Toward A Greener Future:

Advancing Sustainability in Ambulance Services

THE COUNCIL OF AMBULANCE AUTHORITIES

Dr. Shohreh Majd, Research and Policy Manager,
The Council of Ambulance Authorities, smajd@caa.net.au

Marsha Taheri, Research and Policy Assistant,
The Council of Ambulance Authorities, mtaheri@caa.net.au

David Waters, Chief Executive,
The Council of Ambulance Authorities, dwaters@caa.net.au

Mojca Bizjak-Mikic, General Manager,
The Council of Ambulance Authorities, mbizjak-mikic@caa.net.au

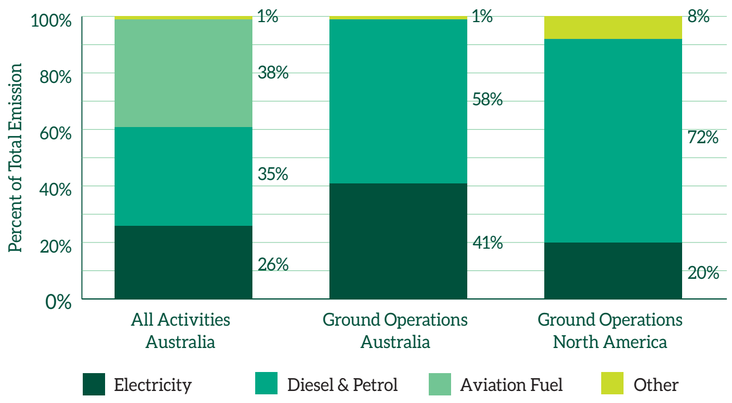
CAA.NET.AU

Introduction

The emergency sector, especially ambulance services, significantly contributes to carbon emissions and climate change, often overshadowed by their vital role in saving lives. Recent data reveals that ambulance fleets worldwide emit millions of tons of carbon dioxide (CO_2) annually due to fuel consumption and energy-intensive medical equipment. These vehicles, predominantly powered by fossil fuels, not only emit greenhouse gases but also worsen air pollution, impacting public health and the environment.

Ambulance services impact climate change in various ways beyond carbon emissions. They consume significant amounts of water for cleaning and generate medical waste that contributes to landfill accumulation. Energy usage in ambulance stations and facilities also adds to greenhouse gas emissions, especially when reliant on traditional sources. Additionally, the construction and maintenance of ambulance infrastructure have environmental implications.

Primary sources of Australian ambulance services' greenhouse gas emissions, and comparison with reported North American data.[2]



The increasing focus on environmental stewardship highlights the need for ambulance services to adopt sustainable practices. Advancing such practices is crucial to curb their carbon footprint and combat climate change effectively. This poster explores various areas where sustainability can be improved within ambulance services to mitigate the healthcare sector's carbon footprint.

Carbon Emissions

Ambulance fleets worldwide emit millions of tons of CO_2 annually. An average ambulance travels approximately 20,000 km each year, consuming large amounts of fossil fuels. In the United States alone, emergency medical services (EMS) vehicles generate an estimated 9.5 million "metric tons of CO_2" (CO_2e) per year. In Australia, ambulance services, produce 216,000 to 547,000 tons of CO_2e annually, which 20% of it arising from direct consumption of vehicle and aircraft fuels.

An ambulance also burns 5.5 lit. of fuel per hour while idling, accounting for 15 kg CO_2e. Ambulance emissions also contain harmful pollutants such as nitrogen oxides (NOx) and particulate matter (PM).

Improving Sustainability

- **Transition to Electric, Hydrogen or Hybrid Fleets**
- **Implementing Anti-idling Policies**
- **Optimising Route Planning**
- **Improving Vehicle Maintenance**
- **Promoting Eco-driving Training**

In a 30-minute flight, a helicopter emits about 470 kg of CO_2

Each ambulance call emits about 31.3 kg of CO_2 on average

Water Consumption

Ambulance services consume significant amounts of water for cleaning vehicles and medical equipment.

Water Consumption:

- A single ambulance consumes hundreds of liters of water per month for cleaning and sterilisation.
- Water-intensive medical equipment, including pressure washers and autoclaves, adds to this consumption.

Environmental Impact:

- Traditional cleaning methods using detergents and disinfectants contaminates water sources.
- Harm to aquatic ecosystems results from these pollutants.

Improving Sustainability

- **Installing Water-Saving Technologies:**
  - Low-flow and sensor-operated faucets
  - Efficient cleaning equipment
  - Dual-flush toilets
- **Recycling Water:**
  - Rain for washing vehicles
  - Installing greywater systems in stations
  - Water-efficient landscaping
  - Closed-loop cooling systems
- **Using Eco-Friendly Cleaning Products and Sterilisation Methods**
- **Training Staff on Water Conservation and Responsible Usage**

Waste Management

Australia's healthcare system generates approximately 43,000 tonnes of waste per year, contributing an estimated 7% of total carbon emissions in the country. Ambulance services produce a significant amount of this waste, which contributes to landfill accumulation and poses environmental risks. The wastes generated by ambulance services include:

- **Used supplies:** Bandages, gloves, syringes, and other disposable items.
- **Contaminated materials:** Blood-soaked gauze, dressings, and biohazardous substances.
- **Packaging:** Wrappers, plastic containers, and cardboard boxes.

Improving Sustainability

- **Waste Reduction:**
  - Conduct waste audits
  - Decrease use of single-use plastics
  - Decrease use of disposal materials
  - Package optimisation, minimal packaging
- **Waste Reuse:**
  - Reuse sterilisable medical equipment
  - Repurpose equipment
  - Encourage staff to creatively reuse materials (old uniforms, plastic storage, etc)
- **Waste Recycle:**
  - Establish recycling bins for various materials
  - Collaborate with local recycling facilities
  - Train staff on proper sorting
  - Recycle electronic waste
  - Investigate closed-loop recycling options
- **Waste Segregation:**
  - Separate hazardous medical waste from recyclable and non-recyclable materials

Electricity

Ambulance stations and facilities utilise electricity for lighting, heating, cooling, and powering medical equipment, which in turn contributes to operational carbon emissions. In Australia, approximately 22% of the annual carbon emissions, ranging from 216 to 547 kt CO_2e, generated by ambulance services stem from electricity consumption.

Improving Sustainability

- **Energy-efficient Lighting:**
  - Retrofit with LED bulbs
  - Use occupancy sensors
  - Maximise natural light
  - Employ daylight harvesting
  - Utilise dimming controls
- **Climate Control Optimisation:**
  - Use renewable energy options (solar-powered HVAC systems)
  - Implement smart thermostats
  - Proper insulation and weather sealing
  - Train staff on energy-saving practices
- **Equipment Efficacy:**
  - Use energy-efficient medical equipment
  - Opt for equipment with power-saving Features such as auto-off or standby modes
  - Assess lifecycle of equipment
  - Offer staff training and awareness sessions
  - Perform routine maintenance and optimisation

Procurement

Unsustainable procurement in ambulance services leads to carbon emissions and environmental harm across the supply chain. Procurement choices directly affect energy consumption and emissions, particularly with non-energy-efficient appliances and supplies. Production and transportation of medical items also contribute to emissions. Ambulance services may inadvertently support harmful practices by choosing products with excessive packaging or from unsustainable sources.

Improving Sustainability

- **Establish Sustainable Procurement Policies/Guidelines, Considering:**
  - Energy efficiency
  - Environmental impact
  - Ethical sourcing practices
- **Supplier Collaboration:**
  - Prioritise environmentally friendly products
  - Encourage supplier to adopt sustainable practices
- **Life Cycle Assessments:**
  - Choose products with lower environmental footprints and longer lifespans

Conclusion

Addressing sustainability within ambulance services is essential to mitigate their environmental impact and promote long-term resilience. Adopting energy-efficient practices, implementing waste management strategies that prioritise recycling and reuse, and promoting sustainable procurement practices are key steps toward reducing carbon emissions and protecting public health. Collaboration between stakeholders, ongoing education, and a commitment to innovation are vital in driving meaningful progress toward a greener future for ambulance services worldwide. Through concerted efforts and a shared commitment to sustainability, the ambulance sector can lead by example, demonstrating its dedication to both saving lives and safeguarding the planet for generations to come.

References:

1. Blanchard I.E. & Brown L.H. (2011). *Carbonfootprinting of North American emergency medical services systems.* Prehosp. Emerg. Care, 15: 23-9.

2. Brown L.H. et al., (2012). *The carbon footprint of Australian ambulance operations.* EMA, 24(6), 657-662.

3. Haines A. et al., (2017). *Climate change and human health Impacts, vulnerability, and mitigation.* The Lancet, 386(10006), 1861-1874.

4. Leslie C.M. et al., (2021). *Shifting the Balance among the 'Three Rs of Sustainability:' What Motivates Reducing and Reusing? Sustainability.* 13(18):10093.

5. North Central Texas Council of Governments. (2018). *Idle Reduction Technologies for Ambulances.*