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The continued inappropriate use and overuse of combination topical clotrimazole-betamethasone

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Abstract

Objective: Combination topical clotrimazole/betamethasone dipropionate (C-BM) contains a high-potency topical corticosteroid and is not infrequently prescribed for inappropriate patient groups and body sites. Use of C-BM can lead to inadequate clearance or exacerbation of fungal infections as well as cutaneous atrophy, striae, and other skin maladies.

Methods: We performed a retrospective chart review of 1,978 clinical visits where C-BM was prescribed within the University of Utah Health system between 2014 and 2018 to better understand current prescribing patterns.

Results: 1,974 prescriptions were written for C-BM. 91.6% of patients were at least the recommended age of 17 years. C-BM was most commonly prescribed for rashes of an inflammatory (42.2%) or fungal nature (38.1%). Clotrimazole/betamethasone dipropionate was prescribed for sensitive areas (face, axillae, groin or diaper region) in 48.9% of patients. Family medicine clinicians prescribed 58.3% of C-BM prescriptions, whereas dermatology clinicians accounted for 3.4%.

Conclusion: We strongly recommend clinicians use alternative treatments for rashes or refer to dermatologists.

Key Words: fungal infections, inflammatory rashes, side effects, topical antifungals, topical corticosteroids

Introduction

Clotrimazole-betamethasone dipropionate (C-BM) is a high-potency, fluorinated, topical corticosteroid combined with a topical antifungal. Inappropriate

prescribing and use of this medication by clinicians includes: use on intertriginous areas, excessive duration of prescribed treatment, and prescription to patients under 17 years of age, all of which are not recommended in the U.S. Food and Drug Administration (FDA) prescribing information [1-3]. These prescribing behaviors are concerning because high-potency topical corticosteroids, such as betamethasone dipropionate, can cause cutaneous atrophy and striae when applied to intertriginous areas or for prolonged durations [4,5]. Another concern is that C-BM is frequently prescribed to treat tinea infections when an over-the-counter or prescription topical antifungal would be more appropriate [1,2]. Studies suggest that combination antifungal/corticosteroid preparations have decreased efficacy and higher relapse rates compared to topical antifungals alone [6-9].

Non-dermatologists are far more likely to prescribe C-BM than dermatologists [2,3,10,11]. This likely relates to non-dermatologists' lack of confidence in differentiating fungal skin infections from inflammatory dermatoses or to dermatologists increased cognizance of the risks of high-potency topical corticosteroids [2,10]. Using National Ambulatory Medical Care Survey data from 1990-

1994, researchers showed that if non-dermatologists prescribed combination products at a low rate similar to dermatologists for tinea infection, annual cost savings would range from USD\$10.3–24.9 million, depending on the topical antifungal chosen [10]. Unfortunately, C-BM continues to be frequently

prescribed. In 2016, C-BM was the most prescribed combination topical medication and the 12th most prescribed topical medication using Medicare Part D data, accounting for 1.3% of all topical medication spending (1.25 million claims, \$47.3 million), [12].

We evaluated current patterns of C-BM prescribing over the past five years at University of Utah Health, a large academic medical center, to understand who prescribes C-BM, how they prescribe it (frequency of use, tube size, and refills), and why. Combining these data with FDA prescribing information, we sought to identify factors predicting inappropriate use of C-BM.

Methods

Data source and variables

We performed a comprehensive retrospective chart review of 1,974 clinical visits in which C-BM was prescribed at University of Utah Health between 2014 and 2018. Sample size represented all available cases over a 5-year period. The study was designed to be a retrospective longitudinal study describing C-BM prescribing practices over time. The University of Utah Institutional Review Board approved this project (#76927). Data extracted included: patient demographics; prescriber information including identification number, specialty, and degree; diagnosis(es); affected body sites; and prescription information including prescribed amounts of medication, number of refills, and recommended treatment duration. The clinical diagnosis associated with the C-BM prescription, if provided, was classified into one of four categories: inflammatory, fungal, both inflammatory and fungal, and other. Clotrimazole-betamethasone dipropionate would be most appropriate for a combined inflammatory/fungal rash. Continuous variables included patient age, prescription year, prescriptions written per year by each clinician, refill number, medication volume given, and treatment duration. These remained continuous and only age (<17 years of age) and volume (>45g per week) were dichotomized to predict prescribing practices contrary to those defined by the FDA prescribing information.

Outcomes of interest included average number of prescriptions per clinician per year in each specialty or degree type, change in average prescription number over time, relationship between prescriber specialty, degree, and concerning prescribing behaviors (FDA contraindications, use of C-BM for sensitive sites, and lack of key prescription information including duration (the prescribing information recommends no more than 2-4 weeks, depending on body site), diagnosis, and anatomic site. Contraindications from the FDA prescribing information (from the Merck Manual) for C-BM, included 1) prescriptions given to patients less than 17 years old and 2) use in the diaper area [13]. Given the high potential for striae and skin atrophy, the authors believe that C-BM poses potential hazard if used in "sensitive areas," which we defined as skin folds (pannus, axilla), groin, genitals, and face.

As a secondary outcome we evaluated if prescriber specialty or degree type predicted diagnosis for use of C-BM. Because prescribing practices may be affected by changes in guidelines, advertising, or data over time, age was considered an important confounder in these analyses. Misclassification bias was controlled for by having two authors review each chart for data extraction (NDF, RC and MF) and quality control was assessed by two other authors (AMS and ZHH). Bias could also occur by the introduction of new prescribers at different time points. Differences in prescribing over time may reflect differences between different groups sampled and not necessarily true aggregate behaviors. This was controlled for by using mixed-models statistical design for assessment of behavior over time.

Statistical analysis

Descriptive statistics of patient, clinician, and prescription characteristics were performed. Median and interquartile ranges were used to describe continuous variables and counts with corresponding proportions are given for categorical variables. Per-clinician prescribing patterns over time were evaluated using mixed-effects Poisson models (fixed effects: clinician specialty, degree type, and year). To assess if clinician specialty or degree type predicted concerning prescribing patterns (outcomes of

interest), logistic analysis was performed. Year of prescription was included to account for confounding. Since clinical indication for prescriptions contained four unordered levels (fungal/yeast, inflammatory, combined fungal/inflammatory, other), multinomial logistic regression was used to compare prescribing patterns between specialties and degree types. Missing data was rare and handled by case-wise deletion. All tests were two-sided where applicable. Significance for all analyses was considered for $P < 0.05$. All analyses performed with STATA v14.2 (StataCorp LLC, College Station, TX).

Results

Over a 5-year period (2014–2018) at our large academic center, 1,974 prescriptions were written for C-BM by 259 unique clinicians. Patient-, clinician-, and prescription-specific characteristics related to C-BM prescribing patterns are described in [Table 1](#). The median patient age was 43.3 years and 91.6% of patients were over the recommended age of 17 years. Females comprised 62.2% of patients prescribed C-BM. Clotrimazole-betamethasone dipropionate was most commonly prescribed for rashes of an inflammatory (42.2%) or fungal nature (38.1%). Notably, nearly one-half (48.9%) of affected body sites included sensitive areas (face, axillae, groin, or diaper region). Family medicine (FM) was the most common prescribing specialty, writing 58.3% of prescriptions.

Over the recorded 5-year period, the median number of prescriptions written per clinician was 26

(Interquartile Range [IQR]: 9–110, range:1-185). One clinician prescribed C-BM 185 times (37 times per year) over the five-year period. The average number of prescriptions written per clinician per year decreased slightly over the study period (Incident Rate Ratio [IRR]=0.97, 95% CI 0.96–0.98, $P < 0.001$). This corresponded to an estimated average prescription count of 3.6 (3.1–4.1) per prescriber in 2014 down to 3.1 (2.7-3.6) per prescriber in 2018.

Raw specialty-specific annual prescription counts are shown in **Figure 1A**. Family medicine (FM) accounted for the most C-BM prescriptions (58.3%), followed by obstetrics and gynecology (OBGYN). Dermatology accounted for 3.4% of all C-BM prescriptions, despite dermatology overall accounts for the majority of topical prescriptions for dermatitis in the U.S. [14]. After year-adjusted Poisson regression, as compared to dermatology, FM (IRR=1.5, 0.9–2.4), OBGYN (1.3, 0.7–2.3), emergency medicine and urgent care (EM/UC), (1.4, 0.6–3.4), internal medicine (IM), (1.1, 0.6–1.8), and surgery (IRR=1.0, 0.5–1.5) all wrote more prescriptions for C-BM, but these differences were not significant ($P > 0.05$ for all). Pediatrics (0.5, 0.2–1.3) wrote fewer prescriptions than dermatology for C-BM but this too was not significant. When interactions between year and specialty/degree type were assessed, prescription counts in these groups were found to be decreasing at similar rates to the overall population of prescribers (IRR~0.97 for all, $P < 0.001$).

Raw annual prescription counts between degree types are shown in **Figure 1B**. After year-adjusted Poisson regression, nurse practitioners (NPs), (IRR 0.7,

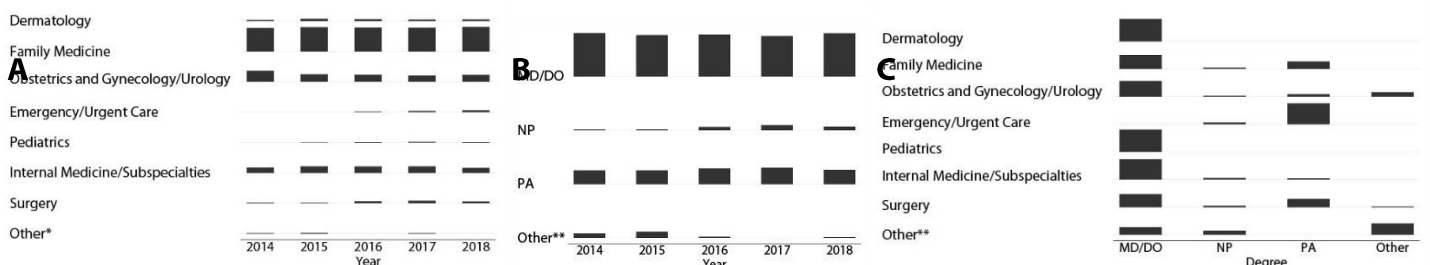


Figure 1. A) Frequency of total prescriptions of clotrimazole-betamethasone (C-BM) by specialty over time. **B)** Frequency of total prescriptions for C-BM by clinical degree type over time. **C)** Total prescription frequency for C-BM arranged by specialty and degree type. EM/UC, emergency medicine/urgent care; OBGYN, obstetrics/gynecology; MD/DO, Medical Doctor/Doctor of Osteopathic Medicine; NP, nurse practitioner; PA, physician assistant. *Other specialties include: Podiatry, Psychiatry, Speech Language Pathology; **Other degrees include: certified nurse midwife, dentist (DDS/DMD), speech language pathologist.

0.5–1.0) and physician assistants (PAs), (0.97, 0.7–1.3) wrote for C-BM less often than physicians (non-significant, $P>0.05$ for both). Of note, 100% of prescriptions from the Emergency Medicine/Urgent Care specialty were written by PAs or NPs (**Figure 1C**). Overall, across all clinicians, 58.3% (95% CI 56.5–60.0%) were decreasing their use of C-BM.

Results of year-adjusted logistic regression models predicting potentially inappropriate C-BM prescribing practices are shown in **Table 2**. Family medicine clinicians were more likely to prescribe to children (<17 years old) than dermatologists (OR=4.5, 95% CI: 1.1–18.7, $P=0.04$), as were pediatricians, although here the confidence interval was extremely large suggesting an imprecise estimate. Nurse practitioners were more likely to prescribe to children than physicians (2.4, 1.3–4.4, $P=0.004$). Although no specialty differences were noted in prescribing more than the recommended volume of medication, PAs as a clinician group were more likely to do so (2.2, CI:1.4–3.6, $P=0.001$). OBGYN/Urology clinicians were more likely to prescribe for sensitive areas, but the CI for this estimate was large. Internal medicine clinicians were more likely to not indicate a recommended duration of treatment (3.3, 1.9–5.9, $P<0.001$), whereas EM/UC and NP/PA clinicians were more likely to indicate treatment duration ($P<0.05$ for both). Relative to dermatologists, IM/subspecialty and pediatricians were less likely to associate a diagnosis with C-BM prescriptions ($P<0.05$). All specialties besides OBGYN/Urology were less likely than dermatology to list body sites for application on the prescription or in the clinic note. However, this effect was only significant for FM and IM/subspecialties ($P<0.05$). Although logistic regression could not be performed for diaper area prescriptions (owing to limited numbers), 85% (17) were written by FM clinicians, 10% (2) by IM/subspecialty clinicians, and 5% (1) by a surgeon.

Clinical diagnoses associated with C-BM prescriptions were compared by specialty and by clinical degree type (**Table 3**). Aside from pediatricians, all non-dermatologists (most notably EM clinicians) were more likely to prescribe C-BM

specifically for either fungal infections or inflammatory conditions. All specialties were less likely than dermatology to prescribe for a combined inflammatory/fungal condition. For most non-dermatology specialties, fungal conditions were the most common diagnosis listed, except pediatrics and surgery departments in which “other” conditions were the most common. By clinician, NPs’ odds of prescribing for inflammatory or fungal conditions was significantly less than that of combined inflammatory/fungal. No significant difference existed for PAs by diagnostic category (**Table 3**).

Discussion

Clotrimazole/betamethasone dipropionate is approved for use in treating tinea corporis and tinea pedis. The rationale behind its use is simple. Patients present for a symptomatic, often pruritic, rash. Treating with topical antifungals alone will eliminate the inciting fungal elements, but the inflammatory response to the fungus and thus the symptoms, can remain for days to weeks. Conversely, treating the inflammatory response of a fungal infection with topical corticosteroids alone will provide more rapid symptomatic relief, but also weakens the localized immune response to the fungus potentially resulting in a more deep-seated fungal infection, like tinea incognito or Majocchi granuloma, most commonly caused by *Trichophyton rubrum* [15]. Thus, C-BM and other combination topical medications, including nystatin-triamcinolone, were developed in an effort to simplify the treatment regimen [16,17].

Unfortunately, this simplification has come with unintended consequences. Clotrimazole/betamethasone dipropionate contains a potent topical corticosteroid that can exacerbate fungal infections and lead to tinea incognito or Majocchi granuloma, both of which often require oral antifungal treatments for eradication [18,19]. Reports demonstrate reduced clearance of cutaneous fungal infections with these combination products compared to topical antifungals alone [7-10,20]. Another issue with C-BM use for treating fungal infections is the frequent occurrence of these

conditions in intertriginous areas, where potent topical corticosteroids are more likely to cause skin thinning and striae [4,5,21,22]. Potent and super-potent topical corticosteroids (like betamethasone) can also be systemically absorbed resulting in systemic corticosteroid side effects like elevated blood sugars, hypertension, and weight gain. As such, combining a topical antifungal (clotrimazole) with a potent topical corticosteroid (betamethasone) creates a potential for inappropriate use and avoidable side effects. Despite this medical knowledge and previous research specifically addressing problems with C-BM overuse [1,2], our study demonstrates that clinicians across most specialties and degrees continue to overuse this medication, often in an inappropriate fashion.

Although the slight decrease of use over time seen in this cohort is encouraging, more efforts should be made to decrease usage. The distribution of our data suggests some areas where educational efforts may be especially salient. For example, FM wrote for the majority of C-BM prescriptions. Fungal infections and inflammatory rashes like dermatitis are some of the most common skin conditions seen by primary care clinicians [23], so it is unsurprising that the majority of our institution's C-BM prescriptions came from FM. We recommend clinicians use point-of-care potassium hydroxide (KOH) preparations to confirm the diagnosis, which has good sensitivity and specificity for identifying fungal skin infections and treat with topical antifungal monotherapy if positive or topical steroid monotherapy if negative [24]. Unfortunately, KOH testing requires training and equipment that may not be accessible to many clinicians. As such, a trial of a topical antifungal monotherapy is recommended [5]. If not improved after a 2-3-week trial or if the rash is accompanied by moderate-severe pruritus, a separate prescription of milder topical corticosteroids (e.g., desonide, hydrocortisone butyrate, or hydrocortisone 2.5%) may be used initially with the topical antifungal for symptomatic relief. If the diagnosis is completely uncertain or if a patient fails this initial topical therapy, referral to a dermatologist for further evaluation is warranted.

Aside from use in general, we also noted a high prevalence (49%) of prescribing C-BM for use in sensitive areas. These areas, including the face and intertriginous areas, have thinner skin and/or a more occlusive surface and increasing the risk of adverse reactions [13]. In this study, OBGYN clinicians were particularly likely to give C-BM for use in sensitive areas. Likewise, FM clinicians gave C-BM for the diaper area in children. Clotrimazole/betamethasone dipropionate should not be used in sensitive areas including genitals and body folds and children under 17 should not receive this medication, especially in areas covered by the diaper. Although we contend that C-BM should not be used for treating cutaneous fungal infections, if prescribers feel the need to use C-BM for whatever reason, limited quantities (only enough for 2-4 weeks of therapy maximum) should be prescribed to prevent overuse and adverse events.

This study is limited by its retrospective nature at a single, large academic center. Although specific associations found in our regression analyses may not be generalizable, we know from national Medicare Part D data that C-BM is commonly prescribed in the U.S. [12]. We plan to validate these findings using a national prescription database or a multicenter study to identify regional practice patterns for C-BM prescribing.

Conclusion

Like other authors, we suspect that one driver of overuse is a lack of diagnostic specificity for rashes [2,10]; clinicians who fail to differentiate fungal infections from inflammatory rashes prescribe C-BM to treat both possibilities [10]. It is also possible that clinicians are not aware that this combination product contains a high-potency topical corticosteroid or realize the risks of high-potency topical corticosteroids. This highlights a larger problem in medicine in that clinicians fail to follow recommended care guidelines and continue to treat patients in a particular fashion despite opposing evidence [25]. Further research is needed to understand why C-BM continues to be overused. Perhaps targeted educational efforts or decision support tools may help to reduce the inappropriate use of this medication.

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Potential conflicts of interest

The authors report no conflicts of interest. None have financial interest in combination topical clotrimazole-betamethasone or competing products.

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Table 1. Patient, prescriber, and prescription characteristics for combination clotrimazole-betamethasone prescriptions.

Variable	N (%)
<i>Patient-level data</i>	
Visit year	
2014	412 (20.9)
2015	360 (18.2)
2016	351 (17.8)
2017	422 (21.4)
2018	429 (21.7)
Age, median (IQR)	43.3 (29.0–59.7)
Age, categorized by recommended minimum age	
≥17 years	1809 (91.6)
<17 years	165 (8.4)
Female	1227 (62.2)
Diagnosis for prescription	
Inflammatory	833 (42.2)
Fungal/Yeast	752 (38.1)
Both	204 (10.3)
Other	57 (2.9)
No diagnosis listed	128 (6.5)
Sensitive body site*	
No	707 (35.8)
Yes	966 (48.9)
Unknown site	301 (15.3)
Diaper Area**	
No	6 (23.1)
Yes	20 (76.9)
<i>Prescriber-level Data</i>	
Prescriber specialty	
Dermatology	68 (3.4)
Family medicine	1150 (58.3)
OBGYN/Urology	369 (18.7)
IM/Subspecialties	279 (14.1)
Surgery	64 (3.2)
EM/UC	28 (1.4)
Pediatrics	10 (0.5)
Other specialty#	6 (0.3)
Prescriber clinical degree	
Medical doctor (MD/DO)	1348 (68.3)
Nurse practitioner	84 (4.4)
Physician assistant	468 (23.7)
Other degree [§]	74 (3.8)
Variable	N (%)
<i>Prescription-level data</i>	
Median treatment duration, in weeks (IQR)	2 (1.4–2.0)
Median volume per week, in grams (IQR)	30 (15–42)
Duration specified on prescription/clinic note	
Yes	649 (32.9)
No	1325 (67.1)
Body site specified on prescription/clinic note	
Yes	1673 (84.8)
No	301 (15.2)
Diagnosis specified on prescription/clinic note	
Yes	1846 (93.5)
No	128 (6.5)

*Sensitive sites included: Face, axilla, groin, diaper area.

**Diaper area was defined as prescription to a child ≤30-months-old in a treatment area that would be covered by a diaper.

#Other specialties include: Podiatry, Psychiatry, Speech Language Pathology.

§Other degrees include: certified nurse midwife, dentist (DDS or DPM), speech language pathologist.

IQR=interquartile range; OBGYN=Obstetrics and Gynecology; EM/UC=Emergency medicine/Urgent care; IM=Internal medicine.

Table 2. Year-adjusted regression analyses exploring associations between prescriber specialty and degree and concerning prescribing patterns. Concerning prescribing patterns included contraindications listed in U.S. Food and Drug Administration (FDA) prescribing information for clotrimazole-betamethasone (C-BM) as well as important missing prescription information. Year was not significantly associated with outcome for any analysis ($P>0.05$).

Variable	Patient Age <17 years		Higher than recommended weekly volume prescribed		Use of C-BM for sensitive areas [#]		No specified treatment duration		No specified body site listed	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Prescriber specialty										
Dermatology	Reference	---	Reference	---	Reference	---	Reference	---	Reference	---
Family medicine	4.5 (1.1–18.7)	0.04	0.9 (0.3–2.7)	0.86	1.0 (0.6–1.7)	0.97	1.4 (0.9–2.3)	0.16	2.3 (1.0–5.4)	0.05
OBGYN/Urology	0.2 (0.02–1.3)	0.09	1.0 (0.3–3.1)	0.95	42.5 (19.0–95)	<0.001	1.5 (0.9–2.6)	0.12	0.4 (0.1–1.1)	0.07
EM/UC	1.3 (0.1–15.0)	0.82	xxx	xxx	2.1 (0.8–5.2)	0.13	0.2 (0.05–0.5)	0.001	xxx	xxx
Pediatrics	52 (7.8–345)	<0.001	xxx	xxx	2.9 (0.5–16.2)	0.22	1.7 (0.4–7.1)	0.48	4.5 (0.9–22.3)	0.07
IM/Subspecialties	1.2 (0.3–5.7)	0.80	2.2 (0.6–7.4)	0.22	1.4 (0.8–2.5)	0.25	3.3 (1.9–5.9)	<0.001	2.9 (1.2–7.1)	0.02
Surgery	2.89(0.5–15.0)	0.22	0.9 (0.2–4.7)	0.94	0.9 (0.5–1.9)	0.80	1.2 (0.6–2.4)	0.58	0.7 (0.2–2.6)	0.59
Other specialty*	xxx	xxx	xxx	xxx	1.3 (0.2–9.5)	0.82	0.8 (0.1–4.0)	0.76	5.0 (0.8–33.5)	0.09
Prescriber degree										
MD/DO	Reference	---	Reference	---	Reference	---	Reference	---	Reference	---
Nurse practitioner	2.5 (1.4–4.7)	0.003	xxx	xxx	1.2 (0.8–2.0)	0.43	0.6 (0.4–0.9)	0.01	0.4 (0.2–0.8)	0.02
Physician assistant	1.4 (1.0–2.0)	0.08	2.2 (1.4–3.6)	0.001	0.8 (0.6–1.0)	0.02	0.4 (0.3–0.5)	<0.001	0.5 (0.3–0.7)	<0.001
Other degree**	xxx	xxx	6.0 (2.2–16.4)	<0.001	10.1 (4.0–25)	<0.001	1.2 (0.7–2.1)	0.45	0.1 (0.03–0.5)	0.003

xxx: Regression failed due to lack of observations in this subgroup. These variables were dropped from the respective analysis.

*Other specialties include: Podiatry, Psychiatry, Speech Language Pathology.

**Other degrees include: certified nurse midwife, dentist (DDS or DPM), speech language pathologist.

[#]Diaper area was the original FDA-listed contraindication. However, only 20 prescriptions were written for diaper rash. As such, “sensitive areas” were used, including diaper area, groin, face, and axillary areas, locations where potent topical corticosteroids (such as betamethasone) would be contraindicated.

CI, confidence interval; EM/UC, Emergency medicine/Urgent care; IM, Internal medicine; OBGYN, Obstetrics and Gynecology; OR, Odds ratio

Table 3. Delta probabilities (i.e., change in probabilities) of prescribing clotrimazole-betamethasone (C-BM) for different indications (fungal/yeast, inflammatory, combined fungal/inflammatory) by specialty and degree type from multinomial Poisson regression analysis. Each diagnosis served as the outcome being predicted. The delta probability was calculated as the difference in probability of prescribing C-BM for the specialty or degree type under consideration compared to the reference groups (Dermatology for specialty type; MD/DO for degree type). Thus, a positive delta probability means that a specialty is more likely to prescribe for that indication than dermatology. For example, for fungal/yeast infections, FM clinicians' delta probability of 36.6% means that FM clinicians are 36.6% more likely than dermatologists to prescribe C-BM for fungal/yeast infections.

Variable	Fungal/Yeast			Inflammatory			Combined Fungal/Inflammatory		
	Delta probability (%)	95% CI	P value	Delta probability (%)	95% CI	P value	Delta probability (%)	95% CI	P value
Prescriber specialty									
Dermatology	Reference	---	---	Reference	---	---	Reference	---	---
Family medicine	36.6	28.6–44.6	<0.001	-16.3	-28.6–[-4.0]	0.01	-20.5	-31.8–[-9.3]	<0.001
OBGYN/Urology	19.9	11.0–28.7	<0.001	-1.3	-14.3–11.6	0.84	-19.8	-31.3–[-8.3]	0.001
EM/UC	64.4	46.7–82.1	<0.001	-43.3	-60.9–[-25.7]	<0.001	-23.2	-37.8–[-8.5]	0.002
Pediatrics	1.9	-22.2–26.0	0.88	4.9	-30.7–40.5	0.79	-17.8	-43.3–[-7.7]	0.17
IM/Subspecialties	25.8	16.1–35.4	<0.001	-12.6	-26.1–1.0	0.07	-17.7	-29.6–[-5.9]	0.003
Surgery	11.1	-1.8–23.9	0.09	-10.9	-28.3–6.5	0.22	-17.0	-31.0–[-2.9]	0.02
Other specialty*	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Prescriber degree									
MD/DO	Reference	---	---	Reference	---	---	Reference	---	---
Nurse practitioner	-11.4	-22.1–[-1.0]	0.04	-8.4	-20.0–2.8	0.14	19.8	9.4–30.2	<0.001
Physician assistant	0.1	-5.3–5.5	0.97	-1.7	-7.2–3.7	0.53	1.6	-1.8–5.1	0.36
Other degree**	-2.0	-13.9–10.0	0.75	-1.0	-13.1–11.1	0.87	3.0	-5.2–11.1	0.47

*Other specialties include: Podiatry, Psychiatry, Speech Language Pathology

**Other degrees include: certified nurse midwife, dentist (DDS or DPM), speech language pathologist

CI, confidence interval; EM/UC, Emergency medicine/Urgent care; IM, Internal medicine; OBGYN, Obstetrics and Gynecology; OR, Odds ratio.