where the hospital image is quite negative, these high rates rather surprised us,” explains the C2DS president, Olivier Toma. “This tool is interesting because the quality approach uses patients as indicators. It was a first experience because, up until that point, quality had not been measured on a national level in this way,” he says. “All institutions use satisfaction surveys, but different ones. Here, the questionnaire is the same for everybody with a survey carried out by a market research institute.” Is this the first step towards a quality approach validated by patients? In order to rethink healthcare in a more sustainable way, prevention and training are important factors. The hospital is opening up, nutrition and alternative therapies help to draw in a new perimeter for health which is broader and more sustainable, and includes the environment.

THE CARING ENVIRONMENT

Thinking about the patients’ environment and their link with the outside world is crucial.

CULTURAL ACTIVITIES IN THE HOSPITAL ENVIRONMENT

Bringing the outside world into the heart of the hospital is another way to care for its environment. In Italy, at the Pole Meyer paediatric Unit, some art installations are part of daily life. “Recently, we organized a party open to the general public and we hold art exhibitions on the occasion”, reveals Mrs Frasinetti. Every three days, an association sends 3 educators give gardening or art workshops. Children can use a toy library, a playground, a gardening area or a library. Children at the Pole Meyer paediatric Unit have plenty to read: “We also have a mobile library which regularly goes from one hospital unit to another. In order to make books available throughout the hospital and renew our stock, we work hand in hand with a neighbouring public library. After making an agreement with Giunt, a children’s publisher,

Sustainable development wall painting at the Rouen University General Hospital, France.

we have a dispenser that distributes books in the emergency waiting room. Children can consult them free of charge. "Nurses' uniforms at the Pole Meyer paediatric Unit are also very creative. Who said that children like white, or pale-coloured medical gowns? "Members of staff help choose the print for their uniforms: "we have several models, some are classical, but some are multi-coloured and have big patterns…" in Spain, at the Juan Ramón Jiménez Hospital in Andalusia, culture has also knocked at the door. "People don't read?" asked Agustin Ortega, "we bring the library to the hospital to reach citizens who are also our patients. The hospital has a partnership with the Ministry of Education and works directly with the local city library." The theatre and the cinema have also been invited into the hospital structure. "We meet in the auditorium after inviting patients to come down and see a play or a short film (up to 45 minutes). The symphony orchestra of Huelva also played here once. We installed optical fiber wiring in the auditorium and patients who cannot be physically present, can enjoy the show from their bed. The message that we want to give to patients is the following: don't worry, you're out of your cultural environment, but we can bring the city to you." In this way, some of the films shown at the Huelva festival were screened at the hospital. Another way to open up the hospital is by providing a school environment. Juan Antonio Ortega Garcia, in charge of Murcia environmental health centre believes that it is the duty of the hospital to make the link with the school system. "This year, Miguel Sanchez, one of our nursing environmental technicians has worked part-time with a secondary school teacher. They met every fortnight and Miguel's role is to help the school team and students to understand environmental health values. Trained professionals are needed to support establishment projects."

The hospital also publishes a Guide to environmental action in the school environment with themes such as: smoking, exposure to UV, pesticides, electromagnetic fields. Health Canada has developed a 2011-2014 Sustainable development strategy. The Ministry established the principle that it is impossible to separate Sustainable development from Health. To establish the link between the two, the main factors which influence Health have been identified and called "Health determinants". These determinants are grouped into broad categories which include the three pillars of Sustainable development, the environmental, social and economic factors. Health Canada is attached to other government Ministries and to the Canadian School of Civil Service in order to design and present new training courses on Sustainable development aimed at the staff of the Canadian public service, and notably those involved in Healthcare. What about food?

RICHARD BEAM, ENVIRONMENTAL DIRECTOR AT PROVIDENCE GROUP ON THE WEST COAST OF THE UNITED STATES.

Lots of spades!

In 2003, when the small Newberg Hospital opened its doors in Oregon, it was a hub of green and innovative ideas. But it is still a country hospital attached to its region. All the inhabitants of Newberg were invited to hospital's inauguration. 26 000 people attended. "Because the hospital was a very special project," laughs Richard Beam, Environmental Manager, "To have a bit of a joke, we suggested people should bring a spade with them to symbolize the beginning of construction. They all arrived with decorated spades, typical of small towns in Oregon. There were 11 300 spades all together! We are in the Guinness book of records for having the largest number of spades at our opening ceremony!" This was a good start for the flagship of Sustainable development.

FOOD

In spring 2011, an antibiotic-resistant bacterium attracted great public attention by causing the death of 47 people, 46 of whom were German. The "cucumber crisis" had dramatic commercial consequences. It was linked to the EHEC bacterium, believed to have come from Egypt, which infected the production of seeds to be germinated for salad seasoning. For the LIEN (the association for help to victims of infections contracted in a clinic or a hospital) and the ISSC, the Inter Association Collective for Health, there is a before and after EHEC. In France, health system users, 200 scientists, scholars and specialized institutions decided to form a French Alliance Against the development of multi-resistant bacteria (AC-2-BMR). They call for urgent action to be taken. It is important to understand that health begins on the plate before a health crisis of such magnitude! Surprisingly, American hospitals have been pioneers in hospital nutrition, Patients' food is taken very seriously, this has meant restructuring markets, and 'à la carte' menus, public Health campaigns and hospital kitchens managed by chefs!

CHANGING EATING HABITS!

Poached halibut filet with olive oil and new potatoes, seafood luigine, osso bucco, lamb… managed by Steve Hiatt, Tatiana Grabowski and the Italian chef Urbano Salvati, the OHSU kitchen has undergone a small revolution over recent years.

EATING DIFFERENTLY

"The cafeteria serves staff members, patients' families, and everyone who has understood that the food is good and reasonably priced," explains Steve Hiatt, catering manager. "Ten years ago, when I began working in the catering department at OHSU, the food wasn't extraordinary," he comments. "Most of the food served came out of cans or was ready-made in large quantities. We went back to the fundamentals of our business, which is food! Everything served in the cafeteria must be prepared in our kitchens." The OHSU wanted to break away from institutional catering, catering firms and huge

Drama, games and cinema in the hospital
Juan Ramón Jiménez, Andalusia

In Paris at the Turin Clinic, patients' beds have multimedia terminals (TMM) that can be fixed on the bedside table or with a articulated arm enabling every position. A tactile screen with access to the telephone, the television and the Internet.

quantities of preserved food stored in Tupperware boxes. "It is possible to make food which is healthy and tastes delicious at the same time. It just takes a lot of work and thinking and, most importantly, no compromise. We can't compromise on freshness, taste or on health needs. For example, we serve unsalted bread, but it still tastes great!" Urbano Salvati has managed to create 120 different menus. This diversity is important, because patients often lose their appetite and one of the challenges faced by hospitals is to get patients to eat. "Today, we have really broken away from mass feeding. We are trying to work like a private restaurant." But a restaurant which can take up to 3 200 orders per day...

A QUALIFIED TEAM

The new infrastructure of the OHSU canteen was much more demanding. The hospital did not hire a specialized chef but decided to train the existing staff. "It was a real revolution," explains Tatiana Grabowski, responsible for reclassifying staff, "In terms of cooking, most employees were used to mixing containers of food. But all of a sudden, we were talking to them about Julienne or velvety texture. I was shocked to see employees that I had known for ten years have a sense of pride in their job for the first time. The work they were being asked to do, was skilled," says Steve Hiatt, Catering Manager. "That is priceless. It was very rewarding for me to see these people jumping at the opportunity." Employees know that we are giving them tools which enhance their skills", adds Tatiana Grabowski. "Of course, it often means they take on more responsibilities, but they are making progress. It is also a question of self-image." The OHSU catering department is Sustainable in many ways: first of all, because it takes into account the environmental dimension due to its purchasing policy, through support to local agriculture and because it apprehends food as a caring practice. It also shows consideration for its employee's well being by offering them real professional opportunities. Finally, food provided at the OHSU is also an economic success, with the new policy; the cafeteria has made a net profit of one million dollars.

RECONSIDERING SERVICES TO PATIENTS

In Burlington, Vermont, the cafeteria at the 562 bed Fletcher Allen Hospital, provides a 'cook to order' service, which doubtlessly eases the patients' hospitalization. Dishes are prepared at the patient's request from a menu. Choosing food is also a way of passing the time of day for patients who are stuck in bed. "Giving people back a taste for life is essential when someone is or has been ill. Menus are adapted to various pathologies." If a patient is too weak, the menu can be ordered on the phone by family members. The real novelty of the Fletcher Allen canteen is its call centre. "Three people take orders and pass them on to the kitchen," explains Diane Imrie.

– "Hello, is it still possible to order breakfast at a quarter to twelve?"
– "No problem"
– "And for lunch, later on, I would like the dish of the day"

The young woman glances briefly at the screen. The software shows a lock. She replies:
– "I am sorry, it's not possible, that dish is not recommended for diabetics… the Caesar salad would be better for you."
– "Good. That's okay, thank you!"
– "Enjoy your meal!"
It takes 30 to 40 minutes to prepare and deliver dishes. Jessica Smith, a young woman has medical training. Taking orders is an easy job until she finishes her studies although she has become taken with the nutrition game. "I really enjoy the contact with patients. I end up knowing them, their tastes, their habits… I believe I'm doing a useful job. When things are explained to them, patients change their eating habits." Jessica Smith had two weeks training for the job.
"We mainly use local products in our kitchens and even the soy milk comes from Vermont! "says Diane Imrie. Fletcher Allen has also got a cafeteria for staff members and visitors which follows the same principles of nutrition. According to its Director, Daria Holcomb, "This is part of establishment philosophy. Vermont is a leading producer of organic products in America. Its economy is based on skiing and agriculture. We must take advantage of this fact." The latest specialty at Fletcher Allen is quite unusual: honey. Since 2009, the hospital has had its own hives and amateur beekeepers, often carers or members of staff, harvested honey for the first last summer. In Freiburg, Germany the hospital has created self-service buffets for patients. "We use 17 tons of organic carrots and 50 tons of potatoes," says Armin Schuster. In France, at the Pasteur Clinic in Toulouse, chefs, cooks and dietary staff are specialized in Sustainable Health Nutrition. An e-learning training module developed by a scientific laboratory allows them to advance at their own pace from home. They learn about 'Intelligent Nutrition', the seasonality of fruits and vegetables, cooking methods, good fats…

RECONSIDERING FOOD PURCHASE: FROM THE PLOW TO THE PLATE

In 2006, the small 85 bed New Milford Hospital, decided to revolutionize all its supply logistics. It launched the Plow to Plate program, on the initiative of the pediatrician Diane D'Isidori, the manager Anne Gallagher, and Marydale DeBor. "In Connecticut, there is a lot of fertile land. More and more farmers are settling here." The program is a success with a system of baskets of local produce and the weekly delivery of fresh vegetables which has literally exploded in the region. "There is a 3 year waiting list!" The hospital had to take advantage of this rich natural environment. The hospital has completely changed its supply chain. "We have entirely reinvented our menus which are based on local produce. At the beginning, it was not very easy to convince farmers to work with us. Prices we offered them were lower than average. Being a public utility organization and even if we recover extra cost through waste treatment, in our position as a public utility organization, we were unable to force negociations. That's how we had the idea of making them pay to secure the market. Instead of buying a certain quantity, we ordered hectares for growing vegetables. For example, we buy a hectare of potatoes and guarantee that we will purchase the entire production."
In Vienna, Austria, the hospital association canteens uses 30 per cent of organic products. Of course, initial expenditure is higher, but thanks to the composition of organic dishes, canteens meet their costs: organic products are more nutritious ensure a well-balanced diet to patients. When quality replaces quantity...

THE HOSPITAL CAN TEACH HEALTHY EATING HABITS

The New Milford Hospital also believes in its educative role. "We have formed a partnership with local schools and a cookery school. We take young people fishing. They are aged between 12 to 16 years old and we teach them how to cook fish. Children have become fervent supporters of good food. They

The Turin Clinic in Paris, France.

are our best ambassadors." But the hospital also runs classes on themes directly related to the hospital sector. What foods should you eat to prevent cancer? How to manage protein consumption? Or even, what should you eat when having chemotherapy? "People receiving chemotherapy treatment often suffer from nausea, with a metallic taste in the mouth and have difficulty eating. For cancer treatment to be successful, it is essential for patients to eat properly. Cooking classes can help them." Lessons are full. "We also work in retirement homes, elderly people forget to eat when they are isolated."

In Granada, Spain, the Junta of Andalusia, the authority which governs the independent province of Andalusia, runs a program which encourages organic food consumption in schools, retirement homes, and social centres. "The Health Sector pillar was missing!" says Martin Germán Blanco Garcia, environment manager. The Granada Hospital immediately offered to take part. Five Ministries (Environment, Agriculture, Education, Social Action and Health) are involved in this ambitious, cross-cutting project; eat better. "It is a success that administrations, have managed to support a joint project over and beyond their political divides." It was difficult to serve organic meals throughout the year. "Currently in Andalusia, there is no distribution channel, or stable market which would help to ensure the supply of sufficient volumes of all products." The hospital proceeded step by step. "We are beginning to incorporate organic food where it is easiest for us, for breakfasts and snacks." However, it hasn't been simple due to the additional costs of organic products.

"We had to find producers and analyze their products to determine whether they met our requirements for balanced meals." It was a laborious process. "But, for the last three years and in spite of difficulties, the hospital has served organic breakfasts and lunches." This policy has launched a new dynamic in local agriculture. We didn't want organic agriculture to be a fleeting trend but agriculture for the future. Our purchasing capacity is enormous. One and a half million meals are distributed every year. We have the means necessary to guarantee market support for the development of local organic agriculture in a sustainable manner. We have a strong voice which differs from that of politicians. We can and must act accordingly to change eating habits."

When the hospital began its program, the organic produce sector did not exist in Granada. Today, two industrial bakeries produce organic bread, and supply supermarkets. This was all initiated by the

Farm boxes: health vouchers!

In order to give real support to local agriculture, the New Milford Hospital, USA, also organizes a green market… and prints its own banknotes! The Farm box is worth $5 to be used on the market. Doctors distribute vouchers to patients along with brochures about healthy food.

hospital sector. Opening up to alternative therapies may also be an asset!

ALTERNATIVE THERAPIES

The assessment of complementary medicine: Osteopathy, acupuncture, homeopathy, hypnosis is one of the points of the AP-HP 2010-2014 strategic development plan. "Nowadays, we can no longer ignore that alternative medicine is growing," says Professor Jean-Yves Fragon, Director of the complementary medicine orientation Committee and head of the Intensive Care Unit at the Georges Pompidou Hospital in Paris. In sight, with the possibility of State reimbursement for these complementary therapies. By putting human beings at the heart of the hospital, hospital professions are recognized and worthy. At the maternity Unit in the Essonne Clinic, Evry, all new mothers can have a consultation with a psychologist, a sexologist and an osteopath. It is a holistic vision of medicine, caring with a wider view point regarding patients. The Lampre Clinic, in the Hautes-Pyrenees, France held a series of conferences about positive medical treatment. Leo Raynal, its director says: "We wanted to reverse the situation: when we talk about positive treatment, it is assumed that there is no abuse. Prevention is better than a cure." According to him, the essence of positive treatment can be found in sharing and communicating amongst employees, and especially with patients. "We organized an internal training session with our quality commission, on this theme. In the end, the twelve establishments, private clinics and retirement homes who signed our convention were interested in this training course.

IT WAS A SUCCESS ALL ALONG THE LINE!

At the Saint-Grégoire Private Hospital Centre, Ille-et-Vilaine, hypnosis is used for relaxation or to treat pain. "In 1999, thanks to the progress of modern brain imaging, objective evidence demonstrating the effect of hypnosis has been published in one of the world's major medical journals, The Lancet." explains Dr. Frank Bernard, initiator of the technique. Far

from being a cliché, it is a hypnotic sedative. It also implies redefining elements of therapeutic language. The brain cannot hear negation. If you are told, for example: "don't think about a fire truck", you'll immediately visualize it. The therapeutic language has to be reviewed: "if we say, don't worry, don't stress", the brain retains, concern, worry, stress…! So, make sure you use appropriate language!"

REINTRODUCING HUMANISM

According to Thierry Janssen, surgeon, psychotherapist and author, medicine of the twenty-first century has to recover its human potential. This can be accomplished through integration, in addition to less curative practices which give vent to emotions. In the maternity Unit at the Kenval Polyclinic in Nîmes, Dolores Renaudeau organizes baby massage classes. "Touching is still taboo in the West," she explains, "Mothers are not always at ease with skin to skin contact. They worry about

The menu from the Marquam Hill of the Portland OHSU in Oregon, USA, often stays away from the bugger-chips-cola.

their child being cold and may feel uncomfortable with nudity," whereas in Indian or African cultures, massaging babies is part of a child's growth.

COPING WITH DEATH IN HOSPITAL

Support and humanity are paramount in palliative care

Even though people are dying, life goes on at the palliative Care Centre in the Vauban Polyclinic, France. "I believe that "human presence has the same effect as morphine," says Dr. Philippe Thomazeau, head of this small six bed unit. "Patients facing death suffer tremendous anxiety and we need to stay with them and hold their hand". It is difficult for nurses to consider this kind of support as a medical act. "In other units, we can count the number of dressings or the number of bedridden patients washed, but here human presence is what is important," explains Renee Picquet, head nurse. Each team member must be able to consider a patient as a whole. "In a palliative care Unit, time is very different from other wards such as accident and emergency," explains Dr. Thomazeau. "Here, time spins out, what is important is the link with the patient. If a patient wants to get up at 11am, the unit must adapt." Visitors are welcome 24 hours a day. A psychologist provides consultations to help relatives with bereavement.

CHARLES-ANTOINE BENHAMOU, DIRECTOR OF THE PRIVATE HOSPITAL NORTH PARISIAN SARCELLES, FRANCE.

Understanding patients

57 ethnic groups are represented in Sarcelles. This creates language and translation difficulties in the hospital. We came upon the idea of supporting ourselves with the skills of our staff. They are a cross-section of the population of Sarcelles. We carried out a large survey amongst our employees, asking them to tell us which languages they speak. Mandarin, Bambara, Turkish, Tamil… more than 30 people made their language skills known. This is indispensable in a multicultural clinic like ours."

The human dimension of medicine is also one of the challenges of Sustainable development.

BUILDING SPECIALIZED UNITS

Another way to give visibility to sustainable medicine is to build 100 per cent environmentally healthy units. This is the case in Spain and Germany. In Spain, at the Juan Antonio Ortega Garcia pediatric Unit in Murcia, patients are always considered in relation to their environment. If I meet the family of a child who has leukemia, I have to work on the child's "environmental history". This helps me determine risk factors." The green sheet, included in the environmental medical record consists of about twenty questions related to children. These have been introduced in all units. We ask if parents smoke. "This should be part of a child's medical record! We also ask what occupational risks parents face. Are they likely to bring chemicals home with them on their clothing? We are then able to make useful recommendations to families and give them tools for improving their quality of life. "The "green sheet" helps practitioners identify children who are in contact with environmental risk factors (pollution, toxic substances…). Early detection of these risks (in the home, professional environment, school…) enables prevention and/or treats these risks as soon as possible, by changing adult behaviour. "Ignorance is the reason why doctors don't incorporate these facts in their medical practices. We have got to teach them!" concludes Juan Antonio Ortega Garcia. According to him, children are the heart of environmental health: newborn babies take 600 breaths per minute, compared to 12 times/min for adults! When breathing, they breathe in toxins contained in the air. Furthermore, they can only feed on breast milk. We must also take this into consideration.

"Young children drink lots of water. My son, aged 5 can easily drink 2 liters per day and he weighs 20 kilos. The water ratio per kilo is therefore very high and my son absorbs more toxic substances if the water he drinks contains them. Their impact is therefore stronger." Children are also nearer to the

ground. "Imagine parents who disinfect carpets by fumigation to get rid of ants or roaches…Adults who walk on the carpet are further away from the ground than children. Children also put things into their mouths. If we spent time crawling around the floor like toddlers, we would remember a multitude of smells and flavours. This is our limbic system!
A lot of substances, such as compound N-oxides, nitrous, VOCs, are heavier than air. They remain in high concentrations near ground level, at a child's height! "
According to the WHO, 40 to 50 per cent of the diseases which can be attributed to the environment affect children, particularly those under the age of 5. "Since 2009, in Murcia we have also held consultations for reproductive environmental health. Reproductive functions are deeply affected by the daily use of reprotoxic substances. Until now, couples have been consulting for obstetric problems but only for prenatal risks. No one was worried about the environment. These environmental health consultations allow us to assess risks and to intervene on various fronts. It is a holistic approach to reproductive health issues." Taking toxic pollution into account in the care process is a necessary evolution which improves efficiency. According to Francisco José Eletaruiz, environmental technician in the Basque country the hospital's role is also to raise the alarm! "In our co-branded [EDITOR'S NOTE: Guipúzkoa, administrative groups in the Basque country] a study has shown that it has one of the highest rates of cancer in the country. Why? It is suspected that a local steel factory could be rejecting mercury… The hospital's role is also to bring attention to such issues!"
In Freiburg, Germany, the Institute of Environmental Medicine intends to carry out studies on pollutants created by hospitals (effluent, toxicological studies) and on new pathologies caused by environmental and chemical changes. This approach is doubly responsible. The research is carried out by a laboratory which experiments with natural medicine and alternative therapies. Armin Schuster, Health and Safety Manager at the Freiburg University Hospital is also known as a "habitat doctor". "I go to people's homes and I take specimens to detect possible allergens in their homes." Fungi, toxic moulds, organic compounds are identified and their toxicological implications are immediately evaluated. "Previously, private companies dealt with this type of analysis. Their skills as chemists were undeniable. However, they sometimes frightened people unnecessarily with regard to the medical aspects. I think it's very important for the analysis of the

CHRYSTELLE COLLEC, GENERAL UNIVERSITY HOSPITAL IN BREST, FRANCE.

Children, development and the environment

"In our neo-natal Unit, we have implemented a program based on the idea that child development goes hand in hand with his/her environment: noise is lower and light is softer. Everything is done to create a pleasant atmosphere adjusted to babies. We respect their sleeping patterns, only taking care of them when they are fully awake, invasive examinations are practiced when medically necessary, and parents are closely involved with infant support. Unlike conventional units for premature babies, where visiting rights are limited, parents are involved in the treatment, and can have 'skin' contact with their child. The impact on the child's development is very positive. Oxygen consumption and ventilation and sleep then increase. Pain is also reduced. The most unexpected impact is the positive effect on the staff. They feel more implicated in their work. The human being is the heart of the profession; it is once again their main focus."

What to eat in prevention of cancer?
How to manage protein consumption?
What to cook when being treated with chemiotherapy?

habitat to remain attached to the hospital." It is still a paying service: 500 euros for the complete analysis of a room. In France, the Brest General University Hospital has just started medical consultations for environmental health. This is intended for anyone who has symptoms which are potentially related to exposure. A consultation may be followed with a home visit by a technician from the City of Brest. This in-situ evaluation measures a number of physical or chemical parameters. This is a first!

SD CHECK-UP !

- ☐ Do you have good relations with occupational medicine?
- ☐ Do you seek suitable solutions to prevent absenteeism?
- ☐ Have you given thought about what your shift workers eat?
- ☐ Do you have a mentoring program for psycho-social risks?
- ☐ Do you have a nursery?
- ☐ Do you have flexible working hours?
- ☐ Do you have a risk-reduction program at work?
- ☐ Do your practitioners focus on prevention?
- ☐ Do you give training courses for patients?
- ☐ Is there a therapeutic education program in your hospital?
- ☐ Is there a cultural program available to your patients?
- ☐ Do you feed organic food to your patients?
- ☐ Is there a strong dietary policy in your establishment?
- ☐ Are there alternative therapies to give care support?

ANTICIPATING THE TRANSITION FROM CURATIVE MEDICINE TO PREDICTIVE MEDICINE

LUC MONTAGNIER,
Biologist and virologist, Nobel Prize-winner for Medicine for the discovery of HIV in 1983, the virus responsible for aids, and emeritus professor at the Pasteur Institute.

FRÉDERIC BIZARD
Consultant and lecturer at Sciences Po (a French faculty renowned for multi-disciplinary education in the social sciences), Paris.

Forum published in *Le Monde*, March 13th, 2012 (Extracts)

[...] The health of a population does not only depend on the health services in that country. It is present in all major State functions: education, environment, sport, agriculture, city, internal security, work, research, industry, and budget. Transversal healthcare management necessitates a new collaboration between the Ministry of Health and other major State functions. Healthcare cannot depend on the prerogatives of a specialized institution. It is a part of the common good and is linked to the State's activity and its government. It must then be guaranteed that change in the system must be adapted to the new health issues of our century, be they technological, economic or social. We are gradually going from curative medicine in the last century, towards "4P" medicine - preventive, predictive, personalized, participative - which basically changed the basis of the system. 4P medicine needs to be integrated in the following: relations between urban medicine and hospital medicine, relations between patients and doctors, general practitioners' missions, training and the way health professionals are remunerated, choice of investment in research, collection and exploitation of data, the place and the way in which the Department of Health is run…

Although, the idea of prevention has not yet been integrated into our system, we will enter over the next ten years, the era of predictive medicine, thanks to the revolution of genomics, new technologies and early detection markers linked to the occurrence of slowly evolving diseases.

The extension of telemedicine allows tremendous advances in the productivity of our care. The applied fields of investigation and application of preventive and predictive medicine are enormous and will generate considerable economical and industrial developments. The current low level of consideration from medical and political authorities for this change is due to the inadequacy and lack of thought about our Health system and the challenges we are faced with this century. Research grants for prevention are minimal in the mass budget devoted to medical research. The transversal approach to Health and 4P medicine to care is based on individual and interpersonal relations. It has moved on from a system centreed around disease, towards a system centreed on a person, and his/her health. This means getting Health out

of hospitals and developing it in schools, businesses, sports clubs...and in the daily lives of individuals. Therefore, to begin with, we need a change of mentality from everybody. This renders the silence of politicians even more deafening.
Finally, Sustainable development, with man and his health as its focal point, will be the major issue of the twenty-first century. Nations who play a leading role will probably be those who have already made heavy investments in this sector. Healthcare will be a substantial economical and human wealth generator in the next few decades. It is amazing that France is not part of this history which is happening before our eyes. The presidential campaign perfectly illustrates the mistake of not making Health, a unconditional function of the State and a strategic sector for investment, although it is our most valuable asset. [...] France has great potential to make a success of the Health, social and industrial transformations indispensible to our times. What is lacking is political willpower!"

We are gradually going from curative medicine in the last century, towards "4P" medicine - preventive, predictive, personalized, participative.

Adopt good Sustainable development practices with the C2DS for better health

The Committee for Sustainable Development in Healthcare (C2DS) is a non-profit organization established in 2006, under the high patronage of the ministries of health and the environment. The members of C2DS are health professionals mobilized by Sustainable development.
The objective of the C2DS is to raise awareness in the healthcare sector and amongst stakeholders to the benefit of good Sustainable Development practices in order to better control the human, environmental and economic impact of their activity.
For the C2DS, the world of healthcare must be exemplary on these three points in direct relation to the Hippocratic oath: «First do no harm, then treat». The C2DS works as an independent «body of research»,a proposition force and diffuser of ideas. It provides methods, tools, and training to accompany members of its network of healthcare professionals, all bearers of a Sustainable development project.

The C2DS regroups 270 health institutions, public, private, semi-private, health centers, cancer centers, retirement home and “hospital at home” services.

WARNING

Warning and giving information about health threats (campaigns against baby cosmetics in maternity units, phthalates, BPA, ethylene oxide, nanoparticular form of titanium dioxide).

NETWORK

Federating and managing a network (5 working groups: sustainable waste management, waste reduction, energy & water, ecoconstruction, nutrition).

PUBLICATIONS

Sensitizing healthcare professionnals to the effectiveness of Sustainable development (Guidelines for better practices in the health sector, 2009, 2010 and 2011 (English and French versions). Documentaries: Toward a world of health, 2009, The ecoconstruction of health facilities, 2011).

TRAINING

Sustainable development training for healthcare professionals: various training modules are available.

CODE OF CONDUCT

Unique initiative in Europe to encourage managers to commit to their patients, institution and profession but also towards the environment an society.

HEALTH SDI

Sustainability indicator in healthcare, a self-diagnostic tool developed specifically for the Health sector.
The sustainability indicator addresses the issues of management, waste, purchasing, ecoconstruction, energy, water, transport and social responsibility.

AUDIT

The C2DS Primum can provide Health professionals with the necessary diagnostic tools, procurement, waste, carbon and energy audit; analytical tools for indoor air quality and determining chemical risks in the establishment; HEQ® support guidelines; support tools aiming at compulsory French certifications, ISO 14001, ISO 26000, Agenda 21 and EMAS.

c2ds committee for sustainable development in healthcare

www.c2ds.eu

DIRECTORY

France, Germany, England, Austria, United-States of America, Canada, Italy, Japan, Netherlands, Sweden, Slovakia, Switzerland... All the medical establishments that we investigated.

FRANCE

Parc Rambot Polyclinic
2, av. du Docteur Aurientis
13611 Aix-en-Provence

Montperrin General Hospital
109, av. du Petit Barthélémy
13617 Aix-en-Provence

Alès General Hospital
811, av. Docteur Goubert
30103 Alès

Amiens-Picardie University General Hospital
Place Victor Pauchet
80054 Amiens

Philippe Pinet General Hospital
Route de Paris
80000 Amiens

University General Hospital
4, rue Larrey
49933 Angers

Anjou Clinic
87, rue du Château d'Orgemont
49044 Angers

Angoulème General Hospital
Rond-Point de Girac
CS 55015 Saint-Michel
16959 Angoulème

Béarn Dialysis Centre
6, rue du Village
64320 Aressy

Arbizon Medical Centre
Domaine de l'Arbizon
65201 Bagnères-de-Bigorre

Saint Thomas de Villeneuve Hospital
2, rue Hippolyte Fillioux
35470 Bain-de-Bretagne

Delay Clinic
36, av. de l'Interne Jacques Loëb
64115 Bayonne

Bethune General Hospital
Rue Delbecque
62408 Béthune

Aressy medical and cardiology Clinic
64320 Bizanos

Blois general Hospital
Mail Pierre Charlot
41000 Blois

Blois General Hospital
Mail Pierre Charlot
41000 Blois

Avicenne AP-HP (Paris Public Hospital)
125, rue de Stalingrad
93009 Bobigny

Tivoli Clinic
91, rue de Rivière
33000 Bordeaux

Bordeaux University General Hospital
12, rue Dubernat
33404 Bordeaux

La Lauranne Clinic
1059, chemin St Hilaire
13320 Bouc-Bel-Air

Val d'Orb Clinic
ZÀ Monestier
34760 Boujan-sur-Libron

EHPAD Les Résidences de Bellevue (longterm care retirement home)
Rue du Président Maulmont
18021 Bourges

Brest University General Hospital
2, av. Foch
29609 Brest

Médipôle Polyclinic
5, rue Ambroise Croisat
66330 Cabestany

Saint-Roch Clinic
128, allée Saint-Roch
59400 Cambrai

Cannes General Hospital
15, av. des Broussailles
06414 Cannes

Montréal Polyclinic
Route de Bram
11890 Carcassonne

Mas de Rochet Medical Clinic
563, chemin du Mas de Rochet
34170 Castelnau-le-Lez

Chambery General Hospital
BP 1125
73011 Chambéry

Mayennais South-West Local hospital
3, route de Nantes
53400 Craon

Dax General Hospital
Bd Yves du Manoir
40107 Dax

Louis Pasteur General Hospital
Av. Léon Jouhaux
39108 Dole

Cèdres Clinic
21, rue Albert Londres
38432 Échirolles

Val d'ouest Clinic
39, chemin de la Vernique
69130 Écully

Essonne Clinic
Bd des Champs-Élysées
91024 Évry

Pavillon de la Chaussée Geriatric and Specialized Centre
Chemin de la Chaussée
60270 Gouvieux-Chantilly

Louis Conte Gramat Local Hospital
150, av. François Souladié
46500 Gramat

Ham General Hospital
56, rue Verdun
80400 Ham

Lagny-Marne-la-Vallée General Hospital
77600 Jossigny

Jury-les-Metz Specialized General Hospital
BP 75088
57000 Jury-les-Metz

Blois Polyclinic
1, rue Robert Debré
41260 La Chaussée St Victor

Lannemezan Hospitals
644, route de Toulouse
65308 Lannemezan

La Roche-sur-Yon General Hospital
Les Oudairies
85925 La Roche-sur-Yon

Hauts Avignon outpatients surgery Centre
275, av. Charles de Gaulle
30133 Les Angles

Les Lauriers Roses convalescence Centre
06670 Levens

Libourne General Hospital
112, rue de la Marne
33500 Libourne

Roger Salengro Hospital
2, av. Oscar Lambret
59000 Lille

Lille Regional University General Hospital
Rue Émile Laine
59037 Lille

Colombier Clinic
92, av. Albert Thomas
87100 Limoges

Limoges University General Hospital
2, av. Martin Luther King
87042 Limoges

Esquirol General Hospital
15, rue Du Dr. Raymond Marcland
87000 Limoges

Emailleurs Clinic
1, rue Victor Schoelcher
87038 Limoges

Leon Berard Centre
28, rue Laennec
69008 Lyon

Parc Clinic
155, bd de Stalingrad
69006 Lyon

Ambroise Paré Hospital
1, rue d'Eylau
13291 Marseille

Paul Desbief Hospital
38, rue de Forbin
13002 Marseille

Paoli-Calmettes Institute
232, bd Ste Marguerite
13009 Marseille

Metz-Thionville Regional General Hospital
28-32, rue du XX^{e} Corps Américain
57000 Metz

Clémenville Clinic
25, rue de Clémentville
34070 Montpellier

Saint-Jean Clinic
36, av. Bouisson-Bertrand
34 093 Montpellier Cedex 5

La Menaudière SSR Centre (Follow-up and rehabilitation care)
Chissay-en-Touraine
41400 Montrichard

Children's Hospital
58 rue des Bourdonnières
44200 Nantes

Nevers General Hospital
1, bd de l'Hôpital
58033 Nevers

Nice University General Hospital
30, voie Romaine
06000 Nice

Les Sophoras Clinic
Rue des Sophoras
30000 Nîmes

Kenval Polyclinic
Avenue Kennedy
30900 Nîmes

Niort General Hospital
5, rue Notre Dame
79000 Niort

Inkermann Polyclinic
84, route d'Aiffres
79000 Niort

Orleans Regional General Hospital
1, rue Porte Madeleine
45000 Orléans

Saint-Pierre Institute
371, av. de l'Évêché de Maguelone
34250 Palavas-les-Flots

Bichat-Claude Bernard Hospital
46, rue Henri-Huchard
75018 Paris

Poitiers University General Hospital
2, rue de la Milétrie
86021 Poitiers

Saint-Jean de Dieu Clinic
19, rue Oudinot
75 007 Paris

Turin Clinic
5-11, rue de Turin
75008 Paris

Georges Pompidou European Hospital
20-40, rue Leblanc
75015 Paris

Navarre Polyclinic
8, bd Hauterive
64075 Pau

Princess Clinic
6, bd Hauterive
64000 Pau

Poitiers Polyclinic
1, rue de la Providence
86035 Poitiers

General University Hospital
2, rue de la Milétrie
86021 Poitiers

Rambouillet General Hospital
5, rue Pierre et Marie Curie
78120 Rambouillet

Reims University General Hospital
25, bd Wilson
51100 Reims

Lyon-Nord Clinic
941, rue du Capitaine Julien
69165 Rillieux

La Roche sur Yon General Hospital
Les Oudairies
85000 La Roche-Sur-Yon

Rouen University General Hospitals
1, rue de Germont
76031 Rouen

Pasteur Clinic
222, route de Rochefort
17200 Royan

Alfred Leune Medical Centre
23000 Sainte-Feyre

Saint-Grégoire Private General Hospital
6, bd de la Boutière
35768 Saint-Gregoire

Bégin Military Hospital
69, av. de Paris
94163 Saint-Mandé

Angoulème General Hospital
Rond Point Girac St Michel
16470 Saint-Michel

North Parisian Private Hospital
3, bd. Maréchal De Lattre de Tassigny
95200 Sarcelles

SIHCUS-CMCO Obstetrics and surgical Medical Centre
19, rue Louis Pasteur
67303 Schiltigheim Cedex

Lampre Clinic
55, rue de la République
65600 Séméac

Civil Hospital
1, place de l'hôpital
67000 Strasbourg

Parc de Taverny Hospital
Chemin des Aumuses
95150 Taverny

Toulouse University General Hospital
2, rue Viguerie
31000 Toulouse

Pasteur Toulouse Clinic
45, av. de Lombez
31300 Toulouse

Sarrus Teinturiers Clinic
49, allée Charles de Fitte
31300 Toulouse

Tours Regional University Hospital
2, bd Tonnellé
37000 Tours

Saint-Gatien Clinic
8, place de la Cathédrale
37000 Tours

Alexis Vautrin Centre
6, av. de Bourgogne
54511 Vandoeuvre-les-Nancy

Vauban Polyclinic
10, av. Vauban
59300 Valenciennes

Vienne General Hospital
Montée du Dr Chapuis
38209 Vienne

Vierzon General Hospital
33, rue Léo Mérigot
18100 Vierzon

MECSS La Guisane
Rue de la Croix de Bretagne
05100 Villard Saint-Pancrace

GERMANY

La Charité University Hospital
Charitéplatz 1
10117 Berlin

Freiburg University Clinic
Hugstetter Strasse 49
79095 Fribourg

Agaplesion Diakonie Hospital
Hohe Weide 17
20259 Hamburg

Asklepios Harburg Clinic
Eißendorfer
Pferdeweg 52
21075 Hambourg

Asklepios Barmbek Clinic
Rübenkamp 220
22291 Hamburg

Asklepios Wandsbeck Clinic
Alphonsstr. 14
22043 Hamburg

Patients' University of Hanover Medical School
Carl-Neuberg-Str. 1
30625 Hanovre

ENGLAND

NHS
Riverside House 2a
London SE1 9HA

UCLH
235 Euston Road
London NW1 2BU

Charing Cross Hospital
Fulham Palace Road
London W6 8RF

Hammersmith Hospital
Du Cane Road
London W12 0HS

Queen Charlotte's and Chelsea Hospital
Du Cane Road
London W12 0HS

Saint-Mary Hospital
Praed Street
London W2 1NY

Nottingham NHS Trust University Hospital
Hucknall Road
Nottingham NG5 1PB

AUSTRIA

Gesundheits- und Spitals-AG
Hafenstr. 47-51
4020 Linz

Baumgartner Höhe Socio Medical Centre
Otto-Wagner-Spital
Baumgartner Höhe 1
1140 Vienne

Glanzing Children Clinic
Thomas-Klestil-Platz 7/1
1030 Vienne

Clinique pour enfants de Glanzing
Montleartstr. 37a
1171 Vienne

CANADA

Joseph Brant Memorial Hospital
1230 North Shore Bl E
Burlington

Laval Health and Social Service Centre
1755 Laval, QC H7M 3L9

Montréal General Hospital
1650 Av. Cedar
Montréal QC H3G 1A4

Montréal Sacré-Coeur Hospital
5400 Boulevard Gouin Ouest
Montréal QC H4J 1C5

Saint-Jérôme Regional Hospital
290 rue De Montigny
Saint-Jérôme J7Z 5T3

SPAIN

Del Mare Hospital
Passeig Marítim 25-29
08003 Barcelona - Catalonia

Nuestra Señora de Fátima Hospital
calle Vía Norte, 48
36206 Ciudad de Vigo - Galicia

Pediatrics unit of Environmental Health
Universitario Virgen de la Arrixaca hospital
Ctra. Madrid-Cartagena, s/n
30120 El Palmar - Murcia

Figueres Hospital
Rda. rector Arolas, s/n
17600 Figueres - Catalonia

Fuenlabrada University General Hospital
Carretera
del Molino, 2
28942 Fuenlabrada - Madrid

Doctor Josep Trueta Hospital
Avda de França s/n.
17007 Girone - Catalonia

Virgen Del Rocío University Hospital
Avenida de las Fuerzas Armadas, 2
18014
Granada - Andalucía

Juan Ramón Jiménez Hospital
Ronda Exterior Norte s/n
21005 Huelva - Andalucía

San Carlos Hospital
28040 Madrid - Madrid

Mollet Hospital
Ronda Pinetons, 8
08100 Mollet del Vallès - Catalonia

Palamos Hospital
SSIBE (Serveis de Salut Integrats Baix Empordà)

Palamos Gent Gran Residency
C. Hospital n°27
17230 Palamós - Catalonia

Colina USP Hospital
Poeta Rodríguez Herrera, 1
38006 Santa Cruz de Tenerife
Canary Island

Valencia General Hospital
Avenida Tres Cruces, 2
46014 Valencia

Zumárraga Hospital
Bqrrio Argixao s/n
20700 Zumarraga - País Vasco

UNITED STATES

Fletcher Allen Hospital
111 Colchester Avenue
Burlington, VT 05401

Hackensack University Medical Centre
30 Prospect Avenue
Hackensack, NJ 07601

Newberg Providence Medical Centre
1003 Providence Drive
Newberg, OR 971

New Milford Providence Hospital
21 Elm Street
New Milford, CT 06776

Saint-Peter Providence Hospital
413 Lilly Road N.E.
Olympia, WÀ 98506-5166

Oregon Health & Science University OHSU
3181 Southwest Sam Jackson Park Road
Portland, OR 97239

Good Samaritan Medical Centre
1015 NW 22nd Avenue
Portland, OR 97210

ITALY

Meyer Pediatrics Hospital
Viale Pieraccini, 24
50100 Florence

JAPAN

Maeda Clinic
Gotemba Shizuoka
412-8601

NETHERLANDS

Slotervaart Hospital
Louwesweg 6
1066 EC Amsterdam

Deventer Hospital
Postbus 5001
7400 GC Deventer

Maastricht University Hospital
P. Debyelaan 25
6229 HX, Maastricht

Utrecht University Hospital
Heidelberglaan 100
3584 CX, Utrecht

CZECH REPUBLIC

Na Homolce Hospital
Roentgenova 2
150 30 Prague 5

SLOVAKIA

Košice Šaca Hospital
Lúcna 57
04015 Košice-Šaca

SWEDEN

Lund university Hospitalt
221 85 Lund

Karolinska University General Hospital
NKS-bygg,
Landstingsstyrelsens förvaltning
Stockholms läns landsting
Box 225 50, 104 22
Stockholm

City council
Hantverkargatan 45
104 22 Stockholm

Uppsala Univerity General Hospital
751 85 Uppsala

SWITZERLAND

H+ Swiss Hospitals
Lorrainestrasse 4 A
3013 Bern

Geneva University Hospitals
Rue Gabrielle-Perret-Gentil 4
1211 Genève 14

Basel University General Hospital
Spitalstrasse 21/
Petersgraben 4
4031 Basel

TAHITI

French Polynesia General Hospital
Taaone Site, Pirae

FONDATION AIA

ARCHITECTURE • SANTÉ • ENVIRONNEMENT

The AIA Corporate Foundation, "Fondation AIA", is born from AIA's willingness to make available for all its strong knowledge and experience gained in the areas of architecture, healthcare and the environment. The foundation is endowed by a body of experts from the medical, economic, urban and institutional worlds gathered in a Scientific Council, to better stimulate the thinking as well as publications.

THE AIA CORPORATE FOUNDATION

- SERVES as a monitoring and exchange platform and manages a knowledge database aimed at answering questions about the architecture and its relation with healthcare and the environment, as well as users organizations

- DEVELOPS or supports Research & Development programs on the same topics

- FACILITATES AND ENDORSES all initiatives that aim at improving knowledge and services to the citizen in these same fields

MAIN TOPICS

- MONOGRAPH on International "green" Hospitals leading projects 2002-2012

- FOCUS on 3 to 5 main environment-friendly hospitals (2007/2012) : history, decision-making, territory & environment, forms, users and patients

- HEALTHCARE CHALLENGES : dependency & ageing

contact : Soizick Angomard • +33 6 75 42 58 69 • s.angomard@aiafondation.org

AIA Corporate Foundation / architecture - healthcare - environment • 23 rue de Cronstadt, 75015 Paris
T. +33 1 53 68 93 28 • www.aiafondation.org Fondation d'entreprise régie par la loi du 23 juillet 1987

QUALITY OF LIFE AT THE SERVICE OF YOUR ESTABLISHMENT'S PERFORMANCE

Contact
sante.medicosocial.fr@sodexo.com

Since 2009, **Sodexo** has developed a sustainable development road map, **The Better Tomorrow Plan.**

It can be broken down into **14 commitments** which articulate around **3 axes:**

- nutrition, health and well-being
- local communities
- environment

sodexo
Quality solutions for everyday life

SIEMENS

Green+ Hospitals

Sustainable Healthcare Infrastructure. More than just Green.

www.siemens.com/greenplushospitals

Healthcare institutions need to cope with various challenges in order to be sustainably profitable and thus fulfill economic as well as ecological requirements. Siemens supports you in meeting these challenging demands and prepares you for the future – with Green+ Hospitals. The Green+ Hospitals approach means more than saving energy and lowering emissions: It includes environmentally friendly products, solutions and services that are in harmony with economic efficiency and optimum quality for your patients.

The Green+ Check provides a structured methodology for the assessment of the sustainability of a hospital along the dimensions Green – Quality – Efficiency. With the help of the Green+ Radar hospitals get a comprehensive overview of their current situation based on quantitative indicators and best practices plus concrete suggestions about where improvements will pay off. The sustainability index Green+ Score summarizes the overall performance and makes progress measurable.

Interested?
Do the Green+ Check. More information on www.siemens.com/greenplushospitals

Answers for life.