Use of Cooperative Health Statistics System Physician Data in Small Area Manpower Needs Assessment: the Case of Rural Colorado

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THE INACCESSIBILITY OF PRIMARY HEALTH CARE for many Americans is a problem that is causing growing concern among public health officials in both the Federal and State governments (*1*). It is especially perplexing because the supply of physicians is increasing rapidly in proportion to the country's population (*2*). Faced with the apparent fact that the solution is not in the mere expansion of the pool of health manpower resources, members of the Congress have allocated funds for programs that specifically address the issue of maldistribution. The National Health Service Corps (NHSC) and Area Health Education Centers (AHECs) are among the most noted programs that have been so mandated. However, the evaluation of health manpower distribution and the appropriate prescription of remedial measures are frequently hampered by the lack of an adequate manpower data base.

The inability to determine precisely physician practice location and specialty generates consequences that are more severe locally than nationally. The presence or absence of one health practitioner can be critical to the objective designation of a rural county as a health manpower shortage or a medically underserved area. The creation of a data base from which delicate assessment can be made of the manpower needs of residents of small geographic or sparsely inhabited areas is long overdue. It is the first major step in assessing the need for physicians.

In accordance with the scope of work prescribed in its contract, No. (HRA) 232-79-0060, with the Bureau of Health Manpower, Health Resources Administration, the Statewide Educational Activities for Rural Colorado's Health (SEARCH) program undertook, in the spring of 1980, to assess the need for additional primary care physicians within the 50 counties of its rural service area. Sponsored by the University of Colorado Health Sciences Center, SEARCH activities are administered through four AHECs dispersed throughout Colorado, but outside the Denver metropolitan area. Members of the SEARCH-AHEC staff directed and coordinated the activities described in this paper, which were a part of an attempt to establish a geographic physician profile for facilitating systematic identification of health manpower shortage areas and for determining the degree of medical underservice to the population of each of the 50 counties. A number of other agencies contributed to that effort by providing physician manpower data and assisting in the verification of the status of physicians practicing in those counties.

During their activities, SEARCH personnel became duly impressed with the outstanding quality and utility of the physician manpower data collected by the Colorado Department of Health, as prescribed in its Cooperative Health Statistics System (CHSS)

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contract with the National Center for Health Statistics (NCHS). Governed by the provisions of Public Law 93–353, the NCHS had decentralized from the Federal to the State level the responsibility for collecting health manpower data in requisite geographic detail (*3*). In Colorado, the State health department had been officially charged with that responsibility.

In this paper I examine the accuracy of CHSS survey manpower data and the potential benefit of continuing to have those data available annually for assessing health manpower needs in small areas. Such inspection is particularly timely. Because Federal funding for CHSS programs has been withdrawn, the States are expected to assume financial responsibility for maintaining the CHSS functions. Their failure to do so could seriously impair future analyses of medical underservice and make unnecessarily difficult the administration of programs implemented for the purpose of distributing health manpower resources.

CHSS Physician Survey Procedure

The high quality of Colorado's CHSS physician data file has been attributed to the procedure used in gathering that data. The survey questionnaire was enclosed along with annual relicensure papers and mailed in January of each year by the State Board of Medical Examiners to physicians licensed to practice in Colorado. Followup mailings were made periodically thereafter by department of health personnel to ensure that a 90 percent response rate was attained. Two followup mailings were done in 1980—the fourth consecutive year that the CHSS survey had been conducted in Colorado. Data were not entered into the physician file from completed questionnaires returned after the middle of June 1980. A wealth of information about each practitioner was collected; following is a list of the major categories of data sought.

Address of residence
Mailing address (if different)
Address of primary workplace
Licensure status 1 year ago
Sex
Date of birth
Ethnicity
Medical school attended
Year first licensed in Colorado
Other States in which licensed
Weeks in practice last year
Years as a practicing physician
Primary professional activity:
  Self-employed
  Residency/fellowship
  Salaried, employed by another
Primary practice setting
Primary practice specialty
Secondary practice specialty
Percent of time in each specialty
Hours per week in specified activities
Malpractice coverage
Education beyond medical school
Location of first residency
Location of other residencies or fellowships
Address of secondary workplace

The questionnaire's contents were changed from year to year in an effort to be responsive to the potential users who identify their data needs annually at the request of the Colorado Department of Health.

The CHSS basic data collection scheme yielded a broad scope of physician manpower data, and in this respect the CHSS data for Colorado excelled over all those from other sources used in developing the SEARCH physician inventory.

In 1980, the CHSS data collection procedure was altered in an effort to enhance response rates and thus reduce the need for costly followup. Physicians who had responded to the survey in any of the 3 previous years were sent an abbreviated form. It consisted of only 13 items; all items not subject to change were omitted. This approach encouraged physicians who had been answering the questionnaire by rote—a practice that frequently resulted in their submitting incomplete forms—to respond conscientiously. A small percentage of all survey subjects—physicians who had been licensed within the 12 months preceding the 1980 survey and those who had failed to participate in all earlier surveys—were asked to complete the 2-page, 23-item instrument.

The CHSS physician data differentiated, for each respondent, between residence and practice locations. For areas where physicians commute from their homes in rural communities to practices that serve primarily urban populations, or where they commute from their urban residences to rural practices, such information is indispensable for accurately assessing manpower needs. For a project such as SEARCH's, which was concerned chiefly with practice locations and to some degree with primary specialty, this differentiation feature rendered the CHSS physician file especially valuable.

Establishing the SEARCH Physician Inventory

Three basic tasks were performed in achieving an accurate physician inventory:

1. A comprehensive basic list of physicians who might have been practicing in 1980 in the SEARCH service area was assembled, based on the file of licensed physicians compiled by the Colorado Board of Medical Examiners.
2. The contents of the files of several independent sources of physician data were compared item by item (name, community of practice, and practice specialty) with the corresponding entries of the basic list.
3. Personnel of various agencies concerned with physician manpower commented on each item of the basic list for which they or someone they knew had knowledge.

After SEARCH analysts weighed the evidence that was gathered for each practitioner and made judgments as to location and primary specialty of practice, a final list of physicians practicing in the SEARCH service area was published. From beginning to end, the process took 3 months.

In addition to the CHSS physician file, the following sources of data were used:

- The Colorado Board of Medical Examiners file on licensed physicians was used as the document upon which all verification activities were focused because it was the most comprehensive of all the files. Names of all physicians licensed to practice in Colorado are listed in that file. (An active physician's failure to be licensed constitutes a violation of State law; therefore, response to the annual board relicensure mailing is mandatory.) The board file is an official State document, although it serves primarily an administrative rather than an analytical purpose. It is believed to be the most current of all files on physician manpower in Colorado at the end of the grace period for relicensure, and the board file used in the SEARCH study was procured immediately after the 1980 grace period had terminated.
- Blue Cross-Blue Shield maintains a current record of physicians who have filed claims within the most recent 3 years. Although some of those physicians may have ended their services to the communities of record during that period, the information suffices to verify that a physician once practiced in a particular town. However, the validity of the data is contingent upon a physician's extensive participation in the Blue Cross-Blue Shield program.
- SEARCH conducts a survey periodically of all physicians believed to be practicing throughout its service area. Two such surveys, one in 1979 and the other in 1980, have been made since the inception of SEARCH in 1977. Each envelope in which a questionnaire is enclosed is annotated "correct address requested"; such correspondence cannot be forwarded by postal personnel. The correspondence is returned if it cannot be delivered. If the physician has moved within the preceding 12 months, the address entered on the forwarding order will be annotated on the returned mail. If the physician never practiced or resided at the address indicated on the envelope, or if he or she had departed from that address for more than 1 year, the correspondence will be returned marked "not deliverable." The results of the mailing facilitates analysis of in- and out-migration patterns for physicians as well as determination of the resources serving geographic areas.
- The telephone directories for each town in the SEARCH service area were reviewed. This investigation sometimes permitted the analyst to distinguish

an office address from a residence address, and often provided information about a physician's primary specialty. In most cases, rural physicians are listed in the yellow pages of the directories.

Missing from this list of data sources is the masterfile of the American Medical Association (AMA). That file was not made available (the AMA policy toward providing its masterfile is stringent). Thus, all the data files used had been generated in Colorado.

Representatives of other agencies were invited to participate in verifying the data in the SEARCH physician inventory, including persons from the three health systems agencies (HSAs) in Colorado. Among the organizations that made valuable contributions to the quality of the SEARCH product are the two HSAs that agreed to participate, the NHSC, the Mountain Plains Outreach Program, the Rural Health Care Association, and the Colorado Osteopathic Society.

The two HSAs that contributed have service areas which include 42 of the 50 counties served by the SEARCH program. Their input was invaluable. The use of the resources of their boards of directors, subarea councils, and the various community agencies that interface with the HSAs brought local expertise to the study. Frequently the HSAs made possible the consultation with people having personal knowledge of the location and practice specialty of a physician for whom the data files from independent sources contained contradictory information.

The NHSC provided information on physicians who staff each of the Corps sites. Participation by representatives of that organization alleviated a problem encountered by investigators who have tried to conduct studies in Colorado similar to the SEARCH one. Historically there has been substantial turnover among NHSC personnel as they complete their Federal obligation (usually 2 years of service to the inhabitants of medically underserved areas). The transience of NHSC professionals has made difficult the determination of the staffing at the Corps sites. NHSC assistance also simplified the review of the status of physicians who have established private practices in rural Colorado since leaving the Corps.

The Mountain Plains Outreach Program and the Rural Health Care Association provide direct support to physicians serving Colorado's rural communities. Their participation was solicited because they are significantly invested in the management of the medical practices they support. Both organizations presented substantive commentary on the status of a large number of practitioners and absolute verification for physicians with whom they had contracted.

Osteopathic physicians are markedly better distributed in rural Colorado than are allopathic physicians. The Colorado Osteopathic Society provided verification of each osteopath's status through personal knowledge of members of its staff. The verification process was simplified administratively because of the society's updated directory of member and nonmember osteopaths in Colorado.

Results

Eighteen of the 21 fully designated medically underserved counties in rural Colorado lie within the SEARCH program service area. All but 1 of these 18 counties are part of the service areas of the 2 HSAs that participated in verifying the physician files obtained from independent sources, and the product of that verification process is believed to validly depict available physician manpower there.

A comparison between the data furnished by the NHSC on Corps physicians who practiced in those 18 medically underserved counties and the determination of their status made by using CHSS data proved the CHSS file to be accurate. There were no discrepancies for any of the 20 NHSC practitioners. Although NHSC physician information comprises only a small part of the SEARCH physician inventory, the data have been troublesome in the past because of the mobility of NHSC professionals, as mentioned. Discovering the accuracy of the CHSS data with respect to the status of the NHSC physicians was particularly encouraging because NHSC sites are located in the most rural and medically underserved parts of the State, and those are the areas for which accuracy is most critical.

For all the 108 physicians serving the 18 counties, only one discrepancy appeared in the CHSS data. The CHSS file listed a physician as having relocated his practice out of the State when, in fact, he continued to serve a rural Colorado community. Commentary from personnel of the local AHEC and the HSA revealed that the physician had not left the area; he had only reported a planned future relocation of his practice. The following table illustrates the results of the practice location analysis.

Physicians' category	*NHSC physicians*	*All physicians*
Physicians practicing in 1 of 18 medically underserved counties.....	20	108
Physicians accurately listed in the CHSS physician file.....	20	107

Since the Board of Medical Examiners does not maintain an automated file of physician specialty

information, the primary specialty practice data used in the verification process were those reported to CHSS in its survey. Information from the HSAs' commentary and the telephone directories' yellow pages did not contradict any of the physicians' self-declarations. However, data from the HSAs' commentary and the telephone directories were not comprehensive.

The population-to-primary care physician ratio is the most important factor in designating a "health manpower shortage area." Of the four criteria used for determining appropriateness in designating a district or a county as a "medically underserved area," only one relates to the availability of health manpower. But the derivation of data associated with the other three—infant mortality rate, percent of population 65 years or older, and percent of families below the poverty level—is hardly controversial. These data are routinely extracted from vital statistics and census results. The accuracy of manpower data is imperative in designating a district or a county as a shortage or underserved area.

The county for which the CHSS physician file was slightly less than perfect as a record of practice location had 10,700 inhabitants and 11 physicians, 9 of whom had primary care practices. Its population is also served by a general acute short-stay hospital. The actual population-to-primary care physician ratio, 1200:1, rather than the 1375:1 that would have been derived by using the CHSS data, does not approach the 3500:1 criterion used by the Federal Government for designating health manpower shortage areas under the authority of Section 332 of the Public Health Service Act. And since that county has, in fact, been designated a "medically underserved area," the small underrepresentation of physician manpower indicated by the CHSS data is inconsequential. Indeed, the index of medical underservice computed from standardized scales for the four respective criteria did not differ as a result.

Discussion and Conclusions

Careful examination of the CHSS physician file for 1980 showed it to be almost flawless in depicting physician manpower resources in service to medically underserved Coloradoans. Some qualification of that result is necessary. The number of physicians in service to each of the counties under study varied from 0 to 23. The single variance with respect to practice location occurred in a county relatively well supplied with primary care physicians. Its effect, therefore, can be dismissed as insignificant. But had that error been made for one of the less fortunate counties—15 of the 18 counties had fewer physicians—the effect on an assessment of its manpower needs would have been more substantial.

A 100 percent response rate to the CHSS survey was attained for physicians practicing in Colorado's underserved rural communities in 1980. Abbreviating the questionnaire and conducting timely followup surely accounted for a good part of that success. Response to the survey was voluntary, although mailing the CHSS questionnaire with the Board of Medical Examiners relicensure documents may have implied mandatory response. (Of course, an expectation of maintaining a perfect response rate from year to year is unrealistic.)

For the SEARCH effort, the CHSS physician file was used only in the analysis of practice location and specialty. In conducting future studies, the investigators may have considered using other than CHSS data for more detailed analyses—for example, number of hours spent in direct patient care weekly and percent of practice time spent in rendering primary versus nonprimary care. The CHSS record for providing data suitable for such analyses was not impressive. However, progress toward collecting such data was made during the 4 years the CHSS survey was conducted in Colorado, and further refinement of the physician survey procedure held great promise of CHSS's securing that information.

A recommendation grew out of the SEARCH effort with respect to changing CHSS survey procedure to contain costs. The NCHS contractual requirement of a 90 percent response rate makes feasible the implementation, for CHSS, of the extensive data verification measure used in creating the SEARCH physician inventory. If all relevant data files from other sources were reviewed and community resources were queried in the verification of data for only the few CHSS nonrespondents, costs would be kept within reasonable limits. Verification of nonrespondent data should effectively supplement the CHSS physician file's content and make it comprehensive. However, comprehensiveness becomes a hypothetical problem when physicians respond 100 percent as they did in 1980, or when a high response rate is coupled with the capacity to identify the nonrespondents easily.

The validity of the CHSS physician manpower data was tested incidentally to developing the SEARCH physician inventory. The quality of the CHSS physician file was discovered when the data from all sources used in the SEARCH project were

compared with SEARCH's final product. I did not intend to pit the content of one data file against that of another. However, the Colorado legislature has failed to allocate funds for continuing the CHSS functions, and it is obvious to my colleagues and me that replicating the physician inventory process will entail substantial costs in terms of dollars and staff time being incurred by SEARCH because of the absence of previously available CHSS data. Physician response to the annual CHSS survey in Colorado has been excellent, and careful examination has shown that the CHSS program has produced a precise description of physician manpower practicing in medically underserved Colorado counties. Failure on the part of State legislators nationwide to recognize that CHSS can provide a needed service could result in a serious loss of opportunity to obtain economically the accurate data required for physician manpower needs assessment.

References

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SYNOPSIS

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Maldistribution with respect to medical practice location and specialty continues to present barriers to quality care for many Americans. Residents of rural communities in Colorado often lack access to health care services appropriate in number and nature to their needs. A valid determination of the severity of inaccessibility of medical care is a prerequisite to effective programming for alleviating the problem. Any such needs assessment must be predicated on the use of a reliable, detailed physician manpower data base. Physician data used in evaluating the adequacy of health care delivery systems serving small or sparsely populated rural areas have traditionally proved inadequate, causing loss of credibility in the findings derived from those efforts. A concerted attempt was made in rural Colorado to establish a physician inventory for identifying health manpower shortage areas and assessing the degree of medical underservice. This undertaking was organized and directed by staff members of the Statewide Educational Activities for Rural Colorado's Health (SEARCH) program, the area health education center program of the University of Colorado Health Sciences Center. Cooperative Health Statistics System (CHSS) physician data, collected in an annual survey conducted by the Colorado Department of Health, were determined to be exceptionally accurate in describing the physician manpower practicing in the State's federally designated medically underserved counties. CHSS proved to be an outstanding source of physician data upon which small area manpower needs assessment can be based for the purpose of designating medically underserved or health manpower shortage areas.