

NHS Direct : managing demand for primary care?

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Abstract

This paper considers how NHS Direct is affecting demand for primary care in particular out of hours services from GPs. This is reviewed through a three-year study of NHS Direct and HARMONI, the integrated telephone health helpline based in West London. It describes the policy background and development of the services on the site, and some of the outcomes of the HARMONI commissioned research to answer the question "Has NHS Direct increased the workload for HARMONI doctors?".

The research adopted both a qualitative and quantitative approach using cross-sectional and longitudinal analysis of the data collected. The analysis of the data reveals the issues as both complex and dynamic in nature. The research shows that while there has been no significant change to the total volume of activity, changes within patient groups or GP practices may be significant. In addition, the changes in organisational arrangements may influence significant changes in referral patterns. This was confirmed for example by the changes described in the interview data on the change in nurses' role from gatekeeper to patient advocate, which happened when they ceased to be employees of the part-time co-op and began to work instead for the 24x7 NHS Direct service.

The conclusions drawn are that behavioural and organisational changes are at least as significant as the evidence-based computerised decision support software in changing outcomes in the demand for primary care. Amongst the evidence cited is the different demand pattern of calls experienced by those local GPs not integrated into out-of-hours provision into NHS Direct on the West London site at the time of the study.

NHS Direct : managing demand for primary care?

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Introduction

The introduction of NHS Direct, providing telephone based information and nurse led triage twenty four hours a day for seven days a week (24x7), is an innovation in the provision of primary care services for the UK NHS. Its purpose is to improve health care by appropriately targeting patients to health care resources, using computerised evidence-based decision support software located in call centres throughout the UK (Department of Health 1997). Its integration with General Practitioner (GP) services, and in particular those providing out-of-hours access to primary care physicians, is now a further developmental target. This strategy is part of an integrated approach to primary care, which it is hoped will lead to a single fast access phone line to all NHS primary care services, and facilitate better management of demand (Mark, Pencheon, & Elliott 2000), which has been the primary policy purpose of such systems in other countries (Donaldson 2000). The Audit Commission report on NHS Direct (Comptroller and Auditor General 2002) does, however, suggest that aspirations to improve access in this way have some way to go. As an innovation it meets key government targets as part of the government's modernisation programme (Cabinet Office 1999). However, as our research so far is suggesting, changes in professional, organisational and patient behaviours are also occurring which may confound some of these objectives in the future.

Research into the effectiveness of such demand management strategies is only just emerging, and will require more longitudinal analysis if patterns of permanent change are to be revealed. This article sets out the results of research that is tracking the development and operation of what at the time was the largest NHS Direct site which, from the outset, was linked to the work of a GP co-operative. The findings provide some indication of the effects that might occur over time elsewhere when these services are integrated. This study describes the first example of how changes in the distribution of out-of-hours health care services occur as a result of the introduction of NHS Direct when linked to a GP co-operative. Rather more difficult to assess is the impact its introduction is having on in-hours general practice and other parts of the system (Munro et al. 2000a), although some evidence is now emerging (Grant et al. 2002) in relation to this. Further testing is required of the hypotheses in our report (Mark & Shepherd 2001) that by managing demand in this way, the profile of work being undertaken by GPs in-hours is changing.

The study context was distinctive for several reasons:

- It is the first UK site where NHS Direct had been superimposed on an existing, successful GP co-operative;
- The call centre served a large catchment population (about 0.9m for the co-operative and 1.35m for NHS Direct);
- It handled a large volume of patient enquiries (a total of 159,176 calls during 1999, and 223,426 calls during 2000), which was reflected in high intensity work within the call centre.

The study itself is also distinctive in that:

- it tracks change over a three-year period; and
- it involves the analysis of large samples of quantitative call information, supplemented by qualitative information from in-depth interviews.

Context

The HARMONI (Harrow Medics Out of hours Network Inc) co-operative in West London was established in 1996 to provide out-of-hours primary medical services to the local population when their own GP practices were closed. The development of this co-operative was seen as a way to improve service provision for patients and quality of life for GPs. As a group they had experienced significant increases in workload in the previous ten years with no significant additional resources to support them, which was in common with the national experience; new strategies to manage this were now required (Mark & Elliott 1997). The introduction of out-of-hours development funds in September 1995 provided each GP in the UK with approximately £1400 to improve services, so the development of co-operatives to jointly manage out-of- hours provision began in earnest. By the beginning of 1999, HARMONI had grown to incorporate about 450 GPs, serving a total of about 900,000 patients. The development of local Primary Care Centres (PCCs), where most requests for out of hours visits would be targeted, was the distinctive feature of HARMONI. These provided access to a GP out-of-hours, usually within the local hospital setting where they were housed. The residual number of home visits required were covered by doctors contracted specifically for this work.

A computerised, evidence-based telephone triage system (TAS) was used at the call centre; this software was later to become one of the pilot software systems for NHS Direct, although this has now been superseded by the national CAS software. Siting NHS Direct with HARMONI was an obvious option and, in March 1999, West London became one of the second-wave sites in the national programme being rolled out by government, relieving GPs of the cost of triage provision for the HARMONI co-op. This changed local provision from a primarily out-of-hours service to one linked with advice and information provided 24 x 7.

The success of HARMONI and the introduction of NHS Direct led the HARMONI board to commission research on the changes that were now occurring. The purpose of the research was to explore trends in the pattern of call outcomes as defined by the computer software data. This was seen as a proxy for patient outcomes in giving some indication of changes in potential workflow based on a notion of concordance rather than patient compliance to professional advice (Jordan, Ellis, & Chambers 2002). In addition, these outcomes would be considered in relation to concurrent changes in call centre organisation and operation to answer the primary research question: *has NHS Direct increased the workload of HARMONI doctors?* While our answer to this question is broadly negative, it is the other changes identified by our research that provide the focus for this paper.

Data and methods

Both quantitative and qualitative data were used for this study. Both were used to generate and test hypotheses, in a research process that iterated between the two sources throughout the study period. The quantitative data consisted of three cross-

sectional samples of anonymised patient computer data records (taken from TAS) for the first two weeks in December 1998 (5,522 records), 1999 (10,014 records) and 2000 (9,866 records). These periods were chosen so as to provide a clear ‘before’ and ‘after’ picture of patient referrals in West London. They were also chosen to provide a significant call volume for analysis, while at the same time avoiding the distortions of the Christmas/New Year break. Examination of meteorological and influenza records suggest that these two-week periods were not exceptional in terms of weather or illness, and the latter has now been confirmed as part of the national picture for General Practice at the time of the millennium (Chapman et al. 2002).

In order to identify trends in anonymised patient referrals through time, only data involving out-of-hours calls to HARMONI GPs belonging to the 160 practices operating in all three study periods were selected for analysis. Moreover, a standard definition of out-of-hours was adopted for all three periods, based on the HARMONI arrangements:

Monday to Friday, 6.30pm to 8.30am (54 hours per week)

Friday 6:30pm to Monday 8.00am (61.5 hours per week)

This local definition, which differs somewhat from that adopted by Salisbury (Salisbury, Trivella, & Bruster 2000), revealed that the total number of HARMONI out-of-hours calls which could be selected for analysis were:

1998	5126 calls
1999	5702 calls

2000

4698 calls

The qualitative data were derived from observation of the call centre operations, attendance at relevant meetings, workshops and training sessions, and 25 in-depth interviews. The latter included 8 GPs and Senior Doctors, 8 Nurses, 4 Call Handlers and 5 other staff involved in management and development of the service, the majority of whom had worked with both HARMONI and NHS Direct. The interviews were held in the summer of 2000 and, through open-ended questions, explored issues of:

personal motivation

expertise

perception of the two systems

system and service advantages and disadvantages

areas of concern

benefits, and

future needs

Data from these interviews were analysed using a grounded theory (Glaser & Strauss 1967) approach. They were then inducted to reveal themes which relate to strategy, structure, motivation, leadership, team working, role boundaries, culture and change identifying within these themes sixty sub- themes which informed both the conclusions and twenty three recommendations of the final 156-page report (Mark & Shepherd 2001). The most notable conclusions in relation to the changing pattern of demand for primary care are:

- the differential effects on individual practices and the reasons why these may occur, e.g. size of practice, in-hours provision, links to HARMONI.
- changes in nurse perception of their role from gatekeepers when employed by HARMONI to patient advocates when employed by NHS Direct.
- changing sensitivity of nurses to patients' needs in response to both computer and organisational systems, notably the development of a social model of care compared to the medical model vested in the computer software.
- increasing awareness by patients of the alternative source of information and access, especially confidential second opinions, which the system facilitates.
- changing opportunities presented by NHS Direct as a gateway to care, notably in identifying unmet need.

It must be emphasised that the picture painted here represents a partial view of primary care in the UK, as seen through the prism of call centre data, but this may be more informative than the previous alternatives based largely on GP night visit fees (Salisbury 2000). It has not been possible to provide data on patient access to primary care through channels other than the call centre, though a complete systems-wide view must be the goal of future research.

Results

The results discussed here focus on changes in referrals for out-of-hours patients, that is those seeking access to a doctor outside of normal surgery hours. Other patterns and trends identified by the study can be found in the final report (Mark & Shepherd 2001).

The results are expressed from both the qualitative and quantitative data in an integrated approach to findings from the two sources.

[Insert about here]

Figure 1. Daily patient calls -- June 1998 to January 2001.

Changes in call volumes

Figure 1 illustrates the daily call volumes at the West London call centre over a two and a half year period that includes the introduction of NHS Direct. Two features are of note: the gradual underlying increase in calls throughout the period; and the peaks related to the Christmas/New Year and Easter breaks. Disaggregating this information for the three study periods (see Table 1) reveals further detail.

	1998	1999	2000
Out-of-hours	5334 <i>96.60%</i>	8163 <i>81.52%</i>	7659 <i>77.63%</i>
In-hours	188 <i>3.40%</i>	1851 <i>18.48%</i>	2207 <i>22.37%</i>
All hours	5522 <i>100.00%</i>	10014 <i>100.00%</i>	9866 <i>100.00%</i>

Table 1. Changes in West London calls (1998-2000).

While the number of calls almost doubled between 1998 and 1999 (from 5522 to 10,014), they decreased slightly between 1999 and 2000 (from 10,014 to 9866). This

apparent slacking off in demand at West London can be attributed to several factors, the most explicit of which are:

- Call numbers in late 1999 were inflated because of the larger than normal Millennium period peak. The distortions were multifactorial but indeterminate, and included media concerns over service availability, fears associated with the millennium computer bug, the longer holiday, and flu epidemic scares.
- The 2000 winter peak was markedly smaller, perhaps as a result of the successful influenza vaccination campaign following what may have been unfounded concerns from the previous year (Chapman, Smith, Warburton, Mayon-White, & Fleming 2002); and
- Starting in the autumn of 2000, a randomly selected proportion of calls to West London have been diverted to other NHS Direct centres at peak periods.

These factors are examples of the complexity (McDaniel & Dreibe 2001, Plsek & Wilson 2001) of analysing data from this ever-changing environment where causal relationships are at best separated over space and time but more often asymmetric in nature.

During the period of this study Table 1 reveals that out-of-hours calls first increased, then stabilised, while in-hours calls grew rapidly between 1998 and 1999, and have since continued to increase. Over the two-year period, the West London call centre has changed from an almost exclusively out-of-hours service to a 24x7 service in which three quarters of all calls are still contained in the out-of-hours time frame, covering time periods which account for just over two thirds of the 24x7 period. What

is not available are the total call volumes to GP practices in hours to give a full picture of activity.

In order to estimate the effect of NHS Direct on the out-of-hours service provided by HARMONI GPs, the TAS call records for patients registered to HARMONI doctors were examined in more detail (see Table 2). This analysis reveals that there was initially a relatively modest increase (11.24%) in the out-of-hours workload of HARMONI GPs between 1998 and 1999 (from 5307 to 5702 calls), but this was followed by a fall of 17.61% between 1999 and 2000 (from 5702 to 4698). At the same time, in-hours calls grew rapidly between 1998 and 1999, accounting for a tenth of all HARMONI calls in 1999, but they then declined to around 8% of all calls by 2000.

	1998	% all calls	1999	% all calls	2000	% all calls
HARMONI calls	5307	96.11	6741	67.32	5507	55.82
- Out of Hours	5126	92.83	5702	56.94	4698	47.62
- In Hours	181	3.28	1039	10.38	809	8.20

Table 2. Changes in calls to HARMONI GPs, West London (1998-2000).

The suggestion that "the greater accessibility of out-of-hours care, reinforced by the expansion of NHS Direct, may lead to an increase in demand for care" (Salisbury, Trivella, & Bruster 2000) is not supported by our findings. An exception to this may be those callers already exhibiting frequent attendance as part of both an in-hours and out-of-hours pattern of use (Vedsted et al. 2000), but linking anonymised data in this

way to GP practices was not possible within this study. When all calls are considered (see Table 1), a consistent increase can certainly be seen in out-of-hours calls from 1998 to 2000. However, in the same period, out-of-hours calls to co-operative members (see Table 2) have declined after an initial increase.

The disproportionate growth in out-of-hours calls to the non-co-operative GPs may be explained in terms of other factors which change the behaviour of patients who are seeking help and support in dealing with medical problems. These can be summarised as:

- differences in the availability of GPs (e.g. opening hours) during the day;
- differences in the perceived sensitivity of GPs to patient's needs; and
- differences among these patients in their need to seek clarification and second opinions from others, without informing their own GP.

These hypotheses are indicated by the qualitative data, and require further investigation.

More recent evidence from our continuing West London research, together with anecdotal evidence from other NHS Direct centres, continues to suggest that the integration of NHS Direct with GP co-operatives is not leading to an expected increase in out-of-hours call volumes in total. However, stabilisation of demand and some reduction in volume shown in our research may be a function of changing access strategies and associated problems, as identified at the West London site in the recent CHI report (Commission for Health Improvement 2002). This change in demand through NHS Direct, although not the overt intention of government and policy makers in the UK (Donaldson 2000), coincidentally alleviates continued

shortages in the provision of doctors and nurses in primary care, but may be impacting adversely on the system elsewhere (Grant, Nicholas, Moore, & Salisbury 2002).

The relationship between the use of NHS Direct and its impact on activity during normal working hours, as well as out-of-hours, also requires further investigation.

Changes in outcomes

In order to identify trends in triage outcomes, the main referral pathways for patients were standardised as follows:

999/Ambulance

A & E

Doctor Advice (provided by on-call doctors over the phone) *

Home Visits *

Nurse Advice (provided by triage nurses over the phone)

Primary Care Centre Visit (PCC) * (an out-of-hours service)

Refer to GP (for in-hours follow up)

Information

(* The three items indicated with an asterisk represent a direct cost to the GP co-operative.)

[Insert about here]

**Figure 2. Trends in out-of-hours referrals - 1998, 1999 and 2000
(HARMONI calls only).**

The main trends for HARMONI members, which are illustrated in Figure 2, are as follows:

- There has been a consistent decline in the proportion of out-of-hours calls resulting in:
 - PCC Visits (20.97% in 1998, 17.15% in 1999, and 15.65% in 2000);
 - Refer to GP (11.33% in 1998, 9.80% in 1999, and 8.22% in 2000) and
 - Nurse Advice (38.86% in 1998, 33.46% in 1999 and 25.61% in 2000).
- By contrast, there has been a consistent increase in the proportion of out-of-hours calls resulting in Doctor Advice (4.23% in 1998, 5.42% in 1999 and 12.03% in 2000), while the proportion of Home Visits first increased then decreased (12.43% in 1998, 15.73% in 1999, and 10.58% in 2000). This may in part be explained by the change in role of nurses from gatekeeper to advocate when they changed from being employees of HARMONI to employees of NHS Direct. Awareness of this changed pattern of behaviour was mediated by levers within the organisation, as it became aware of the impact on calls. An example of such a lever is the blue and yellow card feedback loop, for visiting doctors and GPs, which was developed to identify what were deemed inappropriate referrals to out-of-hours care. In addition, as confidence grew in the role of doctor telephone advice this alternative was used, to filter both requests for home visits and nurse advice where greater risk or patient satisfaction were issues of concern.

- The proportion of out-of-hours Ambulance and A&E referrals have remained relatively stable.

It is of interest to note that the more costly HARMONI services (i.e. home visits and PCC visits) have gone down while the least expensive service (i.e. doctor advice) has risen, this requires further investigation as an organisational re-interpretation of the gatekeeping role.

Our interview data suggest that the gradual decline in PCC referrals, which runs counter to HARMONI aspirations, is partly due to patients and/or triage nurses deciding that the PCC premises in West London may not have been the most appropriate for meeting specific needs. The increase in the proportion of calls resulting in out-of-hours doctor advice may be compensating for the decreases in PCC visits, home visits and referrals to GPs. These trends may be related either to changes in triage nurse behaviour as a consequence of the change in their role from co-operative employees to NHS Direct employees, or to a change in patient behaviour now that there is 24x7 access to telephone triage. This too will require further research.

Referrals for specific age groups

Analysis of key age groups, chosen because of their comparatively high levels of need for health care, reveals an age-related dimension to change in the out-of-hours service in West London. Table 3 reveals a gradual decline in the proportion of calls for the under-5s (from 36% to 29% of out-of-hours calls), and a modest increase in the proportion of calls in the two older age groups. Overall, the proportion of out-of-hours

calls from all three age groups was relatively unchanged between 1998 and 1999 (55.03% and 56.09% respectively), but it fell between 1999 and 2000 (to 50.40%).

	1998	1999	2000	% 1998	% 1999	% 2000
Age < 5	1844	1860	1369	35.97	32.62	29.14
Age 50-60	243	359	241	4.74	6.30	5.13
Age 60+	734	979	758	14.32	17.17	16.13
All ages	5126	5702	4698	100.00	100.00	100.00

Table 3. Changes in out-of-hours calls for selected age groups - 1998 to 2000 (HARMONI calls only).

In terms of the main referral pathways, the key age-related trends appear to be:

- Doctor Advice referrals have increased proportionately for all three age groups (from about 4% of referrals in 1998 to between 10% and 17% in 2000), which is consistent with the general trend described above.
- Home Visits first increased then decreased in the under-5 and 50-60 age groups, but they have declined proportionately in the 60-plus age group (from 36% to 26% of referrals). Home Visits become proportionately more important as one moves up the age scale (currently 6% for the under-5s, 11% for the 50-60 year olds, and 26% for the 60-plus age group). This reflects decreased mobility and perhaps (amongst older patients), as our interview data suggest, a delay in accessing care which leads to more acute presenting conditions.

- The proportion of PCC referrals varies through time in the under-5 age group, declines in the 50-60 age group, and is relatively stable in the 60-plus age group. The highest proportion of PCC use is by the under-5s (currently 22% of referrals); there are relatively few PCC referrals (about 6%) in the 60-plus age group.
- Nurse Advice and Refer to GP referrals have declined proportionately for all three age groups, in line with the general trends reported above. The highest proportion of Nurse Advice is for the under-5s (between 32% and 45% of referrals), which is a reflection of the reassurance role of triage nurses for anxious parents, as indicated by our interview data and supported by the national findings on NHS Direct (Munro et al. 2000b).

The changes we found in the utilisation of out-of-hours co-operative services are in part explained by increased confidence in triage staff to allocate calls appropriately. However, other factors such as national networking of calls at peak demand periods cannot be discounted.

Discussion

The research reported here has shown that while there has been some variation in the experience of individual practices of a combined co-operative and NHS Direct service, the integration has been accompanied by no appreciable long-term increase in the total out-of-hours workload for HARMONI GPs. However, comparisons with the

data provided from non-HARMONI doctors indicate some divergence. The seamless provision of out-of-hours care by HARMONI in conjunction with NHS Direct West London appears to be managing demand more effectively, while among non-HARMONI GPs the same downward trend in activity is not apparent. This significant contrast has important implications for future research and policy. For example, what is the relationship between in-hours provision and out-of-hours expectations of patients, and are more strategies required to match the expectation of patients with the services which are available (McKinley et al. 2002)? Some evidence indicates that frequent users will appear disproportionately in all domains and at any time (Vedsted, Toft, Nielsen, & Olesen 2000; Martin et al. 2002). This may imply that changes to patient utilisation patterns may be more significant for other areas than data from any one part of the system, for example NHS Direct, might suggest.

Various changes in referral patterns appear to result from the changing role of triage nurses. The initial increase in requests for doctor visits following the move from HARMONI to NHS Direct may be indicative of the empowered role of the nurse as patient advocates, who are also acting in more risk-averse ways. The subsequent increase, following some organisational changes, in doctor advice, where more complex problems are sent back to the on-call doctor for assessment, may be indicative also of the professional limits to the nurse triage role and the decision support software. In summary, the increase in out-of-hours doctor advice may be related to the evolving role of nurse triage within the context of NHS Direct.

An alternative interpretation is that this increase in doctor advice is more a function of fiscal constraint or as a counterbalance to a reduction in PCC visits, home visits or nurse advice.

The qualitative research into the transfer of nurses from employment by HARMONI to NHS Direct, which revealed a redefinition of their role from gatekeepers to the system for GPs to patients' advocates, allowed for a more appropriate response to the social context of the help-seeking behaviour of patients. An example is provided by the increased sensitivity to the access problems encountered by some patients, such as the elderly (Drury & Neuberger 2001). Their previous experience of the PCC could be that it was difficult to access for a variety of reasons, and in telling the nurse, an alternative home visit would be scheduled. The choice of alternatives inherent in the TAS decision support system, where the nurse decided on referral pathways, has now been replaced by the national CAS system, where nurses must counter proscribed software advice by giving reasons why alternative pathways are appropriate (Baker, Robson, & Shears 2002).

The efficient management of patients into pathways of care by NHS Direct may indeed be handing over more difficult calls to GPs, and enabling a more effective filtering of patients' needs. Our qualitative data suggests that for some GPs this may cause added stress, for others increased job satisfaction, but the potential for future policy in relation to the recruitment and retention of doctors in primary care must not be underestimated.

The speed of change and development following the integration of the two West London services has at times affected the ability of both individuals and the organisations to cope as the recent report from the Commission for Health Improvement confirms (Commission for Health Improvement 2002). This was especially true for the call handlers (now renamed Information Advisors) who found

the emotional aspects of the work challenging (Taylor 1999; Mark & Shepherd 2001). However, despite such pressures, and because of the learning approach adopted by the organisation (Commission for Health Improvement 2002), progress has been often surprising and considerable (Comptroller and Auditor General 2002).

Conclusions

The trends in referrals that have been revealed by this study, and the behavioural and organisational changes that help to account for them, will be clarified by further research into some of these emerging patterns. The consequences for the future development of NHS Direct, and its relationship with GP out-of-hours care cannot be underestimated, and will be further influenced by the new national software NHS CAS (Baker, Robson, & Shears 2002), which may have a differential effect again on both professional and patient behaviour. The conclusion that organisational and behavioural changes are at least as important as technology in influencing call outcomes, is perhaps confirmed by differential outcomes experienced by the non HARMONI practices, suggesting that integrated organisational and referral pathways managed demand for patients in ways that change their future behaviour. Further work on how these changes are expressed outwith the NHS Direct / GP co-op dynamic explored here will be an essential next step if the full impact on the system of healthcare is to be better understood.

References

- Baker, M., Robson, B., & Shears, J. 2002, "Clinical decision support in the NHS : the clinical element.", *Journal of Clinical Governance*, vol. 10, no. (2), pp. 77-82.
- Cabinet Office 1999, *Modernising Government*, Stationery Office, isbn 0 10-143102-3, Cm4310.

Chapman, R. S., Smith, G. E., Warburton, F., Mayon-White, R. T., & Fleming, D. M. 2002, "Impact of NHS Direct on general practice consultations during the winter 1999-2000: analysis of routinely collected data.", *British Medical Journal*, vol. 325, pp. 1397-1398.

Commission for Health Improvement 2002, *Hillingdon Primary Care Trust and NHS Direct West London - clinical governance review*, The Stationery Office, London, isbn 0-11-703024-4.

Comptroller and Auditor General 2002, *NHS Direct in England*, National Audit Office, Stationery Office London, HC505.

Department of Health. The New NHS-modern, dependable. CM3807. 1997. New labour government legislation.

Donaldson, L. 2000, "Telephone access to health care: the role of NHS Direct.", *Journal of the Royal College of Physicians*, vol. 34, no. 1, pp. 33-35.

Drury, M. & Neuberger, J. 2001, "Ageing Britain - challenges and opportunities for general practice.", *British Journal of General Practice*, vol. 51, no. 462, pp. 5-6.

Glaser, B. G. & Strauss, A. L. 1967, *The discovery of grounded theory: strategies for qualitative research*. Aldine Publishing Company, New York.

Grant, C., Nicholas, R., Moore, L., & Salisbury, C. 2002, "An observational study comparing quality of care in walk-in centres with General Practice and NHS Direct using standardised patients.", *British Medical Journal*, vol. 324, no. 7353, pp. 1556-1559.

Jordan, J. L., Ellis, S. J., & Chambers, R. 2002, "Defining shared decision making and concordance: are they one and the same?", *Postgraduate Medical Journal*, vol. 78, no. 921, pp. 383-384.

Mark, A. & Elliott, R. 1997, "Demarketing dysfunctional demand in the UK NHS", *International Journal of Health Planning and Management*, vol. 12, pp. 297-314.

Mark, A., Pencheon, D., & Elliott, R. 2000, "Demanding Healthcare", *International Journal of Health Planning & Management*, vol. 15, no. 1, pp. 237-253.

Mark, A. L. & Shepherd, I. D. H. 2001, *"Don't shoot the messenger" - an evaluation of the transition from HARMONI to NHS Direct in West London*, Middlesex University, London.

Martin, A., Martin, C., Martin, P. B., Martin, P. A. B., Green, G., & Eldridge, S. 2002, "'Inappropriate' attendance at an accident and emergency department by adults registered in local general practices: how is it related to their use of primary care.", *Journal of Health Services Research and Policy*, vol. 7, no. 3, pp. 160-165.

McDaniel, R. R. & Dreibe, D. J. 2001, "Complexity Science and Health Care Management," in *Advances in Health Care Management*, M. D. Fottler, Savage G.T, & J. D. Blair, eds., Elsevier Science, Oxford, pp. 11-36.

McKinley, T. K., Stevenson, K., Adams, S., & Manku-Scott, T. K. 2002, "Meeting patient expectations of care: the major determinant of satisfaction with out of hours primary medical care?", *Family Practice*, vol. 19, no. 4, pp. 333-338.

Munro, J., Nicholl, J., O'Caithain, A., & Knowles, E. 2000b, *Evaluation of NHS Direct First Wave sites - second interim report to the Department of Health*, ScHARR Medical Care Research Unit University of Sheffield, Sheffield.

Munro, J., Nicholl, J., O'Caithain, A., & Knowles, E. 2000a, "Impact of NHS Direct on demand for immediate care: observational study", *British Medical Journal*, vol. 321, pp. 150-153.

Plsek, P. E. & Wilson, T. 2001, "Complexity, leadership, and management in healthcare organisations", *British Medical Journal*, vol. 323, pp. 746-749.

Salisbury, C. 2000, "The demand for out of hours care from G.Ps: a review", *Family Practice*, vol. 17, no. 4, pp. 340-347.

Salisbury, C., Trivella, M., & Bruster, S. 2000, "General Practice Demand for and supply of out of hours care from general practitioners in England and Scotland: observational study based on routinely collected data", *British Medical Journal*, vol. 320, no. 4th March, pp. 618-621.

Taylor, P. B. P. 1999, "'An assembly line in the head: work and employee relations in the call centre'", *Industrial Relations Journal*, vol. 30, no. 2, pp. 101-117.

Vedsted, P., Toft, H., Nielsen, S. J., & Olesen, F. 2000, "The association between daytime attendance and out of hours frequent attendance among adult patients in general practice.", *British Journal of General Practice*, vol. 51, no. 463, pp. 121-124.

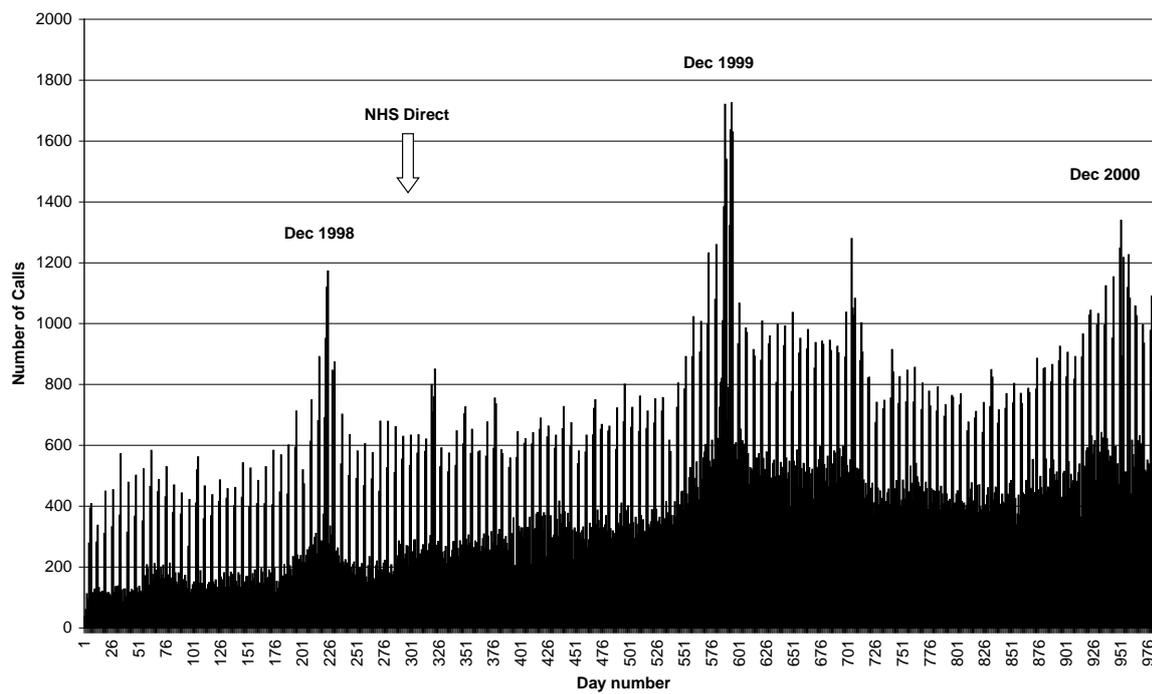


Figure 1. Daily patient calls -- June 1998 to January 2001.

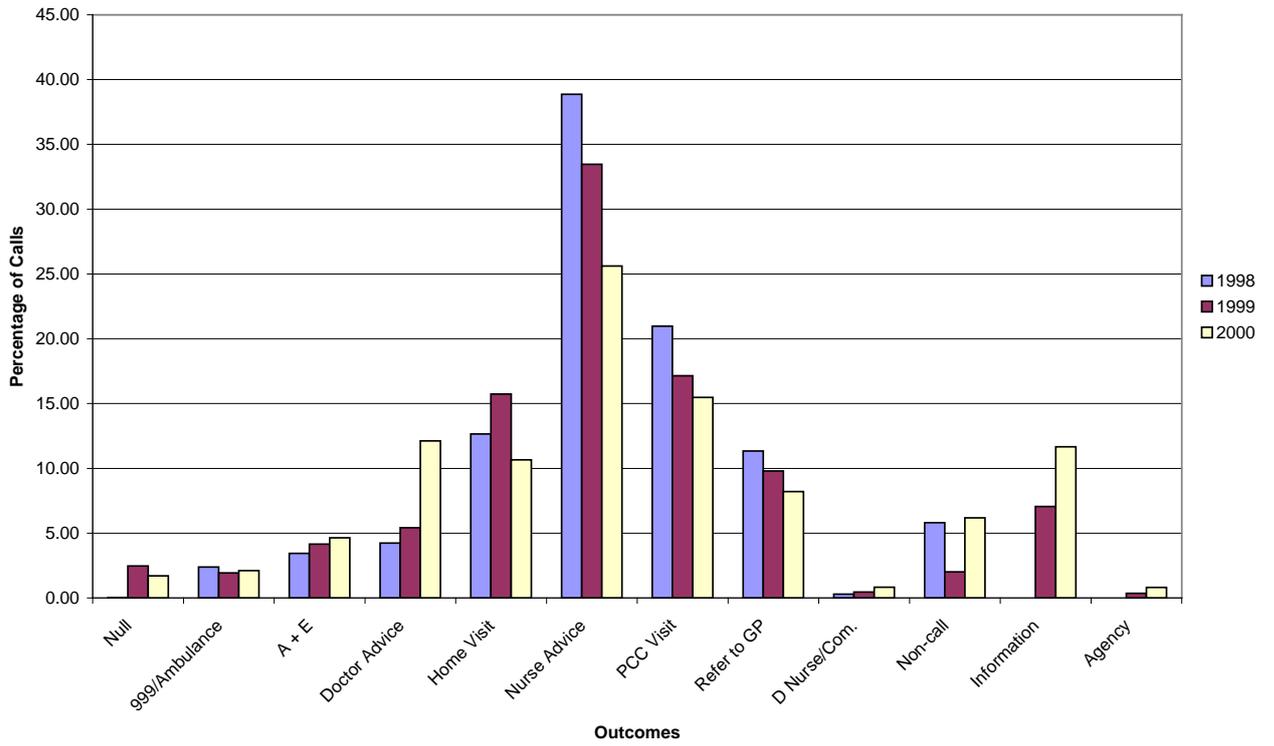


Figure 2. Trends in out-of-hours referrals - 1998, 1999 and 2000 (HARMONI calls only).