

# Excess deaths following a procedure in 2008

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A recent series of articles in BJHCM has been investigating the fundamental causes for the very high financial risk in health care and the associated high spatio-temporal nature of this risk. Incidence of certain cancers and deaths were shown to be particularly volatile due to their relationship with what appears to be a previously uncharacterised infectious outbreak (Jones 2012a-b,d). An accompanying article in this issue investigates the cluster of diagnoses commonly associated with excess deaths within 90 days of a hospital admission in 2008 compared to 2007 or 2009 (Jones 2012c).

**Table 1: Categories of excess deaths following a procedure in 2008**

Description/location of procedure	Deaths following procedure			Excess deaths		
	2007/08	2008/09	2009/10	Minimum	Maximum	Minimum (%)
High cost drugs/chemotherapy	13,047	16,413	14,907	1,480	2,436	10%
Gastro-intestinal	2,250	2,660	2,325	317	372	14%
Biopsy/Diagnostic imaging	1,877	2,322	1,950	312	408	19%
Repair of injury/fracture/burn	888	1,150	889	228	262	29%
Vascular	1,101	1,306	990	183	261	19%
Brain/nervous system	437	574	437	113	137	31%
Ear, nose & throat	219	331	205	94	119	51%
Genito-urinary	455	593	489	92	121	21%
Eye and surrounds	88	161	98	51	68	64%
Kidney	178	234	182	48	54	29%
Rehabilitation for psychiatric disorders	36	61	35	25	25	69%

Footnote: Only a selection of categories are shown in this table. Methods as per Jones (2012c). Data is from <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1299>

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Death following an elective procedure is usually very rare and the 'procedures' will mostly be associated with emergency admission. The particular data set does not differentiate between admission types. Given that patients having a procedure are a sub-set of all admissions a smaller number of excess deaths are expected. To test if clusters of procedures are associated with excess deaths (within 90 days of a procedure) in 2008 the same analysis has been conducted and procedures associated with some 3,000 excess deaths (having very high statistical significance) have been identified. Given the uncertainty surrounding the coding of some procedures over time a more conservative approach has been adopted where death in 2008 has been assessed against the maximum in either 2007 or 2009. Procedures showing obvious counting changes have been excluded. Where deaths for each procedure exceeded the 95% confidence interval they were then aggregated into broad groups as in Table 1.

As has been noted in the accompanying article excess death associated with cancers and injury appear high in the list as do death following diagnostic imaging (suspected cancer, injury, etc). These groups alone account for 2,300 of the 3,000 identified excess deaths associated with a procedure.

Two additional categories warrant further discussion. Increased risk of atherosclerosis and vasculopathy are well known hallmarks of cytomegalovirus (Botto et al 2011, Caposio et al 2011, Varani & Landini 2011) and match the significant increase in death after a range of vascular procedures. Interestingly in those with coronary disease Statin therapy appear to improve survival via an anti-inflammatory effect (Horne et al 2003). The final comment is regarding the final group in Table 1 involving psychiatric disorders. Depression, immune system dysfunction and severity of medical illness have been recognised for many years (Koenig 1997) and the inflammatory mechanisms behind mental illness are now becoming increasingly recognised (Meas et al 2012). The suggestion that the outbreaks of this agent are associated with a cluster of immune related conditions (inflammation through to increased infection) appears to be an integral part of understanding the wider implications.

The observed increase in death following ocular procedures is also consistent with the increasingly recognised role of cytomegalovirus as an agent capable of infecting the eye and surrounding tissue (Pang 2012) - although death is presumably due to wider CMV infection (viremia) in the patient.

There are several key points from this article. Firstly, the financial failure of PCTs following the 2007 outbreak was not due to poor management but rather due to ignorance that a key event was about to occur. Secondly the event and its consequences are very real although excess death is only the tip of the iceberg. While the author has sought to raise awareness to this fundamentally important aspect of health care it is now up to others to explore in far greater detail the breadth of the effects upon morbidity, mortality and costs and in particular to establish if cytomegalovirus is indeed the causative agent. With around £6

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billion of excess costs arising from each outbreak it may well be that vaccination is the only solution to this exceedingly expensive infectious disease.

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