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Title:
Improvement of documentation of the Total Steroid Burden and education of steroid effect in Atopic Dermatitis with the use of a simplified EMR tool

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Title:

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Abstract and Background Information:

Atopic dermatitis (AD) is a common, chronic allergic-dermatologic disorder affecting up to 10-20% of children and 1-3% of adults, with an estimated economic impact of up to $3.8 billion dollars per year.[1-2] Corticosteroids are judiciously used in the medical arena for various disease processes, especially in disorders of "atopy."[3] Allergists and immunologists, dermatologists, and primary care physicians prescribe several types of corticosteroids (topical, intranasal, inhaled, and systemic) and some patients may self-treat with topical or intranasal corticosteroids. This is common especially since many of these steroid preparations are available over the counter to treat protean conditions including atopic dermatitis, eczema, rhinitis, and asthma. Moreover, there is data suggesting that AD patients may be over-prescribed high potency topical as well as systemic corticosteroids.[4] However, monitoring of the total steroid burden is usually considered cumbersome, and its importance is often overlooked by both the patient and the practitioner. As such, side effects, subtle and obvious, local and systemic are not monitored.[3] The education of patients as well as caretakers of pediatric patients with AD is highly recommended to decrease health care associated costs and improve the overall delivery of health care and quality of life in this patient population.[5-6]

The overall goal of this QI project for AD patients is to complete clinical practice utilization of a monitoring tool for total steroid burden (systemic, cutaneous, intranasal and inhaled) with appropriate and compliant health record documentation. This monitoring tool was recently published by members of our Allergy/Immunology group.[3]

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C. Main Section of the proposal

Project Classification:

This proposed initiative best represents a Quality Improvement and Patient Safety(QI/PS) project in our Division of Allergy and Immunology at NYU-Winthrop Hospital. Our institution maintains an educational subscription to the Institute for Healthcare Improvement (IHI) Open School learning curriculum In Quality Improvement and Patient Safety through our Graduate Medical Education department which our resident and fellow physicians complete online.

We will utilize the following IHI Model for Improvement Principals in the development, implementation, and monitoring of this project: **(1)** Patient Safety (Teamwork and Communication in a Culture of Safety); **(2)** Patient Focused Care (Seeing Care Through the Eyes of Patients and Families); **(3)** Quality Improvement (How to Improve with the Model for Improvement, Leading Quality Improvement, and Planning for Spread: from local improvements to system-wide change).

We will structure the QI work using the Plan-Do-Study-Adjust (PDSA) methodology over two linked 1-year improvement cycles.

1. Overall Goals and Objectives:

The overall goals of this QI project for AD patients are: **(1)** Complete clinical practice utilization of a monitoring tool for total steroid burden (systemic, cutaneous, intranasal and inhaled) with appropriate and compliant health record documentation. This monitoring tool was recently published by members of our Allergy/Immunology group.[3] **(2)** Included in this tool and based on the reported steroid use, review of related adverse effects with the patient and/or caretaker will be documented, aiming to enhance their education, awareness and disease-specific health literacy. **(3)** We aim to achieve improvements in patient health outcomes. Based on the result of the tool, we will monitor adjustments made by the provider on the steroid use of the patient. We will specifically monitor safety (decreased side effects) and efficacy. **(4)** We will promote increased clinician awareness of the utility and practicality of use of this monitoring tool for their practice using publication, hands-on precepting of the tool, and didactic sessions. **(5)** We will extend the project to our primary care practices. Thus we utilized the IHI Model for Improvement Principals in the development of an electronic version of the current tool, implementation in our practice, and monitoring for efficacy and practicality. We expect that our practice will use this tool at each patient encounter for asthma, allergic rhinitis, eosinophilic esophagitis patients for total steroid burden. **(6)** We aim to overcome barriers to effective education, patient comprehension, and clinical documentation and how to best take action in overcoming these issues for the success of quality improvement. The stated goals of this QI project align with the focus of the RFP, as the over-arching goal is to improve patient healthcare outcomes via on-going comprehensive medication evaluations and collaborative education through the physician-patient relationship. Overall, if useful, we would like to make this a standard of care for any physician who is prescribing corticosteroids including for asthma, allergic rhinitis, eosinophilic esophagitis and other eczemas. We aim to improve Total Steroid Burden documentation from the current rate of zero to 50% over the two year cycle.

Current Assessment of need in the target area

We aim to increase documentation of total steroid burden of our patients, steroid side effects, patient education based on completed monitoring tools by 50% over 24 months, from 75 patient encounters per year on average, to 300 or more patient encounters by the project's conclusion. Through a billing/patient log query, we will identify our patient population and review charts to assure EMR documentation of:

1) All steroid use and side effects **before** the use of the monitoring tool;
2) All steroid use and side effects **after** the use of the monitoring tool;
3) All patient counseling about prescribed steroid risk and benefits and/or side effects, if any.

We currently do not have a standardized method of documenting the total steroid burden in our outpatient EMR, and we intend to validate the paper-based tool for extended use in informatics setting.

Target Audience:

The primary population targeted for this project is patients with AD evaluated and followed by physicians in our out-patient allergy practice, including both infant/children and adolescent/adult patient populations. For our pediatric patients and cognitively impaired adult patients, their parent(s)/adult caretaker(s) also represent a target audience for this project. All of our new and established patients with AD could represent our sample population for this QI study. In our office, we follow about 300 patients of various ethnic and socioeconomic backgrounds with AD. Many of these patients also have asthma and allergic rhinitis and are prescribe or take other forms of corticosteroids.

Project Design and Methods:

This monitoring tool will be used at each encounter of the AD patient. Using a modified version of our Electronic Health Record (EHR) system, we will measure the differences in steroid burden documentation among AD patients of varying severity as well as the changes in steroid burden in our patients over time (with medication reconciliation, disease exacerbation and/or disease improvement/remission(s)). Based on responses on the monitoring tool, our allergist/immunologists will provide education. We will monitor the baseline and expected increase in the number of patient education encounters over time. We will also assess the health outcome perceptions of the patient and/or caretaker as a result of this education through questionnaire/surveys. We will measure the utility and validity of our monitoring tool by collecting healthcare provider feedback, using a Physician Satisfaction Survey that will measure physician satisfaction, educational efficacy, and impact on length of patient visit.

Innovation: We have conducted an electronic literature search via Google Scholar and PubMed. There are several publications involving quality improvement initiatives in AD, but none that we found in our search, which assesses the total steroid, burden as described above. This project does build upon existing work in our Division of Allergy and Immunology at NYU-Winthrop Hospital, as we have published a peer-reviewed article extensively reviewing the local and systemic adverse effects of corticosteroid preparations.[3]

Evaluation and Outcomes:

(1) We will conduct baseline measure for the documentation of total steroid medication burden and available monitoring tools, as described in the section above. We will collect the data through real-time, on-going reviews of the total steroid medication burden in our AD patients, which will be documented in the EMR record, communicated to the patient verbally, and in writing on a pre-formed template.

(2) We will use quantitative, objective data points (total steroid burden documentation, side effect monitoring, changes done due to monitoring tool). We will provide counseling to the patient and/or caretaker regarding the effects of the steroid medications and determine patient satisfaction with the process

(3) We will assess physician perception of usefulness, value and time spent as well as subjective points (ease of data collection , educational value and provider satisfaction), measured via a ranking scale questionnaire. Baseline measures and changes in patient-level quantitative outcomes (such as total steroid burden) over time will be summarized via raw counts (%), means (standard deviation), and medians (with interquartile range), as appropriate. Below is an example of the paper-based Physician Satisfaction survey, which will be collected from all participating project clinicians on a monthly basis

Physician Survey example

Please rate your experience of using the Total Steroid Burden Monitoring Tool within the EHR

Variable	Response Categories			
Physician satisfaction with the tool	Extremely satisfied	Satisfied	Dissatisfied	Extremely dissatisfied
Ease of data collection using the tool	Extremely satisfied	Satisfied	Dissatisfied	Extremely dissatisfied
Value of Screening information obtained by the tool	Extremely useful	useful	Not useful	
Effect on visit time of using the tool	Decreased	Same	< 10 min	>10 min
Tool's Educational value to you as a clinician	Extremely Valuable	Somewhat valuable	Somewhat invaluable	Extremely invaluable

(4) We currently have no standardized method of quantifying the total steroid burden or providing patient education on this topic so we expect a significant amount of practice change as a result of this QI project.

(5) We will disseminate the project outcomes via both local and national conference presentation (i.e. NYU-Winthrop Research Day, LIAAS, ACAAI, AAAAI) and via peer-reviewed publication. If validated and user-friendly, this tool can be used for asthma and allergic rhinitis patients as well.

Detailed Workplan and Deliverables Schedule

Anticipated Project Timeline: We anticipate that this QI project will have a timeline of approximately 2 years duration. The QI methodology to be used will consist of two-linked PDSA cycles, staged as follows:

Tool: Steroid Burden Monitoring Tool **Step**: MDs performing tool

PDSA Cycle 1:

We will show all physicians demonstration of our steroid burden monitoring tool during Wednesday afternoon conference time. We will ask our workflow representative to be present to explain details of the process. We will test the form and ask for physician feedback on usability.

PDSA Cycle 2:

We will process map and make this a multidisciplinary approach. The medical assistants will use the EMR to enter the data. The physician will be verifying medications and side effects and then counseling the patients.

An initial reminder is needed for physicians to complete the steroid burden monitoring tool.

Description of current EMR workflow

Office Practicum software was originally designed in 1992 and now currently serves as our all-in-one software with billing and a practice management system. The system offers appointment scheduling, clinical documentation management, comprehensive exam room functionality and billing. Key features include medication history checking, several growth chart options, patient chart showing hyperforms, as well as pre-made templates.

Description of modification to EMR workflow for this project

Informatics staff members will modify the medication and history screens of the EMR to capture the steroid burden screening variables during the clinical visit. The resulting workflow is illustrated below

Illlustrations of proposed EMR workflow modification

This project is designed to introduce an EMR modification that will be user friendly and comprehensive, and will captures data that will lead to Improved patient care. The user is prompted to inquire about the medication use and ask or document possible adverse effects of corticosteroids.

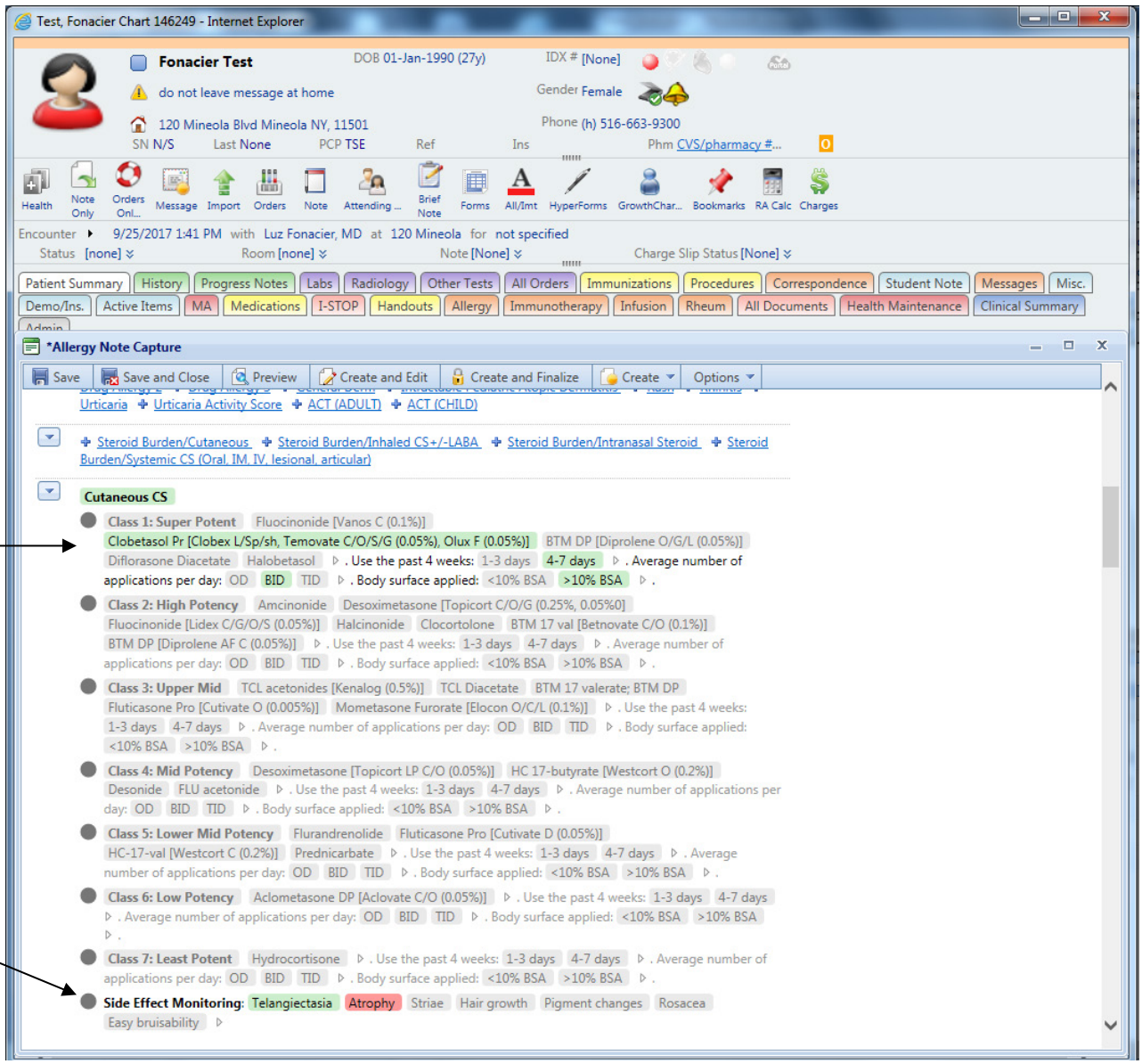
The prompts will be inserted in medication history screen for four types of corticosteroids:

(1) Cutaneous CS
(2) Inhaled CS
(3) Intranasal CS
(4) Systemic CS

The prompt enables user to ask the appropriate question and enter data. As well it increases the clinicians knowledge of the total burden of corticosteroid, information that may not have been captured if patient is presenting with a specific disease (i.e. atopic dermatitis but also has

allergic rhinitis) and/or using over the counter medications that is not documented in their medication list. Changes based on this information will be documented in the counseling section. Illustrations of these prompts, as well as Pediatric Growth Chart, Plan of Action, and Counseling screen prompts, follow this section.

Illustration of the Cutaneous CS monitoring screen:



Arrow A allows user to select **topical cortiocsteroid** the patient is on. Includes

1. Steroid used
2. Number of days used the past 4 weeks
3. The number of applications per day

Arrow B allows user to enter side effects present (green) or absent (red)

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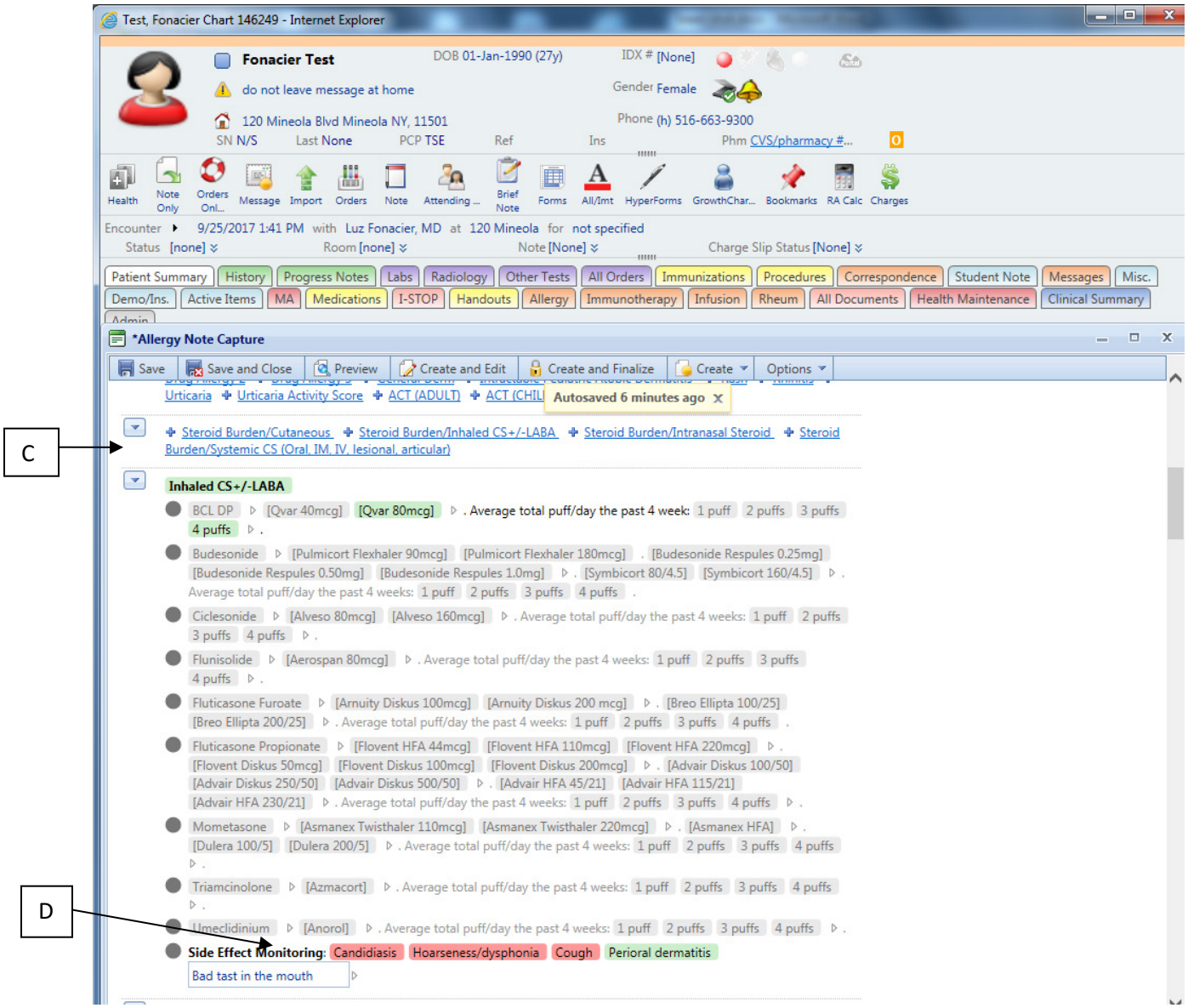
Illustration of the Inhaled CS monitoring screen:



Another drop down box is if the patient is also on **inhaled cortocosteroid**
Arrow C allows the user to select the specific inhaled steroid of the patient and the dosage
Arrow D is side effect monitoring for inhaled corticosteroid.
A separate box for "write in" is available in any area where a triangle is seen(**Arrow B**).

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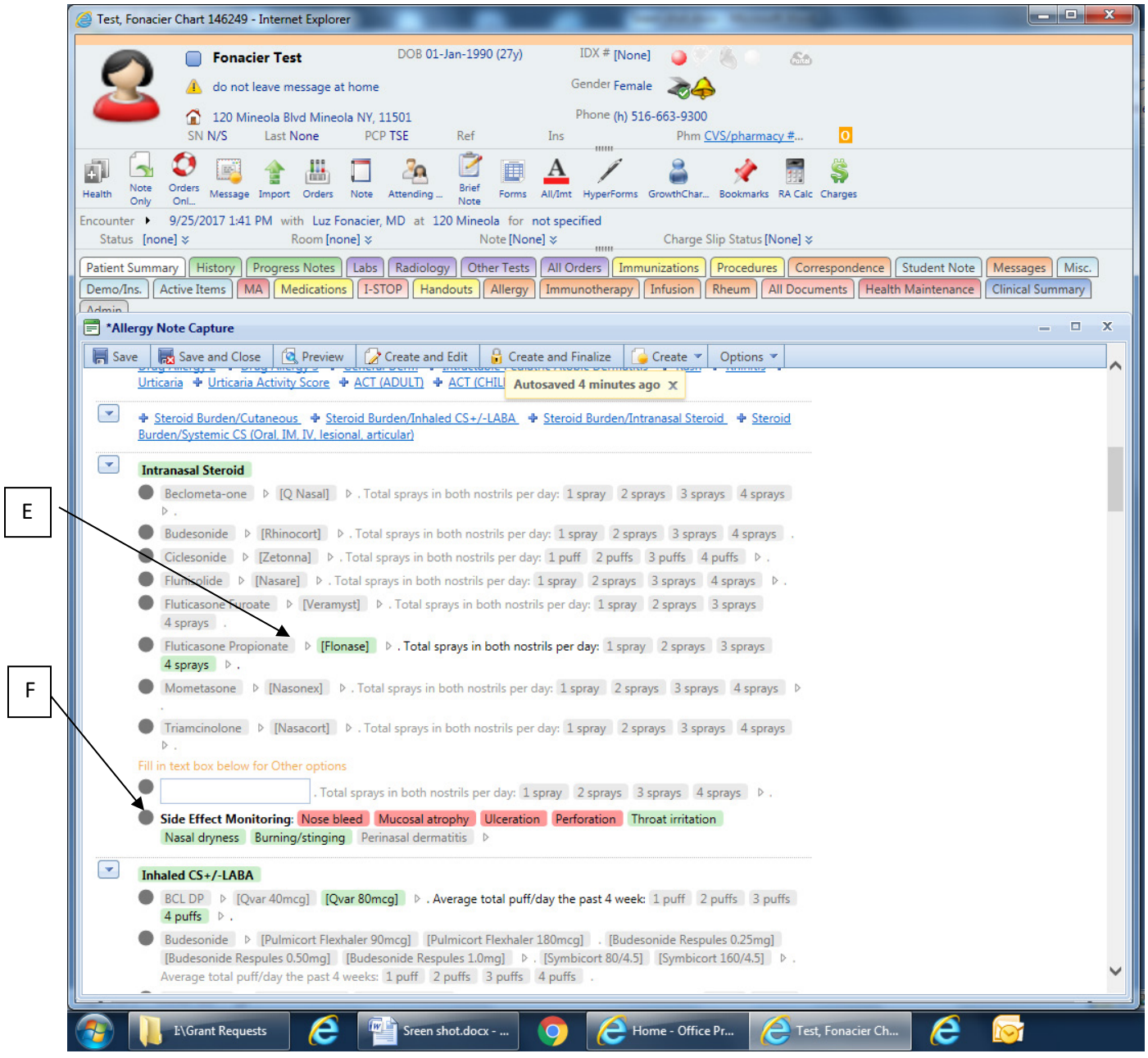
Illustration of the Intranasal CS monitoring screen:



Another drop down box is if the patient is also on **intranasal cortocosteroid**
Arrow E allows user to choose intranasal steroid used and dosage
Arrow F is for side effect monitoring

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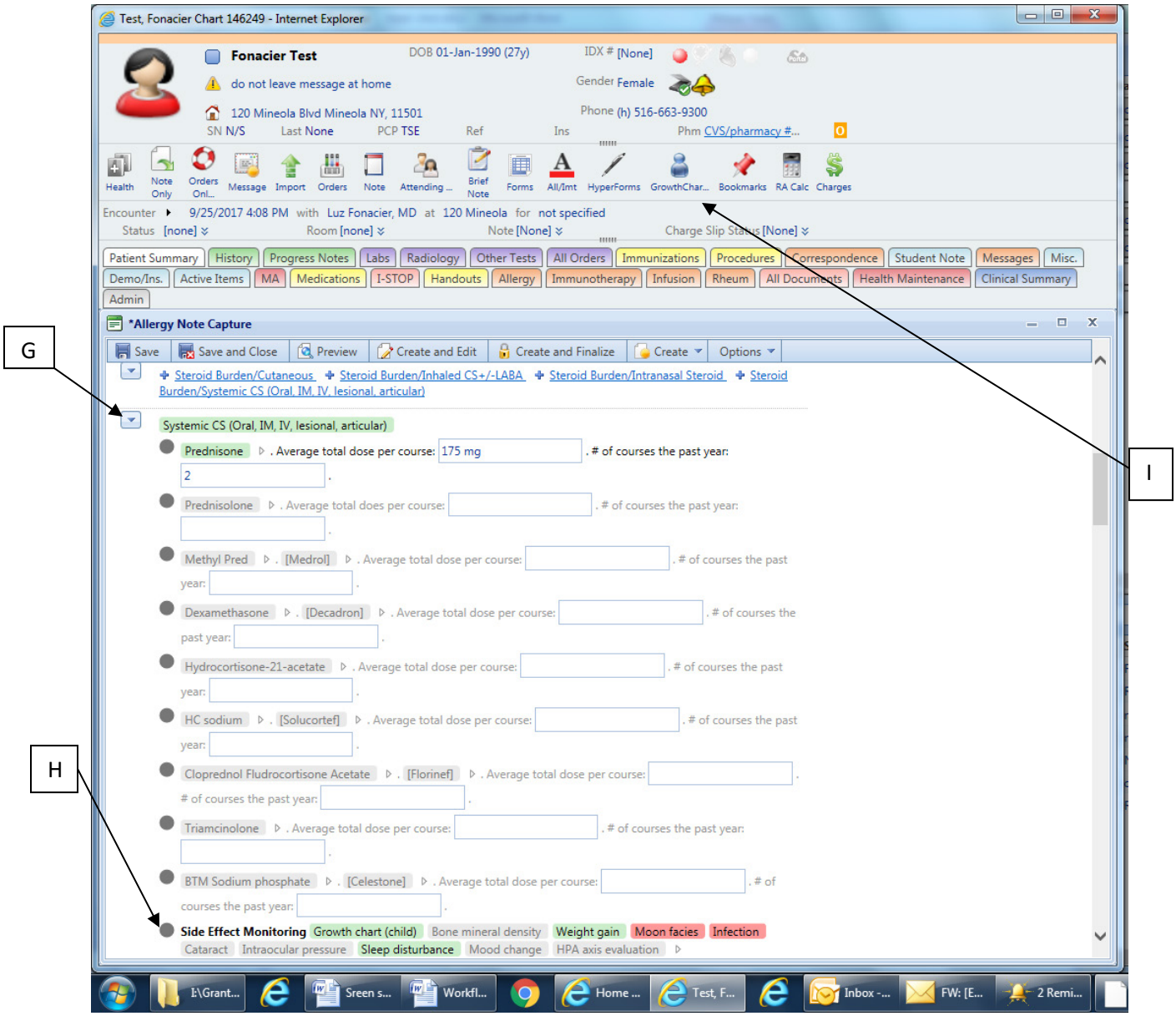
Illustration of the Systemic CS monitoring screen:



This drop down box will be used if the patient is receiving or has received **systemic cortocosteroid the past year.**
Arrow G allows user to choose systemic steroid use and dosage
Arrow H is for side effect monitoring both in children and in adult

Arrow I: The Growth Chart for children is a pull down from the main menu, a sample is attached below.

Illustration of the Growth Chart for children, available in the EMR

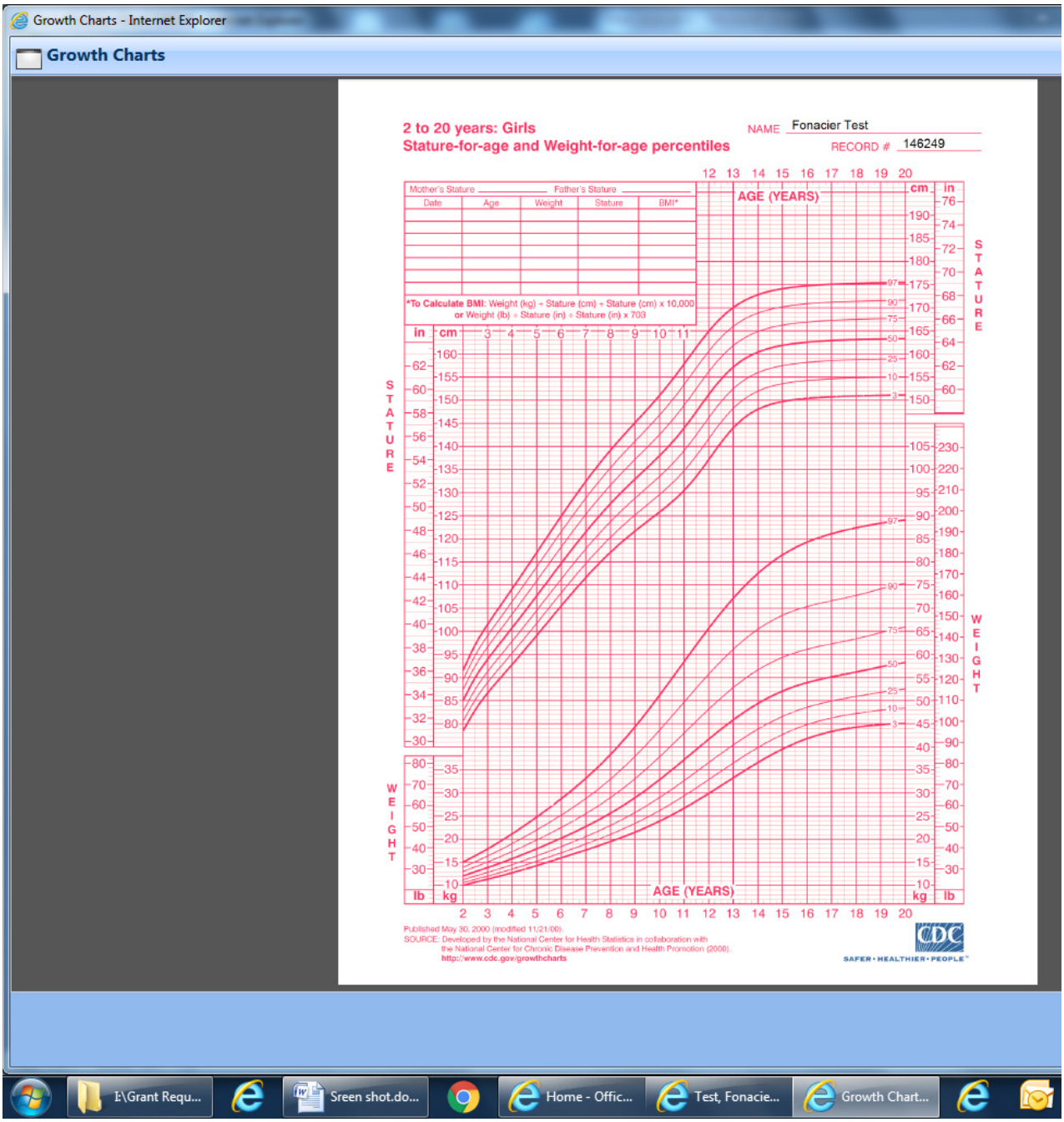


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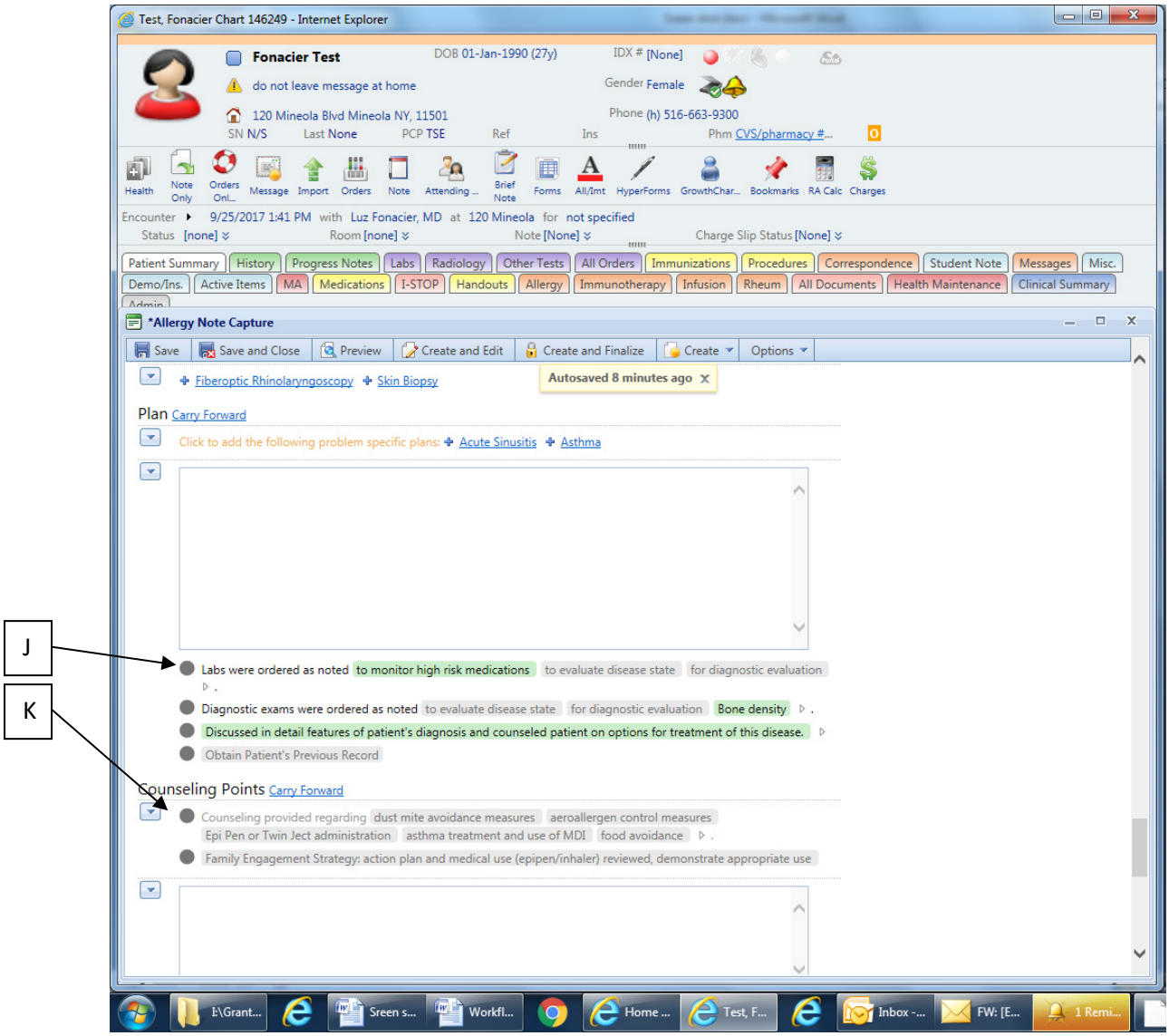
Illustration of Plan of Action screen:



Arrow J: Based on the patient's steroid burden, a plan of action can be done Labs requested, bone density etc wil be documented here)

This will lead to **Arrow K** for counseling

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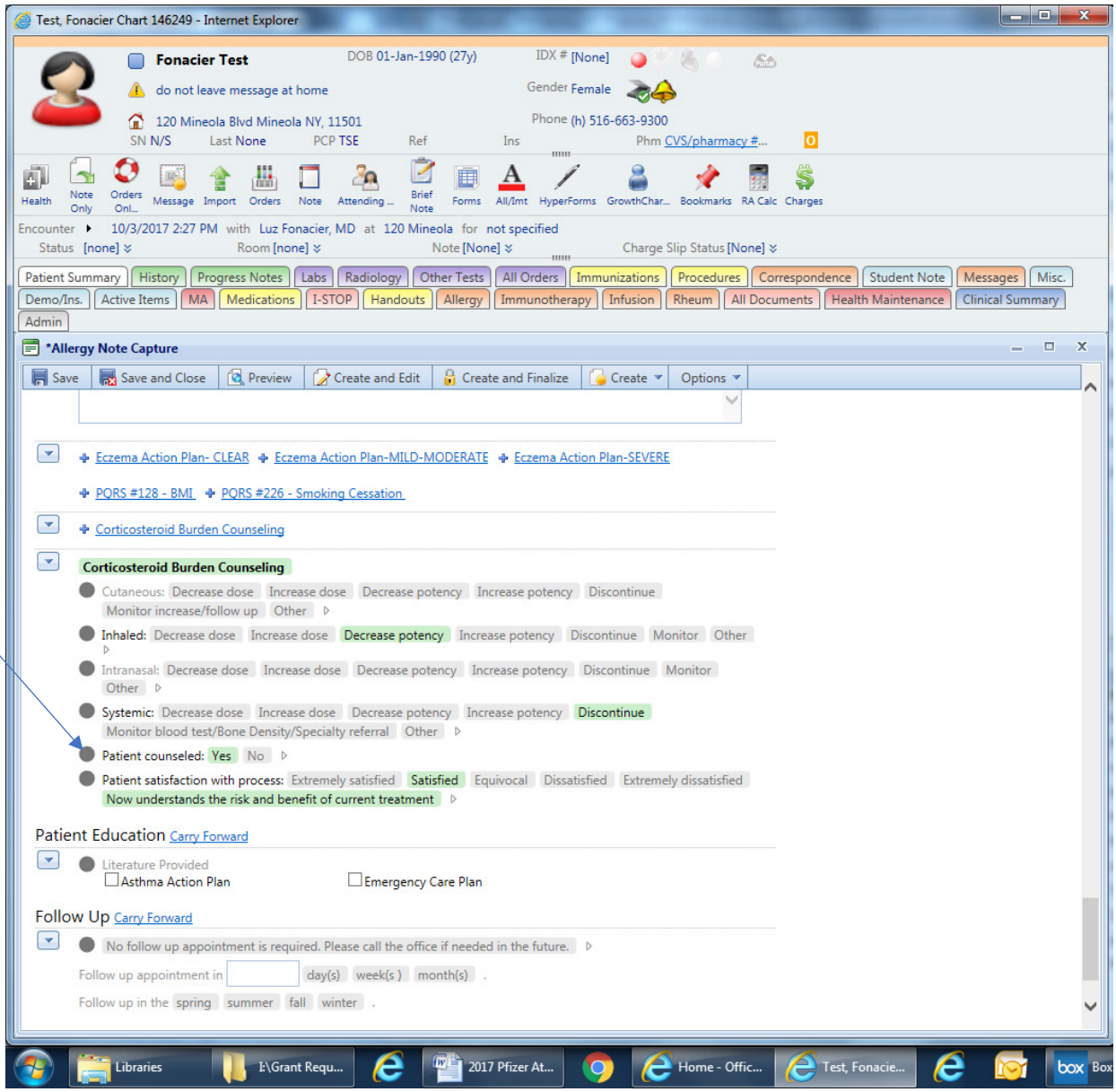
Illustration of the Counseling screen:



The counselling window carries the physician to the course of action. We will monitor changes done based on the information gathered from this tool.

Arrow L: Included are information as to whether the patient/parent was counseled on the risk and benefits of their treament regimen and the patient satisfaction.

D. References

[1]Schneider L, Tilles S, Lio P, et al. Atopic dermatitis: a practice parameter update 2012. J Allergy Clin Immunol. 2013 Feb;131(2):295-9.

[2]Caubet, J-C, Nowak-Wegrzyn A. Atopic Dermatitis in Infants and Young Children. Mount Sinai Expert Guides: Allergy and Clinical Immunology, First Edition. Edited by Hugh A. Sampson. 2015 John Wiley & Sons, Ltd.

[3]Gupta R, Fonacier LS. Adverse effects of non-systemic steroids (inhaled, Intranasal, and cutaneous): a review of the literature and suggested monitoring tool. Curr Allergy Asthma Rep. 2016;16:44.

[4]Schmitt J, Schmitt NM, Kirch W, Meurer M. Outpatient care and medical treatment of children and adults with atopic eczema. J Dtsch Dermatol Ges. 2009 Apr;7(4):345-51.

[5]Staab D, von Rueden U, Kehrt R, et al. Evaluation of a parental training program for the management of childhood atopic dermatitis. Pediatr Allergy Immunol. 2002 Apr;13(2):84-90.

[6]Ahrens B, Staab D. Extended implementation of educational programs for atopic dermatitis in childhood. Pediatr Allergy Immunol. 2015 May;26(3):190-96.