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# Drug Utilization in General and Family Practice by Characteristics of Physicians and Office Visits: National Ambulatory Medical Care Survey, 1980

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## Introduction

Women play an increasing role in the provision of medical care; young physicians of both sexes enter the relatively new specialty of family practice, and physicians who have been in practice for some time tend to delay retirement. At the same time, new discoveries in medication therapy are announced with great frequency. Therefore, it is of interest to know whether a changing population of physicians affects the number and kinds of drugs prescribed. If differences by sex and age of the physician do exist, are they simply the results of the structure of the physician's practice?

In this report drug utilization statistics are presented based on the relationship of the sex of the office-based physician and the year of medical school graduation to selected visit characteristics: sex and age of the patient, status and duration of the visit, major reason for the visit, and the type of physician's practice. An examination of these data indicated that the structure of the practice was more likely to influence drug utilization than was the sex of the physician or the year of medical school graduation.

The data were gathered in 1980 by the National Center for Health Statistics by means of the National Ambulatory Medical Care Survey (NAMCS), a probability sample survey conducted annually through 1981 by the Division of Health Care Statistics. Brief information about the source of the data, sampling errors, and definitions of terms are provided in the technical notes at the end of this report. A complete description of the survey including limitations and definitions was published in *Vital and Health Statistics,* Series 13, No. 66.[1] The methodology used to collect and process the drug information is described in *Vital and Health Statistics,* Series 2, No. 90.[2]

Only physicians engaged in general and family practice were used in this analysis to control for the effect of physician specialty on the nature of drug prescription. General and family practitioners who have a doctor of osteopathy (D.O.) degree were not included because data on the age, sex, or year of the physician's medical school graduation were not available.

The Patient Record form used in the 1980 survey is reproduced in figure 1. Up to eight specific drugs, either new or continued during the visit, may be recorded by the physician in item 11, parts *a* and *b.* In order to present accurately what the physician ordered, prescribed, or provided, drug mentions used in this report are based on the physicians' entries on the Patient Record forms. These entries were brand or generic names of prescription or nonprescription drugs, though in some instances the physician recorded a therapeutic effect; for example, "allergy relief."

## Visit characteristics

Previous reports from NAMCS have demonstrated that drug utilization statistics vary widely with physician specialty and case-mix.[3–5] Therefore, when analyzing drug utilization patterns by variables such as physician sex and year of graduation, it is important to examine other factors that may contribute to differences. The data presented in tables 1 and 2 are for selected patient visit variables that could influence drug prescribing.

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Department of Health, Education, and Welfare
Public Health Service
Office of Health Research, Statistics, and Technology
National Center for Health Statistics

C No. 499932

# PATIENT RECORD
## NATIONAL AMBULATORY MEDICAL CARE SURVEY

**1. DATE OF VISIT** — Month / Day / Year

**2. DATE OF BIRTH** — Month / Day / Year

**3. SEX**
1 ☐ FEMALE
2 ☐ MALE

**4. COLOR OR RACE**
1 ☐ WHITE
2 ☐ BLACK
3 ☐ ASIAN/PACIFIC ISLANDER
4 ☐ AMERICAN INDIAN/ ALASKAN NATIVE

**5. ETHNICITY**
1 ☐ HISPANIC ORIGIN
2 ☐ NOT HISPANIC

**6. PATIENT'S COMPLAINT(S), SYMPTOM(S), OR OTHER REASON(S) FOR THIS VISIT** *[In patient's own words]*
a. MOST IMPORTANT
b. OTHER

**7. MAJOR REASON FOR THIS VISIT** *[Check one]*
1 ☐ ACUTE PROBLEM
2 ☐ CHRONIC PROBLEM, ROUTINE
3 ☐ CHRONIC PROBLEM, FLAREUP
4 ☐ POST SURGERY/POST INJURY
5 ☐ NON-ILLNESS CARE (ROUTINE PRENATAL, GENERAL EXAM., WELL BABY, ETC.)

**8. DIAGNOSTIC SERVICES THIS VISIT** *[Check all ordered or provided]*
1 ☐ NONE
2 ☐ LIMITED HISTORY/EXAM.
3 ☐ GENERAL HISTORY/EXAM.
4 ☐ PAP TEST
5 ☐ CLINICAL LAB TEST
6 ☐ X-RAY
7 ☐ BLOOD PRESSURE CHECK
8 ☐ EKG
9 ☐ VISION TEST
10 ☐ ENDOSCOPY
11 ☐ MENTAL STATUS EXAM.
12 ☐ OTHER *(Specify)* _____

**9. PHYSICIAN'S DIAGNOSES**
a PRINCIPAL DIAGNOSIS/PROBLEM ASSOCIATED WITH ITEM 6a
b. OTHER SIGNIFICANT CURRENT DIAGNOSES

**10. HAVE YOU SEEN PATIENT BEFORE?**
1 ☐ YES 2 ☐ NO
↓
IF YES, FOR THE CONDITION IN ITEM 9a?
1 ☐ YES 2 ☐ NO

**11. MEDICATION THERAPY THIS VISIT** ☐ NONE
*[Using brand or generic names, record all new and continued medications ordered, injected, administered, or otherwise provided at this vist. Include immunizing and desensitizing agents]*

| a. FOR PRINCIPAL DIAGNOSES IN ITEM 9a. | b. FOR ALL OTHER REASONS |
|---|---|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |

**12. NON-MEDICATION THERAPY** *[Check all services ordered or provided this visit]*
1 ☐ NONE
2 ☐ PHYSIOTHERAPY
3 ☐ OFFICE SURGERY
4 ☐ FAMILY PLANNING
5 ☐ PSYCHOTHERAPY/ THERAPEUTIC LISTENING
6 ☐ DIET COUNSELING
7 ☐ FAMILY/SOCIAL COUNSELING
8 ☐ MEDICAL COUNSELING
9 ☐ OTHER *(Specify)* _____

**13. WAS PATIENT REFERRED FOR THIS VISIT BY ANOTHER PHYSICIAN?**
1 ☐ YES
2 ☐ NO

**14. DISPOSITION THIS VISIT** *[Check all that apply]*
1 ☐ NO FOLLOW-UP PLANNED
2 ☐ RETURN AT SPECIFIED TIME
3 ☐ RETURN IF NEEDED, P.R.N.
4 ☐ TELEPHONE FOLLOW-UP PLANNED
5 ☐ REFERRED TO OTHER PHYSICIAN
6 ☐ RETURNED TO REFERRING PHYSICIAN
7 ☐ ADMIT TO HOSPITAL
8 ☐ OTHER *(Specify)* _____

**15. DURATION OF THIS VISIT** *[Time actually spent with physician]*
_____ Minutes

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Figure 1. Patient Record

They are presented to enhance and clarify the interpretation of drug utilization presented later. The following are noteworthy findings from tables 1 and 2 that may be factors contributing to drug use differences by sex of the physician and year of graduation from medical school.

- Female patients constituted 71 percent of visits to female physicians, compared with 60 percent of those to male physicians.
- Patients under 25 years of age accounted for 46 percent of visits to female physicians but only 29 percent of those to male physicians. Patients 45 years of age and over constituted 44 percent of visits to male physicians, compared with 34 percent of those to female physicians.
- Female physicians treated proportionately more new patients (27 percent) than males did (11 percent).
- Proportionately more visits involving nonillness care (general examinations, gynecological examinations, well-baby, and so forth) took place in female physicians' offices (25 percent) than in male physicians' offices (16 percent).
- Female physicians spent some time in face-to-face encounter with virtually all their patients, while 3 per-

Table 1. Percent distribution of office visits to general and family practitioners (M.D.) by selected visit characteristics, according to sex of physician and year of medical school graduation: United States, 1980

| Characteristic | Sex of physician | | | Year of graduation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Both sexes | Female | Male | Before 1941 | 1941–50 | 1951–60 | 1961–70 | 1971–80 |
| | Percent distribution | | | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Sex of patient** | | | | | | | | |
| Female | 60.1 | 71.2 | 59.8 | 57.1 | 59.6 | 59.9 | 61.4 | 61.8 |
| Male | 39.9 | 28.8 | 40.2 | 42.9 | 40.4 | 40.1 | 38.6 | 38.2 |
| **Age of patient** | | | | | | | | |
| Under 15 years | 14.4 | 26.9 | 14.1 | 6.7 | 12.1 | 14.0 | 16.8 | 22.0 |
| 15–24 years | 15.2 | 19.1 | 15.1 | 9.5 | 15.1 | 14.1 | 16.4 | 21.1 |
| 25–44 years | 26.7 | 20.5 | 26.9 | 22.9 | 24.8 | 26.5 | 28.1 | 31.0 |
| 45–64 years | 23.9 | 18.5 | 24.1 | 29.5 | 27.1 | 24.9 | 20.9 | 16.0 |
| 65 years and over | 19.8 | 15.0 | 19.9 | 31.4 | 20.9 | 20.5 | 17.9 | 9.9 |
| **Visit status** | | | | | | | | |
| New patient | 11.4 | 27.3 | 10.9 | 11.9 | 8.2 | 9.3 | 10.4 | 25.9 |
| Old patient, new problem | 34.3 | 25.4 | 34.5 | 26.9 | 34.2 | 35.4 | 37.7 | 30.0 |
| Old patient, old problem | 54.4 | 47.3 | 54.6 | 61.2 | 57.7 | 55.4 | 51.9 | 44.1 |
| **Major reason for visit** | | | | | | | | |
| Acute problem | 46.6 | 40.7 | 46.8 | 43.8 | 43.4 | 47.1 | 48.7 | 49.6 |
| Chronic problem, routine | 24.6 | 22.2 | 24.7 | 36.6 | 28.1 | 23.7 | 22.9 | 15.3 |
| Chronic problem, flareup | 9.1 | 8.6 | 9.2 | 7.3 | 8.3 | 9.7 | 8.8 | 10.8 |
| Postsurgery or postinjury | 3.6 | 3.4 | 3.6 | 3.5 | 3.7 | 3.8 | 3.7 | 2.4 |
| Nonillness care | 16.0 | 25.1 | 15.8 | 8.8 | 16.6 | 15.7 | 16.0 | 22.0 |
| **Duration of visit** | | | | | | | | |
| 0 minutes[1] | 2.9 | - | 3.0 | *1.0 | 2.0 | 3.9 | 3.1 | 2.5 |
| 1–5 minutes | 12.3 | *3.2 | 12.5 | 5.3 | 13.5 | 12.1 | 13.8 | 13.4 |
| 6–10 minutes | 38.8 | 29.6 | 39.0 | 30.0 | 38.3 | 41.8 | 39.7 | 34.2 |
| 11–15 minutes | 27.4 | 28.0 | 27.4 | 35.1 | 26.1 | 26.0 | 27.4 | 28.9 |
| 16–30 minutes | 16.5 | 30.5 | 16.1 | 23.0 | 18.5 | 14.7 | 14.5 | 17.7 |
| 31 minutes or more | 2.1 | 8.7 | 1.9 | 5.8 | 1.6 | 1.5 | 1.6 | 3.4 |
| **Type of practice** | | | | | | | | |
| Solo | 61.4 | 32.8 | 62.2 | 92.9 | 85.8 | 61.7 | 44.4 | 21.9 |
| Other[2] | 38.6 | 67.2 | 37.8 | 7.1 | 14.2 | 38.3 | 55.6 | 78.1 |

[1] Represents visits in which there was no face-to-face encounter between patient and physician.
[2] Includes partnership, group, and other types of practice.

Table 2. Average number of office visits per week to general and family practitioners (M.D.) by sex of physician and year of medical school graduation: United States, 1980

| Year of graduation | Sex of physician | | |
|---|---|---|---|
| | Both sexes | Female | Male |
| | Number of visits per physician per week | | |
| All years of graduation | 94 | 73 | 96 |
| Before 1941 | 60 | 43 | 61 |
| 1941–1950 | 90 | 30 | 92 |
| 1951–1960 | 111 | 87 | 111 |
| 1961–1970 | 102 | 45 | 107 |
| 1971–1980 | 81 | 54 | 85 |

cent of visits to male physicians were "0" minutes; that is, patients were treated by a staff member. Male physicians spent less than 11 minutes in 52 percent of their patient encounters; female physicians spent that amount of time in 33 percent. About 39 percent of visits to female physicians lasted 16 minutes or longer, compared with 18 percent of visits with the same duration to males.

- Visits to male physicians were more likely to be to those in solo practice than in other types of practice, while the reverse was true for females.
- In a typical work-week the average female physician saw 73 patients in the office; the average male saw 96.

- Patients under 25 years of age were more likely to visit physicians who graduated in recent years than those in practice a long time, while the reverse was true for patients 45 years of age and older (figure 2).
- Physicians who graduated after 1970 treated proportionately more new patients than physicians who graduated in earlier years did.
- Proportions of visits for routine chronic problems decreased as the year of graduation became more recent. Physicians who graduated in 1971–80 saw proportionately more patients for nonillness care than older physicians did.
- There were proportionately more visits lasting 16 minutes or longer, and fewer that were shorter than 11 minutes, to physicians who graduated before 1941 than to those who graduated in later years.
- The more recent the year of graduation, the less likely were visits to physicians in solo practice. A clear trend toward practice arrangements other than solo by more recent medical school graduates is indicated in figure 3.
- The most professionally active physicians of both sexes were those who graduated in the period 1951–60, but male physicians saw more patients in a typical work-week than females did, regardless of the year of graduation.

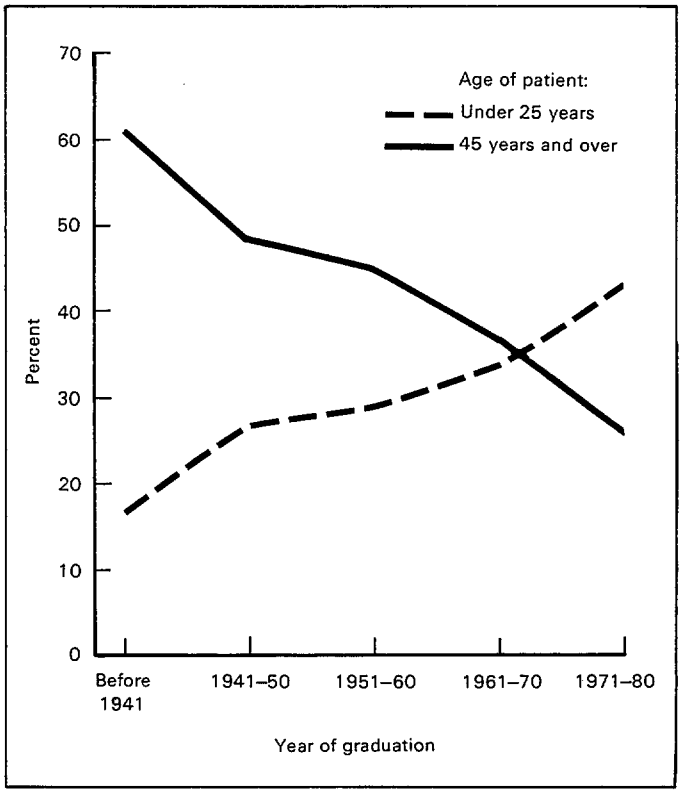


Figure 2. Percent of office visits to general and family practitioners (M.D.), by age of patient and year of medical school graduation: United States, 1980

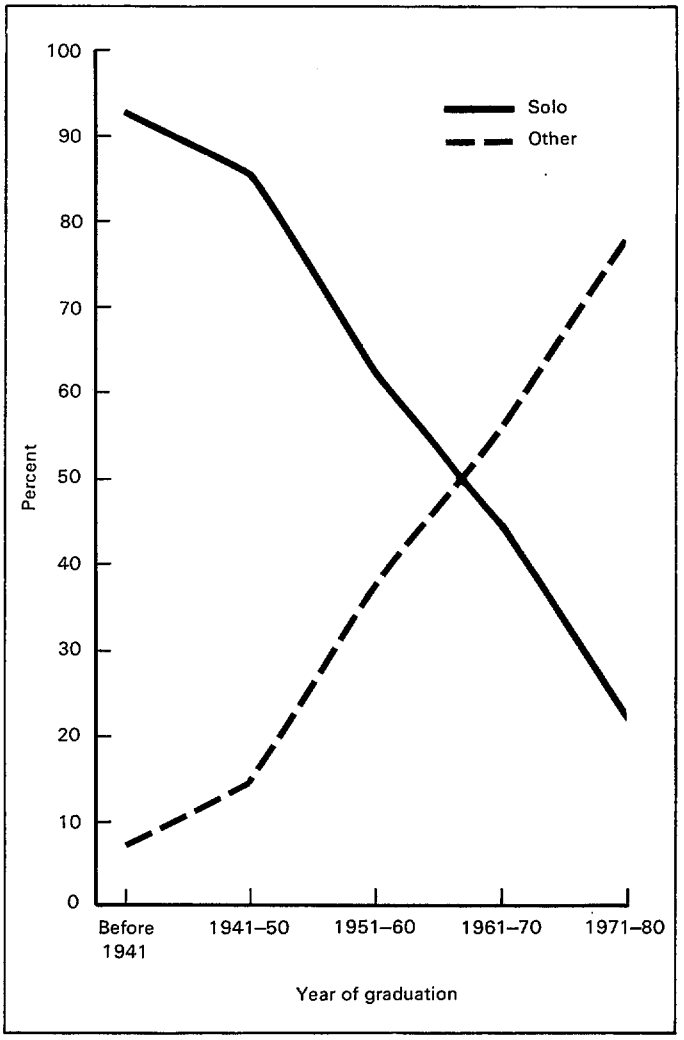


Figure 3. Percent of office visits to general and family practitioners (M.D.), by type of practice and year of medical school graduation: United States, 1980

## Drug utilization rates

Two measures of drug utilization are used in this report: the percent of drug visits and the drug intensity rate. The percent of drug visits refers to the percent of visits in which one or more drugs were ordered or provided. The drug intensity rate is the average number of drugs ordered during drug visits. It is obtained by dividing the number of drug mentions by the number of drug visits. These drug utilization rates by the sex of the physician and the year of medical school graduation (in 10-year intervals) in terms of the same practice variables used to describe the visit estimates shown in table 1 are presented in tables 3–5. The percent distribution of drug mentions by the precise number of medications is shown in table 6.

### Sex of physician

In general, differences in the utilization rates of female and male physicians were not statistically significant. Differences in rates based on the sex of the patient were also not statistically significant. Although female

Table 3. Percent of drug visits and drug intensity rate, by sex and age of patient, sex of general and family practitioner (M.D.), and year of medical school graduation: United States, 1980

| Sex and age of patient | Sex of physician | | | Year of graduation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Both sexes | Female | Male | Before 1941 | 1941–50 | 1951–60 | 1961–70 | 1971–80 |
| Sex of patient | | | | Percent drug visits[1] | | | | |
| Both sexes | 75.1 | 78.7 | 75.0 | 82.8 | 74.8 | 78.3 | 70.6 | 66.9 |
| Female | 75.9 | 76.2 | 75.9 | 85.1 | 75.2 | 79.4 | 72.0 | 65.7 |
| Male | 74.0 | 85.0 | 73.8 | 79.7 | 74.2 | 76.7 | 68.5 | 68.9 |
| Age of patient | | | | | | | | |
| Under 15 years | 71.5 | 73.9 | 71.4 | 73.5 | 68.6 | 77.1 | 69.8 | 64.1 |
| 15–24 years | 64.4 | 67.0 | 64.3 | 68.6 | 65.6 | 66.7 | 62.6 | 58.4 |
| 25–44 years | 72.2 | 76.9 | 72.1 | 81.8 | 73.5 | 74.5 | 66.6 | 67.1 |
| 45–64 years | 80.1 | 84.8 | 80.0 | 82.9 | 78.1 | 83.4 | 76.4 | 73.3 |
| 65 years and over | 83.9 | 97.2 | 83.6 | 89.6 | 82.2 | 85.8 | 78.3 | 80.5 |
| Sex of patient | | | | Rate per drug visit[2] | | | | |
| Both sexes | 1.92 | 2.01 | 1.92 | 1.91 | 1.84 | 2.05 | 1.87 | 1.64 |
| Female | 1.97 | 2.11 | 1.96 | 1.97 | 1.85 | 2.11 | 1.94 | 1.65 |
| Male | 1.85 | 1.79 | 1.85 | 1.81 | 1.83 | 1.96 | 1.75 | 1.63 |
| Age of patient | | | | | | | | |
| Under 15 years | 1.59 | 1.85 | 1.58 | 1.84 | 1.53 | 1.63 | 1.60 | 1.47 |
| 15–24 years | 1.58 | 1.71 | 1.57 | 1.55 | 1.47 | 1.74 | 1.47 | 1.48 |
| 25–44 years | 1.75 | 1.77 | 1.75 | 1.72 | 1.67 | 1.90 | 1.65 | 1.55 |
| 45–64 years | 2.05 | 2.21 | 2.05 | 1.92 | 1.89 | 2.22 | 2.02 | 1.87 |
| 65 years and over | 2.36 | 2.53 | 2.36 | 2.12 | 2.31 | 2.46 | 2.50 | 2.10 |

[1] A visit in which one or more drugs were ordered.
[2] Drug mentions divided by number of drug visits.

physicians treated proportionately more female patients than male physicians did, they used drugs to treat female patients at about the same rate as their male counterparts.

Male physicians had a higher proportion of patients over 65 years of age than female physicians did, but proportionally fewer of those visits resulted in drug therapy than those to female physicians (84 percent of visits to male physicians, compared with 97 percent to females). However, the average number of drugs (drug intensity rate) prescribed during those visits was about the same for all physicians. Similarly, the drug intensity rates for patients under 25 years of age, who were more likely to be treated by female physicians than by males, were not statistically different by sex of the physician.

Regardless of the sex of the physician, patients seen before were more likely to have drug visits than new patients were. However, male physicians ordered more drugs during drug visits by returning patients than by new patients. The drug intensity rates for new and returning patients did not differ significantly when the physician was a female. However, when the major reason for the patient's visit was a routine chronic problem, about 91 percent of visits for such care given by female physicians resulted in a drug prescription, compared with 84 percent of those by male physicians, a statistically significant difference.

Female physicians also tended to prescribe one or more drugs proportionately more often during nonillness visits (69 percent) than male physicians did (49 percent). The drug intensity rates for the routine care of chronic problems and for nonillness care were also higher for female physicians than for males. These results may be due in part to the relatively larger number of female patients seen by female physicians. Also, a higher proportion of female physicians' visits were for examinations (23 percent) than male physicians were (15 percent). Chronic genitourinary problems treated during women's office visits usually require medication therapy while visits for gynecological examinations are likely to include contraceptive prescription. Vitamins are commonly used for prenatal care, which is a leading diagnosis in the nonillness category.

For both female and male physicians the lowest drug intensity rate was associated with very short visits (less than 6 minutes). Otherwise, the average number of drugs prescribed varied only slightly with the longer duration of the visit. Female physicians were more likely than males were to prescribe at least one drug when the visits lasted from 11 to 30 minutes. Because female physicians had a higher proportion of visits with a duration of 16 minutes or more, it may be that the utilization of drug therapy contributed to the greater visit length.

In comparing drug visits by type of practice for male physicians only, it was found that one or more drugs

Table 4. Percent of drug visits and drug intensity rate, by visit status, major reason for visit, duration of visit, sex of general and family practitioner (M.D.), and year of medical school graduation: United States, 1980

| Visit status, major reason for visit, and duration of visit | Sex of physician | | | Year of graduation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Both sexes | Female | Male | Before 1941 | 1941–50 | 1951–60 | 1961–70 | 1971–80 |
| Visit status | | | | Percent drug visits[1] | | | | |
| All patients | 75.1 | 78.7 | 75.0 | 82.8 | 74.8 | 78.3 | 70.6 | 66.9 |
| New patient | 67.2 | 66.9 | 67.2 | 71.6 | 63.7 | 69.5 | 59.5 | 70.2 |
| Old patient, new problem | 76.0 | 80.1 | 75.9 | 78.6 | 75.2 | 80.2 | 71.1 | 69.1 |
| Old patient, old problem | 76.3 | 84.8 | 76.1 | 86.8 | 76.1 | 78.6 | 72.5 | 63.5 |
| Major reason for visit | | | | | | | | |
| Acute problem | 80.5 | 81.3 | 80.5 | 86.6 | 79.6 | 84.4 | 76.1 | 72.5 |
| Chronic problem, routine | 84.0 | 91.0 | 83.9 | 92.0 | 84.9 | 83.6 | 80.1 | 79.2 |
| Chronic problem, flareup | 83.8 | *71.7 | 84.1 | 88.2 | 86.6 | 88.0 | 75.8 | 76.0 |
| Postsurgery or postinjury | 36.3 | *57.2 | 35.7 | *46.9 | 35.0 | 33.3 | 38.0 | *40.3 |
| Nonillness care | 49.7 | 68.9 | 48.9 | 35.3 | 48.2 | 57.1 | 44.8 | 44.3 |
| Duration of visit | | | | | | | | |
| 0 minutes[2] | 77.4 | - | 77.4 | *51.4 | 92.8 | 78.9 | 70.6 | *69.7 |
| 1–5 minutes | 74.1 | *81.3 | 74.1 | 88.0 | 76.5 | 77.5 | 73.8 | 55.3 |
| 6–10 minutes | 78.6 | 79.4 | 78.6 | 83.4 | 79.7 | 81.5 | 73.9 | 70.4 |
| 11–15 minutes | 74.3 | 82.2 | 74.1 | 84.6 | 73.4 | 77.4 | 65.8 | 70.5 |
| 16–30 minutes | 71.0 | 79.3 | 70.6 | 84.8 | 65.3 | 72.2 | 69.5 | 67.1 |
| 31 minutes or more | 57.9 | *61.9 | 57.4 | 60.5 | 54.4 | 69.4 | *53.9 | *43.3 |
| Visit status | | | | Rate per drug visit[3] | | | | |
| All patients | 1.92 | 2.01 | 1.92 | 1.91 | 1.84 | 2.05 | 1.87 | 1.64 |
| New patient | 1.71 | 1.99 | 1.69 | 1.75 | 1.54 | 1.88 | 1.83 | 1.50 |
| Old patient, new problem | 1.80 | 1.78 | 1.80 | 1.82 | 1.81 | 1.84 | 1.77 | 1.64 |
| Old patient, old problem | 2.03 | 2.13 | 2.03 | 1.97 | 1.89 | 2.21 | 1.94 | 1.74 |
| Major reason for visit | | | | | | | | |
| Acute problem | 1.83 | 1.85 | 1.83 | 1.94 | 1.82 | 1.94 | 1.69 | 1.55 |
| Chronic problem, routine | 2.17 | 2.53 | 2.16 | 1.90 | 2.01 | 2.30 | 2.39 | 1.94 |
| Chronic problem, flareup | 2.21 | *2.00 | 2.21 | 2.12 | 2.08 | 2.50 | 1.91 | 1.81 |
| Postsurgery or postinjury | 1.51 | *1.56 | 1.51 | *1.61 | 1.30 | 1.67 | 1.28 | *1.18 |
| Nonillness care | 1.49 | 1.75 | 1.48 | 1.41 | 1.29 | 1.62 | 1.21 | 1.15 |
| Duration of visit | | | | | | | | |
| 0 minutes[2] | 1.38 | - | 1.38 | *1.60 | 1.02 | 1.63 | 1.18 | *1.02 |
| 1–5 minutes | 1.56 | *1.14 | 1.56 | 1.25 | 1.41 | 1.56 | 1.82 | 1.44 |
| 6–10 minutes | 1.91 | 1.83 | 1.91 | 1.72 | 1.88 | 2.04 | 1.83 | 1.62 |
| 11–15 minutes | 2.03 | 1.97 | 2.03 | 2.05 | 1.98 | 2.17 | 1.94 | 1.74 |
| 16–30 minutes | 2.13 | 2.32 | 2.12 | 2.08 | 1.98 | 2.42 | 2.05 | 1.69 |
| 31 minutes or more | 2.02 | *2.00 | 2.02 | 1.97 | 1.98 | 2.14 | *1.87 | *2.00 |

[1] A visit in which one or more drugs were ordered.
[2] Represents visits in which there was no face-to-face encounter between patient and physician.
[3] Drug mentions divided by number of drug visits.

were mentioned in proportionally more visits to those in solo practice (78 percent) than to those in other types of practice (70 percent). This difference was not statistically significant for female physicians. However, female physicians in multiple practices had a higher proportion of drug visits than males in multiple practice arrangements did.

## Year of graduation

It was shown previously that older physicians tended to treat older patients, while recent graduates from medical school tended to treat younger patients. An earlier report[3] indicated a high correlation between the age of the patient and drug utilization, with rates increasing with increasing age. The current study results reflect these findings. Physicians who graduated before 1961 were more likely to include one or more drugs than those who graduated in later years were. The most recent graduates (1971–80) prescribed, on the average, fewer drugs per drug visit than their older counterparts did. They also had the highest proportion of visits with only one drug prescribed. However, their drug intensity rates for patients 45 years of age and over increased with increasing age as did those of other physicians, thus

Table 5. Percent of drug visits and drug intensity rate, by type of physician's practice, sex of general and family practitioner (M.D.), and year of medical school graduation: United States, 1980

| Type of practice | Sex of physician | | | Year of graduation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Both sexes | Female | Male | Before 1941 | 1941–50 | 1951–60 | 1961–70 | 1971–80 |
| | Percent of drug visits[1] | | | | | | | |
| All types of practice | 75.1 | 78.7 | 75.0 | 82.8 | 74.8 | 78.3 | 70.6 | 66.9 |
| Solo | 78.0 | 81.6 | 77.9 | 82.9 | 76.2 | 79.8 | 74.6 | 69.7 |
| Other[2] | 70.6 | 77.3 | 70.3 | 81.3 | 66.5 | 76.0 | 67.4 | 66.1 |
| | Rate per drug visit[3] | | | | | | | |
| All types of practice | 1.92 | 2.01 | 1.92 | 1.91 | 1.84 | 2.05 | 1.87 | 1.64 |
| Solo | 1.95 | 2.30 | 1.94 | 1.89 | 1.85 | 2.08 | 1.87 | 1.82 |
| Other[2] | 1.87 | 1.86 | 1.87 | 2.22 | 1.74 | 2.01 | 1.87 | 1.59 |

[1] A visit in which one or more drugs were ordered.
[2] Includes partnership, group, and other types of practice.
[3] Drug mentions divided by number of drug visits.

Table 6. Percent distribution of drug visits to general and family practitioners (M.D.) by number of medications, according to sex of physician and year of medical school graduation: United States, 1980

| Sex of physician and year of graduation | Number of medications | | | | |
|---|---|---|---|---|---|
| | Total | 1 | 2 | 3 | 4 or more |
| | Percent distribution | | | | |
| All drug visits[1] | 100.0 | 46.2 | 30.5 | 13.3 | 9.9 |
| Sex of physician | | | | | |
| Female | 100.0 | 38.7 | 38.4 | *9.0 | 14.0 |
| Male | 100.0 | 46.5 | 30.3 | 13.4 | 9.8 |
| Year of graduation | | | | | |
| Before 1941 | 100.0 | 42.3 | 33.6 | 16.9 | 7.2 |
| 1941–1950 | 100.0 | 50.3 | 28.3 | 13.1 | 8.3 |
| 1951–1960 | 100.0 | 41.6 | 31.3 | 14.1 | 13.0 |
| 1961–1970 | 100.0 | 48.7 | 30.1 | 12.1 | 9.1 |
| 1971–1980 | 100.0 | 56.5 | 29.4 | 9.4 | 4.7 |

[1] A visit in which one or more drugs were ordered.

providing evidence that the rate of drug use depends on the age of the patient and not the age of the physician.

For all medical school graduates, except the 1971–80 group, proportions of drug visits were higher for old patients returning to the same physician for care of a continuing problem than for new patients. On the other hand, the 1971–80 graduates were more likely to prescribe one or more drugs during initial visits (which were likely to be made by young rather than more mature patients) than during visits by patients returning for continuing care.

Physicians who graduated after 1960, and who had proportionately more patients under 25 years of age than other physicians did, had lower proportions of drug visits for care of acute or chronic problems than physicians who graduated before 1961 did. As expected, proportions of drug visits for nonillness care and post-surgery or postinjury were lowest among all major reasons for visit regardless of the physician's year of graduation. Physicians in practice the longest (graduated before 1941) were the least likely to have drug visits for nonillness care (35 percent). This was probably related to the fact that nonillness care given by older physicians was usually for a routine physical examination, while younger physicians provided more pediatric (immunizations, and so forth) and prenatal care.

Proportions of drug visits did not vary appreciably with changing duration intervals regardless of the year of graduation. Only very long visits (31 minutes or longer) had proportionately fewer drug visits than other durations did. However, the average number of drugs ordered during drug visits to some groups was related to

the duration of the visit. For physicians who graduated before 1961 the drug intensity rate for visits lasting 11 minutes or more was higher than that for visits lasting less than 11 minutes. This difference was not statistically significant for physicians who graduated in later years. One possible explanation for this is that both visit duration and drug utilization increase with increasing patient age group, and physicians who graduated before 1961 see proportionately more older patients than younger physicians do.

## Therapeutic categories

### Sex of physician

Each drug named by the physician in NAMCS is classified according to its desired therapeutic effect based on the classification system of the American Hospital Formulary Service.[6] The distribution of drug mentions by therapeutic category is shown in table 7.

The use of certain kinds of drugs tended to follow the case-mix pattern of the physician groups. The leading category used by physicians of both sexes was central nervous system drugs. Serums, toxoids, and vaccines (13 percent) was the next largest category prescribed by female physicians, and it was significantly greater than the 3 percent of the same drugs used by male physicians. For male physicians the second ranking therapeutic group was anti-infective agents (17 percent), which exceeded the use of such drugs by female physicians (10 percent). Other differences between therapeutic categories used by female and male physicians were not statistically significant.

There were some within-category differences depending on the sex of the physician. In the central nervous system group, no respiratory and cerebral stimulants were prescribed by females. In the hormones and synthetic substitutes group, males used proportionately more adrenals and androgens than females did, while females ordered proportionately more contraceptives. These results reflect the distribution of patient visits by sex of the patients likely to visit female and male physicians.

### Year of graduation

As might be expected considering the age distributions of their patients, physicians who graduated before 1941 made greater use of cardiovascular drugs and diuretics than their younger counterparts did. Physicians who graduated before 1961 were more likely to prescribe central nervous system drugs than those who graduated later were. The most recent graduates were more likely to use antihistamines and skin and mucous membrane preparations, reflecting the higher proportions of young and female patients who visited them.

## Specific drugs

The specific drugs most frequently prescribed by general and family practitioners (including doctors of osteopathy) were listed by age of the patient in Advance Data No. 86.[4] A comparison of those data with the drug lists generated by the physicians grouped by sex of the physician and year of graduation in the current analysis revealed few differences among the groups in the drugs named or their relative standing.

Table 7. Percent distribution of drugs mentioned by general and family practitioners (M.D.) by therapeutic category, according to sex of physician and year of medical school graduation: United States, 1980

| Therapeutic category[1] | Sex of physician | | | Year of graduation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Both sexes | Female | Male | Before 1941 | 1941–50 | 1951–60 | 1961–60 | 1971–80 |
| | Percent distribution | | | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Antihistamine drugs | 6.7 | 5.4 | 6.7 | 6.3 | 6.3 | 5.7 | 7.5 | 11.3 |
| Anti-infective agents | 16.6 | 9.6 | 16.8 | 14.6 | 14.7 | 17.2 | 17.5 | 18.1 |
| Autonomic drugs | 4.6 | *2.8 | 4.7 | 3.4 | 4.3 | 4.8 | 4.5 | 5.8 |
| Blood formation and coagulation | 1.4 | *2.8 | 1.4 | *1.2 | 0.9 | 1.8 | 1.3 | *1.0 |
| Cardiovascular drugs | 10.3 | 7.8 | 10.4 | 14.8 | 11.7 | 9.6 | 9.4 | 7.7 |
| Central nervous system drugs | 18.2 | 14.5 | 18.3 | 17.1 | 21.4 | 18.3 | 16.0 | 15.8 |
| Electrolytic, caloric, and water balance | 8.6 | 10.4 | 8.5 | 11.1 | 9.9 | 8.0 | 8.2 | 6.7 |
| Expectorants and cough preparations | 3.4 | *3.8 | 3.4 | 3.7 | 2.9 | 3.8 | 3.0 | 2.6 |
| Eye, ear, nose, and throat preparations | 1.5 | *1.0 | 1.6 | 2.1 | *0.7 | 1.6 | 1.9 | *1.7 |
| Gastrointestinal drugs | 4.8 | 6.7 | 4.7 | 4.6 | 5.0 | 4.8 | 5.1 | 4.0 |
| Hormones and synthetic substitutes | 7.4 | 7.7 | 7.4 | 5.9 | 6.7 | 8.2 | 8.0 | 6.0 |
| Serums, toxoids, and vaccines | 2.9 | 13.2 | 2.6 | 2.4 | 3.1 | 2.8 | 3.5 | 2.2 |
| Skin and mucous membrane preparations | 5.1 | 8.4 | 5.0 | 4.9 | 3.9 | 4.4 | 6.5 | 8.6 |
| Spasmolytic agents | 1.8 | *0.5 | 1.9 | *1.3 | 2.3 | 1.8 | 1.5 | 2.0 |
| Vitamins | 3.8 | *3.0 | 3.8 | 3.1 | 4.0 | 3.8 | 3.5 | 4.4 |
| All other categories[2] | 2.9 | 2.4 | 2.9 | 3.5 | 2.2 | 3.4 | 2.6 | 2.1 |

[1] Based on the classification system of the American Hospital Formulary Service. See reference 6.

[2] Includes antineoplastic agents, diagnostic agents, enzymes, gold compounds, heavy metal antagonists, local anesthetics, oxytocics, unclassified therapeutic agents, pharmaceutic aids, and therapeutic category undetermined.

## Discussion

This study was limited because of the small number of female physicians in the sample. Females constitute approximately 5 percent of the office-based general and family practitioners in the NAMCS universe. The female general and family practitioners (M.D.'s, doctors of medicine) accounted for 22 percent of all female physicians who reported visits in NAMCS: The males accounted for 21 percent of the male physicians in the same specialty. However, the relatively large sampling error associated with the small size of the female sample made it difficult to detect differences.

Most of the differences in drug utilization between female and male physicians can be attributed to the differences in the demographic characteristics of their patients and the diagnoses commonly associated with them. Although the study was restricted to only one specialty, it is apparent that in general and family practice, case-mix is influenced by the sex of the physician.

Similarly, case-mix also depends on the age of the physician. A medical practice is built over a period of time and it is natural for older patients to continue seeking their health care from the same established physicians. The caseload of the newly graduated physician, on the other hand, typically consists of young patients, many of them seeing a physician for the first time for preventive care or for self-limiting conditions.

These differences in visit characteristics were noticeable in the distribution of drugs by therapeutic category. As expected, there was a strong correlation between case-mix and the categories of drugs most frequently used. It is noteworthy, however, that in the choice of specific drugs, the age of the physician had no apparent effect. Physicians who graduated over 40 years ago prescribed the same brand name drugs, many of them only recently developed, as those who graduated in more recent decades did. Continuing medical education courses and seminars, often required for board certification, is one factor in the updating of the physician's medical knowledge. But pharmaceutical discoveries proliferate at a rapid pace, and the manufacturers also contribute to the modernization of the physician's treatment armamentarium through their representatives and literature. One conclusion that might be drawn from the results of this study suggests that the motivation to acquire new drug information is common to all age physicians.

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[5]National Center for Health Statistics, B. K. Cypress: Medication therapy in office visits for selected diagnoses, National Ambulatory Medical Care Survey, 1980. *Vital and Health Statistics.* Series 13-No. 71. DHHS Pub. No. (PHS) 82–1732. Public Health Service. Washington. U.S. Government Printing Office, Jan. 1983.

[6]American Society of Hospital Pharmacists, Inc.: *The American Hospital Formulary Service.* Washington. Jan. 1980.

# Technical notes

## Source of data and sample design

The information presented in this report is based on data collected by the National Center for Health Statistics (NCHS) through its National Ambulatory Medical Care Survey (NAMCS) during 1980. The target universe of NAMCS includes office visits made within the coterminous United States by ambulatory patients to nonfederally employed physicians who are principally engaged in office practice, but not in the specialties of anesthesiology, pathology, or radiology. Telephone contacts and nonoffice visits are excluded.

NAMCS utilizes a multistage probability sample design that involves samples of primary sampling units (PSU's), physicians' practices within PSU's, and patient visits within physician practices. For 1980 a sample of 2,959 non-Federal, office-based physicians was selected from master files maintained by the American Medical Association and the American Osteopathic Association. The physician response rate for 1980 was 77.2 percent. Sampled physicians were asked to complete Patient Records (figure 1) for a systematic random sample of office visits taking place during a randomly assigned weekly reporting period. During 1980, responding physicians completed 46,081 Patient Records, on which they recorded 51,372 drug mentions. Characteristics of the physician's practice, such as primary specialty and type of practice, were obtained during an induction interview. The National Opinion Research Center, under contract to NCHS, was responsible for the survey's field operations.

For a more detailed discussion of the limitations, qualifications, and definitions of the data collected in the NAMCS, see *Vital and Health Statistics,* Series 13. No. 66.[1]

Estimates presented in this report differ from the estimates reported in the National Medical Care Utilization and Expenditure Survey (NMCUES), another program of NCHS. The variation in estimates is due to differences in survey populations, data collection methodology, and definitions. The NMCUES, cosponsored by NCHS and the Health Care Financing Administration (HCFA), is a national panel survey of households in which information on visits to physicians' offices and hospital outpatient departments was collected. Preliminary survey data as well as a discussion of the survey methodology are forthcoming from NCHS and HCFA.

## Sampling errors and rounding of numbers

The standard error is primarily a measure of the sampling variability that occurs by chance because only a sample, rather than the entire universe, is surveyed. The relative standard error of an estimate is obtained by dividing the standard error by the estimate itself and is expressed as a percent of the estimate. Relative standard errors of selected aggregate visit statistics are shown in Table I. Standard errors for estimated percents of visits are shown in table II. Similar standard errors for drug statistics and percents are shown in tables III and IV. Tables I and II should be used to obtain the standard error of a specific drug mention (e.g., Dyazide). Tables III and IV should be used to obtain the standard error of a group of drug mentions (e.g., all drugs prescribed for hypertension).

Estimates of office visits have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to totals. Rates and percents were calculated on the basis of original, unrounded figures and will not necessarily agree precisely with percents calculated from rounded data.

## Definitions

An *ambulatory patient* is an individual presenting himself for personal health services who is neither bedridden nor currently admitted to any health care institution on the premises.

A *physician eligible for NAMCS* is a duly licensed doctor of medicine (M.D.) or doctor of osteopathy (D.O.) currently in office-based practice who spends time in caring for ambulatory patients. Excluded from NAMCS are physicians who are hospital based; physicians who specialize in anesthesiology, pathology, or radiology; physicians who are federally employed; physicians who treat only institutionalized patients; physicians employed full time by an institution; and physicians who spend no time seeing ambulatory patients.

An *office* is a place that the physician identifies as a

Table I. Approximate relative standard errors of estimated number of office visits based on all physician specialties, NAMCS, 1980

| *Estimated number of office visits in thousands* | *Relative standard error in percent* |
|---|---|
| 500 | 27.3 |
| 1,000 | 19.5 |
| 2,000 | 14.1 |
| 5,000 | 9.4 |
| 10,000 | 7.3 |
| 20,000 | 5.9 |
| 50,000 | 4.9 |
| 100,000 | 4.5 |
| 550,000 | 4.1 |

*Example of use of table:* An aggregate estimate of 75,000,000 visits has a relative standard error of 4.7 percent, or a standard error of 3,525,000 visits (4.7 percent of 75,000,000).

NOTE: A list of references follows the text.

Table II. Approximate standard errors of percents of estimated numbers of office visits based on all physician specialties: NAMCS, 1980

| *Base of percent (number of office visits in thousands)* | *Estimated percent* | | | | | |
|---|---|---|---|---|---|---|
| | *1 or 99* | *5 or 95* | *10 or 90* | *20 or 80* | *30 or 70* | *50* |
| | Standard error in percent | | | | | |
| 500 | 2.7 | 5.9 | 8.1 | 10.8 | 12.4 | 13.5 |
| 1,000 | 1.9 | 4.2 | 5.7 | 7.6 | 8.7 | 9.5 |
| 2,000 | 1.3 | 2.9 | 4.0 | 5.4 | 6.2 | 6.7 |
| 5,000 | 0.8 | 1.9 | 2.6 | 3.4 | 3.9 | 4.3 |
| 10,000 | 0.6 | 1.3 | 1.8 | 2.4 | 2.8 | 3.0 |
| 20,000 | 0.4 | 0.9 | 1.3 | 1.7 | 2.0 | 2.1 |
| 50,000 | 0.3 | 0.6 | 0.8 | 1.1 | 1.2 | 1.3 |
| 100,000 | 0.2 | 0.4 | 0.6 | 0.8 | 0.9 | 1.0 |
| 500,000 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 |

*Example of use of table:* An estimate of 30 percent based on an aggregate of 15,000,000 visits has a standard error of 2.4 percent, or a relative standard error of 8 percent (2.4 percent ÷ 30 percent).

Table III. Approximate relative standard errrors of estimated number of drug mentions based on all physician specialties: NAMCS, 1980

| *Estimated number of drug mentions in thousands* | *Relative standard error in percent* |
|---|---|
| 1,000 | 27.3 |
| 2,000 | 19.7 |
| 5,000 | 13.2 |
| 10,000 | 10.1 |
| 20,000 | 8.2 |
| 50,000 | 6.8 |
| 100,000 | 6.2 |
| 300,000 | 5.8 |
| 650,000 | 5.7 |

*Example of use of table:* An aggregate estimate of 75,000,000 drug mentions has a relative standard error of 6.5 percent, or a standard error of 4,875,000 mentions (6.5 percent of 75,000,000).

location for his ambulatory practice. Responsibility over time for patient care and professional services rendered there generally resides with the individual physician rather than an institution.

A *visit* is a direct personal exchange between an ambulatory patient and a physician or a staff member working under the physician's supervision, for the purpose of seeking care and rendering health services.

A *drug mention* is the physician's entry of a pharmaceutical agent ordered or provided—by any route of administration—for prevention, diagnosis, or treatment. Generic as well as brand-name drugs are included, as are nonprescription as well as prescription drugs. Along with all new drugs, the physician also records continued medications if the patient was specifically instructed during the visit to continue the medication.

Table IV. Approximate standard errors of percents of estimated numbers of drug mentions based on all physician specialties: NAMCS, 1980

| *Base of percent (number of drug mentions in thousands)* | *Estimated percent* | | | | | |
|---|---|---|---|---|---|---|
| | *1 or 99* | *5 or 95* | *10 or 90* | *20 or 80* | *30 or 70* | *50* |
| | Standard error in percent | | | | | |
| 1,000 | 2.7 | 5.8 | 8.0 | 10.7 | 12.2 | 13.3 |
| 2,000 | 1.9 | 4.1 | 5.7 | 7.6 | 8.7 | 9.4 |
| 5,000 | 1.2 | 2.6 | 3.6 | 4.8 | 5.5 | 6.0 |
| 20,000 | 0.6 | 1.3 | 1.8 | 2.4 | 2.7 | 3.0 |
| 100,000 | 0.3 | 0.6 | 0.8 | 1.1 | 1.2 | 1.3 |
| 600,000 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 |

*Example of use of table:* An estimate of 30 percent based on an aggregate of 12,500,000 drug mentions has a standard error of 4.1 percent, or a relative standard error of 13.7 percent (4.1 percent ÷ 30 percent).

## Symbols

| | |
|---|---|
| - - - | Data not available |
| . . . | Category not applicable |
| - | Quantity zero |
| 0.0 | Quantity more than zero but less than 0.05 |
| Z | Quantity more than zero but less than 500 where numbers are rounded to thousands |
| * | Figure does not meet standards of reliability or precision |
| # | Figure suppressed to comply with confidentiality requirements |

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