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Abstract

Background: Prior authorization (PA) of medications is widely used by payers in the United States as a way to promote safe and effective use of medications and to control costs. However, PA-related tasks such as completing forms, submitting forms, researching medical history and submitting required documentation can all contribute to burden on healthcare providers. This study examines how such tasks can affect provider burden and treatment decisions.

Methods: We developed and administered a nationwide, cross-sectional online survey of medical providers in the United States in 2020 based on a convenience sample of 100,000 providers (physicians, nurse practitioners, and physician assistants). Path analysis was used to test the associations between provider practice characteristics, step therapy and other health plan requirements, perceived burdens of PA, and communication issues with insurers on prescribing behaviors, which included prescribing a different medication, avoiding prescribing of newer medications, and modifying a diagnosis. Weighted analyses were also conducted to account for sample bias due to non-response.

Results: A total of 1173 providers (1.2% response rate) provided 1147 usable surveys. The sample was 49.6% female, and a majority were MD/DO providers (85%). Step therapy requirements had the largest influence on prescribing a different medication than planned ($\beta = .22$, 95% CI = .160-.285) and avoiding prescribing a newer medication despite meeting evidence-based guidelines ($\beta = .24$, 95% CI = .181-.309). A unit-weighted index of perceived PA burden risk was associated with prescribing a different medication ($\beta = .09$, 95% CI = .012-.128) and modifying a diagnosis to obtain PA approval ($\beta = .14$, 95% CI = .065-.195). Communication issues were associated with prescribing a different medication ($\beta = .11$, 95% CI = .029-.186), while health plan requirements (e.g., clinical documentation) was significantly associated with all three prescribing outcomes. Weighted analyses showed that the study conclusions were unlikely to have been biased by nonresponse.

Conclusions: Providers report altering and modifying diagnoses to avoid PA requirements and related burdens. Processes that reduce the administrative burden of PA through improved communication and transparency as well as standardized documentation may help ensure that PA more seamlessly achieves its goals of safe and effective use of medications.

Trial Registration: NA

Keywords: clinical decision making, formulary, health plan, pharmacy benefit manager, prior authorization, provider burden, specialty types, step therapy, workarounds

What is already known about this subject:

- Prior authorization is a utilization management tool used by health plans to contain cost and to ensure appropriate use of medications
- PA is known to be a burden to providers and practices.
- Little is known about whether prior authorization affects clinical decision making and in what precise manner.

What this study adds:

- Step therapy requirements were the most efficient predictor of changes in provider prescribing behavior, while patient load had a relatively small influence on prescribing behaviors.
- Health plan requirements and communication issues were also significantly predictive of changes in provider prescribing behavior.
- Comparison of Psychiatry to other medical specialties showed evidence of subtle differences in how PA differentially affects decision making by specialty.

1 **Introduction**

2 Prior Authorization (PA) for prescription medication is one of several drug utilization
3 management tools used by health insurers to manage healthcare resources by controlling access
4 to costly and/or low value medications and improve patient outcomes through safe drug therapy
5 [1]. PA requires providers to obtain advance health plan approval for select drugs to ensure
6 payment. Health plan requirements for PA are product-specific and may require providers to
7 submit additional information on therapeutic failure with preferred medications (step therapy). In
8 some cases, providers are asked to provide additional clinical notes and diagnostic information
9 that supports the provider’s clinical decision making. Peer-to-peer review with a medical
10 representative of the health plan may also be required.

11 While the goals of PA are to ensure safe, effective, and value-based use of medications,
12 several meta-analyses have found that PA and other formulary restrictions can have a negative
13 impact on medication adherence, clinical outcomes and treatment satisfaction [2,3]. Moreover,
14 recent provider surveys have affirmed that medication PA disrupts their workflow and impacts
15 provider satisfaction. For instance, an American Medical Association (AMA) survey [4] reported
16 that providers spend an average of 14.4 hours on PAs per week, and a significant majority of
17 providers rated the burden of insurance company administrative challenges as “high” or
18 “extremely high.” Almost two-thirds stated they wait at least a day to hear back from the
19 insurance company on a PA request and slightly under one-third reported they waited at least
20 three business days. This translates into providers employing increasing numbers of staff to
21 manage PAs. The rates of reported burnout were high, and in some cases led providers to
22 consider leaving the medical profession [5]. These and related findings have been reinforced by
23 more in-depth qualitative studies highlighting provider burden due to extensive paperwork and
24 inconsistent PA requirements between health plans [6,7].

25 PA time and economic burden also varies by medical specialty based on the medications
26 they prescribe. For example, infused biologics, commonly used by rheumatologists, oncologists,

1 and gastroenterologists, often require PA due to high cost [8]. PA is also common with newer
2 medications within classes, including antipsychotics [9], viral and antimicrobial drugs [10,11],
3 and cardiovascular medications [12]. The economic burden of PAs applies to all providers and
4 the health system overall, and includes time diverted from direct patient care, downstream cost
5 associated with delayed care, increased healthcare resource utilization (e.g., emergency
6 department or physician visits), and administrative overhead [8]. The lack of standardization of
7 PA requirements across health plans further adds to provider burden and frustration with the PA
8 process.

9 There is also growing evidence that the medication PA process can delay patient care and
10 contribute to adverse patient outcomes. This has been noted in rheumatologic care with infusible
11 treatments initially denied [13] as well as other medical specialties [9,11,14,15,16]. When
12 surveyed, 24% of physicians noted that PA had led to a serious adverse event in one of their
13 patients, 91% reported that PA requirements cause care delays, and 90% reported that PA delays
14 resulted in worse patient outcomes [4]. Frequently, PA-related cost restrictions create delays that
15 result in patients abandoning prescriptions [17]. These findings have been replicated across a
16 number of specialties including rheumatology, psychiatry, primary care, oncology, infectious
17 disease, and dermatology [9,11,13,14,15,16].

18 Step therapy, also referred to as step edit, is often a key component of PA and requires
19 that a patient has tried and been intolerant or failed to achieve therapeutic goals on preferred
20 therapies prior to authorizing reimbursement for a non-preferred medication [18]. Using point-
21 of-care step-edit procedures, pharmacy benefit managers and health plans can search a patient's
22 claims to determine whether a preferred medication has been utilized. If requirements are met,
23 the process is seamless, and the non-preferred drug is approved for coverage. If step therapy
24 requirements are not met, or if required clinical information is not captured in claims data by the
25 health plan, the prescription claim is rejected, pending review of information requested by the
26 payer. This manual step of documenting medical necessity diverts practice resources and can

1 delay treatment. Given these challenges, there has been a groundswell of support by providers,
2 pharmacists, policy-makers and other stakeholders to limit, standardize, and/or streamline PA
3 processes [19,20,21,22].

4 Given the concerns outlined above, a notable gap in the literature concerns whether
5 medication PA leads to changes in providers' clinical decision making. In other words, do
6 providers find workarounds to address PA requirements, and if so, what do they involve. To
7 address this concern, we conducted a nationwide survey of providers to evaluate their attitudes
8 toward medication PA and whether PA requirements are linked to clinical decision-making in
9 patient care. In so doing, the current study provides a more granular view of whether and how
10 the administrative burdens of PA affect patient care.

11 **Methods**

12 **Sampling frame and survey administration**

13 This study was part of an effort to design a digital solution for medication PA conducted
14 under the auspices of a National Institute of Mental Health Small Business Technology Transfer
15 Grant. Thus, the study was designed to learn more about perceived barriers associated with PA,
16 the current use of electronic solutions, and to identify provider-suggested remedies to inform the
17 development of a point-of-care digital solution. Some items were written de novo to obtain
18 responses that could inform designing an electronic point-of-care PA solution. New items were
19 informed by focus groups and stakeholder interviews conducted prior to the survey construction.
20 The study oversampled mental health providers as they are the current focus of the software
21 platform. The remaining specialty types were based on a recent AMA survey detailing high-
22 volume providers most likely to encounter PA [23].

23 We administered a 58-item survey over a two-week period in October 2020 using the
24 Qualtrics® platform. Invitation emails with an embedded hyperlink were sent out to an initial
25 random sample of 10,000 names drawn from a curated list of 100,000 licensed providers,
26 including MD/DO, nurse practitioners, and physicians assistants) to establish a base response

rate. The balance of 90,000 emails were sent within the following two weeks. Average time to completion was 11.9 minutes (median = 9 minutes), and all respondents received a \$10 incentive following completion of the survey. All participants were consented using a University Institutional Review Board-approved electronic consent prior to taking the survey (University of Nebraska, IRB # 00000672).

Survey Instrument

Exogenous Measures. A single item assessed challenges associated with identifying step therapy requirements prior to prescribing (“In general, how challenging is it to identify appropriate step therapy requirements prior to prescribing a medication?”), with responses on a 5-point scale ranging from ‘*not at all challenging*’ to ‘*extremely challenging*.’ In addition, a single item assessed active patient load (“What is your active patient load?”) with responses on a 5-point scale ranging from ‘*under 25*’ to ‘*over 200 patients*.’

Nine items assessing interactions with health insurance plans were subject to principal axis factoring (Horn’s parallel analysis). A promax rotation produced two subscales, one capturing health plan requirements related to PA and a second subscale reflecting communication issues that arise between provider and health plans. Simple structure was used to generate factor scores using Bartlett’s approach. This allows the loading to be influenced by both the primary factor and adjust for the correlation between factors. The health plan requirements subscale contained five items all containing the stem, “Regarding insurance companies, how often do you find them requiring ...” with responses including requiring manual PA as opposed to electronic; and requiring PA for generic medications;; and “how often to you find them denying prior authorization because ...” of missing description of adverse effects; dosing issues; and formulation issues ($\lambda_{avg.} = .64$). Response options ranged from (1) ‘*very rarely or never*’ to (5) ‘*extremely often*.’ The communication subscale included four items assessing breakdowns in communication between provider and health plans. Stems for each questions included “How often do you find that ...” with responses including: it is necessary to send additional clinical

documentation, your software says a medication is denied by insurance and you later discover it was approved, you are not notified of a medication approval, and you are not notified of a medication denial ($\lambda_{avg.} = .65$). The same 5-point response format was used. A confirmatory factor analysis positing simple structure indicated the correlation between subscales was $r = .61$, $P < .001$, suggesting the two scales share some variance but capture different elements of transacting with health plans.

We also created a unit-weighted risk index based on four items assessing practice characteristics. Additional analyses indicated that the path model achieved better fit with these items bundled versus including them as separate predictors (data not shown). This use of a risk-factor methodology is consistent with prior medical [24,25] and behavioral [26,27] studies that designate “risk” based on elevated or extreme scores. In the current study, we truncated distributions using either a quartile or tertile cut-point to indicate risk. The individual risk factors included number of medication PA’s personally completed in a week with a 6-point response scale ranging from ‘*none*’ to ‘*50+*’ (11-20 or more coded “1”); how many hours/week personally spent completing PAs with a 5-point scale ranging from ‘*less than 5 hours*’ to ‘*more than 20 hours*’ (> 5-10 hour coded “1”); length of time waited for PA decision from health plan with a 7-point scale ranging from ‘*under 1 hour*’ to ‘*more than 5 business days*’ (> 3-5 business days coded “1”); and length of time start to finish to complete PAs including chart reviews and patient research, with a 6-point scale ranging from ‘*0-3 hours*’ to ‘*greater than 2 weeks*’ (> 3-7 days coded “1”). Higher scores on the risk index reflect more perceived burdens of PA based on practice experiences.

Endogenous Measures (Outcomes). Providers were asked in what percentage of cases they prescribe a different medication than initially planned, due to PA delays. Response formats were on a 5-point scale and ranged from ‘<10%’ to ‘>50%.’ A second item assessed how often prescribers avoided prescribing newer medications due to anticipated difficulties with PA, even if the patients meet evidence-based guidelines, with a 5-point response format ranging from ‘*very*

1 *rarely*’ to ‘*extremely often*.’ A third item assessed how often providers have modified a diagnosis
2 to obtain PA, with a 5-point response scale ranging from ‘*very rarely*’ to ‘*extremely often*.’

3 The study was appropriately powered for a single continuous outcome at $>.90$ with an R^2
4 set to $.10$ and five predictors. For the path model, a Monte Carlo simulation using the precise
5 sample size with three continuous outcomes and up to six continuous (correlated) predictors
6 indicates that we can obtain efficient and bias-free parameter estimates with 95% coverage (i.e.,
7 the proportion of replications for which the 95% confidence interval contains the true parameter
8 value) in the path model. Power also exceeded $.90$ based on the proportion of replications (out of
9 10,000) in which the obtained parameters differed from zero [28].

10 Statistical analysis

11 We examined relations between gender, race (white vs. other), practice specialty
12 (Psychiatrist vs. Other), and practitioner type (MD/DO vs. other) using χ^2 tests of independence.
13 We used Students’ t-test to examine mean differences for continuous measures based on gender,
14 practice specialty and practitioner type. A path regression model was conducted using the Mplus
15 statistical software program using maximum likelihood estimation [29]. Model fit was evaluated
16 based on the χ^2 statistic (ratio of $\chi^2:df < 5$ equals good fit), Comparative Fit Index (CFI) [30] and
17 Tucker Lewis Index (TLI) [31,32] (numbers closer to 1.0 indicate better fit), standardized root
18 mean residual (SRMR) and the root mean error of approximation (RMSEA) [33] both of which
19 consider < 0.05 indicating good fit [34].

20 Adjusting for Non-Response

21 Nonresponse weighting adjustments were implemented using propensity weighting
22 strategies [35] to make the sample distributions conform to the total sample (i.e., the known
23 population distribution). We had available reliable benchmarks from the list of providers (which
24 encompasses state license registries), providing population statistics to make inferences [23]. We
25 had available five adjustment (auxiliary) variables to compute weights including sex, age,
26 practitioner role (MD/DO vs. other), and specialty type (available for both respondents and

nonrespondents). Sample response status (respondent coded “1” and nonrespondent “0”) was modeled in a series of iterative logistic regression models predicting the likelihood of any single individual being in the sample versus the population (sample data were removed from the population data to avoid duplication). This produces a predicted response probability for each adjustment variable. Overall, this procedure is more flexible than ranking when the logistic regression model includes both continuous and categorical adjustment variables.

To illustrate this weighting procedure, we first created sample weights associated with sex, obtained from the predicted probabilities of a logistic regression model (defined as $1/\text{predicted response probability}$). Following creation of a sex weight, the resulting data was used to create sample weights associated with age, and a new frequency table was produced after weighting the data based on sex *and* age (the product of sex and age). This iterative procedure continued until the data was weighted by a product of weights for sex, age, practice role, and specialty, yielding a final frequency table for the sample that matched the population. A product of all adjustment weights was then used as a composite weight. Given the low level of missing data (<5%) we created a single imputed dataset that was analyzed for the path model using the weighting procedure.

The fully saturated path model was then run using the composite weight and compared to a model using the unweighted data. Bias was estimated as the difference in parameters between the expected value (based on the population of providers) and the sample value (regression coefficients and standard errors). This procedure was conducted iteratively for each weight individually as well as the composite measure to assess the extent of bias.

Results

A total of 1173 providers (1.2%) responded to the survey. This number was further culled down to 1147 usable surveys after those with <50% completion were eliminated. The sample was 49.6% female and mean age of the sample was 50.62 years (standard deviation [SD] = 12.76). A majority were MD/DO providers (76%; 69% MD and 7% DO) with a smaller

percentage indicating that they were a nurse practitioner (14%) or physician assistant (10%). The racial composition was 67% White, 18% Asian, 2% African American, 3% Other, 3% mixed race, and less than 1% American Indian or Alaska Native (4% identified as Hispanic ethnicity). The four largest states with survey respondents were New York (12.3%), California (10%), Florida (8.8%) and Texas (5.2%) with the remainder providing much smaller percentages. When considering practice type, the largest proportion of survey respondents were in psychiatry, which were oversampled by design (44.9%), followed by internal medicine (18%), dermatology (13.1%), gastroenterology (8.0%), neurology (5.9%), oncology (5.8%), and rheumatology (4.4%). White participants were more likely to be physician providers (MD/DOs) than nurse practitioners or physician assistants, $\chi^2(1) = 36.11, P < 0.01$. Males were more likely to be physician providers (MD/DOs), $\chi^2(1) = 155.87, P < 0.01$, and more likely to be psychiatrists or internists, $\chi^2(2) = 12.27, P < 0.05$.

Table 1 shows mean comparisons for the main model variables based on gender, specialty, and provider type. Race was not significant in any of these tests and therefore was not modeled further. Females were younger and reported fewer medication PAs on average. In comparison to physician assistants and nurse practitioners, physicians reported a greater number of providers in the practice that can prescribe, more hours per week doing medication PAs, and more challenges identifying proper step therapy.

--- Insert Table 1 about here ---

Compared with other medical specialties, psychiatry differed on 12 of the 15 comparisons. Psychiatry providers were older, had fewer providers in their practice, smaller practice loads, encountered fewer medication PAs per week, spent fewer hours doing PAs, had lower waiting time for PA results, took less time to complete medication PAs, reported more communication issues with health plans and perceived lower practice burden risk associated with PAs. With regard to the three endogenous outcomes, psychiatrists reported a lower percentage of cases in which they prescribed a different medication than initially intended, but a higher

percentage in which they avoided prescribing newer, evidence-based medications and reported fewer cases in which they would modify a diagnosis. Given the large number of statistical differences (i.e., mean comparisons) between specialties, we examined differences in the path regression coefficients between psychiatry and other specialties using multiple group analysis.

Figure 1 presents the results of the path analysis. Parameter estimates and their confidence intervals are contained in Table 2. A fully saturated path model (0 degrees of freedom) was initially tested. The model results indicated three paths were not significant and these were removed. They included the paths from patient load to ‘avoid prescribing newer medication’ and ‘modify a diagnosis,’ and the path from the risk burden index to ‘avoid prescribing newer medication.’ A trimmed path model indicated a close fit of the sample data to the hypothesized model, $\chi^2(3) = 6.357$, $P = 0.10$, CFI = .996, TLI = .973, RMSEA = .03 (< .05 is better), and SRMR = .01 (all exogenous and endogenous correlations were significant).

As depicted, the two largest effects overall were associated with the path from step therapy to ‘avoid prescribing newer medication’ ($\beta = .24$, [95% CI] 0.188-0.301, $P < 0.001$) and step therapy to ‘prescribe different medication’ ($\beta = .22$, CI 0.166-0.279, $P < 0.001$). The next largest effect was from health plan insurance requirements to ‘avoid prescribing a newer medication’ ($\beta = .15$, CI 0.074-0.221, $P < 0.001$) and then the practice burden risk index to ‘modify a diagnosis’ ($\beta = .14$, CI 0.086-0.204, $P < 0.001$). Overall, in terms of their predictive efficiency, step therapy requirements was significantly related to all three endogenous outcomes, and likewise health plan insurance requirements was significantly related to all three endogenous outcomes. The remaining exogenous measures each had two significant paths to the endogenous outcomes. Of note, although significant, the smallest effect overall was from patient load to ‘prescribe different medication’ ($\beta = .06$, CI 0.014-0.112, $P < 0.05$).

--- Insert Table 2 about here ---

The curved double-headed arrows on the left-hand side represent associations among the exogenous measures and on the right-hand side they represent correlations among the

1 endogenous outcome measures net of prediction. For the exogenous measures there was a
2 moderate association between health plan requirements and communication issues ($r = .65$, $P <$
3 0.001). Associations between the three outcome measures indicate that providers linked ‘avoid
4 prescribing newer medications’ with ‘prescribe different medication’ ($r = .45$, $P < 0.001$). The
5 variance accounted for in the endogenous outcomes was $R^2 = .161$ for ‘prescribe different
6 medication,’ $R^2 = .133$ for ‘avoid newer medication’ and $R^2 = .103$ for ‘modify diagnosis.’
7 Additional model comparisons based on gender and provider function (MD/DO vs. all others)
8 indicated some small albeit significant differences in the model parameters. However, upon
9 closer inspection, these differences were trivial and not clinically meaningful (results of these
10 specific analyses are available from first author).

11 The comparison of psychiatrists ($n = 515$) with other specialty groups ($n = 631$) revealed
12 a few minor differences in the magnitude of path regression coefficients. Looking first at
13 prescribing a different medication, patient load was significant for other medical specialties but
14 not psychiatrists ($\beta = .096$, $P < 0.05$, vs. $\beta = .057$, $P = ns$, for other specialty vs. psychiatrists,
15 respectively). ‘Health plan requirements’ was significant for other medical specialty but not for
16 psychiatrists ($\beta = .186$, $P < 0.001$, vs. $\beta = .068$, $P = ns$ for other vs. psychiatry). The path from
17 ‘health plan communication’ to ‘prescribe different medication’ was significant for psychiatrists
18 but not for other medical specialty ($\beta = .049$, $P = ns$, vs. $\beta = .141$, $P < 0.01$ for other vs.
19 psychiatry).

20 Regarding ‘avoid prescribing a newer medication,’ the paths from patient load was
21 significant for other specialties but not for psychiatrists ($\beta = .081$, $P < 0.05$, and $\beta = .010$, $P = ns$,
22 for other specialty vs. psychiatrists). The path from health plan communication was not
23 significant for other medical specialty but significant for psychiatrists ($\beta = .048$, $P = ns$, vs. $\beta =$
24 $.142$, $P < 0.01$ for other vs. psychiatry). Two paths associated with the decision to ‘modify a
25 diagnosis’ differed between other specialty group and psychiatrists. These included the path from
26 health plan requirements ($\beta = .128$, $P < 0.05$, vs. $\beta = .030$, $P = ns$) and the path from health plan

communication ($\beta = .109, P < 0.05$, vs. $\beta = .099, P = ns$). The absolute value of the differences in parameter estimates contrasting psychiatrist and other specialty groups was .002, indicating relatively similar effects for the two groups.

We further examined each parameter individually to determine whether they were statistically equivalent across groups. This analysis showed that the difference in parameters was not significantly different from zero. Furthermore, the joint Wald test for the equality of parameters across the two groups was not significant, indicating there is no degradation in the model holding the parameters equal, $\chi^2(15) = 16.923, p = .323$. The total variance accounted for in the three endogenous measures differed slightly between the two groups ('prescribe different medication' $R^2 = .146$ vs. $.171$, 'avoid prescribing newer medication' $R^2 = .123$ vs. $.172$, and 'modify diagnosis' $R^2 = .128$ vs. $.076$, for other vs. psychiatrist). The χ^2 difference test contrasting the constrained and unconstrained models indicated the constrained model provided a better fit, $\Delta\chi^2(9) = 19.472, P < 0.05$; in other words, the two groups can be considered randomly drawn from the same population.

Adjusting for Nonresponse

The results of the weighted vs. unweighted analyses for the fully saturated model using the composite weight indicated some trivial differences in model parameter estimates. However, the overall average difference (risk bias) in the regression parameters was $\Delta\beta$'s = .0005 and the same for the Δ SEs was .004. Also worth noting, the average difference in mean estimates for model variables between unweighted and weighted data was .001 (SE = .006). Taken together, the findings from the weighted and unweighted analyses suggest that nonresponse bias had minimal effect on the final results.

Discussion

To our knowledge this study is the first to provide clarity on factors that contribute to providers' perceptions of medication PA burdens and the effect of these burdens on their prescribing behavior. Other nationwide surveys have reported that providers find PA

1 burdensome, both personally and administratively. However, the current study drilled deeper into
2 what these burdens involve and how they affect clinical decision making.

3 Overall, step therapy challenges had the largest effect on prescribing behavior, being
4 significantly associated with all three prescribing behavior outcomes and most strongly with
5 prescribing a different medication and avoiding prescribing a newer medication. This finding is
6 not unexpected given that step therapy is an ordered protocol. In its most efficient form,
7 information exchange for step therapy is based on available medication dispensing data and fully
8 automated. However, at times step therapy can require providers to complete extensive
9 documentation including prior treatment history, noting dosages, dates, adverse effects,
10 intolerances or medication failures.

11 Health plans vary not only in their PA policies but also with regard to the specific
12 documentation they require. This adds a layer of administrative burden to providers who must
13 keep up with the different requests. Accordingly, we distinguished step therapy from other
14 measures because it represents a different facet of provider-payer interaction specific to
15 demonstrating a patient's outcomes with prior treatment. Indeed, previous studies have shown
16 there is considerable variation with respect to how providers view step therapy, specifically
17 whether they feel it is a viable method to ensure clinically appropriate use of medication and for
18 managing drug costs [36].

19 Perceived practice burden and health plan communication issues were both associated
20 with provider prescribing behavior and changing a diagnosis. Workplace perception of burdens
21 quantified the number of PA's conducted weekly, hours spent per week completing PA's, length
22 of time waiting to hear back from health plans regarding PA outcomes, and how long it takes to
23 complete documentation for PA's including chart reviews and patient research. The additional
24 hours and costs that accrue from processing PA's most likely represents what providers view as
25 "burdens" that have been noted in various professional surveys. In this study, we were able to
26 show that these burdens are linked with changes in prescribing behavior. Interestingly, patient

1 load, which reflects practice size, had a very small effect on prescribing a different medication
2 and no effect on the other two markers of clinical decision making. These null findings may
3 indicate that providers are not hampered by the size of their practice or how many patients they
4 see on a weekly basis as much as the insurance-specific requirements of medication PA.

5 Health plan requirements and communication issues also significantly influenced clinical
6 decision making. Health plan requirements include steps providers must take to ensure patient
7 access to medications, including providing health plans with clinical information regarding
8 medical necessity to secure coverage. Communication issues include the need to send additional
9 information to the health plan, as well as discrepancies between the PA decision communicated
10 to the provider and how it is adjudicated at the pharmacy. PA requirements and communication
11 issues reduce patient care time and, therefore lead providers to seek “workarounds” to avoid the
12 PA process.

13 This study also identified modest differences between psychiatry and other specialties.
14 Overall, psychiatry providers were less inclined to prescribe a different medication than initially
15 planned, or avoid a newer medication in response to patient load and health plan requirements
16 compared with other specialty groups. On the other hand, psychiatry providers were significantly
17 more likely than other specialties to avoid a newer medication when faced with health plan
18 communication issues. This perhaps suggests that psychiatry providers alter their medication
19 prescribing behavior when they feel that communication with the health plan is too demanding.
20 This comes despite their having smaller patient loads and conducting fewer medication PAs on
21 average. Other differences between psychiatry providers and other specialty groups may reflect
22 the types of drugs being prescribed and the diagnoses relevant to the different specialty types.

23 Study findings related to PA requirements and communications issues highlight the
24 fundamental desirability for standardization of PA criteria across health plans, and continued
25 development and adoption of digital solutions for PA processes. By reducing PA burdens, these
26 efforts may reduce the need for providers to seek “workarounds” which can lead to suboptimal

1 drug treatment and poor patient outcomes. Yet in the absence of widespread solutions to the
2 burden of PA, various stakeholders are advocating for local and federal legislation that will limit
3 the scope of PA and step edits. This trend is likely to continue should the burden of PA on
4 providers and patients not be addressed through standardization, digital solutions, or other means
5 [37].

6 This study has certain limitations. Cross-sectional data cannot be used to imply causation
7 in the absence of temporal precedence. Post-stratification weighting procedures were
8 incorporated to bring the sample data in line with population estimates. Notwithstanding these
9 efforts, the pool of adjustment variables was limited. As a result, the final sample may contain
10 moderate bias attributed to provider nonresponse, which may affect generalizability of the
11 findings. Other PA surveys conducted in pharmacy and medicine have obtained higher response
12 rates, however, their sampling frame incorporated drawing smaller “random” samples from a
13 larger pool [37,38,39] which can adversely influence power. Despite a low response rate in the
14 current study, the resulting sample demographic profile matched well to national numbers for all
15 physicians.

16 We did not sample all medical specialties, delimiting the sample to including providers
17 with high-volume medication PA. Not included were surgeons and other specialties that may
18 have lowered the mean time spent on medication PAs. Although the study was properly
19 powered, future studies may want to replicate these findings, ensure a more equitable distribution
20 of specialty types with greater coverage of high-volume PA practices, and widen the subject pool
21 to include pharmacists, administrators, and support staff who may interact with health plans
22 regarding PA. Finally, in asking how long providers waited to hear about medication PAs, we
23 did not qualify whether this was Medicare related or not, as there are stipulations for health plans
24 on Part D mandating expedited processing of medication PAs. Future studies may want to delve
25 more deeply into the nature of medication PAs from a provider’s perspective and precisely how
26 communication with health plans can be modified to reflect patient-centric concerns.

List of Abbreviations

- AMA: American Medical Association
- CFI: Comparative Fit Index
- PA: Prior authorization
- RMSEA: Root mean error of approximation
- SRMR: Standardized root mean residual
- TLI: Tucker Lewis Index

Declarations

- Ethics approval and consent to participate: All participants were consented using a University IRB-approved electronic consent prior to taking the survey (University of Nebraska, IRB # 00000672).
- Consent for publication: Not applicable
- Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- Competing interests: All financial and non-financial competing interests must be declared in this section.
 - SS is CEO of Breezmed and holds a majority stock ownership in the company. He has received a patent for the Breezmed prior authorization software tool from the USTPO (US 11,043,293 B1). As a result, he stands to benefit financially from

1 the eventual commercial sale of the Breezmed application. To minimize influence
2 from any conflict of interest, he was not involved in the construction of the
3 consumer preference survey reported in this study, nor did he oversee the data
4 analyses, which were conducted independently by a third party not affiliated with
5 Breezmed. The publication of this manuscript will in no way influence his
6 holdings in Breezmed nor is there any anticipated gain from publication to the
7 overall financial condition of the company.

- 8 ○ ML, BH, LS, HG, CM declare that they have no competing interests.
- 9 ● Funding: This work was supported by a National Institutes of Health Small Business
10 Technology Transfer grant awarded from the National Institute of Mental Health,
11 #1R41MH124600-01 (Dr. Salzbrenner), titled An Economical Point-of-Care Software
12 Solution for Medication Prior Authorization.
- 13 ● Authors' contributions: The individual contributions of authors to the manuscript should
14 be specified in this section.
 - 15 ○ SS conceptualized the consumer preference survey and contributed to the
16 interpretation of findings.
 - 17 ○ ML conducted background research and literature review to support survey
18 development.
 - 19 ○ BH provided data management, statistical analyses, and procured the curated list
20 of providers.
 - 21 ○ LS contributed to statistical analyses, developed the path model, and contributed
22 to the construction of the manuscript.
 - 23 ○ HG – Editing of the manuscript,
 - 24 ○ CM contributed to interpretation of findings, and conceptualization and
25 development of the manuscript.
 - 26 ○ All authors read, edited, and approved the final manuscript.

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List of Figures:

Figure 1. Final path model predicting provider workarounds.

Boxes represent measured (observed) variables. Straight lines with single headed arrows are path regression coefficients (standardized). Curved lines with double-headed arrows represent correlations. Associations among endogenous measures are net of prediction. Measures of health plan requirements and communication issues are factor composites. Model is trimmed of nonsignificant paths.

Additional Files

- Table 1.docx.
 - Table 1. Mean comparisons between gender, specialty type, and provider type.
 - Describes key survey responses by participant characteristics.
- Table 2.docx.
 - Table 2. Associations between Practice Characteristics and Perceived Burdens for PA and Provider Prescribing Behaviors
 - Presents beta (standardized) coefficients for associations between key exogenous variables and endogenous (outcomes) variables.
- Figure 1.pdf
 - Path Model
 - Presents associations between practice and PA-relevant factors with provider workarounds related to PA

Figures

Figure 1

Path Model. Presents associations between practice and PA-relevant factors with provider workarounds related to PA

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Table1.pdf](#)
- [Table2.pdf](#)