

Health Care Without Harm

Chemicals of concern in Healthcare products

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Improvement Care & Compassion

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Healthcare organisations have social, economic and environmental responsibilities

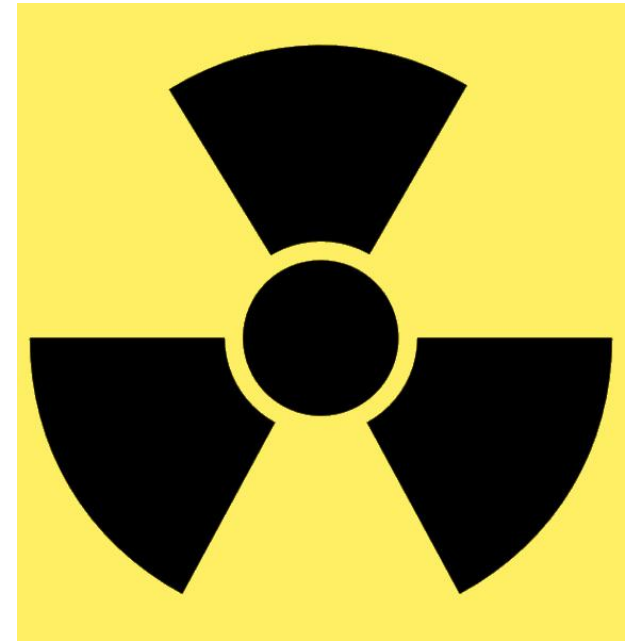


“Hazardous chemicals are often present in medical devices to improve plastic performance e.g. plasticisers, flame-retardants, fillers, colourings, impact modifiers, and stabilisers. These harmful chemicals can represent a high percentage of the final product (in some case up to 80%) and can **leach out of products and have adverse effects on human health** and the environment”

NON-TOXIC HEALTH CARE: Alternatives to Hazardous Chemicals in Medical Devices:
Phthalates and Bisphenol A SECOND EDITION (2019)



- What adverse effects?
- Effects on who?
- Why didn't I know this?



GIG
CYMRU
NHS
WALES

NHS
SCOTLAND



Marjorie Gordon, A radiographer from New Zealand was the first to report a variety of health complaints from exposure to medical imaging chemicals. Gordon reported symptoms including heart arrhythmias and tachycardia, sore throat, nausea, headaches, fatigue and other complaints. It was believed that these and other symptoms such as asthma, upper airway irritation, and laryngeal dysfunction are the result of gradually increasing sensitivity to one or more film processing chemicals.

G. E. Byrns , K. H. Ciacco Palatianos , L. A. Shands , K. P. Fennelley , C. S. McCammon , A. Y. Boudreau , P. N. Breyse & C. S. Mitchell (2000)
Chemical Hazards in Radiology, Applied Occupational and Environmental Hygiene, 15:2, 203-208

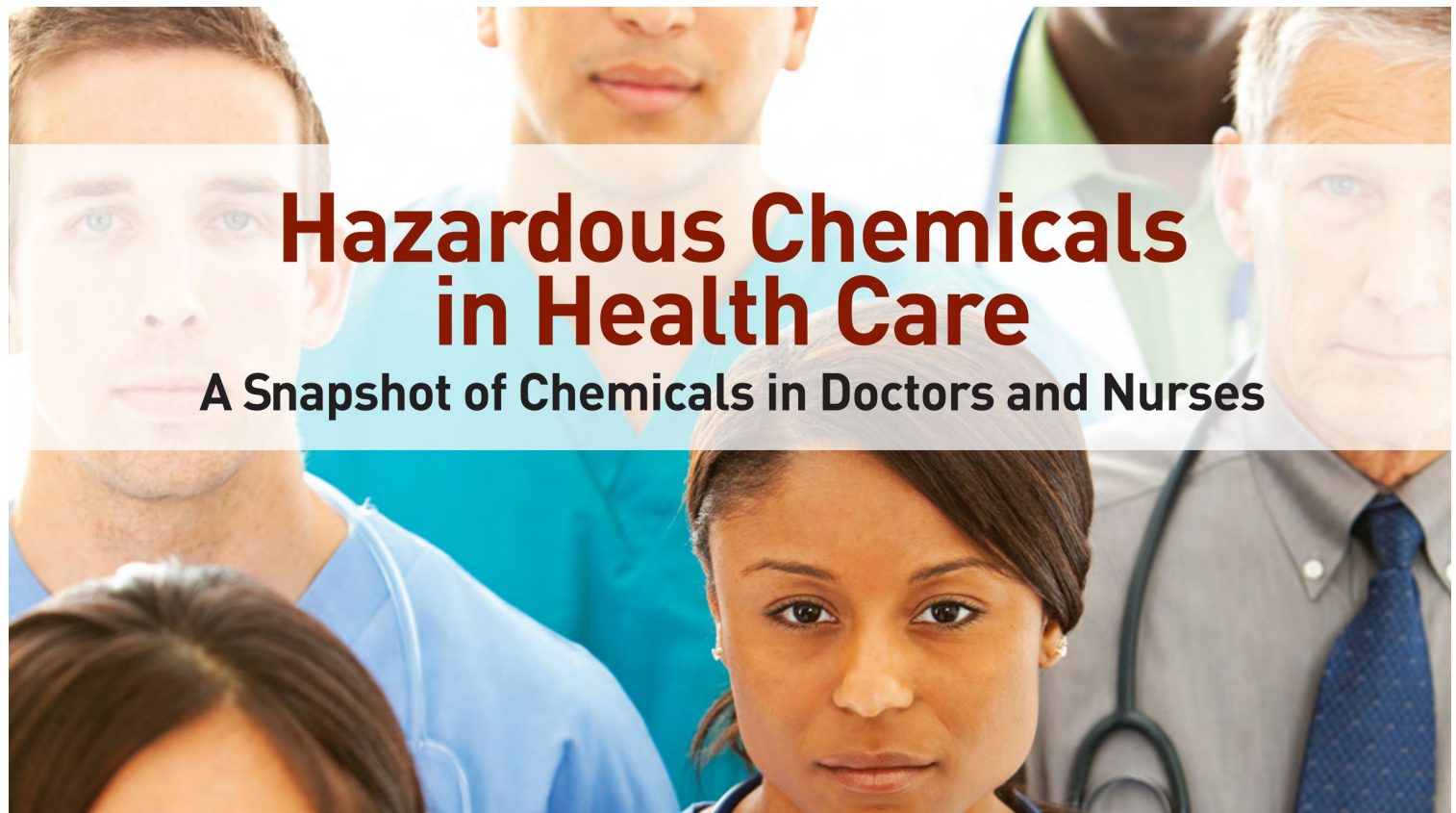
PSR



**PHYSICIANS
FOR SOCIAL
RESPONSIBILITY**

U.S. AFFILIATE OF INTERNATIONAL PHYSICIANS FOR THE PREVENTION OF NUCLEAR WAR

October 2009



Hazardous Chemicals in Health Care

A Snapshot of Chemicals in Doctors and Nurses

Each participant had at least 24 individual chemicals in their body, and two participants had a high of 39 chemicals detected.

Eighteen chemicals were detected in every single participant.

All 20 participants had at least five of the six kinds of chemicals for which were tested, and thirteen of participants had all six.

The plastic revolution in healthcare

1960s introduction of PVC plastic syringes and disposable needles introduced to the American and European markets by Becton Dickinson, Jelco (a division of Johnson & Johnson), Deseret and other manufacturers

A.M, Rivera, K.W, Strauss, A. Van Zundert and E. Mortier. 2005 The history of peripheral intravenous catheters : How little plastic tubes revolutionized medicine *Acta Anaesth. Belg.*, 2005, 56, 271-282



Endocrine disrupting chemicals (EDC)

- EDCs are chemicals or mixtures of chemicals like DEHP (Di (2-ethylhexyl) phthalate) is widely used as a **plasticizer for PVC** in such as footwear, building materials and floor coverings and to make **medical devices pliable**

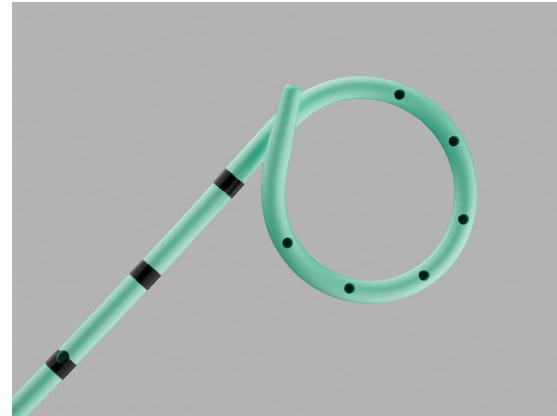
These interfere with the way the body's hormones work:

"hormone mimics"

block natural hormones

increasing or decreasing the levels of hormones in our blood by affecting how they are made, broken down, or stored in our body.

change how sensitive our bodies are to different hormones.



Bisphenol A (BPA)

- BPA-based plastic is made into a variety of common consumer goods, like water bottles, sports equipment, CDs and DVDs.
- Epoxy resins containing BPA are **used as coatings** on the inside of many food and beverage cans
- BPA is in the **lining of tubing and blood bags** like intravenous administration sets, stopcocks, syringes, intravascular catheters, urinary catheters, gastrointestinal tubes, cardiopulmonary bypass circuits, eye lenses, tubing, blood oxygenators and dialysers, surgical trays, nebulizers, humidifiers, haemodialysis membranes dental composite resins, dental sealants and coating for medical devices.

May be harmful if swallowed or in contact with skin causing an allergic skin reaction

Suspected of damaging fertility or the unborn child

Causes damage to organs through prolonged exposure

Toxic to aquatic life

Poly- and perfluoroalkyl substances (PFAS)

- PFAS are 'forever chemicals' used in products to improve their durability and increase their shelf life
- They are widely used as they are stable under intense heat. Many of them also have surfactant properties and function as **water and grease repellents**.
- Major industry sectors using PFASs include aerospace and defence, automotive, aviation, food contact materials, textiles, leather and apparel, construction and household products, electronics, fire-fighting, food processing, and **medical articles**.

May be linked to potential health issues like kidney cancer and thyroid disease.

The issue:

Medical devices are an essential feature of modern healthcare, playing a critical role in the diagnosis, monitoring, and treatment of diseases.

Modern medicine is totally reliant upon these devices yet have limited knowledge about the materials and chemicals used in their production

Pharmaceuticals administered in medical interventions are subject to significant scrutiny and regulation.

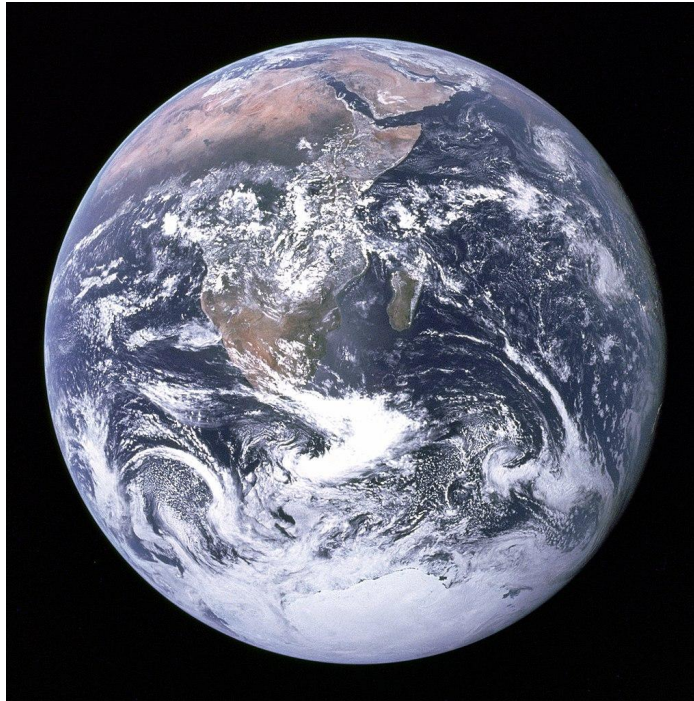
The materials currently used in medical devices often are not.





New words, new challenges

- Polyvinyl Chloride
- Phthalates
- DEHP
- Bisphenol A (BPA)
- EDCs



- Chemical impact on health from medical devices
- Impact of procurement decisions on the emissions from healthcare
- Inability to recycle plastics

Those at most risk



55% senior neonatologists had no info about phthalates in NICU
Bickle- Graz M, tolsa J- F, Fischer Fumeaux CJ. Arch Dis Child
Fetal Neonatal Ed 2020;105:F110– F111.

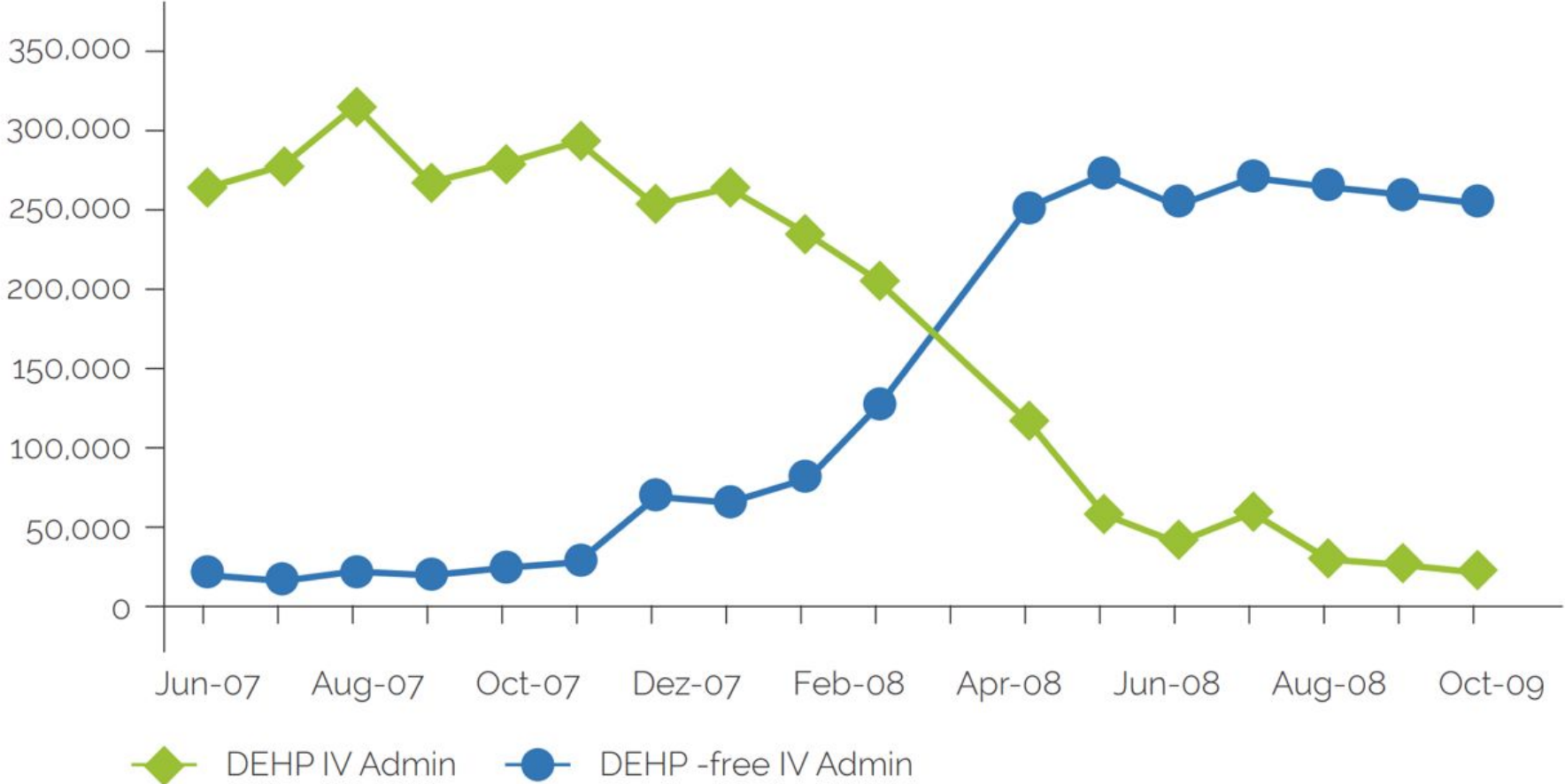


“By early 2012, we were able to convert virtually all of our IV medical equipment, including more than 9 million solution bags to PVC- and DEHP- free alternatives”

Cathy Gerwig
Greening Health Care

Conversion to DEHP-free IV administration sets

(KP California and Hawaii regions use approximately **3 million** sets per year)



Unethical silence?





Medicines & Healthcare products
Regulatory Agency

Safe use of medical devices with DEHP

MHRA is aware of some issues with plastics that contain DEHP, including:

- the possibility of the DEHP leaching from the PVC into solutions like blood or nutrition formulas
- birth defects and infertility in animals with certain doses of the phthalate



Medicines & Healthcare products Regulatory Agency

Scientific Committee on Emerging and Newly-Identified Health Risks (SCENIHR) conclusion

According to [SCENIHR in 2015](#) there is inconclusive or inconsistent evidence to suggest that medical devices containing DEHP pose an unacceptable health risk to humans, specifically to the reproductive health of men.

The report shows that medical devices containing plasticised PVC with DEHP have an important clinical benefit.

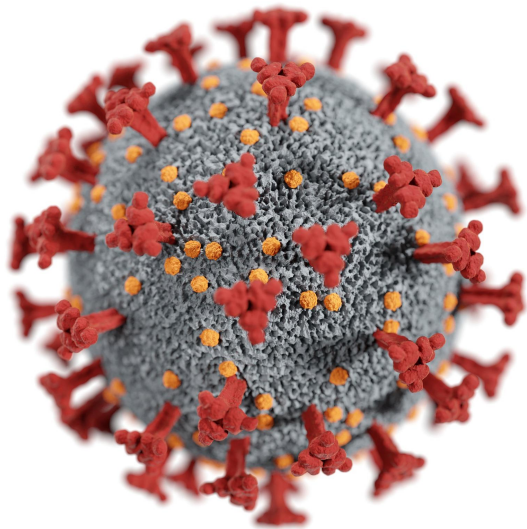
The committee stated that the potential for replacement of DEHP in these products should be considered against their efficiency in the treatment, as well as the toxicological profile and leaching properties of alternative plasticiser materials. The report stated that there is a strong need to develop and collect information about exposure to alternative materials in the conditions of use, to refine the knowledge on their toxicological profile and to develop other alternative materials with a favourable profile for both efficiency and safety.



France
Austria
Denmark
Sweden
Czech
Republic
Slovakia
Italy
Netherlands



The WHO Global analysis of health care waste in the context of COVID-19 bases its estimates on the approximately 87,000 tonnes of personal protective equipment (PPE) that was procured between March 2020- November 2021



Surgical face masks, gloves, and gowns are commonly manufactured from plastics that break down slowly, such as polypropylene, polyurethane, polyacrylonitrile, polyethylene, and polyethylene terephthalate. A surgical mask made from these materials could take 450 years to fully decompose.



Fadare OO. Covid-19 face masks: a potential source of microplastic fibers in the environment.

Sci Total Environ2020;737:140279

Most Preferable

Avoid or Reduce

Re-use

Recycle

Recover Energy

Treat

Dispose

Least Preferable

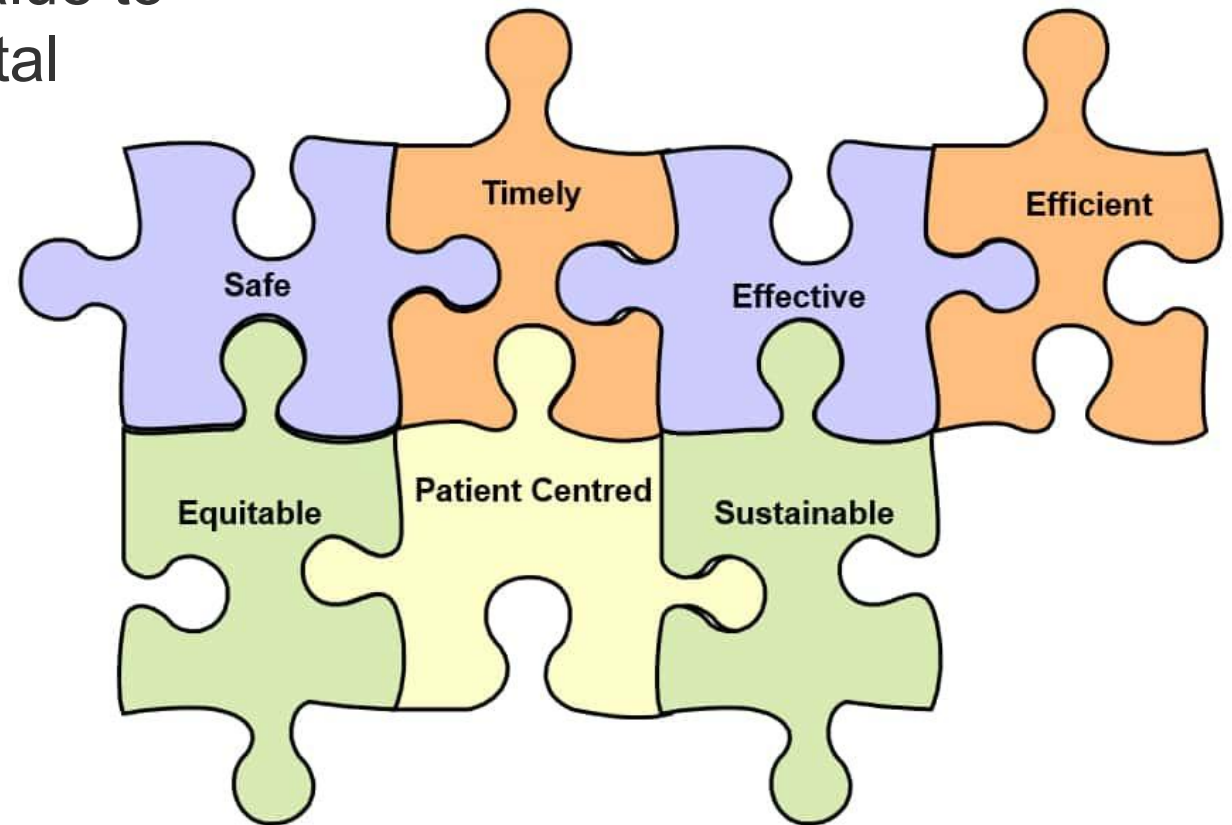


“Sustainability is an important and legitimate domain of quality in healthcare, which calls for the redefinition of value to incorporate social and environmental costs.”

Sustainability in quality improvement: redefining value

Authors: Frances Mortimer et al

Future Healthcare Journal 2018 Vol 5, No 2: 88–93



Source : Atkinson S, Ingham J, Cheshire M, Went S. Defining quality and quality improvement.

Clinical Medicine. 2010 Dec;10(6):537.

1. PREVENTION

promoting health and preventing disease by tackling the causes of illnesses and inequalities

3. LEAN SERVICE DELIVERY

streamlining care systems to minimise wasteful activities

Four principles of SUSTAINABLE HEALTHCARE

Mortimer, F. *The Sustainable Physician*. Clin Med 10(2). April 1, 2010. p 110-111.
<http://www.clinmed.rcpjournal.org/content/10/2/110.full>

2. PATIENT SELF-CARE

empowering patients to take a greater role in managing their own health and healthcare

4. LOW CARBON ALTERNATIVES

prioritising treatments and technologies with a lower environmental impact.



CENTRE *for*
SUSTAINABLE
HEALTHCARE
inspire • empower • transform

**GREEN
TEAM**



**SUSTAINABLE
IMPROVEMENT**

What can you do?

- Question suppliers about their products
- Support environmental awareness locally
- Connect with your QI colleagues within your organisation to remove waste
- Encourage a 'green' metric in every project – big or small
- Give evidence to the influencers to encourage them to take action
- Help staff to get involved and do 'something'
- Share stories to make it real

L = O = V = E = L = Y !



She was certainly an exquisitely lovely creature. Nothing could have been added to enhance her beauty. She compelled admiration, and was an object of worship. This is the universal result of the use of

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SOLD BY DRUGGISTS EVERYWHERE.

Thank you!

References and resources:

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