

Validation of a Population Based Brief Allergy Symptom Questionnaire

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ABSTRACT

Rationale: The purpose of this study was to assess the validity of a population based allergy symptom questionnaire to identify and recruit 800 atopic families. **Methods:** Based on birth records, families in the greater Cincinnati area were asked to participate in a study of newborns and allergies. To be eligible, a parent must be positive to 1 of 18 aeroallergens on skin prick testing (SPT). Each family received mailed information about the study stating that someone would be contacting the family by either phone or home visit. A parent was asked 13 allergy and asthma symptom questions adapted from the ISAAC and Glostrup allergy study. If a parent had a positive response to at least one question, the parent was asked to attend one of four study clinics for SPT.

Results: Thus far, at least one parent in 900 families interviewed by telephone (n=453), in-person (n=206) or mail (n=241) reported one or more allergy related symptoms. A larger percentage of those interviewed by phone, 53%, compared to in-person, 38%, and to mail, 40%, presented to clinic for SPT. Of these, 316 had a positive SPT with an overall positive predictive value (PPV) for the questionnaire of 76%. The PPV for those administered by phone was 75%, by in-person interview, it was 77%, and by mail, it was 76%. Thus far, we have analyzed the individual questions for the 417 parents receiving a skin prick test. Our findings demonstrate that the questions with the highest sensitivity, in regard to positive SPT, was "itchy or stuffy nose or sneezing" (88%), "runny nose" (85%), and "itchy watery eyes" (73%). The three questions with the overall highest PPV was shortness of breath near animals (90.2%), itchy or stuffy nose or sneezing when near animals (89.2%) and diagnosed for eczema (87.5%).

Conclusions: We have developed an efficient, brief and easily administered allergy symptom questionnaire that has a very high PPV in regard to subsequent positive SPT.

* Note: Individual questions analyzed for 417 parents (393 families).

PURPOSE

> Determine if there is a difference by method, telephone, in-person or mail in identifying atopic individuals.

> Determine the positive predictive value of specific symptoms and a positive SPT for pollen, dust, mold and animal.

> Determine the overall sensitivity and positive predictive value of a brief symptom survey in predicting adults with a positive SPT.

DATA COLLECTION

> Birth certificates used to identify parents of newborns.

> Parents screened for allergy symptoms by phone, in-person, or mail.

> Parent with symptom(s) received a skin prick test (SPT) for *

- ◆ Cat & Dog
- ◆ Dust Mite (*Dermatophagoides farinae*, *Dermatophagoides pteronyssinus*)
- ◆ German Cockroach (*Blattella germanica*)
- ◆ Mold (*Alternaria*, *Aspergillus*, *Penicillium* and *Cladosporium*)
- ◆ Pollen (*Fescue*, *Timothy*, *Willow*, *Box Elder*, *Elm*, *Ragweed*, *Cocklebur*, *Sagebrush*, and *Sorrel*)

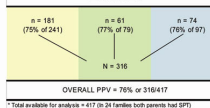
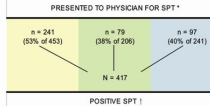
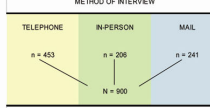
* (Bifurcated: Accu-set™ made by ALK-Abelló™)

> Comparison made of symptoms and SPT

METHODS

Recruitment Stages by Method of Family Interview

METHOD OF INTERVIEW



SYMPTOM QUESTIONNAIRE

Symptom Questionnaire

Do you or the baby's other biological parent have problems with any of the following:

1. Itchy/watery eyes? (Itchy eyes)
2. Itchy ears (inside of the ears)? (Itchy ears)
3. Problems with sneezing, or a runny, or stuffy nose without a cold or flu during the spring or fall? (Runny nose)
4. An itchy or stuffy nose or sneezing during the summer months? (Stuffy nose summer)
5. An itchy or stuffy nose or sneezing when near grass, trees or flowers? (Stuffy nose grass)
6. An itchy or stuffy nose or sneezing when near animals? (Stuffy nose animal)
7. Shortness of breath when near grass, trees or flowers? (Shortness breath grass)
8. Shortness of breath when near animals? (Shortness breath animal)
9. Shortness of breath when cleaning rooms, making beds, or when in bed? (Shortness breath cleaning)
10. Shortness of breath when hurrying on level ground or walking up slight hills? (Shortness breath hurrying)
11. Ever been diagnosed with eczema? (Eczema)
12. Ever been diagnosed with asthma? (Asthma)
13. Ever been diagnosed with reactive airways? (Asthma)

Baby's Mom **Baby's Dad**
 Yes No Yes No

DEFINITIONS

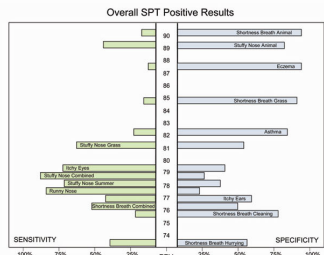
Sensitivity: Proportion of subjects who reported presence of a symptom of those that tested positive to an allergen.

Specificity: Proportion of subjects who reported absence of a symptom of those that tested negative to an allergen.

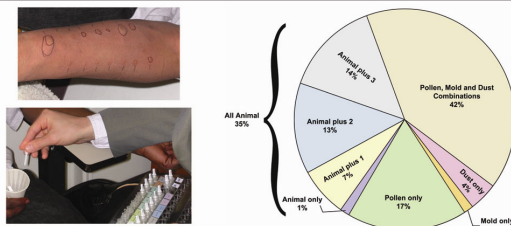
	Disease	No Disease	
Positive Symptom	True Positive (TP)	False Positive (FP)	Sensitivity = TP / (TP + FN)
Negative Symptom	False Negative (FN)	True Negative (TN)	Specificity = TN / (TN + FP)
			Positive Predictive Value = TP / (TP + FP)

PPV: Proportion of subjects who reported the presence of a symptom who tested positive to an allergen.

PPV, SENSITIVITY AND SPECIFICITY

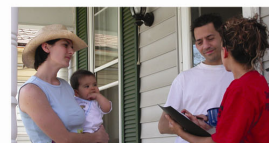


POSITIVE SPT BY ALLERGEN



DEMOGRAPHICS AND THREE MOST SIGNIFICANT SYMPTOMS

Demographics of Interviewed or Skin Prick Tested	
Percent of Mothers Interviewed	90.4
Percent of Mothers Skin Prick Tested	80.8
Percent Caucasian	75.3
Mean Age in Years (Range)	30.9 (19-50)



Three TOP Symptoms with highest PPV By Test

SPT Positive	Symptom	PPV
One or more	Shortness of Breath – Animal	90.2
	Stuffy Nose – Animal	89.2
	Eczema	87.5
Pollen	Shortness of Breath – Animal	81.3
	Stuffy Nose – Animal	78.7
	Stuffy Nose – Animal	76.0
Animal	Shortness of Breath – Animal	67.2
	Stuffy Nose – Animal	46.8
	Eczema	37.5
Mold	Stuffy Nose – Animal	54.4
	Eczema	52.1
	Shortness of Breath – Animal	50.8
Dust	Eczema	56.3
	Shortness of Breath – Animal	52.5
	Stuffy Nose – Animal	52.5

CONCLUSIONS

- > The 3 symptom questions most predictive of a positive SPT are:
 - ◆ Shortness of Breath – Animal
 - ◆ Stuffy Nose – Animal
 - ◆ Eczema

> Telephone, in-person and mailed surveys have an almost identical PPV in identifying adults who will have a positive SPT.

> Individuals interviewed by phone had a significantly higher follow-up for SPT.

