

Low Carbon Models of Care: Introduction to Carbon Footprinting

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What is Carbon Footprinting?

- A measure of impact?
- A method / approach to estimate the greenhouse gases emitted by a process or product
- A widely used metric to express the carbon dioxide equivalent burden of a product or process
- A baseline value for use in on-going reduction strategies
- An audit or benchmark



PUBLICLY AVAILABLE SPECIFICATION

PAS 2050:2011

Specification for the assessment of the life cycle greenhouse gas emissions of goods and services



ICS code: 13.020.40

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Greenhouse Gases, GWP₁₀₀ and Sources

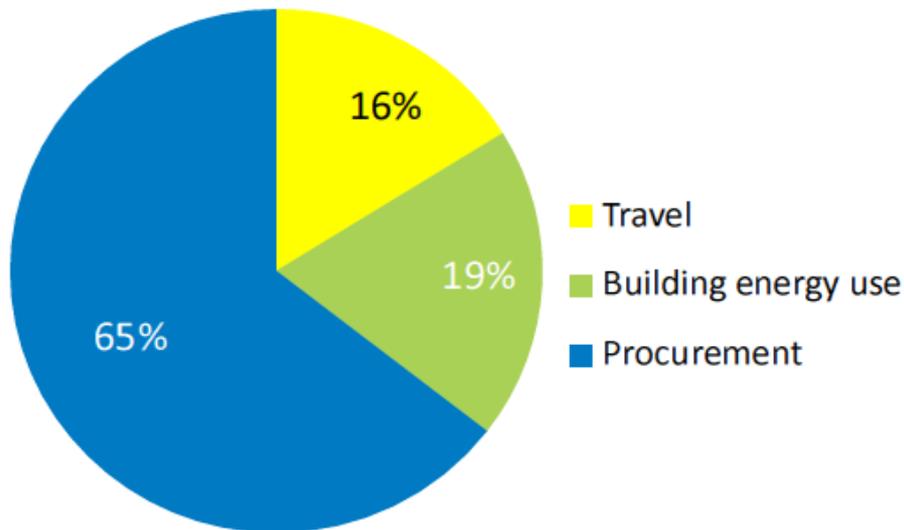
- The global warming potential of greenhouse gases are ranked relative to carbon dioxide:
 - Carbon dioxide (1) - energy
 - Methane (25) - food
 - Nitrous oxide (298) – food, anaesthetic
 - Refrigerants (124 – 14,800) – fridges, freezers
 - Isoflurane (350 - 790) - anaesthetic
 - Sevoflurane (40 - 575) - anaesthetic
 - Desflurane (1526 – 3,650) - anaesthetic

Boundaries

- **Include - emissions arising from processes and use of consumables**
- **Exclude – emissions from the manufacture of capital items**
- **Boundaries can differ depending on circumstance:**
 - **Business controlled direct and in-direct emissions**
 - **Staff commuting**
 - **Patient travel**

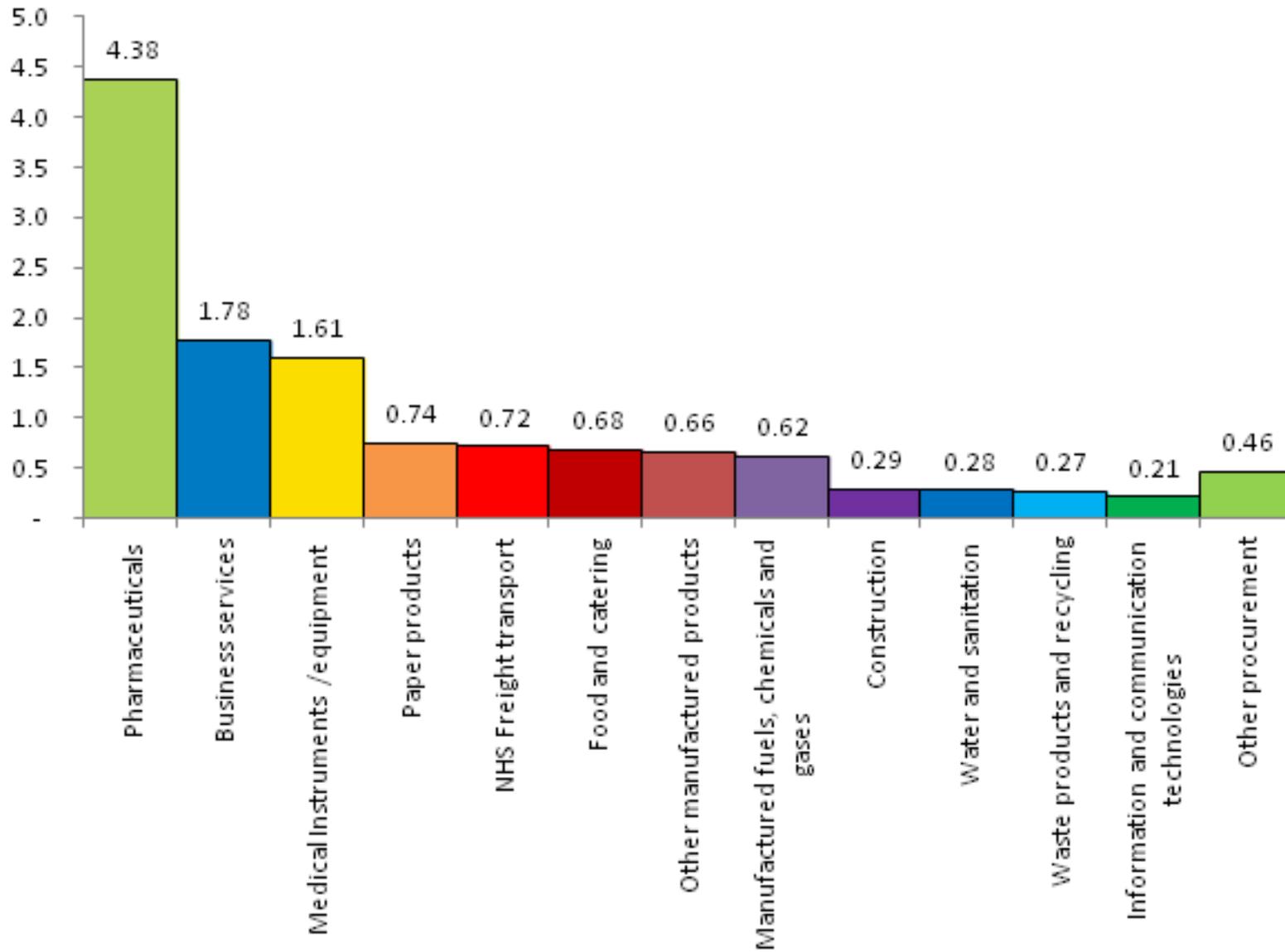
Carbon Footprint of the NHS [1]

- In 2010, the carbon footprint of the NHS was estimated to be 20 million tonnes CO₂e



Travel	3.19	MtCO ₂ e	16%
Building energy use	3.80	MtCO ₂ e	19%
Procurement	12.72	MtCO ₂ e	65%

Carbon Footprint of the NHS [2]

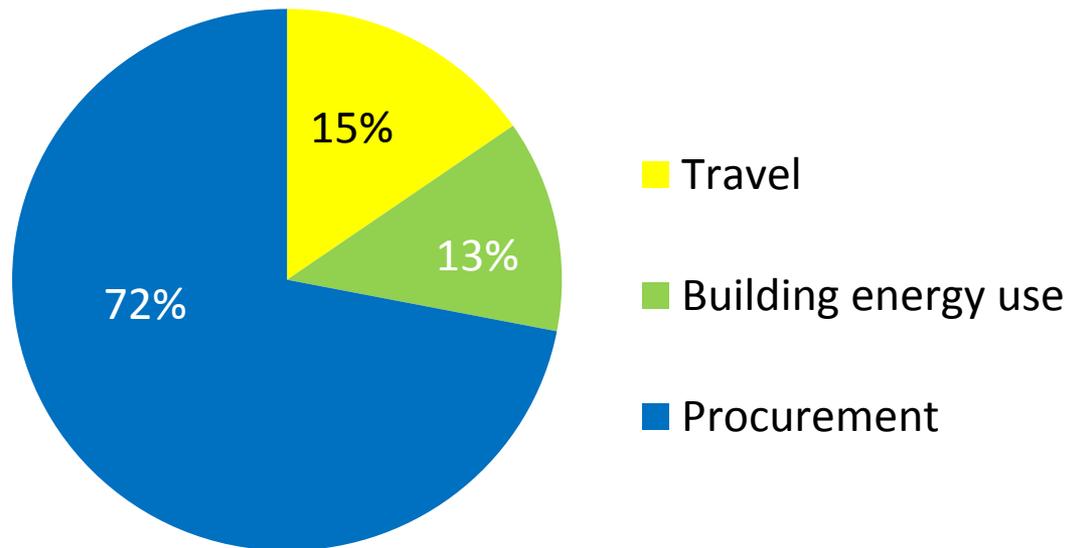


Approaches and Problems

- **The sheer size of the NHS causes problems**
- **Top down or bottom up (component) approach?**
- **NHS carbon footprint is based on a top down approach which uses data on direct energy use plus £ spend on procurement**
- **The conversion of £ spend to CO₂e is crude but necessary as robust and accurate data on pharmaceutical and medical equipment emissions are difficult to obtain**
- **A bottom up or component approach counts or measures everything in smaller scale studies**

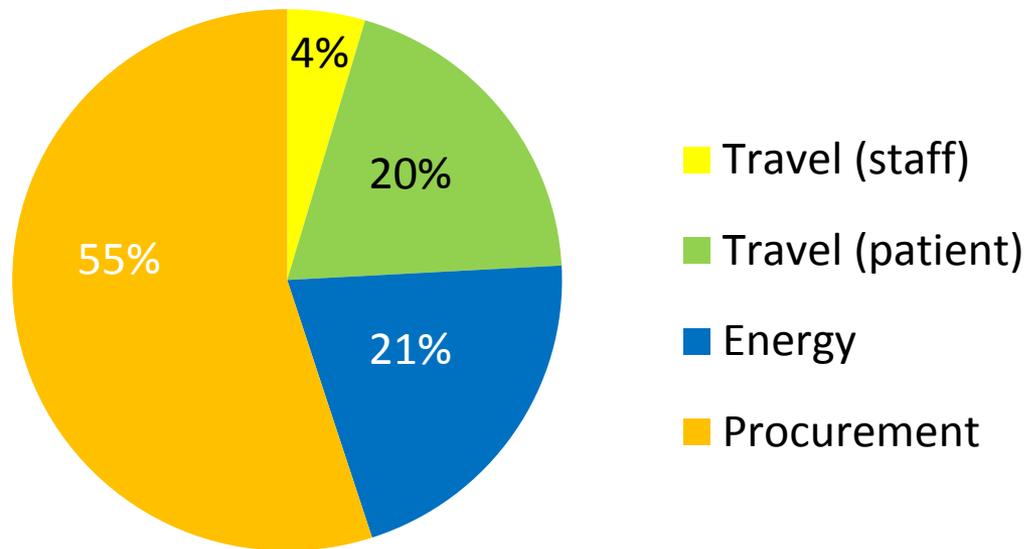
Carbon Footprint of Renal Services

- In 2009, the carbon footprint of the Dorset Renal Service was estimated to be 3,006 tonnes CO₂e



Carbon Footprint of Maintenance Haemodialysis

- In 2010, the carbon footprint of a typical thrice-weekly in-centre haemodialysis was estimated to be 3.8 tonnes CO₂e per patient per annum



Carbon Footprint of Maintenance Haemodialysis

- **In-centre haemodialysis was compared to seven different home haemodialysis regimes:**
 - **In-centre: 3.8 tonnes CO₂e**
 - **Home: (3 daytime regimes) – 4.3 to 5.2 t CO₂e**
 - **Home: (2 nocturnal regimes) – 3.9 to 7.2 t CO₂e**
 - **Home: (NxStage, 2 regimes) – 1.8 to 2.1 t CO₂e**
- **Footprint is influenced more by frequency than by duration**
- **Home haemodialysis is likely to increase carbon footprints despite reductions in patient travel**

Carbon Footprint of Operating Theatres

- **Carbon footprint of two North American operating theatres: Aug 2010 to Jul 2011**

	Hospital 1		Hospital 2	
	kg CO ₂ e	%	kg CO ₂ e	%
Anaesthetic gases	2,898,493	77	3,051,533	64
Energy	493,804	13	1,418,226	30
Waste disposal	363,826	10	264,493	6
Total	3,756,123		4,734,252	

- **Anaesthetic – preference for desflurane**
- **Energy – climate and carbon intense energy supply**

Hospital Food Systems

- **Total food waste ranged between 19% and 66%**
- **Plate waste was between 6% and 42%**
- **Trolley waste was between 26% and 55%**
- **One hospital/ward combination threw away 60% of cooked food**
- **39% of roast lamb was discarded as waste**

Sustainability

- **There are three pillars of sustainability:**
 - **economic, environmental and social**
- **The carbon footprint is a useful environmental indicator but cannot be used to assess sustainability on its own so consider others:**
 - **Value for money, £ spend per treatment/result**
 - **Water use and air quality**
 - **Life expectancy and quality of life!**

Summary

- **A carbon footprint is an estimate of the greenhouse gases emitted by a process or product**
- **It is supported by robust methodology (PAS2050) which is still being developed for different applications**
- **It is useful for establishing baselines for future reduction strategies**
- **It can be used to identify ‘hot-spots’ within the life cycle of a product or process**
- **But ... it is just an environmental indicator and should not be used to assess sustainability on its own**

Thank you for your time