Editorial

Hospital staff to death ratios – a sound performance measure?

National inquiries into health service failings, e.g., Francis (2013) consistently shows that hospital deaths are associated with staffing levels and skill mix. Consequently, English NHS Trusts with higher than average death rates were singled out and investigated (NHS Choices, 2013), which underlined that hospital staffing was an issue.

The literature reveals major empirical studies and systematic reviews (Shekelle, 2013) that offer deeper insights into patient deaths and hospital staffing. Callaghan *et al.* (2003) and Cho *et al.* (2008), for example, looked at neonatal and critical care unit deaths and staffing, and noted similar associations between mortality, staffing levels and skill mix, implying that mortality and staffing are not just a general hospital ward phenomenon. Aiken *et al.* (2016) and Needleman *et al.* (2002) showed that registered practitioner to support worker ratios were also strongly linked to hospital deaths, i.e., "richer" staff mixes (proportionally more registered practitioners) led to better outcomes.

Although the hospital deaths index is standardised, caution is needed when analysing and interpreting hospital deaths data because important clinical and demographic variables will influence mortality rates, such as local population age profile and hospital clinical specialities, which are confounding variables. Nevertheless, hospital staffing and skill mix are likely to be major independent variables.

What do staff-to-bed ratios look like in different contexts? Table I shows that:

- in total, 95 English acute hospitals employ, on average, 7.74 full-time equivalents (FTEs) per occupied bed (Table I, C2);
- hospitals with above average death rates (top quartile in the hospital deaths league table) employ 0.38 FTE fewer staff per occupied bed than the acute hospital average (E2 vs C2); and
- hospitals with the lowest death rates (bottom quartile), on the other hand, have 0.76 FTEs per occupied bed more than their high deaths hospital counterparts (G2 vs E2); i.e., a pattern emerges.

These staff per bed differences may not seem major, but if FTE differences are multiplied by occupied beds, then the variances are startling, i.e., in an acute hospital with 582 occupied beds (i.e. the high deaths hospitals average bed occupancy), 442.3 more FTEs are required to raise the staffing establishment to low death hospital levels. Moreover, proportionally more staff will be registered practitioners; i.e., it is not just staffing levels that influence patient outcomes. Table I supports the rich skill mix argument in the literature; low deaths hospitals:

- employ proportionally more doctors (+2.9 per cent) and nurses (+1.8 per cent); and
- engage fewer clinical support workers (−2.4 per cent) and administrative staff (−3.1 per cent) than high deaths hospitals.

Richer skill mixes seem to improve patient safety and care. Interestingly, Rows 8 and 9 do not support the popular media's assertion that too many "pen pushers" are employed in the health services. Indeed, low deaths hospitals employ more managers (G9 vs C9), which may mean that registered practitioners in low deaths hospitals are released to undertake more clinical work. It is not clear from the data why high deaths hospitals employ fewer staff. Is the staffing shortfall an austerity measure, or is it because recruitment and retention is a problem? These are fundamental questions that warrant additional research.

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A	B	C All acute hospitals ($n = 95$)	D	E High deaths ($n = 24$)	F	G Low deaths ($n = 25$)	H
1	Variable	Staff-to-bed ratio	%	Staff-to-bed ratio	%	Staff-to-bed ratio	%
2	All staff FTEs	7.74		7.36		8.12	
3	Doctor FTEs	1.01	13.1	0.90	12.2	1.23	15.1
4	*RN FTEs*	2.06	26.6	1.92	26.1	2.26	27.9
5	Midwife FTEs	0.23	3.0	0.23	3.1	0.27	3.4
6	ST&T FTEs	0.92	11.9	0.84	11.4	0.94	11.6
7	Clinical Support FTEs	2.22	28.7	2.16	29.4	2.19	27.0
8	A&C FTEs	1.13	14.6	1.15	15.7	1.02	12.6
9	Manager FTEs	0.17	2.2	0.16	2.2	0.20	2.5

Notes: FTEs, full-time equivalents; RN, registered nurse; ST&T, scientific, technical and therapeutic; A&C, administrative and clerical
Source: NHS Digital (2016)

Table I.
Hospital deaths and hospital staffing

Table I has a practical value for workforce planners and quality assurance managers. Practitioners in other countries, for example, can benchmark their hospitals against the overall acute (Col. C), high deaths (Col. E) and low deaths hospitals (Col. G) to see where they lie. However, caution is needed; analysts should ensure that FTEs (not headcounts) are used as the numerator and occupied beds (not bed complement) as the denominator. Headcounts and bed complement generate different ratios, which will not be comparable to the ratios presented in Table I. The other use of Table I is applying the ratios to generate recommended staffing establishments; i.e., multiplying cell G4 by a hospital's occupied beds, for example, will generate a "best practice" nursing establishment, i.e., one more likely to improve patient outcomes.

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