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## Use of Topical Antimicrobial Drugs in Office-Based Practice: United States, 1980–81

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This report examines the use of topical antimicrobial medications in the office-based patient care setting. The information used was obtained by combining the 1980 and 1981 results of the National Ambulatory Medical Care Survey, a sample survey of care provided by office-based physicians. Conducted annually by the National Center for Health Statistics from 1973 through 1981, the survey is being carried out again in 1985.

Because of the nature of the data collected by means of the National Ambulatory Medical Care Survey (NAMCS), the investigation of the use of antimicrobial medications is limited to an inspection of the patterns in physicians' ordering or providing them to patients. It is not possible to assess the extent to which the patients actually filled their prescription orders and used the medications according to instructions.

The estimates presented in this report are based on a sample of office visits, and so are subject to sampling variability. Comparisons among statistics were tested for statistical significance using the Bonferroni test for multiple comparisons, a modification of the *t*-test. Statements regarding differences between or among statistics indicate that the test results showed a difference significant at the  $p < .05$  level. An explanation of sampling errors and guidelines for judging the precision of estimates, as well as a brief description of the survey design, are presented in the technical notes appended to this report.

In selecting the drugs to be included in this analysis, *AMA Drug Evaluations, Fifth Edition*,<sup>1</sup> first was utilized to establish a comprehensive list of drug ingredients (according to generic or nonproprietary name) considered to have antimicrobial activity. All drug mentions (that is, all drugs listed by physicians as ordered or provided to patients) appearing in NAMCS in

1980 and 1981 then were screened for these ingredients. The resulting list of antimicrobial drugs was divided into two sets: those known to be used only topically and all others. The topical drugs, and the patient visits associated with them, are discussed in this report; the other antimicrobial drugs will be presented in an additional report scheduled for publication in 1985.

Thirty-six specific antimicrobial generic ingredients appeared in the topical drug mentions recorded in the 1980 and 1981 surveys. For the purposes of this analysis, they can be classified in the following eight categories:

- Amphenicols (chloramphenicol).
- Macrolide antibiotics (erythromycin).
- Tetracyclines (chlortetracycline, meclocycline, oxytetracycline, and tetracycline hydrochloride).
- Aminoglycosides (gentamicin and neomycin).
- Polymyxins (polymyxin B).
- Sulfonamides (silver sulfadiazine, sulfabenzamide, sulfacetamide, sulfanilamide, sulfathiazole, and sulfisoxazole).
- Antifungal or antibacterial and antifungal agents (amphotericin B, selenium sulfide, sodium thiosulfate, tolnaftate, undecylenic acid, and zinc pyrithione).
- Miscellaneous antimicrobial agents (acetic acid, bacitracin, carbol-fuchsin, gramicidin, iodochlorhydroxyquin, iodoquinol, nitrofurazone, povidone-iodine, and silver nitrate).

Although gramicidin, neomycin, and polymyxin B also are used systemically, such use is unusual, particularly in the office-based ambulatory care setting examined here. Consequently, these three generic ingredients are included only in this topical antimicrobial report.

The specific topical antimicrobial drugs containing the above generic ingredients and appearing in NAMCS in 1980 and 1981 were subdivided according to the body site of application and the types of active ingredients included. This yielded

<sup>1</sup>*AMA Drug Evaluations, Fifth Edition*, Chs. 21, 24, 62, and 69–80. Chicago. American Medical Association, 1983.

seven topical antimicrobial groups with frequencies large enough for analysis:

- *Ophthalmic antibacterial drugs*: Drugs for ophthalmic use only, containing one or more antibacterial agents.
- *Ophthalmic antibacterial-corticosteroid mixtures*: Drugs for ophthalmic use only, containing one or more antibacterial agents and one or more corticosteroids. (These drugs have anti-inflammatory as well as anti-infective properties.)
- *Otic drugs*: Drugs for otic use only, containing one or more antibacterial and/or antifungal agents, with or without a corticosteroid ingredient.
- *Vaginal drugs*: Drugs for vaginal use only, containing one or more antibacterial and/or antifungal agents.
- *Other topical antifungal drugs*: Drugs for use on skin and/or mucous membranes, containing one or more antifungal ingredients.
- *Other topical anti-infectives*: Drugs for use on skin and/or mucous membranes, containing one or more antibacterial ingredients and/or antibacterial and antifungal agents.
- *Other topical anti-infective and corticosteroid mixtures*: Drugs for use on skin and/or mucous membranes, containing one or more antibacterial and/or antibacterial and

Ophthalmic antibacterial drugs			
Bleph	gentian violet	BPN	
Chloromyxin	Gyne-Lotrimin	carbol-fuchsin	
Chloroptic	Koro-Sulf	Castellani's paint	
Econochlor	Monistat 7	Efodine	
Genoptic	Nylmerate	Elaste-Chloromycetin	
Isopto Cetamide	nystatin vaginal tablet	EryDerm	
Ophthochlor	Sulfa Vaginal	Furacin	
Statrol	sulfanilamide	Iodochlor	
Sulamyd	Sultrin	Meclan	
Sulfacel-15	Tricholan	Mity-Mycin	
Vasosulf	Triconol	Mycitracin	
	Tripul Vaginal	neomycin	
	Vagilia	Neo-Polycin	
	Vagitrol	Neosporin	
	Vanobid	nitrofurazone	
		Polysporin	
Ophthalmic antibacterial-corticosteroid mixtures			
Blephamide	Other topical antifungal drugs		
Cetapred	amphotericin	Povidone-iodine	
Chloromycetin-Hydrocortisone	clotrimazole	Sebizon Lotion	
Chloroptic-P	Desenex	Silvadene	
Isopto Cetapred	Exsel Lotion	silver nitrate	
Maxitrol	Fungizone	silver nitrate toughened sticks	
Metimyd	Fungizone Lotion	silver sulfadiazine	
Neo-Hydeltrasol	Halotex	Spectro-Biotic	
Ophthocort	Head and Shoulders	Staticin	
Optimyd	Lotrimin	sulfacetamide	
Poly-Pred	MicaTin	Sulfacet-R	
Sulfapred	miconazole	sulfathiazole	
Vasocidin	Monistat	Thiaphyll	
	Mycelex	Topicycline	
	Nystaform	Triple Antibiotic	
	selenium	Vioform	
	Selsun		
	Selsun Blue	Other topical anti-infective and corticosteroid mixtures	
	Tinactin	Caquin	
	Tinver Lotion	Cordran-N	
	undecylenic acid	Cor-Tar-Quin	
	Verdefam	Cortisporin	
	Zincon	F-E-P	
		hydrocortisone-neomycin	
	Other topical anti-infectives		
	A/T/S	Mycolog	
	acetic acid	Mytrex	
	acetic acid glacial	Neo-Cortef	
	Aureomycin	Neo-Decadron	
	Bacimycin	Neo-Delta-Cortef	
	bacitracin	Neo-Medrol	
	bacitracin-neomycin-polymyxin	Neo-Synalar	
	Betadine	Racet	
	Biotres	Terra-Cortril	
	Biozyme	Vioform-Hydrocortisone	
		Vytone	
Otic drugs			
Chloromycetin Otic			
Domeboro Otic			
Dureze			
Lidosporin			
Neo-Cort-Dome Otic			
otic drops			
Otobione			
Otobiotic			
Otocort			
Otoreid-HC			
Pyocidin			
Vösol			
Vösol-HC			
Vaginal drugs			
AVC			
AVC/Dienestrol			
Betadine Vaginal Douche			
Candepin			
Femguard			

Figure 1. Topical antimicrobial drugs named by physician respondents: United States, 1980-81

antifungal ingredients and one or more corticosteroid ingredients. (These drugs also have anti-inflammatory and anti-infective properties.)

All analyses in this report are based on this categorization of topical antimicrobials. The trade<sup>2</sup> and generic names used by physicians in reporting the specific drugs that appeared in NAMCS in 1980 and 1981 are displayed according to category in figure 1.

**General findings**

The 1980 and 1981 total number of office visits to physicians principally engaged in office-based practice, estimated by means of NAMCS, was 1.1 billion. Of these visits, 62 percent (0.7 billion) were drug visits, that is, visits at which one or more therapeutic medications were ordered or provided. The drug visits involved a total of 1.3 billion drug mentions.

The drug mentions defined as topical antimicrobials numbered 48.4 million, or 3.6 percent of all drug mentions. This reflected an average annual rate of 108.6 topical antimicrobial drugs per 1,000 population. (See table 1.) The most frequently mentioned groups were *other topical anti-infectives*, with 13.1 million mentions (27.0 percent of the total), *other topical anti-infective and corticosteroid mixtures*, with 10.5 million mentions (21.6 percent), and *vaginal drugs*, with 8.1 million mentions (16.8 percent). Although *vaginal drugs* had an annual average rate of 35.2 per 1,000 female population, *other topical anti-infectives* had a rate of 29.4 per 1,000 population, and *other topical anti-infective and corticosteroid mixtures* had a rate of 23.5 per 1,000 population, these differences are not statistically significant.

The 15 specific topical antimicrobial drugs mentioned most frequently are listed in table 2. Together they accounted for almost two-thirds of all drug mentions of this type.

Of the drug mentions under consideration, combination drugs (that is, those containing multiple active ingredients) constituted the majority (27.3 million drug mentions, or 56.1

**Table 2. Number and percent distribution of the 15 topical antimicrobial drugs most frequently mentioned in office-based practice: United States, 1980-81**

Rank	Name of drug and antimicrobial ingredients	Number of mentions in thousands	Percent distribution
	All topical antimicrobial drugs . . .	48,354	100.0
1	Cortisporin (polymyxin B, bacitracin, and neomycin) . . . .	4,988	10.3
2	Neosporin (polymyxin B, bacitracin, and neomycin) . . . .	4,664	9.6
3	Mycolog (nystatin, neomycin, and gramicidin) . . . . .	2,883	6.0
4	Maxitrol (neomycin and polymyxin B) . . . . .	2,057	4.3
5	Monistat 7 (miconazole) . . . . .	1,906	3.9
6	AVC (sulfanilamide) . . . . .	1,828	3.8
7	Monistat (miconazole) . . . . .	1,813	3.7
8	Lotrimin (clotrimazole) . . . . .	1,755	3.6
9	Chloroptic (chloramphenicol) . . .	1,507	3.1
10	Sultrin (sulfathiazole, sulfacetamide, and sulfabenzamide) . . . . .	1,271	2.6
11	Betadine (povidone-iodine) . . . .	1,214	2.5
12	Gyne-Lotrimin (clotrimazole) . . .	1,189	2.5
13	Neo-Decadron (neomycin) . . . . .	1,184	2.4
14	Bacitracin . . . . .	1,016	2.1
15	Silver nitrate . . . . .	959	2.0
...	All other topical and antimicrobial drugs . . . . .	18,119	37.5

percent). The remainder (21.1 million, or 43.9 percent) were single ingredient drugs. Table 3 lists the 15 generic ingredients most frequently included in all topical antimicrobial drug mentions. Together these substances account for more than three-fourths (78.0 percent) of the 109.8 million ingredient mentions listed for these drugs. Although 9 of the 15 most common ingredients were antibacterial or antifungal in nature, 6 were not. These latter ingredients were principally anti-inflammatory in their effects.

NAMCS data files also contain American Hospital Formulary Service information<sup>3</sup> as to the expected therapeutic

<sup>2</sup>The use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

<sup>3</sup>American Hospital Formulary Service Classification System and Therapeutic Category Codes. Washington. American Society of Hospital Pharmacists, Inc., 1980.

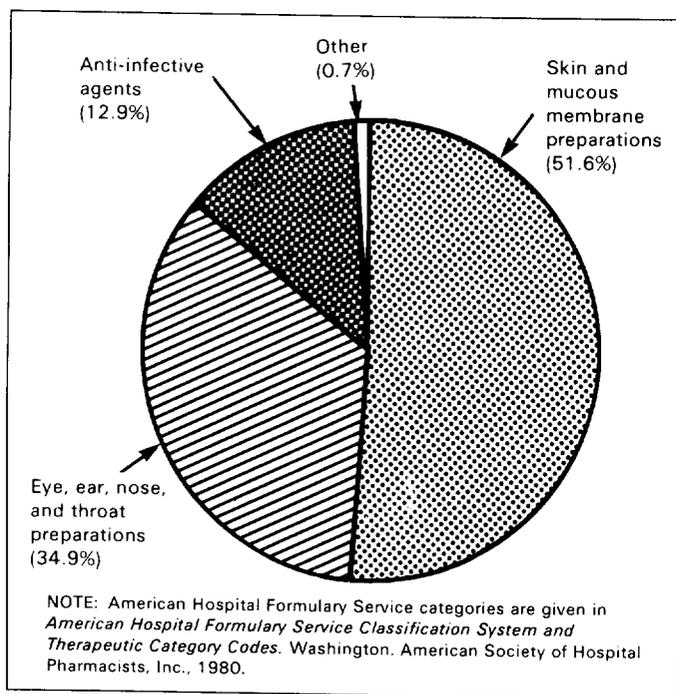
**Table 1. Number, percent distribution, and average annual rate of topical antimicrobial drug mentions in office-based practice by drug group: United States, 1980-81**

Drug group	Number of mentions in thousands	Percent distribution	Average annual rate per 1,000 civilian non-institutionalized population
All topical antimicrobial drugs . . . . .	48,354	100.0	108.6
Ophthalmic antibacterial drugs . . . . .	3,471	7.2	7.8
Ophthalmic antibacterial-corticosteroid mixtures . . . . .	4,558	9.4	10.2
Otic drugs . . . . .	1,487	3.1	3.3
Vaginal drugs . . . . .	8,106	16.8	<sup>1</sup> 35.2
Other topical antifungal drugs . . . . .	7,198	14.9	16.2
Other topical anti-infectives . . . . .	13,074	27.0	29.4
Other topical anti-infective and corticosteroid mixtures . . . . .	10,460	21.6	23.5

<sup>1</sup>Rate is based on the female population only.

**Table 3. Number and percent distribution of the 15 generic ingredients most frequently appearing in topical antimicrobial drug mentions, with principal therapeutic action: United States, 1980 and 1981**

Rank	Generic ingredient	Principal therapeutic action	Number of generic ingredient mentions in thousands	Percent distribution
	All generic ingredients.....	...	109,809	100.0
1	Neomycin.....	Antibacterial	17,585	16.0
2	Polymyxin B.....	Antibacterial	13,966	12.7
3	Bacitracin.....	Antibacterial	12,128	11.0
4	Hydrocortisone.....	Anti-inflammatory	6,564	6.0
5	Sulfacetamide.....	Antibacterial	5,836	5.3
6	Miconazole.....	Antifungal	4,447	4.0
7	Clotrimazole.....	Antifungal	3,727	3.4
8	Dexamethasone.....	Anti-inflammatory	3,241	3.0
9	Nystatin.....	Antifungal	2,948	2.7
10	Triamcinolone.....	Anti-inflammatory	2,916	2.7
11	Gramicidin.....	Antibacterial	2,883	2.6
12	Prednisolone.....	Anti-inflammatory	2,442	2.2
13	Sulfanilamide.....	Antibacterial	2,435	2.2
14	Allantoin.....	Stimulation of healthy tissue growth	2,255	2.1
15	Aminacrine.....	Bacteriostatic	2,255	2.1
...	All others.....	...	24,181	22.0



**Figure 2. Distribution of topical antimicrobial drugs among American Hospital Formulary Service therapeutic categories: United States, 1980-81**

effects of drugs mentioned. The therapeutic categories associated with the topical antimicrobial drugs selected for examination in this report are illustrated in figure 2. A slight majority (51.6 percent) of the drugs were classified as skin and mucous membrane preparations, and another large segment (34.9 percent) was classified as eye, ear, nose, and throat preparations.

Overall, most of the topical antimicrobial medications (90.6 percent) were available to patients only as prescription drugs. Of the ones available without prescription, two-thirds (67.2 percent) were classified for this report as *other topical anti-infectives*. Three of the drug groups—*ophthalmic anti-*

*bacterial drugs, ophthalmic antibacterial-corticosteroid mixtures, and other topical anti-infective and corticosteroid mixtures*—were composed of prescription drugs only. Prescription drugs dominated the remaining drug groups also, but in varying proportions, ranging from 76.6 percent of *other topical anti-infectives* to 97.1 percent of *otic drugs*.

### Visits involving topical antimicrobial drugs

During 1980 and 1981 there were 46.0 million patient visits in which at least one topical antimicrobial drug was ordered or provided. This represented one out of every 25 (4.0 percent) office visits that occurred during that period.

For these visits there was an average of 1.05 topical antimicrobial drug mentions per visit, an intensity rate indicating that the simultaneous order or provision of multiple drugs of this type was an exceptional event. In fact, two or more of these drugs were ordered or provided in only 2.2 million visits, or 4.9 percent of all topical antimicrobial drug visits.

### Patient demographics

As shown in table 4, the overall average annual rate of visits was 103.4 per 1,000 civilian noninstitutionalized population. The greatest number of visits (13.6 million, or 29.6 percent of all these visits) was made by persons 25-44 years of age. Females made a substantial majority (62.3 percent) of the visits involving topical antimicrobials, which did not differ noticeably from the proportion of all other office visits made by females (60.3 percent). Controlling for the relative sizes of the male and female populations, the female rate of 124.4 visits per 1,000 population per year was 54 percent higher than the male rate of 80.6.

The racial distribution of visits shows that white persons made 88.3 percent of the visits involving topical antimicrobial drugs and persons of all other races made 11.7 percent, proportions that did not differ significantly from those observed for

**Table 4. Number, percent distribution, and average annual rate of visits involving topical antimicrobial drugs by age, sex, and race: United States, 1980-81**

Age, sex, and race	Number of visits in thousands	Percent distribution	Rate per 1,000 civilian non-institutionalized population
All topical antimicrobial drug visits	46,034	100.0	103.4
Age			
14 years and under	9,509	20.7	93.5
15-24 years	7,953	17.3	97.7
25-44 years	13,625	29.6	108.7
45-64 years	8,173	17.8	93.0
65 years and over	6,773	14.7	138.2
Sex			
Male	17,361	37.7	80.8
Female	28,673	62.3	124.4
Race			
White	40,662	88.3	106.4
All other	5,372	11.7	84.9

all other visits. The visit rate for white persons (106.4 per 1,000 population per year) was 25 percent higher than that for all others (84.9).

Age, sex, and race distributions varied somewhat among visits involving different types of topical antimicrobial drugs. Excluding *vaginal drugs*, the largest sex differences appeared in the visits involving *other antifungal drugs* (36.4 percent of which were made by males) and *ophthalmic antibacterial-corticosteroid mixtures* (41.9 percent of which were made by males). One factor influencing these sex differences is that some of the *other antifungal drugs* may be used vaginally.

The age distribution of patients who received *ophthalmic antibacterial-corticosteroid mixtures* reflects the significant number of cataract patients. Fully one-third of the patients receiving these drugs (34.7 percent) were at least 65 years old, and an additional 25.1 percent were 45-64 years of age. In fact, the median age for all patients receiving this type of drug was 56.9, which was strikingly higher than the median age of 31.0 for all patients who received topical antimicrobial drugs.

Similarly, the use of *vaginal drugs* was heavily concentrated in the middle age range. The median age of 29.6 years for the patients receiving these drugs reflects the 77.1 percent of these patients who were 15-44 years of age, and is influenced by the relatively high susceptibility of women in the child-bearing years to vaginal infections and inflammation.

The final major age difference in the use of the specific types of topical antimicrobial drug was that children accounted for disproportionate numbers of visits involving *otic drugs* (36.9 percent), *other topical anti-infectives* (27.0 percent), and *other topical anti-infective and corticosteroid mixtures* (30.9 percent). The median patient ages of 24.4, 29.7, and 27.2, respectively, for these groups thus may be indicative of the relative susceptibility of youth to otic infections and superficial injuries.

Significant race differences in utilization of the different types of topical antimicrobials were observed, but possible explanations for these differences are unclear. Of the patients who were ordered or provided with topical antimicrobial drugs, persons of minority races were more likely than white persons to be users of *vaginal drugs* (28.3 percent compared with 15.7 percent) and *other topical antifungal drugs* (23.8 percent compared with 14.0 percent). The reverse was true for *other topical anti-infective drugs*—29.1 percent of the white patients receiving topical antimicrobials were ordered or provided with this type of drug, compared with 18.9 percent of minority race patients. Utilization of *other topical anti-infective and corticosteroid mixtures*, however, showed no difference between these two racial groupings. Because the frequencies of use of *ophthalmic antibacterial drugs*, *ophthalmic antibacterial-corticosteroid mixtures*, and *otic drugs* by minority race persons were too small to be statistically reliable, race differences in utilization of these drugs could not be tested.

### Physician specialty and patients' reasons for visit

The distribution of visits involving topical antimicrobial drugs according to physician specialty is presented in table 5. Although general and family practitioners were the most frequently involved physicians (13.2 million visits, or 28.6 percent of the total), they handled a somewhat smaller proportion of these visits than of all other visits (33.1 percent). Also, the physicians who utilized topical antimicrobial drugs were more concentrated than other physicians in the specific few specialties most concerned with the types of illness and injury associated with the use of these medications—dermatology (11.2 percent of the visits involving topical antimicrobial drugs, compared with 4.1 percent of all other visits), obstetrics and gynecology (14.3 percent compared with 9.2 percent), ophthalmology (17.9 percent compared with 4.9 percent), and otolaryngology (4.4 percent compared with 2.2 percent). In fact, these four specialty groups alone accounted for almost half (47.8 percent) of all topical antimicrobial drug visits, but only one-fifth (20.4 percent) of all other visits.

Because so many infective processes are acute problems rather than chronic ones, it was expected that visits involving topical antimicrobial drugs would reflect more patients presenting for acute care and with new problems. The data presented in

**Table 5. Number and percent distribution of visits involving topical antimicrobial drugs by physician specialty: United States, 1980-81**

Physician specialty	Number of visits in thousands	Percent distribution
All specialties	46,034	100.0
General and family practice	13,170	28.6
Internal medicine	2,298	5.0
Pediatrics	4,872	10.6
Dermatology	5,170	11.2
General surgery	1,589	3.5
Obstetrics and gynecology	6,575	14.3
Ophthalmology	8,222	17.9
Otolaryngology	2,044	4.4
All other specialties	2,094	4.5

table 6 demonstrate that this was indeed the case. A majority of the patients receiving topical antimicrobial drugs (58.4 percent) presented with an acute problem, compared with only one-third (35.5 percent) of all other patients. However, the proportion who presented for postsurgery or injury care was the same, 8.8 percent, for both types of visit. More than half (55.7 percent) of all visits involving topical antimicrobial drugs were prompted by new problems. In contrast, only one-third (35.9 percent) of all other visits involved a new problem.

The principal reasons cited by patients for making office visits are summarized in tables 7 and 8. A full two-thirds (68.8 percent) of all patients receiving topical antimicrobial drugs gave a symptom as their principal reason for visit. In contrast, only half (53.5 percent) of all other patients said they visited a physician primarily because of a symptom. Patients receiving topical antimicrobial drugs also cited injuries and adverse effects more frequently than other patients did (7.8 percent compared with 3.9 percent) and cited diagnostic, screening, and preventive reasons and treatment-oriented reasons less frequently (8.3 percent compared with 19.9 percent, and 6.9 percent compared with 10.6 percent, respectively).

Of the 15 most commonly cited specific reasons for visit, 5 were related to eye problems, 4 to skin problems, 2 to vaginal

**Table 6. Number and percent distribution of visits involving topical antimicrobial drugs by major reason for visit and patient status: United States, 1980-81**

Major reason for visit and patient status	Number of visits in thousands	Percent distribution
All topical antimicrobial drug visits . . . . .	46,034	100.0
Major reason for visit		
Acute problem . . . . .	26,876	58.4
Chronic problem . . . . .	11,774	25.6
Postsurgery or injury . . . . .	4,065	8.8
Nonillness care . . . . .	3,319	7.2
Patient status		
New patient . . . . .	8,887	19.3
Returning patient, new problem . . . . .	16,754	36.4
Returning patient, old problem . . . . .	20,392	44.3

**Table 7. Number and percent distribution of visits involving topical antimicrobial drugs by principal reason for visit module: United States, 1980-81**

Principal reason for visit module <sup>1</sup>	Number of visits in thousands	Percent distribution
All topical antimicrobial drug visits . . . . .	46,034	100.0
Symptom . . . . .	31,666	68.8
Disease . . . . .	3,005	6.5
Diagnostic, screening, and preventive . . . . .	3,815	8.3
Treatment . . . . .	3,157	6.9
Injuries and adverse effects . . . . .	3,611	7.8
Other . . . . .	711	1.5

<sup>1</sup>Based on National Center for Health Statistics, D. Schneider, L. Appleton, and T. McLemore: A reason for visit classification for ambulatory care [RVC]. *Vital and Health Statistics*. Series 2, No. 78. DHEW Pub. No. (PHS) 79-1352. Public Health Service, Washington, U.S. Government Printing Office, Feb. 1979.

**Table 8. Number and percent distribution of the 15 specific principal reasons for visit most commonly given during visits involving topical antimicrobial drugs: United States, 1980-81**

Rank	Most common reason for visit and RVC code <sup>1</sup>	Number of visits in thousands	Percent distribution
...	All topical antimicrobial drug visits . . . . .	46,034	100.0
1	Skin rash . . . . . (S860)	3,384	7.4
2	Earache or ear infection . . . . . (S355)	2,936	6.4
3	Vaginal discharge . . . . . (S760)	2,331	5.1
4	Other vaginal symptoms . . . . . (S765)	2,160	4.7
5	Abnormal sensations of the eye . . . . . (S320)	1,941	4.2
6	Skin lesion . . . . . (S865)	1,622	3.5
7	Postoperative visit . . . . . (T205)	1,573	3.4
8	Abnormal appearance of eyes . . . . . (S330)	1,195	2.6
9	Foreign body in eye . . . . . (J600)	1,035	2.2
10	Progress visit, NOS . . . . . (T800)	1,008	2.2
11	General medical examination . . . . . (X100)	962	2.1
12	Discharge from eye . . . . . (S310)	951	2.1
13	Skin irritations, NEC . . . . . (S870)	775	1.7
14	Acne or pimples . . . . . (S830)	750	1.6
15	Symptoms of eyelids . . . . . (S340)	680	1.5
...	All other reasons for visit . . . . .	22,729	49.4

<sup>1</sup>National Center for Health Statistics, D. Schneider, L. Appleton, and T. McLemore: A reason for visit classification for ambulatory care [RVC]. *Vital and Health Statistics*. Series 2, No. 78. DHEW Pub. No. (PHS) 79-1352. Public Health Service, Washington, U.S. Government Printing Office, Feb. 1979.

symptoms, and 1 to ear symptoms. Twelve of these 15 reasons explicitly mention specific body areas with which topical antimicrobial drugs are concerned. The relatively large proportions of visits precipitated by problems labeled as acute and/or new, the dominance of symptoms as the principal reasons for visit, and the contents of the most common patient complaints together reflect the often acute nature of the problems underlying the visits of interest.

**Diagnostic services and diagnoses**

Patients receiving topical antimicrobial drugs were ordered or provided with an average of 1.6 diagnostic services per visit, the same as all other patients. The types of services differed, however. The topical antimicrobial drug patients more frequently were ordered or provided with limited histories and/or exams (78.0 percent compared with 63.8 percent), Pap tests (8.0 percent compared with 4.2 percent), and vision tests (13.1 percent compared with 5.4 percent). Fewer of them received no diagnostic services (3.5 percent compared with 8.3 percent), general histories and/or exams (11.7 percent compared with 15.6 percent), X-rays (1.6 percent compared with 7.7 percent), and blood pressure checks (23.0 percent compared with 34.7 percent). (See table 9.)

By far the most common class of principal diagnosis assigned to patients receiving topical antimicrobial drugs was diseases of the nervous system and sense organs.<sup>4</sup> (See

<sup>4</sup>Based on Public Health Service and Health Care Financing Administration: *International Classification of Diseases, 9th Revision, Clinical Modification*. DHHS Pub. No. (PHS) 80-1260. Public Health Service, Washington, U.S. Government Printing Office, Sept. 1980.

**Table 9. Number and percent of office visits involving a topical antimicrobial drug by diagnostic service ordered or provided: United States, 1980-81**

Diagnostic service	Number of visits in thousands	Percent <sup>1</sup>
All topical antimicrobial drug visits . . . . .	46,034	100.0
No diagnostic services . . . . .	1,597	3.5
Limited history/examination . . . . .	35,914	78.0
General history/examination . . . . .	5,368	11.7
Pap test . . . . .	3,658	8.0
Clinical lab test . . . . .	9,079	19.7
Blood pressure check . . . . .	10,601	23.0
Vision test . . . . .	6,008	13.1
X-ray . . . . .	744	1.6
Other . . . . .	3,432	7.5

<sup>1</sup>Column does not add to 100.0 percent because multiple diagnostic services were ordered or provided during some visits.

table 10.) The 13.3 million patients who were so diagnosed constituted 28.8 percent of the entire group; in contrast, only 8.6 percent of all other patients had this type of principal diagnosis. Three other major categories of principal diagnosis also were much more common among patients receiving topical antimicrobial drugs than among other patients: infectious and parasitic diseases (15.2 percent compared with 2.8 percent), diseases of the genitourinary system (12.5 percent compared with 5.6 percent), and diseases of the skin and subcutaneous tissue (14.5 percent compared with 5.6 percent). These groups of diagnoses clearly are related to the type of drug under consideration. This relationship between diagnosis and therapeutic medication can be seen in more detail in table 11, which presents the 15 most common specific diagnoses. All of them are concerned with the body sites to which topical antimicrobial drugs are applied, and together they account for more than half (52.1 percent) of all visits involving these drugs.

As was expected, the most common diagnoses varied among the groups of patients receiving the different types of

**Table 10. Number and percent distribution of office visits involving topical antimicrobial drugs by class of principal diagnosis: United States, 1980-81**

Diagnostic class	Number of visits in thousands	Percent distribution
All topical antimicrobial drug visits . . . . .	46,034	100.0
Infectious and parasitic diseases . . . . .	6,985	15.2
Diseases of the nervous system and sense organs . . . . .	13,254	28.8
Diseases of the respiratory system . . . . .	1,666	3.6
Diseases of the genitourinary system . . . . .	5,793	12.6
Diseases of the skin and subcutaneous tissue . . . . .	6,679	14.5
Injury and poisoning . . . . .	4,423	9.6
Factors influencing health status and contact with health service . . . . .	3,068	6.7
Other diagnoses <sup>1</sup> . . . . .	4,167	9.1

<sup>1</sup>Includes neoplasms; endocrine, nutritional, and metabolic diseases and immunity disorders; mental disorders; diseases of the circulatory system; diseases of the digestive system; diseases of the musculoskeletal system; symptoms, signs, and ill-defined conditions; and other, missing, and unknown diagnoses.

**Table 11. Number and percent distribution of the 15 specific principal diagnoses most commonly recorded during visits involving topical antimicrobial drugs: United States, 1980-81**

Rank	Most common principal diagnosis and ICD-9-CM code <sup>1</sup>	Number of visits in thousands	Percent distribution
	All topical antimicrobial drug visits . . . . .	46,034	100.0
1	Inflammatory disease of cervix, vagina, and vulva . . . . . (616)	3,570	7.8
2	Disorders of conjunctiva . . . (372)	3,394	7.4
3	Candidiasis . . . . . (112)	2,561	5.6
4	Disorders of external ear . . . (380)	2,367	5.1
5	Suppurative and unspecified otitis media . . . . . (382)	2,215	4.8
6	Dermatophytosis . . . . . (110)	1,775	3.9
7	Inflammation of eyelids . . . (373)	1,544	3.4
8	Contact dermatitis and other eczema . . . . . (692)	1,274	2.8
9	Diseases of sebaceous glands . . . . . (706)	1,125	2.4
10	Superficial injury of eye and adnexa . . . . . (918)	1,011	2.2
11	Cataract . . . . . (366)	729	1.6
12	Foreign body on external eye . . . . . (930)	632	1.4
13	Other disorders of eye . . . . (379)	607	1.3
14	Dermatomycosis, other and unspecified . . . . . (111)	595	1.3
15	Keratitis . . . . . (370)	578	1.3
...	All other diagnoses . . . . .	22,056	47.9

<sup>1</sup>Based on Public Health Service and Health Care Financing Administration: *International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM]*. DHHS Pub. No. (PHS) 80-1260. Public Health Service, Washington, U.S. Government Printing Office, Sept. 1980.

topical antimicrobial drug. For several of these drug groups, particular diagnoses accounted for a relatively large proportion of visits. Among patients receiving *ophthalmic antibacterial drugs*, disorders of conjunctiva was the principal diagnosis for 28.2 percent (944,000 visits) of all patients receiving this type of drug. Among patients receiving the related *ophthalmic anti-bacterial-corticosteroid mixtures*, the most common principal diagnoses were disorders of conjunctiva (866,000 visits, or 19.4 percent), inflammation of eyelids (590,000 visits, or 13.2 percent), and cataract (584,000 visits, or 13.1 percent). Two diagnoses accounted for almost three-fourths of all patients receiving *otic drugs*: disorders of external ear (603,000 visits, or 40.5 percent) and suppurative and unspecified otitis media (486,000 visits, or 32.7 percent). Similarly, among patients receiving *vaginal drugs*, two diagnoses accounted for half of all visits: inflammatory disease of cervix, vagina, and vulva (2,693,000 visits, or 34.0 percent); and candidiasis (1,409,000 visits, or 17.8 percent). Among patients receiving *other topical antifungal drugs*, five diagnoses reached reliable levels: dermatophytosis (1,528,000 visits, or 21.9 percent); candidiasis (903,000 visits, or 12.9 percent); diseases of sebaceous glands (856,000 visits, or 12.3 percent); other and unspecified dermatomycosis (561,000 visits, or 8.0 percent); and inflammatory disease of cervix, vagina, and vulva (473,000 visits, or 6.8 percent). Two principal diagnoses attained reliable levels among patients receiving *other topical anti-infectives*: disorders of conjunctiva (1,210,000 visits, or 9.4 percent) and impetigo (529,000 visits, or 5.1 percent). Finally, of the patients receiv-

ing other topical anti-infective and corticosteroid mixtures, four principal diagnoses appeared in reliable numbers: disorders of external ear (1,673,000 visits, or 16.1 percent), suppurative and unspecified otitis media (1,473,000 visits, or 14.2 percent), contact dermatitis and other eczema (751,000 visits, or 7.2 percent), and disorders of conjunctiva (478,000 visits, or 4.6 percent).

**Therapeutic services, patient disposition, and visit duration**

An average of 0.5 nonmedication therapeutic services were ordered or provided during each visit made by patients receiving topical antimicrobial drugs. This was not significantly different from the average for all other patients (0.6). Statistics on specific types of therapeutic services are displayed in table 12. Slightly more than half the patients receiving topical antimicrobial drugs (26.0 million, or 56.4 percent) obtained no nonmedication therapeutic services, a proportion that did not differ from that for all other patients. The topical antimicrobial drug patients, however, did receive office surgery at a higher rate (12.4 percent compared with 7.2 percent) and psychotherapy or therapeutic listening, diet counseling, and family or social counseling at lower rates (0.9 percent compared with 5.1 percent, 3.2 percent compared with 8.3 percent, and 0.9 percent compared with 2.1 percent, respectively). Thus patients receiving topical antimicrobial drugs did not differ from other patients with respect to nonmedication therapeutic services rendered as much as they did with respect to diagnostic services performed.

The disposition of patients receiving topical antimicrobial drugs differed somewhat from that of other patients, but these differences also were not large ones. No followup was ordered for virtually identical proportions of each type of patient (11.4 percent of patients receiving topical antimicrobial drugs and 11.5 percent of all others). Patients who received topical antimicrobial drugs were instructed to return at a specified time somewhat less frequently than others (56.5 percent compared with 60.8 percent), but were requested to return if needed somewhat more frequently (29.6 percent compared with 22.4 percent). (See table 13.)

**Table 12. Number and percent of office visits involving topical antimicrobial drugs with nonmedication therapeutic services ordered or provided, by type of service: United States, 1980-81**

<i>Nonmedication therapeutic service</i>	<i>Number of visits in thousands</i>	<i>Percent<sup>1</sup></i>
All topical antimicrobial drug visits . . . . .	46,034	100.0
No nonmedication therapeutic services . . . . .	25,960	56.4
Physiotherapy . . . . .	1,691	3.7
Office surgery . . . . .	5,690	12.4
Family planning . . . . .	1,193	2.6
Psychotherapy or therapeutic listening . . . . .	*420	*0.9
Diet counseling . . . . .	1,478	3.2
Family or social counseling . . . . .	*417	*0.9
Medical counseling . . . . .	11,181	24.3
Other nonmedication therapy . . . . .	986	2.1

<sup>1</sup>Column does not add to 100.0 percent because multiple nonmedication therapy services were ordered or provided during some visits.

**Table 13. Number and percent distribution of office visits involving topical antimicrobial drugs by patient disposition: United States, 1980-81**

<i>Patient disposition</i>	<i>Number of visits in thousands</i>	<i>Percent distribution</i>
All topical antimicrobial drug visits . . . . .	46,034	100.0
No followup . . . . .	5,228	11.4
Return at specified time . . . . .	25,998	56.5
Return if needed . . . . .	13,640	29.6
Other . . . . .	2,826	6.1

NOTE: Categories do not add to totals because more than one disposition was recorded for some patients.

**Table 14. Average duration of office visits involving topical antimicrobial drugs by type of drug: United States, 1980-81**

<i>Type of topical antimicrobial drug involved in visit</i>	<i>Average duration of visit</i>
	Minutes
All topical antimicrobial drugs . . . . .	13.9
Ophthalmic antibacterial drugs . . . . .	15.7
Ophthalmic antibacterial-corticosteroid mixtures . . . . .	12.7
Otic drugs . . . . .	11.7
Vaginal drugs . . . . .	15.8
Other topical antifungal drugs . . . . .	13.3
Other topical anti-infectives . . . . .	14.2
Other topical anti-infective and corticosteroid mixtures . . . . .	13.0

**Table 15. Number and percent distribution of co-occurring medications during office visits involving topical antimicrobial drugs by therapeutic category: United States, 1980-81**

<i>Therapeutic category<sup>1</sup></i>	<i>Number of drug mentions in thousands</i>	<i>Percent distribution</i>
All co-occurring drug mentions . . . . .	37,490	100.0
Anti-infective agents . . . . .	12,045	32.1
Skin and mucous membrane preparations . . . . .	6,109	16.3
Central nervous system drugs . . . . .	3,052	8.1
Eye, ear, nose, and throat preparations . . . . .	2,944	7.9
Hormones and synthetic substitutes . . . . .	2,837	7.6
Antihistamines . . . . .	2,431	6.5
Cardiovascular drugs . . . . .	1,376	3.7
Vitamins . . . . .	1,042	2.8
Electrolytic, caloric, and water balance agents . . . . .	985	2.6
Serums, toxoids, and vaccines . . . . .	966	2.6
Autonomic drugs . . . . .	933	2.5
Expectorants and cough preparations . . . . .	674	1.8
All other <sup>2</sup> . . . . .	2,095	5.6

<sup>1</sup>American Hospital Formulary Service Classification System and Therapeutic Category Codes. American Society of Hospital Pharmacists, Inc.

<sup>2</sup>Includes antineoplastic agents; blood derivatives; blood formation and coagulation agents; diagnostic agents; enzymes; gastrointestinal drugs; gold compounds; heavy metal antagonists; local anesthetics; oxytocics; radioactive agents; spasmolytic agents; unclassified therapeutic agents; devices; pharmaceutical aids; and undetermined agents.

The average duration of visits involving topical antimicrobial drugs (shown in table 14) was 13.9 minutes, compared with 15.5 minutes for all other visits. The shortest visits were those involving *otic drugs* (11.7 minutes), and the longest were those involving *vaginal drugs* (15.8 minutes) and *ophthalmic antibacterial drugs* (15.7 minutes).

**Co-occurring drugs**

As table 15 shows, there were 37.5 million other drugs ordered or provided during visits involving topical antimicrobial drugs. This was an average of 0.82 other drugs per visit. Of these drug mentions, almost one-third (32.1 percent) were classified in the therapeutic category of anti-infective agents. Skin and mucous membrane preparations also accounted for a notable proportion (16.3 percent).

Only seven specific other drugs reached reliable frequencies. (See table 16.) These accounted for only 13.8 percent of all co-occurring drug mentions, reflecting the fact that a wide variety of other drugs, rather than a specific few, were utilized during topical antimicrobial drug visits. It is noteworthy, however, that all of the leading other drugs are classified as anti-

**Table 16. Number and percent distribution of the 7 co-occurring drugs most frequently mentioned during office visits involving topical antimicrobial drugs: United States, 1980-81**

Rank	Name of drug	Number of drug mentions in thousands	Percent distribution
...	All co-occurring medications .....	37,490	100.0
1	Ampicillin .....	1,168	3.1
2	Tetracycline .....	862	2.3
3	Flagyl (metronidazole) .....	798	2.1
4	Erythromycin .....	781	2.1
5	Amoxicillin .....	624	1.7
6	Amoxil (amoxicillin) .....	475	1.3
7	E.E.S. (erythromycin) .....	461	1.2
...	All other .....	32,320	86.2

infective agents that may be administered systemically. This suggests that a high priority in the drug treatment of the cases inspected here is a multipronged attack on the infective diseases precipitating the visits.

## Technical notes

### Source of data and sample design

The estimates presented in this report are based on the findings of the National Ambulatory Medical Care Survey (NAMCS), a sample survey of office-based care conducted annually from 1973 through 1981 by the National Center for Health Statistics. The target universe of NAMCS is composed of office visits made by ambulatory patients to non-Federal and noninstitutional physicians who are principally engaged in office-based, patient-care practice. Visits to physicians practicing in Alaska and Hawaii are excluded from the range of NAMCS, as are visits to anesthesiologists, pathologists, and radiologists.

NAMCS uses a multistage probability sample design that involves a step sampling of primary sampling units, physicians' practices within primary sampling units, and patient visits within physicians' practices. The physician sample (5,805 physicians for 1980 and 1981) was selected from master files maintained by the American Medical Association and the American Osteopathic Association. Those members of the sample who proved to be in scope and eligible participated at a rate of 77.3 percent. Responding physicians completed visit records for a systematic random sample of office visits made during a randomly assigned weekly reporting period. Telephone contacts were excluded. During 1980 and 1981 responding physicians completed 89,447 visit records on which they recorded 97,796 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 the National Center for Health Statistics, was responsible for the field operations of the survey.

### Sampling errors and rounding

The standard error is 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. In this report, any estimate that exceeds a relative standard error of 30 percent is marked with an asterisk. Table I should be used to obtain the relative standard error for aggregates of office visits or for mentions of drugs by specific name (for example, Darvon). Table II should be used to obtain the relative standard error for drug mentions expressed as drug groups (for example, the analgesic drug family).

In this report, the determination of statistical significance is based on the Bonferroni modification of the *t*-test with a critical value of 1.96 (0.05 level of significance). Terms relating to differences, such as "higher" or "less," indicate that the differences are statistically significant. Terms such as "similar" or "no difference" mean that no statistical significance exists between the estimates being compared. A lack of comment in a comparison between any two estimates does not mean that the difference was tested and was not significant.

In the tables of this report estimates have been rounded to

**Table I. Approximate relative standard errors of estimated number of office visits and of drug mentions when drug is listed by product name (for example, Darvon), based on all physician specialties: National Ambulatory Medical Care Survey, 1980-81**

<i>Estimated number of office visits or specific drug mentions</i>	<i>Relative standard error</i>
Number in thousands	Percent
*200.....	*44.8
*400.....	*31.7
*450.....	*30.0
600.....	26.0
800.....	22.6
1,000.....	20.2
2,000.....	14.5
5,000.....	9.5
10,000.....	7.1
20,000.....	5.6
50,000.....	4.4
100,000.....	3.9
200,000.....	3.6
500,000.....	3.5
1,000,000.....	3.4

EXAMPLE OF USE OF TABLE: An aggregate estimate of 35,000,000 office visits has a relative standard error of 5.0 percent or a standard error of 1,750,000 visits (5.0 percent of 35,000,000 visits).

**Table II. Approximate relative standard errors of estimated number of drug mentions when drugs appear in groups (for example, the analgesic drug family), based on all physician specialties: National Ambulatory Medical Care Survey, 1980-81**

<i>Estimated number of grouped drug mentions</i>	<i>Relative standard error</i>
Number in thousands	Percent
*200.....	*54.2
*400.....	*38.5
*600.....	31.5
*650.....	*30.0
800.....	27.3
1,000.....	24.5
2,000.....	17.6
5,000.....	11.6
10,000.....	8.7
20,000.....	6.8
50,000.....	5.3
100,000.....	4.7
200,000.....	4.4
500,000.....	4.2
1,000,000.....	4.1

EXAMPLE OF USE OF TABLE: An aggregate estimate of 30,000,000 drug mentions has a relative standard error of 7.0 percent or a standard error of 2,100,000 mentions (7.0 percent of 30,000,000 mentions).

the nearest thousand. For this reason, detailed estimates do not always add to totals.

### Definitions

An *office* is a place that physicians identify as a location for their ambulatory practice. Responsibility for patient care

and professional services rendered in an office resides with the individual physician rather than an institution.

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

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

An *acute problem* is a morbid condition with a relatively sudden or recent onset (within 3 months of the visit).

A *chronic problem* is a morbid condition that existed for 3 months or longer before the visit. The care indicated is of a regular, maintenance nature.

A *chronic problem flareup* is a sudden exacerbation of a preexisting chronic condition.

*Nonillness care* denotes health examinations and care provided for presumably healthy persons. Examples of nonillness care include prenatal and postnatal care, annual physicals, well-child examinations, and insurance examinations.

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### 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 standard of reliability or precision
#	Figure suppressed to comply with confidentiality requirements

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