Ecological footprint of Victoria's public hospitals

health

Non-technical summary

Introduction

The Victorian public health care portfolio covers close to 2.5 million square metres, equivalent to around 100 MCGs[1]. The facilities vary widely in age, size, acuity and complexity. Ensuring public health care facilities continue to deliver efficient and effective patient outcomes requires significant investment every year.

Each year public hospitals use enough energy to power over 60,000 households, enough water to fill over 1,700 olympic-sized swimming pools and generate approximately 14 billion black balloons (or 180,000 cars) of greenhouse gas emissions from stationary energy.

As a significant user of natural resources the Department of Health is committed to delivering health care facilities that deliver positive patient outcomes, and are environmentally efficient with minimal impact on the environment. As health care practitioners we know that the environment is a key determinant of health, and that the health care sector has an obligation to minimise its own environmental and carbon footprint.

Summary Includes:

How your Health Service can use this information

Measuring Southern Health's Environmental Impact using Mass Balance and Ecological Footprint

International comparison with other Health Systems

Applying the data to the whole Victorian Public Health System

In 2009 the Department of Health commissioned a mass balance and ecological footprint study of Southern Health to use as a baseline for estimating the environmental impact of the Victorian public health system as a whole. Southern Health, Victoria's largest health service, comprises more than 40 sites including six major hospitals with over 2,100 acute, sub-acute, mental health and aged care beds. In floor area it represents 9.5 per cent of the Victorian public health system.

How can your health service use this information?

Victorian government policy commits all public agencies (including health services) to develop environmental management plans by 2011 and publicly report on their environmental performance from 2011/12.

Agencies should consider the findings of this study when preparing and updating their environmental management plans, especially in relation to identifying key impact areas of their health service.

Measuring Southern Health's Environmental Impact

Mass balance

The results of a mass balance study can be used to establish an organisation's eco-efficiency. This is a measure how effectively the organisation uses natural resources in delivering its products or services. In this case, how efficiently Southern Health delivers its range of health services based on comparing its resource consumption with its waste generation.

Defining mass balance

The mass balance approach is a technique used to determine the status of an ecosystem by comparing its inputs and outputs. Material within a defined boundary is tracked to see how much is accumulated (comes in) and much is emitted (goes out).

To do this, **products and food** purchased by Southern Health in 2007–08 was compared with the amount of **waste** it produced. Stock built up during this period amounted to 2,406 tonnes, while consumption was calculated at just over 9,872 tonnes (excluding water and energy consumption). This means that for every tonne of material and product purchased by Southern Health in 2007–08, 24 per cent was retained and 76 per cent left Southern Health (including 17 per cent which was recycled).

Southern Health consumed around **450 million megajoules of energy** from 'stationary' energy sources including natural gas (61 per cent), electricity (39 per cent) and diesel (0.2 per cent). 39 per cent of this was consumed at the Monash Medical Centre Clayton campus.

More than **8,000 tonnes of products was purchased** over the study period, most of which was linen (40 per cent). Medical gases were the next largest contributor at just over 7 per cent of the entire mass. Food was consumed at a rate of about 1,553 tonnes.

Waste and recyclables amounted to 7,467 tonnes, 75 per cent of which was categorised as general waste. Paper recycling was the next largest stream at 6.2 per cent, with clinical waste at 5.2 per cent. Just over 17.2 per cent of total waste was recycled.

Transportation consumed over **460 million megajoules of energy** during 2007–08, 70 per cent of which was staff travel (including air and road travel), followed by visitor vehicle transportation (17 per cent) and outpatient transportation (5 per cent).[2]

Carbon dioxide equivalents **(greenhouse gases)** made up almost all (98 per cent) of Southern Health's transport emissions to air, mostly from car or petrol-powered van travel, followed by sulfur dioxide at 1 per cent.

Ecological footprint

This part of the study examined how much of the productive capacity of the planet, measured in global hectares (gha), is required to support Southern Health in a typical year.

For 2007–08, the total ecological footprint for Southern Health was calculated at 96,378 gha. The average footprint per staff member was 7.88 gha, higher than the average Australian at 6.6 gha and Victorian at 6.8 gha[3]. Figure 2 shows the breakdown of components contributing to Southern Health's ecological footprint.

Defining ecological footprint

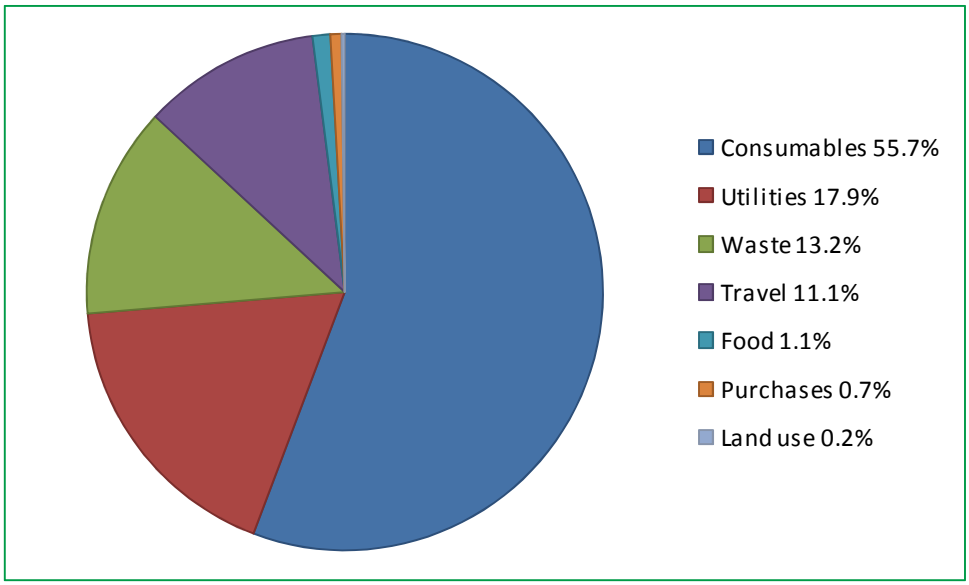
The ecological footprint measures human demand on our planet's ecosystems by comparing this demand with the planet's ecological capacity to regenerate. It estimates the area of productive land (expressed in global hectares) **gha** is required to sustain the level of consumption and waste generation of an organisation or entity.

Just over 80 per cent of the ecological footprint of **consumables** came from miscellaneous medical equipment. Four thousand tonnes of miscellaneous medical equipment was consumed. .

Linen and cloths made up another 13 per cent (3,000 tonnes) of consumables. The land use required for production of cotton is a significant environmental impact.

Electricity was the major **utilities** contributor and made up 75 per cent of the ecological footprint of all utilities. It was followed by gas (25 per cent) and diesel (less than 1 per cent).

Figure 1: Ecological footprint results for Southern Health



Of the **travel** footprint (10,746 gha), 98 per cent was through commuting to and from the hospital by car or van, and 2 per cent by rail (including the journeys of staff, patients and visitors). Other modes of transport represented less than 1 per cent. Business travel (including by air) made up less than 1 per cent of the total impact.

Waste accounted for 13 per cent of Southern Health's total ecological footprint, most of which (94 per cent) was considered 'general waste' as opposed to clinical or recycled waste.

International comparisons

Southern Health's ecological footprint was compared with two other public studies: one based on the London Health Sciences Centre in Ontario, Canada, and other based on the UK National Health Service (NHS).

In overall results, Southern Health's breakdown of impact areas was similar to those in the UK and Canada. Although attempts were made to compare intensity between health services in different countries, some caution needs to be exercised given differences in methodologies for measuring activity intensity.

Southern Health's carbon footprint for procurement was higher than the NHS total at 67 per cent compared with 60 per cent. In the other measures, Southern Health was lower, recording 20 per cent for energy (compared with 22 per cent) and 13 per cent for travel (compared with 18 per cent).

These results show that, Southern Health's ecological footprint is comparable in terms of the breakdown or composition of the ecological footprint, to similar overseas health services.

Defining carbon footprint

Carbon footprint is slightly different to ecological footprint in that looks solely at the greenhouse gas emissions associated with the activities of an organisation, product or process. It is measured in carbon dioxide equivalents (CO2-e) as carbon dioxide makes up the bulk of most greenhouse gas emissions.

Applying the data to the whole Victorian public health system

The data obtained from the Southern Health study was extrapolated to estimate the environmental impact of the whole Victorian public system. Two measures were used: separations (a measure of activity) and floor area.

Based on these two measures, the total ecological footprint of all Victorian health services is estimated at 780,661 gha (based on separations) or 1,021,606 gha (based on floor area).

The total energy consumption, greenhouse gas emissions and ecological footprints of both Southern Health and the Victorian public health system were compared with the Victorian community as a whole. This showed that:

- During 2007–08, the health system consumed approximately 9,821 terajoules of energy, about 1.2 per cent of the state's overall energy consumption.
- The health system generated 1,180 kilotonnes of greenhouse gases, representing 1 per cent of Victoria's total carbon footprint.
- The health system makes up approximately 2.8 per cent of Victoria's total ecological footprint (36,480,640 gha).

Resources

Material Health: A Mass Balance and Ecological Footprint Analysis of the NHS(2004) J Barrett, N Cherret, K. Lewis, N. Jenkin, G Vergoulas: Downloadable from: www.materialhealth.com

EPA Victoria, www.epa.vic.gov.au/ecologicalfootprint

The Eco-footprint Health Guide (Canadian)
http://www.globalhealthsafety.org/resources/library/GHSI_EcoHealthFootprint_Guide_v1-2_June2009.pdf
Global Footprint Network www.globalfootprintnetwork.com

Further information

For further information contact the Sustainability Unit, Department of Health.

Email: sustainability@health.vic.gov.au

Phone: (03) 9096 2049 / 9096 2057

Web: www.dhs.vic.gov.au/environment (this site is being updated and will be redirected to the health portal)

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Endnotes

1 Melbourne Cricket Ground Stadium
2 There was insufficient information about inpatient transport to include in the study.
3 Refer www.epa.vic.gov.au/ecologicalfootprint. This Department of Health study refers to the EPA calculation of Victoria's eco-footprint which is lower than that reported by in the 2008 Living Planet Report undertaken by Best Foot Forward; for further information refer to the technical report.