

Characteristics of Recipients of Free Prescription Drug Samples: A Nationally Representative Analysis

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Free prescription drug samples are used widely in the United States. The retail value of drug samples distributed in the United States totaled more than \$4.9 billion in 1996 and climbed to over \$16.4 billion in 2004.¹⁻³

Controversy surrounds the use of free samples.⁴ Studies have described potential safety problems,^{5,6} health professionals who divert samples for self-administration or resale,⁷⁻¹⁰ the influence of pharmaceutical representatives who distribute samples,¹¹⁻¹³ and the contribution of samples to rising drug and health insurance costs.¹⁴⁻¹⁶ In addition, numerous studies suggest that free samples may influence the prescribing behavior of physicians and trainees.^{7,14,16-22} In its most recent report, the Institute of Medicine has called for further investigation of sample use, citing concerns over patient safety, provider prescribing habits, and consumer adherence to prescribed regimens.²³

Nonetheless, many physicians believe that samples allow them to give free medications to their neediest patients.^{10,15} This view is also held by the Pharmaceutical Research and Manufacturers of America, whose vice president wrote in the *New York Times*, "many uninsured and low-income patients benefit from these free samples, which often serve as a safety net."²⁴

However, few data are available on recipients of free samples. Although a few studies have looked at the receipt of free samples in selected populations,^{6,25,26} no national study has examined this issue. We analyzed the receipt of free samples using nationally representative data from the United States in 2003 to determine the characteristics of free sample recipients.

METHODS

We analyzed the Agency for Healthcare Research and Quality's 2003 Medical Expenditure Panel Survey (MEPS), Household

Objectives. Free prescription drug samples are used widely in the United States. We sought to examine characteristics of free drug sample recipients nationwide.

Methods. We analyzed data on 32 681 US residents from the 2003 Medical Expenditure Panel Survey (MEPS), a nationally representative survey.

Results. In 2003, 12% of Americans received at least 1 free sample. A higher proportion of persons who had continuous health insurance received a free sample (12.9%) than did persons who were uninsured for part or all of the year (9.9%; $P < .001$). The poorest third of respondents were less likely to receive free samples than were those with incomes at 400% of the federal poverty level or more. After we controlled for demographic factors, we found that neither insurance status nor income were predictors of the receipt of drug samples. Persons who were uninsured all or part of the year were no more likely to receive free samples (odds ratio [OR]=0.98; 95% confidence interval [CI]=0.087, 1.11) than were those continuously insured.

Conclusions. Poor and uninsured Americans are less likely than are wealthy or insured Americans to receive free drug samples. (*Am J Public Health.* 2008;98:XXX-XXX. doi:10.2105/AJPH.2007.114249)

Component. MEPS is a nationally representative longitudinal survey of the civilian noninstitutionalized US population. The MEPS cohort is drawn from respondents to the previous year's National Health Interview Survey, conducted by the National Center for Health Statistics at the Centers for Disease Control and Prevention. The National Health Interview Survey uses a stratified, multistage probability cluster sampling design with an oversampling of Blacks and Hispanics.²⁷ The response rate for the survey in 2003 was 64.5%.

MEPS surveyors query respondents 5 times over 2.5 years. Interviewers travel to the homes of respondents and conduct in-person, computer-assisted interviews. The MEPS surveyors collect detailed information on health care expenditures, health care utilization, health insurance, and sociodemographic characteristics, as well as information on all outpatient medications used by each household member. The Agency for Healthcare Research and Quality provides weights that adjust for the complex sample design and survey nonresponse and facilitate extrapolation to the US population as a whole.

In every interview, MEPS surveyors ask participants to name all filled prescriptions received in conjunction with a hospital discharge, emergency department visit, or medical outpatient visit. Surveyors then ask respondents to name any medications purchased or received that have not already been listed. The surveyor then asked: "Since [the last interview] did [you] get any free samples of prescribed medicines from a medical or dental provider that we have not yet talked about?"²⁸ MEPS defines free samples as "limited amounts of a prescription medication which are given out by doctors to patients free of charge, sometimes in lieu of a written or verbal prescription."²⁸

If a respondent answers "yes" to this question, the names of any medicines received as samples are obtained.

We were interested in 3 questions that required us to analyze the complex MEPS data set in different ways: (1) Are free drug samples more frequently given to uninsured and low-income persons than to insured and affluent persons? (2) Does type of drug coverage influence the likelihood of receiving free samples? (3) Which drugs are most commonly distributed as samples?

Effect of Insurance and Income

We used several approaches to examine whether free drug samples were given more frequently to uninsured and low-income persons. First, we analyzed bivariate associations between receipt of at least 1 free sample in 2003, and insurance status and income, respectively. For this analysis, we classified respondents as “insured all year” if they indicated having some form of hospital or medical insurance, or both, for every month of 2003. We classified respondents as “uninsured part or all year” if they reported having insurance during some but not all months or if they had no insurance during any month of 2003. We excluded individuals for whom insurance information was not continuously available for all of 2003 (2.8% of respondents). We defined low-income persons as those with family incomes less than 200% of the federal poverty line, middle-income persons as those with incomes between 200% and 400% of the poverty line, and high-income persons as those whose incomes were more than or equal to 400% of the poverty line. In 2003, the federal poverty line was set at \$18 400 for a family of 4.

Next, we sought to understand the effect of other demographic features on the relation between receipt of free drug samples and insurance status or income. We developed a multivariate model and used the same definitions for outcome (receipt of at least 1 free sample in 2003), insurance classification, and income as were used in our bivariate analyses. We examined the effect of insurance and income on receipt of free samples and we controlled for demographic features including age, gender, race, Hispanic ethnicity, place of birth, education level, and language spoken. Information on all demographic features, including ethnicity and race, was provided by the respondents through the survey questionnaire. To determine Hispanic ethnicity, respondents were asked to characterize themselves as either Hispanic or non-Hispanic; to determine race, respondents were asked to characterize their race as White, Black, American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, or multiple races. For our analysis we categorized race as White versus non-White.

We also performed a secondary, exploratory multivariate analysis to evaluate the role of potential intermediary variables related to access to care: site of usual medical care (hospital based vs office vs no usual site of care) and total number of prescription medications received including refills.

Effect of Drug Coverage

We then examined the effect of prescription drug coverage on sample receipt. For this analysis we focused on a single round of MEPS interviews that collected data for the preceding 2 to 6 months. We conducted this single-round analysis to identify as accurately as possible the type of drug coverage at the time any sample was received. We analyzed bivariate associations between type of drug coverage during the interview round and receipt of at least 1 free sample in the interview round.

We categorized drug coverage as (1) no health insurance and no drug coverage, (2) Medicaid at any point in the round, (3) non-Medicare private insurance with drug coverage, (4) non-Medicare private insurance without drug coverage, (5) Medicare with supplemental drug coverage, and (6) Medicare without supplemental drug coverage. We chose the interview round for our analysis by selecting the only MEPS interview that collected data for a period that both began and ended in 2003 for every respondent.

For our estimate of the most frequently distributed drugs, we reviewed the names of all medications given as samples during calendar year 2003. To provide a comparison, we repeated this analysis using the 2002 MEPS data. Because the MEPS data do not indicate how many separate samples of each drug a patient received, we were able to estimate the top 10 most frequently named sample medications but were not able to establish an exact count.

Statistical Methods

We calculated the number of people who received free drug samples in 2003 as a percentage of all respondents and as a percentage of all those taking 1 or more prescription drugs. We used the χ^2 test to study the bivariate association between categorical predictors and receipt of free drug samples.

We constructed a principle multivariate model of predictors of sample receipt by

initially including our income and insurance variables in the logistic regression model. We then entered into the model all demographic variables that were significant on bivariate analysis ($P < .1$) or that we considered to be clinically significant. We ran a secondary multivariate model that included income, insurance, and all significant demographic variables and added (1) site of usual medical care and (2) total number of prescription medications taken.

We used the SAS version 9.1 (SAS Institute Inc, Cary, NC). To account for sample design effects, we used SAS survey commands that make it possible to estimate confidence intervals in the presence of stratification and clustering.

RESULTS

In 2003, 12% of Americans received a free drug sample. Among persons who received prescription drugs in 2003, 18.7% received at least 1 drug as a free sample.

Table 1 displays the demographic and health care use characteristics of sample recipients and nonrecipients. Low-income respondents who were uninsured all or part of 2003 were less likely to receive free samples than were high-income and insured respondents. Among persons who were insured all year, 12.9% received a sample, versus 9.9% of those uninsured for part or all of the year ($P < .001$). Of all persons who received a sample, 82.1% were insured all year; only 17.9% of sample recipients were uninsured for all or part of the year. Similarly, of all sample recipients, 71.9% had an income 200% or more of the federal poverty line, whereas 28.1% had an income less than 200% of the poverty line. The poor were the least likely to receive free samples, whereas individuals in the highest income category were the most likely to receive free samples (10.8% of low-income persons received at least 1 sample vs 12.3% of middle-income persons vs 12.8% of higher-income persons; $P < .001$ for ordered categories).

Non-Whites, Hispanics, non-English speakers, and persons born outside the United States were less likely to receive a free sample than were Whites, non-Hispanics, English speakers, and persons born in the United States, respectively. Respondents who usually

TABLE 1—Percentage of Respondents Who Received at Least 1 Free Prescription Drug Sample in 2003, by Demographic Group: Medical Expenditure Panel Survey, 2003

Variable	Demographic Group as % of Total Population ^a	% of Demographic Group that Received at Least 1 Free Sample (95% CI)
Total (n = 32 681)	100	12.0 (11.4, 12.6)
Total persons who received prescription drugs (n = 19 848)	64.4	18.7 (17.8, 19.6)
Insurance status ^b		
Uninsured part or all year	22.1	9.9 (9.0, 10.9)
Insured all year	77.9	12.9 (12.2, 13.6)
Income as % of poverty line ^b		
<200%	31.2	10.8 (9.9, 11.7)
200–399%	31.0	12.3 (11.3, 13.3)
≥400%	37.7	12.8 (11.9, 13.8)
Combined insurance and income status ^b		
<200% of poverty line and uninsured part or all year	10.9	9.5 (8.2, 10.8)
≥200% of poverty line or insured all year	89.1	12.3 (11.7, 13.0)
Age, ^b y		
0–20	30.1	6.0 (5.4, 6.7)
21–44	33.9	11.4 (10.6, 12.3)
45–64	23.9	15.7 (14.5, 17.0)
≥65	12.2	21.2 (19.3, 23.1)
Gender ^b		
Men	49.0	9.1 (8.4, 9.7)
Women	51.1	14.8 (14.0, 15.6)
Race ^b		
Non-White	19.1	8.5 (7.7, 9.3)
White	81.0	12.8 (12.1, 13.5)
Ethnicity ^b		
Hispanic	14.0	6.0 (5.2, 6.8)
Non-Hispanic	86.0	13.0 (12.3, 13.7)
Education ^b		
Younger than 16 years	24.1	5.7 (5.1, 6.4)
No degree	14.8	11.6 (10.4, 12.8)
General educational development	3.2	16.0 (13.3, 18.7)
High school diploma	34.2	14.3 (13.4, 15.3)
Undergraduate degree	12.1	13.5 (11.9, 15.2)
Master's degree	4.7	15.3 (12.8, 17.8)
Doctorate or other degree	6.9	16.9 (14.7, 19.2)
Place of birth ^b		
Outside United States	12.8	7.3 (6.4, 8.2)
In United States	87.2	12.8 (12.2, 13.5)
Language ^b		
Non-English speaking	11.8	5.1 (4.3, 6.0)
English speaking	88.2	13.1 (12.4, 13.8)
Site of usual medical care ^b		
No usual provider	18.9	6.3 (5.6, 7.0)
Hospital (clinic or emergency department)	13.5	10.0 (8.6, 11.3)
Office	67.6	14.3 (13.5, 15.1)

Continued

received their medical care in an office were much more likely to receive samples (14.3%) than were those who used hospital clinics or hospital emergency departments (10.0%) or persons with no usual provider (6.3%; $P < .001$). Persons who were uninsured part or all of the year were much more likely to lack a usual source of medical care (42.9% vs 12.1% of those insured continuously; $P < .001$) and were less likely than those insured continuously to report receiving medical care in an office (14.5% of uninsured part or all year vs 85.5% of continuously insured; $P < .001$). They were also less likely than those insured continuously to report receiving medication in 2003 (46.5% vs 70.1% of those insured continuously; $P < .001$).

Table 2 presents the results of our multivariate analyses of sample receipt. In our principle model, we analyzed income and insurance as predictors of the receipt of free drug samples; we also controlled for age, gender, race, Hispanic versus non-Hispanic ethnicity, place of birth (United States vs foreign born), education level, and language spoken. Persons who were uninsured for part or all of the year were no more likely to receive free samples (odds ratio [OR]=0.98; 95% confidence interval [CI]=0.87, 1.11) than were those continuously insured. Likewise, being in the lowest income group was not a significant predictor of sample receipt (OR=1.05; 95% CI=0.92, 1.19).

We constructed a secondary, exploratory model, keeping all of the afore-mentioned demographic variables and adding 2 intermediary variables related to access to health care: the number of prescription medications received and the site of usual medical care. In this model, persons who were uninsured for part or all of the year were more likely than those insured continuously to receive free samples (OR=1.25; 95% CI=1.10, 1.43). The association between income and receipt of free samples remained nonsignificant.

In our bivariate analysis of type of drug coverage and receipt of free drug samples during the 2- to 6-month period in 2003 (Table 3), respondents with Medicaid at any point in the round had the lowest likelihood of receiving a sample (4.12%), followed by those with no insurance coverage (4.66%).

TABLE 1—Continued

No. of medications in 2003 (by quartile for those who received medications) ^b		
0	35.6	0.0 (—)
1-2 (1st quartile)	18.1	10.6 (9.6, 11.6)
3-6 (2nd quartile)	13.7	16.4 (14.9, 17.9)
7-18 (3rd quartile)	16.5	21.3 (19.7, 22.9)
19-500 (4th quartile)	16.0	27.0 (25.0, 29.0)

Note. CI = confidence interval.

^aWeighted percentages are representative of the noninstitutionalized US civilian population. Totals may not add to 100 because of rounding.

^b $P < .001$, for χ^2 analysis measuring difference between categories for this variable.

Table 4 shows that the 3 most frequently named free drug samples in 2003 were: (1) Lipitor (atorvastatin), (2) Allegra (fexofenadine), and (3) Advair diskus (fluticasone/salmeterol). The 3 most frequently prescribed drug samples in 2002 were: (1) Vioxx (rofecoxib), (2) Lipitor (atorvastatin), and (3) Celebrex (celecoxib).

DISCUSSION

To our knowledge, ours was the first population-based study of free drug sample distribution. We found that 12% of US residents received free samples during 2003 but less than one third of all sample recipients were low income and less than one fifth of all sample recipients were uninsured at any point during the year. Indeed, the poor were less likely to receive free samples than were those with a higher income, and the uninsured were less likely to receive free samples than were those with insurance coverage.

Several other vulnerable groups, including non-Whites, Hispanics, non-English-speakers, and persons born outside the United States were also less likely to receive a free sample than were those born in the United States. In a study of Medicare patients in Hawaii, Taira et al. similarly found that being White was associated with a greater likelihood of receiving a drug sample.²⁶ Although overt discrimination might explain the racial and ethnic disparities, we suspect that they reflect unmeasured differences in overall access to care. Persons from these minority groups may also be seeing providers who distribute fewer samples. We found that women and older persons had a greater likelihood of receiving samples, which was possibly a reflection of increased use of health care services by these groups.

Our exploratory multivariate model suggests that the relation of health coverage and affluence to sample receipt is mediated by 2 access-related factors: site of usual medical care and total use of pharmacotherapy. Office-based medical care recipients were more likely to have received at least 1 free drug sample. If we include site of medical care in our multivariate model, uninsured persons appear more likely to receive a free sample than do insured persons. We interpret this finding to reflect office-based practitioners' sincere effort to give free samples to their neediest patients. Unfortunately, these efforts do not appear to compensate for larger access barriers that prevent uninsured and other disadvantaged patients from consulting physicians who are office based. People who were uninsured in 2003 were more likely to use hospital clinics or hospital emergency departments or to report no usual source of care and were less likely to have purchased or received medication compared with people who were insured.

Previous studies have looked at receipt of free samples in selected populations and generated similar findings. Stevens et al.²⁵ found that insured adults with asthma were more likely to receive samples than were their uninsured counterparts. A survey of elderly enrollees in a single health insurer in Hawaii²⁶ found that 50% to 60% had received a free sample in the previous 12 months. That study, like ours, found that race, ethnicity, and age were associated with likelihood of receiving a sample. Lack of drug coverage among insured persons was also associated with greater likelihood of receiving a sample.

Our study had several limitations. We do not have information on the total number of

pills received as samples and, therefore, we are unable to determine the percentage of total medications represented by free samples. Such information would be useful to obtain in future studies. We may have underestimated the total number of free samples received by respondents. Respondents may have forgotten to report samples that they received for brief durations earlier in the interview reference period, although the relatively short duration of interview reference periods (ranging from 2- to 6-month intervals) should have minimized recall bias. Poor or uninsured respondents may have perceived receipt of free samples as shameful or embarrassing and underreported these events. It is not our experience, however, that free samples carry such a stigma. Free samples obtained directly from manufacturers by mail order may have been undercounted, but as of 2002, the majority of such programs required that applications be filled out by a physician and (in approximately 83% of cases) samples be delivered to the doctor's office.²⁹ Hence, we believe that many, perhaps most, of such free medications would be classified as free samples in the MEPS data.

Free samples that were subsequently followed by filled prescriptions within a single interview reference period may have been undercounted, because the interviewer asked respondents about free samples received only after reviewing filled prescriptions. If 2 patients were each given a free sample along with prescriptions to be filled, the patient with lower income and no insurance is probably less likely to fill the prescription because of cost. Poor and uninsured respondents may therefore be more likely to report having received a sample in our survey design; if so, our study may understate the relation of social advantage to sample receipt.

Poor and uninsured Americans are less likely to receive free samples than those Americans with higher income and those with insurance coverage. Although physicians may target samples to needy patients who enter their offices, these individual efforts fail to counteract society-wide factors that determine access to care and selectively direct free samples to the affluent. Our findings suggest that free drug samples serve as a marketing tool, not as a safety net. ■

TABLE 2—Multivariate Odds of Free Drug Sample Receipt in 2003: Medical Expenditure Panel Survey, 2003

Variable	Principle Model, ^a OR (95% CI)	Exploratory Model, ^b OR (95% CI)
Insurance status		
Insured all year (Ref)	1	1
Uninsured part or all of 2003	0.98 (0.87, 1.11)	1.25 (1.10, 1.43)
Income as % of poverty line		
≥400% (Ref)	1	1
200–399%	1.08 (0.96, 1.22)	1.04 (0.92, 1.18)
<200%	1.05 (0.92, 1.19)	0.96 (0.84, 1.10)
Age, y		
0–20 (Ref)	1	1
21–44	1.50 (1.18, 1.92)	1.36 (1.06, 1.74)
45–64	2.04(1.58, 2.63)	1.39 (1.07, 1.80)
≥65	2.75 (2.11, 3.58)	1.53 (1.15, 2.03)
Gender		
Men (Ref)	1	1
Women	1.70 (1.57,1.85)	1.54 (1.41, 1.68)
Race		
Non-White (Ref)	1	1
White	1.44(1.27, 1.63)	1.38 (1.21, 1.57)
Ethnicity		
Hispanic (Ref)	1	1
Non-Hispanic	1.51 (1.26, 1.81)	1.35 (1.12, 1.63)
Education		
No high school diploma (Ref)	1	1
Younger than 16 years	0.74 (0.58,0.95)	0.73 (0.57, 0.94)
General educational development	1.17 (0.94,1.44)	1.17 (0.94, 1.45)
High school diploma	0.99 (0.86,1.13)	1.07 (0.93, 1.23)
Undergraduate degree	0.95 (0.79,1.15)	1.05 (0.87, 1.27)
Master's degree	1.05 (0.83, 1.33)	1.14 (0.90, 1.44)
Doctorate or other degree	1.25 (1.01,1.54)	1.34 (1.08, 1.67)
Place of birth		
Outside United States (Ref)	1	1
United States	1.33 (1.13,1.57)	1.20 (1.01, 1.41)
Language		
Non-English speaking (Ref)	1	1
English speaking	1.56 (1.23, 1.98)	1.50 (1.18, 1.90)
Site of usual medical care		
No usual site of care (Ref)		1
Hospital		1.32 (1.09, 1.60)
Office		1.88 (1.63, 2.16)
Total no. of prescription meds in 2003 ^c		1.02 (1.02, 1.02)

Note. OR = odds ratio; CI = confidence interval.

^aThis model included insurance status and income, and controlled for age, gender, race, Hispanic ethnicity, place of birth, education level, and language spoken.

^bThis model controlled for the factors controlled for in the principle model as well as site of usual medical care (hospital based vs office vs no usual site of care) and total number of prescription medications received including refills.

^cOR for each incremental increase of 1 drug.

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Contributors

All of the authors participated in designing the study, analyzing and interpreting the data, writing and revising the article. S.L. Cutrona, S. Woolhandler, and D.U. Himmelstein performed the statistical analysis. D.H. Bor provided supervision and obtained funding. S.L. Cutrona has had full access to all the data in the study and has final responsibility for the decision to submit for publication.

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Human Participant Protection

This study was deemed exempt from review by the Cambridge Health Alliance institutional review board.

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TABLE 3—Percentage of Respondents Receiving at Least 1 Free Drug Sample in a Single Interview Round in 2003, by Detailed Insurance Coverage: Medical Expenditure Panel Survey, 2003

Drug Coverage	Received at Least 1 Free Sample, % (95% CI)
No health insurance and no drug coverage	4.66 (3.57, 5.74)
Medicaid at any point in round	4.12 (3.21, 5.04)
Non-Medicare private insurance with drug coverage	5.80 (5.12, 6.49)
Non-Medicare private insurance without drug coverage	5.95 (3.65, 8.24)
Medicare with private supplemental drug coverage	10.43 (7.46, 13.40)
Medicare without supplemental drug coverage	12.78 (9.99, 15.58)

Note. CI = confidence interval.

TABLE 4—Most Frequently Reported Free Drug Samples: Medical Expenditure Panel Survey 2002–2003

2002	2003
1. Vioxx (rofecoxib)	1. Lipitor (atorvastatin)
2. Lipitor (atorvastatin)	2. Allegra (fexofenadine)
3. Celebrex (celecoxib)	3. Advair diskus
4. Allegra (fexofenadine)	(fluticasone/salmeterol)
5. Nexium (esomeprazole)	4. Celebrex (celecoxib)
6. Zoloft (sertraline)	5. Nexium (esomeprazole)
7. Norvasc (amlodipine)	6. Vioxx (rofecoxib)
8. Toprol XL (metoprolol)	7. Toprol XL (metoprolol)
9. Zocor (simvastatin)	8. Prevacid (lansoprazole)
10. Paxil (paroxetine)	9. Norvasc (amlodipine)
	10. Zoloft (sertraline)

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