

## **SUSTAINABLE HOSPITALS – RESPONSE TO VICTORIAN CLIMATE CHANGE GREEN PAPER**

### **Introduction:**

Climate change is the biggest global health threat to the 21<sup>st</sup> century<sup>1</sup> and one of the greatest barriers ever faced to achieving and maintaining human health.<sup>2,3</sup> As health professionals we have a duty of care to firstly “do no harm” and advocate for action to protect health and humanity, although for many of us our work places significantly contribute to an adverse ecological footprint. This response to the Victorian Climate Change Green Paper aims to promulgate ideas and recommendations to help achieve large decreases in CO<sub>2</sub> emissions, energy usage, water consumption and landfill amounts often with concurrent financial benefits.

The scale of carbon reduction needed to limit the effects of global warming cannot be achieved without the health sector playing its part.<sup>4</sup> The United Kingdom’s National Health System (NHS) produces 3.2% of the country’s total carbon footprint.<sup>5</sup> Although there is no equivalent national Australian data, Victoria’s public hospital sector consumes 60% of the total energy used by all of its state government departments,<sup>6</sup> produces the waste equivalent of approximately 200,000 households<sup>7,8</sup> and Melbourne’s public hospitals use 1% of the city’s water.<sup>9,10</sup> Victoria alone spends \$10 million per annum disposing of solid waste from its public hospitals.<sup>7</sup> Relatively minor improvements in resource efficiency could have significant environmental and financial benefits for the State.

To credibly address and improve the sustainability of our hospitals an extensive audit to determine total CO<sub>2</sub> emissions, energy consumption, waste management and water usage will be paramount. Unfortunately, at present both the national and state data in these areas are limited although we can be lead and be guided by the NHS Sustainability Development Unit.<sup>11</sup>

### **1. CO<sub>2</sub> Emissions and Energy Consumption:**

A recent analysis of CO<sub>2</sub> emissions from the NHS showed that the procurement of goods and services accounted for 60% of total CO<sub>2</sub> emissions, considerably greater than the 22% from powering NHS buildings or the 18% accrued by staff and patient travel.<sup>11</sup>

#### **1.1 Procurement (and food)**

Attention to the processes by which medical drugs, equipment, and paper (accounting for 22%, 9% and 5% respectively of total NHS CO<sub>2</sub> emissions) are sourced could result in significant environmental and financial benefits. Disposable medical

equipment has increasingly replaced reusable items in our hospitals, due to lower perceived costs, infection risks and personal opinion, usually without considering the environmental impact. The few life cycle analyses of medical products have found that reusable devices are generally financially and environmentally preferable to single use comparators.<sup>12,13,14</sup>

Alterations in the production and packaging of medical drugs and equipment to improve their carbon footprint would be ideal, but unfortunately may be limited by the very nature of these products. Production of medical drugs is highly CO<sub>2</sub> intensive. Professor James Clark, head of the Green Chemistry Centre of Excellence, University of York, UK, whilst discussing drug manufacturing has been recently quoted in the British Medical Journal as stating “it is widely accepted that 99% of the raw materials will end up as waste”.<sup>5</sup> Hospitals therefore need to examine the environmental impact of their purchased products together with critically analysing the latest clinical recommendations, ensuring all products and equipment used are of genuine benefit to patients and that appropriate prescribing and administering habits prevent unnecessary consumption, waste and costs.

#### Recommendations;

- Require Product Evaluation Committees to make purchasing decisions on whole life cycle financial and environmental costs.
- Encourage locally sourced, environmentally friendly products with minimal packaging.
- Promote widespread use and support of EcoBuy – “one-stop shop to support organizations to ‘green’ their purchasing.”<sup>15</sup>
- Require hospitals to purchase recycled paper, default printer settings to double sided printing and encourage electronic storage of patient information. (recycled paper requires 35% less energy to manufacture than new paper<sup>16</sup>)
- Source food that is fresh and locally produced to minimise the energy required for freezing / thawing / reheating and transport.

#### 1.2 Energy

Hospitals are very energy intensive - a 300 bed mid-sized hospital uses the energy equivalent of approximately 5,000 Victorian households. Heating, air conditioning and ventilation account for 65% of hospital energy consumption whilst lighting contributes 20%.<sup>6</sup> Hospitals provide a multitude of opportunities for improving hospital energy efficiency from large projects possibly involving co-generation, solar panels and wind turbines to lighting upgrades, computer hibernation and adjusting of thermostats closer to expected external temperatures. The Institute of Hospital Engineering of Australia (IHEA)<sup>17</sup> is a useful information source.

#### Recommendations;

- Subsidise renewable energy for all Victorian hospitals rather than hospitals routinely purchasing discounted CO<sub>2</sub> emitting power.
- Encourage local power production through co-generation, solar and wind power.
- Insulate and adjust ambient thermostats closer to predicted external temperatures.
- Instigate lighting upgrades, sensors and timers where possible.

### 1.3 Travel

Walking, cycling and utilising public transport would reduce CO<sub>2</sub> emissions, improve staff fitness and set an example for patients.

Recommendations;

- Build all new hospitals close to public transport.
- Improve public transport and bicycle routes to existing hospitals.
- Routinely review the need for staff, patients and visitors to travel.
- Monitor and develop plans to reduce the CO<sub>2</sub> emissions from hospital fleet vehicles.

## 2. **Waste**

Disposal of hospital clinical (infectious) waste is approximately 10 times the cost of general waste and requires high temperature incineration or chemical treatment followed by shredding prior to deposition in landfill.<sup>18</sup> Large financial and environmental benefits could be achieved through more rigorous separation of hospital infectious and general waste.

Although local councils have been collecting road-side co-mingled waste to recycle for many years hospitals often still deposit similar objects into landfill. Significant reduction in landfill waste can be achieved by proper recycling of paper, cardboard, plastics and even food waste. In 2007 a regional Victorian hospital disposed of 100 tonnes of compost waste (20% of general waste) to a worm farm rather than to landfill.<sup>19</sup>

Manufacturing recycled plastics uses approximately 25% of the energy compared to equivalent primary plastic products with less, though still significant savings for glass and cardboard.<sup>16</sup> Hospital plastic recycling programs do exist in Victoria, some hospitals have plastic recycling programs allowing the recycling of identifiable plastic (International Plastic Association Codes 1-7). A Melbourne metropolitan plastic recycling company is currently converting polypropylene surgical instrument wrap (Kimguard®) into plastic products such as boardwalks and outdoor furniture.<sup>20</sup> There are also pilot plastic recycling projects which take ampoules, syringe barrels, intravenous cannula covers and surgical wrap to make plastic flooring.<sup>21</sup> In addition a pilot program has recently been set up to recycle polyvinylchloride (PVC) into irrigation pipes<sup>22</sup> - significant as PVC comprises 25% of medical plastics<sup>23</sup> and cannot be recycled with other plastic.

Appropriate waste management can achieve large environmental and financial rewards however far more significant benefits would undoubtedly be obtained with less waste generation to begin with. Each patient in UK hospitals produces 5.5 kg of waste per day.<sup>24</sup> Australian estimates are similar whereas French and German hospitals generate 1.9 kg and 0.4 kg per patient per day respectively.<sup>24</sup> Therefore critical analysis into why our hospital waste amounts are so great is needed to achieve the maximum benefits in waste minimisation and recycling programs. Amounts of clinical waste in particular should be examined as it is estimated to have higher fossil carbon content compared with general waste,<sup>25</sup> requires extensive treatment before depositing into landfill and, as already stated, is 10 times the expense of general waste to dispose of.

Recommendations;

- Develop programs to reduce waste amounts (examine the benefits of reusable versus disposable items).
- Ensure correct segregation of clinical (infectious) and general waste.
- Place co-mingled (non-infective) recycling receptacles in all hospital areas.
- Encourage and support plastic recycling programs.
- Compost appropriate waste rather than depositing as landfill.
- Feedback energy obtained from incineration of clinical waste into the power grid.

### **3. Water**

Victoria's water reserves are dangerously low due to increasing population levels, and an unprecedented drought worsened by climate change.<sup>26</sup> It is imperative that efforts be made to reduce water consumption in all private, public, industrial and agricultural settings. Hospitals are well placed to deliver major water savings as they not only consume large amounts of water but also have the potential to collect substantial amounts of rainwater from their large roof areas. Within hospitals the majority of water used is through tap, shower and toilet use (approximately 80%). Although food processing, water cooling units and renal dialysis also contribute significantly to water consumption. Reverse-osmosis renal dialysis units "reject" or discard water (30-50% of the original mains water used) that is formed by pre-dialysis water filtration before exposure to blood products. This "reject" water falls within potable limits in most Australian districts and has been used in gardens and toilets,<sup>27</sup> although there is great potential for more wide spread usage.

Recommendations;

- Annual audits of water consumption and cost for all hospitals and the implementation of water saving plans.
- Promote collection of rainwater (roof and ground) and uncontaminated renal dialysis water to be used as grey water.
- Mandate low flow showerheads and dual flush toilets.
- Ensure cleaning and sterilisation processes are using best practice water conservation methods.
- Efficient use of water should be integrated into all buildings at the design stage.

### **4. Medical Gases**

The contribution of nitrous oxide (N<sub>2</sub>O) to the "greenhouse effect" is approximately 5% of the total.<sup>28</sup> Although medical use is a small proportion of total N<sub>2</sub>O released (0.35-2%)<sup>29,30</sup> it is significant when related to other daily activities. An anaesthetist, if using N<sub>2</sub>O for a day, is contributing as much to the 'greenhouse effect' as driving an average car 500-1,000 km.<sup>31</sup> Other anaesthetic gases also have greenhouse effects within the same order of magnitude<sup>31</sup> yet they are used in far lower concentrations. N<sub>2</sub>O and isoflurane also have ozone depleting potential. Many anaesthetics are delivered safely throughout the world without the traditional use of N<sub>2</sub>O and at low flows to enable minimal anaesthetic gas use.

Recommendations;

- Encourage minimal N<sub>2</sub>O use.
- Ensure anaesthetic ventilators are purchased that enable low flow delivery of anaesthetic gases.
- Avoid piping N<sub>2</sub>O into new hospital buildings.

## **5. Governance and Workforce Development**

The health sector must achieve improved environmental sustainability to help limit the effects of global warming as well as reduce waste.<sup>4</sup> The NHS has chosen to take a lead in sustainable health with a NHS Sustainable Development Unit and commitments for a 10% reduction in their CO<sub>2</sub> emissions by 2015 from 1990 levels and 80% by 2050.<sup>11</sup>

The Environment Protection Authority of Victoria has mandated that large energy and water users provide annual Energy and Resource Efficiency Plans (EREP)<sup>32</sup> to reduce their resource use and waste generation. Unfortunately only Victoria's very largest hospitals need to comply with EREP and the Australian National Greenhouse and Energy Reporting (NGER) Act,<sup>33</sup> the latter requiring the reporting of energy consumption. The Victorian Government needs to encourage all health facilities, including hospitals, to include CO<sub>2</sub> reduction and sustainable development within their governance guidelines and set clear aims to monitor and reduce CO<sub>2</sub> emissions.

Sustainability standards as part of hospital accreditation could achieve rapid improvements in reducing the ecological footprint of our health systems and hospitals.<sup>34</sup> The Australian Council of Health Care Standards (ACHS), through its Evaluation and Quality Improvement Programs (EQUIP)<sup>35</sup> accredits Australian Hospitals against mandatory and preferred criteria. Within the standard EQUIP program there are currently no mandatory criteria addressing the issues of energy, water and waste auditing and efficiencies or the presence of a hospital sustainability / environmental officer or committee.

Recommendations;

- Healthcare regulators should consider making sustainability and the environmental impact of services an integral part of quality standards.
- CO<sub>2</sub> emission reduction and sustainable development should be an inherent part of each hospital's performance and governance guidelines.
- Ensure the presence of an executive sponsored hospital environmental committee and sustainability / environmental manager.
- Include sustainability governance within job descriptions for all staff.
- Promote the education of staff and patients on the health effects of climate change. Provide programs to guide both staff and patients in reducing their own and their work places ecological footprint.

## **Conclusion**

Our hospitals aim to heal the sick. Hospitals should not continue to contribute to climate change that will adversely effect present and future generations. In addition, many sustainability measures will be medium to long-term cost saving exercises. We need healthy, clean, green, sustainable hospitals in the State of Victoria.

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Written by:

Dr Forbes McGain  
Anaesthetist and Intensivist  
MBBS, FANZCA, FJFICM

Dr Eugenie Kayak  
Anaesthetist  
MBBS, FANZCA, MSc

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