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Rural Health Practice Applications

Comparisons of Two Types of Nonphysician Providers Using Episode Based Data*

Earl V. Dunn and Chris A. Higgins

ABSTRACT: *Using episode based data, analysis of those patients with diagnoses of upper respiratory infection or laceration seen in a remote setting revealed that the medical care given by nurse practitioners and minimally trained indigenous health aides was comparable in relation to management and outcome. Specifically, the average number of visits per episode, the length of episodes and the percentage of patients who subsequently developed complications were similar for the nurses and the health aides. Although both the nurses and the health aides managed over 90 percent of the patients independently, the health aides were more likely to communicate, refer or transfer the patient to the care of another provider. These findings, if applicable to medical problems in general, imply that nonphysician providers in a remote setting can give quality care and can be trained to manage conditions appropriately, if the needed back-up is available.*

Primary health care is increasingly available in underdeveloped countries and remote areas through the use of nonphysician providers. These providers vary from well trained nurse practitioners and paramedics to minimally trained indigenous workers. To date, questions relating to the practice patterns and competence of these practitioners in rural and isolated settings have not been adequately addressed.

The literature on the practice and performance of nonphysician providers is extensive (Yankauer and Sullivan, 1982). The issue which is most relevant to the research reported here concerns the quality of care provided by these personnel in a remote setting. Some articles involving quality of care contrast different levels of providers. For example Sox (1979) reviewed four studies (Fine and Silver, 1973; Greenfield, Friedland, Scifers, Rhodes, Black and Komaroff, 1974; Ott, Bellaire, Machotka and Moon, 1974; Russo, Gururaj, Bunye, Kim and Ner, 1975) which assessed quality of care by different levels of providers. Other authors have done similar analyses (Goldberg, Jolly, Hosek and Chu, 1981; Powers, Jalowiec and Reichelt, 1984; Ramsay, McKenzie and Fish, 1982). In addition, several studies have looked at economic benefits. Kane, Olsen and Castle (1978) and Chambers, Bruce-Lockhart, Black, Sampson and Burke, (1977) described the costs and effects of adding a nurse health practitioner. Average costs per person per year were

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reported by Spector, McGrath, Alpert, Cohen and Aitkins (1975) and Tompkins, Wood, Wolcott and Walsh (1977), while, Salkever, Skinner, Steinwachs and Katz (1982) conducted an extensive time/efficiency study of nurse practitioners.

Other studies are also relevant to the assessment of nonphysician providers. Quality of care studies of specific medical diagnoses can be found in several reports (Flynn, 1974; Levine, Morlock, Mushlin, Shapiro and Malitz, 1976; Sackett, Spitzer, Gent and Roberts, 1974). Tompkins et al. (1977), Duttera and Harlan (1978) and Kane, Olsen and Castle (1976) all reported on the type and adequacy of technical care rendered by physician extenders. Goldberg et al. (1981) studied 30 physician extenders in relation to several medical conditions and several procedures. They found no differences between physician extenders and physicians in the use of ancillary services and in orders for further care. Studies have also been done relating costs and quality. These include research on pediatric nurse practitioners by Schiff, Fraser and Walters (1969) and Charney and Kitzman (1971). All these studies have shown that nonphysician providers can deliver care comparable to physicians in the same situation. In spite of the numerous studies, no reports consider or assess the functioning of physician extenders in areas where physicians are not always available to provide primary contact care or to directly supervise nonphysician providers. Since this is typical of many rural/remote health care systems such an examination is warranted.

Within the literature there are four basic criteria on which quality of care analyses are based: types of tasks performed, health provider encounters, person-year of care and analysis of episodes. Analysis by episodes has the advantage that this is the usual presentation of illness and, if studied appropriately, can partially correct for the variability of encounter data. Four recent studies used episode based data for comparison analyses. Moscovice (1978) reported a study which compared nurses and family nurse practitioners in treating otitis media and urinary tract infection. Tompkins et al (1977) contrasted internists and algorithm-assisted physician's assistants in treating acute respiratory illnesses. Salkever et al (1982) compared the efficacy of physicians and nurse practitioners using episode based data for otitis media and sore throat. Powers et al (1984) compared physicians and nurse practitioners delivering nonurgent emergency room care. All these studies, using episode based data, demonstrated that the physician extender provided equivalent care and, in two studies, (Salkever et al., 1982; Tompkins et al., 1977) at less cost.

The analysis reported herein, using episode based data, examines the practice patterns of a sample of nonphysician providers in their treatment of upper respiratory infection and lacerations under situations where physicians are not immediately available. Although analyses of these two conditions cannot be used as a measure of total quality of care they do indicate managements of very different conditions and imply that many other problems will probably be managed equally well.

The Setting

The study was conducted in
Canada, known as the Sioux Look
large area (385,000 square kilome
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Celsius. There are 10,000 people
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The Setting

The study was conducted in a remote area of northwestern Ontario, Canada, known as the Sioux Lookout Zone. This is a sparsely populated and large area (385,000 square kilometers) characterized by numerous lakes and rivers, muskeg, swamps, and dense forest. The climate is harsh with a long, cold winter during which temperatures can drop as low as −50 degrees Celsius. There are 10,000 people, mostly native Cree and Ojibwa Indians, living in the area, scattered among 27 small communities which range in size from 25 to 1,000 people. Only one of the communities is connected to the "outside" world by a road. All the other communities rely on bush planes for other than local transportation.

None of the communities is large enough to support a full-time physician. Seven communities, with populations of 350 or more, have a nursing station staffed by 2 to 5 nurse practitioners whereas the other 20 smaller communities are served by indigenous health aides. Each health aide station reports to one of the nursing stations. The centre of the health care system is the Zone Hospital which is from 30 to 900 kilometers distant from these 27 communities.

Each health clinic has telephone or, when necessary, radio contact with the zone physicians or nurses. Thus, primary health care is provided by nurses or health aides with regular and emergency supervision by the zone doctors. In each community the nurse or health aide sees patients on a daily basis. They either treat the patient themselves, consult via a communication system, transfer the patient for further care or have the patient seen by a doctor or other health worker on their next visit to the community. There are no formal algorithms and few protocols for the nurses and health aides. Some guidelines are provided and are becoming more common and formalized. However, they are still applicable to only a few of the patients seen by these workers and do not apply to the conditions considered in this research.

Weather permitting, physicians visit each nursing station twice a month and the smaller health aide communities every one or two months. The doctors, on each visit, see referred patients and also most of the patients who present with a problem on that day. Nurses attempt to visit their satellite health aide stations every two weeks. In addition, pediatricians, psychiatrists, cardiologists, ENT consultants and other medical specialists make regular but very infrequent visits to these remote communities.

The training of these two types of health workers in the Sioux Lookout Zone is very different. All the nurses have regular nursing training, many of them are trained mid-wives and most have nurse practitioner or public health training. In contrast, the health aides are minimally trained. Most have at least high school education. In addition, some have up to 12 weeks formal medical training. However, most learn on the job and during in-service development programs. Recently there has been a more concentrated in-service program to upgrade the skills of the health aides.

Hypotheses

The intent of the research that was conducted was to compare the practice patterns of two types of providers; nurse practitioners and minimally trained indigenous health aides. The comparison was based on the treatment and outcomes associated with upper respiratory infections and lacerations. These two conditions are not a reflection of total quality of care. Nonetheless, they are two very different conditions with different decision making strategies. If similar findings can be shown with these two diagnoses, then it is probable that many other conditions would have similar findings.

Three hypotheses were used for the analyses: (1) the practice patterns of the nurses and health aides will be the same, as measured by the number of visits per episode, the length of the episodes, the percentage of episodes lasting only one visit and the frequency of prescription of antibiotics; (2) there will be no differences in the outcomes of patients treated by the nurses and health aides as measured by the subsequent development of bronchitis and/or pneumonia for upper respiratory infections (URI) and the subsequent development of infection in those patients treated for lacerations; and, (3) the health aides will be more dependent on other providers, as measured by a higher frequency of asking for assistance (i.e. communications, referrals and/or transfers).

Methods

For several years we have been collecting patient care data in all 27 communities in the Sioux Lookout Health Zone (Dunn and Higgins, 1986). The data reported here is an analysis for the period from January 1, 1978, to the end of December 1980. They include encounters with eight different staff family physicians, visiting consultants, over 30 different nurses and 20 health aides. All the nurses are full-time employees of the health system. Since the health aides work in the smaller communities there is less need for their services and most of them are employed on a part-time basis. Nonetheless, since they are the only health workers living in the community they are "on call" 24 hours a day. The data used for the analyses include the location of the visit, the provider of the service, the diagnoses and managements made and any transfers, referrals, or communications which occurred. Diagnoses werre coded according to the 371 rubrics used in the International Classification of Health Problems in Primary Care (ICHPPC-2) and the managements with our own classification scheme which contained 84 distinct rubrics.

All encounters were converted to disease episodes. This was accomplished by assigning one of 8 time intervals to each diagnosis in the ICHPPC classification. These intervals included single visits, six different classes varying from one week to one year, and a chronic category. For example, upper respiratory infection had an interval of two weeks, laceration one month and abdominal pain a single visit. For chronic conditions, such as diabetes and hypertension, a single episode wa
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Results

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hypertension, a single episode was created, a lifetime episode for that condition. Signs and symptoms were not, in general, assigned a time interval. The time intervals were created by two physicians, one a family physician and the other a pediatrician.

The time intervals were used in the following way. When a diagnosis was made, the time interval for that diagnosis was assigned to that encounter. If that or a diagnosis from the same ICHPPC class was recorded on a subsequent visit within that time period the second visit was considered part of the disease episode. The time interval of the subsequent diagnosis was used and a further search for encounters was made. The episode terminated when no follow-up visits occurred within the specified time interval.

As an example, a patient might receive a diagnosis of upper respiratory infection. Since the time interval for URI is 14 days, the computer program would search for a subsequent diagnosis in the same ICHPPC class (class 8 – respiratory). If no diagnosis was found the episode terminates. If a diagnosis is found, say acute bronchitis, the time interval for acute bronchitis (21 days) would be used to search for another similar encounter (i.e. in the same ICHPPC class). The episode would continue until no similar diagnoses were found within the time interval of the last diagnosis. Although this method is artificial and computer generated, a review by two independent physicians (one pediatrician and one family physician) of episodes for several different diagnoses (e.g., URI, lacerations, UTI, and acute bronchitis) comparing the computer generated episodes with the actual charts indicated that episodes created in this way were realistic and appeared to reflect what was occurring. A comprehensive review of this technique and its utilization can be found in Higgins (1980).

For the purposes of this study the first type of provider seen by the patient was considered as the primary caregiver and that episode was assigned to that type of provider for analysis even if subsequent care was given by another type of provider. In addition, because of confusion with multiple diagnoses on a single visit, only those episodes which had a single diagnosis, URI or laceration, on the first visit were considered.

Results

Table 1 provides some background information on the health care utilization for the Sioux Lookout Zone. It summarizes the diagnoses for the 139,618 visits during the three years, listed by ICHPPC class, for the three types of provider. The nurses saw 70.4% of all patients, the health aides 18.9% and the physicians 10.7%. For these visits there were a total of 180,163 diagnoses recorded, of which 10,593 were listed as upper respiratory infection (URI) and 5,618 as laceration. These data illustrate the degree to which the nonphysician providers operate independently in the field in this setting.

Each of Tables 2 through 10 contrast health care parameters for the nurses and the health aides. These tables also include the same parameters

Table 1: Diagnoses by ICHPPC Class: Frequency and Percentage Percent of Diagnoses Per Patients Seen by Provider Class.

	Class	Nurse	Health Aide	Doctor	Total
1	Infective	12,180 (12.4)*	3,042 (11.5)	1,263 (8.5)	15,598 (11.8)
2	Neoplasms	744 (0.7)	8 (0.0)	214 (1.4)	965 (0.7)
3	Endocrine	2,829 (2.9)	354 (0.4)	729 (4.9)	3,889 (2.8)
4	Blood	1,346 (1.4)	98 (0.4)	206 (1.4)	1,650 (1.2)
5	Mental	2,468 (2.5)	373 (1.4)	369 (2.5)	3,198 (2.3)
6	Nervous	13,483 (13.7)	2,039 (7.7)	2,616 (17.5)	18,138 (13.0)
7	Circulatory	6,694 (6.8)	1,101 (4.2)	1,663 (11.1)	9,458 (6.8)
8	Respiratory	20,672 (21.0)	6,487 (24.6)	2,122 (14.2)	25,037 (21.0)
9	Digestive	5,228 (5.3)	1,277 (4.8)	728 (4.9)	7,233 (5.2)
10	Urinary	12,731 (12.9)	1,855 (7.0)	2,593 (17.4)	17,129 (12.3)
11	Pregnancy	4,511 (4.6)	288 (1.1)	962 (6.4)	5,757 (4.1)
12	Skin	10,049 (10.2)	2,902 (11.0)	1,236 (8.3)	14,187 (10.2)
13	Musculoskeletal	5,298 (5.4)	1,251 (4.7)	1,212 (8.1)	7,761 (5.6)
14	Congenital	421 (0.4)	8 (0.0)	314 (2.1)	743 (0.5)
15	Perinatal	99 (0.1)	9 (0.0)	18 (0.1)	127 (0.1)
16	Signs and Symptoms	19,800 (20.1)	10,363 (39.3)	3,378 (22.6)	33,541 (24.0)
17	Accidents	12,292 (12.5)	2,284 (8.7)	1,140 (7.6)	15,716 (11.3)
18	Supplementary	29,554 (30.0)	4,745 (18.0)	4,692 (31.4)	38,991 (27.9)
Total Diagnoses		127,573	33,313	19,268	180,163
Patients Seen		98,338 (70.4)	26,345 (18.9)	14,935 (10.7)	139,618

*The column percentage total to more than 100% because, in the ICHPPC classification, a number of diagnoses (e.g. warts, prenatal care) appear in more than one class.

for the doctors to demonstrate how the physicians influence delivery patterns, although the doctors are only occasional visitors to the remote communities and provide direct primary care only when they are actually in the community.

Our first hypothesis stated that there would be no differences between the nurses and health aides in the number of visits per episode, the average length of an episode, the percentage of episodes lasting only one visit, and the frequency of prescription of antibodies. Data in Table 2 indicate that for upper respiratory infections there were no significant differences between the nurses and health aides in terms of the number of visits per episode and the average length of an episode. There were also no differences in the percentage of episodes requiring only a single visit and the percentage of episodes in which an antibiotic was given. Similar data for lacerations are pre-

Table 2: Patterns of Care – Up (Percent in Brackets).

Factor	Nurses
Episodes	3954
Average Length	9.7
Mean # Visits	1.46
Single Visit	3034 (76.7)
Antibiotics	614 (15.5)

Table 3: Patterns of Care – Lac (Percent in Brackets).

Factor	Nurses
Episodes	2131
Average Length	3.23
Mean # Visits	1.63
Single Visit	1402 (65.8)
Antibiotics	225 (11.1)

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s: Frequency and Percentage
tients Seen by Provider Class.

lth Aide	Doctor	Total
i2 (11.5)	1,263 (8.5)	15,598 (11.8)
8 (0.0)	214 (1.4)	965 (0.7)
4 (0.4)	729 (4.9)	3,889 (2.8)
8 (0.4)	206 (1.4)	1,650 (1.2)
3 (1.4)	369 (2.5)	3,198 (2.3)
9 (7.7)	2,616 (17.5)	18,138 (13.0)
1 (4.2)	1,663 (11.1)	9,458 (6.8)
7 (24.6)	2,122 (14.2)	25,037 (21.0)
7 (4.8)	728 (4.9)	7,233 (5.2)
5 (7.0)	2,593 (17.4)	17,129 (12.3)
8 (1.1)	962 (6.4)	5,757 (4.1)
2 (11.0)	1,236 (8.3)	14,187 (10.2)
1 (4.7)	1,212 (8.1)	7,761 (5.6)
8 (0.0)	314 (2.1)	743 (0.5)
9 (0.0)	18 (0.1)	127 (0.1)
3 (39.3)	3,378 (22.6)	33,541 (24.0)
4 (8.7)	1,140 (7.6)	15,716 (11.3)
5 (18.0)	4,692 (31.4)	38,991 (27.9)
3	19,268	180,163
5 (18.9)	14,935 (10.7)	139,618

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e visit and the percentage of epi-
milar data for lacerations are pre-

Table 2: Patterns of Care – Upper Respiratory Infection (Percent in Brackets).

Factor	Nurses	Health Aide	p-value	Doctor
Episodes	3954	1767		636
Average Length	9.7	8.9	>.10	7.6
Mean # Visits	1.46	1.38	>.10	1.40
Single Visit	3034 (76.7)	1379 (78.0)	>.10	504 (79.2)
Antibiotics	614 (15.5)	263 (14.9)	>.10	89 (14.0)

Table 3: Patterns of Care – Laceration (Percent in Brackets).

Factor	Nurses	Health Aide	p-value	Doctor
Episodes	2131	703		178
Average Length	3.23	2.11	<.05	2.59
Mean # Visits	1.63	1.33	<.05	1.47
Single Visit	1402 (65.8)	650 (78.6)	<.001	183 (75.3)
Antibiotics	225 (11.1)	60 (8.7)	>.10	42 (15.1)

sented in Table 3. The mean number of visits and the average length per episode are significantly higher for the nurses. The percentage of episodes lasting only a single visit is significantly higher for the health aides. The nurses had a tendency to prescribe antibiotics more frequently although the difference is not significant. Thus, Hypothesis 1 has support when considering upper respiratory infection but is rejected for lacerations with the nurses giving more care and prescribing more antibiotics.

The second hypothesis focused on the differences in outcomes for patients treated by the nurses and health aides. The measure used was the number of URI patients with a subsequent development of bronchitis and/or pneumonia and the number of patients with a laceration who subsequently were treated for an infection. Data in Table 4 indicate no difference in outcomes as measured by patients who had a diagnosis of URI and subsequently had a diagnosis of bronchitis or pneumonia during that episode. Of the 3,954 URI episodes treated initially by the nurse practitioners, 368 (9.3%) subsequently were diagnosed to have bronchitis or pneumonia. For

Table 4: Outcome -Upper Respiratory Infection.

Factor	Nurses	Health Aide	p-value	Doctor
Episodes	3954	1767		636
Subsequent Diagnosis of Bronchitis or Pneumonia During Episode	368 (9.3)	137 (7.7)	>.10	52 (8.2)

Table 5: Treatment for Upper Respiratory Infection.

	Antibiotics Given on First Visit	Number of Episodes	Subsequent Diagnosis of Bronchitis or Pneumonia During Episode
Nurse	NO	3339 (84%)	303 (9%) p=.04
	YES	614 (16%)	64 (10%) p>.10
Health Aide	NO	1504 (85%)	109 (7%)
	YES	263 (15%)	28 (10%)

those treated initially by the health aid 7.7% developed bronchitis or pneumonia.

Table 5 gives a more complete breakdown on the use of antibiotics for the treatment of URI by the nurses and the health aides. It describes the episodes when antibiotics were either prescribed or not on the first visit and the subsequent development of bronchitis and/or pneumonia. While there is no difference in the use of antibiotics, patients seen by the nurse and not given antibiotics are more likely (p=.04) to get bronchitis/pneumonia. Similar data are provided for lacerations in Tables 6 and 7. There are no significant differences in the percentage of patients who subsequently had an infection. Data in Table 7 demonstrate that there were no differences between the outcomes of patients treated by the nurses and health aides for cases involving the use of antibiotics on the first visit.

Hypothesis 2 has support. For both URI and lacerations there is no difference between the nurses and health aides in the percentage of episodes which develop more serious complications.

Table 6: Outcome -Laceration.

Factor	Nu
Episodes	2
Subsequent Diagnosis of Infection	79

Table 7: Treatment of Lacerati

	Antibiotics Given on
Nurse	NO
	YES
Health Aide	NO
	YES

Table 8: Requests for Help – U

Method	Nurses
Communications	34 (1.0)
Referrals	80 (1.5)
Transfers	24 (0.6)

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Infection.

Health Aide	p-value	Doctor
1767		636
137 (7.7)	>.10	52 (8.2)

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84%)	303 (9%) p=.04
6%)	64 (10%) p>.10
35%)	109 (7%)
5%)	28 (10%)

7.7% developed bronchitis or

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he nurses and health aides for
rst visit.
and lacerations there is no dif-
s in the percentage of episodes

Table 6: Outcome -Laceration.

Factor	Nurses	Health Aide	p-value	Doctor
Episodes	2131	704		178
Subsequent Diagnosis of Infection	79 (3.7)	30 (4.3)	>.10	5 (2.8)

Table 7: Treatment of Lacerations.

	Antibiotics Given on	Number of Episodes	Subsequent Diagnosis of Infection
Nurse	NO	1906 (89%)	72 (3.8%) p>.10
	YES	225 (11%)	7 (3.1%) p>.10
Health Aide	NO	643 (91%)	26 (4.0%)
	YES	60 (9%)	4 (6.7%)

Table 8: Requests for Help – Upper Respiratory Infection.

Method	Nurses	Health Aide	p-value	Doctor
Communications	34 (1.0)	40 (3.0)	<.001	7 (1.4)
Referrals	80 (1.5)	51 (2.9)	=.04	18 (4.5)
Transfers	24 (0.6)	7 (0.4)	>.10	5 (0.8)

The data on physicians indicate that the nurses and health aides do as well relative to the subsequent development of bronchitis and/or pneumonia or infection. The doctors are involved, relatively, in more transfers but that is part of their function as the backup system.

The final hypothesis stated that health aides would be more dependent on other providers than the nurses. Table 8 presents the use of communica-

Table 9: Requests for Help – Laceration.

Method	Nurses	Health Aide	p-value	Doctor
Communications	39 (1.8)	53 (7.5)	<.001	9 (5.0)
Referrals	57 (2.7)	52 (7.4)	<.001	14 (7.9)
Transfers	44 (2.1)	26 (3.7)	= .03	7 (3.9)

Table 10: Referral Patterns for All Patients.

		Nurse	Referred to Doctor	Other
Referred By	Nurse	213	4,082	564
	Health Aide	1,559	302	8
	Doctor	25	726	144

*Other includes referrals to the dentist, mental health workers, audiologist and other disciplines including the health aides (regrettably the data collection forms cannot clearly distinguish this latter category).

tions and referrals in the treatment of URI. The health aides were more likely to make a communication ($p < .001$) and refer a patient to another provider ($p = .04$). For lacerations (Table 9), the results are similar with the health aides also transferring more patients. Hypothesis 3 has support.

Table 10 displays the referrals for all patients for the three year period by the three types of providers and to whom the referrals were made. The nurses referred 84% to doctors and 11.5% to others (dentists, mental health workers but also to the health aides). The health aides referred 84% to nurses and 16% to doctors. Thus, many of the referrals were to the next higher level of provider. The doctors made 81% of their referrals to other physicians. These same trends hold for the specific diagnoses of upper respiratory infections and lacerations.

Discussion

Our hypotheses have partial support. Hypothesis 1 was supported for the treatment of upper respiratory infection but not for lacerations. A further look at the data for laceration

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Aide	p-value	Doctor
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.4)	< .001	14 (7.9)
.7)	= .03	7 (3.9)

ents.

	Referred to Doctor	Other
	4,082	564
	302	8
	726	144

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ther look at the data for lacerations reveals that the health aides transferred a significantly higher proportion of patients with lacerations than the nurses. The majority of health aide referrals would be to nurses. This could explain why the length and number of visits per episode were less for the health aides, since they turned over care of the more serious cases to a more highly trained provider. A tentative conclusion one could draw is that, for non-serious conditions such as upper respiratory infection, the care provided by the nurses and health aides is similar. For conditions which might have more serious consequences, such as lacerations, the health aides can care for most (>90%) patients themsevles and can identify and refer those who have more severe problems.

The testing of hypothesis 2 indicated that patients treated by the nurses and health aides had similar outcomes. Finally, hypothesis 3 showed the higher dependence of the health aides on assistance, as one would expect.

The general pattern of care delivered by the nurses and the health aides for these conditions were similar. The outcomes did not differ. It appears that these similarities are accomplished by having the health aides use the available back-up system much more frequently than the nurses. This is reflected in significantly higher utilization of communications systems and referral pathways and the transfer of more serious cases to other providers. Nonetheless, it appears that the health aides can distinguish the patients they are unable to care for. Quality of care is maintained even with primary care being given by minimally trained workers.

For these two conditions the nurses and health aides handled most of the episodes without help. We have also found (Dunn and Higgins, 1986) that for all medical problems both the nurses and the health aides manage more than 90% of the patients that present. Thus, much of the daily health care delivery is adequately provided by nonphysician providers.

These data are a reflection of the health care of one region. Many factors could be influencing the outcomes. If these results could be reproduced for other conditions, or in other settings, we could conclude that one critical factor to maintain qualty of care by minimally trained health workers is to establish and reinforce the help seeking behaviors of the first line workers, in this circumstance, to reinforce the communications and referral patterns used by the nonphysician providers.

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Rural Health Poli

A Comparison of the Rur Differential for Deaths Fr Cardiovascular Disease ar

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ABSTRACT: *Using a nine catego major metropolitan counties of on with less than 2,500 residents, the urban differentials in mortality n 1980 non-metropolitan counties co significantly higher than metropoli diovascular disease, and cancer. A ized rates reveals that virtually all due not to residence* per se, *but to ticularly age composition. Rural a skewed toward the older ages whe implications of the findings for discussed with an emphasis on the vice needs of an aging population.*

The dichotomous portrayal anomic urban existence bears little ty. The erroneous nature of the ste ences in socioeconomic and demog communities (Bender et al., 1985 claimed continual distinction is h thesis is that rural areas are decide (Cordes, 1985; Wright and Lick, tends, "rural America is a roug America" (pp. 111) is not enti evidence. The purpose of this pap differentials between rural and ur 1980. We examine differentials i and total deaths from all causes a persistence of a rural health disadv

* An earlier version of this manuscript the American Rural Health Assoc authors acknowledge the helpful sug anonymous reviewers of *The Journal* tion should be addressed to: Dr. Research, University of Florida He Florida 32610.