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Online Supplementary Material

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Appendix 1. Methods and Selected Results

Patient Record Form

This form (Appendix 1, Figure 1) was used to record all data about individual patient visits. It is a modified version of the 1997-1998 National Ambulatory Medical Care Survey (NAMCS) patient record form.[1] Kentucky Ambulatory Network (KAN) modifications are described in the main article.

Participant Eligibility

To be eligible for participation in this study, each clinician had to meet these criteria as of December 1, 2001: (1) be in the KAN database of members, or referred to us by a member, and (2) be a community-based clinician practicing primary care during the time of data collection.

Details on Sampling of Visits

Participation was facilitated by allowing practices to choose 2 nonconsecutive weeks preferable for them for data collection. Any calendar month was limited to 4 practices collecting data to spread data collection as evenly as possible throughout the year. The steering committee decided that 25 was the maximum number of patient records that we should request per clinician per week. Selection bias was minimized through systematic sampling based on a set ratio of patient visits, calculated using the target of 25 visits recorded per clinician per week, and the expected number of patient visits per week to the participating clinicians in a practice. For example, if 3 clinicians at a practice participated, and they estimated collectively seeing 300 patients per week, our goal wold be 75 (3×25) completed patient records from that practice during each of their weeks of data collection; 1 of every 4 patients visiting each clinician each day. We advised each practice to have a clinic staff member place a patient record form on every Xth patient chart. If a given clinician were in the office for less than the whole week, he or she would still collect data at the prespecified ratio when there.

The study materials facilitated practice participation. Our study manual was a single-page double-sided laminated tool. The data collection forms were printed on card stock with serial numbers. Each patient record form included a tear-off stub that stayed with the practice. In addition to the study serial number, the stub had the patient's medical record number so that, if necessary, the research team could contact the practice about unclear or missing data. In fact, we decided not to request chart reviews for missing data, considering the potential cost in goodwill to be too high for data of uncertain quality. (KAN staff and investigators at the university did not have consent to review identifiable patient records.) No data were collected electronically for this study.

Coding Details

Patient record forms were coded according to the methods used by NAMCS.[1,2] Reasons for visits were coded using a system devised especially for NAMCS[3]; International Classification of Diseases, Ninth Revision (ICD-9) diagnosis codes were used, with diagnoses clustered according to NAMCS,[2,4] and medications were coded using the Centers for Disease Control and Prevention (CDC) Ambulatory Care Drug Database system.[5] Problems with legibility were resolved through consensus of the study coordinator, the network director-principal investigator, and a research assistant.

Assurance of Confidentiality – All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purpose of the survey and will not be disclosed or released to other person or used for any other purpose withour consent of the individual or establishment in accordance with Sec. 308(d) of the PHS Act (42 USC 242m).

CLINICIAN NUMBER _____

KAN Replication of NATIONAL AMBULATORY MEDICAL CARE SURVEY
PATIENT RECORD

1. DATE OF VISIT

_____/_____/_____
Month Day Year

2. DATE OF BIRTH

_____/_____/_____
Month Day Year

SEX

1 ___ Female

2 ___ Male

Is Patient pregnant?

1 _ Yes

2 _ No

3 _ Unknown

4. RACE

1 __ White
2 __ Black
3__ Asian/Pacific Islander
4__American Indian/Eskimo/ Aleut

5. ETHNICITY
1 __ Hispanic origin
2__ Not Hispanic

6. WAS AUTHORI-ZATION REQUIRED FOR CARE ?

1__ Yes

2__ No

3__ Unknown

7. PRIMARY EXPECTED SOURCE OF PAYMENT FOR THIS VISIT.
1__Private Insurance
2__Medicare
3__Medicaid
4__Worker's Compensation
5__Self-pay
6__No charge
7__ Other
8 Unknown

8. ARE YOU THE PATIENT'S PRIMARY CARE PHYSICIAN?

1 __ Yes

2 __ No

3 __ Unknown

9. HAVE YOU OR ANYONE IN YOUR PRACTICE/ DEPARTMENT SEEN PATIENT BEFORE?

1 __ Yes, established patient

2__ No, New patient

10. HEIGHT

_____ inches
(without shoes)

11. WEIGHT

_____ lbs.
(without coat)

12. DOES THIS PATIENT CURRENTLY USE TOBACCO?

1__ Yes
2__ No
3__ Unknown

IF YES,
Check all that apply.

1__ smoking cigarettes
2 __ smoking cigars
3 __Oral tobacco
4 other

13. PATIENT'S COMPLAINT(S), SYMPTOM(S) OR OTHER REASON(S) FOR THIS VISIT
Use the patient's own words.

1. Most Important:_____
_____
_____

2. Other:_____
_____
_____
_____

3. Other:_____
_____
_____
_____
_____

4. Other:_____
_____
_____
_____

14. MAJOR REASON FOR THIS VISIT

1 __ Acute problem

2__ Chronic problem, routine

3 __ Chronic problem, flareup

4 __ Pre- or post surgery/injury followup

5__ Non-illness care (e.g., routine prenatal general exam., well baby)

15. IS THIS VISIT RELATED TO INJURY OR POISONING? Refers to all types of injury or poisoning, including adverse drug experiences, medical misadventures, etc.

1 __ Yes (Answer a, b, c, and d.) 2 __ No (Skip to item 16)

a. Place occurrence
1 __ Residence
2__ recreation/ sports areas
3__ Street or highway
4__ School
5__ Other public
6__ Industrial places
7__ Other
8__ Unknown

b. Is this injury intentional?
1 __ Yes (Self-afflicted)
2__ Yes (assault)
3__ No, unintentional
4__Unknown

c. Is this injury work related?

1__ Yes 2 __ No 3 __ Unknown

d. Cause of injury Describe events that preceded injury (e.g. reaction to penicllin, wasp sting, driver in motor vehicle traffic accident involving collision with parked vehicle, shot with a handgun during a brawl, etc.)

_____
_____
_____
_____

16. PHYSICIAN'S DIAGNOSES FOR THIS VIST
As specifically as possible, list diagnoses related to this visit including chronic conditions (e.g. depression, obesity, asthma, etc.)

1. Primary Diagnosis: _____
_____

2. Other: _____
_____

3. Other: _____
_____

4. Other: _____
_____

5. Other: _____
_____

6. Other: _____
_____

17. WAS CHRONIC PAIN ADDRESSED THIS VISIT? 1 __ Yes 2__ No

18. DID DEPRESSION or ANIXIETY CONTRIBUTE TO THIS VISIT? 1__ Yes 2__ No

19. DIAGNOSTIC/SCREENING SERVICES Check all ordered or provided at this visit today.

1 __ NONE

EXAMINATIONS:
2__ Breast
3__ Pelvic
4__ Rectal
5__ Skin
6__ Visual acuity
7__ Glaucoma
8 __ Hearing

TESTS AND MEASUREMENTS:
9__ Blood pressure
10 __ Strep test
11__ Pap test
12__ Urinalysis
13__ Pregnancy test
14__ PSA
15__ Blood lead level
16__ Cholesterol measure
17__ HIV serology
18__ Other STD test
19__ Hct/Hgb
20__Blood glucose
21__ Other Blood test
22__ EKG

IMAGING:
23__ X-Ray
24__ CAT scan/MRI
25__ Mammography
26__ Ultrasound

ALL OTHER:
27 _____
_____
_____

20. THERAPEUTIC AND PREVENTIVE SERVICES
Check all ordered or provided at this visit. Exclude medications. Include referrals.

1__ NONE

COUNSELING/EDUCATION:
2__ Diet/nutrition
3 __ Exercise
4__ HIV/STD
5__ Family planning/ contraception
6__ Prenatal instructions
7__ Breast self exam
8 __ Tobacco use/exposure
9 __ Growth/development
10__ Mental health
11__ Stress management
12__ Skin cancer prevention
13 __ Injury Prevention

OTHER THERAPY:
14 __ Psychotherapy
15 __ Physiotherapy

ALL OTHER: Specify
16 _____
_____

21. AMBULATORY SURGICAL PROCEDURES

__ NONE

List up to 2 surgical procedures actually performed at this visit. Include biopsy.

1_____
_____

2_____

22. MEDICATIONS/INJECTIONS List names of up to 9 medications that were ordered, supplied, administered, or continued during their visit. Include prescriptions and OTC medications, immunizations, allergy shots, and anesthetics. Use brand or generic names. DO NOT INCLUDE dosages.

____ NONE

Check the [ ] next to drug name if is a new prescription today.

1 [ ] _____ 4 [ ] _____ 7 [ ] _____
2 [ ] _____ 5 [ ] _____ 8 [ ] _____
3 [ ] 6 [ ] 9 [ ]

23. PROVIDERS SEEN THIS VISIT Check all that apply.

1__ Physician
2__ Physician Assistant
3__ Nurse Practitioner
4__ Nurse Mid-wife
5__ R.N.
6__ L.P.N.
7__ Medical/nursing assistant

24. TIME SPENT WITH PHYSICIAN

If not seen by physician, enter zero

_____
Minutes

Data Management

Records were kept of all survey forms dispensed, and their return was tracked using serial numbers. All data were entered twice, and any discrepancies between duplicate entries were resolved by reference to the original patient record forms. Descriptive analyses and tests of association between categorical variables were done using SAS Version 8.2 (SAS Institute, Cary, NC). Comparisons of our data with data from other studies were made using *z* tests for one-sample proportions with α set at .05. Bonferroni adjustments were made for multiple comparisons.

Specific Analyses

Clinician Demographics

Clinician demographics were compared with limited analyses of general and family practice available from the American Academy of Family Physicians (AAFP).[6]

Visit Data

We compared our data with the most recently published NAMCS reports that included analyses of interest for general and family practice,[2] and other data published by the CDC.[7,8] NAMCS data analyses published since 1999 have not been stratified by specialty, except for a few restricted data fields, such as the distribution of all visits. Limited analyses of NAMCS 2000 for general and family practice are available from the American Academy of Family Physicians.[6] Those data on patient demographics and principal diagnoses were very similar to earlier NAMCS data published by the CDC.

Clustering

Our data from the patient record forms include practitioner and practice site codes. We adjusted our statistical test of a hypothesized association between body mass index (BMI) and counseling in KAN data for clustering within practice. We did this by computing the *intracluster* correlation coefficient (ICC), hence the design effect, and using it to adjust the chi-square test of association between the 2 variables.[9] We were unable to make similar adjustments for the comparisons between KAN data and other data (ie, NAMCS, National Health and Nutrition Examination Survey [NHANES], etc), however, because we lacked any information on clustering for those other datasets, which is further explained below.

In multisite research, including PBRN research, clustering of data supplied by each practice (or even by each clinician) is inevitable; its significance depends on the aims of the research and what types of inferences are made from the data. In general, clustered samples are not as statistically efficient as simple random samples for testing hypotheses. If the variance of a characteristic is lower among patients within a practice (cluster) than it is across the whole pool of patients from all of the participating PBRN practices, then the power to test hypotheses related to that characteristic in the pooled data will be reduced. Inferential statistics testing for significant associations or between-group differences must be adjusted to account for the reduced power inherent to this situation using the intracluster correlation coefficient, or ICC. The ICC accounts for the relative magnitudes of within-cluster-variance and between-cluster variance. If data from a PBRN are statistically compared with similar data from another source (eg, null hypothesis = no difference in obesity prevalence between KAN patients and NAMCS patients), then ICC calculations are indicated for maximum accuracy in the estimation of significance levels. To do so, however, one must be able to calculate the ICC for both data sets. No information on clustering was available for the data sets with which we compared KAN data. By contrast, because the correlation of counseling with BMI involved only KAN data, we were able to adjust for the clustering of BMI within practices and the clustering of counseling rates within practices.

RESULTS

This appendix is restricted to more detailed expositions of the results summarized in the main article that were selected to illustrate the usefulness of practice content data.

Participating Clinician Characteristics

Characteristics of Participants and Nonparticipants

Practice locations were designated as rural or urban based on designations compiled by the Office of Rural Health Policy (US Health Resources and Services Administration). Our ability to compare participants with nonparticipants was limited, because only name, contact information, and an expressed interest in being a KAN member were required for membership at that stage in our development (we have since realized the importance of requiring more information for membership registration).

Eighty-two clinicians were eligible: 56 participated and 26 did not. Among the 56 participating clinicians, 37.5% (n = 21) were female compared with 11.5% (n = 3) among nonparticipants (P = .016 for difference). Seventy-three percent of participants (n = 41) practiced in a rural county compared with 61.5% (n = 16) of nonparticipants (P = .285 for difference).

Appendix 1, Table 1. Characteristics of Study Participants

Characteristic	KAN NAMCS-Plus %	AAFP Database[6] Kentucky %	AAFP Database[6] USA %
Sex			
Female	38.2	NR	26.5*
Male	61.8	NR	73.5*
Location			
Rural	74.5	46.2*	24.6*
Urban	25.5	53.8*	75.4*
Practice size			
Solo	27.0	27.0	20.4
2-person	10.8	12.3	9.3
2-person primry care	40.5	43.8	46.5
Multispecialty	21.6	17.0	23.9
Practice ownership			
Provider owned	36.4	NR	50.9*
Not provider owned	63.6	NR	49.1*

AAFP = American Academy of Family Physicians; KAN = Kentucky Ambulatory Network; NAMCS = National Ambulatory Medical Care Survey; NR = not reported.

* $P \leq .05$ for difference between KAN and AAFP.

Participant Characteristics Compared With AAFP Member Database

In Appendix 1, Table 1, selected characteristics of the participating clinicians are compared with national data on members of the AAFP, the most complete database of primary care physicians that we could find.[6] These demographic data for primary care clinicians were not available from NAMCS. KAN clinicians differed from those in the AAFP database, with KAN having higher percentages of women, physicians in rural practices, and provider ownership. These clinicians were similar to those in the AAFP database in terms of practice group size.

Appendix 2, Table 2a. Distribution of Completed Patient Records Forms (Visit Data) Among Participating Practices and Clinicians, by Practice Characteristics

Characteristic	No. (Range)
Total patient record forms completed	2,228
Practices	24
Clinicians	56
Patient records per clinician, mean	39.8 (5-75)
Patient records per clinician, median	45
Patient records per practice, mean	92.8 (26-279)
Patient records per practice, mean	66
Participating clinicians per practice, mean	2.33 (1-7)

Appendix 2, Table 2b. Distribution of Completed Patient Record Forms (Visit Data) Among Participating Practices and Clinicians, by Clinicians per Practice

Clinicians per Practice	Number of Practices	Patient Records Returned per Practice Range
1	12	26-56
2-4	10	76-202
6-7	2	226-279

Distribution of Visits Recorded on Patient Record Forms

Appendix 1,Tables 2a and b show how the completed patient record forms were distributed among clinicians and practices. We had set the target at 50 visits recorded per clinician, and the actual median was

45, partially because 10 of 56 clinicians completed only 1 week of data collection. Completed patient records were distributed according to the number of participating clinicians in the practice. The concept of clustering, and its limited application to results reported in this article are discussed in the Methods section of this appendix. Having practice codes on each patient record form will allow us to adjust for clustering in future inferential analyses of our data.

Data Completeness

All patient record forms were accounted for. Among the 2,228 patient records returned, data completeness for the 24 fields ranged from 100% to 81.3 %. The only fields with less than 90% completeness were height (87.1%) and ethnicity (81.3%). Similarly low levels of reporting ethnicity have been observed in NAMCS data, and in ASPN,[2,10] neither of which collected height data. We decided that the cost in goodwill of asking the clinicians to review patient charts and provide missing data was not worth the incremental improvement in completeness. Unlike NAMCS, we did not impute missing data.

Appendix 1, Table 3. Patient Visit Demographics

Demographic	KAN %	NAMCS[2] %	ASPN[10] %
Age			
0-14 y	16.8	15.8	19.8†
15-24 y	12.7	10.0*	10.3†
25-44 y	28.3	27.7	30.2
45-64 y	27.7	23.7*	21.0†
65-74 y	8.2	12.5*	10.2†
≥ 75 y	6.3	10.3*	8.5†
Sex			
Male	37.1	41.1*	38.8
Female	62.9	58.9*	61.2
Race			
White	95.3	84.9*	92.9†
Black	4.2	10.9*	5.3
Other	0.5	4.2*	6.8†
Ethnicity			
Hispanic	0.9	NR	5.5†
Non-Hispanic	79.4	NR	88.0†
Unspecified	19.7	NR	6.5†

KAN = Kentucky Ambulatory Network; NAMCS = National Ambulatory Medical Care Survey; ASPN = Ambulatory Sentinel Practice Network; NR = not reported.

* P ≤.05 for difference between KAN and NAMCS.

† P ≤.05 for difference between KAN and ASPN.

Visit Characteristics

Patient visit demographic characteristics are displayed in Appendix 1, Table 3.

A consultant and several KAN members suggested that we expand the number of responses possible for number of diagnoses and number of medications prescribed to improve our ability to describe the complexity of primary care. We thought that complexity of care was inadequately described by NAMCS, in which only 3 problems or diagnoses (or 6 medications) can be recorded. The results in Appendix 1, Table 4 suggest that clinicians in our network tend to handle multiple issues in a single visit, with one third of visits addressing 3 or more diagnoses, and 15% addressing 4 or more diagnoses. Also, a substantial proportion of KAN visits involved multiple medications. Four or more medications were prescribed or continued at almost one fourth of all visits; 12 % of visits had 6 or more medications. KAN visits involved more medications than NAMCS visits.

Appendix 1, Table 4. Percentage of Distribution of Visits by Number of Diagnoses and Number of Medications

	Number of Diagnoses or Medications						
Survey	0	1	2	3	4	5	6 +
Diagnoses per visit, %							
KAN	1.0	37.0	28.6	18.1	9.4	3.7	2.2
NAMCS[2*] GP/FP	NR	NR	NR	NR			
Medications per visit, %							
KAN	14.1	26.3	22.3	13.4	7.2	4.5	12.2
NAMCS[2] GP/FP	28†	31†	22	10†	5†	2†	3†

Note: Percentages may not total exactly 100 because of rounding error.

KAN = Kentucky Ambulatory Network; NAMCS = National Ambulatory Medical Care Survey; GP/FP = general physician/family physician; NR = not reported; CDC = Centers for Disease and Prevention.

* CDC-NAMCS limited number of diagnoses recorded to 3, and did not report percentage of distributions.

† *P* ≤ .05 for difference between KAN and NAMCS.

Appendix 1, Table 5 shows the distribution of BMI among nonpregnant adult visits. Seventy percent of adult visits to our network were made by overweight (30%) or obese (40%) patients. This obesity prevalence exceeds estimates based on state and national population-based data.[7,8] The decision to add height and weight measurements to our survey is a good example of clinicians' impressions and ideas leading to informative data. Their collective impression of very high prevalence of obesity among their patients was confirmed. We expect this finding to inspire and support further research in our network.

Appendix 1, Table 5. Prevalence Comparisons of Body Mass Index (BMI) Among Adults

Data Source	Percent Overweight (BMI 25-29)	Percent Obese (BMI ≥30)
KAN visits	29.7	40.2
KY BRFSS*[7]	38†	23†
US BRFSS*[7]	37†	21†
NHANES‡[8]	34†	30†

KAN = Kentucky Ambulatory Network; KY BRFSS = Behavioral Risk Factor Surveillance System; NHANES = National Health and Nutrition Examination Survey.

* The Behavioral Risk Factor Surveillance System is a random-sample telephone survey of adults supported by the US Centers for Disease Control. Data are from 2001.

† $P \leq .05$ for difference between KAN and other data source.

‡ The National Health and Nutrition Examination Survey is a population-based survey of US households that includes measured height and weight. Data are from 1999-2000.

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