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MEASURING INTEGRATION IN PRIMARY CARE

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Preliminary draft. Please do not quote without authors' permission.

SUMMARY

The measurement of integration in economics has mainly focused on whether firms are integrated or not. In health care, integration of primary care organisations is determined by policy (i.e. the formation of PCG/Ts and LHCCs). However, although an integrated organisation may exist, this does not mean that in practice its functions are fully integrated. The extent to which GPs, and other health and social care professionals integrate with these organisations may vary considerably along a number of dimensions. The aim of this paper is to measure the extent of integration with LHCCs. Seven dimensions of integration are derived from the economics and health care literature, and used to measure LHCC integration.

A postal questionnaire survey of all 79 Scottish LHCCs was conducted. Data were analysed using descriptive and statistical techniques. Hierarchical cluster analysis was used to classify LHCCs according to the extent of LHCC integration. The evidence shows that the process of LHCC change is diverse and developmental. During the first year of LHCC operation, the various dimensions of LHCC integration have not developed at the same pace. The 28 responding LHCCs could be classified in two groups, with LHCCs in one group achieving a higher extent of LHCC integration along all dimensions than LHCCs in the other group. These results indicate that LHCC integration is not homogeneous across Scotland. Policy makers need to target those LHCCs that haven't made much progress in terms of LHCC integration, if integration can be shown to be cost-effective.

1. INTRODUCTION

As of 1st April 1999, 79 local health care co-operatives (LHCCs) were introduced in Scotland (Secretary of State for Health, 1997). Each LHCC has an average of 12 general practices, 47 GPs, and 59,130 people. These horizontally integrated primary care organisations allow general practitioners (GPs), community nurses, and other health and social care professionals to co-ordinate the delivery of services and improve the health of their populations. An LHCC is an operational unit of a Primary Care Trust (PCT), which is responsible for providing community health services, mental health services, services for people with disabilities, continuing care of elderly people, as well as primary care services based in the general practice (Secretary of State for Health, 1997).

In the absence of central guidance to inform the process of developing and operating an LHCC, developments may tend to be ad hoc, and collaborative working among LHCC practices may take time to establish. Therefore, the pace of LHCC development is likely to vary across LHCCs. Over time, as LHCCs mature, some LHCCs may wish to extend their range of functions. This means that no uniform model for LHCCs is likely to exist.

LHCC integration takes the form of the LHCC providing support functions to LHCC practices, setting up specific LHCC workgroups, conducting LHCC-wide clinical projects, and stimulating co-operation among LHCC practices. Although LHCCs create a structure for integrative processes, this does not guarantee achievement of LHCC integration.

The aim of this paper is to measure dimensions of LHCC integration and to identify groups of LHCCs that vary in the extent to which GPs, and other health and social care professionals have integrated. Moreover, patterns of dimensions of LHCC integration by type of LHCC are examined and relationships between dimensions of LHCC integration are identified.

2. DIMENSIONS OF LHCC INTEGRATION

A previous paper proposed a number of dimensions of integration in primary care that were derived from the economics and health care literature (Simoens and Scott, 1999). These dimensions were developed in the context of LHCC integration as follows:

The breadth of integration denotes the number of health care services that are integrated within the LHCC (Harrigan, 1985). LHCCs are currently involved in and plan to encourage co-operation among LHCC practices in a number of disease areas.

The degree of integration was defined as the extent to which services were shared or co-ordinated across LHCC practices as opposed to being provided independently by each LHCC practice (Harrigan, 1985).

The extent to which the LHCC (with or without the assistance of the PCT) supports LHCC practices in delivering integrated health care services is labelled clinical

integration (Gillies et al., 1993). Clinical integration can take different forms: the co-ordination of support for services, the development of new services, the sharing of clinical skills, the exchange of data, and the development of the primary health care team (Secretary of State for Health, 1997a).

Provider-system integration relates to how staff of LHCC practices assimilate to the LHCC (Gillies et al., 1993). Different aspects of provider-system integration were distinguished: involvement in LHCC governance, commitment to LHCC values, use of LHCC facilities, collaboration with staff of other LHCC practices and with LHCC staff.

Financial integration entails the allocation of a budget to the LHCC for specific types of services. LHCCs have the right to hold a budget comprising some or all of the following: GMS cash-limited funds, prescribing funds, a budget for community based clinical and PAM services, a community hospital budget, and a share of the Joint Investment Fund (Secretary of State for Health, 1997). However, the extent to which any of these budgets is devolved from the PCT to the LHCC is decided in consultation with the PCT.

Functional integration describes the extent to which support functions and activities are provided or co-ordinated by the LHCC (with or without the assistance of the PCT) (Gillies et al., 1993). The following functions that can be performed by an LHCC were considered: human resources, finance, needs assessment and planning, information technology, infrastructure, and clinical governance.

Co-operation refers to the extent of collaborative working between the LHCC and a number of stakeholders. The focus was on LHCC internal co-operation, that is co-operation among LHCC practices and co-operation between the LHCC and other health care professionals, and on LHCC external co-operation, i.e. co-operation between the LHCC and community hospitals, mental health services, the acute care sector, social services etc.

3. METHODS

3.1. Questionnaire design and piloting

Data for this study were gathered from an anonymous postal questionnaire survey sent to all 79 LHCCs in Scotland. The self-administered questionnaire was addressed to the LHCC general manager because it was felt that the LHCC general manager would be best placed to know about the issues involved in the development and operation of the LHCC. Information on names and addresses of LHCC general managers was provided by the primary care managers of the 14 Scottish PCTs and by the Information and Statistics Division of NHS Scotland. The questionnaire related to the first year of LHCC operation. LHCC general managers were asked to fill in the questionnaire from the perspective of their LHCC.

The questionnaire had 33 questions, some of which are the subject of this study. The breadth of integration was quantified by the number of clinical projects that the LHCC

was supporting. The degree of integration and financial integration were measured on a scale of 0% to 100%. LHCC clinical integration, LHCC provider-system integration, LHCC functional integration, and LHCC co-operation were elicited on five-point Likert scales. Some questions are presented in the Appendix as they appeared in the questionnaire.

The questionnaire was piloted during April–August 2000 on five LHCCs located in Grampian Health Board (HB), Greater Glasgow HB, and Highlands HB. An iterative process was set up in which LHCC general managers were asked to discuss the relevance of the questions, to comment on their wording and interpretation, and to check whether all potential answers were included (face and content validity). 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. The revised questionnaire was then sent to the general manager of another LHCC. This was repeated until it was felt that only marginal corrections were being proposed.

3.2. Statistical analysis

The main aim of the study was to measure LHCC integration. Since LHCC integration was measured along a number of dimensions that used different scales, hierarchical cluster analysis (Aldenderfer and Blashfield, 1984) was used to indirectly calculate LHCC integration as a linear combination of dimensions. It then uses the measure of LHCC integration to assign LHCCs to groups. These groups are defined in such a way that LHCCs belonging to the same group exhibit a similar extent of LHCC integration, which differs from the extent of LHCC integration in other groups.

Clusters were linked using Ward's method, which has consistently been found to generate the best fit (Lewis and Alexander, 1986; Weiner and Alexander, 1993; Alexander et al., 1996). Ward's method minimises the sum of squares of any two hypothetical clusters that could be formed at each stage (Bourassa et al., 1999). The distance measure used was the squared Euclidean distance, which equals the sum of the squared differences between the values of observations. Given that different scales were used, variables were standardised by converting data to z scores.

Discriminant analysis was used to assess the internal validity of the cluster solution by calculating the percentage of observations correctly classified in the clusters (Klecka, 1980). The procedure generates a discriminant function based on a linear combination of the predictor variables that provides the best discrimination between clusters. Predicted cluster membership is calculated on the basis of this discriminant function and then compared with actual cluster membership.

Dimensions of LHCC integration were also cross-tabulated with certain LHCC population and practice characteristics to assess if there were any patterns by type of LHCC. Moreover, relationships between dimensions of LHCC integration were explored. To test for such associations, two-tailed tests of significance based on the

Pearson or Spearman rank-order correlation coefficient were performed for continuous variables.

LHCC population and practice characteristics included the number of GPs, the number of WTE GPs, the number of general practices, the size of the patient population covered, the number of patients per WTE GP, the age of GPs, the proportion of single-handed practices, the proportion of ex-fundholding practices, the proportion of training practices, rurality, and population morbidity and deprivation. Rurality was measured by the proportion of people living in urban locations having a population exceeding 500 people. The Arbutnott index (Scottish Executive Health Department, 2000a) is a composite index of population morbidity and deprivation based on four indicators: the standardised mortality rate among people under the age of 65 years, the unemployment rate, the proportion of elderly people claiming income support, and the number of households with two or more indicators of deprivation out of a total of six indicators. All calculations were carried out in SPSS for Windows.

4. RESULTS

4.1. Response rate

The survey was conducted in November 2000. A first reminder was sent two weeks later and a second reminder was posted three weeks after the first. After two months, 28 questionnaires had been completed and returned, yielding a response rate of 35%. A comparison of the characteristics of respondents and non-respondents is displayed in Table 1.

Responding LHCCs were more likely to have a higher proportion of single-handed practices ($p < 0.01$). For the group of respondents, the median proportion of single-handed practices was 20%. In the full sample, this probability was 9%. Therefore, data were weighted by the proportion of single-handed practices to ensure that the responding LHCCs used in the analysis would be representative of the population of Scottish LHCCs. The characteristics of the weighted sample are shown in the fifth column of Table 1.

Table 1. Comparison of responding and non-responding LHCCs.

	Respondents (n = 28)	Non-respondents (n = 51)	P-value	Weighted sample
Mean number of GPs (\pm s.d.)	45 (\pm 24)	48 (\pm 27)	0.67 ^a	46 (\pm 24)
Mean number of WTE GPs (\pm s.d.)	36 (\pm 20)	40 (\pm 22)	0.53 ^a	37 (\pm 20)
Mean number of practices (\pm s.d.)	12 (\pm 6)	11 (\pm 5)	0.54 ^a	12 (\pm 6)
Mean size of patient population covered (\pm s.d.)	55,553 (\pm 30,028)	60,937 (\pm 35,289)	0.50 ^a	56,503 (\pm 30,225)
Median number of patients per WTE GP (\pm s.d.)	1,575 (616-2,058)	1,571 (406-1,841)	0.67 ^b	1,574 (616-2,058)
Mean age of GPs (\pm s.d.)	46 (\pm 2)	46 (\pm 2)	0.95 ^a	46 (\pm 2)
Median proportion of single-handed practices (range)	0.20 (0-0.67)	0.07 (0-0.67)	0.00 ^b	0.17 (0-0.67)
Median proportion of ex-fundholding practices (range)	0.12 (0-0.80)	0.17 (0-1)	0.36 ^b	0.12 (0-0.80)
Mean proportion of training practices (\pm s.d.)	0.26 (\pm 0.23)	0.31 (\pm 0.24)	0.30 ^a	0.28 (\pm 0.24)
Median rurality score (SPAR) (range)	0.97 (0.38-1)	0.95 (0.28-1)	0.51 ^b	0.97 (0.38-1)
Mean morbidity and deprivation score (NRRRA) (\pm s.d.)	0.32 (\pm 3.00)	-0.06 (\pm 2.72)	0.57 ^a	0.11 (\pm 2.95)

Notes: ^a Independent samples t-test. ^b Mann-Whitney test.

4.2. Breadth of LHCC integration

LHCC general managers were asked to specify current and planned areas in which the LHCC encourages co-operation among LHCC practices. LHCCs were currently involved in projects relating to heart disease, diabetes, mental health, and care of the elderly. Co-operation was most likely to be planned in areas concerned with cancer, alcohol and substance abuse, mental health, and teenage health. The areas in which LHCCs are currently or planning to co-operate agreed well with the prioritised health topics identified by the Government (Secretary of State for Scotland, 1999; Scottish Executive, 2000).

4.3. Degree of LHCC integration

The degree of LHCC integration was measured by the extent to which services are shared or co-ordinated across LHCC practices as opposed to provided independently by each LHCC practice. Thirty-four percent of LHCCs reported that no services were shared or co-ordinated across LHCC practices. For the remaining 64% of LHCCs, on average 13% of services were shared or co-ordinated across LHCC practices.

4.4. LHCC clinical integration

Table 2 summarises the extent to which health care services are co-ordinated across LHCC practices (with or without the assistance of the PCT). LHCCs were most likely to have completed work on the “exchange of prescribing/referral data among LHCC practices” and the “development of the primary health care team”. This was followed by service development, including “co-ordination of delivery of existing services across LHCC practices”, “development of new services in the general practice”, and “co-ordination of administrative support for existing services across LHCC practices”. Less progress had been made in terms of the “sharing of clinical skills among LHCC practices” and the “exchange of patient data among LHCC practices”.

Table 2. LHCC support for co-ordination of services across LHCC practices^{a,b}.

	Not considered (“1”)	Develop in long-term (“2”)	Develop in short-term (“3”)	Some work underway (“4”)	Some work completed (“5”)	Mean
1. Exchange of prescribing/referral data among LHCC practices	1 (3%)	1 (3%)	2 (4%)	6 (16%)	26 (73%)	4.54
2. Development of primary health care team	1 (3%)	3 (7%)	1 (3%)	9 (25%)	22 (62%)	4.36
3. Co-ordination of delivery of existing services across LHCC practices	5 (13%)	2 (4%)	2 (6%)	15 (44%)	11 (33%)	3.79
4. Development of new services in general practice	1 (3%)	4 (12%)	11 (31%)	6 (17%)	13 (37%)	3.74
5. Co-ordination of administrative support for existing services across LHCC practices	4 (12%)	4 (10%)	6 (16%)	9 (25%)	13 (36%)	3.64
6. Sharing of clinical skills among LHCC practices	4 (10%)	6 (18%)	7 (19%)	11 (31%)	8 (22%)	3.37
7. Exchange of patient data among LHCC practices	7 (19%)	5 (15%)	10 (28%)	6 (18%)	7 (20%)	3.05

Notes: ^a Based on weighted data. ^b Percentages may not add up to 100% due to rounding.

4.5. LHCC provider-system integration

With respect to the extent to which staff of LHCC practices had assimilated to the LHCC, LHCC general managers strongly agreed with statements that “practice staff actively worked together with each other and with LHCC staff”, that “practice staff were actively involved in LHCC decision making”, that “practice staff made regular use of LHCC facilities and services”, and that “practice staff have agreed on and share LHCC norms and values” (see Table 3). They agreed less with the final aspect of provider-system integration that “practice staff are highly committed to the LHCC”.

Table 3. Relationship between LHCC and staff of LHCC practices^{a,b}.

	Not considered ("1")	Develop in long-term ("2")	Develop in short-term ("3")	Some work underway ("4")	Some work completed ("5")	Mean
1. Practice staff actively work together with each other and with LHCC staff	1 (3%)	7 (21%)	4 (10%)	21 (61%)	2 (4%)	3.44
2. Practice staff are actively involved in LHCC decision making	5 (13%)	6 (18%)	3 (7%)	17 (49%)	5 (13%)	3.31
3. Practice staff make regular use of LHCC facilities and services	2 (6%)	8 (24%)	5 (13%)	17 (48%)	3 (9%)	3.31
4. Practice staff have agreed on and share LHCC norms and values	1 (3%)	9 (25%)	11 (31%)	12 (34%)	3 (7%)	3.18
5. Practice staff are highly committed to the LHCC	2 (6%)	9 (25%)	18 (52%)	5 (15%)	1 (3%)	2.84

Notes: ^a Based on weighted data. ^b Percentages may not add up to 100% due to rounding.

4.6. LHCC financial integration

The scope of budgetary responsibility varies across LHCCs. As LHCCs mature, the range of budgets delegated to LHCCs is set to expand. On average, LHCCs controlled 76% of budgets, with budgets fully devolved to 38% of LHCCs. Ninety-two percent of the budget for community-based clinical and PAM services had been devolved to LHCCs. The extent to which prescribing funds and GMS cash-limited funds had been delegated to LHCCs amounted to 71% and 60%, respectively. Fifty-seven percent of responding LHCCs did not include community hospitals, and so did not have an associated budget. Of the remaining 43% of LHCCs, the community hospital budget had been fully delegated in 89% of LHCCs (average extent of budgetary devolution of 97%).

4.7. LHCC functional integration

The extent to which LHCCs (with or without the assistance of the PCT) support functional integration was assessed with respect to six support functions and activities. LHCCs were most likely to have completed work with respect to needs assessment and planning, information technology, and human resources (see Table 4). Less progress had been made in terms of clinical governance, assistance in preparing and submitting bids for infrastructure, and finance.

With respect to human resources, LHCCs had made more progress in “providing education and training to practice staff” than in “assisting human resource management to LHCC practices”. LHCC support for finance focused on financial incentives: “arrangements to deal with savings made by LHCC practices”, “incentive arrangements for LHCC practices”, and “provision of comparative financial data to LHCC practices” were well developed. Not much progress had been made in terms of LHCC budgetary arrangements, such as “budgets for LHCC practices” and “financial risk management arrangements for LHCC practices”.

Table 4. LHCC provision and co-ordination of support functions and activities^{a,b}.

	Not considered ("1")	Develop in long-term ("2")	Develop in short-term ("3")	Some work underway ("4")	Some work completed ("5")	Mean
<i>Human resources:</i>						3.48
1. Education and training of staff of LHCC practices	4 (12%)	5 (13%)	1 (3%)	12 (34%)	13 (38%)	3.73
2. Assistance in human resource management to LHCC practices	11 (31%)	4 (10%)	2 (4%)	5 (13%)	14 (41%)	3.23
<i>Finance:</i>						3.15
1. Arrangements to deal with savings made by LHCC practices	3 (9%)	2 (4%)	4 (10%)	8 (23%)	18 (53%)	4.07
2. Incentive arrangements for LHCC practices	5 (15%)	3 (7%)	3 (7%)	10 (28%)	15 (43%)	3.76
3. Provision of comparative financial data to LHCC practices	7 (20%)	4 (10%)	2 (4%)	4 (12%)	18 (53%)	3.66
4. Set budgets for LHCC practices	15 (44%)	3 (9%)	5 (15%)	5 (15%)	6 (18%)	2.53
5. Financial risk management arrangements for LHCC practices	24 (69%)	4 (10%)	3 (7%)	2 (6%)	3 (7%)	1.72
<i>Needs assessment and planning</i>	2 (6%)	3 (7%)	0 (0%)	16 (47%)	14 (40%)	4.08
<i>Information technology:</i>						3.50
1. Support information systems of LHCC practices	6 (16%)	2 (6%)	4 (12%)	10 (28%)	13 (38%)	3.67
2. Assistance to LHCC practices in preparing and submitting IT bids	8 (23%)	2 (6%)	2 (4%)	8 (23%)	15 (43%)	3.57
3. Link information systems across LHCC practices	6 (16%)	5 (15%)	10 (28%)	3 (9%)	11 (32%)	3.27
<i>Assistance in preparing and submitting bids for infrastructure:</i>	11 (31%)	2 (6%)	0 (0%)	9 (27%)	13 (37%)	3.33
<i>Clinical governance:</i>						3.43
1. Practice accreditation	1 (3%)	1 (3%)	5 (13%)	13 (38%)	15 (43%)	4.15
2. Prescribing policy	3 (9%)	6 (16%)	5 (15%)	3 (9%)	18 (52%)	3.78
3. Pathways of care and service models	1 (3%)	6 (18%)	4 (12%)	14 (41%)	9 (27%)	3.71
4. Review of critical incidents	6 (18%)	0 (0%)	10 (28%)	13 (38%)	6 (16%)	3.35
5. Information on cost-effective clinical practice and service provision	8 (22%)	5 (15%)	4 (10%)	5 (15%)	13 (38%)	3.32
6. Review of complaints	10 (29%)	3 (7%)	1 (3%)	8 (24%)	13 (36%)	3.30
7. Review of clinical risk	4 (10%)	6 (18%)	12 (35%)	8 (22%)	5 (15%)	3.13
8. Referral policy	8 (23%)	8 (22%)	10 (30%)	5 (15%)	4 (10%)	2.66

Notes: ^a Based on weighted data. ^b Percentages may not add up to 100% due to rounding.

Eighty-seven percent of LHCCs reported that work was underway or had been completed with respect to LHCC functional integration of needs assessment and planning. With respect to LHCC functional integration of information technology, LHCCs were most likely to have made progress on “supporting information systems of LHCC practices”. This was followed by “assistance to LHCC practices in preparing and submitting IT bids” and “linking information systems across LHCC practices”. Thirty-one percent of LHCCs did not consider supporting LHCC functional integration of infrastructure, whereas 63% reported that work was underway or had already been completed.

LHCCs were involved in a wide range of clinical governance activities. LHCCs were most likely to have completed work on the development of practice policies, including – in decreasing order of development – “practice accreditation”, “prescribing policy”, and “pathways of care and service models”. They also supported dissemination and review procedures, such as the “review of critical incidents”, “information on cost-effective clinical practice and service provision”, “review of complaints”, and “review of clinical risk”. Least progress had been made in terms of developing a “referral policy”.

4.8. LHCC co-operation

LHCCs need to work in partnership with other organisations (Secretary of State for Health, 1997). Table 5 shows that LHCC internal co-operation generally had developed to a greater extent than LHCC co-operation with external stakeholders.

With respect to LHCC co-operation with internal stakeholders, “co-operation between LHCC and other health care professionals” was more extensive than “co-operation among LHCC practices”.

The most developed areas of LHCC co-operation with external stakeholders included, in decreasing order of progress, “co-operation between LHCC and social work department”, “co-operation between LHCC and community hospitals”, “co-operation between LHCC and PCT”, “co-operation among LHCCs”, “co-operation between LHCC and mental health services”, “co-operation between LHCC and local health council”, and “co-operation between LHCC and voluntary sector”. Less progress had been made in such areas as “co-operation between LHCC and general public”, “co-operation between LHCC and acute care sector”, “co-operation between LHCC and education services”, and “co-operation between LHCC and housing services”.

Table 5. LHCC co-operation^{a,b}.

Co-operation between:	Not considered ("1")	Planned to develop in future ("2")	Developing co-operation ("3")	Extensive co-operation ("4")	Very extensive co-operation ("5")	Mean
<i>Internal stakeholders:</i>						3.62
1. LHCC and other health care professionals	0 (0%)	1 (3%)	12 (34%)	16 (47%)	6 (16%)	3.76
2. LHCC practices	1 (3%)	0 (0%)	20 (56%)	10 (28%)	5 (13%)	3.48
<i>External stakeholders:</i>						3.14
1. LHCC and social work department	0 (0%)	1 (3%)	12 (35%)	15 (44%)	6 (18%)	3.77
2. LHCC and community hospitals	8 (22%)	0 (0%)	6 (16%)	3 (7%)	19 (54%)	3.72
3. LHCC and PCT	2 (4%)	1 (3%)	8 (22%)	21 (60%)	4 (10%)	3.69
4. LHCC and other LHCCs	1 (3%)	3 (7%)	21 (59%)	7 (20%)	4 (10%)	3.28
5. LHCC and mental health services	0 (0%)	5 (15%)	16 (45%)	13 (37%)	1 (3%)	3.28
6. LHCC and local health council	2 (6%)	2 (4%)	17 (50%)	13 (37%)	1 (3%)	3.27
7. LHCC and voluntary sector	1 (3%)	5 (13%)	23 (66%)	5 (15%)	1 (3%)	3.02
8. LHCC and general public	1 (3%)	9 (25%)	21 (61%)	3 (7%)	1 (3%)	2.82
9. LHCC and acute care sector	2 (6%)	10 (29%)	21 (59%)	1 (3%)	1 (3%)	2.68
10. LHCC and education services	6 (18%)	10 (28%)	14 (41%)	4 (10%)	1 (3%)	2.53
11. LHCC and housing services	7 (20%)	10 (29%)	12 (35%)	4 (12%)	1 (3%)	2.47

Notes: ^a Based on weighted data. ^b Percentages may not add up to 100% due to rounding.

4.9. Classification of LHCCs according to the extent of LHCC integration

Seven dimensions of LHCC integration were combined to examine if groups of LHCCs can be observed that vary according to the extent of LHCC integration. Dimensions contributing to LHCC integration were breadth of LHCC integration, degree of LHCC integration, LHCC clinical integration, LHCC provider-system integration, LHCC financial integration, LHCC functional integration, and LHCC external co-operation.

The results of the hierarchical cluster analysis indicated that the 28 responding LHCCs could be classified in two distinct groups. The discriminant analysis showed that 96% of LHCCs were correctly classified, supporting the internal validity of the cluster solution.

Table 6 shows that LHCCs belonging to the second group were more integrated than those of the first group along all dimensions of LHCC integration. This provides support for using cluster analysis to calculate LHCC integration.

Table 6. The extent of LHCC integration by LHCC group.

	Group 1 (n = 15)	Group 2 (n = 13)	P-value ^a
Mean current breadth of integration (\pm s.d.)	4 (\pm 2)	9 (\pm 1)	0.00
Mean degree of integration (\pm s.d.)	7 (\pm 8)	19 (\pm 21)	0.04
Mean clinical integration (\pm s.d.)	3.44 (\pm 0.79)	4.16 (\pm 0.31)	0.00
Mean provider-system integration (\pm s.d.)	2.73 (\pm 0.75)	3.75 (\pm 0.57)	0.00
Mean financial integration (\pm s.d.)	64 (\pm 30)	89 (\pm 16)	0.00
Mean functional integration (\pm s.d.)	3.04 (\pm 0.73)	3.81 (\pm 0.77)	0.00
Mean LHCC external co-operation (\pm s.d.)	2.89 (\pm 0.63)	3.43 (\pm 0.59)	0.02

Note: ^a Independent samples t-test.

The characteristics of the 28 responding LHCCs may reveal information that can be used to predict the extent of LHCC integration of the other Scottish LHCCs. Descriptive statistics of the two groups are displayed in Table 7. This shows that the two groups are comparable in terms of LHCC population and practice characteristics, except for training status. LHCCs with a smaller proportion of training practices were more likely to achieve a higher extent of LHCC integration ($p = 0.04$).

Table 7. LHCC population and practice characteristics of LHCC groups.

	Group 1 (n = 15)	Group 2 (n = 13)	P-value
Mean number of GPs (\pm s.d.)	46 (\pm 16)	43 (\pm 32)	0.74 ^a
Mean number of WTE GPs (\pm s.d.)	36 (\pm 11)	37 (\pm 27)	0.97 ^a
Mean number of general practices (\pm s.d.)	12 (\pm 5)	11 (\pm 8)	0.98 ^a
Mean size of patient population covered (\pm s.d.)	55,427 (\pm 15,090)	55,699 (\pm 41,990)	0.98 ^a
Mean number of patients per WTE GP (\pm s.d.)	1,553 (\pm 212)	1,446 (\pm 395)	0.37 ^a
Mean age of GPs (\pm s.d.)	46 (\pm 1)	46 (\pm 2)	0.40 ^a
Mean of the proportions of single-handed practices (\pm s.d.)	0.16 (\pm 0.13)	0.23 (\pm 0.16)	0.20 ^a
Mean of the proportions of fundholding practices (\pm s.d.)	0.15 (\pm 0.11)	0.15 (\pm 0.22)	0.95 ^a
Mean of the proportions of training practices (\pm s.d.)	0.32 (\pm 0.25)	0.19 (\pm 0.19)	0.04 ^a
Median rurality score (SPAR) (range)	0.98 (0.65-1)	0.91 (0.38-1)	0.08 ^b
Mean population morbidity and deprivation score (NRR) (\pm s.d.)	0.28 (\pm 3.04)	0.37 (\pm 3.08)	0.82 ^a

Notes: ^a Independent samples t-test; ^b Mann-Whitney test.

4.10. Relationships between LHCC characteristics and dimensions of LHCC integration

A preliminary insight into the factors affecting integration can be gained from examining associations between dimensions of integration and LHCC population and practice characteristics. A more detailed empirical analysis of the factors affecting integration in primary care is reported in Simoens and Scott (2001).

It is hypothesised that LHCCs located in rural areas achieve a lower extent of integration, due to the costs incurred by general practices to co-operate with the LHCC. LHCCs located in rural areas had a lower extent of financial integration ($p < 0.01$), but a higher extent of provider-system integration ($p = 0.03$).

GPs with a high workload are hypothesised to integrate less with an LHCC, given the additional demands on time that LHCCs impose on GPs. LHCCs with a higher number of patients per WTE GP (a proxy for GP workload) achieved a lower extent of provider-system integration ($p = 0.04$) and financial integration ($p < 0.01$). However, high population morbidity and deprivation, which is likely to increase GP workload, was associated with a lower extent of financial integration ($p < 0.01$).

4.11. Relationships among dimensions of LHCC integration

An integration strategy may involve further integration in one dimension and dis-integration in another. Thus, it is important to investigate associations between dimensions of integration.

Following Gillies et al. (1993), it is hypothesised that provider-system integration, functional integration, and financial integration are necessary conditions for the breadth of integration, clinical integration, and co-operation.

LHCCs in which staff of LHCC practices were more assimilated to the LHCC ($p < 0.01$) and LHCCs with a higher extent of functional integration ($p = 0.03$) achieved a higher current breadth of integration. LHCCs with a higher extent of provider-system integration ($p = 0.03$) and functional integration ($p < 0.01$) were more likely to have a higher extent of clinical integration. Finally, LHCCs with a higher extent of financial integration had a higher extent of LHCC co-operation ($p = 0.02$).

5. DISCUSSION

The purpose of this study was to systematically gather data on dimensions of LHCC integration. Data were collected from a survey of all 79 Scottish LHCC general managers. The results indicated that the process of LHCC change is diverse and developmental. During the first year of LHCC operation, the various dimensions of LHCC integration have not developed at the same pace. The dimensions of LHCC integration developed in this paper can be used by policy makers to identify and target

those LHCCs haven't made much progress in terms of LHCC integration, if integration can be shown to be cost-effective.

The existing literature on the measurement of integration was taken forward in a number of respects. A measure of integration was constructed applying cluster analysis and used to identify groups of LHCCs that differ in terms of the level of integration. Factors affecting and relationships between dimensions of integration were also investigated.

With respect to the dimensions of integration in primary care, previous studies largely related to the development phase of LHCCs and were anecdotal and qualitative in nature (Hopton and Heaney, 1999; Goldie and Sheffield, 2000). Our results were based on a nationwide survey of Scottish LHCCs and measured aspects of LHCCs during their first year of operation. In contrast with previous studies (Frontline Management Consultants, 1998; Royal College of General Practitioners and British Medical Association, 2000); Scottish Executive Health Department, 2000b), the actual extent of LHCC integration was measured.

Cluster analysis has proven to be a useful statistical method to calculate a composite measure of LHCC integration. Some LHCCs had achieved a higher extent of LHCC integration than others, indicating that LHCC integration is not homogeneous across Scotland. This shows that a real classification of LHCCs does not emerge from the single LHCC model implicitly assumed in central guidance (NHSME, 1999), but rather from the observation of actual experience. The emergence of different LHCC models is valuable as long as it does not adversely affect the efficiency and equity of health care provision in Scotland. Further research is required here.

LHCCs made more progress in terms of LHCC internal co-operation than with respect to LHCC co-operation with external stakeholders, which is to be expected in this first year of LHCC operation. Inadequate representation on LHCC governing bodies, incompatible boundaries, and differences in budgetary arrangements still pose considerable barriers to closer co-operation between local authorities and LHCCs. However, such collaborative working is necessary if LHCCs are to achieve their objective of developing a population-wide approach to health improvement and disease prevention through lifestyle and behavioural change (Secretary of State for Health, 1997).

This study has provided a snapshot of LHCCs as they begin to tackle their core functions and exert influence on service provision during their first year of operation. Many questions remain as to how LHCC integration will develop, how LHCC integration will affect efficiency and equity, and what the implications for patient care will be.

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APPENDIX: questions from the questionnaire:

Breadth of integration:

1. Please indicate the main areas in which the LHCC is encouraging co-operation among LHCC practices.

	Current co-operation	Planned co-operation
a) Heart disease	<input type="checkbox"/>	<input type="checkbox"/>
b) Stroke	<input type="checkbox"/>	<input type="checkbox"/>
c) Cancer	<input type="checkbox"/>	<input type="checkbox"/>
d) Diabetes	<input type="checkbox"/>	<input type="checkbox"/>
e) Hepatitis	<input type="checkbox"/>	<input type="checkbox"/>
f) HIV /AIDS	<input type="checkbox"/>	<input type="checkbox"/>
g) Mental health in primary care	<input type="checkbox"/>	<input type="checkbox"/>
h) Care of the elderly	<input type="checkbox"/>	<input type="checkbox"/>
i) Maternity care	<input type="checkbox"/>	<input type="checkbox"/>
j) Palliative care	<input type="checkbox"/>	<input type="checkbox"/>
k) Teenage health	<input type="checkbox"/>	<input type="checkbox"/>
l) Alcohol and substance abuse	<input type="checkbox"/>	<input type="checkbox"/>
m) GP out-of-hours care	<input type="checkbox"/>	<input type="checkbox"/>
n) Respiratory diseases	<input type="checkbox"/>	<input type="checkbox"/>
o) Musculo-skeletal diseases	<input type="checkbox"/>	<input type="checkbox"/>

Degree of integration:

2. For your LHCC, please write down below the extent to which service provision by each LHCC practice is shared or co-ordinated with other LHCC practices as opposed to services being provided independently by each LHCC practice (for example, minor surgery provided by one practice to which all other practices refer patients compared to minor surgery provided by all practices). Please use percentages to indicate relative importance.

a) Co-ordinated or shared service provision	%
b) Independent service provision by each LHCC practice	%
	100 %

Provider-system integration:

3. Please state below whether you agree or disagree with the following statements about the relationship between staff of LHCC practices and your LHCC.

	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
a) Practice staff are actively involved in LHCC decision making					
b) Practice staff are highly committed to the LHCC					
c) Practice staff have agreed on and share LHCC norms and values					
d) Practice staff make regular use of LHCC facilities and services					
e) Practice staff actively work together with each other and with LHCC staff					

Financial integration:

4. To what extent are any of the following budgets devolved to your LHCC?

Degree of delegation

a) GMS cash-limited funds	%
b) Prescribing funds	%
c) Budget for community-based clinical and PAM services	%
d) Community hospital budget	%