



D. MacDonald

I was excited about this project because my interests are in evaluating electronic health records, and the province was beginning to implement the Pharmacy Network. *Ce projet m'attirait beaucoup parce que je m'intéresse à l'évaluation des dossiers électroniques de la santé et la province commençait à peine à mettre en place le réseau de pharmacies (Pharmacy Network).*

# Community pharmacists' expectations of a pharmacy network: a baseline evaluation

Pharmacists anticipate benefits to patient safety as well as additional income opportunities

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## Abstract

**Background:** The Newfoundland and Labrador Centre for Health Information has been mandated to build a provincial Health Information Network (HIN). Phase I, Unique Personal Identifier/Client Registry, is complete. Phase II, the

Newfoundland and Labrador Pharmacy Network (Pharmacy Network), will provide integration among community and institutional pharmacies, the Newfoundland and Labrador Prescription Drug Program, hospital emergency rooms, and physician offices. This study was carried out to determine community pharmacists' perceived value of a pharmacy network pre-implementation.

**Methods:** A four-part questionnaire was designed using

a literature review and a pilot study. In December 2002, questionnaires were mailed to all 435 community pharmacists in the province.

**Results:** Overall, 90.3% of community pharmacists agreed that drug utilization review would be an important function of the Pharmacy Network. The perceived value of computerized physician order entry was high. Removing problems with illegible handwriting received the strongest support (97.2%). Payment for providing various levels of pharmaceutical care also received strong support. The perceived value of a pharmacy network differed among community pharmacists with respect to age, sex, education, years in practice, and place of business.

**Conclusions:** The results contributed important baseline information about community pharmacists' expectations pre-implementation. They also provided benchmarks for future comparative studies that measure perceived value after implementation of the Pharmacy Network.

## Summary

Before introducing a pharmacy network in Newfoundland and Labrador, community pharmacists were surveyed on their expectations. Pharmacists anticipate a reduction of medication errors and enhanced provision of patient-centred care. Young, female pharmacists in particular had high expectations.

*Avant de mettre en place un réseau de pharmacies à Terre-Neuve et au Labrador, on a mené un sondage auprès des pharmaciens communautaires afin de découvrir quelles étaient leurs attentes. Les pharmaciens s'attendent à une réduction des erreurs de médication et à une amélioration des soins axés sur les patients. Les jeunes pharmaciens et les pharmaciennes, en particulier, avaient des attentes élevées.*

Pharmacy has evolved through phases of increasing functionality and complexity: compounding and dispensing, clinical pharmacy, and pharmaceutical care.<sup>1</sup> In

the past, pharmacists were expected to prepare and dispense medications, thus requiring skills to mix drugs. As the complexity of drugs increased, large drug companies assumed the role of preparing medications, leaving pharmacists with the responsibility of dispensing medications.<sup>2</sup> In the late

1960s, a shift occurred that saw pharmacists involved in a more clinical role. The role of today's pharmacist is expanding to include pharmaceutical care delivery — a model of care wherein the pharmacist works in partnership with other health care professionals to maximize the health outcomes of their patients.<sup>3</sup>

This shift to pharmaceutical care has presented challenges for community pharmacists. In fact, the lack of training, confidence, and time in the pharmacist's practice have created barriers to embracing this new model of care. Because present-day pharmacies are profit driven, these obstacles may be difficult to overcome.<sup>4</sup>

## New technologies

Despite barriers, community pharmacies continue to introduce new processes into their business practices to facilitate movement toward pharmaceutical care, one of which is the introduction of advanced technologies in support of service delivery.<sup>5</sup> Technology that was introduced into pharmacies in the 1970s was usually referred to as *pharmacy informatics*, including in-house computerized medication profiles and inventory management systems. In recent years, the term *pharmacy network* has emerged, linking individual computerized pharmacies to a network. A pharmacy network is a comprehensive set of modules and processes that establish a relationship with the patient, create a database, list and rank problems, provide options, and plan and monitor.<sup>6</sup> A pharmacy network allows pharmacists to embrace an even more enhanced role in the delivery of pharmaceutical care, while maintaining business profitability.

Of the ten provinces, nine have some form of pharmacy network.<sup>7</sup> Most of these networks connect community retail pharmacies and provincially funded drug programs. Systems that provide complete drug profiles to pharmacists at the point of distribution were implemented in four provinces: Alberta (WellNet); Prince Edward Island (Pharmacy Network); British Columbia (PharmaNet); and Manitoba's Drug Programs Information Network (DPIN).

Table 1 shows that each of the provinces, to varying degrees, has incorporated the following functions in designing its pharmacy network:

- Online real-time adjudication
- Checks for duplication and double-doctoring
- Drug utilization reviews (DURs)
- Patient eligibility checks
- Drug profiles
- Connection to hospitals and physician offices
- Electronic prescribing

The Newfoundland and Labrador Centre for Health Information's (NLCHI) work presents a unique opportunity in that it determines the network's perceived value to community pharmacists prior to implementation. Along with investigating the perceptions of community pharmacists' pre-pharmacy network, this study specifically examined the value of a complete patient profile, the usefulness of DURs, and the electronic prescribing and payment for pharmaceutical care.

## Methods

For the purpose of this study, a community pharmacist was defined as "a pharmacist who was employed in a community pharmacy that is operated independently or as part of a national chain." Pharmacists employed in either an educational or hospital setting were not part of this study.

A four-part questionnaire was designed using a literature review and a pilot study. The questionnaire used a five-point Likert scale, ranging from 1 (strongly agree) to 5 (strongly disagree), to solicit responses for most questions. The first section captured demographic information, the second identified those functions that community pharmacists view as most crucial to the success of the Pharmacy Network, the third measured support specific to reimbursement for pharmaceutical services, while the fourth section dealt with general issues. The questionnaire was mailed out to all 435 community pharmacists in Newfoundland and Labrador in December 2002.

Responses were investigated using descriptive statistics (i.e., Pearson's chi-square and Fisher's exact tests). The five-point agreement scale was collapsed into a dichotomous variable for the purpose of developing 2 × 2 contingency tables. For tables where the expected cell count for at least one cell was less than five, the 2-sided Fisher's exact test was used. A *p*-value of 0.05 was chosen for determining statistical significance.

The dichotomous "Level of Agreement" variable was investigated using chi-square tests across age groupings, gender, education, years in practice, and

## Key points/Points clés

- Before the implementation of a pharmacy network, community pharmacists were surveyed about its perceived value.
- The Pharmacy Network function that received the strongest support was the elimination of illegible M.D. handwriting (97.2%).
- The perceived value of a pharmacy network differed among community pharmacists with respect to age, sex, education, years in practice, and place of business.
- *Avant de mettre en place un réseau de pharmacies, on a effectué un sondage auprès des pharmaciens communautaires en vue d'évaluer la pertinence d'une telle initiative.*
- *L'activité du réseau de pharmacies qui a reçu le plus grand appui était l'élimination des problèmes liés à l'écriture illisible (97,2 %).*
- *Selon leur âge, leur sexe, leur niveau d'instruction, le nombre d'années d'exercice et l'emplacement de leur établissement, les pharmaciens communautaires avaient des opinions variées quant à la pertinence d'un réseau de pharmacies.*

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place of business (i.e., urban vs rural).

The cut-off between urban and rural communities was based on a population of 10,000 and is consistent with Statistics Canada's definition of urban or rural communities.<sup>8</sup> All analyses were carried out using SPSS version 11.5 (SPSS Inc., Chicago, IL).

To measure the internal consistency of the survey questionnaire, we conducted a reliability analysis on questions that related to community pharmacists' perceived support for computerized physician order entry (CPOE), DURs, and payment for providing pharmaceutical care. The model, Cronbach's Alpha, found that each of these three scales had a high internal consistency: CPOE (0.86), DURs (0.80), and payment for providing pharmaceutical care (0.89).

The survey was conducted from Dec 11, 2002 to January 30, 2003. Of the 435 surveys mailed out, 219 community pharmacists responded. In two cases the respondents did not complete the main

## Providing default doses and dose ceilings was perceived as a major benefit of computerized physician order entries

part of the questionnaire, providing written comments only. Consequently, these two surveys were excluded from the quantitative analysis of the study, and the adjusted response rate to the survey was 49.9% (217 of 435).

### Results

#### *Characteristics of the sample*

Slightly more than half of the community pharmacists were male; of interest, female respondents were generally younger (Table 2). Most had obtained a BSc in Pharmacy, and the remainder had graduated from college with a pharmacy diploma. Male pharmacists had more experience

TABLE 1 Functions of selected provincial pharmacy networks

| Function  | Alberta (2002)                     | British Columbia (1995)        | Manitoba (1994)  | PEI (1999)                    |
|---|------------------------------------|--------------------------------|--|-------------------------------|
| Online real-time adjudication and transmission                            | ✓                                  | ✓                              | ✓  | ✓                             |
| Checks for duplication  | ✓                                  | ✓                              | ✓  | ✓                             |
| Checks for double-doctoring   | ✓                                  | ✓                              | ✓  | ✓                             |
| Provides full retrospective drug use evaluation/review on patient profile | ✓                                  | ✓                              | ✓  | ✓                             |
| Tracks patients' deductible on co-pay                                     | ✓                                  | ✓                              | ✓  | ✓                             |
| Patient eligibility check   | ✓                                  | ✓                              | ✓  | ✓                             |
| Immediately identifies what is and is not a benefit                       | ✓                                  | ✓                              | ✓  | ✓                             |
| Pharmacare status   | ✓                                  | ✓                              | ✓  | ✓                             |
| Drug profiles   | ✓                                  | ✓                              | ✓  | ✓                             |
| Drug profiles history on each patient                                     | ✓                                  | ✓                              | ✓  | ✓                             |
| Records Rx dispensed for all or a select group of patients                | Will record all prescriptions      | All prescriptions are recorded | Not mandatory for Aboriginal people, but most recorded | Will report all prescriptions |
| Ability to record non-dispensing events                                   | ✓                                  |                                |  |                               |
| Connected with hospitals  | ✓                                  | ✓                              |  |                               |
| Connected with physician offices/desktop prescribing                      | ✓                                  |                                |  |                               |
| Other notes   | Currently in a 6-month pilot stage |                                | Five-year plan   | In the developmental stage    |

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(years) than did females, and about half of all pharmacists worked in pharmacies located in communities with populations under 10,000.

### Drug utilization review

Table 3 presents the perceived value of drug utilization reviews (DURs) to community pharmacists in the development of the Pharmacy Network. Most community pharmacists agreed that DURs would be an important function, with more females than males agreeing. Similarly, pharmacists who were female and under age 37 years and/or who had a university degree were more likely to agree that their clients would value the services provided through their use of the Pharmacy Network.

### Computerized Physician Order Entry (CPOE)

Table 4 presents the perceived value of a CPOE function to community pharmacists in enhancing patient safety. While there was strong support for all CPOE functions, the greatest perceived enhancement to patient safety was the impending removal of problems associated with errors in interpreting physician handwriting. Females were more likely than were males to agree that CPOE would solve problems with illegible handwriting.

Pharmacists in practice  $\geq 12$  years vs  $< 12$  years were more likely to agree with the value of CPOE in checking for dose ceilings. Pharmacists who practised in urban (vs rural) places of business were more apt to agree with the value of a complete patient profile and CPOE's ability to identify medication appropriateness based on patients' medical history.

### Payment for pharmaceutical care

Most community pharmacists agreed on receiving compensation for the four pharmaceutical care services measured in this study (Table 5). Females, however, were more likely to believe that pharmacists should receive payment for counselling services and monitoring patient outcomes. Pharmacists who were younger, female, and/or who had been practising  $< 12$  years were more likely to view compensation for services related to the identification of medication appropriateness as necessary.

## Discussion

### Perceived value of drug utilization reviews

These findings indicate that DURs are viewed as an added value in delivering enhanced patient care. The availability of a complete medication profile in performing DURs is core to a pharmacy network. If, however, pharmacists believe that their clients are regular customers, filling prescriptions only at their store, the value of the DUR function would

TABLE 2 Characteristics of the sample

| Variable                          | Sample |            |
|-----------------------------------|--------|------------|
|                                   | n      | Statistic  |
| <i>Gender</i>                     |        |            |
| Male                              | 120    | 55.6%      |
| Female                            | 96     | 44.4%      |
| <i>Age (Male)</i>                 |        |            |
| Mean age (years)                  | 113    | 41.6 years |
| Median age (years)                | 113    | 42.0 years |
| 24–34                             | 36     | 31.9%      |
| 35–44                             | 35     | 31.0%      |
| 45–64                             | 39     | 34.5%      |
| 65+                               | 3      | 2.7%       |
| <i>Age (Female)</i>               |        |            |
| Mean age (years)                  | 94     | 34.7 years |
| Median age (years)                | 94     | 33.5 years |
| 24–34                             | 51     | 54.3%      |
| 35–44                             | 34     | 36.2%      |
| 45–64                             | 9      | 9.6%       |
| 65+                               | 0      | 0.0%       |
| <i>Education level</i>            |        |            |
| Bachelor of Science               | 123    | 58.9%      |
| Diploma                           | 86     | 41.1%      |
| <i>Years in practice (Male)</i>   |        |            |
| Mean years in practice            | 119    | 17.3 years |
| Median years in practice          | 119    | 17.0 years |
| < 5                               | 21     | 17.6%      |
| 5–10                              | 19     | 16.0%      |
| 11–15                             | 16     | 13.4%      |
| 16+                               | 63     | 52.9%      |
| <i>Years in practice (Female)</i> |        |            |
| Mean years in practice            | 96     | 11.5 years |
| Median years in practice          | 96     | 9.0 years  |
| < 5                               | 26     | 27.1%      |
| 5–10                              | 28     | 29.2%      |
| 11–15                             | 10     | 10.4%      |
| 16+                               | 32     | 33.3%      |
| <i>Community population</i>       |        |            |
| City                              | 83     | 38.8%      |
| Community > 10,000                | 29     | 13.6%      |
| Community < 10,000                | 102    | 47.7%      |

likely diminish. Our results are similar to those findings of a post-implementation study carried out in Manitoba, whereby 13.5% of pharmacists agreed that the Drug Programs Information Network was irrelevant to their clients, because most were regular customers.<sup>9</sup>

The benefit of DURs in reducing prescribing problems is widely accepted,<sup>10,11</sup> with most studies carried out in a hospital setting.<sup>12,13</sup> Our study indicated that more than 80% of community pharmacists believed that DURs, based on all prescriptions prescribed, would significantly

## Almost one-third of pharmacists viewed their dispensary as too busy to respond to the Pharmacy Network

reduce hospital admissions. Opinions differed significantly, however, between younger and older age groups when pharmacists were asked whether their clients would value DURs (64.1% vs 76.9%, respectively). Conversely, the Manitoba post-implemen-

TABLE 3A Pharmacists' perceptions of the value of Drug Utilization Reviews

| DURs   | Total | Level of agreement; n (and %) |                |                            |                   |                   |
|--|-------|-------------------------------|----------------|----------------------------|-------------------|-------------------|
|  |       | Strongly agree                | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
| Limited value without complete patient profile | 217   | 134 (61.8)                    | 60 (27.6)      | 13 (6.0)                   | 8 (3.7)           | 2 (0.9)           |
| Will reduce prescribing problems               | 217   | 118 (54.4)                    | 80 (36.9)      | 14 (6.5)                   | 5 (2.3)           | 0 (0.0)           |
| Will reduce hospital admissions                | 217   | 82 (37.8)                     | 92 (42.4)      | 37 (17.1)                  | 5 (2.3)           | 1 (0.5)           |
| Clients will value DUR services                | 217   | 57 (26.3)                     | 94 (43.3)      | 52 (24.0)                  | 13 (6.0)          | 1 (0.5)           |
| Important function of pharmacy network         | 217   | 114 (52.5)                    | 82 (37.8)      | 16 (7.4)                   | 2 (0.9)           | 3 (1.4)           |

TABLE 3B Drug Utilization Reviews: level of agreement and demographics

| Variable    | Level   | DUR an important function of the pharmacy network; n (and %) |           | Total | p-value |
|-------------|---------|--|-----------|-------|---------|
|             |         | Agree  | Disagree  |       |         |
| Gender      | Male    | 104 (86.7)   | 16 (13.3) | 120   | 0.045   |
|             | Female  | 91 (94.8)  | 5 (5.2)   | 96    |         |
|             | Total   | 195 (90.2)   | 21 (9.8)  | 216   |         |
| Variable    | Level   | Clients will value DUR services; n (and %)                   |           | Total | p-value |
|             |         | Agree  | Disagree  |       |         |
| Age (years) | < 37    | 66 (64.1)  | 37 (35.9) | 103   | 0.043   |
|             | 37+     | 80 (76.9)  | 24 (23.1) | 104   |         |
|             | Total   | 146 (70.5)   | 61 (29.5) | 207   |         |
| Gender      | Male    | 74 (61.7)  | 46 (38.3) | 120   | 0.006   |
|             | Female  | 76 (79.2)  | 20 (20.8) | 96    |         |
|             | Total   | 150 (69.4)   | 66 (30.6) | 216   |         |
| Education   | B.Sc.   | 78 (63.4)  | 45 (36.6) | 123   | 0.041   |
|             | Diploma | 66 (76.7)  | 20 (23.3) | 86    |         |
|             | Total   | 144 (68.9)   | 65 (31.1) | 209   |         |

tation study found that only 58.6% of pharmacists viewed their clients as valuing the drug-monitoring services they provide through the DPIN use.<sup>9</sup>

Notably, though, most pharmacists in Manitoba also indicated that their clients would value DURs. Comparing the perceived value of DURs across age groups, an interesting paradox emerged: younger pharmacists appear to support the value of the DUR function, compared with their older colleagues; however, older pharmacists believe more strongly that their patients would value the services provided. Older pharmacists, while not fully accepting electronic DURs, may still conclude that their clients have a high comfort level with technology in the pharmacy.

Our results indicate that for all DUR measures, females' level of agreement was higher than that of males, although only two factors were significant: 1) their clients would value DUR services, and 2) the DUR function would be an important function of the Pharmacy Network. Females in this study were generally younger than their male colleagues, were working in a chain store, and were employed at a pharmacy in an urban community.

Given these demographic characteristics, it is reasonable to assume that a larger proportion of females in this study worked in pharmacies where large volumes of prescriptions are filled, thus relying on technology more in their day-to-day work activities. Comparing the differences in perceived value of DUR measures across education, more pharmacists with a diploma were convinced that their clients would value DUR services. What prompted this difference of agreement among education levels? It is possible that pharmacists who had a diploma had

## Limitations of the study

- The investigator designed the questionnaire, which was not extensively tested for reliability and validity.
- The results may be biased by socially desirable responses.
- A Type II error may have been introduced as a result of making multiple comparisons.
- A 50% response rate may contribute to erroneous interpretation. Future studies might consider methods for increasing the response rate, such as the Total Design Method, developed by Dillman.<sup>14</sup>

more years of experience than did those with a BSc, and as pharmacists gain experience, they build up a relationship with many of their clients. This results in a comfort level in providing regular DUR services, which are, in turn, appreciated by the client.

### Perceived value of computerized physician order entry

Of the eight CPOE measures in this study, six were strongly supported, with the strongest support being the removal of problems associated with illegible handwriting. CPOE's ability to ensure that the medication order is complete and unambiguous is widely accepted.<sup>15-17</sup>

Further, CPOE enhances patient safety by providing clinical guidelines and alerts for default doses for normal conditions, which particularly benefits pediatric patients who require their dosages to be weight-based.<sup>18</sup> Pediatric patients are a more vulnerable

TABLE 4A Pharmacists' perceptions of the value of computerized physician order entry

| CPOE enhances patient safety by:                    | Total | Level of agreement; n (and %) |                |                            |                   |                   |
|---|-------|-------------------------------|----------------|----------------------------|-------------------|-------------------|
|   |       | Strongly agree                | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
| Providing default doses                             | 214   | 41 (19.2)                     | 108 (50.5)     | 49 (22.9)                  | 11 (5.1)          | 5 (2.3)           |
| Removing problems with illegible handwriting        | 215   | 178 (82.8)                    | 31 (14.4)      | 3 (1.4)                    | 3 (1.4)           | 0 (0.0)           |
| Checking dose ceilings                              | 214   | 60 (28.0)                     | 118 (55.1)     | 29 (13.6)                  | 5 (2.3)           | 2 (0.9)           |
| Checking allergy information                        | 215   | 71 (33.0)                     | 112 (52.1)     | 21 (9.8)                   | 11 (5.1)          | 0 (0.0)           |
| Screening for drug interactions                     | 214   | 84 (39.3)                     | 95 (44.4)      | 23 (10.7)                  | 11 (5.1)          | 1 (0.5)           |
| Providing complete profile information              | 213   | 113 (53.1)                    | 68 (31.9)      | 23 (10.8)                  | 8 (3.8)           | 1 (0.5)           |
| Providing real-time information                     | 213   | 74 (34.7)                     | 102 (47.9)     | 32 (15.0)                  | 4 (1.9)           | 1 (0.5)           |
| Providing information on medication appropriateness | 214   | 56 (26.2)                     | 97 (45.3)      | 49 (22.9)                  | 11 (5.1)          | 1 (0.5)           |

group. In other words, although medication errors for young people occur at similar rates to those of adults, they are more likely to cause harm in young people.<sup>19</sup> The perceived value of CPOE to enhance patient safety by providing default doses and dose ceilings was also evident in this study. Most agreed that CPOE would enhance patient safety by checking for allergy information and screening for drug interactions. Kozyrskyj and colleagues found that 58.6% of community pharmacists who were surveyed agreed that the DPIN enhanced their ability

to identify drug-related problems for clients.<sup>9</sup> Across gender, the only significant difference found in our study was CPOE's ability to remove problems with illegible handwriting, although the agreement was high for both males and females (94.4% vs 100%).

Comparing measures of CPOE and the number of years in practice, a significant difference was found in CPOE's ability to check for dosage ceilings. That a larger proportion of pharmacists with over 12 years experience valued this function might relate to their additional experience with adverse drug

**TABLE 4B Computerized physician order entry: level of agreement and demographics**

| Variable          | Level  | Removing problems with illegible handwriting; <i>n</i> (and %) |           | Total | <i>p</i> -value |
|-------------------|--------|--|-----------|-------|-----------------|
|                   |        | Agree  | Disagree  |       |                 |
| Gender            | Male   | 102 (94.4)   | 6 (5.6)   | 108   | 0.034*          |
|                   | Female | 96 (100.0)   | 0 (0.0)   | 96    |                 |
|                   | Total  | 198 (92.5)   | 6 (7.5)   | 204   |                 |
| Variable          | Level  | Checking dose ceilings; <i>n</i> (and %)                       |           | Total | <i>p</i> -value |
|                   |        | Agree  | Disagree  |       |                 |
| Years in practice | < 12   | 82 (78.1)  | 23 (21.9) | 105   | 0.034           |
|                   | 12+    | 96 (88.9)  | 12 (11.1) | 108   |                 |
|                   | Total  | 178 (83.6)   | 35 (16.4) | 213   |                 |
| Variable          | Level  | Providing complete patient profile; <i>n</i> (and %)           |           | Value | <i>p</i> -value |
|                   |        | Agree  | Disagree  |       |                 |
| Place of business | Urban  | 98 (90.7)  | 10 (9.3)  | 108   | 0.021           |
|                   | Rural  | 81 (79.4)  | 21 (20.6) | 102   |                 |
|                   | Total  | 179 (85.2)   | 31 (14.8) | 210   |                 |
| Variable          | Level  | Providing information on medication appropriateness            |           | Total | <i>p</i> -value |
|                   |        | Agree  | Disagree  |       |                 |
| Place of business | Urban  | 85 (78.0)  | 24 (22.0) | 109   | 0.047           |
|                   | Rural  | 67 (66.7)  | 35 (33.3) | 102   |                 |
|                   | Total  | 152 (72.0)   | 59 (28.0) | 211   |                 |

\*2-sided Fisher's exact test.

**TABLE 5A Pharmacists' perceptions regarding reimbursement by type of pharmaceutical service provided**

| Service                    | Total | Level of agreement; <i>n</i> (and %) |                |                            |                   |                   |
|----------------------------|-------|--------------------------------------|----------------|----------------------------|-------------------|-------------------|
|                            |       | Strongly agree                       | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Strongly disagree |
| Providing counselling      | 216   | 131 (60.6)                           | 48 (22.2)      | 23 (10.6)                  | 4 (1.9)           | 10 (4.6)          |
| Monitoring outcomes        | 216   | 146 (67.6)                           | 46 (21.3)      | 17 (7.9)                   | 2 (0.9)           | 5 (2.3)           |
| Medication appropriateness | 216   | 124 (57.4)                           | 63 (29.2)      | 18 (8.3)                   | 6 (2.8)           | 5 (2.3)           |
| Working with physicians    | 216   | 134 (62.0)                           | 59 (27.3)      | 16 (7.4)                   | 4 (1.9)           | 3 (1.4)           |

reactions caused by improper medication dosage.

Place of business was found to be significant for two measures of CPOE: 1) providing a complete patient profile and 2) providing information on medication appropriateness, perhaps because pharmacists in urban areas rely more on technology. Compared with those who work in rural communities, they generally fill higher volumes of prescriptions. Similarly, urban areas provide many options for clients for prescription refills, possibly resulting in a dispersed and fragmented medication profile. With possibly only one pharmacy serving one or more communities, clients in rural areas encounter limited options.

#### Payment for pharmaceutical care

Community pharmacists strongly agreed with reimbursement for the four pharmaceutical services measured in this study. By gender, female pharmacists supported payments for pharmaceutical care more than their male colleagues. Because the female pharmacists in this study were generally younger, they were perhaps more comfortable with using the technology to enhance patient care. Even so, they also expected to be appropriately reimbursed for these services. Conversely, male pharmacists were generally older, perhaps believing that these services

have always been provided to patients at no cost and that implementing a pharmacy network would not change their provision of client services.

A US study of community pharmacies indicated that financial incentives were the most important motivators in providing pharmacy services.<sup>20</sup> If the Government of Newfoundland and Labrador does not provide financial incentives to community pharmacists, it is unlikely that pharmaceutical care services will increase to any degree as a result of the Pharmacy Network. This was also the case in the Manitoba study, where 74.6% of pharmacists agreed that one potential problem was the lack of reimbursement for the provision of services as a result of DPIN.<sup>9</sup>

In addition, those community pharmacists who hold advanced degrees or who have been involved in continuing education are more apt to provide pharmaceutical services. In fact, confidence in providing pharmaceutical services increased with increased education and/or training.<sup>21</sup> This may have implications in Newfoundland and Labrador, for it is only since 1990 that a BSc has been offered in pharmacy at Memorial University. Of the community pharmacists in the province, only 194 (41%) had graduated from this program as of December 2002.

Consideration must be given to how busy the

TABLE 5B Selected services: level of agreement and demographics

| Variable          | Level  | Providing counselling; n (and %)      |           | Total | p-value |
|-------------------|--------|---------------------------------------|-----------|-------|---------|
|                   |        | Yes                                   | No        |       |         |
| Gender            | Male   | 90 (75.6)                             | 29 (24.4) | 119   | 0.002   |
|                   | Female | 88 (91.7)                             | 8 (8.3)   | 96    |         |
|                   | Total  | 178 (82.8)                            | 37 (17.2) | 215   |         |
| Variable          | Level  | Monitoring outcomes; n (and %)        |           | Total | p-value |
|                   |        | Yes                                   | No        |       |         |
| Gender            | Male   | 99 (83.2)                             | 20 (16.8) | 119   | 0.004*  |
|                   | Female | 92 (95.8)                             | 4 (4.2)   | 96    |         |
|                   | Total  | 191 (88.8)                            | 24 (11.2) | 215   |         |
| Variable          | Level  | Medication appropriateness; n (and %) |           | Total | p-value |
|                   |        | Yes                                   | No        |       |         |
| Age               | < 37   | 94 (91.3)                             | 9 (8.7)   | 103   | 0.042   |
|                   | 37+    | 84 (81.6)                             | 19 (18.4) | 103   |         |
|                   | Total  | 178 (86.4)                            | 28 (13.6) | 206   |         |
| Gender            | Male   | 96 (80.7)                             | 23 (19.3) | 119   | 0.005   |
|                   | Female | 90 (93.8)                             | 6 (6.2)   | 96    |         |
|                   | Total  | 186 (86.1)                            | 29 (13.9) | 215   |         |
| Years in practice | < 12   | 96 (91.4)                             | 9 (8.6)   | 105   | 0.039   |
|                   | 12+    | 90 (81.8)                             | 20 (18.2) | 110   |         |
|                   | Total  | 186 (86.5)                            | 29 (13.5) | 215   |         |

\*2-sided Fisher's exact test.

pharmacist is when determining the level of pharmaceutical care provided.<sup>22</sup> While only 8.3% of community pharmacists believed that the additional information provided through the Pharmacy Network would interfere with customer service, 31.3% viewed their dispensary as too busy to respond to information provided by the Pharmacy Network. Although valuing the information provided through a pharmacy network, they may lack the time to take advantage of the additional information. However, with the appropriate financial incentives, the delivery of pharmaceutical care services may become readily accepted in Newfoundland and Labrador's community pharmacies.

### Implications for future research

This study provides important baseline information about community pharmacists' expectations of a pharmacy network pre-implementation, and is the only known study of its kind. However, if the study were duplicated in another jurisdiction, the following should be taken into consideration: 1) more intense efforts should be made to achieve a higher response rate; and 2) hospital pharmacists and physicians should be included.

In addition, a follow-up post-implementation study should be conducted to determine the change in expectations of a pharmacy network once community pharmacists have had experience using it. ■

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