Best Evidence Statement (BESt)

Date: April 8, 2013

Title: Allergy Testing and Immunotherapy Administration

Clinical Question:

P	*(Population/Problem)*	Among outpatient health care providers administering allergy testing and immunotherapy* in an outpatient setting
I	*(Intervention)*	does storage of extracts* or technique of administration
C	*(Comparison)*	
O	*(Outcome)*	affect extract strength and testing accuracy?

*Definitions for terms marked with * may be found in the Supporting Information section.*

Target Population for the Recommendation:

Inclusion: Outpatient health care providers handling immunotherapy vials and administering allergy testing.

Exclusion: Outpatient health care providers whose practice is related to allergy treatment and testing, food challenges, intradermal testing, and treatment and testing other than allergy.

Recommendations:

1) It is recommended that allergen extracts and immunotherapy vials remain at a temperature of 4 degrees Celsius when not in use, to maintain potency (Moore, Tucker, Grier & Quinn, 2010[4a]; Nelson, Ikle, & Buchmeier, 1996a[4a]; Grier, Hazelhurst, Duncan, & Esch, 2001[5a]).

2) It is recommended that health care providers use a standard skin prick testing technique (e.g. placement, distance, timing) to increase testing accuracy (Nelson, Knoetzer & Bucher, 1996b[4a]; Seibert, King, Kline, Mende, & Craig 2011 [4a]; American Academy of Allergy, Asthma and Immunology(AAAAI), 2008 [5a]; AAAAI, 1995 [5a]; Bousquet et al., 2011 [5a]; Nelson, 2001 [5a]; Nolte, Kowal, & DuBuske, 2012 [5a]; Oppenheimer & Nelson, 2006 [5a]; Dolen, 2001 [5b]).

   Note: Areas for standardized placement include the volar area of the forearm or back at least 2 centimeters apart with results read 15 to 20 minutes post-placement (AAAAI, 2008 [5a]; AAAAI, 1995 [5a]; Bousquet et al., 2011 [5a]; Dolen, 2001 [5b]; Nelson, 2001 [5a]; Nelson et al., 1996b [4a]; Nolte et al., 2012 [5a]; Oppenheimer & Nelson, 2006 [5a]; Seibert et al., 2011 [4a]).

Discussion/Synthesis of Evidence related to the recommendations:

The grade of the body of evidence to answer the question was low. The evidence and expert opinions were consistent. Three articles related to extract storage found that degradation of the extract can occur when exposed to temperatures higher than 4^{o} Celsius (Moore et al., 2010 [4a]; Nelson et al., 1996a [4a]; Grier et al., 2001[5a]). Moore et al. (2010[4a]) conducted a bench study with one extract at varied dilutions and concluded that although the potency decreased after higher temperature exposure, the potency levels were still within the Food and Drug Administration limits defined for testing.

Grier et al. (2001 [5a]) and Nelson et al. (1996a [4a]) found that extract potency varies from extract to extract some remained stable with temperature increases or decreases while others decreased significantly. Additionally, Nelson et al. (1996a [4a]) determined that, over time, extracts that had been diluted or mixed with other extracts had varying stability. To optimize safe patient care and practices, a standardized process helps ensure a reliable and valid result (Institute for Health care improvement (IHI), 2005 [5a]. A standard approach includes a written description of the safest, most efficient, and effective way to perform a specific task based on a checklist or procedure (IHI, 2005 [5a]).

References:

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Oppenheimer, J., & Nelson, H. S. (2006). Skin testing. *Annals of Allergy, Asthma, & Immunology, 96*(2) (Sup 1), S6-S12. doi: 10.1016/S1081-1206(10)60895-2 [5a]Seibert, S. M., King, T. S., Kline, D., Mende, C., & Craig, T. (2011). Reliability of skin test results when read at different time points. *Allergy & Asthma Proceedings, 32*(3): 203-205. doi: 10.2500/aap.2011.32.3436 [4a]

IMPLEMENTATION

Applicability Issues:

The following may need to be in place for successful implementation of these recommendations:

- a standardized evidence-based process
- staff educated to best practice
- proficiency testing, as appropriate
- refrigeration with continuous temperature monitoring, within close proximity to the care area
- information regarding proper refrigeration during transport by patients to their primary care physician

Relevant CCHMC Tools for Implementation:

Policies, Procedures, Knowing Notes, or Health Topics
Maintaining Allergy Prick Wells for Skin Testing in Allergy Clinic in the OPD Base, Neighborhood Locations and Liberty Clinics, Policy 204
Allergy Injections, Policy PR-03
Allergy Testing for Children – CCHMC Health Topic

Outcome or Process Measures:

Ongoing temperature log monitoring
Observation of daily work pertaining to allergy skin prick testing

SUPPORTING INFORMATION

Background/Purpose of BESt Development:

It was noted that refrigeration and skin prick testing practices vary across allergy clinic sites therefore the literature was searched to determine best practice related to extract storage, mixing, and testing.

Definitions:

SPT: Skin prick testing
Immunotherapy: allergy shots for desensitization
Extracts: allergens used in testing

Search Strategy:

Databases: PubMed: Medline, Ovid: CINAHL and Cochrane Library, MD Consult, Mosby's, Up to Date, Google Scholar
Websites: AAAAI, ACAAI, JCAAI, Greer Laboratories, Hollister-Stier Laboratories
Search Terms: Allergy, skin testing, extract storage, testing protocols, testing, well maintenance, well storage; reliable, allergy testing, skin prick testing techniques; valid allergy testing, variables in allergy testing; prick testing, prick testing protocol, prick testing techniques; SPT in allergy, protocol, techniques
Limit, Filters, Search Dates: English language 1990 to present,
Last Date Searched: November 2012

Relevant CCHMC Evidence-Based Documents: None were found

Group/Team Members:

Team Leader/Author: Gina Geigle, BSN, RN, CPN, Neighborhood Locations Allergy Clinic Staff
Team Members: Chris Steinmetz, RN, Allergy Case Manager and Holly Kuhl, RN, Outpatient Department Allergy staff nurse
Support/Consultant: Patti Besuner, RN, MN, CPNP, Evidence-Based Practice Mentor
Ad Hoc/Content Reviewer: H. Kalra, MD, Allergy Specialist

Conflicts of Interest were declared for each team member:

- ☒ No financial or intellectual conflicts of interest were found.
- ☒ No external funding was received for development of this BESt.
- ☐ The following conflicts of interest were disclosed:

Note: Full tables of the LEGEND evidence evaluation system are available in separate documents:

- Table of Evidence Levels of Individual Studies by Domain, Study Design, & Quality *(abbreviated table below)*
- Grading a Body of Evidence to Answer a Clinical Question
- Judging the Strength of a Recommendation *(dimensions table below)*

Table of Evidence Levels *(see note above)*:

Quality level	*Definition*
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

†a = good quality study; b = lesser quality study

Table of Language and Definitions for Recommendation Strength *(see note above)*:

Language for Strength	*Definition*
It is strongly recommended that… It is strongly recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is high support that benefits clearly outweigh risks and burdens. *(or visa-versa for negative recommendations)*
It is recommended that… It is recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is moderate support that benefits are closely balanced with risks and burdens.
There is insufficient evidence and a lack of consensus to make a recommendation…	

Given the dimensions below and that more answers to the left of the scales indicate support for a stronger recommendation, the recommendation statement above reflects the strength of the recommendation as judged by the development group.
(Note that for negative recommendations, the left/right logic may be reversed for one or more dimensions.)

Rationale for judgment and selection of each dimension:

1. Grade of the Body of Evidence	☐ High	☐ Moderate	☒ Low
Rationale: While the grade of the body of evidence is low it is clinically significant in that recommended similar processes for allergy testing. Bousquet et al. (2012[5a]), Nolte et al. (2012[5a], Nelson 2001[5a]), Dolen (2001[5b]) and Nelson et al. (1996b[4a]).			
2. Safety/Harm (Side Effects and Risks)	☒ Minimal	☐ Moderate	☐ Serious
Rationale: Standardized practice would optimize safe patient care and produce reliable and valid testing results. (Institute for Health care improvement (IHI), 2005 [5a]). Skin prick testing is said to be diagnostically reliable if performed properly by trained professionals (AAAAI, 2008[5a]; AAAAI, 1995[5a]; Nolte, Kowal and DuBuske (2012)[5a]; Oppenheimer and Nelson, 2006[5a]). Nolte et al. (2012[5a]) and Oppenheimer and Nelson (2006[5a]) both supported use of a protocol for clinician proficiency testing.			
3. Health benefit to patient	☐ Significant	☒ Moderate	☐ Minimal
Rationale: Proper testing techniques and quality/potency of the extracts produce more reliable results and can decrease the incidence of false positives/negatives(Nolte et al. ,2012[4a]).			
4. Burden on outpatient health care provider to adhere to recommendation	☐ Low	☒ Unable to determine	☐ High
Rationale: Proficiency Protocol recommended by two articles would involve increased training time for the clinicians (Nolte et al., 2012[5a]; Oppenheimer and Nelson, 2006 [5a]).			
5. Cost-effectiveness to healthcare system	☐ Cost-effective	☒ Inconclusive	☐ Not cost-effective
Rationale: Nolte, Kowal and DuBuske (2012 [5a]) found skin prick testing to be as cost-effective diagnostic procedure for allergy testing.			
6. Directness of the evidence for this target population	☒ Directly relates	☐ Some concern of directness	☐ Indirectly relates
Rationale:			
7. Impact on morbidity/mortality or quality of life	☐ High	☒ Medium	☐ Low
Rationale: Anecdotally from within the clinic setting skin prick testing can be emotionally upsetting and stressful to some patients. Re-application of testing due to error or decrease potency of extract due to storage can cause unnecessary stress on the patient [5].			

Copies of this Best Evidence Statement (BESt) and related tools (if applicable, e.g., screening tools, algorithms, etc.) are available online and may be distributed by any organization for the global purpose of improving child health outcomes. Website address: http://www.cincinnatichildrens.org/service/j/anderson-center/evidence-based-care/bests/
Examples of approved uses of the BESt include the following:

- Copies may be provided to anyone involved in the organization's process for developing and implementing evidence based care;
- Hyperlinks to the CCHMC website may be placed on the organization's website;
- The BESt may be adopted or adapted for use within the organization, provided that CCHMC receives appropriate attribution on all written or electronic documents; and
- Copies may be provided to patients and the clinicians who manage their care.

Notification of CCHMC at **EBDMinfo@cchmc.org** for any BESt adopted, adapted, implemented, or hyperlinked by the organization is appreciated.

Please cite as: Geigle, G., Cincinnati Children's Hospital Medical Center: Best Evidence Statement Allergy Testing and Immunotherapy Administration, http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm, BESt 163, pages 1-5, 4/8/13.

This Best Evidence Statement has been reviewed against quality criteria by two independent reviewers from the CCHMC Evidence Collaboration. Conflict of interest declaration forms are filed with the CCHMC EBDM group.

Once the BESt has been in place for five years, the development team reconvenes to explore the continued validity of the guideline. This phase can be initiated at any point that evidence indicates a critical change is needed. CCHMC EBDM staff perform a quarterly search for new evidence in an horizon scanning process. If new evidence arises related to this BESt, authors are contacted to evaluate and revise, if necessary.

For more information about CCHMC Best Evidence Statements and the development process, contact the Evidence Collaboration at EBDMinfo@cchmc.org.

Note:
This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.