Formulating hypotheses and implementing research in allergic disorders in rural Crete, Greece

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Clinic of Social and Family Medicine, School of Medicine, University of Crete, Greece
The outline of the presentation

- Implementing primary care research in a country with low capacity
- Bronchial asthma and allergic rhinitis, two common problems in primary care.
- A focus on symptoms
- The Cretan story
- Important European resources for general practitioners/family physicians
- Key messages
Implementing research in a non-privileged country: the case of Greece

- Develop an EPR system
- Explore opportunities to work together with an academic department
- Start with assessment of population health needs
- Identify common ill conditions and health problems
- Ask about the existence of common diagnostic tools—if not discuss possibility of translating and adapting into local and cultural setting other well assessed in the literature
- Identify the burden of common illness and measure diagnostic probabilities
- Discuss opportunities to publish your initial non experimental research

A ten steps stepwise model-C. Lionis 2007
Respiratory disorders, common in primary care

Mariolis, et al 2004
Research questions

● What is the prevalence of allergic rhinitis, asthma and dermatitis among grape farmers in Crete?
● Are grape farmers at increased risk of developing allergic disorders compared to non-exposed controls?
● Which are the risk factors for allergic disorders in this occupational group?
Mrs S.K. 30 years old, non-smoker, presented to his GP office with cough, rhinitis and wheezing. After the recession of the respiratory symptoms, the patient underwent a spirometry examination.

The results of the test were:
- FEV1: 2,20 L (77.1%)
- FEV1/FVC: 66,32%

The patient repeated the spirometry 20 minutes later after the bronchodilation. The results of the new test were:
- FEV1`: 2,51 L (87.5%)
- FEV1/FVC: 75,60%
Methods

Collaboration of the Clinic of Social and Family Medicine in the University Hospital of Heraklion, Crete with:

- the Department of Otolaryngology
- the Department of Dermatology
- the Department of Thoracic Medicine
Methods

- Questionnaire
- Skin prick tests (SPTs)
- Measurement of specific IgE antibodies (EIA tests)
- Spirometry
Population of the study

a. **Grape farmers**
   - 150 randomly selected grape farmers
   - Age: 25-70 years
   - Participation rate: 120/150 (80%)

b. **Controls**
   - 150 subjects working in the tourist industry
   - Age: 25-70 years
   - Response rate: 100/150 (67%)
Questionnaire

A. Medical history
- Personal and demographic information
- Respiratory and skin symptoms in the last 12 months
- Personal and family history of allergic diseases
- Smoking habits, alcohol consumption
- House environment information

B. Occupational history
- Number of working hours per day/ duration of grape cultivation
- Work-related respiratory and skin symptoms
- Use of pesticides
- Use of preventive measures
Skin prick tests (SPTs)

Allergens (16)

a. Pollens (Gramineae mix, Cynodon dactylon, Composite mix, Parietaria officinalis, Parietaria Jiudaica, Parietaria plus, Tree mix, Olive European)

b. Mites (Dermat. Farinae, Dermat. Pteronyssinus, Glycyp. Domesticus, Acarus siro)

c. Molds (Alternaria tenius, Cladosporium herbarum, Mucor mix)

d. Animal epithelium (Cat epithelium)

• Positive result: ≥ 3mm
EIA test

• The enzyme immunoassay method (EIA test) was used to quantify IgE antibodies
• Allergens (8)
  • A. Pollens: Grass mix, Parietaria officinalis, Olive European, Common ragweed
  • B. Mites: Dermatophagoides Farinae, Dermatophagoides pteronyssinus
  • C. Molds: Molds mix
  • D. Animal epithelium: Cat epithelium

• Positive result: \( \geq 0.35 \text{kU/L} \)
Diagnostic criteria of allergic rhinitis*

1. **According to the questionnaire:** 2 or more nasal symptoms (i.e., rhinorrhea, sneezing, nasal obstruction, and nasal itching) on most days in the last 12 months, apart from a cold.

2. **According to questionnaire and allergy tests:**
   Allergic rhinitis according to the questionnaire, followed by a positive SPT test result and/or a positive EIA test result.

*International Consensus Report on the diagnosis and management of rhinitis. Allergy, 1994*
Diagnostic criteria of asthma

1. **According to the questionnaire:**
   (i.e., attack of asthma during the last 12 months, having been woken up by an attack of shortness of breath during the last 12 months, or current use of asthma medication)

2. **According to questionnaire and spirometry tests:**
   Current asthma based on questionnaire, followed by a positive bronchodilatation test

Statistical analysis

A. Univariate analysis
Comparison of continuous variables: t test/Mann-Whitney test
Comparison of categorical variables: Pearson’s chi-square test

B. Multivariate analysis
Multiple logistic and linear regression models controlling for age, sex and smoking
## Demographic characteristics

<table>
<thead>
<tr>
<th></th>
<th>Grape farmers (n=120)</th>
<th>Controls (n=100)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>45.6 (12.1)</td>
<td>34.9 (7.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Men, n (%)</strong></td>
<td>43 (36)</td>
<td>29 (29)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Women, n (%)</strong></td>
<td>77 (64)</td>
<td>71 (71)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Current smokers, n (%)</strong></td>
<td>32 (27)</td>
<td>59 (59)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Ex smokers, n (%)</strong></td>
<td>16 (13)</td>
<td>9 (9)</td>
<td></td>
</tr>
<tr>
<td><strong>Non smokers, n (%)</strong></td>
<td>72 (60)</td>
<td>32 (32)</td>
<td></td>
</tr>
</tbody>
</table>
Working conditions in grape farmers

- **Years of farming**, Mean (SD) 25.0 (11.7)
- **Age at grape farming onset**, Mean (SD) 20.6 (7.7)
- **Working hours/24h**, Mean (SD) 6.9 (2.3)
- **Use of preventive measures**, n (%) 59 (49)
- **Use of pesticides**, n (%) 78 (65)
Prevalence of allergic rhinitis among grape farmers and controls

<table>
<thead>
<tr>
<th></th>
<th>Grape farmers</th>
<th>Controls</th>
<th>Adjusted OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic Rhinitis</td>
<td>55 (46)</td>
<td>27 (27)</td>
<td>2.3 (1.3-4.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Allergic Rhinitis</td>
<td>49 (41)</td>
<td>26 (26)</td>
<td>2.0 (1.1-3.5)</td>
<td>&lt;0.02</td>
</tr>
</tbody>
</table>

According to the questionnaire; #According to the questionnaire, followed by a positive SPT test result and/or a positive EIA test result.

adjusted OR= Odds ratio for grape farmers for age, sex, and smoking.

Study objective: To measure the prevalence of allergic rhinitis, atopy, and asthma among grape farmers, and to compare the respiratory and atopic status in grape farmers with those of nonexposed control subjects.

Design: Cross-sectional study.

Setting: Malvani region in northern Crete, Greece.

Subjects and methods: One hundred twenty grape farmers and 100 control subjects living in the Malvani region were examined. The protocol comprised a questionnaire, skin prick tests for 18 common allergens, measurement of specific IgE antibodies against 8 allergens, and spirometry before and after bronchodilatation.

Results: Grape farmers were found to have an excess of respiratory symptoms. The comparison with the control group, after adjusting for age, sex, and smoking status, showed that the differences were statistically significant for rhinorrhea (OR 2.7, 95% CI 1.3 to 5.5, p < 0.01), sneezing (OR 2.5, 95% CI 1.3 to 4.6, p < 0.01), and nasal itching (OR 1.9, 95% CI 1.0 to 3.5, p < 0.05), but were nonsignificant for asthma-related symptoms. In the multiple logistic regression model, grape farmers were found to have increased work-related exposure, such as sneezing (OR 2.0, 95% CI 1.5 to 2.6, p < 0.01), rhinorrhea (OR 2.5, 95% CI 1.3 to 6.1, p < 0.01), cough (OR 2.7, 95% CI 1.2 to 6.2, p < 0.01), and dyspnea (OR 3.8, 95% CI 1.1 to 1.2, p < 0.05). The prevalence of allergic rhinitis was 49.8% in grape farmers and 28% in control subjects (OR 2.0, 95% CI 1.1 to 3.5, p < 0.01). Increased but statistically nonsignificant values of asthma prevalence were found in grape farmers (6.7%) compared with the control group (2.0%). The prevalence of asthma was 56.2% in grape farmers and 35.6% in the control group (OR 2.2, 95% CI 1.2 to 3.8, p < 0.01). Mean FEV1 was significantly lower in grape farmers than in control subjects (p < 0.05), after adjusting for age, sex, and smoking status. Bronchodilator reversibility was observed in 23 grape farmers (19.2%) and in 19 control subjects (9.6%, p < 0.01).

Conclusions: The study mainly demonstrated the high prevalence of allergic rhinitis and work-related respiratory symptoms in grape farmers compared to control subjects. It also suggested that grape farming is possibly associated with increased allergic sensitization to specific pollen, low baseline FEV1, and increased bronchial hyperresponsiveness. Further studies are needed to determine the potential risk factors for these disorders among the farming population.
# Prevalence of asthma among grape farmers and controls

<table>
<thead>
<tr>
<th></th>
<th>Grape farmers</th>
<th>Controls</th>
<th>Adjusted OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current asthma</strong></td>
<td>11 (9)</td>
<td>4 (4)</td>
<td>2.7 (0.6-9.7)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Current asthma</strong></td>
<td>8 (7)</td>
<td>2 (2)</td>
<td>3.5 (0.7-17.0)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Asthma diagnosis</strong></td>
<td>8 (7)</td>
<td>6 (6)</td>
<td>1.0 (0.1-35.2)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Medication for asthma</strong></td>
<td>8 (7)</td>
<td>2 (2)</td>
<td>3.5 (0.7-17.0)</td>
<td>NS</td>
</tr>
</tbody>
</table>

*C According to the questionnaire;

# According to the questionnaire, followed by a positive bronchodilator response

Adjusted OR= Odds ratio for grape farmers / controls after adjustment for age, sex, and smoking

Chatzi et al, Chest; 2005
## Prevalence of work-related respiratory symptoms among grape farmers and controls

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Grape farmers n (%)</th>
<th>Controls n (%)</th>
<th>Adjusted OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhinorrea</td>
<td>27 (23)</td>
<td>9 (9)</td>
<td>2.9 (1.3-6.6)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Sneezing</td>
<td>27 (23)</td>
<td>9 (9)</td>
<td>2.9 (1.3-6.6)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Dyspea</td>
<td>13 (11)</td>
<td>4 (4)</td>
<td>3.8 (1.1-1.3)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Wheezing</td>
<td>6 (5)</td>
<td>1 (1)</td>
<td>1.0 (0.7-3.3)</td>
<td>NS</td>
</tr>
<tr>
<td>Cough</td>
<td>16 (13)</td>
<td>4 (4)</td>
<td>3.7 (1.2-11.4)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Adjusted OR= Odds ratio for grape farmers / controls after adjustment for age, sex, and smoking

Chatzi et al, Chest; 2005
<table>
<thead>
<tr>
<th></th>
<th>Grape farmers n (%)</th>
<th>Controls n (%)</th>
<th>Adjusted OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥1 + SPT</td>
<td>61 (51)</td>
<td>32 (32)</td>
<td>2.2 (1.3-3.8)</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>+ SPT pollens</td>
<td>54 (45)</td>
<td>26 (26)</td>
<td>2.3 (1.3-4.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>+ SPT mites</td>
<td>19 (16)</td>
<td>16 (16)</td>
<td>1.6 (0.3-1.5)</td>
<td>NS</td>
</tr>
<tr>
<td>+ SPT molds</td>
<td>7 (6)</td>
<td>3 (3)</td>
<td>2.2 (0.5-8.7)</td>
<td>NS</td>
</tr>
<tr>
<td>+ SPT cat epithel</td>
<td>3 (2)</td>
<td>1 (1)</td>
<td>2.8 (0.3-27.9)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Adjusted OR= Odds ratio for grape farmers /controls after adjustment for age, sex, and smoking status

Chatzi et al, Chest; 2005
## Prevalence of positive allergic tests in grape farmers and controls (II)

<table>
<thead>
<tr>
<th></th>
<th>Grape farmers n (%)</th>
<th>Controls n (%)</th>
<th>Adjusted OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atopy</td>
<td>77 (64)</td>
<td>38 (38)</td>
<td>2.2 (1.2-3.5)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>+ EIA pollens</td>
<td>33 (28)</td>
<td>24 (24)</td>
<td>1.6 (0.8-3.2)</td>
<td>NS</td>
</tr>
<tr>
<td>+ EIA mites</td>
<td>25 (21)</td>
<td>14 (14)</td>
<td>1.4 (0.6-3.1)</td>
<td>NS</td>
</tr>
<tr>
<td>+ EIA molds</td>
<td>8 (7)</td>
<td>4 (4)</td>
<td>1.4 (0.3-5.6)</td>
<td>NS</td>
</tr>
<tr>
<td>+ EIA cat epithel</td>
<td>7 (6)</td>
<td>2 (2)</td>
<td>3.0 (0.6-15.0)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Atopy = ≥ 1 +SPT and/or 1 + EIA test
Adjusted OR= Odds ratio for grape farmers /controls after adjustment for age, sex, and smoking status
## Lung function measurements in grape farmers and controls*

<table>
<thead>
<tr>
<th></th>
<th>Grape farmers Mean (SD)</th>
<th>Controls Mean (SD)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC (% of pred)</td>
<td>106.3 (21.9)</td>
<td>113.6 (14.5)</td>
<td>0.17</td>
</tr>
<tr>
<td>FEV₁ (% of pred)</td>
<td>100.9 (24.2)</td>
<td>112.6 (14.4)</td>
<td>0.03</td>
</tr>
<tr>
<td>FEV₁/FVC (% of pred)</td>
<td>99.5 (10.7)</td>
<td>104.1 (7.8)</td>
<td>0.08</td>
</tr>
<tr>
<td>FEV₁′ (% of pred)</td>
<td>107.3 (24.9)</td>
<td>115.6 (14.6)</td>
<td>0.10</td>
</tr>
</tbody>
</table>

FEV₁′ = FEV₁ after bronchodilatation
*p values adjusted for age, sex, and smoking

Chatzi et al, Chest; 2005
## Association of all use of pesticides

### Objective:
To explore the association of allergic rhinitis with the use of pesticides among grape farmers in Crete.

### Methods:
A cross-sectional study of 120 grape farmers and 100 controls in the Malvesi region in Northern Crete was conducted. The protocol consisted of a questionnaire, skin prick tests for 16 common allergens, measurement of specific IgE antibodies against 16 allergens, and spirometry before and after bronchodilatation.

### Results:
Grape farmers who used pesticides had higher prevalence rates of allergic rhinitis symptoms (OR, 3.0; 95% CI, 1.4 to 6.2) compared with grape farmers who reported no current use of pesticides, and control subjects. Logistic regression models controlling for age, sex, and smoking status showed that 6 of the 12 predefined groups of major pesticides were significantly related to allergic rhinitis symptoms. The highest risks were observed for paraquat and other Inorganic herbicides (OR, 2.5; 95% CI, 1.0 to 4.9). Dithiocarbamate fungicides (OR, 2.5; 95% CI, 1.1 to 5.9) and carbamate insecticides (OR, 3.0; 95% CI, 1.4 to 6.2). A factor analysis of pesticides used identified 3 distinct factors. The most common factor was that of multiple pesticide use that included 9 pesticides and was significantly associated with allergic rhinitis (OR, 1.5; 95% CI, 1.0 to 2.3). ORs were higher when allergic rhinitis was defined using both questionnaire data on symptoms and atopy.

### Conclusions:
Occupational exposure to multiple agricultural chemicals could be related to allergic rhinitis in grape farmers.

### Pesticides and OR (95% CI)

<table>
<thead>
<tr>
<th>Pesticides</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbicides n = 72</td>
<td>2.7 (1.4)</td>
</tr>
<tr>
<td>Bipyridyl n = 50</td>
<td>2.2 (1.3)</td>
</tr>
<tr>
<td>Glyphosate n = 67</td>
<td>2.3 (1.4)</td>
</tr>
<tr>
<td>Triazine n = 7</td>
<td>3.8 (0.5)</td>
</tr>
<tr>
<td>Fungicides n = 72</td>
<td>2.8 (1.3)</td>
</tr>
<tr>
<td>Dithiocarbamate n = 63</td>
<td>2.5 (1.3)</td>
</tr>
<tr>
<td>Thiophthalimide n = 46</td>
<td>2.2 (1.0 to 0.4)</td>
</tr>
<tr>
<td>Pyrimidine n = 57</td>
<td>1.8 (0.6 to 2.6)</td>
</tr>
<tr>
<td>Triazole n = 70</td>
<td>2.2 (1.1 to 4.6)</td>
</tr>
<tr>
<td>Inorganic n = 74</td>
<td>1.5 (0.7 to 3.4)</td>
</tr>
<tr>
<td>Insecticides n = 78</td>
<td>1.8 (0.8 to 4.2)</td>
</tr>
<tr>
<td>Carbamate n = 75</td>
<td>3.0 (1.4 to 6.5)</td>
</tr>
<tr>
<td>Organophosphate n = 37</td>
<td>1.4 (0.6 to 3.2)</td>
</tr>
<tr>
<td>Organochlorine n = 5</td>
<td>1.2 (0.2 to 7.8)</td>
</tr>
<tr>
<td>Bioinsecticides (Bacillus thuringiensis) n = 12</td>
<td>1.9 (0.5 to 7.0)</td>
</tr>
</tbody>
</table>

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**Chatzi et al, Occup Environ Med; 2007**
### Prevalence of skin symp skin symptoms among grape farmers and controls.

<table>
<thead>
<tr>
<th>Skin Symptom</th>
<th>Grape Farmers</th>
<th>Controls</th>
<th>Adjusted OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itchy rash</td>
<td>45 (38)</td>
<td>15 (15)</td>
<td>2.24 (1.11-4.44)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Itchy rash with vesicles</td>
<td>16 (13)</td>
<td>2 (2)</td>
<td>7.77 (1.77-33.6)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>W-R itchy rash</td>
<td>19 (16)</td>
<td>2 (2)</td>
<td>4.42 (1.1-20.77)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>W-R itchy rash with vesicles</td>
<td>7 (6)</td>
<td>1 (1)</td>
<td>2.80 (0.3-3.3)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Adjusted OR= Odds ratio for grape farmers / controls after adjustment for age and sex.

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**Skin Symptoms and Work-Related Skin Symptoms Among Grape Farmers in Crete, Greece**

Leda Chatzi, MD, PhD; Athanasios Alegakis, MD; Sabine Krüger-Krasagakis, MD, PhD; and Christos Lionis, MD, PhD

**Background.** Grape farmers are exposed to a variety of agents capable of inducing occupational skin disease. We conducted a study to measure the prevalence of skin symptoms and work-related skin symptoms among grape farmers in the Malvitsi region of Crete and to provide data on associated risk factors.

**Methods.** One hundred twenty grape farmers and 100 controls participated in the study. The protocol consisted of a questionnaire, skin prick tests for 16 common allergens, and measurement of specific-IgE antibodies against 8 allergens.

**Results.** Self-reported itchy rash (OR, 2.31; 95% CI, 1.10-4.84, P < 0.05) within the last 12 months, and work-related itchy rash (OR, 4.06; 95% CI, 1.01-16.35, P < 0.05) were significantly higher in grape farmers than in controls, after adjusting for age and sex. Sensitization to pollen (OR, 4.30; 95% CI, 1.41-12.92, P < 0.01) and allergic rhinitis (OR, 3.06; 95% CI, 1.21-8.28, P < 0.05) were found to be significantly associated with self-reported itchy rash in the grape farmers group.

**Conclusions.** Grape farmers reported skin symptoms more frequently than non-exposed controls, and IgE-mediated sensitization to pollen was found to be significantly associated with the reported symptoms. Further studies are needed to evaluate the impact of specific occupational agents on skin diseases among grape farmers. Am J Ind Med. 40:71–84, 2004. © 2005 Wiley-Liss, Inc.

**KEY WORDS:** grape farmers; skin symptoms; work-related skin symptoms; pollen; sensitization

Chatzi et al, Am J Ind Med; 2006
Proportion of positive SPT/EIA tests among grape farmers with itchy rash and w-r itchy rash

<table>
<thead>
<tr>
<th>Pollens</th>
<th>Mites</th>
<th>Molds</th>
<th>Cat epithelium</th>
</tr>
</thead>
<tbody>
<tr>
<td>78,9</td>
<td>33,3</td>
<td>6,7</td>
<td>11,1</td>
</tr>
<tr>
<td>77,8</td>
<td>36,8</td>
<td>10,5</td>
<td>10,5</td>
</tr>
</tbody>
</table>

Bar chart showing the proportion of positive SPT/EIA tests for different allergens:
- Pollens: 78,9%
- Mites: 33,3%
- Molds: 6,7%
- Cat epithelium: 11,1%
Risk factors for itchy rash among grape farmers

- Age: OR = 1.0 (0.9-1.0)
- Sex: OR = 2.0 (0.8-5.0)
- Pollens: OR = 3.7 (1.3-10.2)
- Pesticides: OR = 1.8 (0.6-5.2)
- Allergic rhinitis: OR = 3.0 (1.2-7.6)
Limitations of the study

- Cross-sectional study
- Small study population
- Selection bias-Healthy worker effect?
- Lack of skin examination
The Cretan Project-conclusions

Grape farming

↑ Allergic rhinitis

↑ Itchy rash

↑ Atopy

↑ Sensitization to pollens

Low FEV₁

Use of pesticides
Management of Asthma

Step 1: Intermittent asthma; symptoms ≤ once per week

When patients present with infrequent symptoms, prescribe rapid-acting beta-2 agonists. In patients over 60 years of age, anticholinergics can be considered as an alternative. Prescribe a rapid-acting beta-2 agonist for patients with exercise-induced asthma. Occasionally, patients with intermittent asthma develop severe exacerbations; these patients should be treated as if they had persistent asthma.

Step 2: Mild persistent asthma; symptoms > once per week

When patients present with more frequent symptoms, start with inhaled corticosteroids in a low dose: 200–400 mcg of beclomethasone or equivalent [23]***. If inhaled corticosteroids fail to improve asthma after a period of three months, ascertain the reason why. In patients believed to have good compliance, a satisfactory inhalation technique, and no identified trigger factors for their asthma, treatment should be extended to Step 3.

Step 3: Moderate persistent asthma

The Step 2 treatment goal has not been reached despite low dose of inhaled corticosteroids and appropriate compliance. The preferred treatment is regular treatment with a combination of inhaled glucocorticosteroid and a long-acting beta-2 agonist [24,25]***. Alternatives are combinations of inhaled corticosteroids with sustained release theophyllines or with leukotriene receptor antagonists [20]***.
Management of allergic rhinitis

Pharmacologic therapy

Depends on both the classification of severity and the individual patients’ symptoms

- Oral and local H1 antihistamines
- Intranasal glucocorticosteroids
- Systemic and intranasal glucocorticosteroids
- Chromones
- Decongestants
- Anticholinergics
- Antileukotrienes
- Allergen-specific immunotherapy
**Allergic Rhinitis**

The majority of studies compare intranasal corticosteroids over sedating or non-sedating antihistamines for relief of symptoms of nasal allergy. These results are true for seasonal and perennial allergic rhinitis.

**Antihistamines vs. Immunotherapy.** Direct comparisons between these two therapies with respect to efficacy are not likely to be done. Immunotherapy is generally considered to be a long-term disease-modifying treatment requiring months to years of treatment, and antihistamines are most often used for immediate symptom relief.

**Nasal Corticosteroids vs. Immunotherapy.** No randomized controlled trials were identified that directly compared immunotherapy with intranasal corticosteroids in treating seasonal or perennial allergic rhinitis.

**Sedating vs. Non-sedating Antihistamines.** Study results indicate no consistent benefit of sedating antihistamines over non-sedating antihistamines with respect to symptom alleviation in seasonal and perennial allergic rhinitis, but the side-effect profile is more favorable with non-sedating antihistamines.

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**Practice Guidelines**

**AHRQ Releases Review and Nonallergic Rhinitis**

Genevieve W. Ressel

An evidence report from the Agency for Healthcare Research and Quality (AHRQ) provides a review of the available literature on the various treatments for allergic and nonallergic rhinitis. The complete report, "Evidence Report/Technology Assessment No. 54--Management of Allergic and Nonallergic Rhinitis," is available at www.ahrq.gov. Printed copies may be obtained free of charge from the AHRQ Publications Clearinghouse (800-358-9295). For this report, the American Academy of Family Physicians served as the science partner, and the American College of Allergy, Asthma and Immunology and the American Academy of Allergy, Asthma and Immunology provided technical experts.
Key messages

- GPs are the front door physicians in the diagnosis and management of patients with bronchial asthma and allergic rhinitis.
- GPs are in the unique position to make research hypotheses relevant to disease’s occurrence and natural course.
- GPs seem capable in publishing their research results in well-known journals.
- Research in clinical entities, including bronchial asthma and allergic rhinitis, requires effective collaboration with hospital physicians.
Do not forget—Research in primary care needs a paper, a pencil (*John Fry*) and medical records.

Developing an Appropriate EPR System for the Greek Primary Care Setting

Dimitris K. Kounalakis, Christos Lionis, Iege Okkes, and H. Lamberts

The creation of an electronic patient record (EPR) system with a user-friendly interface based on the scope of the episode of care was considered an urgent priority in the present Greek context, where Health Care Reform programs is in progress. This paper reports the procedures of the shaping of an EPR project, and outlines some of the essentials and key issues. We performed a systematic review and analyzed the perceptions and patterns of use of existing EPR systems among Greek general practitioners. On the basis of this analysis, Tornado was selected using defined criteria for appropriateness, efficacy, and feasibility for general practice as a prototype, for creating a Windows-based EPR system using the International Classification of Primary Care (ICPC-2) and International Classification of Diseases (ICD-9) as terminologies. The new EPR system seems approaching feasible within the current Greek primary care setting. Further studies are required for an evaluation.

KEY WORDS: electronic patient records system; EPR; ICPC primary care.

BACKGROUND

Effectiveness and quality performance in primary care hold a central position in the recent direction of health promotion and health care. The Greek primary health care system, through the enhancement of primary care, has been recently approved.

In Crete, there is increasing interest in the implementation of research findings into daily practice and in assessing the performance of primary care physicians serving the island population, whereas a network between the medical faculty and university hospital and rural health systems has been developed over the past few years. The

Values of Social and Public Medicine, School of Medicine, University of Crete, RIO, Crete, Greece, July 1999.