EMPLOYMENT RETENTION OF HEALTH CARE PROVIDERS IN FRONTIER AREAS OF ALASKA

ABSTRACT

Objectives. The objectives of this study were to: describe the length of employment of health care providers in rural Alaska; assess whether there are differences in length of employment among community health aides, medical doctors, and nurses; and determine whether provider length of employment is significantly increased following implementation of telemedicine.

Study Design. We conducted a prospective cohort study of length of employment among health professionals in rural Alaska, and identified the cohort based on current employment status of community health aides, medical doctors, and nurses.

Methods. Employment data were collected from four Alaska Native regional health corporations. Kaplan-Meier product-limit survival analysis was used to assess employment length. The Mantel-Haenszel log-rank test was used to test the difference between retention (survival) curves among doctors, nurses, and community health aides for all four regional health corporations combined. Data included provider hire date, termination date, and position title. Fifty seven percent of the data points were right-hand censored.

Results. The community health aides (median (Mdn) = 1186 days) were retained significantly longer than either the doctors (Mdn = 596 days), or the nurses (Mdn = 408 days), who were not significantly different from each other (log-rank $\chi^2$ (2, N = 996) = 68.30, p = 0.0001).

Conclusions. Our findings document that community health aides in the region retain their jobs significantly longer than doctors and nurses. Findings highlight the problem of providing an adequate health work force in rural areas.

Keywords: Telemedicine, retention, rural health
INTRODUCTION

The problems created by staff turnover in the delivery of health care services include both visible costs, such as employee recruitment and advertising expenses, as well as hidden costs, such as those incurred through inefficiencies of departing, interim, and newly hired employees (1, 2). Inefficiencies caused by provider turnover can diminish both quality and cost-effectiveness of health care delivery (1). Failure to retain primary care providers, for example, has major fiscal implications for employers and represents a loss of resources that would otherwise be devoted to patient care (3). Furthermore, staff turnover can impair communication and upset cohesion among members of a work group (4), and lower group cohesion has been found to predict turnover in health care settings (5). Moreover, the additional workload that staff members may carry during hiring, training, and transition periods may lead to a stressful work atmosphere, which can, in turn, lead to additional turnover, thereby exacerbating the adverse effects of staff turnover (6).

Recruitment of health care providers is influenced by preference for particular communities (7, 8), rendering the problem of turnover an even greater concern in rural, medically underserved areas. Research has shown that small, non-metropolitan areas have lower physician-to-population ratios and growth rates (9), as well as lower registered nurse-to-population ratios than do metropolitan areas (10). In fact, rural health care facilities take 60% longer to fill nursing vacancies than do those in urban areas (11). Registered nurse vacancy rates in hospitals have been estimated at 18.9% (12), and hospitals in the U.S. lose, on average, over 15% of their nursing staff each year to defection and other employment termination factors (13). Rural areas are especially vulnerable to attrition and turnover. Despite federal health personnel policies of the 1960s and 1970s, designed both to increase the overall supply of physicians and to mitigate maldistribution in underserved, rural areas, chronic shortages in health care providers have persisted in such regions (14). The lack of enthusiasm among health care providers for working in rural areas has been attributed to lack of adequate medical facilities, professional isolation, limited support services, inadequate organizational settings, excessive workloads and time demands, limited earning potential, lack of social, cultural and educational opportunities, and spousal influence (15). In addition, higher
percentages of older physicians practice in non-metropolitan counties, suggesting challenges in retaining rural providers in the future (16). These problems are anticipated to be most severe in the very smallest counties. It is important, especially in rural areas, to include non-physicians in considerations of provider supply (16), because such individuals may be employed more frequently in rural areas than are physicians, and their retention length is necessary for understanding provider supply.

There has been a continual problem with retaining qualified health care providers in rural areas of Alaska. In these communities, primary health care is provided in approximately 200 villages by approximately 450 community health aides/practitioners (CHAPs) who receive medical supervision from a physician at a regional medical center, with whom they communicate by telephone. Community Health Aide/Practitioners are important health care providers in rural Alaska; their role includes obtaining medical histories, conducting physical examinations, making assessments, and planning and coordinating care. These providers are employed by their tribal council, or tribal health organization, and work under the supervision of a referral physician employed by the Indian Health Service, or by a tribally managed hospital, or clinic. The program includes basic training, which takes a minimum of 14 months to complete, plus additional clinical requirements and successful examination performance.

The Alaska Telemedicine Testbed Project, funded by the National Library of Medicine, was designed to demonstrate and evaluate the use of narrow bandwidth telecommunications and information technology for telemedicine in frontier areas of Alaska. The Project developed and deployed telemedicine workstations for oto-laryngology (ENT) assessment at a distance and consultation in frontier areas of Alaska. These areas included 25 remote Native villages, four regional health care facilities, and the Alaska Native Medical Center. Workstations were designed and installed between November, 1998, and July, 1999. The project is described in further detail elsewhere (17).

Telemedicine has been considered a promising strategy for mitigating the problem of health care provider turnover in rural areas, and has been implemented in several demonstration and pilot projects (18-24). Formally defined as "the use of electronic information and communications technologies to provide and support health care when distance separates the participants" (25, p. 1), telemedicine has yielded intra-
guing findings that bear on provider retention in rural areas. Telemedicine research has shown positive results for the health care work force (24), and both improved access to health services for rural patients and reduced feelings of professional isolation (20).

The objectives of this study were to: (1) describe the length of employment of health care providers in frontier areas of Alaska, (2) assess whether there are differences in length of employment among medical doctors, nurses, and community health aides, and (3) determine whether length of employment of health care providers is significantly increased following the implementation of telemedicine. However, because overall worker retention was much longer than hypothesized, it was not possible to test whether telemedicine increases the length of employment of rural health care workers. Therefore, this report focuses on the remaining study objectives, describing the length of employment for health care workers in rural Alaska, and examining differences in employment length by health care worker types.

We hypothesized a mean of 11 months (approximately 330 days) retention time for all health care providers, because the East Aleutian Tribes, Inc., had reported an average retention length for nurses, nurse practitioners, and mental health clinicians of 11 months (K. Boucha, personal communication, September 1995; March 1997).

MATERIALS AND METHODS

Sample
Subjects included 996 doctors, nurses, and community health aides currently employed at four Alaska Native regional health corporations located in rural Alaska. Of these, 145 were medical doctors (14.5%), 434 were nurses (43.6%), and 417 were community health aides (41.9%). Nurses were broadly defined and included nurse practitioners, certified health practitioners, licensed nurse practitioners, certified nursing midwives, nursing assistants, certified nursing assistants, flight nurses, and registered nurses.

The health corporations were: Yukon-Kuskokwim Health Corporation (53.5%, n = 533), Norton Sound Health Corporation (24.9%, n = 248), Maniilaq Health Corporation (11.9%, n = 118), and Bristol Bay Area Health Corporation (9.7%, n = 97). Each of the four corporations receives Indian Health Service funding.
Table I presents the distribution of health care worker employment categories by site. The health care entities included as study sites were selected through open solicitation for all regional health care corporations and member entities of the Alaska Native Health Board in Anchorage, Alaska. Selection of the four entities was based on the number of predicted health care events in order to maximize statistical power for analyses. Twelve of 20 agencies applied; the four agencies with the largest number of anticipated oto-laryngological visits were included.

| Site             | Doctors | Nurses | Community Health Aides |
|------------------|---------|--------|-------------------------|
| Yukon-Kuskokwim (n = 533) | 69 13.0% | 233 43.7% | 231 43.3% |
| Norton Sound (n = 248) | 45 18.1% | 95 38.3% | 108 43.6% |
| Maniilaq (n = 118) | 18 15.2% | 50 42.4% | 50 42.4% |
| Bristol Bay (n = 97) | 13 13.4% | 56 57.7% | 28 28.9% |
| Totals (N = 996) | 145 14.5% | 434 43.6% | 417 41.9% |

**Measures**
Administrative data were used in this study. Therefore, data were limited to the information maintained by the participating health agencies. Data collected included hire date, termination date, and position title for all doctors, nurses, and community health aides currently employed at the four health care entities. Specifically, the variables under study included the length of employment retention (number of days) and the category, or type, of health care worker (doctors, nurses, and community health aides). The hire date was defined as the date entered in administrative records on which the employee was initially hired for employment at the health care entity; the termination date was defined as the date recorded in administrative records indicating termination of employment with the entity.

A staff member of each health care entity created a spreadsheet of the variables under study from the larger administrative computer files maintained by the entity using Microsoft Excel. Files were copied onto a floppy disk, and provided to the research staff by each health
care entity. Data files included information for all current employees as of August 26, 1998. Research staff created uniform numeric codes for the category of health care worker variable.

**Procedures**

The Alaska Telemedicine Testbed Project was designed to demonstrate and evaluate the use of narrow bandwidth telecommunications and information technology for telemedicine in frontier areas of Alaska. Telemedicine workstations were used to provide patients in remote areas with "virtual access" to physicians and specialists.

**Analyses.**

SAS © software was used to read the data files and to conduct survival (event history) analyses (26). Kaplan-Meier product-limit survival analysis was conducted to model employment length. Survival analysis is used to study the length of time until an event occurs (27); in this case, termination of employment. Because we did not have access to additional data beyond the health care employment category (doctor, nurse, or CHAP), we used the Kaplan-Meier product limit method of estimating the survival function, rather than methods designed to include additional predictor variables, or covariates. The Mantel-Haenszel log-rank test, available in PROC LIFETEST, was used to test the difference between retention (survival) curves between doctors, nurses, and community health aides for all four regional health agencies combined. Statistica © software was used to create survival graphs (28).

**RESULTS**

Slightly more than half of the data points were right-hand censored (i.e. employees had not terminated employment by the time of data file construction, on August 26, 1998). The community health aides were retained significantly longer (Mdn = 1186 days, interquartile range (IQR) = 2331) than either the doctors (Mdn = 596 days, IQR = 1125), or the nurses (Mdn = 408 days, IQR = 736); log-rank \( \chi^2 \) (2, \( N = 996 \)) = 68.30, \( p = 0.0001 \). There was no significant difference between the doctors and nurses in terms of length of retention. The Kaplan-Meier retention (survival) curves for each of the three employment catego-
ries are shown in Figure 1. Comparison of the three curves shows a longer length of retention (days) of community health aides compared to the other two groups. Figure 2 shows a histogram of the median employment time and interquartile range by profession, illustrating the higher median length of employment retention, as well as the higher relative interquartile range, for community health aides compared to the medical doctors and nurses.

Figure 1. Kaplan-Meier employment retention (survival) curves for three categories of health care providers: community health aides, medical doctors, and nurses.

Figure 2. Median employment time by profession with interquartile range.
DISCUSSION

These findings document that community health aides retain their jobs much longer than either doctors, or nurses. Our findings document median retention of both doctors and nurses in rural Alaska to be under two years. The documentation of the short duration of employment in the regions by both doctors and nurses highlights the problem of providing an adequate health work force in rural Alaska. Policy implications of this study include the fact that the employment retention of nurses is very short, creating a confluence of problems associated with health care provider turnover in the rural, frontier areas of Alaska.

The median tenure for physicians working in federally-funded U.S. community and migrant health centers has been reported to be three years (29). The University/Industry Alaskan Nursing Education Task Force recently examined strategies for reducing the statewide nursing crisis. While their final report (30) did not include data regarding median length of nurse retention, key findings include the fact that, between 1992 and 1998, the number of registered nurses working in hospitals increased by 5%, but that, during the same period, the number of inpatient days increased by 51%. Furthermore, the number of Alaskan nurses per 100,000 residents fell by 20% between 1996 and 2000, compared to a corresponding national decrease of only 10% (31). Data on the median length of employment retention for CHAPS has also not been reported. However, the Alaska Center for Rural Health at the University of Alaska Anchorage, currently is conducting a study, funded by the Health Resources and Services Administration, to document the CHAP program with an emphasis on reducing attrition (32).

Community health aides in rural Alaska are generally drawn from the local indigenous population, whereas doctors and nurses are more likely recruited from the larger Alaskan cities (e.g., Anchorage, Fairbanks), or from outside of the state. This pattern would help to account for the longer retention of community health aides in our study. It is believed that cultural familiarity and membership in the local community help indigenous persons overcome the personal, social, and professional barriers responsible for low retention among non-Native health care personnel (33). Nonetheless, attrition among Native professional and para-professional health workers is believed
to be high, though poorly documented (33). Kindig, Schmelzer and Hong (16) have asserted that regional considerations in addressing retention in non-metropolitan areas is critical, and that local situations may be difficult to consider from a national perspective. An important contribution of our study is the documentation of actual employment and retention patterns for doctors, nurses and community health aides in rural Alaska.

In a recent review of turnover research, Tai, Bame and Robinson (34) recommended several management strategies to address nursing turnover. These strategies include implementing employee assistance programs, offering a positive work climate, strengthening supervisory support and training programs, enhancing community feedback, providing benefit packages for longer tenure employees, creating opportunities for advancement, and maintaining a stable work environment. These researchers have also emphasized the importance of social support in mitigating turnover (34).

Other research has focused on the National Health Service Corps, a scholarship program designed to increase the supply of physicians in medically underserved areas (35) and the role of physician training (36) in the retention of rural physicians. Because Alaska lacks its own medical school, it, along with two other states, has entered into an educational agreement with the University of Washington School of Medicine. This program, WAMI (Washington, Alaska, Montana, Idaho), provides access for Alaskans to medical education specifically relevant to practice in rural Alaska at reasonable cost, helps to improve the scientific environment at the University of Alaska Anchorage, and offers major medical school resources to Alaskan health providers (37). (Wyoming has since joined the group, creating, WWAMI.)

Given the greater job tenure of indigenous community health aides in rural Alaska, their training takes on critical importance. The maintenance of hands-on clinical skills has been a major concern in the ongoing training of CHAPs in rural Alaska (38). In a study of para-professional health care workers in rural Canada, native health care workers reported that their professional training left them unprepared for the breadth of demands placed on them in their practice (33). The authors also assert that a clear understanding of the role of the para-professional by community members, employers and co-workers would improve the retention of para-professional health care providers.
A limitation of our study is the fact that the data available for analysis were limited to those data collected by each health care entity. Thus, we were not able to include predictor variables in modeling time until termination of employment for the three groups of health care providers. Research on the retention of physicians in community and migrant health centers has incorporated other variables in survival models (29). Additional limitations include the fact that retention was longer than anticipated. While this is a positive finding in terms of health care worker retention in rural Alaska, as a consequence, many cases in our data set were right-hand censored, meaning that the study did not allow sufficient time for the individual health care worker to leave the job. Therefore, these cases provided less information for the study. That is, we did not learn the total number of days they would be employed in their health care worker role. Instead, we learned only a minimum number of days that they were retained, without yet leaving the job. Finally, because the data sets were provided to us by staff members of the four different health entities, we do not know the extent to which cases may have been missing from the data sets that were provided to us.

It is unfortunate that we were unable to test our initial hypothesis that access to telecommunications increases the length of employment of health care providers in frontier regions, such as rural Alaska. Future research should address the effect of telemedicine on employment retention of different types of health care workers, as well as on retention lengths for additional types of medical staff.

An important contribution of our study is the documentation of actual length of employment retention for doctors, nurses and community health aides in rural Alaska. The Alaska Physician Work force Study conducted by the Alaska Center for Rural Health and the Institute for Circumpolar Health Studies reported that, "a wide variety of institutions and organizations would benefit from better information about the evolving condition of Alaska’s health work force" (39, p. 2). Documenting the length of employment is important, because hospitals in underserved areas, like rural Alaska, spend a considerable amount of money to recruit medical staff. Hospitals also provide incentives, such as moving costs and bonuses. Estimates of the cost of recruiting and orienting a nurse range from $2,000 to $20,000 (40-44), and these figures are likely to be higher in rural areas. The expected turnover rate for health care providers directly influences the amount
of money budgeted for recruitment. The finding that doctors were retained longer than estimated suggests that it may be possible to decrease the amount allocated for the recruitment of doctors and increase the amount allocated for nurses. In this context, accurate information about length of provider retention can help improve the estimation of recruitment expenses for each type of health care worker and can help hospitals target recruitment resources more appropriately, reducing the likelihood of increased shortage of medical care providers.

In addition to the problems of both health care provider recruitment and retention, access to health care services represents yet another health care problem in rural communities (45). It has been proposed that telemedicine can ameliorate these problems through four distinct mechanisms: 1) decreasing patient transfers, 2) decreasing travel for providers and patients, 3) meeting health care needs of underserved populations, and 4) building knowledge among patients and providers and reducing rural isolation (46). By providing means by which rural health care providers can consult with distant colleagues, telemedicine can reduce the providers’ isolation from professional colleagues. Telemedicine holds promise in mitigating the related problems of provider recruitment, provider retention and patient access, and should be developed, implemented, and evaluated in medically isolated and underserved areas, such as rural Alaska.

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