

SAMPLING PRENATAL CARE PROVIDERS FROM A FRAME OF PHYSICIANS

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1. INTRODUCTION

The national Centers for Disease Control (CDC) is interested in mounting a national prospective health survey of women during pregnancy and the early childhood of their offspring. The goals of the survey would include measuring rates of maternal morbidity and profiling aspects of prenatal health care.

Sampling women early in pregnancy proved to be problematic (Kalsbeek et al., 1987; Sanders and Kalsbeek, 1990). An approach in which pregnant women are reached through a sample of prenatal care providers was investigated and ultimately recommended.

Physician-Based Provider Sampling

The selection process under this design is done in two sampling stages. In the first stage, a disproportionately allocated sample of currently practicing physicians is randomly chosen from a national list available from the American Medical Association's (AMA) Physician Masterfile (Daigle, 1986). It should be noted that a sample of contiguous county groups preliminary to sampling physicians could be done to reduce travel cost, although this would add a third stage to the sample and reduce the statistical effectiveness of the sample.

In the second stage, a random sample of one-week enrollment periods is separately chosen for each selected physician. Those physicians are asked to list all settings at which they provide prenatal care. The same set of enrollment periods is applied to each place the physician lists, and a sample of pregnant women is identified during the enrollment periods.

2. METHODS

The ideal list frame for the national study would consist exclusively of currently practicing prenatal care physicians. No such list presently exists. The list of physicians available through

the AMA was thought to be a reasonable option.

One aspect important to the design is the willingness of the physician to report his or her linkages to health care settings in which prenatal care is delivered. These would include places where he or she provides prenatal care in person, supervises prenatal care delivery by another health care professional, or provides consultation or supervision to a health care professional who has his or her own practice. Of particular concern are the public sector prenatal care settings (e.g., local health department prenatal care clinics) where low SES women who might not otherwise receive prenatal care would have a chance to be included in the study.

In order to assess the proposed sampling design, we set five objectives for our study:

- (i) To estimate the AMA list coverage rates, defined as the proportion of eligible prenatal care physicians who are on the AMA list;
- (ii) To estimate the proportion of physicians on the AMA list who provide prenatal care.
- (iii) To profile the types of ancillary practices to which AMA-listed physicians are linked (i.e., private practice, public health department, HMO, hospital, etc.);
- (iv) To estimate the proportion of AMA-listed physicians who are linked to one or more ancillary prenatal care setting; and
- (v) To estimate the proportion of linked settings that AMA-listed physicians can/will report when asked, including the settings in which the physician is first discovered in the study.

Sites

A site consists of a pair of counties, one rural and one urban, in close proximity to each other. The sites were selected based on poverty level, geographic location, malpractice rates, demographic features, and operational feasibility in an effort to gain some amount of diversity. The three sites chosen were Durham and Chatham counties in North Carolina, including the City of Durham; Wayne and Monroe

Counties in Michigan, including the City of Detroit; and Hennepin and Wright Counties in Minnesota, including the City of Minneapolis.

AMA Physician Frame

A subset of the AMA Masterfile of physicians was obtained. Specifically requested were all currently practicing medical doctors (MDs) and doctors of osteopathy (DOs) who list general practice, family practice, obstetrics-gynecology (OB-GYN), obstetrics (OB) or maternal-fetal medicine as their primary or secondary specialties and whose mailing address is in one of the selected counties. Both civilian and military practitioners are included. The breakdown by primary specialty of the AMA list of physicians is shown in table 2.1.

Data Collection Procedures

In order to estimate the coverage of the AMA list, we needed a complete list of prenatal care physicians at the three sites. The method used to accomplish this was snowball listing (Kish, 1965). In this study, the core of the snowball was the list of AMA physicians that met the criteria above. In the North Carolina site, the core also included nurse practitioners, certified nurse midwives, and physician's assistants listed at health departments, the state board of medical examiners, and the state board of nursing.

The instrument was intended to confirm the eligibility of the health care provider (HCP) to be in the study and to gather information about other prenatal practices and HCPs. The instrument asked the HCP if he/she practiced prenatal care, if he/she practiced in the study counties, and the type of practice at which he/she worked (private, HMO, hospital, etc.). For the snowball part of the study, the HCP was asked to identify other prenatal care HCPs at his/her primary practice and at other practices in the eligible counties.

To see what practices would be identified in the proposed design, physicians were asked to identify all the places they practice and any HCPs in the target counties to whom they provide standing orders or supervision (and those practices). To identify any practices not reported by physicians in the proposed design, non-physicians were asked to identify physicians who supervise them or provide them with standing orders. These two were "linkage" questions.

Calling and mailing procedures differed somewhat among the three sites. Changes were made as problems arose. The first site contacted was Minnesota where questionnaires were mailed individually to each core physician (found on the subset of the AMA list). If a physician failed to return the questionnaire, an interviewer completed the questionnaire over the phone with a member of the physician's office staff, usually the office manager. But many offices had several prenatal care physicians and so were contacted repeatedly. The questionnaire for the Minnesota physicians did not include the question about the physician's other practices, so the offices were called again. At this time, the interviewer also asked for the names of any other prenatal care providers in the office and completed the questionnaire over the phone for them.

In North Carolina and Michigan, the core HCPs were grouped by office address before calling or mailing was done to reduce the number of calls per office. An interviewer called each office and asked for the names of all prenatal care providers at that site. The interviewer then solicited the help of the office manager to distribute questionnaires to those HCPs and later to collect and return them. If the office manager agreed, we sent all the questionnaires for that office to him or her. A gift basket was later sent to the office manager as an incentive. Follow up calls were made to encourage the office manager to return the completed questionnaires. If this was impossible, the interviewer completed a questionnaire for each HCP over the phone through the office manager.

Response

Of the 1432 physicians on our AMA list, 205 could not be located. A physician was not eligible to respond if he or she was retired, deceased, or away for the study period. The upper bounds of response rates for Minnesota, Michigan, North Carolina, and overall are 98%, 99%, 97%, and 98% respectively. The lower bounds are 89%, 77%, 82%, and 83% respectively. Response rates that estimate the proportion of eligible physicians among those not located are 89%, 78%, 82%, and 84% respectively (CASRO Task Force on Completion Rates (1982)). These rates are high, mainly due

TABLE 2.1: Total counts by site for primary specialty of AMA physicians

	Michigan	Minnesota	North Carolina
Overall	547	702	182
Obstetrics, OB/GYN	244	174	74
Family Practice	177	452	94
General Practice	102	62	5
Gynecology	13	6	6
Maternal and Fetal Medicine	9	5	2
Reproductive Endocrinology	2	3	1

TABLE 2.2: Results for AMA-listed physicians

	Michigan	Minnesota	North Carolina
HCP not a Prenatal Care Provider or not in Eligible County, No Questionnaire Sent	194	104	76
HCP not Practicing (Retired, Deceased or Away for Study), No Questionnaire Sent	16	33	4
HCP not Found, No Questionnaire Sent	115	63	27
HCP or Office Staff Refused to Participate, No Questionnaire Sent	6	13	5
Questionnaire Completed by HCP, HCP Provides Prenatal Care*	69	207	34
Questionnaire Completed over Phone by Staff, HCP Provides Prenatal Care*	124	65	28
Questionnaire Completed by HCP, HCP does <i>not</i> Provide Prenatal Care*	1	213	9
Questionnaire Completed over Phone by Staff, HCP does <i>not</i> Provide Prenatal Care*	22	4	0
Total	547	702	183

* In Eligible Counties

TABLE 3.1: Total counts and values for the proportion of eligible prenatal care physicians who are on the AMA list

	Eligible Prenatal Care Physicians On AMA List	Eligible Prenatal Care Physicians	Proportion of Eligible Prenatal Care Physicians On AMA List
Overall	527	950	0.555
Michigan Site	193	444	0.435
Minnesota Site	272	403	0.675
North Carolina Site	62	103	0.602
Primary Practice			
Private Practice / HMO	222	330	0.673
Medical School / Hospital	152	399	0.381
Public Health Facility / Other	7	74	0.095
Unknown	146	147	0.993

to the fact that office staff answered on behalf of physicians in many instances. Also, response rates include cases where an interviewer determined, without sending a questionnaire, that an HCP does not provide prenatal care in one of the selected counties.

3. ANALYSIS AND FINDINGS

Objective (i) (See Table 3.1)

Overall, of the 950 physicians found to practice prenatal care, 527 (55%) were listed on our subset of the AMA list. In order to determine why 423 physicians were *not* on the list, we requested a name match of 108 of those physicians against the entire AMA list. Forty of the 108 names were not found by this match. This may be due to problems with using a name match or a coverage problem with the AMA list. Sixty eight of the 108 physicians were found on the AMA list in this match. Forty four of those physicians had addresses in counties other than

our site counties and/or graduated in 1992, after the original list was obtained. The other twenty four physicians met the original criteria for inclusion. Either they were omitted due to error or those physicians changed their AMA addresses after the original list was compiled.

This suggests that, in order to increase coverage, the frame list for the study should also include physicians whose addresses are in counties surrounding the target counties. If those physicians are included and the AMA list is up to date, we would expect to capture about 83% of the physicians practicing in the target counties.

Objective (ii) (See Table 3.2)

The proportion of physicians on the AMA list who were found to provide prenatal care is .37 and varies little between the sites. As would be expected, the rates for OB/GYN and maternal fetal medicine/reproductive endocrinology are higher than overall rates. It should be noted that

TABLE 3.2: Total counts and values for the proportion of physicians on the AMA list who provide prenatal care

	AMA Physicians Who Provide Prenatal Care	AMA Physicians	Proportion of AMA Physicians Who Provide Prenatal Care
Overall	527	1431	0.368
Michigan Site	193	574	0.336
Minnesota Site	272	702	0.387
North Carolina Site	62	182	0.341
Primary Specialty			
OB / GYN	318	517	0.615
General Practice	6	169	0.036
Family Practice	189	723	0.261
Other*	14	22	0.636
Present Employment			
Private Practice	278	806	0.345
Medical School / Hospital	160	335	0.478
Government	28	84	0.333
Unknown	61	206	0.296
Graduated Since 1983	207	462	0.449
Graduated Before 1983	320	969	0.330

* Other includes maternal and fetal medicine and reproductive endocrinology

TABLE 3.3: Distribution of types of ancillary practices reported by AMA prenatal care physicians

		No. of Reported Practices	Private / HMO	Medical School / Hospital	Public Health Facility / Other
Without Duplication	Overall	80	0.525	0.387	0.088
	Michigan Site	29	0.276	0.621	0.103
	Minnesota Site	47	0.724	0.255	0.021
	North Carolina Site	4	0	0.250	0.750
With Duplication ¹	Overall	249	0.546	0.398	0.056
	Michigan Site	83	0.217	0.723	0.060
	Minnesota Site	154	0.766	0.227	0.007
	North Carolina Site	12	0	0.333	0.667
	Primary Specialty				
	Obstetrics / Gynecology	183	0.547	0.404	0.049
	General Practice/Family Practice	58	0.603	0.328	0.069
	Other ²	8	0.125	0.750	0.125
	Present Employment				
	Private Practice	144	0.701	0.229	0.069
	Medical School / Hospital	55	0.109	0.855	0.036
Government	19	0.579	0.421	0.0	
Unknown	31	0.581	0.355	0.064	
Graduated Since 1983	95	0.400	0.558	0.042	
Graduated Before 1983	154	0.636	0.299	0.065	

NOTE: Row proportions sum to 1.

¹Duplication of an office was allowed if more than one physician had ancillary links to that office.

²Other includes maternal and fetal medicine and reproductive endocrinology.

physicians in the latter category comprised 1.5% of the original AMA list. Very few (3.6%) of the AMA-listed general practitioners were found to practice prenatal care. AMA physicians who graduated more than 10 years ago had a lower rate than those who graduated more recently.

Objective (iii) (See Table 3.3)

Ancillary practices are places a physician works other than his or her primary practice. Michigan and Minnesota ancillary offices seem to

be distributed differently with respect to office type. The majority of Michigan ancillary offices are medical school/hospital while the majority of Minnesota offices are private/HMO.

Although, the proportion of reported ancillary practices is low for public health facilities, the reporting of ancillary prenatal care practices does span the full spectrum of prenatal care providers, both public and private. This is crucial since one of the concerns at the outset of

TABLE 3.4: Total counts and values for proportion of AMA prenatal care physicians with ancillary practices

	AMA Prenatal Care Physicians With Ancillary Practices	AMA Prenatal Care Physicians	Proportion of AMA Prenatal Care Physicians With Ancillary Practices
Overall	111	527	0.211
Michigan Site	57	193	0.295
Minnesota Site	47	272	0.173
North Carolina Site	7	62	0.113
Primary Specialty			
Obstetrics / Gynecology	81	318	0.255
General Practice / Family Practice	26	195	0.133
Other*	4	14	0.286
Present Employment			
Private Practice	46	278	0.165
Medical School / Hospital	41	160	0.256
Government	8	28	0.286
Unknown	16	61	0.262
Graduated Since 1983	55	218	0.252
Graduated Before 1983	56	309	0.181

* Other includes maternal and fetal medicine and reproductive endocrinology

TABLE 3.5: Total counts and values for the proportion of physician practices that a physician will report

	Practices that a Physician Reports	Total Physician Practices	Proportion of Physician Practices that a Physician Reports
Overall	744	853	0.872
Michigan Site	251	313	0.802
Minnesota Site	416	460	0.904
North Carolina Site	77	80	0.963
Primary Specialty			
Obstetrics / Gynecology	477	557	0.856
General Practice / Family Practice	245	273	0.897
Other*	22	23	0.957
Present Employment			
Private Practice	421	469	0.898
Medical School / Hospital	190	231	0.823
Government	44	55	0.800
Unknown	89	98	0.908
Graduated Since 1983	290	342	0.848
Graduated Before 1983	454	511	0.888

* Other includes maternal and fetal medicine and reproductive endocrinology

our research was that a physician-based approach might not fully tap into the public sector.

Objective (iv) (See Table 3.4)

The proportion of AMA-listed physicians found to have ancillary practices was 21%. It was highest among physicians at the Michigan site and lowest among those in North Carolina and varied little except in categories with few physicians. This proportion is probably an underestimate since much of the reporting in this study was done by office staff who might not know about a physician's other practices, especially if the physician was one of many in that office.

Objective (v) (See Table 3.5)

The rate of AMA physician reporting of his or her other practices was high. Overall, 87% of

physician links to practices that we found were reported by the physician (or by office staff). If there are physician-to-practice links that were missed by this study, the proportion of reported practices would be lower.

4. DISCUSSION

While the findings from this study do not preclude the potential efficacy of the physician-based provider sampling design for a national prenatal care survey, they do suggest that important modifications to the strategy may be necessary. First, county groupings which would be the primary sampling units (PSUs) for the national study should be chosen so that the highest possible percentage of physicians will have their residence and offices located within the grouping. In urban centers this might mean

using Metropolitan Statistical Areas (MSAs) as PSUs, where each MSA typically include the central city portions of the larger cities as well as neighboring suburbs. The standard practice of grouping several neighboring counties might be used in rural areas.

Second, ineligibles on the AMA frame might be eliminated in two ways. One is to drop general practitioners, whose eligibility rate is low and who make up a small percentage of prenatal care providers. The other is to telephone a sample of physicians from the AMA list and determine their eligibility status, then sample from those found to be eligible.

Finally, our findings clearly confirm the need to link to physicians' ancillary practices if a physician-based provider approach is followed to sample women during pregnancy (Table 3.4). While the reasons for our inability to obtain a complete reporting of such practices from these physicians is not clear, it is clear that every effort must be made to obtain this information effectively from physicians during the recruitment part of the national study.

So long as there remains the need to mount an effective national prospective study of prenatal care, a physician-based provider approach should be considered as a plausible option for sampling women during pregnancy. We have seen in this portion of the study that, while somewhat complicated to implement, this approach succeeds in adequately covering the population of prenatal care providers, an essential feature to any viable approach. However, more research is needed into ways in which this approach might be effectively implemented on a national scale.

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