

Specialist physician perspectives on non-medical switching of prescription medications

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ABSTRACT

Introduction: A non-medical switch is a change to a patient's medication regimen for reasons other than lack of clinical response, side-effects or poor adherence. Specialist physicians treat complex patients who may be vulnerable to non-medical switching.

Objectives: To evaluate specialist physicians' perceptions regarding the frequency of non-medical switch requests, and the impact on their patients' outcomes and healthcare utilization.

Methods: An online survey of randomly sampled physicians spending $\geq 10\%$ of time providing patient care and having received ≥ 1 non-medical switch request during the prior 12-months.

Results: Among 404 specialist physicians surveyed, non-medical switch requests were reported as very frequent or frequent by 35.0% of oncologists (for injectable cancer agents) and up to 80.3% of endocrinologists (for injectable anti-hyperglycemics). Respondents reported decreased medication effectiveness (25.0% of oncologists to 75.0% of dermatologists) and increased side-effects (32.5% of oncologists to 66.7% of psychiatrists). Most specialists reported very frequent or frequent increases in non-office visits (52.5% of oncologists to 75.3% of endocrinologists) and calls with pharmacies (57.5% of oncologists to 80.5% of rheumatologists) due to non-medical switching.

Conclusions: Receipt of non-medical switching requests were common among specialist physicians. Non-medical switching may lead to negative effects on patient care and require increased healthcare utilization.

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Non-medical switch; outcome assessment; specialization; therapeutic interchange

Introduction

Non-medical switching is defined as a change in a stable patient's prescribed medication to a clinically distinct, non-generic alternative for reasons other than poor clinical response, side-effects or non-adherence [1–4]. Non-medical switching is often the result of medication cost containment strategies implemented by insurers (e.g., formulary changes, prior authorization, step therapy) [2,3].



Specialist physicians may be particularly weary of non-medical switching because they more frequently care for 'complex' patients compared to primary care physicians (albeit varying degrees of complexity across various medical specialties)[5]. Although there is no widely accepted definition of a complex patient, prior evaluations have incorporated the number of prescriptions, comorbid conditions, socioeconomic circumstances and healthcare utilization [5–7]. Often patients managed by specialists are referred by primary care

physicians after their initial treatment plans were not fully successful, necessitating the use of newer, more costly therapies or off-label medications to achieve desired goals [8,9]. Treatment plans designed by specialists may take months before a condition is successfully controlled[10]. The commonplace requirement for non-medical switching may threaten patient's ability to persist on their regimen[11].

We performed a cross-sectional survey study to explore specialty physicians' perceptions regarding the impact of non-medical switching on their prescription of certain medication classes, patient outcomes and healthcare utilization.

Methods

We conducted an on-line cross-sectional survey of physicians[12]. Physicians were identified and recruited by Research Now-Survey Sampling International using

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their voluntary physician panel derived from state licensing and professional association data. Physicians were randomly sampled, sent an email invitation to opt-in to participate in the survey and were provided a modest honorarium upon survey completion.

The study intended to enroll ~400 specialty physicians, with quotas for individual subspecialties set *a priori* (cardiology, $n = 80$; dermatology, $n = 40$; endocrinology, $n = 80$; gastroenterology, $n = 40$; oncology, $n = 40$; psychiatry, $n = 80$; and rheumatology, $n = 40$). Prior to being allowed to participate in the full survey, physicians first had to complete a screener in order to determine whether they met the present study's inclusion criteria including being a licensed specialist (cardiologist, dermatologist, endocrinologist, gastroenterologist, oncologist, psychiatrist or rheumatologist) physician currently practicing (post-residency and/or fellowship >2 years but <30 years); spending a minimum of 10% of their professional time providing direct patient care and had received a request for a non-medical switch for at least one patient in prior 12-months. All eligible participants based on the screener questions were invited to complete the online survey. The survey was administered using the Decipher online survey platform (FocusVision, New York, NY, USA) and was fielded in November through December 2018. Investigators were blinded to all respondents to remain compliant with the Health Insurance Portability and Accountability Act. The study was approved by an independent institutional review board (Solutions IRB, Yarnell, AZ, USA) and reporting of results follow American Association for Public Opinion Research guidance[13].

The present study examines the impact of non-medical switching on physicians' use, stratified by specialty type, of certain medication classes, patient outcomes and healthcare utilization. Survey questions were framed as either 5-point ('Very Frequently', 'Frequently', 'Occasionally', 'Rarely', 'Never') or 7-point ('Increases Greatly', 'Increases Very Much', 'Increases Somewhat', 'No Change', 'Decreases Somewhat', 'Decreases Very Much', or 'Decreases Greatly') ordinal Likert scales. Data regarding physician's demographics and professional/practice characteristics were also collected and reported. Responses to the question regarding the frequency in which non-medical switching impacted physicians' prescribing of medication classes was only reported for a specialty type if 'not applicable' was selected <5% of the time. The analysis of our survey data was descriptive in nature. Categorical variables were summarized as counts and percentages and continuous measures as means with standard deviations (SDs) or medians with ranges. Statistical analysis was conducted using IBM SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Results

In total 21,493 physicians from the RN-SSI panel were available for recruitment into this survey study. Email invitations to opt-in (consent) were sent to a random sample of 13,117 physicians of which 1,818 opened the email and clicked on the embedded survey link. The main study included responses from 1,010 physicians who passed the screener, met all study inclusion criteria and completed the survey. Of these, 404 were specialist physicians and were included in the present analysis.

Demographic and physician practice characteristics are summarized in Table 1. Specialties included cardiology, dermatology, endocrinology, gastroenterology, oncology, psychiatry and rheumatology. Majority of responding physicians were men (ranging from 54.3% for endocrinologists to 85.0% for gastroenterologists). Between 60.0% (dermatology) and 85.2% (cardiology) of physicians reported being in practice for ≥ 10 -years. Private practice was most common among dermatologists (82.5%), endocrinologists (65.4%), gastroenterologists (57.5%) and rheumatologists (51.2%). The most common settings for cardiologists were community hospital and private practice (45.7% and 44.4%, respectively); oncologists were academic hospital and private practice (47.5% and 35.0%, respectively); and psychiatrists were private practice and outpatient centers (44.4% and 37.0%, respectively). More than 97% of all specialist reported spending over half of their time providing direct patient care.

Specialist familiarity with the term non-medical switching is reported in Table 2. The majority (>55% of responding cardiologists, dermatologists, endocrinologists and psychiatrists) were not familiar with the term "non-medical switching" prior to survey participation. Gastroenterologist, oncologists, and rheumatologist were more familiar, with 52.5%, 60.0% and 56.2%, respectively reported they heard the term prior to survey participation.

Table 3 summarizes how often specialists were asked to comply with a non-medical switch for each of the medication classes. Most specialists reported at least occasional requests for non-medical switches. Endocrinologists had the highest rates of non-medical switch requests with 80.3%, 70.4% and 48.2% reporting frequent or very frequent requests for injectable anti-hyperglycemics, oral anti-hyperglycemics and hormone replacement therapy, respectively. Conversely, oncologists had the lowest rates of non-medical switch requests with only 35.0% and 37.5% reporting frequent or very frequent requests to injectable and oral cancer agents, respectively. Requests for a non-medical switch was reported as frequent or very frequent by 52.5% of

Table 1. Demographic and physician site characteristics.

	Specialty						
	Cardiology N = 81	Dermatology N = 40	Endocrinology N = 81	Gastroenterology N = 40	Oncology N = 40	Psychiatry N = 81	Rheumatology N = 41
Age (mean±SD)	52.3 ± 9.15	47.4 ± 9.09	48.1 ± 9.39	52.5 ± 8.74	47.2 ± 8.58	49.9 ± 9.49	49.2 ± 10.36
Sex							
	17.3%	42.5%	43.2%	12.5%	22.5%	40.7%	39.0%
	80.2%	55.0%	54.3%	85.0%	75.0%	55.6%	61.0%
Practice Setting	2.5%	2.5%	2.5%	2.5%	3.7%	3.7%	0.0%
	35.8%	5.0%	27.2%	20.0%	47.5%	17.3%	39.0%
	18.5%	15.0%	21.0%	20.0%	20.0%	37.0%	17.1%
	45.7%	2.5%	13.6%	37.5%	22.5%	16.0%	12.2%
	44.4%	82.5%	65.4%	57.5%	35.0%	44.4%	51.2%
	3.7%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%
	0.0%	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%
	30.6%	18.2%	9.4%	26.1%	14.3%	50.0%	42.9%
	8.3%	21.2%	17.0%	4.3%	14.3%	2.8%	9.5%
	44.4%	42.4%	24.5%	47.8%	57.1%	38.9%	33.3%
	16.7%	18.2%	49.1%	21.7%	14.3%	8.3%	14.3%
Characteristics of Private Practice							
	85.3%	90.0%	75.6%	67.5%	73.5%	48.6%	75.0%
	12.0%	7.5%	15.4%	32.5%	23.5%	28.4%	19.4%
	2.7%	2.5%	9.0%	0.0%	2.9%	10.8%	5.6%
	0.0%	0.0%	0.0%	0.0%	0.0%	12.2%	0.0%
	10.7%	37.5%	28.2%	37.5%	23.5%	68.9%	22.2%
	36.0%	52.5%	59.0%	55.0%	52.9%	24.3%	72.2%
	41.3%	10.0%	11.5%	7.5%	23.5%	6.8%	5.6%
	12.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%
	18.7%	2.5%	9.0%	0.0%	11.8%	20.3%	8.3%
	56.0%	20.0%	33.3%	42.5%	38.2%	33.8%	41.7%
	22.7%	55.0%	44.9%	47.5%	47.1%	24.3%	44.4%
	2.7%	22.5%	12.8%	10.0%	2.9%	21.6%	5.6%
	96.0%	100.0%	100.0%	100.0%	100.0%	91.9%	97.2%
	4.0%	0.0%	0.0%	0.0%	0.0%	5.4%	2.8%
	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.0%
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	8.0%	0.0%	3.8%	0.0%	17.6%	9.5%	13.9%
	42.0%	65.0%	43.2%	50.0%	40.0%	42.0%	31.7%
	23.5%	32.5%	29.6%	20.0%	20.0%	8.6%	43.9%
	58.0%	25.0%	55.6%	50.0%	57.5%	63.0%	51.2%
	0.0%	0.0%	0.0%	2.5%	0.0%	2.5%	0.0%
	23.5%	25.0%	34.6%	17.5%	32.5%	23.5%	34.1%
	23.5%	20.0%	23.5%	20.0%	32.5%	23.5%	17.1%
	33.3%	45.0%	28.4%	27.5%	15.0%	35.8%	34.1%
	19.8%	10.0%	13.6%	35.0%	20.0%	17.3%	14.6%
Proportion of Time Covered by Medicaid							
	<25%						
	25 to 49%						
	50 to 74%						
	≥75%						
Medicare/Medicare Advantage							
	<25%						
	25 to 49%						
	50 to 74%						
	≥75%						
Commercial							
	<25%						
	25 to 49%						
	50 to 74%						
	≥75%						
Uninsured/unable to pay							
	<25%						
	25 to 49%						
	50 to 74%						
	≥75%						
Not reported							
Reimbursement Mechanisms							
	Fee for service						
	Value-based payment arrangements						
	Salary						
	Other						
	Northeast						
	Midwest						
	South						
	West						

(Continued)

Table 1. (Continued).

	Specialty							
	Cardiology N = 81	Dermatology N = 40	Endocrinology N = 81	Gastroenterology N = 40	Oncology N = 40	Psychiatry N = 81	Rheumatology N = 41	
Years of Practice								
< 10 years	14.8%	40.0%	28.4%	15.0%	22.5%	22.2%	31.7%	
10 to 19 years	39.5%	27.5%	38.3%	25.0%	47.5%	40.7%	39.0%	
≥20 years	45.7%	32.5%	33.3%	60.0%	30.0%	37.0%	29.3%	
Proportion of Time Providing Direct Patient Care								
10 to 24%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	
25 to 49%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	
50 to 74%	1.2%	2.5%	2.5%	2.5%	7.5%	6.2%	0.0%	
≥75%	98.8%	97.5%	96.3%	97.5%	90.0%	93.8%	100.0%	

Table 2. Familiarity with the term ‘Non-Medical Switching’.

	Specialty							
	Cardiology N = 81	Dermatology N = 40	Endocrinology N = 81	Gastroenterology N = 40	Oncology N = 40	Psychiatry N = 81	Rheumatology N = 41	
Physicians have heard the term ‘non-medical switching’ prior to survey participation	Yes	24 29.6%	16 40.0%	25 30.9%	21 52.5%	24 60.0%	26 32.1%	23 56.1%
	No	48 59.3%	22 55.0%	48 59.3%	13 32.5%	13 32.5%	47 58.0%	14 34.1%
	Unsure	9 11.1%	2 5.0%	8 9.9%	6 15.0%	3 7.5%	8 9.9%	4 9.8%

gastroenterologists (for immunomodulatory agents) and 60.5% of psychiatrists (for psychoactive medications). For antihypertensives, lipid-lowering agents and anticoagulants/antiplatelets there were 42.0%, 43.2% and 50.6% of cardiologists that reported frequent or very frequent non-medical switch requests. For immunomodulatory agents and pain medications there were 61.0% and 51.2% of rheumatologists, respectively that reported frequent or very frequent non-medical switch requests.

The perceived impact of non-medical switching on patient outcomes is reported in Table 4. Respondents often felt their patients experienced a negative impact on the effectiveness of a medication following a non-medical switch (ranging from 25.0% of oncologists, up to 75.0% for dermatologists). Side-effects were reported to increase by many respondents (ranging from 32.5% of oncologists, up to 66.7% of psychiatrists). Medication adherence was also found to be negatively impacted (30.0% for oncologists, up to 67.5% for dermatologists). The out of pocket costs for medication was commonly reported to increase (ranging from 40.7% for endocrinologists, up to 58.0% for psychiatrists). Nearly half of respondents reported increased abandonment of treatment (ranging from 45.0% for oncologists and gastroenterologists, up to 67.5% for dermatologists). Respondents reported an increased frequency of medication errors (ranging from 42.0% for psychiatrists, up to 60.5% for endocrinologists). Patient’s confidence and trust in their physician were commonly reported as neutral in all specialties except by dermatology in which 47.5% reported decreased trust in their physician’s ability to effectively practice medicine.

The majority of specialist physicians reported frequent or very frequent increases in non-office visit contacts (i.e. phone calls and emails) (ranging from 52.5% for oncologists, up to 75.3% for dermatologists) and increased calls with pharmacies (57.5% for oncologists, up to 80.5% for rheumatologists) (Table 5). About a third of specialists reported frequent or very frequent increases in office visits (22.2% for endocrinologists, up to 41.5% for rheumatologists). The need for laboratory testing and/or additional medications varied among specialties. Frequent or very frequent increase of laboratory testing were reported by 13.6% of psychiatrists to 43.9% of rheumatologists and frequent or very frequent increase of additional medications were reported by 14.8% of endocrinologists to 42.5% of dermatologists. Emergency department visits and hospitalizations were less frequently impacted by non-medical switching, though emergency department visits (3.7% of

Table 3. Frequency of non-medical switching for various medication classes.

Cardiology (N=81)						
	Antihypertensives		Lipid-Lowering Agent		Anticoagulant/Antiplatelet	
Very Frequently	9	42.0%	13	43.2%	14	50.6%
Frequently	25		22		27	
Occasionally	32	40.0%	36	44.4%	32	39.5%
Rarely	13	18.5%	6	9.9%	7	8.6%
Never	2		2		0	
Not Applicable	0	0.0%	2	2.5%	1	1.2%
Dermatology (N=40)						
Very Frequently						
Frequently						
Occasionally						
Rarely						
Never						
Not Applicable						
Endocrinology (N=81)						
	Inject Anti-Hyperglycemic		Oral Anti-Hyperglycemic		Hormone Replacement	
Very Frequently	44	80.3%	35	70.4%	15	48.2%
Frequently	21		22		24	
Occasionally	11	13.6%	15	18.5%	25	30.9%
Rarely	3	6.2%	6	7.4%	13	18.5%
Never	2		0		2	
Not Applicable	0	0.0%	3	3.7%	2	2.5%
Gastroenterology (N=40)						
	Immunomodulatory Agent					
Very Frequently	3	52.5%				
Frequently	18					
Occasionally	11	27.5%				
Rarely	7	17.5%				
Never	0					
Not Applicable	1	2.5%				
Oncology (N=40)						
	Injectable Cancer Agent		Oral Cancer Agent			
Very Frequently	6	35.0%	5	37.5%		
Frequently	8		10			
Occasionally	11	27.5%	11	27.5%		
Rarely	6	32.5%	7	30.0%		
Never	7		5			
Not Applicable	2	5.0%	2	5.0%		
Psychiatry (N=81)						
	Psychoactive Medication					
Very Frequently	19	60.5%				
Frequently	30					
Occasionally	26	32.1%				
Rarely	6	7.4%				
Never	0					
Not Applicable	0	0.0%				
Rheumatology (N=41)						
	Immunomodulatory Agent		Pain Medication			
Very Frequently	15	61.0%	12	51.2%		
Frequently	10		9			
Occasionally	10	24.4%	15	36.6%		
Rarely	4	14.6%	3	9.8%		
Never	2		1			
Not Applicable	0	0.0%	1	2.4%		

dermatologists to 30.0% of oncologists) and hospitalizations (8.6% of endocrinologists to 17.5% of oncologists) were still reported to very frequently or frequently increase.

Discussion

This present, online, cross-sectional survey study of specialist physicians found that $\leq 60\%$ were previously familiar

Table 4. Perceived effects of non-medical switching by participants.

		Specialty													
		Cardiology N=81	Dermatology N=40	Endocrinology N=81	Oncology N=40	Gastroenterology N=40	Psychiatry N=81	Rheumatology N=41							
<i>Effectiveness of treatment</i>	Increases greatly	0		1	8.6%	1	25.0%	0	7.5%	0	6.2%	1	7.3%		
	Increases very much	2	9.9%	1	10.0%	4	10.0%	0	0	0	0	1	2.4%		
	Increases somewhat	6		3		5		3		5		1			
	No change	47	58.0%	6	15.0%	26	32.1%	20	50.0%	16	40.0%	16	19.8%	11	26.8%
	Decreases somewhat	22		22		44		9		19		50		24	
	Decreases very much	2	32.1%	7	75.0%	4	59.3%	1	25.0%	2	52.5%	9	74.1%	2	65.9%
	Decreases greatly	2		1		0		0		0		1		1	
<i>Side effects</i>	Increases greatly	3		0		0		0		0		1	2		
	Increases very much	5	46.9%	2	52.5%	6	54.3%	2	32.5%	3	47.5%	10	66.7%	5	58.5%
	Increases somewhat	30		19		38		11		16		43		17	
	No change	41	50.6%	16	40.0%	31	38.3%	23	57.5%	19	47.5%	21	25.9%	16	39.0%
	Decreases somewhat	2		3		6		2		2		6		0	
	Decreases very much	0	2.5%	0	7.5%	0	7.4%	0	10.0%	0	5.0%	0	7.4%	1	2.4%
	Decreases greatly	0		0		0		0		0		0		0	
<i>Medication adherence</i>	Increases greatly	0		0		0		1		0		0	2		
	Increases very much	2	13.6%	1	2.5%	1	8.6%	2	27.5%	1	7.5%	0	7.4%	0	9.8%
	Increases somewhat	9		0		6		8		2		6		2	
	No change	41	50.6%	12	30.0%	19	23.5%	17	42.5%	18	45.0%	28	34.6%	12	29.3%
	Decreases somewhat	24		22		50		11		15		38		21	
	Decreases very much	3	35.8%	4	67.5%	5	67.9%	1	30.0%	3	47.5%	8	58.0%	3	61.0%
	Decreases greatly	2		1		0		0		1		1		1	
<i>Out-of-pocket medication costs</i>	Increases greatly	6		2		2		1		1		2	5		
	Increases very much	6	44.4%	5	52.5%	1	40.7%	7	45.0%	3	42.5%	14	58.0%	6	56.1%
	Increases somewhat	24		14		30		10		13		31		12	
	No change	19	23.5%	10	25.0%	27	33.3%	14	35.0%	10	25.0%	16	19.8%	14	34.1%
	Decreases somewhat	24		8		20		4		12		15		3	
	Decreases very much	2	32.1%	1	22.5%	0	25.9%	4	20.0%	0	32.5%	2	22.2%	1	9.8%
	Decreases greatly	0		0		1		0		1		1		0	
<i>Abandonment of treatment</i>	Increases greatly	3	45.7%	2	67.5%	3	61.7%	2	45.0%	1	45.0%	3	65.4%	2	63.4%
	Increases very much	4		6		2		3		3		7		5	
	Increases somewhat	30		19		45		13		14		43		19	
	No change	38	46.9%	9	22.5%	25	30.9%	16	40.0%	21	52.5%	26	32.1%	14	34.1%
	Decreases somewhat	4		3		5		5		0		2		1	
	Decreases very much	1	7.4%	1	10.0%	0	7.4%	1	15.0%	0	2.5%	0	2.5%	0	2.4%
	Decreases greatly	1		0		1		0		1		0		0	
<i>Frequency of medication errors</i>	Increases greatly	3		0		3		1		1		1	2		
	Increases very much	10	53.1%	4	57.5%	9	60.5%	6	45.0%	3	47.5%	7	42.0%	2	51.2%
	Increases somewhat	30		19		37		11		15		26		17	
	No change	36	44.4%	17	42.5%	29	35.8%	17	42.5%	20	50.0%	47	58.0%	17	41.5%
	Decreases somewhat	0		0		2		3		0		0		3	
	Decreases very much	1	2.5%	0	0.0%	1	3.7%	2	12.5%	1	2.5%	0	0.0%	0	7.3%
	Decreases greatly	1		0		0		0		0		0		0	
<i>Confidence in their physician</i>	Increases greatly	0		0		2		2		1		0	2		
	Increases very much	2	9.9%	0	7.5%	1	11.1%	7	27.5%	0	2.5%	0	2.5%	1	12.2%
	Increases somewhat	6		3		6		2		0		2		2	
	No change	50	61.7%	19	47.5%	51	63.0%	22	55.0%	26	65.0%	56	69.1%	20	48.8%
	Decreases somewhat	19		14		20		6		11		18		13	
	Decreases very much	2	28.4%	4	45.0%	1	25.9%	1	17.5%	2	32.5%	5	28.4%	2	39.0%
	Decreases greatly	2		0		0		0		0		0		1	
<i>Trust in their physicians abilities to effectively practice medicine</i>	Increases greatly	0		1		3		1		1		0	2		
	Increases very much	5	13.6%	0	12.5%	0	13.6%	5	30.0%	0	12.5%	0	3.7%	2	12.2%
	Increases somewhat	6		4		8		6		4		3		1	
	No change	49	60.5%	16	40.0%	48	59.3%	21	52.5%	23	57.5%	48	59.3%	21	51.2%
	Decreases somewhat	18		14		20		6		10		25		12	
	Decreases very much	1	25.9%	4	47.5%	2	27.2%	1	17.5%	2	30.0%	5	37.0%	2	36.6%
	Decreases greatly	2		1		0		0		0		0		1	

with the term non-medical switch prior to the survey, however all had experience with it in their clinical practice. Over one-third of physicians in every specialty reported frequent or very frequent non-medical switch requests in their applicable medication classes with over half reporting at

least an occasional non-medical switch request. Furthermore, majority of specialists reported negative or neutral patient outcomes in terms of treatment effectiveness, side-effects, adherence, out-of-pocket medication costs, abandonment of treatment, medication errors,

Table 5. Utilization of the health care system following non-medical switching.

Increase In ...		Specialty													
		Cardiology N=81		Dermatology N=40		Endocrinology N=81		Oncology N=40		Gastroenterology N=40		Psychiatry N=81		Rheumatology N=41	
Office visits	Very frequently	3	27.2%	5	37.5%	4	22.2%	1	32.5%	1	25.0%	4	38.3%	5	41.5%
	Frequently	19		10		14		12		9		27		12	
	Occasionally	37	45.7%	20	50.0%	44	54.3%	13	32.5%	20	50.0%	35	43.2%	19	46.3%
	Rarely	15	27.2%	4	12.5%	14	23.5%	13	35.0%	8	25.0%	13	18.5%	3	12.2%
	Never	7		1		5		1		2		2		2	
Non-office visit contacts (eg, phone, email)	Very frequently	17	61.7%	14	75.0%	31	75.3%	5	52.5%	6	67.5%	20	66.7%	12	73.2%
	Frequently	33		16		30		16		21		34		18	
	Occasionally	24	29.6%	9	22.5%	16	19.8%	9	22.5%	8	20.0%	19	23.5%	8	19.5%
	Rarely	3	8.6%	0	2.5%	4	4.9%	10	25.0%	5	12.5%	8	9.9%	2	7.3%
	Never	4		1		0		0		0		0		1	
Emergency room visits	Very frequently	3	16.0%	0	5.0%	1	3.7%	2	30.0%	1	7.5%	3	13.6%	2	22.0%
	Frequently	10		2		2		10		2		8		7	
	Occasionally	23	28.4%	8	20.0%	29	35.8%	8	20.0%	10	25.0%	24	29.6%	14	34.1%
	Rarely	34	55.6%	14	75.0%	40	60.5%	15	50.0%	21	67.5%	39	56.8%	13	43.9%
	Never	11		16		9		5		6		7		5	
Lab tests	Very frequently	3	22.2%	2	22.5%	4	27.2%	1	20.0%	2	25.0%	2	13.6%	2	43.9%
	Frequently	15		7		18		7		8		9		16	
	Occasionally	35	43.2%	17	42.5%	40	49.4%	13	32.5%	13	32.5%	36	44.4%	19	46.3%
	Rarely	25	34.6%	6	35.0%	13	23.5%	16	47.5%	14	42.5%	24	42.0%	2	9.8%
	Never	3		8		6		3		3		10		2	
Hospitalizations	Very frequently	7	12.3%	0	10.0%	2	8.6%	0	17.5%	0	15.0%	1	13.6%	2	14.6%
	Frequently	3		4		5		7		6		10		4	
	Occasionally	19	23.5%	9	22.5%	20	24.7%	13	32.5%	10	25.0%	25	30.9%	14	34.1%
	Rarely	36	64.2%	9	67.5%	40	66.7%	14	50.0%	17	60.0%	38	55.6%	14	51.2%
	Never	16		18		14		6		7		7		7	
Additional medications (for added effect or to manage side effects)	Very frequently	5	22.2%	4	42.5%	3	14.8%	4	22.5%	0	17.5%	3	22.2%	3	31.7%
	Frequently	13		13		9		5		7		15		10	
	Occasionally	31	38.3%	15	37.5%	45	55.6%	17	42.5%	14	35.0%	41	50.6%	16	39.0%
	Rarely	26	39.5%	6	20.0%	18	29.6%	12	35.0%	16	47.5%	19	27.2%	9	29.3%
	Never	6		2		6		2		3		3		3	
Calls to/from pharmacy	Very frequently	18	65.4%	13	75.0%	28	80.2%	8	57.5%	7	60.0%	26	74.1%	12	80.5%
	Frequently	35		17		37		15		17		34		21	
	Occasionally	22	27.2%	9	22.5%	14	17.3%	12	30.0%	10	25.0%	18	22.2%	7	17.1%
	Rarely	4	7.4%	0	2.5%	1	2.5%	5	12.5%	6	15.0%	2	3.7%	0	2.4%
	Never	2		1		1		0		0		1		1	

patient confidence and trust in their physician. Lastly, specialists reported occasional to frequent increases in health-care utilization through office visits, non-office visit contact, laboratory testing and communication with pharmacies, and less often (but still occurring) with emergency department visits and hospitalizations.

Our study focused on specialist physicians because they are responsible for managing medications for the most complex of patients; a population in whom a successful treatment regimen is often challenging to develop[5]. A study by Tonelli and colleagues of primary care physicians (i.e., family physicians, general internist) and 11 sub-specialties evaluated patient 'complexity' in terms of number of comorbidities, risk of mental health conditions, number of prescribed medications, number of physician types, number of physicians, length of stay in hospital, emergency department visits, long-term care placement and risk of mortality. The study found that many specialist physicians including nephrologists, infectious disease specialists,

neurologists, respirologists, hematologists, rheumatologists, gastroenterologists and cardiologist were more likely to treat more complex patients as compared to primary care providers[5]. Of the specialties evaluated in Tonelli et al. and our survey study; rheumatologists, cardiologists and gastroenterologists were found to have higher complexity in terms of prescribed medications compared to primary care physicians[5]. Specialists may encourage or utilize newer medications more frequently than primary care physicians [8] due to this increased complexity of patients they treat, and these medications are often more costly due to a lack of generic availability.

Specialist physicians' perceptions of the impact of non-medical switching on clinical and healthcare utilization outcomes observed in our study are generally consistent with those from a recently published systematic review on the topic[11]. This systematic review by Weeda and colleagues evaluated the impact of non-medical switching on four domains (clinical, economic,

resource utilization and medication taking behaviors). The review included 38 real-word studies that evaluated non-medical switching in the US. Overall, the outcomes were reported as neutral or negative in over 90% of cases. Specifically, the authors found outcomes relating to clinical, economic, health-care utilization and medication taking behaviors were negative or neutral in 86.0%, 95.9%, 97.0%, and 100% of cases respectively.

Our study has limitations worth noting. First, as with any self-reported response survey, social desirability bias (whereby respondents answer questions in a manner they feel will be viewed positively by others) may exist[14]. Next, our study had a small sample size of specialists from limited areas; notably we did not have respondents from the specialties of infectious disease, nephrology, neurology or respiratory which may have resulted in decreased applicability to various medication classes (e.g., epileptic medications, inhalers, anti-retrovirals, etc). Finally, to avoid respondent burden[12], we restricted the number of questions asked and did not offer respondents the opportunity to provide an explanation or more nuanced response.

In summary, this cross-sectional survey study suggests non-medical switching occurs frequently across a range of specialties in various medication classes. Furthermore, non-medical switching may lead to negative effects on patient care and require increased utilization of the healthcare system. Medical societies and patient advocacy groups should provide as much guidance as possible regarding when and how (if at all) non-medical switching should be performed.

Disclosure statement

T.S. has disclosed that she is employed by the American College of Physicians and was a consultant to Janssen on this study.

A.D. and A.C. have disclosed that they are employees of Xcenda which received funding for this study from Janssen

A.P., J.V. and B.B. have disclosed that they are employees and shareholders of Janssen.

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O.S.C. has no conflicts of interest to declare.

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References

- [1] Dolinar R, Kohn CG, Lavernia F, et al. The non-medical switching of prescription medications. *Postgrad Med*. 2019;131:335–341.
- [2] American Medical Association. H-125.991 Drug formularies and therapeutic interchange. Available at: <https://policysearch.ama-assn.org/policyfinder/detail/Drug%20Formularies%20and%20Therapeutic%20Interchange%20H-125.991?uri=%2FAMADoc%2FHOD.xml-0-227.xml>. [cited 2019 Nov 4]
- [3] Prior Authorization and Utilization Management Reform Principles. American Medical Association. 2017. [cited 2019 Nov 4]. Available from: <https://www.ama-assn.org/sites/default/files/media-browser/principles-with-signatory-page-for-slsc.pdf>
- [4] Nguyen E, Weeda ER, Sobieraj DM, et al. Impact of non-medical switching on clinical and economic outcomes, resource utilization and medication-taking behavior: a systematic literature review. *Curr Med Res Opin*. 2016;32:1281–1290.
- [5] Tonelli M, Wiebe N, Manns BJ, et al. Comparison of the complexity of patients seen by different medical subspecialists in a universal health care system. *JAMA*. 2018;1:e184852.
- [6] Grant RW, Ashburner JM, Hong CS, et al. Defining patient complexity from the primary care physician's perspective: a cohort study. *Ann Intern Med*. 2011;155:797–804.
- [7] Shippee ND, Shah ND, May CR, et al. Cumulative complexity: a functional, patient-centered model of patient complexity can improve research and practice. *J Clin Epidemiol*. 2012;65:1041–1051.
- [8] Florentinus SR, Heerdink ER, van Dijk L, et al. Is new drug prescribing in primary care specialist induced? *BMC Health Serv Res*. 2009;9:6.
- [9] Wittich CM, Burkle CM, Lanier WL. Ten common questions (and their answers) about off-label drug use. *Mayo Clin Proc*. 2012;87:982–990.
- [10] Hidalgo-Mazzi D, Berk M, Cipriani A, et al. Treatment-resistant and multi-therapy-resistant criteria for bipolar depression: consensus definition. *Br J Psychol*. 2019;214:27–35.
- [11] Weeda ER, Nguyen E, Martin S, et al. The impact of non-medical switching among ambulatory patients: an updated systematic literature review. *J Mark Access Health Policy*. 2019;7:1–16.
- [12] Allery LA. Design and use questionnaires for research in medical education. *Educ Prim Care*. 2016;27:234–238.
- [13] The American Association for Public Opinion Research. Standard definitions: final dispositions of case codes and outcome rates for surveys. 9th ed. AAPOR; 2016. [cited 2019 Nov 4]. Available from: https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf
- [14] Phillips AW, Reddy S, Durning SJ. Improving response rates and evaluating nonresponse bias in surveys: AMEE Guide No. 102. *Med Teach*. 2016;38:217–228.