Variations in Patients' Perceptions and Use of Generic Drugs: Results of a National Survey

Aaron S. Kesselheim, M.D., J.D., M.P.H.[1,3], *Joshua J. Gagne, Pharm.D., Sc.D.*[1,3],
Jessica M. Franklin, Ph.D.[1,3], *Wesley Eddings, Ph.D.*[1,3], *Lisa A. Fulchino, B.A.*[1,3], *Jerry Avorn, M.D.*[1,3],
and Eric G. Campbell, Ph.D.[2,3]

[1]Division of Pharmacoepidemiology and Pharmacoeconomics, Department of Medicine, Brigham and Women's Hospital, Boston, MA, USA;
[2]Mongan Institute for Health Policy, Massachusetts General Hospital, Boston, MA, USA; [3]Harvard Medical School, Boston, MA, USA.

BACKGROUND: Over 84 % of all prescriptions in the US are filled as generic drugs, though in prior surveys, patients reported concerns about their quality.

OBJECTIVE: We aimed to survey patients' perceptions and use of generic drugs.

DESIGN: Our survey (administered August 2014) assessed patients' skepticism about generic drug safety and effectiveness and how often they requested brand-name drugs. Chi-square tests and two-sample *t*-tests assessed associations between patient demographics and the outcomes.

PARTICIPANTS: Our sample frame was the CVS Advisor Panel, a national database of 124,621 CVS customers. We randomly selected 1450 patients with self-reported chronic conditions who filled at least one prescription in the prior 3 months.

MAIN MEASURES: We assessed how often patients reported asking their physicians to prescribe a brand-name over a generic drug in the last year, and "generic skepticism," defined as not believing generic drugs were as safe, effective, had the same side effects, and contained the same active ingredients as brand-name drugs.

KEY RESULTS: Of the 1,442 patients with valid addresses, 933 responded (65 % response rate) and 753 took the full survey. A vast majority (83 %) agreed that physicians should prescribe generic drugs when available, and 54 % said they had not asked their physicians to prescribe a brand-name drug over a generic in the past year. Most respondents considered generic drugs to be as effective (87 %) and safe (88 %) as their brand-name counterparts, and to have the same side effects (80 %) and active ingredients (84 %). Non-Caucasians were more likely than Caucasians to request a brand-name drug over a generic (56 % vs. 43 %, $p < 0.01$), and were also more skeptical of generic drugs' clinical equivalence (43 % vs. 29 %, $p < 0.01$).

CONCLUSIONS: We found a substantial shift towards more patients having positive views of generic drugs, but lingering negative perceptions will have to be overcome to ensure continued cost-savings and improved patient outcomes from generic drugs.

L ow-cost generic drugs currently make up over 84 % of all prescriptions in the US and have saved consumers over a trillion dollars in the last decade alone.[1,2] According to the Congressional Budget Office, drug spending per person increased by only 2 % per year, on average, between 2007 and 2010, compared with average growth of 13 % per year between 1999 and 2003, in large part due to the introduction of new generic drugs and greater use of them by consumers.[3]

However, the use of generic drugs remains controversial.[4–6] In recent years, quality or substitutability concerns relating to some generic drugs have been widely publicized[7]; for example, one large generic manufacturer pleaded guilty to distributing adulterated products resulting from inadequate manufacturing facilities.[8] There have been isolated cases of substandard generic products being withdrawn from the market.[9] In 2012, the Food and Drug Administration (FDA) changed the therapeutic rating of two versions of the generic antidepressant extended-release bupropion that were found to be non-bioequivalent, following reports describing adverse events or lack of therapeutic effectiveness in patients who switched from the brand-name version.[10]

Previous surveys of patients have documented that consumer uncertainty persists about the safety and effectiveness of generic drugs.[11,12] The most recent national US survey on this topic, conducted in 2007 by Shrank and colleagues, found that less than 40 % of patients preferred generic drugs over brand-name formulations.[5] Other surveys of patients have also suggested that views on generic drugs may differ based on certain demographic characteristics, including ethnicity, income, and education level.[11,13–15] Finally, some surveys have documented consumer misperceptions; for example, one survey in 2008 found that 40 % of respondents were not aware that generic drugs were less expensive than brand name drugs.[16] Another set of investigators reported that the lower cost of

generic drugs engendered skepticism concerning their effectiveness.[17] Uncertainty, misperceptions, and skepticism contribute to the preferences of some consumers for brand-name drugs, despite the availability of therapeutically equivalent generic drugs for the majority of widely used medications.[18] Such preferences have been estimated to cost the US health care system about $12 billion annually in excess drug costs.[19]

Due to the important economic and clinical role that generic drugs play in the US health care system, we conducted a national survey of patients to assess their perceptions of and use of generic drugs compared to their brand-name counterparts. We sought to identify relevant demographic characteristics that may predict preference for brand-name drugs over therapeutically equivalent generic formulations, as well as skepticism over the interchangeability of generic and brand-name drugs.

METHODS

Survey Design

We designed a new survey to collect information on patients' views of generic and brand-name drugs, and to specifically address their perceptions of the safety and effectiveness of these products. To enhance comparability, we adapted some questions from the survey by Shrank and colleagues.

Perceptions About Generic Drugs. First, to assess patients' perceptions about generic drugs, we asked whether they thought brand-name or generic prescription drugs were "more expensive than they should be", "priced about right", or "cheaper than they should be". We then asked whether respondents thought prescription drugs "that have been on the market for a long time" were likely to be safer, neither more nor less safe, or less safe than "drugs that are newly on the market." Similarly, we asked whether newer drugs were better than older ones, with the response options of "always, usually, sometimes, rarely, or never." We also asked respondents to quantify how often they specifically requested a brand-name drug over a generic alternative in the last year (never, once, 2-3 times, or 4 or more times). Other questions addressed how often respondents thought their doctors should prescribe generic drugs when one was available (always, usually, sometimes, rarely, or never), whether they thought Americans should use more, less or "about the same" amount of generic drugs than they do now, and to what extent they personally preferred generic drugs or brand-name drugs.

Perceptions About the Safety and Effectiveness of Generic Drugs. Using a five-point Likert scale (ranging from "definitely yes" to "definitely not"), we asked patients whether they felt generic drugs were as effective, as safe, had the same side effects, and had the same active ingredients as their brand-name versions. We asked about their level of comfort with asking their doctors for generic drugs, taking generic drugs prescribed by their doctors, and having pharmacists fill prescriptions for brand-name drugs with generic drugs—using a four-point Likert scale ranging from "very comfortable" to "very uncomfortable"—and whether they would approve of their health insurer requiring a switch from a brand-name to a generic version of the same drug.

Demographic Information. Finally, we collected age, gender, highest educational level attained, self-described race/ethnicity, total 2013 household income, perception of current health status, ZIP code of primary domicile, and number of prescriptions filled at a pharmacy in the last 3 months (1–4 vs. 5 or more). The survey was pilot-tested with a convenience sample of 12 patients and adjusted for understandability based on their responses, and then pretested in six additional respondents from within the survey sampling frame (not included in the final results). See Appendix for all questions. The project was approved by the Institutional Review Board of Brigham and Women's Hospital (the FDA Research Involving Human Subjects Committee had an authorization agreement with the Brigham and Women's Hospital IRB) .

Survey Sample

Our sampling frame was the CVS Advisor Panel, a proprietary database of 124,621 CVS customers with national representation who have pre-consented to participate in online survey research (88 % report at least minimal prescription drug insurance coverage). We identified all CVS panel members who had filled at least one prescription at a CVS retail pharmacy during the 3 months prior to the survey. From this group, we randomly selected 725 males and 725 females who had self-reported having a chronic disease to increase the likelihood of patients having experienced numerous fills and refills of generic drugs. Sampling was performed separately by gender to correct for the over-representation of women in the CVS advisor panel (87 %) and to create a sampled gender balance closer to the US population.

The first six questions of the survey included some demographic information and screening questions confirming the respondents had a chronic disease and assessing whether they had received at least one prescription drug in the last three months. Respondents who denied having a chronic disease or filling any prescription in the past 3 months were not given the full survey.

Survey Administration

The survey was administered online by Research Results, Inc. in August 2014. Participants received an introductory email explaining the purpose of the project, providing a web link to the survey, and offering two CVS Extra Bucks for starting the survey and an additional 15 CVS Extra Bucks for those completing the entire survey. Non-respondents were sent up to 11 email reminders to encourage participation. We excluded eight respondents found to have incorrect email addresses.

Statistical Analyses

To study the association between survey responses and demographics, we used two outcome variables. The first one was how often patients reported asking their physicians to prescribe a brand-name rather than a generic drug in the last year, which we dichotomized between never and any other answer (1 time, 2-3 times, 4 or more times). Second, we defined being a generic skeptic as answering "definitely not," "probably not," or "not sure" to any of the four questions addressing whether generic drugs were as safe as brand-name drugs, as effective as brand-name drugs, had the same number of side effects as brand-name drugs, and contained the same active ingredients as brand-name drugs (respondents answering "definitely yes" or "probably yes" to all four questions were defined as generic believers).

To assess demographic variations in responses to these questions, we used Pearson's chi-square test for categorical demographic variables and two-sample t-tests for continuous variables. We compared responses among Caucasians to non-Caucasians, since we did not have sufficient power to evaluate differences among demographic subgroups (see Appendix). To estimate adjusted associations we used logistic regression and likelihood-ratio tests. We used the Wilson method to find confidence intervals for proportions.[20] The analysis for each variable used all available observations, and no adjustments were made for multiple comparisons. All analyses were done in Stata 13.1 (StataCorp LP, College Station TX).

RESULTS

Of the 1,442 people in the sample, 933 responded, for a response rate of 65 %. Among respondents, 180 did not qualify for the full survey. Table 1 shows the characteristics of the final analytic cohort, which is similar to the prior national survey of patients by Shrank et al. (see Appendix).

Perceptions about Generic Drug Use

A vast majority of patients (83 %, 95 % confidence interval [CI]:80–86 %) reported that their doctor should "always" or "usually" prescribe a generic drug to them when one was available (Table 2). Slightly more than one-third (37 %, 95 % CI: 34–41 %) reported that they preferred taking a brand-name drug, and about two-thirds of respondents (68 %, 95 % CI 65–71 %) thought Americans should use more generic drugs. Ninety-four percent of respondents reported being "very comfortable" or "somewhat comfortable" asking their physicians to write prescriptions for generic drugs if one is available (95 % CI:92–96 %), while 97 % (95 % CI: 95–98 %) reported being "very comfortable" or "somewhat comfortable" taking a generic drug prescribed by their physician. However, about one-half of respondents reported requesting that their physicians prescribe brand-name drugs rather than generic drugs in the past year (46 %, 95 % CI: 42–49 %).

Table 1. Characteristics of National Generic Drug Survey Respondents

Characteristic	Respondents % (*n*/N respondents)*
Sex	
• Male	41 (306/742)
• Female	59 (436/742)
Age, mean years	50 (SD: 13)
Self-reported health status	
• Excellent	6 (43/742)
• Good	55 (410/742)
• Fair	34 (252/742)
• Poor	5 (37/742)
Prescriptions filled or refilled in last 3 months	
• 1–4	34 (251/742)
• 5 or more	66 (491/742)
Level of education	
• High school or less	11 (81/738)
• Some college	30 (224/738)
• College graduate	35 (259/738)
• Some graduate school	24 (174/738)
Race/ethnicity	
• African American	7 (48/733)
• Hispanic	6 (46/733)
• Asian/Pacific Islander	8 (61/733)
• Caucasian/White	80 (586/733)
• Other	1 (10/733)
Total 2013 household income	
• < $15,000	5 (38/728)
• $15–30,000	11 (78/728)
• $30–50,000	18 (131/728)
• $50–75,000	27 (195/728)
• $75–100,000	16 (120/728)
• > $100,000	23 (166/728)
Region of the country	
• Midwest	21 (155/742)
• Northeast	25 (187/742)
• South	42 (315/742)
• West	11 (85/742)

*Age reported in mean years. Denominators vary across questions because some respondents did not complete the entire survey

Perceptions About the Safety and Effectiveness of Generic Drugs

A vast majority of respondents also considered generic drugs to be interchangeable with brand-name drugs. As shown in Table 3, more than three-quarters of respondents considered generic drugs to be as effective (87 % [95 % CI: 85–90 %]) and safe (88 % [95 % CI: 86–91 %]) as their brand-name counterparts, and to have the same side effects (80 % [95 % CI: 77–83 %]), and the same active ingredients (84 % [95 % CI: 82–87 %]).

Perceptions About the Cost of Generic Drugs

Nearly all respondents (97 % [95 % CI: 96–98 %]) reported that generic drugs were less expensive than brand-name drugs. We found that 95 % (95 % CI: 93–96 %) of respondents considered brand-name drugs to be more expensive than they should be, while 82 % (95 % CI: 79–85 %) of respondents believed generic drugs were priced about right. Interestingly, 105 respondents (14 % [95 % CI: 12–17 %]) also thought generic drugs were more expensive than they should be, with the remaining 4 % (95 % CI: 3–5 %) finding generic drugs cheaper than they should be.

Table 2. Patients' Perceptions about Use of Generic Drugs

Perception of	% (95 % Confidence Interval)	n/N respondents*
Whether your doctor should prescribe a generic drug for you if one is available		
Always	45 (42, 49)	334/740
Usually	38 (35, 42)	282/740
Sometimes	16 (14, 19)	119/740
Rarely/never	1 (0.3, 1.6)	5/740
Safety of prescription drugs on the market for a long time vs. drugs newly on the market		
Safer	53 (50, 57)	395/739
Neither more nor less safe	46 (42, 49)	338/739
Less safe	1 (0.4, 1.8)	6/739
Whether newer drugs are better than older ones		
Always/usually	18 (15, 20)	130/740
Sometimes	80 (77, 83)	592/740
Rarely/never	2 (2, 4)	18/740
Americans' use of generic drugs		
Use more	68 (65, 71)	503/739
Use about the same amount	27 (24, 31)	201/739
Use fewer	5 (3, 7)	35/739
Preference in taking generic vs brand-name drug		
Prefer a brand-name drug	37 (34, 41)	277/740
Don't prefer one or the other	35 (32, 39)	261/740
Prefer a generic drug	27 (24, 31)	202/740
How often asked doctor to prescribe a brand-name drug rather than a generic in the last year		
4 or more times	10 (8, 12)	73/737
2–3 times	20 (17, 23)	149/737
1 time	15 (13, 18)	114/737
Never	54 (51, 58)	401/737

Denominators vary across questions because some respondents did not complete the entire survey

Association Between Demographics and Perceptions and use of Generic Drugs

Non-Caucasians were more likely than Caucasians to report that they requested a brand-name drug over a generic (56 % vs. 43 %, $p < 0.01$), and the difference remained statistically significant after adjustment for household income, education, and age ($p < 0.01$). Requesting a brand-name drug did not significantly vary between men and women (49 % vs. 43 %, $p = 0.14$), by age, or across household income or education categories.

Non-Caucasians were more often classified as generic skeptics than Caucasians (43 % vs. 29 %, $p < 0.01$), and the difference remained statistically significant after adjustment for household income, education, and age ($p < 0.01$). No other statistically significant predictors of skepticism were found. There were fewer generic skeptics among respondents who reported some graduate school (25 %), as compared to those with education levels reported as high school or less (34 %) or some college (32 %) or college graduates (35 %), but the difference was not statistically significant ($p = 0.13$). There were more generic skeptics among respondents reporting a household income of less than $15,000/year (45 % vs. 31 % for all other income classes), although the difference was also nonsignificant ($p = 0.07$).

DISCUSSION

In our national survey of US patients, we found that confidence in and acceptability of generic drugs is widespread, and is at a level substantially higher than reported in previous surveys. However, a minority of patients still report strong preferences for brand-name drugs and report specifically requesting that their physicians prescribe brand-name drugs in place of generics. In addition, we found demographic differences in perceptions and use of generic drugs, with the highest skepticism among non-Caucasian patients.

We found a major shift in patients' positive perceptions about generic drugs. For example, a previous national survey of patients from 2007 found that about two-thirds were comfortable asking their physicians to prescribe generic drugs and 60 % were comfortable if their pharmacist filled a prescription for a brand-name drug with a generic [5]; by contrast, in our survey, over 90 % of patients reported comfort with such practices. A number of factors can explain these trends. In the past decade, the market exclusivity periods for many widely used drugs ended, such that generic drugs are now available in nearly every major drug class and for most

Table 3 Patients' Perceptions Of Generic Substitution and the Comparative Clinical Effects of Brand-Name and Generic Drugs

Do you think generic drugs	% (95 % Confidence Interval) respondents answering definitely/probably yes	n/N respondents answering definitely/probably yes
Are as effective as their brand-name versions	87 (85, 90)	647/740
Are as safe as their brand-name versions	88 (86, 91)	654/739
Have the same side effects as their brand-name versions	80 (77, 83)	588/736
Are made of the same active ingredients as their brand-name versions	84 (82, 87)	623/738
How comfortable do you feel:	% (95 % Confidence Interval) respondents answering very/somewhat comfortable	n/N respondents answering very/somewhat comfortable
Asking your doctor to write a prescription for a generic drug if one is available	94 (92, 96)	698/740
Taking a generic drug that was prescribed for you by your doctor	97 (95, 98)	717/740
If your pharmacist filled the prescription with an FDA-approved generic version of that drug when your doctor prescribed a brand-name drug	90 (87, 92)	664/740
If your health insurance company required use of an available and FDA-approved generic version of a brand-name drug that your doctor prescribed*	60 (56, 63)	439/740

Answers were categorized as approve vs. not approve/no opinion

common medical conditions. In addition, nearly all government and private health insurers employ differential co-pays, tiered formularies, prior authorization or fail-first requirements, and other programs that explicitly encourage use of generic drugs. As a result, it is hard for a patient with a chronic disease to avoid use of generic drugs, and the positive clinical outcomes from these experiences combined with the familiarity and necessity of generic drugs to so many patients may contribute to greater confidence in them.

However, skepticism about generic drugs remains, as evidenced by the disconnect between patients' reported positive perceptions of generic drugs and the fact that nearly half have specifically requested a brand-name dispensing in the last year. Though this skepticism may have some basis in well-publicized cases of manufacturing irregularities at generic drug manufacturing plants or reports of non-bioequivalence (as in the bupropion case), it is also encouraged by brand-name manufacturers' marketing campaigns.[21] In addition, conscious and unconscious psychological biases lead people to believe that more costly drug products work better.[22]

All of these causes of skepticism may be remedied with focused policy interventions. Greater funding for FDA regulation of generic manufacturing plants, many of which are overseas, can reduce the risk of manufacturing irregularities, through inspections and other oversight activities; based on resources from recently-established generic drug user fees, such activities are already underway . Better communication to patients about the well-documented safety and effectiveness of generic drugs [23–26] might help promote popular opinions more consistent with the large benefits of using generic drugs, particularly with respect to cost savings. Educational efforts could be directed at groups that our survey found were of higher risk of skepticism about generic drugs, including non-Caucasian patients and patients with lower socioeconomic statuses. Discrimination that members of certain minority groups and patients with lower socioeconomic status have experienced in the health care system may make such patients less likely to trust an authority figure, such as a physician,[27] offering them something that is just as good, but costs less. Seeking to correct such misperceptions is particularly important because differences in perceptions may lead to underuse of generic drugs among these patients, which can contribute to worse health outcomes and exacerbate health disparities. Focused advertising by the government—perhaps funded in part by the generic drug user fees [28] —could be helpful, as it has been for educating about the risks of smoking and other topics of high public health importance.[29] To help target such educational campaigns to overcome remaining barriers to generic use, future research might help determine whether perceptions differ by therapeutic class or set of therapeutic classes used to treat a specific condition.

Such interventions are important because negative perceptions by some patients about generic drugs lead to important health-related consequences and unnecessary spending. Use of generic drugs improves medication adherence, and has been associated with improved patient health outcomes.[30] One way to avoid use of generic drugs is if physicians write "dispense as written" on their prescriptions, which occurred nearly 5 % of the time in a recent cohort of 5.6 million prescriptions.[18] In some states, patients can also request that the pharmacist dispense the brand-name version even if the physician has not indicated "dispense as written." Our survey suggests that a driver of underuse of generic drugs and "dispense as written" prescriptions could be specific requests reported by a substantial minority of patients to use brand-name drugs when generic versions are available. While some patients may make a conscious choice to receive a brand-name product—and pay the expected difference in cost—a reasonable goal for policymakers should be to minimize the number of patients whose decisions to avoid generics are related to lack of knowledge or misinformation about their therapeutic interchangeability.

Our survey achieved a high response rate and we compared early and late responders to confirm the representativeness of the respondents (see Appendix).[31] However, our base population is not generalizable to the entire US population, because we sampled from a selection of patients with chronic diseases who had access to a CVS pharmacy. In addition, our survey population had agreed to participate in surveys and was required to have Internet access to complete this online-only survey, which could also impact its generalizability. If patients open to receiving surveys from their pharmacy benefit managers are more attentive to prescription drug issues, our assessments of generic drug skepticism may be underestimates. We may also be underestimating national levels of generic drug skepticism due to the demographic makeup of our sample, which was disproportionately well-educated and slightly wealthier than the US national median.[32]

Our survey addressed patients' perceptions of generic drugs as a whole, and did not distinguish among different types of generic drugs; for example, some patients have expressed greater concern about generic narrow therapeutic index drugs. Surveys may also suffer from socially desirable response bias and recall bias related in our case to questions such as whether patients requested brand-name drugs instead of generics. Unmeasured variables, such as employment status, that may be associated with generic drug perceptions [33] may have also affected the results. Finally, comparisons between our survey responses and those of prior surveys, including the one by Shrank et al., are limited by variations in the source populations and the fact that the questions were worded and ordered differently.

Despite these limitations, our study suggests that US patients have made substantial progress in becoming more comfortable with FDA-approved generic drugs in the past decade. Overcoming remaining skepticism identified in this survey may require continued attention to ensure the safety and quality of the generic drug supply, as well as efforts to ensure that physicians continue to offer generic drugs, when they are available, to increasingly receptive patients.

Corresponding Author: *Aaron S. Kesselheim, M.D., J.D., M.P.H.; Division of Pharmacoepidemiology and Pharmacoeconomics, Department of Medicine, Brigham and Women's Hospital, 1620 Tremont Street Suite 3030, Boston, MA, USA (e-mail: akesselheim@partners.org).*

Compliance with Ethical Standards:

Conflict of Interest: *The authors have no conflicts of interest   to disclose.*

REFERENCES

1. IMS Health. Declining Medicine Use and Costs: For Better or Worse? Available at: http://static.correofarmaceutico.com/docs/2013/05/20/usareport.pdf.

2. Government Accountability Office. Drug pricing: research on savings from generic drug use. http://www.gao.gov/assets/590/588064.pdf.

3. Congressional Budget Office. Competition and cost of Medicare's prescription drug program. July 2014. Available at: http://www.cbo.gov/sites/default/files/45552-PartD.pdf.

4. **Roman B.** Patients' attitudes towards generic substitution or oral atypical antipsychotics: a questionnaire-based survey in a hypothetical pharmacy setting. CNS Drugs. 2009;23(8):693–701.

5. **Shrank WH, Cox ER, Fischer MA, Mehta J, Choudhry NK.** Patients' perceptions of generic medications. Health Affairs. 2009;28:546–56.

6. **Maly J, Dosedel M, Kubena A, Vlcek J.** Analysis of pharmacists' opinions, attitudes and experiences with generic drugs and generic substitution in the Czech Republic. Actas Pol Pharm. 2013;70(5):923–31.

7. **Hoffman M.** Epilepsy medications: when it is safe to substitute a generic? Oct 28, 2009. Available from: http://www.webmd.com/epilepsy/features/epilepsy-medications-when-is-it-safe-to-substitute-a-generic.

8. Department of Justice. Generic Drug Manufacturer Ranbaxy Pleads Guilty and Agrees to Pay $500 Million to Resolve False Claims Allegations, cGMP Violations and False Statements to the FDA. 13 May 2013. Available at: http://www.justice.gov/opa/pr/generic-drug-manufacturer-ranbaxy-pleads-guilty-and-agrees-pay-500-million-resolve-false.

9. **Wang B, Gagne JJ, Choudhry NK.** The epidemiology of drug recalls in the United States. Arch Intern Med. 2012;172:1109–10.

10. **Woodcock J, Khan M, Yu LX.** Withdrawal of generic budeprion for nonbioequivalence. The New England Journal of Medicine. 2012;367(26):2463–2465.

11. **Figueiras MJ, Alves NC, Merclino D, et al.** Assessing lay beliefs about generic medicines: Development of the generic medicines scale. Psychol Health Med. 2009;14(3):311–21.

12. **Sewell K, Andrae S, Luke E, Safford MM.** Perceptions of and barriers to use of generic medications in a rural African American population, Alabama, 2011. Prev Chronic Dis. 2012;9, E142.

13. **Gaither CA, Kirking DM, Ascione FJ, Welage LS.** Consumers' views on generic medications. J Am Pharm Assoc. 2001;41:729–736.

14. **Omojasola A, Hernandez M, Sansgiry S, Jones L.** Perceptions of generic prescription drugs and utilization of generic drug discount programs. Ethn Dis. 2012;22(4):479–485.

15. **Iosifescu A, Halm EA, McGinn T, Siu AL, Federman AD.** Beliefs about generic drugs among elderly adults in hospital-based primary care practices. Patient Educ Couns. 2008;73(2):377–383.

16. **Hoshi S, Kimura H.** Questionnaire on the awareness of generic drugs among outpatients and medical staff. Drug Discov Ther. 2008;2(3):194–9.

17. **Himmel W, Simmenroth-Nayda A, Niebling WE, et al.** What do primary care patients think about generic drugs. Int J clin Pharmacol Ther. 2005;43(10):472–9.

18. **Shrank WH, Liberman JN, Fischer MA, Avorn J, Kilabuk E, et al.** The consequences of requesting "dispense as written.". Am J Med. 2011;124:309–317.

19. IMS Institute for Healthcare Informatics. Avoidable costs in U.S. health care. 2013. Available: http://www.imshealth.com/deployedfiles/imshealth/Global/Content/Corporate/ IMS%20Institute/RUOM-2013/IHII_Responsible_Use_Medicines_2013.pdf.

20. **Brown LD, Cai TT, DasGupta A.** Interval estimation for a binomial proportion. Statistical Science. 2001;16:101–133.

21. **Saul S, Berenson A.** Maker of Lipitor digs in to fight generic rival. New York Times. Nov 3, 2007:A1.

22. **Waber RL, Shiv B, Carmon Z, Ariely D.** Commercial features of placebo and therapeutic efficacy. JAMA. 2008;299(9):1016–7.

23. **Dong BJ, Hauck WW, Gambertoglio JG, et al.** Bioequivalence of generic and brand-name levothyroxine products in the treatment of hypothyroidism. JAMA. 1997;277:1205–13.

24. **Kesselheim AS, Misono AS, Lee JL, et al.** Clinical equivalence of generic and brand-name drugs used in cardiovascular disease: a systematic review and meta-analysis. JAMA. 2008;300:2514–26.

25. **Kesselheim AS, Stedman MR, Bubrick EJ, et al.** Seizure outcomes following the use of generic versus brand-name antiepileptic drugs: a systematic review and meta-analysis. Drugs. 2010;70:605–21.

26. **Dentali F, Donadini MP, Clark N, et al.** Brand name versus generic warfarin: a systematic review of the literature. Pharmacotherapy. 2011;31:386–93.

27. **Boulware LE, Cooper LA, Ratner LE, LaVeist TA, Powe NR.** Race and trust in the health care system. Public Health Rep. 2003;118(4):358–365.

28. Food and Drug Administration Safety and Innovation Act. US Government Printing Office. http://gpo.gov/fdsys/pkg/BILLS-112s3187enr/pdf/BILLS-112s3187enr.pdf.

29. **Huang LL, Thrasher JF, Abad EN, Cummings KM, Bansal-Travers M, Brown A, Nagelhout GE.** The U.S. National Tips From Former Smokers Antismoking Campaign: Promoting Awareness of Smoking-Related Risks, Cessation Resources, and Cessation Behaviors. Health Educ Behav. 2015 Jan 14. [ePub ahead of print.]

30. **Gagne JJ, Choudhry NK, Kesselheim AS, Polinski JM, Hutchins D, Matlin OS, Brennan TA, Avorn J, Shrank WH.** Comparative effectiveness of generic and brand-name statins on patient outcomes: a cohort study. Ann Intern Med. 2014;161(6):400–407.

31. **Johnson TP, Wislar JS.** Response rates and nonresponse errors in surveys. JAMA. 2012;307(17):1805–1806.

32. United States Census Bureau. Income data by topic. 16 Sept 2015. Available from: https://www.census.gov/hhes/www/income/data/.

33. **Skipper N, Vejlin R.** Determinants of generic v. brand choice: Evidence from population-wide Danish data. Social Science and Medicine. 2015;130:204–215.