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**HORIZONTAL INTEGRATION IN PRIMARY CARE:
THE FACTORS AFFECTING LHCC CO-OPERATION**

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SUMMARY

Horizontal integration in primary care has taken the form of GP out-of-hours co-operatives, multi-funds, total purchasing projects, GP commissioning groups, and locality commissioning groups. In Scotland, the latest governance structure to promote collaborative working among general practices is the Local Health Care Co-operative (LHCC). The voluntary nature of LHCCs implies that general practices face two decisions: whether to join an LHCC or not and how much to co-operate with the LHCC. A number of hypotheses about the determinants of co-operation with an LHCC are derived from economic theories of integration. These include public choice, transaction cost, economies of scale and scope, market imperfection, managerial discretion, resource-based and institutionalist perspectives on integration. Hypotheses about determinants were included in a questionnaire sent to every general practice in Scotland. Ordered probit regression techniques were employed to explore the effect of determinants on the degree of co-operation with the LHCC.

Preliminary findings provide evidence on the factors affecting the extent to which general practices co-operate with an LHCC. The regression analysis had reasonable explanatory power and hypotheses were generally supported, taking into account the small sample size. These initial results lend some support to the theoretical validity of the model. However, the coefficients of some determinants were counter-intuitive. Moreover, determinants exhibited high inter-correlations, signalling the potential for multi-collinearity in the ordered probit regression analysis. Caution needs to be exercised when adding determinants to the regression analysis depending on whether economic theories of integration are viewed as complementary or competing. This analysis has important implications for the further development of theoretical models of the rationale of LHCCs.

1. INTRODUCTION

In the last decade, GPs and their associated primary care teams have increasingly reaped the benefits from working together to plan and deliver primary care services for a larger patient population. Various forms of horizontal integration in primary care (in which general practices are organised in groups) have developed through GP out-of-hours co-operatives, multi-funds, total purchasing projects, GP commissioning groups, locality commissioning groups, primary care groups, and local health groups. In Scotland, the latest governance structure promoting such collaborative working among general practices is the Local Health Care Co-operative (LHCC) (Secretary of State for Health, 1997).

The motives for integration in primary care have generally remained the subject of debate. LHCCs have been introduced in the absence of evidence on their costs and effects. Whether they have an impact will depend crucially on the nature and extent of co-operation between general practices within each LHCC.

A general practice needs to make a decision about two aspects of LHCC integration. First, whether to join an LHCC or not and, second, the extent of co-operation with the LHCC. Although it is possible to distinguish between these two decisions about LHCC integration from a theoretical perspective, in reality they are likely to be jointly determined. A previous paper has examined the first decision (Simoens and Scott, 2000). This study focuses on the second decision and aims to explain the extent to which a general practice co-operates with an LHCC.

Hypotheses about the determinants of co-operation with the LHCC are derived from a number of economic theories of integration. Ordered probit regression techniques are then employed to explore the relative impact of these determinants on the degree of co-operation with an LHCC. Preliminary results are based on a sub-sample of 50 questionnaires taken from a nationwide survey of general practices that have already joined an LHCC. The focus of this paper is to elicit comments about the methods of analysis used, rather than on results.

Information about the factors that affect co-operation with the LHCC is valuable in three respects. First, it may help to explain the operation of LHCCs and the range of local service provision models that currently exist throughout Scotland. Second, it may inform decision makers about ways to best support general practices that have joined an LHCC. Third, LHCC integration is viewed by the government as a vehicle for offering co-ordinated, cost-effective care, thereby improving the value of health care services for all concerned. Insight into the factors that affect the degree of co-operation with the LHCC may enable us to understand the mechanisms by which LHCCs achieve their goals.

The paper is organised as follows. The next section sets out the theoretical framework that underlies the study. The questionnaire design and sampling, data sources, and methods of analysis are outlined in section 3. The main results are presented in section 4. The final section discusses limitations of the study and sets out a future programme of research.

2. THEORETICAL FRAMEWORK

This study focuses on the extent to which a general practice co-operates with an LHCC. Four types of factors were identified that play a role in this decision. A number of hypotheses about the determinants of co-operation with the LHCC were derived from economic theories of integration. The voluntary nature of the decision to join an LHCC and an LHCC effect are also expected to affect the degree of co-operation with an LHCC. Finally, the analysis needs to account for confounding variables over which general practices have no influence.

2.1. Determinants of co-operation with the LHCC

Previous work has derived a number of hypotheses about the determinants of integration in primary care from a range of economic theories of integration (Simoens and Scott, 1999). Since there is not one perspective that is pertinent to integration, the literature review covered public choice, transaction cost, economies of scale and scope, market imperfection, managerial discretion, resource-based and institutionalist perspectives on integration. This generated the following hypotheses:

Hypothesis 1: *General practices that wish to take advantage of the specific skills or knowledge of other general practices or health care professionals, are more likely to co-operate with the LHCC.*

Several theories of integration have proposed human asset specificity as a potential determinant of co-operation with the LHCC. Transaction cost models draw attention to the idiosyncratic and intangible nature of human capital (Williamson, 1975). Market imperfection models regard human asset specificity as a source of information asymmetry between general practices (Perry, 1989). Resource-based models view human asset specificity as a resource on which the survival of the general practice depends (Wernerfelt, 1984). In the presence of human asset specificity, LHCC integration may enable general practices to mitigate opportunistic behaviour, to overcome the skill gap between general practices or to appropriate competencies of other general practices.

Hypothesis 2: *General practices that wish to maintain or enhance their reputation are more likely to co-operate with the LHCC.*

Reputation, that is the status of GP or general practice in the eyes of peers, patients or society has been suggested to determine co-operation with the LHCC by three theories. Transaction cost models regard reputation as a means of reducing transaction costs associated with consumer search, negotiation and monitoring (Klein and Leffler, 1981). Managerial discretion models consider reputation as one of the arguments in the GP utility function (Scott, 1997). Institutional models posit that general practices try to establish a good reputation and gain societal legitimacy by complying to pressures from the institutional environment (Arndt and Bigelow, 1992).

Hypothesis 3: *General practices that wish to provide cost-effective care are more likely to co-operate with the LHCC.*

Co-operation with the LHCC may allow general practices to share patients or services with other practices to exploit economies and to provide care at the lowest cost. Some economies are also likely to be generated in terms of budgets, service provision, and

management time through centralisation of functions at LHCC level. However, to maximise population health subject to a budget constraint, it has become necessary not simply to provide services at lowest cost, but to carry out only those procedures that are cost-effective. Clinical governance within LHCCs may contribute to this goal.

Hypothesis 4: General practices that wish to assure supply of health care services for their patients are more likely to co-operate with the LHCC.

Due to imperfections between and within stages of the health care value chain, general practices may find it difficult to obtain the required mix of health care services (Simoens and Scott, 1999). Given that primary, community and mental health services are brought together in Primary Care Trusts, co-operation with the LHCC may enable general practices to secure supply for or to lever improvements in the services of other health care providers. Moreover, horizontal integration within LHCCs may be a pre-condition to vertical integration.

Hypothesis 5: General practices that wish to obtain information about other health care services are more likely to co-operate with the LHCC.

Market imperfections between and within stages of the health care value chain may also lead to an information gap between health care professionals. This implies that general practices may find it difficult to obtain information about the quality, quantity or cost of services provided by other health care professionals.

Hypothesis 6: General practices that value benefits accruing to GPs are more likely to co-operate with the LHCC.

Hypothesis 7: General practices that value benefits accruing to patients are more likely to co-operate with the LHCC.

Another reason for co-operation with the LHCC derives from imperfections in the doctor-patient relationship. On the one hand, general practices may co-operate with an LHCC for purposes related to the personal interests of their GPs. On the other hand, some of the tasks of LHCCs as proposed by ‘*Designed to care*’ (Secretary of

State for Health, 1997) are likely to have implications for patients, such as the improvement of quality of care, the introduction of standards of clinical care, the development of a population-wide approach to health improvement and disease prevention, and the provision of additional services in general practice. Both public choice and managerial discretion models draw attention to the pecuniary and non-pecuniary arguments in the GP utility function.

Hypothesis 8: General practices that wish to acquire additional financial resources for the general practice are more likely to co-operate with the LHCC.

Expectations of increases in the amount of resources allocated to general practices may act as a determinant of co-operation with the LHCC. Increased funding can take the form of a rise in the GMS budget or prescribing budget, financial assistance with computing and management costs, or for specific clinical projects conducted across the LHCC. Gains of financial resources as a potential determinant of co-operation with the LHCC is proposed by three theories of integration. Public choice models view GPs as self-interested budget-maximisers. As suggested by managerial discretion models, the amount of financial resources allocated to general practices may influence several arguments in the GP utility function, such as GP income, power, and reputation. Resource-based models argue that general practices need to acquire critical resources to ensure survival.

Hypothesis 9: General practices that wish to work in collaboration with other general practices and health care professionals are more likely to co-operate with the LHCC.

Resource-based models state that general practices depend on resources for their survival, but that these resources are distributed unequally across providers. This implies that the provision of care may involve multiple providers. In order to be able to provide comprehensive care that is not distorted by organisational boundaries, the opportunity to work collaboratively with other health care providers may act as a driving force of co-operation with the LHCC.

Hypothesis 10: *General practices that wish to promote service development in the practice are more likely to co-operate with the LHCC.*

The opportunity to develop new services in the practice may act as a catalyst for co-operation with the LHCC. Resource-based models view service development as a way of acquiring new resources for the practice.

2.2. The voluntary nature of LHCC membership

Hypothesis 11: *General practices that were free to choose whether or not to join an LHCC are more likely to co-operate with the LHCC.*

Although the decision whether or not to join an LHCC was voluntary, regional differences exist in the extent to which Health Boards exerted pressure on general practices to join an LHCC. This conforms to institutionalist models of integration, which argue that coercion drives general practices to adopt institutionalised structures (Simoens and Scott, 1999). General practices that perceive that they were forced to join an LHCC are hypothesised to be more reluctant to co-operate with the LHCC.

2.3. LHCC effect

Hypothesis 12: *A general practice is more likely to co-operate with an LHCC if other LHCC members co-operate with the LHCC.*

The extent to which an individual general practice co-operates with the LHCC may depend on the degree of involvement of other LHCC practices. This implies that the extent of co-operation with the LHCC is correlated across LHCC practices and points to the existence of an effect at the level of the LHCC.

2.4. Confounding variables

In addition to the determinants of the extent of co-operation with the LHCC, practice and population characteristics may influence the extent to which general practices co-operate with the LHCC. For instance, general practices located in deprived areas experience higher needs. They may be more likely to co-operate with an LHCC to benefit from clinical projects that are conducted across the LHCC. Socio-economic and demographic characteristics were taken from a previous study on LHCC membership (Simoens and Scott, 2000).

3. METHODS

3.1. Questionnaire design and sampling

The questionnaire was piloted in a number of general practices in Grampian during July – August 2000. An iterative approach was followed in which the senior GP of each general practice was asked to discuss the relevance of the questions (face validity), to comment on their wording and interpretation, and to check whether all potential answers were included. Ambiguous questions or answers were deleted or rewritten for greater clarity. Respondents were also asked to fill in the questionnaire. This enabled us to assess the extent of variation in the responses (frequency of endorsement). The revised questionnaire was then forwarded to the next batch of general practices. This was repeated until it was felt that only marginal corrections were being proposed. In total, 35 practices participated in the piloting process (20 in the first round and 15 in the second round).

The questionnaire had 16 questions, some of which are the subject of this study. The determinants of co-operation with the LHCC were measured on a Likert scale that included the following 5 categories: “strongly disagree” (rated “1”), “disagree” (rated “2”), “unsure” (rated “3”), “agree” (rated “4”), and “strongly agree” (rated “5”). The voluntary nature of the decision to join an LHCC and the degree of co-operation with the LHCC were elicited on a scale of 1 to 5. Questions are presented in Appendix 1 as they appeared in the questionnaire.

Sample size was determined on the basis of the following considerations. Previous studies on the determinants of integration in primary care have used samples of between 50 and 100 (Scott and Wordsworth, 1998; Posnett et al., 1998). Given that data will be analysed by socio-economic and demographic characteristics of general practices, the sample must be large enough to be able to conduct subgroup analysis. This implies that the minimum number of observations should apply to each subgroup of general practices. Given that the determinants of integration may vary across the 79 LHCCs in Scotland, a sufficient number of general practices must be sampled in each LHCC. Postal questionnaires sent to GPs regularly generate response rates of around 30% in research of this nature. However, follow-up studies suggest that systematic bias in the responding group is rarely present (Templeton et al, 1997). Hence, it was decided to enrol all 934 Scottish general practices that have already joined an LHCC in the study.

3.2. Data

Data were obtained by means of an anonymous postal questionnaire survey conducted in October 2000. The survey was targeted at the person who represents the practice and acts as the contact between the LHCC and the practice, as it was felt that the practice representative is best aware of the issues involved in deciding to become a member of an LHCC. LHCC general managers provided us with the names and addresses of practice representatives in each LHCC. If these data could not be obtained, the questionnaire was addressed to the senior partner of the general practice. This information was gathered from the Information and Statistics Division (ISD) of the NHS in Scotland. Respondents were asked to fill in the questionnaire from the perspective of their general practice.

Data on socio-economic and demographic characteristics of general practices were collected from ISD and the supply and needs database compiled for the National Review of Resource Allocation for the NHS in Scotland (Scottish Executive Health Department, 2000). Variables supplied by ISD referred to 1998 or 2000 and variables contained in the supply and needs database related to 1991 or 1997. No effort was made to adjust for differences in dates since relative changes in variables over this

time period are likely to be small. This dataset was then linked to data obtained from questionnaires.

3.3. Statistical analysis

The relative impact of the determinants of co-operation with the LHCC was assessed using regression analysis. An ordered probit model was used to test the relationship between the extent of co-operation with the LHCC (a categorical and ordered dependent variable) and the set of independent variables covering determinants, the nature of the decision to join an LHCC, an LHCC effect, and confounding variables. In ordered probit, the probability of observing outcome i corresponds to the probability that a linear function of the independent variables, plus random error term, falls within the range of the set of cut points estimated for that outcome:

$$P(\text{outcome}_j = i) = P(K_{i-1} < \beta_1 x_{1j} + \beta_2 x_{2j} + \dots + \beta_k x_{kj} + \mu_j < K_i)$$

where μ_j is assumed to be normally distributed.

The coefficients $\beta_1, \beta_2, \dots, \beta_k$ and the cut points K_1, K_2, \dots, K_{I-1} (where I is the number of possible outcomes) are estimated using maximum likelihood. No constant term appears in this parameterisation as the effect is absorbed into the cut points.

4. RESULTS

Assuming a linear additive functional form, the equation to be estimated is:

$$(1) \quad \text{COOPERATION}_{ij} = \sum_p \beta_p \text{DETERMINANTS}_{p_{ij}} + \beta_r \text{NATURE}_{ij} + \sum_q \beta_q \text{CHARACTERISTICS}_{q_{ij}} + \varepsilon_{ij} + \mu_j$$

Where COOPERATION_{ij} is the extent to which general practice i co-operates with LHCC j ; p is the number of determinants of co-operation with the LHCC; NATURE is a variable reflecting the voluntary nature of the decision whether or not to join an LHCC; q is the number of socio-economic and demographic characteristics of general

practices; ε_{ij} is the random variation across general practices; and μ_j is the random variation across LHCCs. The independent variables are defined in Table 1.

The extent of co-operation with the LHCC is likely to be determined at the level of the LHCC, which may lead error terms being correlated across LHCC general practices. The use of standard multiple regression techniques produces small standard errors which, in turn, over-estimates the statistical significance of explanatory variables. The model, therefore, needs to be estimated using random effects ordered probit. Due to the small sample size, it was not possible to test for an LHCC effect.

Descriptive statistics for the data obtained from the questionnaire are summarised in Table 2. Cross-tabulations revealed that some of the cells contained less than 5% of the observations. Hence, variables representing the voluntary nature and determinants of LHCC integration were recoded as binary variables.

The small sample size also prohibited the inclusion of all explanatory variables in one model because of potential problems with degrees of freedom. Therefore, a separate ordered probit regression analysis was run of co-operation with the LHCC on practice and population characteristics. The following variables turned out to be statistically significant: the proportion of people living in urban locations having population > 500 people (SPAR), access to NHS community hospital and GP-controlled beds (NHSCOM), access to local authority residential care homes for the elderly (LAEL), access to local authority day care places for the elderly (DCEL), the Carstairs index (CARSTAIRS), and the number of GPs in the general practice (GPS). These variables were then included as confounding factors in the primary regression analysis on co-operation with the LHCC.

The results of the ordered probit regression analysis are presented in Table 3. The likelihood ratio test which assesses the joint contribution of all explanatory variables was statistically significant and showed that the inclusion of the independent variables improved the explanatory power of the model. This was corroborated by the pseudo R^2 of 0.36, which is a measure of the percentage reduction in the log likelihood.

The coefficients of all but three determinants had a positive sign, indicating that the extent to which general practices were motivated by one of these factors had a positive effect on co-operation with the LHCC. General practices that wish to provide cost-effective care and that value benefits accruing to GPs had a higher probability of co-operating with an LHCC. General practices that were free to choose whether or not to join exhibited a higher propensity to get involved in the LHCC, although this effect was not statistically significant.

Although previous work (Simoens and Scott, 2000) has shown that rural general practices were less likely to join an LHCC, this study demonstrates that those rural practices that have joined exhibited a higher probability of co-operating with the LHCC. Given that LHCC membership is likely to involve higher transaction costs for rural general practices, if they decide to join an LHCC, they can be expected to work more closely with the LHCC to take advantage of the services it provides and recoup some of the costs.

Mixed evidence was found with respect to access measures. Whereas general practices with low access to NHS community hospital and GP-controlled beds were more likely to co-operate with the LHCC, those practices with high access to local authority residential care homes for the elderly had a higher probability of co-operation with the LHCC. Finally, general practices with more GPs and practices located in deprived areas were more likely to co-operate with the LHCC.

Correlations between LHCC membership determinants may introduce multicollinearity in the ordered probit model. This makes it difficult to disentangle the separate effect of individual determinants of LHCC membership on LHCC participation. Imprecise estimators also lead to wide confidence intervals and weak tests of hypotheses. However, with this small sample, many variables were still statistically significant, and standard errors were relatively small.

5. DISCUSSION

This study has presented a preliminary analysis of the factors affecting the extent to which general practices co-operate with an LHCC. The results provide evidence on the relative impact of the determinants of co-operation with the LHCC, the voluntary nature of the LHCC membership decision, and socio-economic and demographic characteristics of general practices. Hypothesised determinants derived from economic theories of integration turned out to be jointly significant in explaining co-operation with the LHCC, although some were not individually significant.

The regression analysis on the degree of co-operation with an LHCC had reasonable explanatory power and hypotheses were generally supported, taking into account the small sample size. These initial results lend some support to the theoretical validity of the model. However, the coefficients of some determinants were counter-intuitive. This may be a function of the small sample size. Moreover, determinants exhibited high inter-correlations, signalling the potential for multi-collinearity in the ordered probit regression analysis. However, with this small sample, many individual variables were still statistically significant. The potential for multi-collinearity may also be related to deriving hypotheses about determinants from several theories of integration. Caution needs to be exercised when adding determinants to the regression analysis depending on whether these theories are viewed as complementary or competing. This will be examined further when all the data are available.

There are some obvious drawbacks with this study with respect to the preliminary analysis being based on 49 observations. Some of the explanatory variables had to be recoded, a secondary regression of LHCC participation on population and practice characteristics had to be performed, and the LHCC effect was not accounted for. Hence, the results are likely to change as the full dataset becomes available.

Agreement with determinants of co-operation with an LHCC was elicited on a scale of 1 to 5. Although substantial variation was noted in the level of support for determinants across general practices, extreme categories (“strongly disagree” and “strongly agree”) tended to appear less. This impedes the explanation of variations in the extent of co-operation with an LHCC. Moreover, respondents were inclined to

assign the same value across determinants, which makes it difficult to pick up the effect of each individual determinant (hence, relatively high inter-correlations).

Endogeneity and selection effects may be an issue since the decisions to join and participate in an LHCC are related. It was hypothesised that the strength of support for LHCC determinants would affect the degree of participation in the LHCC. However, the extent to which general practices participate in an LHCC may also have an impact on the extent to which LHCC determinants can be realised.

This paper presented findings based on a small number of questions taken from the questionnaire. Information was also elicited about sources of information about LHCCs, support for LHCC activities, satisfaction with the current operation of the LHCC, objections to and disadvantages associated with LHCCs, and future LHCC membership. LHCCs are voluntary organisations, which raises the point of the self-selected status of LHCC members. Additional work is currently underway to examine the motives of the other general practices in Scotland for not joining an LHCC.

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APPENDIX

Questions from the questionnaire:

1. **To what extent was your practice free to choose whether or not to join the LHCC?** Please use a scale of 1 to 5, where 1 = voluntary decision made by practice and 5 = practice was obliged to join an LHCC. Rate 1 to 5
- | |
|--|
| |
|--|

2. **Leaving aside any pressure to join the LHCC, please fill in the columns below giving your impression of the other reasons that your practice had for joining the LHCC.**

For each reason, please indicate its relevance to your practice
by using a scale of 1 to 5 (where 1 = not relevant and 5 = highly relevant)

	Rate 1 to 5
a) To share clinical expertise with other providers of primary, community, and mental health services	
b) To maintain and enhance status of the practice in the eyes of patients, peers, society	
c) To provide care on a more cost-effective basis	
d) To obtain better access to other primary, community, and mental health services	
e) To obtain better information about other primary, community, and mental health services	
f) For purposes related to GPs' personal interests (income, leisure, workload, quality of care, intellectual satisfaction, autonomy, etc.)	
g) To improve patient care	
h) To secure additional funding for the practice	
i) To work co-operatively with other health care professionals (e.g. other GPs, community nurses, PAMs, dentists, pharmacists, opticians)	
j) To promote GP provision of new services in the practice	

3. **Please indicate the extent to which your practice actively participates in the LHCC.** Please use a scale of 1 to 5, where 1 = minimum participation and 5 = maximum participation. Rate 1 to 5
- | |
|--|
| |
|--|

Table 1 Definitions of independent variables.

Variable	Definition
DETERMINANTS:	
Expertise	To share clinical expertise with other providers of primary, community, and mental health services [binary variable]
Reputation	To maintain or enhance status of practice in eyes of patients, peers, society [binary variable]
Cost-effectiveness	To provide cost-effective care [binary variable]
Access	To obtain better access to other primary, community, and mental health services [binary variable]
Information	To obtain better information about other primary, community, and mental health services [binary variable]
GP interests	For purposes related to GPs' personal interests [binary variable]
Patient interests	To improve patient care [binary variable]
Funds	To secure additional funding for the practice [binary variable]
Collaboration	To improve collaboration with other health care professionals [binary variable]
Service	To promote GP provision of new services in the practice [binary variable]
NATURE OF DECISION TO JOIN AN LHCC:	
Nature	Whether practice was free to choose whether or not to join an LHCC or obliged to join [binary variable]
CONFOUNDING VARIABLES:	
Spar	Proportion of people living in urban locations having population > 500 people [continuous variable]
Nhscom	Average access to NHS community hospital and GP -controlled beds [continuous variable]
Nhsmi	Average access to NHS mental illness beds [continuous variable]
Lami	Average access to local authority residential care homes for mental illness [continuous variable]
Lald	Average access to local authority residential care homes for learning disabilities [continuous variable]
Lael	Average access to local authority residential care homes for the elderly [continuous variable]
Dcld	Average access to local authority day care places for learning disabilities [continuous variable]
Dcel	Average access to local authority day care places for the elderly [continuous variable]
List	The number of patients per WTE GP [continuous variable]
Pop	The number of patients aged 60 years and over as a proportion of total practice patient population [continuous variable]
Carstair	The Carstairs deprivation index [continuous variable]
Training	Training practice [binary variable]
Register	New registration fees per 1,000 patients [continuous variable]
GP	The number of GPs in the general practice [continuous variable]
Surg	The number of episodes of paid minor surgery per GP [continuous variable]
Matern	The number of maternity claims per 1,000 patients [continuous variable]
Contra	The number of claims for supplying contraceptive services per 1,000 patients [continuous variable]
Avage	Average age of GPs in the general practice [continuous variable]

Table 2 Descriptive statistics.

Variable	“1”	“2”	Ratings “3”	“4”	“5”	Total
Co-operation	7 (14%)	6 (12%)	10 (20%)	14 (29%)	12 (24%)	49 (100%)
Expertise	3 (6%)	9 (18%)	6 (12%)	26 (53%)	5 (10%)	49 (100%)
Reputation	9 (18%)	18 (37%)	5 (10%)	14 (29%)	3 (6%)	49 (100%)
Cost-effectiveness	4 (8%)	15 (31%)	12 (24%)	16 (33%)	2 (4%)	49 (100%)
Access	2 (4%)	10 (20%)	11 (22%)	22 (45%)	4 (8%)	49 (100%)
Information	2 (4%)	13 (26%)	8 (16%)	24 (49%)	2 (4%)	49 (100%)
GP interests	5 (10%)	23 (47%)	10 (20%)	9 (18%)	2 (4%)	49 (100%)
Patient interests	3 (6%)	5 (10%)	11 (22%)	21 (43%)	9 (18%)	49 (100%)
Funds	3 (6%)	18 (37%)	10 (20%)	17 (35%)	1 (2%)	49 (100%)
Collaboration	1 (2%)	4 (8%)	7 (14%)	25 (51%)	12 (24%)	49 (100%)
Service	4 (8%)	12 (24%)	12 (24%)	18 (37%)	3 (6%)	49 (100%)
Nature	33 (67%)	4 (8%)	3 (6%)	9 (18%)	0 (0%)	49 (100%)

Percentages may not add up to 100 due to rounding.

Table 3 Ordered probit of LHCC co-operation on determinants (n = 49).

Variable	Coefficient (standard error)
Expertise	0.82 (0.66)
Reputation	0.29 (0.43)
Cost-effectiveness	1.02 (0.48)*
Access	0.81 (0.68)
Information	-0.91 (0.56)
GP interests	1.02 (0.43)*
Patient interests	-0.25 (0.55)
Funds	-0.19 (0.46)
Collaboration	0.12 (0.74)
Service	-0.86 (0.56)
Nature	0.53 (0.45)
Spar	-7.68 (1.95)**
Nhscom	-12.45 (5.76)*
Lael	7.16 (2.62)**
Dcel	-0.10 (0.16)
GPs	0.60 (0.12)**
Carstairs	0.39 (0.12)**
- 2 log likelihood	-49.02
- 2 restricted log likelihood	-76.54
Pseudo R ²	0.36
Likelihood ratio test	55.04**

** statistically significant at 1% level; * statistically significant at 5% level.