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Title	Factors associated with staffing provision and medical equipment acquisition in Irish general practice
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Publication date	2012-11-01
Original Citation	Bourke, J. and Bradley, C. (2012) 'Factors associated with staffing provision and medical equipment acquisition in Irish general practice', Irish Medical Journal, 105(10), 9929, pp. 338-340. Available at: http://archive.imj.ie/ViewArticleDetails.aspx?ArticleID=9929 (Accessed: 21 December 2022)
Type of publication	Article (peer-reviewed)
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Download date	2026-10-10 17:42:35
Item downloaded from	https://hdl.handle.net/10468/13997

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Factors associated with staffing provision and medical equipment acquisition in Irish general practice

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Abstract
GPs form an integral part of Irish primary care provision. However, current information concerning general practice structure, staffing and development in Ireland is quite limited. This report provides a profile of General Practice in Ireland in 2010 drawing on a national survey of practices using a standardised questionnaire. On average, there are 2.7 GPs per practice, although one in four practices remains single-handed. The majority of practices employ nursing 485(80.7%) and clerical 549(91.3%) support. A high proportion of practices have the following items of equipment: ECG machine 496(82.5%), 24 hour blood pressure monitor 481(80.1%), spirometer 383(63.8%), cryotherapy equipment 505(84%), minor surgery equipment 453(74.3%) and foetal monitor 484(80.5%). Using chi-square analysis, we find statistically significant positive relationships between nursing support and possession of each of the six items of medical equipment (X^2 = 81.57, p<0.01; X^2 = 105.4, p<0.01; X^2 = 38.5, p<0.01; X^2 = 16.6, p<0.01; X^2 = 39.5, p<0.01; X^2 = 19.5, p<0.01)and between practice size and possession of each item of medical equipment (X^2 = 26.3, p<0.01; X^2 = 45, p<0.01; X^2 = 16.5, p<0.01; X^2 = 44.4, p<0.01; X^2 = 13.8, p<0.01; X^2 = 14.7, p<0.01).

Introduction
The Irish government considers primary care to be the appropriate setting to meet 90-95 per cent of all health and personal social service needs, with GPs central to its provision[1]. More than two-thirds of the Irish population attend their GP each year[2] and, therefore, are directly affected by how their GP runs their practice. Irish GPs are, by and large, self-employed private practitioners who enjoy considerable autonomy with respect to staffing and practice development investments. Consequently, Irish general practices vary greatly in size and personal characteristics[3]. There is no definitive register or database of general practices in Ireland. Therefore, information concerning staffing and equipment provision in general practices is obtained primarily from survey studies[3-5], with O'Dowd et al[3] providing the most comprehensive profile of general practice in Ireland to date.

Wide-ranging reforms for general practice are currently proposed in the new Programme for Government; which, if implemented, will have significant implications for Irish GPs[6]. The Irish government proposes to introduce Universal Health Care, which would mean that fees for patients for GP care will be removed and GPs will be paid primarily by capitation for the care of their patients. There is on-going discussion and debate as to the potential impact of these health care reforms on general practice, with limited consensus to date. These discussions are hampered by the lack of information as to the present capabilities of Irish general practices with respect to staffing and equipment resources. In 2010, we surveyed Irish GPs by means of a self-administered postal questionnaire collecting information on GP and practice characteristics, practice staff and use of medical equipment. The contribution of our survey findings is two-fold: firstly, it provides a comprehensive and timely profile of general practices in Ireland, with respect to GP and practice characteristics and, secondly, provides in-depth information on medical equipment provision and the factors which influence such investments. Finally, we discuss our findings in the context of the proposed Universal Health Care reforms.

Methods
The purpose of our study was to collect timely and detailed information on general practice in Ireland. Our questionnaire, the Medical Equipment and IT in General Practice questionnaire, is the first survey of Irish general practices where the unit of analysis is the practice rather than individual GPs. Such an approach is warranted as staffing and investment decisions are more likely to be at a practice level than at the level of the individual GP, and recent changes in general practice indicate a move away from solo-practitioner to multi-partner practices[3,7,8]. The questionnaire included questions relating to practice structure, staff and location and possession of medical equipment. In relation to medical equipment, respondents were asked if their practice had the following equipment: electrocardiogram (ECG) machine, 24hr blood pressure monitor, spirometer, cryotherapy equipment, minor surgery equipment and foetal monitors (see Bourke and Bradley (2010) for a more detailed description of the survey).

Designing a sample frame of all general practices in Ireland is complicated by the fact that there is no official register of Irish GPs[3]. However, it is estimated that there are approximately 2,500 GPs in Ireland[3,9,10] and approximately 1650 general practices in Ireland[8,11]. The Golden Pages website provided the sample frame for this study. We would expect most general practices to have a presence on the website. The database comprised of contact details for 1417 practices. The questionnaire was tested in a pilot study in February 2010. The final questionnaires were distributed in February and March 2010. We received 601 completed questionnaires, representing a 42 per cent response rate. We estimate that our sample size of 601 represents approximately one-third of the Irish general practice population[8,11]. Given the geographic variations in population density in the four Health Service Executive (HSE) regions, we examined response rates by HSE region to ensure our survey is representative of all of Ireland. There is slight over-representation of respondents from the HSE South region; potentially as a result of the survey's association with University College Cork, located in the south of Ireland. A Chi- Square Goodness of Fit test was conducted and determined that the responses by HSE region were reasonably representative geographically.

The purpose of this paper is to outline the changing face of primary care in Ireland, and so in the following section, we present data on practice characteristics by HSE region. Chi-square analyses were conducted to determine the relationship between medical equipment acquisition and HSE region, practice size and support services.

Table 1 Practice Characteristics by HSE Region

HSE Region	City	Large Town	Small Town	Village/ Rural	Average No. of GPs	Percentage of Solo-GP Practices	Nursing Support	Clerical Support
Dublin Mid	43.3%	27.7%	19.1%	9.9%	2.89	23.0%	77.1%	91.5%

Leinster								
Dublin North East	37.3%	27.5%	23.1%	12.1%	2.63	23.6%	86.6%	92.3%
South	29.4%	20.4%	31.7%	18.5%	2.87	21.3%	85.2%	92.4%
West	19.8%	12.7%	37.7%	30.0%	2.34	33.3%	74.5%	89.2%
Ireland	**32.5%**	**22.1%**	**27.9%**	**17.6%**	**2.68**	**25.3%**	**80.7%**	**91.3%**
	n=600	n=600	n=600	n=600	n=596	n=596	n=596	n=600

Results

Practice Characteristics by HSE Region

Table 1 presents practice characteristics by HSE region. Unsurprisingly, we found that there are more rural practices in the HSE West, and more city practices in the HSE Dublin Mid-Leinster and HSE Dublin North-East. The average number of GPs per practice is 2.68. The predominantly urban practices of HSE Dublin Mid Leinster region (2.89) are largest with the smaller practices occurring more frequently in the more rural HSE West region (2.34). More importantly, however, one in four general practices in Ireland remain solo-practitioner practices (Table 1). This figure is slightly lower in the HSE Dublin Mid-Leinster, HSE Dublin North East and HSE South regions; compared to the HSE West region where one in three practices are solo-practitioner practices. More than four in five general practices employ a nurse (80.7 per cent). HSE Dublin North East and HSE South are above the national average with 86 per cent and 85 per cent of practices employing a nurse. In the HSE West, fewer than three in four practices employ a nurse. The majority of general practices - 91 per cent - in Ireland employ clerical support, although this figure is somewhat lower in the HSE West.

Table 2 GP Practices with Medical Equipment by HSE Region

	ECG Machine	24hr Blood Pressure Monitor	Spiro-meter	Cryo-therapy	Minor Surgery	Foetal Monitor
HSE Dublin Mid Leinster	75.7%	79.3%	63.6%	82.9%	73.6%	77.1%
HSE Dublin North East	81.3%	81.3%	63.7%	83.5%	65.9%	79.1%
HSE South	83.4%	76.3%	59.2%	84.8%	79.6%	83.4%
HSE West	89.8%	83.4%	68.8%	84.7%	78.3%	82.2%
Ireland	82.5%	80.1%	63.8%	84.0%	74.3%	80.5%

Use of Medical Equipment by HSE Region, Practice Size and Nursing Support

Respondents were asked if their practice had a number of specific items of medical equipment. Eighty-three per cent of practices have an ECG machine; 80 per cent have a 24 hour blood pressure monitor; 64 per cent have a spirometer; 84 per cent have cryotherapy equipment, 74 per cent have minor surgery equipment; and 80 per cent have a foetal heart monitor (see Table 2). Across all six items of medical equipment examined, practices in the HSE West have a higher proportion of this equipment than the national average, whereas practices in the HSE Dublin Mid Leinster region have a slightly lower proportion of the equipment than the national average. We also examined associations between having medical equipment and practice characteristics, such as size and nursing support. There is a lower penetration of medical equipment among solo-practitioner general practices than group practices (Table 3). There is a significantly higher degree of penetration of medical equipment among practices with nursing support than practices with no nurse employed (Table 3).

Table 3 GP Practices with Medical Equipment by Practice Size & Nursing Support

	ECG Machine	24hr Blood Pressure Monitor	Spiro-meter	Cryo-therapy	Minor Surgery	Foetal Monitor
Solo-GP Practice	69.3%	60.0%	49.3%	66.7%	64.0%	70.0%
Group Practice	87.6%	86.0%	68.3%	90.1%	79.6%	84.7%
Nurse Support	89.8%	87.9%	69.8%	87.3%	81.5%	84.6%
No Nurse Support	53.9%	44.3%	38.3%	71.3%	53.1%	66.1%

Tables 2 and 3 indicate the presence of a relationship between medical equipment acquisition and HSE region, practice size and support services which was examined using chi-square tests (see Table 4). In general, there is no statistically significant relationship between HSE Region and possession of medical equipment, with the exception being ownership of an ECG machine. There is a statistically significant relationship ($p<0.01$) between practice size (group practice vs. solo practice) and possession of medical equipment. There is a statistically significant relationship ($p<0.01$) between nursing support and all six items of medical equipment, indicating that practices which invest in nursing support are also more likely to invest in medical equipment.

Table 4 Chi- Square Analysis of Medical Equipment Acquisition

		Chi- Square Test of Association	Phi Test – Strength of Association
HSE Region	ECG	$p<0.05$; $df = 3$; $\chi^2 = 10.62$	$p<0.05$; $\varphi c = 0.133$
	24hr BPM	$p>0.05$; $df = 3$; $\chi^2 = 3.02$	$p>0.05$; $\varphi_c = 0.071$
	Spirometer	$p>0.05$; $df = 3$; $\chi^2 = 3.55$	$p>0.05$; $\varphi_c = 0.077$
	Cryotherapy	$p>0.05$; $df = 3$; $\chi^2 = 0.314$	$p>0.05$; $\varphi_c = 0.023$

	Minor Surgery	$p>0.05$; $df=3$; $\chi^2=7.44$	$p>0.05$; $\varphi_c=0.111$
	Foetal Monitor	$p>0.05$; $df=3$; $\chi^2=81.57$	$p>0.05$; $\varphi_c=0.065$
Nurse Support	ECG	$p<0.01$; $df=1$; $\chi^2_{Yates}=81.57$	$p<0.01$; $\varphi=0.376$
	24hr BPM	$p<0.01$; $df=1$; $\chi^2_{Yates}=105.4$	$p<0.01$; $\varphi=0.426$
	Spirometer	$p<0.01$; $df=1$; $\chi^2_{Yates}=38.5$	$p<0.01$; $\varphi=0.259$
	Cryotherapy	$p<0.01$; $df=1$; $\chi^2_{Yates}=16.6$	$p<0.01$; $\varphi=0.173$
	Minor Surgery	$p<0.01$; $df=1$; $\chi^2_{Yates}=39.5$	$p<0.01$; $\varphi=0.263$
	Foetal Monitor	$p<0.01$; $df=1$; $\chi^2_{Yates}=19.5$	$p<0.01$; $\varphi=0.186$
Practice Size	ECG	$p<0.01$; $df=1$; $\chi^2_{Yates}=26.3$	$p<0.01$; $\varphi=0.211$
	24hr BPM	$p<0.01$; $df=1$; $\chi^2_{Yates}=45.0$	$p<0.01$; $\varphi=0.280$
	Spirometer	$p<0.01$; $df=1$; $\chi^2_{Yates}=16.5$	$p<0.01$; $\varphi=0.171$
	Cryotherapy	$p<0.01$; $df=1$; $\chi^2_{Yates}=44.4$	$p<0.01$; $\varphi=0.279$
	Minor Surgery	$p<0.01$; $df=1$; $\chi^2_{Yates}=13.8$	$p<0.01$; $\varphi=0.157$
	Foetal Monitor	$p<0.01$; $df=1$; $\chi^2_{Yates}=14.7$	$p<0.01$; $\varphi=0.163$

Discussion

Our study clearly highlights that a high proportion of practices are investing in medical equipment, as well as, detailing how practice characteristics influence such investment decisions. While there is evidence that the number of solo-practitioner practices is decreasing in Ireland, 25 per cent of practices are still single-handed. Our results indicate that solo-practitioner practices are less likely to invest in medical equipment. This finding may highlight the financial strain some solo-practitioner GPs face in terms of investing in medical equipment. Likewise, general practices with nursing support are more likely to have a broad range of medical equipment. However, 20 per cent of practices do not employ nursing support. Given that the decision to invest in staff and equipment is at a practice level as opposed to a system level, there are obvious inconsistencies in terms of the development of general practices in Ireland. Health economics literature frequently profiles GPs as economic agents who respond to economic incentives[12-14]. In the early 1990s, the Irish government developed the Indicative Drug Treatment Scheme (IDTS) to try to contain prescribing costs, whereby GPs were set indicative budgets for prescribing for their public patients. GPs were entitled to keep a proportion (40-60 per cent) of savings for projects benefitting their patients and practices. In the first year alone of the IDTS, this scheme resulted in savings of IR£13.5 million (€17million)[15]. Incentive structures could be a means of ensuring consistency of service provision across the HSE, and could also be used to ease the strain of investment outlays by smaller practices.

While we find little evidence of a statistically significant relationship between practice equipment and HSE region, it should be noted that these findings contrast with findings of previous Irish studies. For instance, an economic study of the factors affecting the adoption of multiple technologies and IT in Irish general practices, found that practices in the HSE West are more likely to adopt medical technologies and are also earlier adopters of numerous IT applications[16]. In addition, Nic Gabhainn et al. found that medical equipment is available more frequently in rural practices than in city and town practices[17]. These smaller, more rural practices may be acquiring this equipment to compensate for poorer access to secondary care services[18]. Our findings in relation to HSE region and ECG machine acquisition may support such a hypothesis.

As previously mentioned, it is proposed to introduce Universal Primary Care in Ireland. Our findings portray GPs as a group of professionals with a commitment to patient care and practice development within the present general practice environment. It is uncertain to what extent Universal Primary Care will affect the autonomy presently enjoyed by Irish GPs and what effect it might have on GPs' decisions about investing in their practices. While opportunities for innovative behaviour in practice development may continue, a changed incentive structure could discourage individual interests in investments at the practice-level. The proposed reforms specifically identify staffing within general practices as an important issue but are unclear as to how this could be enable. Universal health care is surmised to encourage moves towards group practice and to increase the number of practice nurses which our data would suggest is likely to be associated with increased medical equipment ownership. However, this is likely to be contingent on incentives provided to practices to encourage such investments.

Acknowledgements

The 601 GPs who took the time to complete and return our questionnaire. S Roper, University of Warwick; and a number of GPs who provided invaluable assistance in relation to the design of the questionnaire. Valuable comments were also received from B McElroy, Department of Economics, UCC.

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