Use of a Risk-Stratification Tool in Identification of Potential Adrenal Suppression Preceding Steroid Injection Therapy in Chronic Pain Patients

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Abstract

Background. Patients who present for steroid injections are not routinely screened for potential hypothalamic-pituitary-adrenal (HPA) axis suppression from previous steroid exposure. Patients often receive various steroid therapies that are not reported by the patient or recorded in available medical records. Yet, HPA axis suppression has been reported with a single intra-articular injection.

Methods. An IRB-approved quality improvement questionnaire was implemented to comprehensively screen patients for risk of HPA axis suppression secondary to prior and/or concurrent corticosteroid use. This questionnaire was given to adult patients seen in a University Pain Management Clinic, who were being considered for a steroid injection, to define the extent of exposure to corticosteroids either by mouth, topically, inhaled, or systemic/local injection within the past 6 months.

Results. Two hundred patients completed the questionnaire. Eighty-nine patients (44.5%) screened positive for significant steroid exposure with a screen score of three or above. The average score for the screen positive group was 6.31 ± 3.47 (range 3–22). Women were 1.9 times more likely to screen positive than men (53.4% vs 27.5%, P < 0.0004). Otherwise, the screen positive and screen negative groups were similar in demographic characteristics (age, BMI, and diabetes status).

Conclusions. Our results suggest that patients receive steroids from many sources and may be at risk for HPA axis suppression. Further testing is necessary to determine if these patients indeed have biochemical evidence of adrenal suppression. Utilization of a screening questionnaire might help identify patients who should be considered for HPA axis testing prior to steroid injections.

Key Words. Secondary Adrenal Insufficiency/Suppression; Screening Questionnaire; Chronic Pain; Corticosteroids; Steroid Injection; Hypothalamic-Pituitary-Adrenal Axis
**Introduction**

Corticosteroids are used to treat a number of medical conditions including, but not limited to, pulmonary disorders such as chronic obstructive lung disease (COPD) and asthma exacerbations, immunologic conditions including rheumatoid arthritis and ulcerative colitis, pain exacerbations, and dermatologic disorders. While the use of corticosteroid treatment may provide significant relief, it also exposes the patient to many potential side effects. These side effects include weight gain, swelling, osteoporosis, hypertension, hyperglycemia, and secondary adrenal insufficiency due to hypothalamic-pituitary-adrenal (HPA) axis suppression. Repeated and long-term corticosteroid use is known to cause adrenal suppression by decreasing adrenocorticotropic hormone (ACTH) release from the anterior pituitary gland as well as corticotropin-releasing hormone release from the hypothalamus. This can lead to adrenal gland atrophy and possibly permanent damage. The resultant adrenal suppression leads to dangerous complications such as hypotension, hypoglycemia, and in severe cases coma and death.

The potential for HPA axis suppression generally increases with higher doses of steroids as well as longer duration of therapy although specific threshold doses/durations have not been well defined [1]. However, HPA axis suppression has been reported after a single epidural steroid injection [2–4] and has been well-documented and referenced by expert recommendations [5]. Burn and Langdon (1974) showed depressed plasma cortisol levels in 50 of 56 patients for 1–2 weeks after an epidural injection of 80 mg methylprednisolone acetate [2] Jacobs et al. (1983) further studied the potential for one epidural injection of 80 mg methylprednisolone to affect the HPA axis [3] They found that patients’ adrenals had less ability to respond to ACTH compared with pretreatment responses despite minimally detectable drug levels in systemic circulation. Also, they found evidence of central suppression in morning plasma cortisol and ACTH levels that did not resolve to pretreatment levels at 3 weeks after a single injection. Suppression of the HPA axis was most notable 1 week after epidural steroid injection with gradual recovery thereafter, which was similar to the results of the Burn and Langdon study.

In a case report by Horani and Silverberg (2005), their patient showed evidence of adrenal suppression lasting over 2 months after her one and only epidural steroid injection [4]. The patient was given replacement hydrocortisone 20 mg orally once a day. Her HPA axis was still abnormal at 8 months but recovered by ACTH stimulation testing at 12 months without adjustments or tapering of this dose.

Compared with a single injection, the risk for HPA axis suppression due to steroid injections may be higher in patients who have received serial injections [6]. Kay et al. (1994) showed that 5 of 14 patients who received 80 mg triamcinolone epidural injections weekly for 3 weeks had a subnormal response to cosyntropin stimulation test 1 month after the last epidural injection [6]. An additional five other cases of biochemically proven HPA axis suppression due to steroid injections were reported by Knight and Burnell in 1980 [7].

In addition to epidural steroid injections, other routes of corticosteroid delivery have been shown to cause adrenal suppression. Oral formulations including dexamethasone, prednisone, and hydrocortisone taken in supraphysiologic doses or for a prolonged duration are a well-known cause of adrenal suppression [8]. Less well-known causes include inhaled [9], topical skin applications [10], intranasal [11], or intra-articular joint injections [12,13]. A study involving 16 asthmatic pediatric patients, who were treated with inhaled beclomethasone dipropionate daily, resulted in adrenal suppression in all of the subjects after 6–42 months as confirmed by an insulin tolerance test [9].

Silver et al. (2013) found 2 out of 43 subjects undergoing psoriasis treatment with calcipotriene/betamethasone dipropionate topical suspension developed adrenal suppression based on an ACTH stimulation test at week four of an eight week trial [10]. Those participants were withdrawn from treatment and subsequently had normal serum cortisol 30-minutes values at follow-up 4 weeks later.

Perry et al. (2002) report a case series involving nine pediatric patients who developed occult adrenal suppression and/or growth impairment associated with intranasal steroids [11]. Adrenal suppression was observed with intranasal preparations of betamethasone, beclomethasone, flunisolide, and budesonide.

In a study of otherwise healthy young male athletes with articular injuries, Duclos et al. (2007) investigated the effect of a single intra-articular or periarticular corticosteroid injection on adrenal suppression [12]. They found that patients’ cortisol levels remained significantly depressed compared with preinjection levels 14 days after the injection with either cortivazol or betamethasone. The degree of adrenal suppression was directly proportional to the steroid dose injected. Habib et al. (2014) found similar results in patients suffering from osteoarthritis of the knee [13]. They found that 25% of patients who received an intra-articular knee joint injection with 80 mg of methylprednisolone demonstrated biochemical signs of adrenal suppression for at least 2–4 weeks after injection compared with zero patients in the control group as demonstrated by low-dose (1 μg) ACTH stimulation test.

Patients who come to pain management centers for steroid injections are likely being inadequately screened for potential HPA axis suppression from previous doses of steroids. Chronic pain patients are often high level medical consumers with multiple treating providers. They potentially can receive multiple doses of oral...
steroids for inflammatory conditions or acute illnesses, topical or inhaled steroids, and/or intramuscular or joint injections that have not been acknowledged or reported by the patient, present in the available medical record, or recognized by the pain management physician. This could lead to an excessive cumulative dose of corticosteroids causing HPA axis suppression and morbidity. Because we could not find a reference that systematically evaluated cumulative steroid exposure, we developed a detailed questionnaire to determine if exposure was significant enough to warrant consideration of implementing a routine detailed history prior to administering steroids.

Methods

This was an Institutional Review Board-sanctioned quality improvement (QI) project to identify the frequency and sources of corticosteroid exposure in chronic pain patients presenting to a comprehensive pain management center, who were being considered for a therapeutic steroid injection. The questionnaire (Appendix 1) was designed to identify the multiple potential exposures that could place patients at risk for adrenal suppression from previously administered steroid doses. The goal was to use the questionnaire to determine the prevalence of at-risk patients and the sources of exposure to determine whether routine screening should be instituted as part of clinical care.

Questionnaire

The comprehensive questionnaire queried patients on their use of many different types of steroid formulations including injections, oral medications, nasal, topical, and eye suspensions. The questionnaire also determined if patients have any relevant medical history that would have required past or current steroid use such as COPD, asthma, Lupus, Crohn’s disease, multiple sclerosis (MS), and so forth. Each “yes” response to questions about previous glucocorticoid use within the last 1 month received three points, while exposures during the preceding 2–6 months received one point. Each “yes” response to questions about relevant medical history also received one point. A positive screen was defined as three points or more, which reflects the documented risk of adrenal suppression with more recent steroid exposure receiving a greater weight. Demographic information such as age, gender, body mass index (BMI), diabetes status, and pain type were also collected.

Patient Participation

Consecutive patients presenting to an academic multidisciplinary pain management center, who were potential candidates for steroid injection therapy, were interviewed by a research coordinator and invited to participate in an anonymous and voluntary QI project. Patients were advised that their responses would be de-identified and not shared with the treatment team. Patients who chose to participate were then given the questionnaire (Appendix 1) and asked to complete it to the best of their memory with regards to timing of previous steroid exposure. The questionnaire was read to the patient if necessary. The questionnaire included doses and timing of steroids where appropriate. If a patient screened positive for potential adrenal suppression per our predetermined cutoff score, he or she was given educational material and counseled about the risks of HPA axis suppression.

Statistical Analysis

Age, gender, BMI, diabetes status, pain type, and relevant past medical history were collected on all patients interviewed. These data were analyzed to look for significant differences between those who screened positive vs negative for potential HPA axis suppression using descriptive statistics. The screen positive group was further divided into those who screened high positive with screen score of six or above and low positive with a score of three to five. This stratification facilitated the identification of similar demographic characteristics in those with high levels of previous steroid exposure vs those with less significant exposure. Two sample T-tests were conducted to determine if statistically significant differences existed in gender, BMI, diabetes status, and so forth among the screen groups. P < 0.05 was considered statistically significant. A score of two or below was considered a negative screen, representing a lower risk of HPA axis dysfunction. This determination was based on our assessment of the relative risk of adrenal suppression with regards to timing of steroid exposure given the current literature cited above.

Results

Screen Results

Eighty-nine patients (44.5%) screened positive for significant steroid exposure with a screen score of three or above. The average screen score for the screen positive group was 6.31 ± 3.47 (range 3–22). Forty-five patients (22.5%) received a score of three to five resulting in a low positive categorization. Forty-four patients (22%) received a score of six or higher resulting in a high positive screen. One hundred eleven patients (55.5%) screened negative for significant risk of adrenal suppression.

Steroid Exposure

Figure 1 summarizes the sources of steroid exposure in each of the screening groups. Previous steroid injection therapy accounted for the majority of positive screen points for the low positive and high positive screen groups (74.63% and 64.52%, respectively). Patients in the low positive group (n = 45 patients) were more likely to have had significant exposure to epidural steroid (n = 34 injections, $P < 0.0001$) and sacroiliac joint injections (n = 18 injections, $P < 0.0002$) than the screen negative group in the past 2–6 months. Similarly,
patients in the high positive group (n = 44 patients) had a higher exposure to epidural steroid (n = 30 injections, \( P < 0.0001 \)) and sacroiliac joint injections (n = 17 injections, \( P < 0.003 \)) than the screen negative group in the past 2–6 months.

Oral steroid use composed 19.40% and 17.05% of screen points for the low and high positive groups, respectively. The low positive group had a significantly higher exposure to oral prednisone (36% vs 5%, \( P < 0.0006 \)) and methylprednisolone dose pack (22% vs 1%, \( P < 0.0008 \)) compared with the screen negative group in the past 2–6 months. However, inhaler use and nasal steroid use were not significantly different from the screen negative group (\( P = 0.865 \) and \( P = 0.129 \), respectively). The high positive group had a significantly greater exposure to oral prednisone (75% vs 5%, \( P < 0.0003 \)), methylprednisolone dose pack (9% vs 1%, \( P < 0.01 \)), inhaler use (50% vs 3%, \( P < 0.000003 \)), and nasal steroid use (32% vs 5%, \( P < 0.000002 \)) compared with the screen negative group in the last 2–6 months. Figures 2 and 3 summarize the oral and alternative steroid exposure based on screen result.

Demographics

A total of 200 patients were interviewed and completed the questionnaire. Two patients declined to participate in the study resulting in a participation rate of 99% (200/202). Sixty-nine men completed the study (34.5%) along with 131 women (65.5%). Of the 69 men who completed the questionnaire, 72.5% (50/69) screened negative for adrenal suppression, 14.5% (10/69) screened low positive, and 13.0% (9/69) screened into the high positive group. Of the 131 women who completed the study, 46.6% (61/131) screened negative for potential HPA axis suppression, 26.7% (35/131) screened low positive, and 26.7% (35/131) screened into the high positive group.

A significantly higher proportion of females (53.44%, 70/131) screened positive for potential HPA axis suppression compared with males (27.54%, 19/69) with \( P < 0.0004 \). Figure 4 shows a summary of the gender differences among the screen groups.

The mean age was not significantly different for the screen negative group \( 52.33 \pm 13.02 \) vs 49.96 ± 14.57 for the low positive group (\( P = 0.320 \)). Similarly, no significant difference was found in mean age between the screen negative and high positive group \( 52.33 \pm 13.02 \) vs \( 51.64 \pm 10.55 \, P = 0.752 \). No difference in age was found between the female (mean = 50.7) and male group (mean = 53.4, \( P = 0.171 \)).

Figure 1: Summary of all steroid exposure among the screen result groups. Total exposure included steroid injections occurring in the last 1 month, steroid injections in months 2–6, oral/inhaled steroid use in months 2–6, and all other steroid use in months 2–6.

Figure 2: Type of oral corticosteroid exposure in last 2–6 months vs screen result. Average screen points were the mean points received for oral steroids taken in the last 2–6 months. Each course of oral steroids earned one point.

Figure 3: Types of alternative corticosteroid exposure in last 2–6 months vs screen result.
Diabetes/BMI

No significant differences in diabetes status and BMI were found among the screen groups. Twenty patients (18.02%) in the screen negative group had known diabetes, while the average BMI was 31.44 ± 6.82. In the low positive group, 10 patients had known diabetes (22.22%), while the average BMI was 31.89 ± 6.78 (P = 0.710). Nine patients in the high positive group had known diabetes (20.45%), while the average BMI was 31.35 ± 6.71 (P = 0.94). Table 1 summarizes the demographic information for the screen negative and screen positive groups.

Chronic Medical Conditions

In the screen negative group, patients had a low prevalence of chronic medical conditions: 10% for asthma, 6% for COPD, and 5% for cancer. Patients had a higher prevalence of asthma in the low positive group compared with the screen negative group (27% vs 10%, P < 0.008). The prevalence of COPD (4%, P = 0.654) and cancer (11%, P = 0.210) were not significantly different from the screen negative group.

For the high positive group, patients had a higher prevalence of chronic medical conditions compared with the screen negative group: asthma (61% vs 10%, P < 0.00001), COPD (32% vs 6%, P < 0.00001), and rheumatoid arthritis (7% vs 1%, P < 0.037). Other medical conditions were not significantly different including cancer, polymyalgia rheumatica, ulcerative colitis, and Crohn’s disease. Figure 5 summarizes the prevalence of chronic medical conditions vs screening result.

Table 1  Patient demographic information. A significantly higher proportion of females screened positive for possible adrenal suppression compared with males (P < 0.0004)

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th>Screen Neg (n = 111)</th>
<th>Screen Pos (n = 89)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male % (n)</td>
<td>25.00% (50)</td>
<td>9.50% (19)</td>
<td>&lt;0.0004</td>
</tr>
<tr>
<td>Female % (n)</td>
<td>30.50% (61)</td>
<td>35.00% (70)</td>
<td></td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg age (SD)</td>
<td>52.33 (13.02)</td>
<td>50.79 (12.70)</td>
<td>0.3996</td>
</tr>
<tr>
<td>Avg male age (SD)</td>
<td>53.88 (12.30)</td>
<td>52.00 (8.12)</td>
<td>0.5407</td>
</tr>
<tr>
<td>Avg female age (SD)</td>
<td>51.07 (13.55)</td>
<td>50.46 (13.70)</td>
<td>0.7993</td>
</tr>
<tr>
<td>BMI:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg BMI (SD)</td>
<td>31.44 (6.82)</td>
<td>31.62 (6.71)</td>
<td>0.8511</td>
</tr>
<tr>
<td>Diabetes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Yes to diabetes (n)</td>
<td>18.02% (20)</td>
<td>21.35% (19)</td>
<td>0.5570</td>
</tr>
</tbody>
</table>
Primary diagnostic groups were evaluated to determine if they correlated with steroid exposure. A chi-square analysis revealed no significant difference ($P = 0.99$) among the types of pain in the screen negative vs screen positive groups. In patients who screened negative, back pain was the primary complaint in 50.5% of patients, neck pain in 9.0%, radiculopathy in 7.2%, and joint pain in 7.2%. For those who screened positive, back pain was the chief complaint in 58.4% of patients, neck pain in 9.0%, radiculopathy in 5.6%, and joint pain in 13.5%.

**Low Yield Questions**

Certain items in the screening questionnaire resulted in zero patients responding “yes” and thus had no impact on the overall screening results even in the high positive screen group. Questions related to specific past medical history including temporal arteritis, organ transplant, multiple sclerosis, and dermatomyositis resulted in zero “yes” responses.

**Discussion**

We attempted to determine whether patients presenting for potential steroid injection therapy are at risk for adrenal suppression based on previously administered corticosteroids using a detailed questionnaire. The analysis suggests that patients receive steroids from many sources and a significant percentage are at risk for existing HPA axis suppression. The most common steroid exposure was receiving an injection in the last 30 days, which resulted in an automatic positive screen. Previous studies have suggested that steroid injections occur at least 1 month apart due to biochemical evidence of depressed adrenal function for at least 2–3 weeks following a single injection [2,3]. Although joint injections and epidural steroid injections were the most prevalent in the high positive group, given the broad referral area for the clinic, this medical information was often not available to the treating team in the existing patient record. Many patients received injections at outside clinics from providers not affiliated with the University, and thus the information was not available to the treating physician.

While sufficient evidence exists to suggest that oral steroids lead to HPA axis suppression, less convincing evidence exists detailing the possibility of adrenal suppression from nasal and inhaled corticosteroids. A recent meta-analysis conducted by Fan et al. (2014) revealed that many of the findings regarding HPA axis suppression and intranasal/inhaled corticosteroids use vary widely between studies [14]. Factors such as steroid dose, duration, study population, and assay sensitivity all contributed to varying results across studies. For example, Aaronson et al. (1998) reported a 6-week study assessing budesonide-dry powder inhaler at 800, 1,600, or 3,200 $\mu g$/day in 64 adult asthmatics using a randomized, placebo-controlled, parallel-group, multicenter design [15]. Statistically significant evidence of HPA axis suppression was observed in the group taking 3,200 $\mu g$/day of budesonide, which is double the maximum recommended dose for daily asthma control. In contrast, Donnelly et al. (1997) found that the 1,600 $\mu g$/day dose of inhaled budesonide produced a significantly greater reduction (66%) in morning plasma cortisol compared with the trial by Aaronson (14%) [16].

Similarly, among studies for corticosteroid nasal spray formulation, only one showed HPA axis suppression with fluticasone propionate. HPA axis suppression was detected via overnight 10-hours urine cortisol (43% decrease) at day four in patients taking 200 $\mu g$/day of intranasal fluticasone [17]. Because of the various study designs, it is difficult to conclude with certainty whether inhaled or intranasal steroid use is associated with HPA axis suppression when taken at the recommended dose. Therefore, nasal and inhaled corticosteroid use must remain an integral part of the screening tool.

**Conclusion**

A significant portion of the patients being considered for steroid injection therapy did in fact screen positive for risk of possible adrenal suppression. Our results suggest that patients receive steroids from many sources and may not report these exposures without detailed questioning. Utilization of a screening questionnaire can help identify patients who should be considered for HPA axis testing prior to steroid injection therapy. The screening questionnaire will be implemented in our University Pain Management Clinic as part of routine care for all patients being considered for steroid injection therapy. We will remove questions from the questionnaire that yielded little positive data. Questions pertaining to specific past medical history will be removed: multiple sclerosis, temporal arteritis, organ transplant, and dermatomyositis. This will ultimately streamline clinic operations by including only the higher yield screening questions and thus promote efficiency and improved patient safety.

Based on the results of this questionnaire, routine, detailed assessment of previous and current steroid exposure should be considered prior to steroid injections. The risk of HPA axis suppression should be weighed against the potential benefits of the injection prior to proceeding. In addition, HPA axis testing should be considered for patients who have multiple exposures prior to interventions that involve steroids to determine which patients actually have biochemical evidence of HPA axis suppression. The exact threshold for HPA axis testing is yet to be determined [6,8]. For patients receiving, for example, more than one epidural steroid injection over the course of several months, but with no other exposures, the alternative would be to schedule the subsequent injection well outside of the documented window for suppression. Finally, patients should be educated about the risks of excessive steroid
While corticosteroids offer many benefits, they carry significant, well-documented risks that are often not adequately appreciated by patients or providers. Further study is needed to assess the risk of HPA axis suppression associated with multiple, often coincident routes of steroid exposure to further define the threshold of exposure that should trigger HPA axis testing prior to administration of steroids.

References

APPENDIX 1: ADRENAL SUPPRESSION SURVEY, IRBHSR #17680

The purpose of this brief questionnaire is to determine if you may be at risk for adrenal supression.

Since you have been scheduled to undergo a procedure, it is important to determine if you may be at higher risk of developing a complication from this procedure. Your participation in this study is completely voluntary and the results of this study will be kept confidential.
and anonymous. Please do not hesitate to ask questions should they arise. Thank you for your help and participation.

* Required

Please enter your subject ID (given by survey administrator):*

Gender:* 
Male  
Female

Age:* 
How tall are you in inches? (5 feet = 60 inches; please only enter a number)*

How much do you weigh in lbs? (please only enter a number)*

Do you have diabetes?*
Yes  
No

What type of pain are you seeing the doctor for? 
(If you do not know, please type “N/A” in the space marked Other:)
Back pain  
Neck pain  
Joint pain  
Radiculopathy  
Neuroma  
Nerve pain  
Pelvic pain  
Chronic Headache  
CRPS  
Other:

In the past 6 months, how many joint injections have you received (shoulder, elbow, wrist, hip, knee, ankle, etc.)*
None 0 1 2 3 4 5 6 Injections

Have any of these joint injections occurred in the past month?*
Yes  
No  
N/A I have not received any joint injections in the past 6 months

In the past 6 months, how many bursa injections have you received?*
None 0 1 2 3 4 5 6 Injections

Have any of these bursa injections occurred in the past month?*
Yes  
No  
N/A I have not received any bursa injections in the past 6 months

In the past 6 months, how many peripheral nerve injections have you received?*
None 0 1 2 3 4 5 6 Injections

Have any of these peripheral nerve injections occurred in the past month?*
Yes  
No  
N/A I have not received any peripheral nerve injections in the past 6 months

In the past 6 months, how many epidural injections have you received?*
None 0 1 2 3 4 5 6 Injections

Have any of these epidural injections occurred in the past month?*
Yes  
No  
N/A I have not received any epidural injections in the past 6 months

In the past 6 months, how many sacroiliac joint injections have you received?*
None 0 1 2 3 4 5 6 Injections

Have any of these sacroiliac joint injections occurred in the past month?*
Yes  
No  
N/A I have not received any sacroiliac joint injections in the past 6 months

In the past 6 months, how many injections for painful scars or a keloid have you received?*
None 0 1 2 3 4 5 6 Injections

Have any of these injections for scars/keloids occurred in the past month?*
Yes  
No  
N/A I have not received injections for scars/keloids in the past 6 months
In the past 6 months, how many injections for headaches have you received?*  
None 0 1 2 3 4 5 6 Injections

Have any of these injections for headaches occurred in the past month?*  
Yes  
No  
N/A I have not received injections for headaches in the past 6 months

In the past 6 months, how many courses of the following oral medications have you taken?*  
Prednisone 0 1 2 3 4 5 6  
Medrol Dosepak 0 1 2 3 4 5 6  
Hydrocortisone 0 1 2 3 4 5 6  
Dexamethasone 0 1 2 3 4 5 6  
Other Steroids 0 1 2 3 4 5 6

If you answered “yes” to taking any of the above mentioned pills, please describe your usage (dose, length of time taking):

Have you taken any of the above mentioned oral steroids in the past month?*  
Yes  
No  
N/A I have not taken oral steroids in the past 6 months

In the past 6 months, how many times have you been admitted to the hospital for an asthma, COPD, Crohn’s, or Ulcerative Colitis exacerbation?*  
None 0 1 2 3 4 5 6

In the past 6 months, how many surgeries have you had?*  
None 0 1 2 3 4 5 6

Do you use any steroid creams for the skin, hemorrhoids, vagina or other bodily region?*  
Yes  
No

If yes to the above question, please describe your usage (amount, frequency):

Do you take steroids regularly at home?*  
Oral Yes No  
Inhaler Yes No  
Eye Yes No  
Nasal Yes No

If you answered “yes” to the above, do you take the medication more than 3 times per week?  
Yes  
No

Do you have any of the following conditions?*  
Asthma Yes No  
COPD Yes No  
Lupus Yes No  
Rheumatoid Arthritis Yes No  
Temporal Arteritis Yes No  
Organ Transplant Yes No  
Cancer Yes No  
Multiple Sclerosis Yes No  
Polymyalgia rheumatica Yes No  
Dermatomyositis Yes No  
Other rheumatologic disorder Yes No  
Ulcerative colitis Yes No  
Crohn’s disease Yes No