# Patient Perceptions of Deprescribing (PPoD):

## Survey Development and Psychometric Assessment

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## Abstract

**Background:** Although clinicians ultimately decide when to discontinue (deprescribe) medications, patients' perspectives may guide the process.

**Objectives:** To develop a survey instrument that assesses patients' experience with and attitudes toward deprescribing.

**Research Design:** We developed a questionnaire with established and newly created items. We used exploratory factor analysis and confirmatory factor analysis (EFA and CFA) to assess the psychometric properties.

**Subjects:** National sample of 1547 Veterans Affairs patients prescribed ≥5 medications.

**Measures:** In the EFA, percent variance, a scree plot, and conceptual coherence determined the number of factors. In the CFA, proposed factor structures were evaluated using standardized root mean square residual, root mean square error of approximation, and comparative fit index.

**Results:** Respondents (n = 790; 51% response rate) were randomly assigned to equal derivation and validation groups. EFA yielded credible 4-factor and 5-factor models. The 4 factors were "Medication Concerns," "Provider Knowledge," "Interest in Stopping Medicines," and "Unimportance of Medicines." The 5-factor model added "Patient Involvement in Decision-Making." In the CFA, a modified 5-factor model, with 2 items with marginal loadings moved based upon conceptual fit, had an standardized root mean square residual of 0.06, an RMSEA of 0.07, and a CFI of 0.91. The new scales demonstrated internal consistency reliability, with

Cronbach α's of: Concerns, 0.82; Provider Knowledge, 0.86; Interest, 0.77; Involvement, 0.61; and Unimportance, 0.70.

**Conclusions:** The Patient Perceptions of Deprescribing questionnaire is a novel, multidimensional instrument to measure patients' attitudes and experiences related to medication discontinuation that can be used to determine how to best involve patients in deprescribing decisions.

## Keywords

survey research; deprescribing; shared-decision making; medication safety

The magnitude of harms from inappropriate medication use is well established, with negative effects on both the patient and the health care system overall.[1–3] One approach to reduce these adverse clinical and economic outcomes is to reduce inappropriate medication use. Although there has been focus on minimizing initiation of inappropriate prescriptions,[4] a complementary tactic is to discontinue inappropriate medications that a patient is already taking. Known as deprescribing, this approach is defined as a "systematic process of identifying and discontinuing drugs in instances in which existing or potential harms outweigh existing or potential benefits within the context of an individual patient's care goals, current level of functioning, life expectancy, values, and preferences. Deprescribing is part of the good prescribing continuum y [and is] not about denying effective treatment to eligible patients."[5]

Although the actual act of prescribing remains the responsibility of the clinical provider, understanding the patient perspective is critical. Patient medication-taking behavior is influenced by many factors, including health literacy, socio-economic status, attitudes and beliefs including perceived medication necessity and future health concerns, and whether the drug provides symptom relief.[6–8] In our prior qualitative work, patients often expressed interest in taking fewer medications, consistent with findings by others.[9–11] Patients may also prioritize one or more of their medications as less important to their health, a perception susceptible to change when provided with additional education.[12–14] Patients may also prioritize one or more of their medications as less important to their health, a perception susceptible to change when provided with additional education. Further, prescribing can occur because of provider perception—accurate or not—of the patient's wishes, even if the provider does not believe in the medical necessity of a particular drug treatment.[15] Without knowledge of a patient's medication-related attitudes and behavior, a clinician may make decisions about starting or stopping a prescription based on false assumptions.[16,17]

Efforts to improve clinical processes to facilitate deprescribing have been found to be more successful when patients are included in interventions.[18] However, few tools that specifically measure patients' interest in and experiences with deprescribing exist. When available, a psychometrically sound survey of this sort could be used by researchers to gather data for use in the design of such interventions and to evaluate their impact. A short-form version could also be used in clinical practice to elicit patient preferences on these issues. To that end, we undertook the present study to develop a survey instrument that assesses patients' experience with and attitudes toward medication discontinuation.

## METHODS

### Instrument Development

We began with a conceptual framework of patient factors hypothesized to be predictive of willingness to discontinue a medication. This framework was developed from our previous qualitative work using interviews and focus groups with 27 Veterans to evaluate patients' interest and experiences with deprescribing,[10] and it was augmented by a review of the literature on medication discontinuation. The hierarchical model has 3 overarching domains: Conflicting Views of Medication, Importance of Patient-Provider Relationships, and Limited Experience with Medication Discontinuation. Two of these domains encompass several dimensions. Within "Conflicting Views" we identified 3 dimensions: Desire for Fewer Medications, Adherence, and Specific versus General. "Relationships" was comprised of 4 dimensions: Trust, Relying on Expertise, Shared Decision-Making, and Balancing Multiple Providers. Each dimension represents a construct, or abstract idea, we sought to measure in the survey instrument.[19] On the basis of these overarching domains and constituent dimensions, we developed a questionnaire that incorporated scales and select items from established instruments related to medication use—but not necessarily deprescribing—including the Beliefs about Medications Questionnaire (BMQ), Trust in Physician, CollaboRATE, Patient Attitudes Toward Deprescribing (PATD), and Autonomy Preference Index.[20–24] We composed 27 new items to address dimensions of the conceptual model not adequately covered by existing measures, especially regarding coordinating care between providers and prior experiences with discontinuation, ensuring that each dimension was represented by at least 3 items.

Our initial pool of 62 content and 13 demographic and background items was circulated to a 7-member expert panel of researchers and primary care providers, including experts in survey development and medication safety, for a modified Delphi process. Each expert independently rated the importance of including the dimension in a measure of attitudes related to deprescribing and the importance of each candidate item as representative of the hypothesized dimension. Opportunity was provided to submit suggestions for additions, subtractions and alterations to items. The ratings for each item were averaged, and the results were reviewed and discussed by the panel in a group session. On the basis of this feedback, the initial draft of the survey consisted of 44 content items and 14 demographic and background questions.

Next, we used a semistructured cognitive interview protocol with specific probes in one-on-one sessions with Veteran Affairs (VA) patients taking 5 or more medications, representing our target population.[25] These interviews followed a modified form of retrospective debriefing in which subjects completed the survey one section at a time, followed by questions designed to probe how they interpreted the items and decided on a response.[26] The cognitive interviews were conducted in 3 rounds (5, 5, and 4 subjects in each round, respectively). After each round, we modified items and instructions based on the feedback obtained. The resulting pilot-ready version of the survey included 43 items related to medication discontinuation organized around the 8 dimensions noted above, plus 14 demographic and background items. Early testing indicated that respondents could expect a

completion time of 10–15 minutes. The substantive content of the pilot-ready survey is summarized in Table 1.

## Pilot Study and Psychometric Evaluation

**Sample**—We queried VA national administrative databases in the Corporate Data Warehouse to identify a sampling frame of all VA patients with (a)    5 concurrent prescriptions for 90 days (December 17, 2014—March 16, 2015), (b) at least 1 primary care visit during that same timeframe, plus (c) at least 1 additional visit in the prior year. A total of 448,155 cases were identified, from which we randomly sampled 1600 subjects. This sample size was based on 2 factors: (1) guidelines for adequate sample size required for our primary analyses, exploratory factor analysis and confirmatory factor analysis (EFA and CFA), to be conducted in separate derivation and validation samples, respectively; and (2) anticipated response rates based on other recent surveys of Veterans. With regard to the EFA and CFA, given 43 items related to deprescribing in the pilot instrument, accepted guidelines of 5–10 respondents per item suggest a required sample of 215–430.[27,28] Thus, our target for the combined derivation and validation samples was 480 respondents. On the basis of Veteran response rates of approximately 30% obtained for mail surveys of similar length and using a similar multiple-contact methodology, we selected an initial mail-out sample of 1600 qualifying Veterans. Women constituted 5.7% of the population sampling frame but were oversampled to constitute 15% of the mail-out sample to ensure adequate representation and to enable comparisons by sex.

**Survey Administration**—We mailed each patient a letter introducing the survey objectives and informing them of the upcoming survey arrival. One week later, we mailed the survey instrument, along with a $5 VA Patron Coupon incentive and an opt-out postcard. Nonrespondents received a reminder letter 2 weeks later, and another copy of the survey was sent 2 weeks after that. If a subject was unreachable (mail undeliverable or notification received of their death), they were removed from the administration cycle. All returned responses were entered into a database; 10% of entries were checked to ensure coding accuracy. All responses were anonymous.

**Analysis Strategy**—We used EFA and CFA to identify the factor structure of the survey items and subsequently assess the reliability and validity of the hypothesized factor-based scales. We randomly split the respondents into derivation and validation groups and ran the initial EFA in the derivation group. Assuming that the various dimensions of attitudes regarding medications and deprescribing would be correlated, we used oblique rotation to clarify the initial factor structure. However, given that this content area is largely unexplored and because an assumption of independent dimensions can help clarify the factor structure, we also applied an orthogonal factor rotation method and compared the results to those first obtained using the oblique approach. We used a factor loading    0.40 as the criterion for identifying which items defined each factor.[29] We also examined the percent of common variance accounted for, a scree plot, and conceptual coherence to determine the final number of factors to retain.

We then tested the hypothesized factor structure in the validation sample using CFA. Following recommended practice, we examined the preponderance of evidence across several different measures of model fit to counterbalance the potential shortcomings of any one method. Specifically, the fit of the proposed model to the data were evaluated using indices of absolute fit ($\chi^2$ and the standardized root mean square residual, SRMR), parsimony-corrected fit (root mean square error of approximation, RMSEA), and comparative fit (comparative fit index, CFI). The SRMR is the standardized difference between the observed and predicted covariances from the model; a value of 0 indicates perfect fit, but a value <0.08 is considered good fit.[30] RMSEA evaluates model residuals, and a value 0.06 indicates good fit.[30] Lastly, the CFI compares the proposed model with a null model assuming the items are not correlated; ideal values are >0.95.[30]

We determined the internal consistency reliability (Cronbach $\alpha$) for each new and established scale, with a reliability of 0.70 considered acceptable.[31] To assess the degree of overlap among the proposed scales, we also examined the relationships among all scales using Pearson correlations. Correlations 0.70, indicating about 50% of shared variance, would suggest that the involved scales may not be measuring unique constructs, and correlations >0.80 indicate scales that are likely redundant and may need to be revised or combined.

All analyses were conducted in SAS (version 9.3). The study was approved by the VA Boston Healthcare System Institutional Review Board.

## RESULTS

### Characteristics of Study Sample

Of the 1600 in the initial mail-out sample, 53 could not be contacted, primarily (n = 40) because of inaccurate address information. We obtained 790 completed surveys for an adjusted response rate of 51%. Participant characteristics are presented in Table 2. Respondents were predominantly male (85%), and 73% identified as white, 18% as Black, and 9% as other. The majority was over age 65 (62%), with generally poor (16%) or fair (45%) health. With respect to prescription medications, 7% reported taking fewer than 5, 38% reported 5–8 medications, 35% reported 9–12 medications, and 21% reported 13 or more prescriptions. Over one third of the respondents (36%) had been admitted to a hospital in the prior year. Nonrespondents were generally similar to respondents with regard to race and region of the country, but responders were older (mean age, 67 vs. 65.5 y; $P = 0.01$) and took slightly fewer medications (mean, 10.1 vs. 10.5; $P = 0.02$). Regarding data quality, the median percent of missing responses per item on the substantive questions was 0.88% (range, 0%–6.3%; n = 0–50); the median percent missing on the demographic questions was 0 (range, 0%–1.5%; n = 0–12). The sample was randomly divided into derivation and validation groups of 395 each. The success of the randomization was checked; no statistically significant demographic differences except prevalence of arthritis were found between the groups.

### EFA

We conducted an EFA using an oblique (promax) rotation algorithm in the derivation group on the 21 items that were not demographics, health status, or part of a complete established scale. Four interpretable factors defined by 16 items emerged from this initial analysis, each with an eigenvalue exceeding Kaiser's criterion of 1. A fifth factor had an eigenvalue of 0.999 and examination of the scree plot indicated that interpreting 4 or 5 factors would be appropriate. To assess the robustness of these findings and potentially further clarify the factor structure, we conducted a second EFA using an orthogonal (varimax) rotation. This yielded very similar results with the exception that one of the previously included items did not have a factor loading >0.40 on any of the orthogonal factors. We then conducted a third EFA, again using an oblique (promax) rotation, this time specifying the retention of 5 factors. For the 5-factor model, all loadings ranged from 0.44 to 0.95, and each factor consisted of a conceptually consistent set of items. Two items were moved on the basis of empirical and conceptual considerations. One item regarding belief that future health is dependent on medicines had a relatively lower (0.48) loading on a factor tentatively identified as representing views about importance of medications; removing that item increased the internal consistency reliability of the scale. A second item regarding comfort with number of medicines that had a marginal loading (0.39) on a factor tentatively identified as representing medication concerns in the 5-factor model was moved back to the factor on which it loaded in the previous 4-factor model based on conceptual coherence. In the end a total 18 of 21 items were included in 5 factors (Table 3).

### CFA

To test the robustness of the 5 factors derived in the EFA, we performed a CFA of that model in the validation group. As expected, the $\chi^2$ test was statistically significant given the large sample size, rejecting the null hypothesis of exact fit ($\chi^2$ 320.64, $P < 0.0001$). However, all other fit statistics supported the fit of the 5-factor model to the new data: SRMR was 0.06, RMSEA was 0.065 (95% confidence interval, 0.056–0.074), and CFI was 0.91.

### Reliability and Interscale Correlations

Results regarding scale reliability and the relationships among scales are reported in Table 4, based on all respondents. Diagonal entries are Cronbach $\alpha$ coefficients; offdiagonal entries are Pearson correlation coefficients. For these analyses we included the 5 new scales and 3 off-the-shelf scales previously established as representing important dimensions of patient factors related to medications. This allowed us to assess the reliability of the established scales in the present sample and to evaluate whether the new scales were substantially redundant with any of the existing scales.

Four of the 5 new factors had adequate to excellent internal consistency reliability (Medication Concerns, 0.82; Provider Knowledge, 0.86; Interest in Stopping Medicines, 0.77, Unimportance of Medicines, 0.70). The fifth factor, Patient Involvement in Decision-Making, had a Cronbach $\alpha$ of 0.61.

Among the 5 new scales, the highest correlation (0.57) was between Medication Concerns and Interest in Stopping Medicines. One of the new scales, Provider Knowledge, was

relatively strongly correlated with 2 established scales: Trust in Provider (0.73) and CollaboRATE (0.68).

### Scale Score Distributions

Basic descriptive statistics for the 5 new scales and 3 established scales are reported in Table 5. CollaboRATE responses range from 1 = "no effort" to 5 = "every effort." The remaining 7 scales response options range from 1 = "strongly disagree" to 5 = "strongly agree." Scale scores computed as the mean across relevant items ranged from 2.39 (SD = 0.75) for Unimportance of Medicines to 3.75 (SD = 0.82) for Provider Knowledge. For new scales, the percentage of respondents with scores at the floor ranged from 0.38% (Patient Involvement in Decision-Making) to 6.8% (Unimportance of Medicines), while the range of responses at the ceiling ranged from 0% (Unimportance of Medicines) to 12.5% (Provider Knowledge). Skew statistics ranged from 0.01 (Patient Involvement in Decision-Making) to 0.61 (Provider Knowledge).

## DISCUSSION

We developed a survey-based measurement of patient attitudes toward and experiences with deprescribing of medications, building on a conceptual model developed from qualitative work as well as established instruments. Using standard techniques for administration of a mail-based survey, we obtained 790 returned surveys (51% response rate) from Veteran users of the VA health care system who were prescribed 5 or more medications. EFA in a derivation group suggested either a 4-factor or 5-factor structure; the 5-factor model was preferred due to greater potential to assess relevant distinct dimensions of patient attitudes toward medication discontinuation. The 5-factor structure was strongly supported by CFA in an independent validation group.

The newly developed Patient Perceptions of Deprescribing (PPoD) instrument contains 5 original scales along with 3 scales from previously validated instruments to form an assessment of the multiple constructs related specifically to medication discontinuation. The Medication Concerns scale includes 6 items, 3 of which were modified from the BMQ-Concerns scale and 3 of which were based on items from the PATD instrument.[20,23] Provider Knowledge is comprised of 3 newly created items eliciting perceptions of their provider's understanding of medical information and medicines. Interest in Stopping Medicines was created with 2 items of the PATD and 1 de novo item to assess whether patients would prefer fewer medications.[23] Patient Involvement in Decision-Making is a 3-item scale, of which 2 items are based on the Autonomy Preference Index, addressing the role patients should have in making decisions about their health care treatments.[24] Unimportance of medicines has 3 items, 1 newly created and 1 each from BMQ-Harm and PATD, and it evaluates whether patients believe medicines are not needed or may even be harmful. The 3 established scales, included in their entirety, are: BMQ-Overuse (4 items), Trust in Provider (5 items), and CollaboRATE (3 items).[20,22,32]

There are many strengths of PPoD. The 5 new scales had essentially normal distributions; the largest magnitude skew was 0.61 (Provider Knowledge). The range of responses at the floor was low, with the highest at 6.8% (Unimportance of Medicine), and the greatest

percent at the ceiling was 12.5% (Provider Knowledge). There was a low missing data rate, indicating that the survey was well-received. Four of the 5 scales showed acceptable internal consistency reliability, with a Cronbach α of 0.70 or greater. The exception, Patient Involvement in Decision-Making, had a somewhat lower coefficient of 0.61, although even this comfortably exceeded the criterion of 0.50 that has also been suggested as a minimum for making group-level comparisons.[33] Nonetheless, some caution may be warranted in interpreting results using the current version of this scale, and future work should include the addition of 1 or 2 items to this scale to improve reliability. Interscale correlations between the 5 new scales were also low to modest, with the greatest magnitude correlation at 0.57 (indicating only 32% shared variance). Similarly, there was only modest overlap between the new and existing measures, with the strongest relationships observed among measures of logically related constructs (eg, Trust in Provider and Provider Knowledge). In applications where survey length is a concern, the 3 established scales could be eliminated to create a shorter form of the questionnaire. All scale α coefficients were higher than scale-to-scale correlations, providing additional support to the discriminant validity of the new scales. Overall, the results are consistent with those expected of a set of measures of related yet distinct factors that relate to patients' perceptions of deprescribing.

Some limitations of the present study should be noted. Given the cross-sectional design, the study was limited to an assessment of the internal consistency reliability of PPoD. Future studies are necessary to evaluate test-retest reliability. Further, our sample consisted of Veteran users of the VA Healthcare System and may not be generalizable to Veterans who do not receive care at the VA or non-Veteran populations; additional work in other samples is needed to confirm our results. We had a very good response rate of 51%, but responders were 1.5 years older and taking 0.4 fewer medications on average than nonresponders. Although these differences do not appear clinically meaningful at face value, there is some possibility that nonresponders would have different attitudes and experiences. With respect to commonly accepted values indicative of good fit in CFA, our RMSEA of 0.065 is slightly >0.06, and the CFI 0.91 is marginally lower than the threshold of 0.95. However, others have favored benchmarks of 0.08 for RMSEA and 0.90 for CFI, both of which were met in this study.[34] Combined with the favorable SRMR, the preponderance of evidence favors the 5-factor model adopted here.

The PPoD questionnaire is a novel, multidimensional instrument to measure patients' attitudes, knowledge and experiences related to medication discontinuation. Psychometric analyses demonstrated strong empirical support for a 5-factor structure evaluating patients' concerns about medications, perceptions of their providers' knowledge, interest in deprescribing, affinity for a role in decision making and views of the importance of medications. Three additional relevant dimensions were assessed using existing scales: BMQ-Overuse, Trust in provider, and CollaboRATE. Scale distributions indicated only a small proportion of respondents with scores at the ceiling of the possible range, suggesting potential for responsiveness to change and for assessing variation in attitudes across groups. The PPoD questionnaire can be used in future research to determine how to best involve patients in decisions about deprescribing. These data may then facilitate the development of targeted interventions that lead to safe and high-quality medication use by discontinuing medications that are no longer appropriate.

## ACKNOWLEDGMENT

## REFERENCES

1. Nebeker JR, Barach P, Samore MH. Clarifying adverse drug events: a clinician's guide to terminology, documentation, and reporting. Ann Intern Med. 2004;140:795–801. [PubMed: 15148066]

2. Gandhi TK, Weingart SN, Borus J, et al. Adverse drug events in ambulatory care. N Engl J Med. 2003;348:1556–1564. [PubMed: 12700376]

3. Bushardt RL, Massey EB, Simpson TW, et al. Polypharmacy: misleading, but manageable. Clin Interv Aging. 2008;3:383–389. [PubMed: 18686760]

4. Meeker D, Linder JA, Fox CR, et al. Effect of behavioral interventions on inappropriate antibiotic prescribing among primary care practices: a randomized clinical trial. JAMA. 2016;315:562–570. [PubMed: 26864410]

5. Scott IA, Hilmer SN, Reeve E, et al. Reducing inappropriate polypharmacy: the process of deprescribing. JAMA Intern Med. 2015;175: 827–834. [PubMed: 25798731]

6. DiMatteo MR, Haskard KB, Williams SL. Health beliefs, disease severity, and patient adherence: a meta-analysis. Med Care. 2007;45: 521–528. [PubMed: 17515779]

7. Fried TR, McGraw S, Agostini JV, et al. Views of older persons with multiple morbidities on competing outcomes and clinical decision-making. J Am Geriatr Soc. 2008;56:1839–1844. [PubMed: 18771453]

8. Piette JD, Heisler M, Harand A, et al. Beliefs about prescription medications among patients with diabetes: variation across racial groups and influences on cost-related medication underuse. J Health Care Poor Underserved. 2010;21:349–361. [PubMed: 20173274]

9. Moen J, Bohm A, Tillenius T, et al. "I don't know how many of these (medicines) are necessary"—a focus group study among elderly users of multiple medicines. Patient Educ Couns. 2009;74:135–141. [PubMed: 18845412]

10. Linsky A, Simon SR, Bokhour B. Patient perceptions of proactive medication discontinuation. Patient Educ Couns. 2015;98:220–225. [PubMed: 25435516]

11. Sanford D, Kyle R, Lazo-Langner A, et al. Patient preferences for stopping tyrosine kinase inhibitors in chronic myeloid leukemia. Curr Oncol. 2014;21:e241–e249. [PubMed: 24764709]

12. Tannenbaum C, Martin P, Tamblyn R, et al. Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the EMPOWER cluster randomized trial. JAMA Intern Med. 2014;174:890–898. [PubMed: 24733354]

13. Krol N, Wensing M, Haaijer-Ruskamp F, et al. Patient-directed strategy to reduce prescribing for patients with dyspepsia in general practice: a randomized trial. Aliment Pharmacol Ther. 2004;19:917–922. [PubMed: 15080853]

14. Linsky A, Simon SR. Patients' perceptions of their "most" and "least" important medications: a retrospective cohort study. BMC Res Notes. 2012;5:619. [PubMed: 23121715]

15. Britten N, Stevenson FA, Barry CA, et al. Misunderstandings in prescribing decisions in general practice: qualitative study. BMJ. 2000; 320:484–488. [PubMed: 10678863]

16. Mulley AG, Trimble C, Elwyn G. Stop the silent misdiagnosis: patients' preferences matter. BMJ. 2012;345:e6572. [PubMed: 23137819]

17. Street RL Jr, Haidet P. How well do doctors know their patients? Factors affecting physician understanding of patients' health beliefs. J Gen Intern Med. 2011;26:21–27. [PubMed: 20652759]

18. Ostini R, Jackson C, Hegney D, et al. How is medication prescribing ceased? A systematic review. Med Care. 2011;49:24–36. [PubMed: 20966784]

19. Lavraka PJ. Encyclopedia of Survey Research Methods. Thousand Oaks, CA: Sage Publications Inc; 2008.

20. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health. 1999;14:1–24.

21. Hall MA, Zheng B, Dugan E, et al. Measuring patients' trust in their primary care providers. Med Care Res Rev. 2002;59:293–318. [PubMed: 12205830]

22. Gordon HS, Street RL Jr, Sharf BF, et al. Racial differences in trust and lung cancer patients' perceptions of physician communication. J Clin Oncol. 2006;24:904–909. [PubMed: 16484700]

23. Reeve E, Shakib S, Hendrix I, et al. Development and validation of the patients' attitudes towards deprescribing (PATD) questionnaire. Int J Clin Pharm. 2013;35:51–56. [PubMed: 23054137]

24. Ende J, Kazis L, Ash A, et al. Measuring patients' desire for autonomy: decision making and information-seeking preferences among medical patients. J Gen Intern Med. 1989;4:23–30. [PubMed: 2644407]

25. Willis GB. Cognitive interviewing: a "how to" guide Paper presented at: Meeting of the American Statistical Association. 1999.

26. Dillman D. Mail and Internet Surveys: The Tailored Design Method. New York, NY: John Wiley & Sons; 2000.

27. Bryant FB, Yarnold PR. Principle-components analysis and exploratory and confirmatory factor analysis In: Grimm LG, Yarnold P, eds. Reading and Understanding Multivariate Statistics. Washington, DC: American Psychological Association; 1995:99–136.

28. Tabachnick BG, Fidell L. Using Multivariate Statistics, 4th ed Boston, MA: Allyn & Bacon; 2001.

29. Peterson RA. A meta-analysis of variance accounted for and factor loadings in exploratory factor analysis. Marketing Letters. 2000;11:261–275.

30. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equation Model. 1999;6:1–55.

31. Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika, 16:297–334.

32. Elwyn G, Barr PJ, Grande SW, et al. Developing CollaboRATE: a fast and frugal patient-reported measure of shared decision making in clinical encounters. Patient Educ Couns. 2013;93:102–107. [PubMed: 23768763]

33. Helmstadter G Principles of Psychological Measurement. New York, NY: Appleton-Century Crofts; 1964.

34. Brown T Confirmatory Factor Analysis for Applied Research. New York, NY: Guilford Press; 2006.

**TABLE 1.**

Conceptual Framework: Initial Dimensions and Representative Survey Item

| Domain | Dimension | Sample Item |
|---|---|---|
| Conflicting Views of Medication | Desire for fewer medications | 18. I would like to reduce the number of medicines that I am taking [*] |
| | Adherence | 50. Have you ever tried to stop a regular medicine (without your doctor's knowledge)? |
| | Specific vs. general | 16. One (or more) of my medicines is more important for my health than my other medicines |
| Importance of Patient-Provider Relationships | Trust | 35. I completely trust my PCP's decisions about which medicines are best for me [†] |
| | Relying on expertise | 28. My PCP knows a lot about all of my medicines |
| | Shared decision-making | 31. When there are different options available, patients should have a say in which medicine they receive |
| | Balancing multiple providers | 45. Have you ever had one provider tell you one thing about a medicine and another provider tell you something different about that medicine? |
| Limited Experience with Medication Discontinuation | | 48. Has any provider ever told you to stop taking a medicine? |

[*] Item adapted from Patient Attitudes Toward Deprescribing.[22]

[†] Item adapted from Trust in Provider.[21]

PCP indicates primary care provider.

**TABLE 2.**

Self-report Respondent Demographics

| Respondent Characteristic | n (%) | | | P |
| --- | --- | --- | --- | --- |
| | All* | Derivation Group* | Validation Group* | |
| Age (y) | | | | 0.7 |
| 55 | 104 (13.6) | 56 (14.6) | 48 (12.6) | |
| 56–65 | 184 (24.0) | 91 (23.7) | 93 (24.4) | |
| 66–75 | 330 (43.1) | 168 (43.8) | 162 (42.5) | |
| 76 or older | 147 (19.2) | 69 (18.0) | 78 (20.5) | |
| Sex (Male) | 647 (85.2) | 331 (86.2) | 316 (84.3) | 0.5 |
| Race | | | | 0.1 |
| White | 559 (73.4) | 268 (70.2) | 291 (76.6) | |
| Black | 137 (18.0) | 79 (20.7) | 58 (15.3) | |
| Other | 66 (8.7) | 35 (9.2) | 31 (8.2) | |
| Education level | | | | 0.8 |
| High school graduate or less | 292 (38.0) | 149 (38.5) | 143 (37.4) | |
| Some college or more | 477 (62.0) | 238 (61.5) | 239 (62.6) | |
| Would you say your health is: | | | | 0.2 |
| Poor | 122 (15.7) | 65 (16.8) | 57 (14.5) | |
| Fair | 348 (44.7) | 173 (44.8) | 175 (44.6) | |
| Good | 240 (30.9) | 123 (31.9) | 117 (29.9) | |
| Very good | 61 (7.8) | 21 (5.4) | 40 (10.2) | |
| Excellent | 7 (0.9) | 4 (1.04) | 3 (0.8) | |
| Comorbidities | | | | |
| Anxiety | 280 (35.4) | 143 (36.2) | 137 (34.7) | 0.7 |
| Arthritis | 470 (59.5) | 259 (65.6) | 211 (53.4) | 0.0005 |
| Cancer | 156 (19.8) | 80 (20.3) | 76 (19.2) | 0.7 |
| Chronic lung disease | 224 (28.4) | 102 (25.8) | 122 (30.9) | 0.1 |
| Depression | 344 (43.5) | 176 (44.6) | 168 (42.5) | 0.6 |
| Diabetes | 416 (52.7) | 213 (53.9) | 203 (51.4) | 0.5 |
| Heart failure | 165 (20.9) | 89 (22.5) | 76 (19.2) | 0.3 |

| Respondent Characteristic | n (%) | | | P |
|---|---|---|---|---|
| | All* | Derivation Group* | Validation Group* | |
| Hypertension | 577 (73.0) | 294 (74.4) | 283 (71.7) | 0.4 |
| Ischemic heart disease | 246 (31.1) | 136 (34.4) | 110 (27.9) | 0.05 |
| Posttraumatic stress disorder | 258 (32.7) | 127 (32.2) | 131 (33.2) | 0.8 |
| Stroke | 86 (10.9) | 39 (9.9) | 47 (11.9) | 0.4 |
| No. prescription medications | | | | 0.2 |
| 0 | 2 (0.3) | 2 (0.5) | 0 (0.0) | |
| 1–4 | 48 (6.3) | 21 (5.5) | 27 (7.03) | |
| 5–8 | 287 (37.5) | 136 (35.6) | 151 (39.3) | |
| 9–12 | 269 (35.1) | 132 (34.6) | 137 (35.7) | |
| 13 or more | 160 (20.9) | 91 (23.8) | 69 (18.0) | |
| No. nonprescription medications | | | | 0.8 |
| 0 | 222 (28.7) | 118 (30.6) | 104 (26.8) | |
| 1–4 | 471 (60.9) | 229 (59.3) | 242 (62.4) | |
| 5–8 | 65 (8.4) | 31 (8.03) | 34 (8.8) | |
| 9–12 | 10 (1.3) | 5 (1.3) | 5 (1.3) | |
| 13 or more | 6 (0.8) | 3 (0.8) | 3 (0.8) | |
| No. visits to any health care provider in past year | | | | 0.2 |
| 1–4 | 227 (29.1) | 118 (30.4) | 109 (27.8) | |
| 5–8 | 220 (28.2) | 101 (26.03) | 119 (30.4) | |
| 9–12 | 122 (15.6) | 70 (18.04) | 52 (13.3) | |
| 13 or more | 211 (27.1) | 99 (25.5) | 112 (28.6) | |
| Admitted to a hospital in past year | 277 (35.5) | 136 (35.1) | 141 (36.0) | 0.8 |

*
Sums and percentages do not add up to 790 due to missing data.

**TABLE 3.**

Factor Loadings for Final Exploratory Factor Analysis

| Item Description* | Factor 1 Loading | Factor 2 Loading | Factor 3 Loading | Factor 4 Loading | Factor 5 Loading |
|---|---|---|---|---|---|
| Medication Concerns | | | | | |
| 9. Having to take medicines disrupts my life (BMQ-C) | 65 | −1 | 3 | 0 | 0 |
| 10. I sometimes worry about long-term effects of my medicines (BMQ-C) | 83 | 5 | −6 | 7 | −5 |
| 11. I sometimes worry about becoming too dependent on my medicines (BMQ-C) | 85 | 9 | −11 | 1 | −1 |
| 13. I feel that I am taking a large number of medicines (PATD) | 58 | −3 | 31 | −3 | −22 |
| 15R.† I am comfortable with the number of medicines that I am taking (PATD) | 39 | −18 | 20 | 5 | 4 |
| 20. I believe one or more of my medicines is giving me side effects, unwanted reactions, or other problems(PATD) | 51 | −8 | 11 | −6 | 12 |
| Provider Knowledge | | | | | |
| 28. My PCP knows a lot about all of my medicines | −5 | 87 | 3 | 0 | 1 |
| 29. My PCP knows about all of my medical problems | 1 | 86 | −2 | 2 | −1 |
| 30. My PCP keeps up with new medical information | −4 | 75 | 6 | −4 | −1 |
| Interest in Stopping Medicines | | | | | |
| 17. If my doctor said it was possible, I would be willing to stop one or more of my regular medicines (PATD) | 0 | 9 | 62 | −1 | −3 |
| 18. I would like to reduce the number of medicines that I am taking (PATD) | 3 | −4 | 95 | 4 | −9 |
| 22. I am taking one or more medicines that I would like to stop | 23 | 7 | 47 | 2 | 27 |
| Patient Involvement in Decision-Making | | | | | |
| 31. When there are different options available, patients should have a say in which medicine they receive | 13 | 9 | 12 | 53 | −4 |
| 32R. I should go along with my PCP's advice even if I disagree with it (API) | 3 | −6 | −10 | 71 | 2 |
| 33R. The important medical decisions should be made by the doctor, not by the patient (API) | −14 | −4 | 4 | 63 | 6 |
| Unimportance of Medicines | | | | | |
| 19. I feel that I may be taking one or more medicines that I no longer need (PATD) | 13 | 0 | 38 | −3 | 45 |
| 21. I am taking one or more medicines that are not important for my health | 23 | −1 | −1 | −2 | 64 |
| 27. Medicines do more harm than good (BMQ-H) | 25 | 0 | −5 | 2 | 44 |
| 12R. My health in the future will depend on my medicines (BMQ-N) | −28 | 0 | −5 | 4 | 48 |
| 14. Some of my medicines are difficult to take (eg, the pill is hard to swallow or the inhaler is hard to use) | 36 | −9 | −2 | −8 | 12 |
| 16. One (or more) of my medicines is more important for my health than my other medicines | 26 | −12 | 9 | −1 | −9 |

*
Information within parenthesis indicates question source. If none, then item created de novo.

†
"R" indicates that item was reverse coded.

API indicates Autonomy Preference Index; BMQ, Beliefs about Medications Questionnaire-Concerns (C), Harm (H), Necessity (N); PATD, patient attitudes toward deprescribing; PCP, primary care provider.

**TABLE 4.**

Correlations Among Scales (Internal Consistency Reliability Estimates in Diagonal)

| | Medication Concerns | Provider Knowledge | Interest in Stopping Medicines | Patient Involvement in Decision-making | Unimpor-tance of Medicines | BMQ-Overuse | Trust in Provider | Collabo RATE |
|---|---|---|---|---|---|---|---|---|
| Medication Concerns | (0.82) | | | | | | | |
| Provider Knowledge | −0.27 | (0.86) | | | | | | |
| Interest in Stopping Medicines | 0.57 | −0.11 | (0.77) | | | | | |
| Patient Involvement in Decision-Making | 0.17 | −0.26 | 0.12 | (0.61) | | | | |
| Unimportance of Medicines | 0.53 | −0.29 | 0.51 | 0.08 | (0.70) | | | |
| BMQ-Overuse | 0.52 | −0.31 | 0.49 | 0.20 | 0.65 | (0.77) | | |
| Trust in Provider | −0.27 | 0.73 | −0.14 | −0.30 | −0.28 | −0.28 | (0.57) | |
| CollaboRATE | −0.32 | 0.68 | −0.20 | −0.24 | −0.32 | −0.33 | 0.70 | (0.93) |

Italics indicate established scales. Analysis conducted on entire sample.

All Pearson correlation coefficients were statistically significant ($P < 0.0001$) except for 3 which were significant at $P < 0.05$.

BMQ indicates Beliefs about Medications Questionnaire.

**TABLE 5.**

Final Scale Descriptive Statistics

| Scale | N Items in Scale | Mean | SD | Skew | % at Floor | % at Ceiling | Observed Range[*] |
|---|---|---|---|---|---|---|---|
| Medication Concerns | 6 | 3.01 | 0.85 | −0.03 | 0.76 | 0.63 | 1–5 |
| Provider Knowledge | 3 | 3.75 | 0.82 | −0.61 | 1.0 | 12.5 | 1–5 |
| Interest in Stopping Medicines | 3 | 3.42 | 0.84 | −0.42 | 1.3 | 4.1 | 1–5 |
| Patient Involvement in Decision-Making | 3 | 3.25 | 0.79 | 0.01 | 0.38 | 2.3 | 1–5 |
| Unimportance of Medicines | 3 | 2.39 | 0.75 | 0.19 | 6.8 | 0.0 | 1–4.67 |
| *BMQ-Overuse* | *4* | *2.91* | *0.75* | *0.049* | *1.7* | *0.89* | *1–5* |
| *Trust Provider* | *5* | *3.56* | *0.57* | *−0.95* | *0.38* | *0.38* | *1–5* |
| *CollaboRATE* | *3* | *3.73* | *0.98* | *−0.65* | *2.2* | *18.6* | *1–5* |

[*] Possible range of scores for all scales: 1–5. Italics indicate established scales.