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Higher energy prices are associated with diminished resources, performance and safety in Australian ambulance systems

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Abstract

Objective : To evaluate the impact of changing energy prices on Australian ambulance systems.

Methods : Generalised estimating equations were used to analyse contemporaneous and lagged relationships between changes in energy prices and ambulance system performance measures in all Australian State/Territory ambulance systems for the years 2000–2010. Measures included: expenditures per response; labour-to-total expenditure ratio; full-time equivalent employees (FTE) per 10,000 responses; average salary; median and 90th percentile response time; and injury compensation claims. Energy price data included State average diesel price, State average electricity price, and world crude oil price.

Results : Changes in diesel prices were inversely associated with changes in salaries, and positively associated with changes in ambulance response times; changes in oil prices were also inversely associated with changes in salaries, as well with staffing levels and expenditures per ambulance response. Changes in electricity prices were positively associated with changes in expenditures per response and changes in salaries; they were also positively associated with changes in injury compensation claims per 100 FTE.

Conclusion : Changes in energy prices are associated with changes in Australian ambulance systems' resource, performance and safety characteristics in ways that could affect both patients and personnel. Further research is needed to explore the mechanisms of, and strategies for mitigating, these impacts. The impacts of energy prices on other aspects of the health system should also be investigated.

References

1 Bailey DM. Energy contingency planning for health facilities: Conference report. *Public Health Rep*. 1980; **95**: 58–61.

PubMed | Web of Science® | Google Scholar

2 Frumkin H, Hess J, Vindigni S. Peak petroleum and public health. *JAMA*, 2007; **298**(14): 1688–90.

CAS | PubMed | Web of Science® | Google Scholar

3 Frumkin H, Hess J, Vindigni S. Energy and public health: The challenge of peak petroleum. *Public Health Rep*. 2009; **134**: 5–19.

Google Scholar

4 Hanlon P, McCartney G. Peak oil: Will it be public health's greatest challenge? *Public Health*. 2008; **122**: 647–52.

CAS | PubMed | Web of Science® | Google Scholar

5 Hess J, Bednarz D, Bae J, Pierce J. Petroleum and health care. Evaluating and managing health care's vulnerability to petroleum supply shifts. *Am J Public Health*. 2011; **101**: 1568–79.

PubMed | Web of Science® | Google Scholar

6 Schwartz BS, Parker CL, Hess J, Frumkin H. Public health and medicine in an age of energy scarcity: the case of petroleum. *Am J Public Health*. 2011; **101**: 1560–7.

PubMed | Web of Science® | Google Scholar

7 Wilkinson P. Peak oil: Threat, opportunity or phantom? *Public Health*. 2008; **122**: 664–6.

CAS | PubMed | Web of Science® | Google Scholar

8 Winch P, Stepnitz R. Peak oil and health in low- and middle-income countries: impacts and potential responses. *Am J Public Health*. 2011; **101**: 1607–14.

PubMed | Web of Science® | Google Scholar

9 Nisbet MC, Maibach E, Leiserowitz A. Framing peak petroleum as a public health problem: audience research and participatory engagement in the United States. *Am J Public Health*. 2011; **101**: 1620–6.

PubMed | Web of Science® | Google Scholar

10 Council of Ambulance Authorities. *2009–2010 Annual Report [Internet]*. Findon (AUST) : CAA; 2010. [cited 2011 May 26]. Available from: http://www.caa.net.au.

Google Scholar

11 BBC News Berkshire. Ambulance service's budget pressure over diesel price. BBC News. 2011 Feb 17 [cited 2011 Feb 18]. Available from: http://www.bbc.co.uk/news/uk-england-berkshire-12494388.

Google Scholar

12 Fallon P. W. Va. Ambulance fuel costs over budget. Charleston [W.Va.] Daily Mail. 2011 Apr 9 [cited 2011 Jul 25]. Available from: http://www.ems1.com.

Google Scholar

13 Harlin K. Air ambulance company rebounds from tragedies, high fuel prices [Internet]. Investor's Business Daily. 2009 Sep 18 [cited 2010 Dec 7]. Available from: http://www.investors.com/NewsAndAnalysis/Article.aspx?id=506506.

Google Scholar

14 Odell E. No more fuel for emergency vehicles [Internet]. WAAY Television News. 2011 Mar 7 [cited 2011 Mar 14]. Available from: http://www.waaytv.com/news.

Google Scholar

15 Penner DE. Rising fuel prices add millions to services costs [Internet]. The Vancouver [BC] Sun. 2008 July 8 [cited 2010 Sep 23]. Available from: http://www.canada.com/vancouversun/news.

Google Scholar

16 Lerner EB, Nichol G, Spaite DW, Garrison HG, Maio RF. Comprehensive framework for determining the cost of an emergency medical services system. *Ann Emerg Med*. 2007; **49**: 304–13.

PubMed Web of Science® Google Scholar

17 Australian Institute of Petroleum. *Terminal Gate Prices (TGPs): Historical Averages for Petrol and Diesel [Internet]*. Canberra (AUST) : AIP; 2011 [cited 2011 May 24]. Available from: http://www.aip.com.au/pricing/tgp.htm.

Google Scholar

18 Australian Energy Market Operator. *Average Price Tables [Internet]*. Melbourne (AUST) : AEMO; 2011 [cited 2011 May 24]. Available from: http://www.aemo.com.au.

Google Scholar

19 U.S. Energy Information Administration. *World Crude Oil Prices [Internet]*. Washington (DC) : EIA; 2011 [cited 2011 May 25]. Available from: http://www.eia.gov/dnav/pet/pet_pri_wco_k_w.htm.

Google Scholar

20 Australian Tax Office. *Foreign Exchange Rates [Internet]*. Canberra (AUST) : ATO: 2011 [cited 2011 May 25]. Available from: http://www.ato.gov.au.

Google Scholar

21 Markus GB. *Analyzing Panel Data*. Beverly Hills (CA) : Sage Publications; 1979.

Google Scholar

22 Hsiao C. *Analysis of Panel Data*. Cambridge (UK) : Cambridge University Press; 1986.

CAS | Google Scholar

23 Twisk JWR. *Applied Longitudinal Data Analysis for Epidemiology*. Cambridge (UK) : Cambridge University Press; 2003.

Google Scholar

24 Burton P, Gurrin L, Sly P. Extending the simple linear regression model to account for correlated responses: An introduction to generalized estimating equations and multi-level mixed modeling. *Stat Med*. 1998; **17**: 1261–91.

CAS | PubMed | Web of Science® | Google Scholar

25 Zeger SL, Liang K-Y. Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*. 1986; **42**: 121–30.

CAS | PubMed | Web of Science® | Google Scholar

26 Australian Bureau of Statistics. *Consumer Price Index, Australia, Dec 2011 [Internet]*. Canberra (AUST) : ABS; 2012 [cited 2012 Jan 27]. Available from: http://www.abs.gov.au.

Google Scholar

27 Blackwell TH, Kaufman JS. Response time effectiveness: Comparison of response time and survival in an urban emergency medical services system. *Acad Emerg Med*. 2002; **9**: 288–95.

PubMed | Web of Science® | Google Scholar

28 Blanchard IE, Doig CJ, Hagel BE, Anton AR, Zygun DA, Kortbeek JB, *et al*. Emergency medical services response time and mortality in an urban setting. *Prehosp Emerg Care*. 2012; **16**: 142–51.

PubMed | Web of Science® | Google Scholar

29 De Maio VJ, Stiell IG, Wells GA, Spaite DW. Optimal defibrillation response intervals for maximum out-of-hospital cardiac arrest survival rates. *Ann Emerg Med*. 2003; **42**: 242–50.

PubMed | Web of Science® | Google Scholar

30 Pons PT, Haukoos JS, Bludworth W, Cribley T, Pons KA, Markovchick VJ. Paramedic response time: Does it affect patient survival? *Acad Emerg Med*. 2005; **12**: 594–600.

PubMed | Web of Science® | Google Scholar

31 Pons PT, Markovchick VJ. Eight minutes or less: Does the ambulance response time guideline impact trauma patient outcome? *J Emerg Med*. 2002; **23**: 43–8.

PubMed | Web of Science® | Google Scholar

32 Patterson PD, Weaver MD, Frank RC, Warner CW, Martin-Gill C, Guyette FX, *et al*. Association between poor sleep, fatigue, and safety outcomes in emergency medical services providers. *Prehosp Emerg Care*. 2012; **16**: 86–97.

PubMed | Web of Science® | Google Scholar

33 Gallo A, Mason P, Shapiro S, Fabritius M. What is behind the increase in oil prices? Analyzing oil consumption and supply relationship with oil price. *Energy*. 2010; **35**: 4126–41.

Web of Science® | Google Scholar

34 Ghoshray A, Johnson B. Trends in world energy prices. *Energy Econ*. 2010; **32**: 1147–56.

Web of Science® | Google Scholar

35 Hamilton JD. Oil and macroeconomy since World War II. *J Polit Econ*, 1983; **91**(2): 228–48.

Web of Science® | Google Scholar

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