

## ENGLISH VERSION: INTEGRATED CARE PATHWAYS FOR PREDICTIVE MEDICINE ACROSS THE LIFE CYCLE (ARIA – 2016 EXECUTIVE SUMMARY)\*

V. Barzylovich<sup>1\*</sup>, V. Chopiak<sup>2\*</sup>, I. Gogunskaya<sup>3\*</sup>, L. Iashyna<sup>4,6\*</sup>, I. Kaidashev<sup>5\*</sup>, T. Umanets<sup>1\*</sup>, D. Zabolotna<sup>3\*</sup>, S. Zaikov<sup>6\*</sup>, I. Agache<sup>7</sup>, C. Bacher<sup>8</sup>, A. Bedbrook<sup>9</sup>, G. Canonica<sup>10</sup>, T. Casale<sup>11</sup>, A. Cruz<sup>12</sup>, W. Fokkens<sup>13</sup>, P. Hellings<sup>14</sup>, B. Samolinski<sup>15</sup>, J. Bousquet<sup>16</sup>

\* – ARIA action group in Ukraine:

<sup>1</sup> Government Institution «Institute of Pediatrics, Obstetrics and Gynecology under NAMS of Ukraine».

<sup>2</sup> Department of Clinical Immunology and Allergology, Danylo Halytsky Lviv National Medical University, Ukraine.

<sup>3</sup> Center for Allergic Diseases of the Upper Respiratory Tract and Ear of the State Institution «O.S. Kolomyychenko Institute of Otolaryngology of National Academy of Medical Sciences of Ukraine».

<sup>4</sup> Department of Diagnostic, Therapy and Clinical Pharmacology of Lung Diseases, SO «National Institute of Phthysiology and Pulmonology named after F.G. Yanovsky NAMS of Ukraine».

<sup>5</sup> Department of Internal Medicine No.3 with Phthysiology, Ukrainian Medical Stomatological Academy, Poltava, Ukraine.

<sup>6</sup> Department of Phthysiology and Pulmonology of National Medical Academy of Postgraduate education named after P.L. Shupik, Ukraine.

ARIA coordinators in other member countries:

<sup>7</sup> Transylvania University of Brasov, Brasov, Romania.

<sup>8</sup> Upper Airways Research Laboratory, ENT Department, Ghent University Hospital, Ghent, Belgium.

<sup>9</sup> MACVIA-France, Contre les MALadies Chroniques pour un Vieillessement Actif en France, European Innovation Partnership on Active and Healthy Ageing Reference Site, Montpellier, France.

<sup>10</sup> Asthma and Allergy Clinic, Humanitas University, Rozzano, Milan, Italy.

<sup>11</sup> Division of Allergy/Immunology, University of South Florida, Tampa, FL USA.

<sup>12</sup> ProAR – Nucleo de Excelencia em Asma, Federal University of Bahia, Salvador, Brazil; GARD Executive Committee, Salvador, Bahia Brazil.

<sup>13</sup> Department of Otorhinolaryngology, Academic Medical Centre, Amsterdam, The Netherlands.

<sup>14</sup> Laboratory of Clinical Immunology, Department of Microbiology and Immunology, KU Leuven, Louvain, Belgium.

<sup>15</sup> Department of Prevention of Environmental Hazards and Allergology, Medical University of Warsaw, Warsaw, Poland.

<sup>16</sup> University Hospital, Montpellier, France.

*The Allergic Rhinitis and its Impact on Asthma (ARIA) initiative commenced during a World Health Organization (WHO) workshop in 1999. The initial goals were (i) to propose a new allergic rhinitis classification, (ii) to promote the concept of multi-morbidity in asthma and rhinitis and (iii) to develop guidelines with all stakeholders for global use in all countries and populations. ARIA – disseminated and implemented in over 70 countries globally – is now focusing on the implementation of emerging technologies for individualized and predictive medicine. MASK (MACVIA (Contre les MALadies Chroniques pour un Vieillessement Actif)-ARIA Sentinel Network) uses mobile technology to develop care pathways in order to enable the management of rhinitis and asthma by a multi-disciplinary group or by patients themselves. An App (Android and iOS) is available in 20 countries and 15 languages. It uses a visual analogue scale to assess symptom control and work productivity as well as a clinical decision support system. It is associated with an inter-operable tablet for physicians and other health care professionals. The scaling up strategy uses the recommendations of the European Innovation Partnership on Active and Healthy Ageing. The aim of the novel ARIA approach is to provide an active and healthy life to rhinitis sufferers, whatever their age, sex or socio-economic status, in order to reduce health and social inequalities incurred by the disease.*

**Key words:** ARIA, rhinitis, ICT, EIP on AHA, mobile technology, AIRWAYS ICPs

### Introduction

Patients, clinicians and other HCPs are confronted with various treatment choices for the management of AR. This contributes to considerable variation in clinical practice and patients are often unsatisfied by their treatment. The Allergic Rhinitis and its Impact on Asthma (ARIA) initiative commenced during a World Health Organization (WHO) workshop in 1999 (published in 2001). Its aim was to provide a guide for the diagnosis and management of allergic rhinitis and asthma multimorbidity [1, 2]. In 2008, ARIA was updated using the same recommendation system [1, 3]. In its 2010 Revision, ARIA was the first chronic respiratory disease guideline to adopt the GRADE (Grading of Recommendation, Assessment, Development and Evaluation) approach, an advanced evidence evaluation methodology [4, 5].

ARIA, disseminated and implemented in over 70 countries around the world [6], is now focusing on the implementation of emerging technologies for individualized and predictive medicine. MASK (MACVIA (Contre les MALadies Chroniques pour un Vieillessement Actif)-ARIA Sentinel Network) uses mobile technology to de-

velop care pathways in order to enable the management of rhinitis and asthma by a multi-disciplinary group or by patients themselves [7, 8].

The aim of the novel ARIA approach is to provide an active and healthy life to rhinitis sufferers across the life cycle, whatever their sex or socio-economic status, in order to reduce health and social inequities incurred by the disease.

#### 1. AIRWAYS ICPs: the ARIA 2016 political agenda

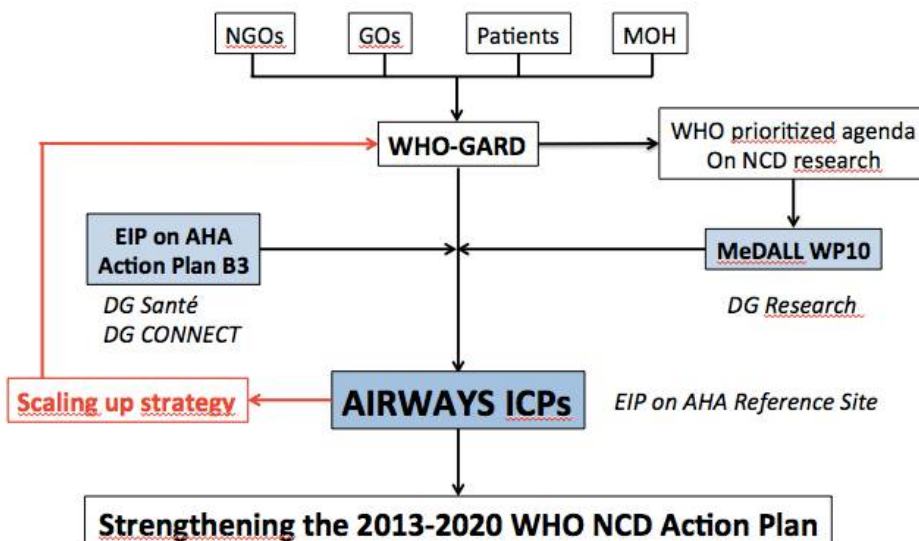
In 2012, the European Commission launched the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA; DG Santé and DG CONNECT). The aim was to enhance EU competitiveness and tackle societal challenges of ageing through research and innovation [9]. The B3 Action Plan is devoted to the scaling up and replication of successful innovative integrated care models for chronic diseases amongst older patients using Chronic Respiratory Diseases as the pilot project.

AIRWAYS ICPs (Integrated care pathways for airway diseases) is the implementation tool of the project. The major AIRWAYS-ICPs activity is the development of multi-sectoral care pathways (ICPs) for rhinitis, asthma and their multi-morbidities, implementing emerging tech-

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nologies for predictive medicine across the patient life cycle [7, 8, 10] in countries and regions. The aim is to reduce chronic respiratory disease burden, mortality and multi-morbidity, while maintaining patients' quality-of-life (QOL) [7, 11]). The Action Plan of AIRWAYS ICPs has

been implemented and scaled up globally [12]. Moreover, AIRWAYS ICPS is a WHO Global Alliance against Chronic Respiratory Diseases (GARD) demonstration project (Figure 1). ARIA 2016 is a major component of AIRWAYS ICPs [13].



NGO: nongovernmental organisation, GO: Governmental organisation, MOH: Ministry of Health

Figure 1: AIRWAYS ICPs interactions between the European Union and WHO (from Bousquet et al [11]).

**2. From guidelines to integrated care pathways: MACVIA-ARIA Sentinel network (MASK)**

**Need for multisectoral care pathways for rhinitis and asthma using ICT**

A large number of AR patients appear to be self-managing their condition. They consult infrequently with regards to their allergy prescription [14]. However, AR negatively impacts social life, school and work productivity [3]. Many AR patients use over the counter (OTC)

drugs [15-17] and only a fraction request medical consultation. The vast majority of patients who visit GPs or specialists have moderate/severe rhinitis [18-20]. A large number of OTC or prescribed drugs are available for the patient who can also choose alternative medicine or allergen specific immunotherapy [21]. Thus, ICPs should consider a multi-disciplinary approach including self-management as proposed by AIRWAYS ICPs (Figure 2).

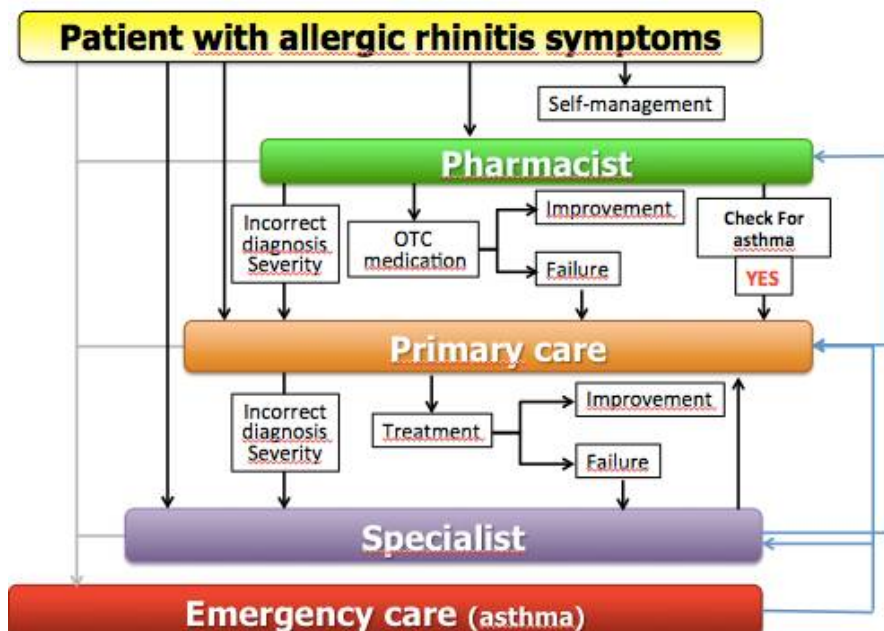


Figure 2: Multi-sectoral care pathway for allergic rhinitis (from Bousquet et al [25]).

ICPs are structured multi-disciplinary care plans detailing key steps of patient care. They promote the translation of guidelines into local protocols and their subsequent application to clinical practice. ICPs differ from

clinical practice guidelines as they are utilized by a multi-disciplinary team, and focus on the quality and coordination of care. ICPs need to have a mechanism for recording variations/deviations from planned care.

For the ARIA recommendations, the variations/deviations from planned care have been assessed. Disease severity is associated with several health outcomes, including quality of life [18-20]. The classification of rhinitis (intermittent/severe-persistent) is an important indicator of asthma multi-morbidity (in some but not all studies) [22], duration of AR treatment and efficacy of treatment in AR [23]. However, most patients receive combinations of oral antihistamines and intra-nasal corticosteroids (INS that are insufficiently evaluated in guidelines that use an appropriate methodology [24].

**Simple approach to assess control in allergic rhinitis**

In AR, the switch from symptom severity to disease control to guide treatment decisions has been led by ARIA and includes (I) a visual analogue scale (VAS) as a common validated language of AR control, (II) categorization of AR control using VAS score cut-offs, (III) incorporation of this VAS into simple interactive apps for both patients (*ARIA Allergy Diary*) and HCPs (*ARIA Allergy Diary Companion*) [8, 25, 26], (IV) the integration of all this knowledge into ICPs [25] and (V) the development of a clinical decision support system (CDSS).

AR symptoms vary daily and necessitate the step up/step down of individualized therapeutic regimens over time. Patients, caregivers or HCPs should use a common and simple AR symptom scoring system rapidly responsive to change. MACVIA-ARIA has produced a simple VAS-based algorithm, called the *ARIA CDSS*, which uses a VAS score to guide treatment decisions in a step-up/step-down approach [27].

**The MASK (MACVIA-ARIA Sentinel network) tools: the *ARIA Allergy Diary* and *ARIA Allergy Diary Companion* apps**

The *ARIA Allergy Diary* is freely available for patients in 15 EU countries, Australia, Brazil, Canada, Mexico and Switzerland and in 15 languages (translated and back-translated, culturally adapted and legally compliant). The companion App for HCPs is also freely available [26].

• **Questionnaires**

Upon registration, *ARIA Allergy Diary* users fill in simple questionnaires on asthma, rhinitis and the impact of the disease (globally, on work and school, on daily activities and on sleep) (table 1). The pilot study including around 5,000 users (9% over 60 years of age) indicates that these questions are easily answered and can help to stratify patients with rhinitis [28].

Table 1: Baseline questionnaire

- Q1: I have rhinitis: Yes/No
- Q2: I have asthma: Yes/No

Q3: My symptoms (tick)

- Runny nose
- Itchy nose
- Sneezing
- Congestion (blocked nose)
- Red eyes
- Itchy eyes
- Watery eyes

Q4: How they affect me: My symptoms (tick)

- Affect my sleep
- Restrict my daily activities
- Restrict my participation in school or work
- Are troublesome

Q5: Medications

Q6: Are you currently receiving immunotherapy (a small dose of the thing you are allergic to, usually taken as an injection or placed under your tongue)? Yes/No

If YES to Q6 (Q7 and Q8)

Q7: What allergy is this?

- Grass pollen
- Parietaria pollen
- Birch pollen
- Other pollen
- Dust mite
- Animal
- Cypress tree pollen
- Don't know
- Add allergy

Q8: How do you receive your treatment?

- Injection
- Tablet under the tongue
- Drops under the tongue
- Spray under the tongue
- Other

Moreover, two specific questionnaires are applied every week to assess disease impact on patients' QoL (EQ-5D) [29] and productivity at work (WPAI-AS) [30].

• **Treatments received**

A list of all treatments available for asthma, conjunctivitis and rhinitis is included in the *ARIA Allergy Diary* and users select the treatment(s) they are taking. Multiple treatments may be selected, and users can update the information when (or if) their treatment changes (Figure 3). The list has been customized for all 20 countries in which the *ARIA Allergy Diary* is available. Information on allergen specific immunotherapy is also requested on the day of first use.

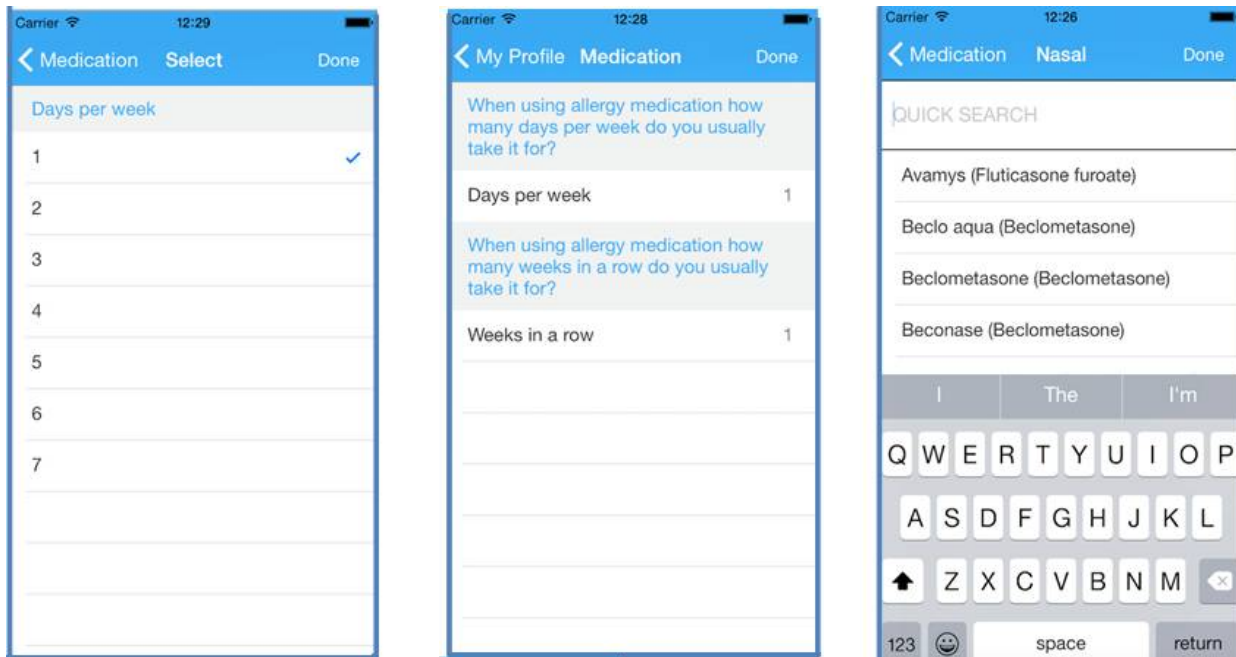


Figure 3: Screens on medications

- **Daily visual analogue scales**

Geolocized users assess their daily symptom control via the touchscreen functionality on their smart phone to click on 5 consecutive VASs (global symptoms due to allergic diseases, rhinitis, conjunctivitis, asthma and work productivity) (Figure 4).

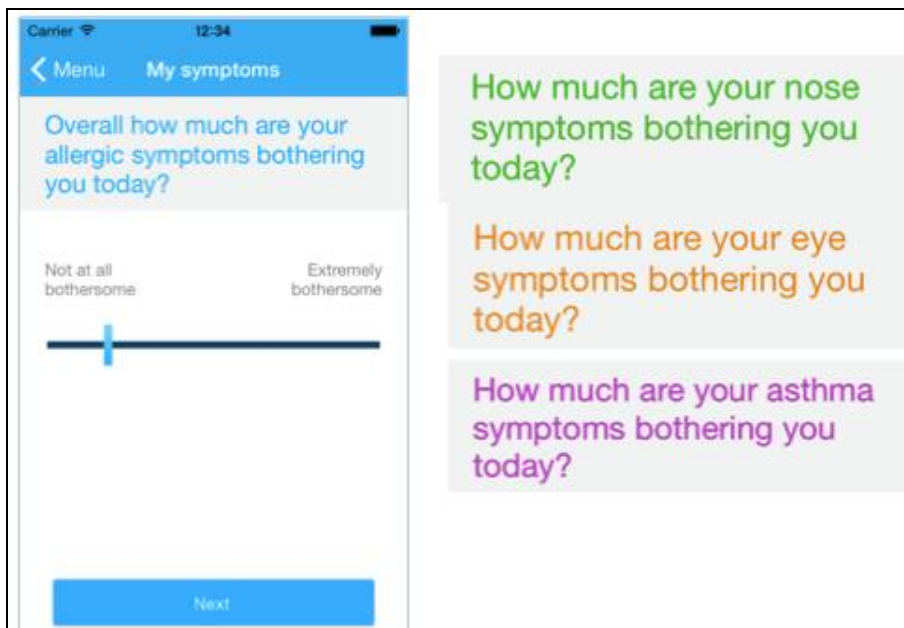


Figure 4: Screens on daily visual analogue scales

- **Clinical decision support system**

The MASK CDSS is incorporated into an app for HCPs (ARIA Allergy Diary Companion). It is an algorithm based on VAS to help clinicians select medications for patients with AR and to stratify their disease severity [27]. It uses a simple step-up/step-down individualized approach to AR pharmacotherapy.

**3. New concepts in allergic multimorbidity embedded in ARIA**

**Stratification of severe allergic and/or asthma patients**

Despite the major advances in understanding AR, treatments are not effective in all patients [31]. The aspiration is to provide more effective therapeutic interventions tailored to the individual using patient stratification with MASK.

Long-term birth cohort studies are essential for understanding the life course of allergic diseases (including asthma and rhinitis) and the complex interplay between genes and environment [32]. BAMSE (Barn Allergi Milj. Stockholm Epidemiologi Projektet) [33] and MeDALL (Mechanisms of the Development of ALLergy; EU FP7-CP-IP; Project No: 261357; 2010-2015) [34] identified a

rare but severe allergy phenotype: polysensitized-multimorbid phenotype confirmed in patient cohorts in children and adults [35-38]. These studies confirm that subjects who are polysensitized and multimorbid have a very high frequency of allergic symptoms, persistent symptoms over time, more severe asthma or rhinitis symptoms than other phenotypes and higher total and specific IgE levels.

Taken altogether, these results indicate that asthmatic patients cannot be managed appropriately without considering rhinitis multimorbidity. They reinforce the importance of nasal problems (rhinitis and/or rhinosinusitis) in many uncontrolled asthmatic patients [39, 40].

#### Allergic multimorbidity in old age adults

The expected epidemic wave of asthma and rhinitis in older adults is an insufficiently recognized problem. Older adults with asthma and rhinitis have specific symptoms and treatment needs. These patients also suffer from multimorbidity and high rates of polypharmacy are reported. ICPs for rhinitis and asthma should cover the entire life cycle.

#### 4. The scaling up strategy in Ukraine

There is an urgent need for scaling up strategies in order to (I) avoid fragmentation, (II) improve health care delivery across Europe, (III) speed up the implementation of good practices using existing cost-effective success stories and (IV) meet the EIP on AHA objectives [9]. This strategy has already been applied to the chronic respiratory diseases action plan of the EIP on AHA [12].

#### Conclusion

ARIA has evolved from a rigorously developed guideline to a mobile technology-based implementation strategy in order to provide an active and healthy life to rhinitis sufferers, whatever their age, sex or socio-economic status and with the aim to reduce health and social inequalities incurred globally by this very common disease.

#### Abbreviations

AIRWAYS ICPs: Integrated care pathways for airway diseases

AR: Allergic rhinitis

ARIA: Allergic Rhinitis and Its Impact on Asthma

CDSS: Clinical Decision Support System

DG: Directorate General

EIP on AHA: European Innovation Partnership on Active and Healthy Ageing

EU: European Union

FP: Framework Programme (EU)

GARD: WHO Global Alliance against Chronic Respiratory Diseases

GRADE: Grading of Recommendation, Assessment, Development and Evaluation

HCP: Health Care Professional

ICP: Integrated care pathway

MACVIA-LR: contre les MALadies Chroniques pour un Vieillessement Actif (Fighting chronic diseases for active and healthy ageing)

MASK: MACVIA-ARIA Sentinel Network

MedDALL: Mechanisms of the Development of Allergy (EU FP7)

NCD: Non-communicable disease

RCT: Randomized controlled trial

RQLQ: Rhinoconjunctivitis Quality of Life Questionnaire

SCUAD: Severe Chronic Upper Airway Disease

VAS: Visual analogue scale

WHO: World Health Organization

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