

32 Instructions and Consent Forms for Subcutaneous Allergen Immunotherapy

Linda Cox

Allergy & Immunology and Internal Medicine in Fort Lauderdale, Florida, U.S.A.

Richard F. Lockey

Division of Allergy and Immunology, Department of Internal Medicine, University of South Florida College of Medicine and the James A. Haley Veterans' Hospital, Tampa, Florida, U.S.A.

INTRODUCTION

The primary objective of allergy skin test and immunotherapy forms is to provide sufficient information about the procedures to allow accurate interpretation by physicians and other health care professionals, even when they are in an office other than that of the prescribing physician. The immunotherapy and allergy skin test forms also should be sufficiently detailed to enable all physicians to make treatment decisions.

The recommended information to be included on the forms has been outlined in the *Guidelines for Reporting Immediate Allergy Skin Test Results* by the American Academy of Allergy, Asthma, and Immunology's Immunotherapy Committee (AAAAI's ICOM) (1) and in the Joint Task Force on Practice Parameters' *Allergen Immunotherapy: A Practice Parameter Second Update (JAIPP)*(2). The purpose of these guidelines is to optimize the practice of clinical allergy through objective, scientific, and reproducible documentation and standardization of skin testing and immunotherapy procedures. The intended outcome is enhanced safety, accuracy, and efficacy of allergy diagnostic testing and allergen immunotherapy (AIT).

This chapter reviews these guidelines and recommendations and includes examples of the standardized immunotherapy and allergy skin test forms developed by the AAAAI's ICOM and the Joint Task Force on Practice Parameters. The immunotherapy forms are also included in the *Allergen Immunotherapy: A Practice Parameter Second Update* and are provided as a courtesy of the Joint Task Force on Practice Parameters (2). The forms integrate the guidelines into editable documents. Also included are examples of consent and instruction forms. Readers can obtain copies of the Allergy Skin Test form, Immunotherapy Prescription and Administration forms, Consent and Instruction forms on the AAAAI website (www.aaaai.org/members).

Physicians may use these forms as a template and customize them for their practice, while maintaining the basic information recommended in the published guidelines. Utilization of these forms will potentially lead to uniformity of allergy skin testing and immunotherapy procedures and improve the safety and accuracy of allergy care, particularly if there is a transfer or change in a patient's allergy care (e.g., new location, new nursing staff).

ALLERGY SKIN TEST FORMS

The use of immediate hypersensitivity (allergy) skin testing as a diagnostic tool in clinical allergy dates to the late 1800s with the work of Charles Blakely (1820–1900), an English physician who proved, through experiments on himself, that hay fever was a result of pollen. During these experiments, he discovered that he could elicit a response if he rubbed the pollen into his scratched skin (3). Since its inception more than 100 years ago, allergy skin testing has continued to be the primary diagnostic tool for patients with allergic diseases and for clinical trials of AIT. Until the latter part of the 20th century, there was little effort to ensure that the clinical practice of allergy skin testing is uniform and consistent. As a result, there is considerable variability in how allergy skin test results are performed and recorded. This variability can adversely impact patient care, particularly individuals who may require

a transfer of their allergy care. Physicians may have difficulty interpreting allergy skin test results performed in another facility and recommend the transferring patient undergo a repeat allergy evaluation. The AAAAI's ICOM developed guidelines to provide parameters for allergy skin reporting to help the allergy community move toward a more uniform practice. The goal of these guidelines is to improve the quality of allergy skin testing and reduce undesirable variation by documenting the results in an objective, scientific, and reproducible manner.

The completed allergy skin test form should provide enough information to allow other physicians to understand the type of test and how it was performed. Many variables can potentially affect allergy skin test results and are included in the skin test form developed by the AAAAI's Immunotherapy Committee. These variables include location of the testing site (4), skin test device (5-7), testing technician, patient age (8), sun damage of the skin (8), and medications. These variables can influence the interpretation of the allergy skin test results. Therefore, it is important to include details about these variables on the allergy skin test form.

The key purpose of the allergy skin test report is to convey information about the test results. The skin test results should be recorded in a manner permitting other physicians to readily interpret the patient's positive and negative allergy skin test profile. The two most commonly used methods of reporting allergy skin test results are

- *Quantitative results:* These are reported as measurement in millimeters of the longest diameter of wheal and diameter of erythema/flare or the sum of the longest diameter plus the widest perpendicular diameter (orthogonal).
- *Semiquantitative scoring:* This is reported on a scale of 0 to 4+. The key to scoring must be included and must be based on measurement of wheal and flare.

One of the limitations of the semiquantitative scoring method is that it fails to provide specific information about the degree of skin test reactivity (i.e., a 4+ could represent a wide range of wheal sizes in many of the currently used scoring systems). Reporting the skin test response in millimeters of the longest diameters of the wheal and erythema/flare may provide more specific information. The longest diameter of the skin test response correlates well with the actual area in a study that used a graphics tablet interfaced to a microcomputer to compare computer-determined areas of 50 randomly selected skin test responses with measured skin test responses (9). In this study, the areas measured by the computer were highly correlated with the actual areas ($r = 0.999$). The sums and products of orthogonal diameters were also highly correlated with the actual areas ($r = 0.953$ and $r = 0.988$, respectively) and added little to the correlation of the maximum (longest) diameter ($r = 0.923$). This study also compared area and maximum diameter measurements of prick skin test responses applied by different persons and found significant differences in the area measurements between testers, which were not found when maximum diameter measurements were compared.

There are some clinical implications associated with the degree of skin test reactivity that are pertinent to patients on AIT.

- High degree of skin test reactivity may be associated with greater risk during immunotherapy (10).
- Starting dose of immunotherapy may be based on skin test reactivity (10).
- Change in skin test reactivity with immunotherapy may predict who is less likely to experience clinical relapse after discontinuing immunotherapy, although this is controversial (11).

Recording the allergy skin test results as measurements of the wheal and erythema in millimeters will provide any physician with precise, reproducible information about the patient's degree of allergen sensitivity.

An objective test protocol for quality assurance should be used to assess the allergy skin test technician's testing proficiency. One suggested protocol for quality assurance and proficiency testing is to have the skin testing technician test 20 alternating positive and negative controls on the back (Fig. 1A) (12). The longest diameters of the wheal and the longest diameters of the flare should be measured and recorded in millimeters. The mean wheal

Suggested Proficiency Testing/Quality Assurance Technique for Skin Prick Testing

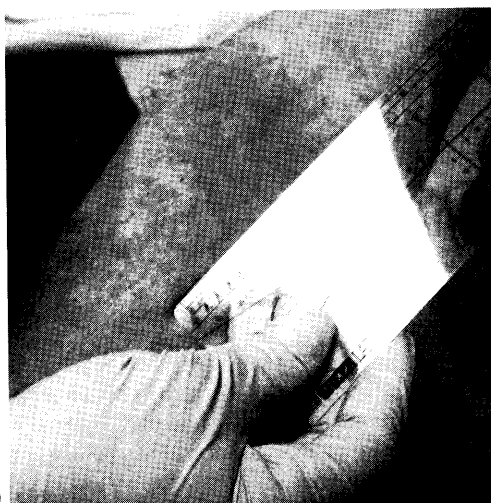
- Using desired skin test device, perform skin testing with positive and negative controls in an alternate pattern on a subject's back (histamine 1-10 [10 mg/mL] and saline 1-10)
- Record histamine results at 8 minutes by outlining wheals with a felt-tip pen and transferring results with transparent tape to a blank sheet of paper
- Record saline results at 15 minutes by outlining wheal and flares with a felt-tip pen and transferring results with transparent tape to a blank sheet of paper
- Calculate the mean diameter $X = (D+d)/2$; D =largest diameter and d =perpendicular diameter at midpoint of D

• Histamine

Calculate the mean and standard deviations of each mean wheal diameter
Determine coefficient of variation = standard deviation/mean
Quality standard should be less than 30%

• Saline

- (A) All negative controls should be <3-mm wheals and <10-mm flares



(B)

Figure 1 (A) Skin test proficiency test. (B) (See color insert.) Reporting allergy skin test results as a measurement in millimeters of longest diameter of the wheal and flare/erythema. Source: From Ref. 12.

diameter with the following formula can be used to calculate the coefficient of variation, which is a measure of skin test reproducibility: standard deviation of wheal divided by mean wheal diameter. Ideally, the coefficient of variation should be less than 30%.

The skin testing form should contain the following information:

- A. Patient and prescribing physician information
 1. Patient name, date of birth, and identifying number (if applicable)
 2. Prescribing physician name, address, and telephone number
 3. Testing date
 4. Last time of administration of medications, which can interfere with interpretation or increase the risk of skin testing (e.g., antihistamine or β -blocker)
- B. Allergy skin test methods
 1. Skin test technician (the clinic should have some documentation of the quality assurance evaluation of skin test technician's skin test technique)
 2. Location of test (e.g., back or arm)
 3. Type of test (e.g., percutaneous and/or intradermal)
 4. Instrument used (e.g., testing device, needle size and commercial kit)
 5. Elapsed time between application of tests and reading of tests
 6. Amount injected with intradermal technique
- C. Testing materials
 1. Positive and negative controls
 2. Manufacturing company or source of reagents
 3. Common name (scientific name optional) of allergens
 4. Concentration used in testing
 5. Dilution and diluent where applicable
 6. Contents, concentrations, and diluents of any mixtures
- D. Recording of results
 1. Quantitative: The method recommended by the Joint Task Force's *Allergy Diagnostic Testing: An Updated Practice Parameter* (13) and the AAAAI Immunotherapy and Allergy Diagnostic Committee's skin test reporting guidelines is recording results as the longest diameters of wheal and erythema/flare in millimeters or recording both the longest diameters of wheal and erythema/flare and the widest perpendicular diameter (orthogonal) (Fig. 1B).
 2. Semi-quantitative method: Results are recorded by a numerical scale from 0 through 4+. This method is *not recommended* because it is more variable and lacks precision. If this method is used, each score must include a measure of wheal and flare/erythema in millimeters.
- E. Actual forms

The following forms were developed by the AAAAI's ICOM and include the information recommended by its earlier published guidelines. Figure 2 is an example of an allergy skin test form and Figure 3 represents an example of a completed allergy skin test form.

AIT PRESCRIPTION FORMS

The immunotherapy prescription form should provide specific information about the contents of the AIT vaccine. Precise details are necessary for any other physician or health care professional to replicate the prescription without significant variation from the previous vaccine, aside from known differences of lots and manufacturers. AIT vaccines differ when there are changes in the constituents of the mixture, including the diluent, manufacturer, and extract type (aqueous vs. glycerinated) (2). The AIT vaccine label is important and should contain sufficient detail to allow physicians, other health care professionals and the patient to recognize for whom the AIT vaccine is indicated as well as pertinent information about its content (Figs. 4 and 5). The JAIPP has proposed a nomenclature system for allergen vaccine dilutions (Table 1, Figs. 4 and 5). Uniform adoption of this system should reduce errors in administration of AIT, particularly when administered outside of the prescribing physician's office.

variation, which
v mean wheal

with interpreta-
tation)

of the quality

kit)

Force's Allergy
AAI Immuno-
guidelines is
hema/flare in
erythema/flare

scale from 0
able and lacks
e of wheal and

and include the figure 2 is an example of a

Immunotherapy prescription forms should contain the following information:

- A. Patient information
 1. Patient name, patient number (if applicable), birth date, telephone number, and picture (optional but helpful)
- B. Preparation information
 1. Name and signature of person preparing the vaccine
 2. Date of preparation
 3. Vial name

For example, a name could be "Trees and Grasses." If abbreviations are used, a legend should be included to describe the meaning of abbreviations.
- C. AIT extract content information (The following information for each allergen should be included on the form in a separate column.)
 1. Content of the allergen extract including common name or genus and species of individual allergens and detail of all mixes

ut the contents
or health care
the previous
es differ when
manufacturer, and
nt and should
d the patient to
ation about its
llergen vaccine
duce errors in
physician's office.

Dr. Ah Choo, M.D. Address: 665 Rosebud Lane Hollywood, FL 33424 Telephone: 645-123-4444 Fax: 645-123-4567							
Patient name: Jerry Cleanex Date of birth: 05/05/90 Patient number: 23456 Testing Technician: Mary Lancet Last use of antihistamine (or other med affecting response to histamine): 10 days ago medication _____ Testing Date (s) and Time: Percutaneous 5/30/02 10:30 AM Intradermal 6/2/02 11:15 AM							
General information about skin test protocol 1. Percutaneous reported as: Allergen: Testing concentration: Extract company (*see below) Location: back <u>X</u> arm Device: HS Quintip 2. Intradermal : 0.02ml injected, Location: arm Testing concentration: 1:500 w/v, 100 BAU or AU/ml, 400 PNU 3. Results Longest diameter (<i>Left in this example</i>) or longest diameter and orthogonal diameter (<i>Right in this example</i>) of wheal (W) and erythema (flare) (F) measured in millimeters at 15 minutes Blank in results column indicates test was not performed, O=negative * Extract manufacturer abbreviations: G=Greer, AL= Allergy Labs (Oklahoma), AK=ALK Abello, AD=ALK (Denmark), H=Hollister-Stier, AG=Antigen, N=Nelco, AM=Allermed., AT=Antigen							
Allergen: Concentration:	Percutaneous	W (mm) F	Intradermal	W (mm) F	Allergen: Concentration:	Percutaneous	Intradermal
Extract Manufacturer: *					Extract Manufacturer: *		
Trees					Weeds		
<i>Ulmaceae</i>					<i>Composite family</i>		
1. American Elm 1:20 G	0	0			21. Mugwort 10,000 PNU AD	4/6	18/15
<i>Cupressaceae</i>					22. Short Ragweed 1:10 H	10/6	20/20
2. Mountain Cedar 1:10 AL	0	0			<i>Chenopod</i>		
<i>Betulaceae</i>					23. Russian Thistle 1:20 AG	3/7	10/15
3. Paper Birch 1:20 AK	3	15			24. Burning Bush 20,000 PNU N	4/6	15/20
4. Red Alder 1:20 AD	3	10			25. Lamb's Quarter 1:40 AM	6/10	15/20
<i>Fagaceae</i>					<i>Amaranth</i>		
5. White Oak 1:10 H	0	0	10	20	26. Red Root Pigweed G	8/10	20/30
6. Red Oak 1:10 AG	5	15			<i>Plantaginaceae</i>		
<i>Aceraceae</i>					27. English Plantain AK	10/9	20/18
7. Box Elder 1:20 N	0	0			Molds/Fungi		
<i>Oleaceae</i>					28. Alternaria alternata AD	10/9	20/18
8. White Ash 1:20 AM	0	0			29. Cladosporium herbarum H	0	0
9. Olive 1:20 G	5	20			30. Cladosporium cladosporioides AG	0	0
<i>Salicaceae</i>					31. Penicillium chrysogenum N	4/5	15/10
10. Cottonwood Eastern 1:40 AL	6	25			32. Aspergillus fumigatus AM	5/7	20/16
<i>Moraceae</i>					33. Epicoccum nigrum G	0	0
11. Mulberry 1:20 AK	7	30			34. Helminthosporium solani AL	0	0
<i>Juglandaceae</i>					Animals/Mites /Cockroach/Others		
12. Pecan 1:20 AD	0	0			35. D. Pteronyssinus AK	20/30	40/30
13. Black Walnut 1:20 H	0	0			36. D. Farinae AD	15/9	32/40
<i>Plantaceae</i>					37. American Cockroach H	5/6	12/10
14. Sycamore 1:40 AG	0	0			38. German Cockroach AG	7	18
Grasses					39. Cat Epithelium N	15	30
15. Bahia 1:20 N	20	40			40. Dog Epithelium 1:20 AM	0	0
16. Bermuda 10,000 BAU/ml AM	15	35			Controls		
17. Sweet Vernal 1:20 G	25	40			Percutaneous		
18. Timothy 100,000BAU/ml AL	30	45			Negative: 50% glycerine-saline G	0	0
19. Johnson 1:10 AK	15	30			Positive: Histamine 1mg/ml AL	5/7	20/15
Weeds					Intradermal		
<i>Polygonaceae</i>					Negative: 0.05 % glycerine-saline AK		0
20. Sheep sorrel H	4/9	15/12			Positive: Histamine 1mg/ml AD		15/20
Interpretation:							

Figure 3 Example of a completed allergy skin test form. *Source:* From AAAAI website.

2. Concentration of manufacturer's extract
3. Volume of manufacturer's extract to add to achieve a selected volume of the projected effective concentration

This can be calculated by dividing the projected effective concentration by the concentration of available manufacturer's extract and multiplying by the selected volume. For example, the recommended maintenance dose for cat is 1000 to 4000 BAU. To deliver 2000 BAU in a 0.5 mL maintenance injection, the final concentration would be 4000 BAU/mL (projected effective concentration). To calculate how much cat extract should be added to a mixture with a final volume of 5 mL the following formula can be used

$$4000 \text{ (projected effective concentration)} \div 10,000 \text{ BAU/mL (available manufacturer's extract concentration)} \times 5 \text{ mL (final volume)} =$$

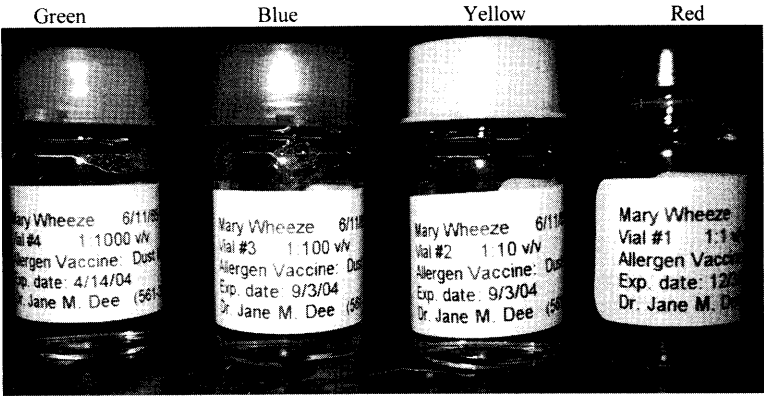


Figure 4 (See color insert.) Picture of color-coded labeled allergen immunotherapy extracts with dilutions from maintenance concentrate.

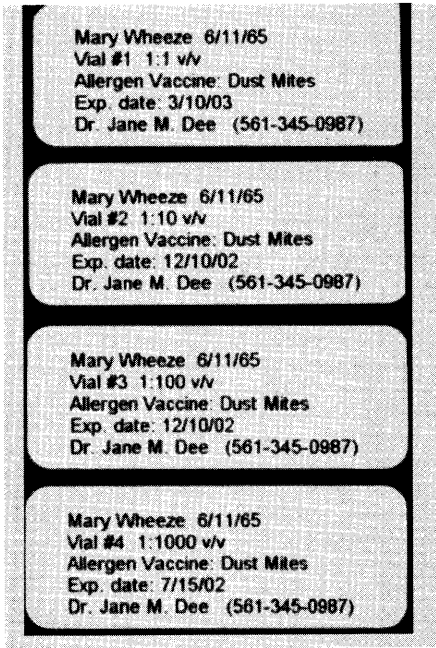


Figure 5 Example of a completed allergen extract label.

Table 1 Suggested nomenclature for labeling dilutions from the maintenance concentrate

Dilution from maintenance concentrate	^a Vol/vol label	^b Number	Color
Maintenance concentrate	1:1	1	Red
10-fold	1:10	2	Yellow
100-fold	1:100	3	Blue
1000-fold	1:1000	4	Green
10,000-fold	1:10,000	5	Silver

^aVol/vol refers to volume per volume dilution with 1:1 being the maintenance concentrate and subsequent dilutions based on the maintenance concentrate.
^bIt is recommended that the numbering system begin with the highest concentration, the maintenance concentrate. This will provide consistency in labeling in the event a greater number of dilutions are needed.
Source: From JAIPP.

2.00 mL (amount of cat extract to be added to the diluent or other allergen extract to make a final volume of 5 mL).

4. The type of diluent (if used)
5. Extract/vaccine manufacturer
6. Lot number
7. Expiration date (This date should not be later than the expiration date of any of the individual components.)

D. Actual forms

The AAAAI's ICOM developed standardized forms for immunotherapy prescription writing. These forms are included in the JAIPP *Allergen Immunotherapy: A Practice Parameter* (14). One form (Fig. 6) is primarily used for the build-up phase of immunotherapy, because it includes a section to document subsequent dilutions

Patient Name: Patient Number: Birth Date: Telephone:	Prescribing Physician: Address: Telephone: Fax:
---	--

Vaccine Name:	Maintenance Concentrate Prescription Form
----------------------	--

Bottle Name Abbreviations Tree: T Mold: M Grass: G Cat: C Weed: W Dog: D Ragweed: R Cockroach: Cr Mixture: Mx Dust Mite: Dm	Prepared by: _____ Date Prepared: ____/____/____ Dates of subsequent dilutions from maintenance concentration with expiration dates Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____ Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____ Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____ Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____
--	--

Antigen Number	Extract Name Allergen or Diluent (Common name or Genus/species)*	Concentration and Type Manufacturer's Extract (AU, BAU, W/V, PNU) (50% G, Aq, Ly, AP)	Volume of Manufacturer's Extract to Add	Extract Manufacturer	Lot Number	Expiration Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Diluent						
Total Volume						

* Components of mixes listed on a separate sheet

Specific Instructions:

Volume to add = $\frac{\text{Maintenance Concentration}}{\text{Conc. Of Manufacturer's Extract}} \times \text{Total volume}$

Maintenance concentration and subsequent dilutions reported as volume/volume (v/v) dilutions with maintenance concentration=1:1 v/v

Prescribing Physician Signature _____	Date ____/____/____	
Patient Consent Form Signed _____	Date ____/____/____	

BAU = Bioequivalent Allergy Unit, AU = Allergy Unit
 PNU = Protein Nitrogen Unit
 W/V = Weight per Volume Ratio
 G = 50 % Glycerinated
 Aq = Aqueous, Ly = Lyophilized
 AP = Alum precipitated

Figure 6 Immunotherapy prescription form for build-up phase. Source: From AAAAI website.

Instructions and Consent Forms for Subcutaneous AIT

Patient Name: Patient Number: Birth Date: Telephone:	Prescribing Physician: Address: Telephone: Fax:
---	--

Vaccine Name:

**Maintenance Concentrate
Prescription Form**

Bottle Name Abbreviations
 Tree: T Mold: M
 Grass: G Cat: C
 Weed: W Dog: D
 Ragweed: R Cockroach: Cr
 Mixture: Mx Dust Mite: Dm

Prepared by: _____ **Date Prepared:** __/__/__

Antigen Number	Extract Name Allergen or Diluent (Genus, species or Common name)*	Concentration and Type Manufacturer's Extract (AU, BAU, W/V, PNU/ (50% G, Aq, Ly, AP)	Volume of Manufacturer's Extract to Add	Extract Manufacturer	Lot Number	Expiration Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Diluent						
Total Volume						

* Components of mixes listed on a separate sheet

Specific Instructions:

Volume to add = $\frac{\text{Maintenance Concentration}}{\text{Conc. Of Manufacturer's Extract}} \times \text{Total volume}$

Maintenance concentration and subsequent dilutions reported as volume/volume (v/v) dilutions with maintenance concentration=1:1 v/v

BAU = Bioequivalent Allergy Unit, AU = Allergy Unit
 PNU = Protein Nitrogen Unit
 W/V = Weight per Volume Ratio
 50%G = 50 % Glycerinated
 Aq = Aqueous, Ly = Lyophilized
 AP = Alum precipitated

Figure 7 Maintenance Immunotherapy prescription form. *Source:* From AAAAI website.

from the maintenance concentration. The second form (Fig. 7) does not include the build-up section and is intended for the maintenance phase of immunotherapy treatment. The third form (Fig. 8) is used to document the components of any mixes used in the immunotherapy vaccine and would accompany the primary immunotherapy prescription. Figure 9 is an example of a completed immunotherapy prescription form.

Suggested nomenclature for labeling allergen immunotherapy extract dilutions is based upon the system proposed by the JAIPP in *Allergen Immunotherapy: A Practice Parameter* (Figs. 4 and 5) (14)

Patient Name: Jerry Cleanex
 Patient Number: 23456
 Birth Date: 05/05/90
 Telephone: 645-345-0987

Prescribing Physician: Dr. Ah Choo
 Address: 665 Rosebud Lane
 Hollywood, FL 33424
 Telephone: 645-123-4444
 Fax: 645-123-4567

Vaccine Name: C, R, G, T, W

Maintenance Concentrate Prescription Form

Prepared by: Mary Lancet Date Prepared: 6/10/02

Bottle Name Abbreviations

Tree: T Mold: M
 Grass: G Cat: C
 Weed: W Dog: D
 Ragweed: R Cockroach: Cr
 Mixture: Mx Dust Mite: Dm

Dates of subsequent dilutions from maintenance concentration with expiration dates
 Vial 4 from Vial 1 on 8/30/02 Expiration date: 10/15/02
 Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____
 Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____
 Vial _____ from Vial _____ on ____/____/____ Expiration date: ____/____/____

Antigen Number	Extract Name Allergen or Diluent (Common name or Genus/species)*	Concentration and Type Manufacturer's Extract (AU, BAU, W/V, PNU)/ (50% G, Aq, Ly, AP)	Volume of Manufacturer's Extract to Add**	Extract Manufacturer	Lot Number	Expiration Date
1	Short ragweed	1:20 w/v G (150 Amb a1)	0.5ml	Greer	12345	1/01/03
2	<i>Amaranthus Retroflexus</i>	1:10 w/v G	0.5ml	H-S	6789	2/07/03
3	Ash	1:10 w/v G	0.5ml	Center	3333	3/17/03
4	Cat	10,000 BAU/ml G	2.00ml	ALO	9898	2/27/03
5	Timothy grass	100,000 BAU/ml G	0.4ml	ALK	56789	7/09/03
6	Johnson grass	1:10 w/v G	0.5ml	Greer	2434	7/20/03
7						
8						
9						
10						
Diluent	HSA		0.6ml	ALK	68597	12/03
Total Volume			5.00 ml			1/01/03

* Components of mixes listed on a separate sheet

** Assumes 0.5 ml injection as target maintenance dose
 Specific Instructions:

Volume to add = $\frac{\text{Maintenance Concentration}}{\text{Conc. Of Manufacturer's Extract}} \times \text{Total volume}$

Maintenance concentration and subsequent dilutions reported as volume/volume (v/v) dilutions with maintenance concentration=1:1 v/v

BAU = Bioequivalent Allergy Unit, AU =Allergy Unit
 PNU=Protein Nitrogen Unit
 W/V=Weight per Volume Ratio
 G= 50 % Glycerinated
 Aq=Aqueous, Ly=Lyophilized
 AP= Alum precipitated

Figure 9 Example of a completed immunotherapy prescription. Source: From AAAAI website.

provide enough
 precisely before
 ory to include

h as large local

Several risk factors for immunotherapy have been identified and include symptomatic asthma (15), high degree of hypersensitivity (10,16), use of β -blockers, dosing errors, and injections giving during periods of symptom exacerbation (16,17). With the exception of dosing errors and high degree of hypersensitivity, these risk factors can be minimized with a preinjection health screen before the administration of the allergy vaccine. This preinjection evaluation may include a peak flow measurement for asthmatic patients and a health inquiry administered verbally or as a written questionnaire. The health inquiry is to determine if there were any recent health changes that may require modifying or withholding that patient's

immunotherapy treatment (e.g., the addition of a β -blocker medication to treat hypertension). The immunotherapy administration form is used to document an evaluation of the patient's health status before administering the allergy vaccine. The form was created by the AAAAI's ICOM and is based on the recommendations of the JAIPP. The information recommended on an immunotherapy administration form is summarized below.

Summary Points of AIT Administration Forms

- A. Patient information
 - 1. Patient name, date of birth, telephone number, patient photograph (optional but helpful)
- B. AIT vaccine information
 - 1. AIT vaccine name and dilution from maintenance concentrate in vol/vol (Table 1), vial letter (e.g., A, B), color or number if used.
 - 2. Expiration date of all dilutions
- C. Administration information in separate columns
 - 1. Date of injection
 - 2. Patient's health before injection

This is obtained via a verbal or written interview of the patient before administering the immunotherapy injection. Among other issues, the patient is questioned about increased asthma or allergy symptoms, β -blocker use, change in health status (including pregnancy), or an adverse reaction to previous injection (including delayed large local reactions). Patients with a significant systemic illness, such as influenza, usually should not receive an allergy injection.

- 3. Antihistamine use

There have been very few studies that have investigated the effect of premedication on conventional immunotherapy build-up schedules. One concern is that antihistamines taken before each injection during a conventional immunotherapy buildup might mask a minor reaction that would otherwise alert a physician to an impending systemic reaction. However, one randomized-controlled study demonstrated that premedication with fexofenadine reduced the frequency of severe systemic reactions during a conventional immunotherapy buildup as well as increasing the proportion of patients who achieved the target maintenance dose (18). The JAIPP suggests noting if the patient is taking an antihistamine in order to consistently interpret reactions. It may also be desirable for a patient to be consistent and either take or not take an antihistamine on the day they receive their injection. The immunotherapy administration form is a means by which antihistamine use is documented and reflects specific instructions from the treating physician about an antihistamine on injections days.

- 4. Peak flow reading

Symptomatic asthma is a risk factor for immunotherapy (10,15). Obtaining a peak flow measurement prior to the immunotherapy injection may help screen patients with active asthma who should not receive their immunotherapy injection on that day. The form should provide the patient's best peak flow baseline as a reference and the health care professional giving the injection should be provided with specific guidelines about the degree of diminished peak flow for which an injection should be withheld.

- 5. Baseline blood pressure

It is desirable to record the patient's baseline blood pressure for future reference.

- 6. Arm administered

Noting into which arm each vaccine is injected facilitates identification of the cause of a large local reaction and, therefore, which vaccine may be modified.

- 7. Projected build-up schedule

- 8. Delivered volume reported in milliliters

- 9. Injection reaction

Allergen Immunotherapy Administration Form

Patient Name:		Date of Birth:		Prescribing Physician:	
Patient Number:		Diagnosis:		Address:	
Telephone Number:				Telephone:	
				Fax:	

Dilution Color	1:10,000 (v/v) Silver	1:1000 (v/v) Green	1:100 (v/v) Blue	1:10 (v/v) Yellow	Maintenance 1:1 (v/v) Red	Immunotherapy	A	B
Vial number	5	4	3	2	1	Date started		
Expiration date(s)						Date maintenance dose reached		
						Maintenance dose		
						Maintenance interval		

Best Baseline Peak Flow: _____
 Baseline Blood pressure: _____

Allergen extract: contents

Date	Time	Health screen abnormal ¹	Anti-histamine taken? ² or premed	Peak Flow	Arm	Vial Number or Dilution	Delivered Volume	Reaction ³	Injector Initials
1.		Y N	Y N		R L				
2.		Y N	Y N		R L				
3.		Y N	Y N		R L				
4.		Y N	Y N		R L				
5.		Y N	Y N		R L				
6.		Y N	Y N		R L				
7.		Y N	Y N		R L				
8.		Y N	Y N		R L				
9.		Y N	Y N		R L				
10.		Y N	Y N		R L				
11.		Y N	Y N		R L				
12.		Y N	Y N		R L				
13.		Y N	Y N		R L				
14.		Y N	Y N		R L				
15.		Y N	Y N		R L				
16.		Y N	Y N		R L				
17.		Y N	Y N		R L				
18.		Y N	Y N		R L				
19.		Y N	Y N		R L				
20.		Y N	Y N		R L				
21.		Y N	Y N		R L				
22.		Y N	Y N		R L				
23.		Y N	Y N		R L				
24.		Y N	Y N		R L				

1. **Health screen** refers to either a written or verbal interview of the patient prior to the administration of the allergy injection regarding: the presence of increased allergy or asthma symptoms or symptoms of respiratory tract infection, beta-blocker use, change in health status (including pregnancy) or adverse reaction to previous injection. A yes answer to this health screen may require further evaluation (see health screen record on back page).

2. **Antihistamine use:** to improve consistency in interpretation of reactions it should be noted if the patient has taken an antihistamine on injection days. Physician may also request that **antihistamines be taken consistently on injection days; recommended: Y N**

3. **Reaction:** refers to either immediate or delayed systemic or local reactions. Local reactions (noted as LR) can be reported in millimeters as the longest diameter of wheal and erythema. The details of the symptoms and treatment of a **systemic reaction** (noted as SR) would be recorded elsewhere in the medical record. Guidelines for dose reduction after a systemic reaction on a separate instruction sheet.

Projected Build-up Schedule					
Vial 5	Vial 4	Vial 3	Vial 2	Vial 1	

Date to reorder: _/_/_

Figure 10 Allergen immunotherapy administration form. Source: From AAAAI website.

The details of any treatment given in response to either a systemic or large reaction should be documented on the health screen (second page of the administration form) or elsewhere in medical record and referenced on the administration form.

The initials of the individual who gives the injection should be included. The immunotherapy administration forms were developed as a two-part form (Figs. 10 and 11) and are included in the JAIPP. Figure 10 is used to document the preinjection screening and allergy immunotherapy injection administration for up to two vaccines. A modification of this form with columns for three vaccines is available but not included in this book. The second page is used to note the results of the pre-injection screen including any delayed immunotherapy reactions or immediate systemic reactions. Figures 12 and 13 are the pre-immunotherapy injection

Patient name: _____ Date of birth: _____ Patient number: _____

Health Screen Record

1. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

2. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

3. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

4. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

5. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

6. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

7. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

8. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

9. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

10. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

11. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

12. Date of immunotherapy injection visit: ____/____/____
 Patient's response to pre-injection screening questions: _____
 Staff action taken (if any): _____

Figure 11 Health screen record form for immunotherapy administration page 2. *Source:* From AAAAI website.

questionnaire and the systemic reaction reporting forms (developed by the AAAAI's Immunotherapy and Anaphylaxis Committee).

IMMUNOTHERAPY INSTRUCTION AND CONSENT FORMS

Instruction Forms

There are two types of instruction forms pertinent to immunotherapy treatment. One form is designed to instruct physicians and other health care professionals from offices outside the prescribing allergist's office if the patient transfers their immunotherapy treatment. The other is directed at the patient or patient's guardian. If a patient's immunotherapy treatment is transferred from one physician to another, there is an added risk for a systemic reaction

Immunotherapy Pre-Injection Questionnaire

Patient Name: _____ Date: _____

This questionnaire is designed to optimize safety precautions already in place for your allergen immunotherapy injection (s) (allergy shot). Please review and answer the following questions. The nursing staff will review your responses and notify your physician if they have any questions or concerns about whether you should receive your injection(s) today. **If you are pregnant or have been diagnosed with a new medical condition, please notify the staff.** (Please circle the appropriate answer.)

1. Have you had increased asthma symptoms (chest tightness, increased cough, wheezing, or shortness of breath) in the past week? **Yes** **No**

2. Have you had increased allergy symptoms (itching eyes or nose, sneezing, runny nose, post-nasal drip, or throat-clearing) in the past week? **Yes** **No**

3. Have you had a cold, respiratory tract infection, or flu-like symptoms in the past two weeks? **Yes** **No**

4. Did you have any problems such as increased allergy or asthma symptoms, hives, or generalized itching within 12 hours of receiving your last injection or swelling that persisted into the next day? **Yes** **No**

5. Are you on any new medications? Any new eyedrops? Please specify. _____

Staff intervention/office visit:

Staff Signature: _____

Figure 12 Preimmunotherapy health screen form. *Source:* From AAAAI website.

because of the multiple variables that may change with the transfer of care. Changes in the allergen extract components, such as the extract manufacturer, may be one of the reasons for the added risk following transfer of immunotherapy treatment. Additional risk may come from staff unfamiliar with the prescribing allergist's immunotherapy schedule, allergy immunotherapy vial color-coding and nomenclature system. Therefore, it is important that immunotherapy transfer forms provide clear, specific instructions, and information. When such documentation is provided and there is no change in the allergy vaccine components or immunotherapy schedule, the risk of a systemic reaction from transferring care is minimized.

It is important to provide patients with information about immunotherapy prior to starting treatment. Compliance with immunotherapy treatment is historically poor (19), which should improve by enhancing a patient's understanding of the immunotherapy process. A study of patients receiving AIT ($N = 134$ patients: mean age 30 ± 13 with male to female ratio of 1:2 and mean duration of immunotherapy 30 ± 60 months) demonstrates that a substantial number of patients have poor knowledge, many misconceptions and unfounded expectations

Allergen Immunotherapy Systemic Reaction/Anaphylaxis Treatment Record

Name: _____ Date: _____

Date of Birth: _____ Prescribing Physician: _____

Allergens: Tree-Grass-Weed-Mites-Cockroach-Animal Dander-Mold-Hymenoptera

Prior systemic rxn: _____ Hx of asthma? _____

Date/time of injection: _____ Date/time of rxn: _____

Dilution (Vial #): _____ New? Yes No

History of the systemic reaction (SR):

Immediate measures:

___ Assess airway, breathing, circulation, and orientation

___ Epinephrine IM into thigh

___ Activate EMS (call 911 or local rescue squad) Y/N Time called: _____ AM/PM

___ Management algorithm reviewed (as needed)

Signs and Symptoms

Respiratory:	Skin:	Eye/Nasal:	Vascular:	Other:
Shortness of Breath	Hives	Runny Nose	Hypotension	Difficulty Swallowing
Wheezing	Angioedema	Red Eyes	Chest Discomfort	Abdominal pain, nausea, diarrhea
Cough	Generalized Itch	Congestion	Dizziness	Diaphoresis
Stridor	Flushing	Sneezing	Headache	

Time	Resp. rate/ PEFR	Pulse/ O2 Saturation	BP	Intervention, Medications, Exam Comments

Time of discharge from the office: _____ Condition upon release: _____

Patient instructions: _____

Follow-up call to patient: _____

Time _____

Comments: _____

Clinical impression: True SR Questionable SR No SR

Systemic reaction severity classification: EAACI _____ Portnoy _____

Dosage adjustment? _____

Signatures _____ RN _____ MD/DO _____

Figure 13 Systemic reaction reporting sheet. *Source:* From AAAAI website.

of various important aspects of immunotherapy (20). Immunotherapy patients should be familiar with the potential risks involved and the time commitment necessary to receive such therapy. They should also have an understanding of the time necessary before they will begin to improve. Consent and Instructions Forms for Allergy Skin testing and Immunotherapy (Figs. 14–20).

Immunotherapy Instruction Forms for Physicians Supervising Immunotherapy Prescribed by Another Physician

Instruction forms (Figs. 14, 16, and 20) for patients transferring from one physician to another should provide the following:

1. Detailed documentation of the patient's previous immunotherapy treatment, which should include specific information about the components of the AIT

<Insert Date>

<NAME AND ADDRESS OF SUPERVISING PHYSICIAN>

Re: Patient Allergen Immunotherapy

Dear Supervising Physician:

We understand that (Patient) will receive his allergen immunotherapy injections in your office/clinic. Allergen Immunotherapy has demonstrated in controlled studies to be effective in the treatment of allergic rhinitis, asthma and hymenoptera hypersensitivity. But the treatment is not without risk. We have explained the risk and benefits of immunotherapy to (Patient) prior to obtaining (his/her) consent to begin this treatment. (Patient) has requested that immunotherapy treatment be administered in your office because of (reason e. g. convenience of location). Serious adverse reactions to immunotherapy are rare but do occur. There are some safety measures you should implement to ensure this treatment is administered under the safest circumstances. The following are some of the identified risk factors for adverse reactions to allergen immunotherapy.

Risk Factors for immunotherapy¹

Some of the primary common risk factors in administering immunotherapy treatments are as follows:

1. Error in dosage
2. Presence of symptomatic asthma
3. High degree of hypersensitivity
4. Use of beta-blockers
5. Injections from new vials
6. Injections made during periods of exacerbation of symptoms

Minimizing Risk with Immunotherapy²

The following is an excerpt of a Position Statement on the administration of immunotherapy outside of the prescribing allergist's office. A copy of the full Position Statement is enclosed herewith for your information. Please review this and the accompanying documentation before administering immunotherapy to (Patient):

"It has been recommended that allergen immunotherapy should be given in settings where emergency resuscitative equipment and trained personnel are immediately available to treat systemic reactions under the supervision of a physician or licensed physician extender. The trained personnel should be familiar with the following procedures:

- Adjustment of dose of allergen immunotherapy extract to minimize reactions.
- Recognition and treatment of local and systemic reactions to immunotherapy injections.
- Basic cardiopulmonary resuscitation.
- Ongoing patient education in recognition and treatment of local and systemic reactions that occur outside the physician's office."

Recommended emergency resuscitative equipment

- Stethoscope and sphygmomanometer.
- Tourniquet, syringes, hypodermic needles (14-gauge) and large bore needles.
- Aqueous epinephrine HCL 1:1000.
- Equipment to administer oxygen by mask.
- Intravenous fluid set-up.
- Antihistamine.
- Corticosteroids for intravenous injection.
- Vasopressor
- Oral airway.
- Equipment to maintain an airway appropriate for the supervising physician expertise and skill.

"and trained personnel are immediately available to treat systemic reactions under the supervision of a physician or licensed physician extender. The trained personnel should be familiar with the following procedures:"

Figure 14 A letter to physician who will be supervising immunotherapy outside of the prescribing allergist's office. *Source:* From AAAAI and modified with permission by Richard Lockey, MD.

Please execute and date a duplicate copy of this letter and return it to our office to confirm that your office will be administering (Patient's) immunotherapy under your supervision.

We appreciate your assistance and cooperation in this matter and look forward to receiving the request confirmation from you in the near future.

Sincerely,

[PRESCRIBING PHYSICIAN SIGNATURE]

I have reviewed the allergen immunotherapy information and instructions set forth herein and enclosed herewith and I hereby give permission for (Patient) to receive (his/her) allergy immunotherapy injections in my office under my supervision. I further agree to administer same in accordance with the information and instructions set forth herein or enclosed herewith.

Name and Address of physician:

Physician's signature: _____ Date: _____

Patient's signature: _____ Date: _____

1. Bousquet J., Lockey R., Malling H.J. WHO Position Paper Allergen immunotherapy: therapeutic vaccines for allergic diseases *Allergy Eur. J of Allergy Clin Immunol* 1998; Number 44 Volume 53

2. Position Statement on: Administration of immunotherapy outside of the prescribing allergist facility *Drug and Anaphylaxis Committee of ACAAI. Ann Allergy Asthma and Immunol* 1998;81: 101-102.

The readers can obtain copies of this position statement through the American College of Allergy, Asthma and Immunology website www.ACAAI.org
Modified with permission of Dr. Richard Lockey, M.D.

Figure 14 (Continued)

- extract, details of any adverse reaction to immunotherapy, schedule, and allergy skin test results
2. Specific instructions for administering immunotherapy and treatment of immunotherapy large local and systemic reactions
3. Guidelines for dosage adjustments for unexpected interruptions in immunotherapy injections and systemic reactions (see Figure 20 for an example of a dose reduction schedule for interruptions in treatment).

Patient Skin Test and Immunotherapy Instruction and Consent Forms (Figs. 15,17-19)

Instructions for patients beginning immunotherapy should provide the following information:

1. Description of what immunotherapy treatment involves and what alternative treatments are available
2. Potential benefits to be expected from the treatment and the expected timing of these benefits
3. Potential risk of immunotherapy, including the remote possibility of death
4. Costs associated with immunotherapy and who pays these costs
5. The anticipated duration of treatment

<Insert date>

Re: Receiving allergy injections outside prescribing allergist's office

Dear: <patient name>

We understand that you will receive your allergy injections at another health care facility outside of this office. For your continued safety and well-being, we want to make sure that you are fully aware of several important issues about allergy shots. To do so, I have enclosed a copy of the American College of Allergy Asthma and Immunology's position statement on this issue for your information.

Allergy injections, when appropriately administered, effectively alleviate symptoms caused by allergic diseases, such as hay fever, eye symptoms, allergic asthma, and insect allergy. However, as is true with any form of treatment, there are potential side effects. By injecting allergic patients with the very things to which they are allergic, it is possible to cause an allergic reaction. Some of the symptoms of such a reaction can include shortness of breath, hives, drop in blood pressure, and even loss of consciousness. Very rarely, these reactions can be life-threatening and result in death.

If you experience any increased allergy symptoms, difficulty breathing, light-headedness or any unusual symptoms after receiving your allergy injection please report them to the physician or staff immediately.

It is for these reasons that patients are not permitted to receive their allergy injections at home. Also; the physician supervising your allergy injections should be prepared to treat an adverse reaction and have available various medications and equipment. (please see the enclosed American College of Allergy, Asthma and Immunology's Position Statement).

It is also important that you remain in the office where you receive your injection for 30 minutes following your injection and that a physician be present during that time adjustments in your dosage sometimes are necessary when you have worsening of your nasal symptoms or asthma from a cold or allergen exposure. Similarly, dosage adjustments are sometimes necessary if you have large bumps at your injection site or have hay fever symptoms, asthma, or other symptoms following your injection. The nurse or physician monitoring your injections will ask questions regarding your health status prior to administering your injection. Please inform him/her if you are having increased allergy or asthma symptoms, new medications or other change in your health status or problems with your previous injection. The instructions accompanying your allergen immunotherapy vials contain information about adjusting your dose if there has been a gap in your treatment or if you encounter difficulties with large local reactions.

Together, we can control your allergic problems. Help us help you by receiving your shots on a regular basis. Please feel free to call on us if you have any questions about your injections or injection schedule. We look forward to seeing you at your next office visit.

Sincerely,

<Prescribing allergist>

Figure 15 A letter to a patient who will receive immunotherapy in an outside office. *Source:* From AAAAI website and modified with permission by Richard Lockey, MD.

6. Any specific office policies regarding immunotherapy, such as deferment of immunotherapy injections with acute illness

Examples of consent and instruction forms, allergy skin test forms, AIT, and administration forms can be downloaded from www.aaaai.org Members Only section.

ALLERGY INJECTIONS ADMINISTERED AT AN OUTSIDE MEDICAL FACILITY

Please complete the following if the allergen vaccine will be administered at an outside medical facility.

I have read (if new patient) or re-read (if established patient) all the information about allergy injections, and I agree that I will not attempt to administer my vaccines to myself nor will I permit anyone who is not a licensed physician or under the supervision of a licensed physician to administer these vaccines.

Patient (or parent/guardian if minor) _____ Date: _____

Witness _____

FACILITY WHERE IMMUNOTHERAPY INJECTIONS WILL BE ADMINISTERED:

Figure 16 Consent form for patient to sign if receiving immunotherapy outside of the prescribing allergist's office.
Source: From AAAAI website and modified with permission by Richard Lockey, MD.

**SALIENT POINTS FOR INSTRUCTIONS AND CONSENT FORMS
FOR ALLERGEN IMMUNOTHERAPY (AIT)**

- AIT administration forms should include patient information, allergen vaccine information, and administration information.
- Patient information on AIT forms should include patient name and sufficient of the following data to allow identification of patient. These data may include date of birth, telephone number, record number, or patient photograph.
- Allergen vaccine information on AIT form should convey the contents of the maintenance vaccine with sources of components, the expiration date, and the dilution from maintenance in volume per volume of each vial. The dilutions may be designated with numbers (e.g., 1:1 v/v, 1:10 v/v), letters (e.g., A, B) or color (e.g., red, yellow). A combination of two is desirable.
- Administration information on AIT form should include date, dose, arm in which dose administered, side effects, current health status, and initials of the professional administering the dose. Additional information desirable in select cases includes blood pressure, peak flow and premedication. Subsequent doses and dosing interval should also be clearly displayed.
- Forms for administration of AIT by another, nonprescribing physician should include vaccine contents, schedule and dose of AIT, history of significant prior reactions, and guidelines for change following local or systemic reactions or following interruptions in treatment schedule. Contact information for the prescribing physician should also be clearly displayed. Recommendations for required observation time after treatment and equipment and medication recommended on site should be considered.
- Patient instruction forms for AIT should include a simple description of treatment, treatment options other than AIT, potential benefits and risks, required waiting time after injections, estimated cost, estimated duration of treatment and specific office/clinic policies related to deferment of treatment for illness.

<Practice letterhead>

Patient Instruction/Consent Sheet for Allergy Skin Testing

Skin Test: Skin tests are methods of testing for allergic antibodies. A test consists of introducing small amounts of the suspected substance, or allergen, into the skin and noting the development of a positive reaction (which consists of a wheal, swelling, or flare in the surrounding area of redness). The results are read at 15 to 20 minutes after the application of the allergen. The skin test methods are:

Prick Method: The skin is pricked with a needle where a drop of allergen has already been placed.

Intradermal Method: This method consists of injecting small amounts of an allergen into the superficial layers of the skin.

Interpreting the clinical significance of skin tests requires skillful correlation of the test results with the patient's clinical history. Positive tests indicate the presence of allergic antibodies and are not necessarily correlated with clinical symptoms.

You will be tested to important (location) airborne allergens and possibly some foods. These include, trees, grasses, weeds, molds, dust mites, and animal danders and, possibly some foods. The skin testing generally takes 45 minutes. Prick (also known as percutaneous) tests are usually performed on your back but may also be performed on your arms. Intradermal skin tests may be performed if the prick skin tests are negative and are performed on your arms. If you have a specific allergic sensitivity to one of the allergens, a red, raised, itchy hive (caused by histamine release into the skin) will appear on your skin within 15 to 20 minutes. These positive reactions will gradually disappear over a period of 30 to 60 minutes, and, typically, no treatment is necessary for this itchiness. Occasionally local swelling at a test site will begin 4 to 8 hours after the skin tests are applied, particularly at sites of intradermal testing. These reactions are not serious and will disappear over the next week or so. They should be measured and reported to your physician at your next visit. You may be scheduled for skin testing to antibiotics, caines, venoms, or other biological agents. The same guidelines apply.

DO NOT

1. No prescription or over the counter antihistamines should be used 4 to 5 days prior to scheduled skin testing. These include cold tablets, sinus tablets, hay fever medications, or oral treatments for itchy skin. Over the counter allergy medications, such as Actifed, Dimetapp, Benedryl, and many others. If you have any questions whether or not you are using an antihistamine, please ask the nurse or the doctor. Some allergy eye medications have antihistaminic activity and will need to be discontinued prior to testing. Patients on new prescription antihistamines such as Claritin, Clarinex, Alavert, Allegra, and Zyrtec should be off these medications for at least 5 days prior to testing. In some instances a longer period of time off these medications may be necessary.
2. Medications such as over the counter sleeping medications (e.g. Tylenol PM) and other prescribed drugs, such as amitriptyline hydrochloride (Elavil), hydroxyzine (Atarax), doxepin (Sinequan), and imipramine (Tofranil) have antihistaminic activity and should be discontinued at least 2 weeks prior to receiving skin test after consultation with your physician. Please make the doctor or nurse aware of the fact that you are taking these medications so that you may be advised as to how long prior to testing you should stop taking them.

Figure 17 Allergy skin test consent form. *Source:* From AAAAI website and modified with permission by Richard Lockey, MD. (continued on next page.)

YOU MAY

1. You may continue to use your intranasal allergy sprays such as Flonase Rhinocort, Nasonex, Nasacort and Nasarel. Afrin and Sudafed may be used temporarily but not the day of testing.
2. Asthma inhalers (inhaled steroids and bronchodilators), leukotriene antagonist s (e.g. Singulair, Accolate) and oral theophylline (Theo-Dur, T-Phyl, Uniphyll, Theo-24, etc.) do not interfere with skin testing and should be used as prescribed.
3. Most drugs do not interfere with skin testing but make certain that your physician and nurse know about every drug you are taking (bring a list if necessary)..

Skin testing will be administered at this medical facility with a medical physician or other health care professional present since occasional reactions may require immediate therapy. These reactions may consist of any or all of the following symptoms: itchy eyes, nose, or throat; nasal congestion; runny nose; tightness in the throat or chest; increased wheezing; lightheadedness; faintness; nausea and vomiting; hives; generalized itching; and shock, the latter under extreme circumstances. Please let the physician and nurse know if you are pregnant or taking beta-blockers. Allergy skin testing may be postponed until after the pregnancy in the unlikely event of a reactions to the allergy testing and beta-blockers are medications they may make the treatment of a reaction to skin testing more difficult.

Please note that these reactions rarely occur but in the event a reaction would occur, the staff is fully trained and emergency equipment is available.

After skin testing, you will consult with your physician or other health care professional who will make further recommendations regarding your treatment

We request that you do not bring small children with you when you are scheduled for skin testing unless they are accompanied by another adult who can sit with them in the reception room.

Please do not cancel your appointment since the time set aside for your skin test is exclusively yours for which special allergens are prepared. If for any reason you need to change your skin test appointment, please give us at least 48 hours notice, due to the length of time scheduled for skin testing, a last minute change results in a loss of valuable time that another patient might have utilized.

I have read the patient information sheet on allergy skin testing and understand it. The opportunity has been provided for me to ask questions regarding the potential side effects of allergy skin testing and these questions have been answered to my satisfaction. I understand that every precaution consistent with the best medical practice will be carried out to protect me against such reactions.

Patient _____ Date signed _____

Parent or legal guardian* _____ Date signed _____

*as parent or legal guardian, I understand that I must accompany my child throughout the entire procedure and visit.

Witness _____ Date signed _____

Figure 17 (Continued)

BACKGROUND INFORMATION ABOUT IMMUNOTHERAPY

(ALLERGY SHOTS) FOR PATIENTS

Allergy shots

Allergen immunotherapy injections or "allergy shots" are prescribed for patients with allergic rhinitis (hay fever), allergic asthma or life threatening reactions to insect stings. Immunotherapy is the only medical treatment that could potentially modify allergic disease. Some studies have shown that it may have a preventive role in allergic children, possibly preventing asthma from developing in some patients with allergic rhinitis. Immunotherapy would be considered for individuals, who have moderate or severe symptoms not adequately controlled by environmental control measures and/or medications.

Effectiveness

Allergen immunotherapy (allergy shots) may "turn down" allergic reactions to common allergens including pollens, molds, animal dander and dust mites. In most cases, the initial 6 to 12 month course of allergy shots is likely to gradually decrease sensitivity to airborne allergens and continuation of injections leads to further improvement. The injections do not cure patients but diminish sensitivities, resulting in fewer symptoms and use of fewer medications. It is important to maintain shots at the proper time interval; missing your shots for a short time may be acceptable but an appropriate adjustment in the dose of vaccine may be necessary for long lapses in injections. Please see us if you miss receiving your injections for longer than what is recommended for your current vial.

How long are shots given?

There are generally two phases to immunotherapy: a build-up phase and a maintenance phase

- **Build-up phase:** involves receiving injections with increasing amounts of the allergens. The frequency of injections during this phase generally ranges from 1 to 2 times a week, though more rapid build-up schedules are sometimes used. The duration of this phase depends on the frequency of the injections but generally ranges from 3 to 6 months (at a frequency of 2 times and 1 time a week, respectively).
- **Maintenance phase:** This phase begins when the effective therapeutic dose is reached. The effective therapeutic dose is based on recommendations from a national collaborative committee called the **Joint Task Force for Practice Parameters: Allergen Immunotherapy: A Practice Parameter** and was determined after review of a number of published studies on immunotherapy. The effective maintenance dose may be individualized for a particular person based on their degree of sensitivity (how 'allergic they are' to the allergens in their vaccine) and their response to the immunotherapy build-up phase. Once the target maintenance dose is reached, the intervals between the allergy injections can be increased. The intervals between maintenance immunotherapy injections generally ranges from every 2 to every 4 weeks but should be individualized to provide the best combination of effectiveness and safety for each person. Shorter intervals between allergy injections may lead to fewer reactions and greater benefit in some people and some individuals may tolerate intervals longer than four weeks between injections.

Reactions to allergy injections

It is possible to have an allergic reaction to the allergy injection itself. Reactions can be local (swelling at the injection site) or systemic (affecting the rest of the body). Systemic reactions include hay fever type symptoms, hives, flushing, lightheadedness, and/or asthma, and rarely, life threatening reactions. Some conditions can make allergic reactions to the injections more likely: heavy natural exposure to pollen during a pollen season and exercise after an injection. Serious systemic reactions can occur in patients with asthma that has worsened and is not well controlled on recommended medications. Therefore, if you have noted worsening of your asthma symptoms, notify your nurse or physician before receiving your scheduled injections! Reactions to injections can occur, however, even in the absence of these conditions.

Please inform the nursing staff if you have been diagnosed with a new medical condition or prescribed any new medications since your last visit. If any symptoms occur immediately or within hours of your injection, please inform the nurse before you receive your next injection.

Figure 18 (Continued)

ALLERGEN IMMUNOTHERAPY PATIENT CONSENT FORM

Immunotherapy, hyposensitization, or allergy injections should be administered at a medical facility with a medical physician present since occasional reactions may require immediate therapy. These reactions may consist of any or all the following symptoms: itchy eyes, nose, or throat; nasal congestion; runny nose; tightness in the throat or chest; coughing; increased wheezing; lightheadedness; faintness; nausea and vomiting; hives; generalized itching; and shock, the last under extreme conditions. Reactions, even though unusual, can be serious and rarely, fatal. You are required to wait in the medical facility in which you receive the injections for 30 minutes after each injection. If the patient is 17 years of age or younger, a parent or legal guardian must be present during the waiting period. I verify that I (or patient) am not taking beta blocker medications or that if I am, I have discussed the risks/benefits of doing so with my physician (see information sheet).

I have read (if new patient) or re-read (if established patient) the patient information sheet on immunotherapy and understand it. The opportunity has been provided for me to ask questions regarding the potential side effects of immunotherapy and these questions have been answered to my satisfaction. I understand that every precaution consistent with the best medical practice will be carried out to protect me against such reactions. I also agree that if I have an allergic reaction to the injections that the physician-in-charge has permission to treat said reaction.

I acknowledge the fact with my signature that I am authorizing the office to bill for allergen vaccines, even if, for any reason, I decide not to initiate the allergen immunotherapy program after the vaccine has been made. Vaccines may be prepared up to 1½ weeks prior to my appointment. I agree to obtain prior authorization, if needed, from my insurance plan.

PATIENT _____ DATE _____

PARENT or LEGAL GUARDIAN _____ DATE _____

As parent or legal guardian, I understand that I must accompany my child throughout the entire 30-minute wait.

WITNESS _____ DATE _____

Figure 19 Patient Immunotherapy consent form. Source: From AAAAI and modified with permission by Richard Lockey, MD.

Immunotherapy Administration instructions

NAME _____ DATE _____

- 1) Use a 1 ml disposable syringe, graduated to 0.01 cc and a 26 to 27 gauge, ½-inch needle.
- 2) Carefully withdraw the proper amount from the appropriate vial.
- 3) Check to make sure that it is the correct patient, dilution dose and that the patient did not have any problems with the previous injection.
- 4) Allergy vaccines should be refrigerated. Avoid vaccine exposure to sunlight, extreme heat or freezing. Do not administer expired vaccines
- 5) Cleanse the skin area with an alcohol swab before injecting.
- 6) Give the injection **subcutaneously** in the posterior aspect of the middle third of the arm.
 - a. Gently draw back the plunger before injecting and if blood appears, withdraw the needle and select a new site.
 - b. Slowly inject the vaccine, withdraw the needle, and apply pressure over the injection site to prevent bleeding.
 - c. Do not massage the area.
 - d. Either arm may be used or the arms may be alternated.
- 7) **30 minute wait:** Each patient is required to wait 30 minutes in a medical facility after receiving allergy infection treatment so that he or she can be checked for local and systemic reactions.

Note: Do not give allergy injection unless a appropriate medical supervision is present during the 30 minute waiting period.

Management of local reactions: recent literature suggests that individual local reactions do not predict systemic reaction.^{1,2} However, one study found that the rate of large local reactions, defined as ≥ 25 mm was almost 4 times higher (35.2% vs 8.9% of all visits and 19.5% vs 5.3% of all injections; $P < .001$ for each) among patients who subsequently experienced a systemic reaction compared with those who had never experienced a systemic reaction.³ For patient comfort dosage adjustments should be considered if large local reactions develop.

Guidelines for administration of allergy injection based on reaction size.

- Negative: Swelling (as in a welt NOT the redness) < 15 mm (dime size) - progress according to schedule.
- Swelling 15-20 mm (dime to nickel size) - repeat same dosage.
- Swelling 20-25 mm (quarter size) - return to the last dosage, which caused no reaction.
- Swelling persisting more than 12 hours or over 25 mm (quarter size or larger) - decrease dosage by 50%*

*If reduced dose is tolerated, increase dose by 0.05 to 0.1 cc weekly and resume schedule. If local reaction occurs again, patient should be seen in our office with dosage sheet.

Example of Immunotherapy Dose Adjustments for Unscheduled Gaps in Allergen Immunotherapy Injection Intervals

There have been no studies that have investigated the effect of dosage modification for gaps in immunotherapy injection intervals. Below is a suggested approach to modification of doses of allergen immunotherapy because of gaps between treatment during the build-up and maintenance phase

Build-up phase for weekly or biweekly injections (time intervals from missed injection)

- Up to 7 days, continue as scheduled (i.e. if on weekly build-up then it would be up to 14 days after administered injection or 7 days after the missed scheduled injection):
- 8 to 13 days after missed scheduled injection; repeat previous dose.
- 14 to 21 days after missed scheduled injection; reduce dose 25%
- 21 to 28 days after missed scheduled injection; reduce previous dose 50%

Then increase dose each injection visit as directed on the immunotherapy schedule until therapeutic maintenance dose is reached.

Figure 20 Guidelines for administration of immunotherapy. *Source:* From AAAAI and modified with permission by Richard Lockey, MD. (continued on next page.)

Maintenance phase (time intervals from missed injection)

- Up to 10 days, repeat last dose.
- 11 to 20 days, reduce dose by 25%. *
- 21 to 28 days, reduce dose by 50%. *
- Over 28 days, contact physician for orders.

Increase dose by 0.05 cc one injection per week (each vial, if more than one vial) until maintenance is reached, and then resume maintenance schedule.

Systemic reactions: Systemic reactions resulting from injections can occur in the course of treating allergic patients. Most reactions occur within 30 minutes after an injection. Symptoms may include itching of the palms of the hands or other parts of the body, sneezing, coughing, hives (welts), swelling of the lips or other areas, and shortness of breath. At the first sign of any systemic reaction **epinephrine 1:1000 w/v should be administered intramuscularly** (about 0.3 cc in adults and 0.15 ml in a child over 30 kg and 12 years and 0.01 mg/kg in children under 30 kg). With severe reactions, acute asthma or a drop in blood pressure (anaphylaxis) may occur. Fatalities can occur with allergy injections. Epinephrine should be repeated if improvement does not occur within minutes, almost immediately. A venous tourniquet applied above the injection site may decrease absorption of the allergen. Any hypotension or loss of consciousness should be treated first with epinephrine, followed by rapid intravenous infusion of normal saline solution. Epinephrine, 1:10,000 w/v, can be given, as needed, intravenously, with severe anaphylaxis. Oxygen by mask or cannula should be administered if respiratory or circulatory compromise occurs. Antihistamines, glucocorticosteroids, vasopressors, and other medications may be necessary for a severe reaction after treatment with epinephrine. After a systemic reaction additional allergy injections should not be given. The patient must return to our office with all records for re-evaluation before injections are resumed.

First sign of systemic reaction: Epinephrine 1:1000 w/v (1 mg/ml): intramuscularly

Adults: 0.3 ml epinephrine 1:1000 w/v IM

Children: < 30 kg give: 0.01 mg/kg 1:1000 w/v IM

: >30 kg and 12 yrs give: 0.15 ml 1:1000 w/v IM

Note: If patient has a history of previous systemic reactions or severe asthma from injection therapy, discuss with the attending physician if any additional reduction is necessary.

If you have any questions, please call our office at: prescribing allergists/immunologist's office number _____

Additional considerations:

- **Refrigeration:** If vaccine is exposed to extreme heat or cold or if serum becomes cloudy, do not administer and notify the office.
- **Expiration date:** Allergen vaccines have an expiration date and should be replaced after this date.
- **Beta-blockers:** Oral and eye drop beta-blockers used concomitantly with allergen immunotherapy are a potential problem because the medications can worsen anaphylaxis by limiting the effectiveness of epinephrine.
 - **Advise the physician if patient is taking any of these or other beta blockers:**
 - Blocadren, Brevibloc, Corgard, Inderal, Inderal-LA, Lopressor, Normozide, Sactal Tenoretz, Tenormin Viskin, Normodyne, Tenoretic, Ziac, Corzide, Timolide, Sactal Tenormin Viskin, and Inderide.
- **Pregnant:** If the patient becomes pregnant, do not administer any further injections. Have her schedule an appointment with our office and bring vials and all dosage sheets for this visit.
- **Wheezing:** do not give allergy shots if the patient is having asthma symptoms.
- **Exercise:** no exercise for at least 2 hours after receiving injection.

Figure 20 (Continued)

- **Wheezing:** Do not give allergy shots if patient is having any asthma symptoms.
- **Asthmatic patients:** Peak flow measurements or another form of breathing test should ideally be done prior to all injections. If the peak flow measurement is **less than 70%** of the patient's baseline, the allergy injection should **not be given until the patient is further evaluated by physician.**
- **Exercise:** No exercise for at least **2 hours** after receiving injection.

Always send the dosage sheet(s) and remaining vials with the patient when he or she is returning to the office for new vials and/or dosage adjustments.

1. Tankersley MS, Butler KK, Butler WK, Goetz DW. Local reactions during allergen immunotherapy do not require dose adjustment. *J Allergy Clin Immunol* 2000;106:840-3.
2. Kelso JM. The rate of systemic reactions to immunotherapy injections is the same whether or not the dose is reduced after a local reaction. *Ann Allergy Asthma Immunol* 2004;92:225-7.
3. Roy SR, Sigmon JR, Olivier J, Moffitt JE, Brown DA, Marshall GD. Increased frequency of large local reactions among systemic reactors during subcutaneous allergen immunotherapy. *Ann Allergy Asthma Immunol* 2007;99:82-6.

Figure 20 (Continued)

REFERENCES

1. American Academy of Allergy Asthma. American Academy of Allergy, Asthma and Immunology's Immunotherapy Committee's Guidelines for Reporting Immediate Allergy Skin Test Results. Academy News 1999.
2. Cox L, Li J, Nelson H, Lockey R. Allergen immunotherapy: a practice parameter second update. *J Allergy Clin Immunol* 2007; 116:120:525-585.
3. Simons EF. *Ancestors of Allergy*. New York: New York Global Medical Communications Ltd, 1994.
4. Carr WW, Martin B, Howard RS, et al. Comparison of test devices for skin prick testing. *J Allergy Clin Immunol* 2005; 116:341-346.
5. Nelson HS, Lahr J, Buchmeier A, McCormick D. Evaluation of devices for skin prick testing. *J Allergy Clin Immunol* 1998; 101:153-156.
6. Nelson HS, Oppenheimer J, Buchmeier A, et al. An assessment of the role of intradermal skin testing in the diagnosis of clinically relevant allergy to timothy grass. *J Allergy Clin Immunol* 1996; 97:1193-1201.
7. Nelson HS, Rosloniec DM, McCall LI, et al. Comparative performance of five commercial prick skin test devices. *J Allergy Clin Immunol* 1993; 92:750-756.
8. King MJ, Lockey RF. Allergen prick-puncture skin testing in the elderly. *Drugs Aging* 2003; 20:1011-1017.
9. Ownby DR. Computerized measurement of allergen-induced skin reactions. *J Allergy Clin Immunol* 1982; 69:536-538.
10. Bousquet J, Lockey R, Malling HJ. Allergen immunotherapy: therapeutic vaccines for allergic diseases. A WHO position paper. *J Allergy Clin Immunol* 1998; 102:558-562.
11. Des Roches A, Paradis L, Knani J, et al. Immunotherapy with a standardized Dermatophagoides pteronyssinus extract. V. Duration of the efficacy of immunotherapy after its cessation. *Allergy* 1996; 51:430-433.
12. Oppenheimer J, Nelson HS. Skin testing: a survey of allergists. *Ann Allergy Asthma Immunol* 2006; 96:19-23.
13. Bernstein IL, Li JT, Bernstein DI, et al. Allergy diagnostic testing: an updated practice parameter. *Ann Allergy Asthma Immunol* 2008; 100:S1-148.
14. American Academy of Allergy, Asthma and Immunology. American College of Allergy, Asthma and Immunology. Allergen immunotherapy: a practice parameter. *Ann Allergy Asthma Immunol* 2003; 90:1-40.
15. Bernstein DI, Wanner M, Borish L, et al. Twelve-year survey of fatal reactions to allergen injections and skin testing: 1990-2001. *J Allergy Clin Immunol* 2004; 113:1129-1136.
16. Lockey RF, Benedict LM, Turkeltaub PC, et al. Fatalities from immunotherapy (IT) and skin testing (ST). *J Allergy Clin Immunol*, 1987:660-677.
17. Amin HS, Liss GM, Bernstein DI. Evaluation of near-fatal reactions to allergen immunotherapy injections. *J Allergy Clin Immunol* 2006; 117:169-175.
18. Ohasi Y, Nakai Y, Murata K. Effect of pretreatment with fexofenadine on the safety of immunotherapy in patients with allergic rhinitis. *Ann Allergy Asthma Immunol* 2006; 96:600-605.
19. Cohn JR, Pizzi A. Determinants of patient compliance with allergen immunotherapy. *J Allergy Clin Immunol* 1993; 91:734-737.
20. Sade K, Berkun Y, Dolev Z, et al. Knowledge and expectations of patients receiving aeroallergen immunotherapy. *Ann Allergy Asthma Immunol* 2003; 91:444-448.