Change management in allergic rhinitis and asthma multimorbidity using mobile technology
Eller, Esben; Pedersen, Søren; MASK study group; MASK study group*

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ARIA Phase 4 (2018): Change management in allergic rhinitis and asthma multimorbidity using mobile technology

Jean Bousquet, MD, Peter W. Hellings, MD, Ioana Agache, MD, Flore Amat, MD, Isabella Annesi-Maesano, MD, Ignacio J. Anstegui, MD, Josep M. Anto, PhD, Claus Bachert, MD, Eric D. Bateman, MD, Anna Bedbrook, BSc, Kazi Bennoor, MD, Mickael Bewick, MD, Carsten Bindslev-Jensen, MD, Sinthia Bosnic-Anticevich, PhD, Isabelle Bosse, MD, Jan Brozek, MD, Luisa Brussino, MD, Giorgio W. Canonica, MD, Victoria Cardona, MD, Thomas Casale, MD, Alfonso M. Cepeda Sarabia, MD, Niels H. Chavannes, MD, Lorenzo Cecchi, MD, Jaime Correia de Sousa, MD, Elisio Costa, PhD, Alvaro A. Cruz, MD, Wienczyslawa Czarlewski, MD, Giuseppe De Carlo, MD, Giulia De Feo, MD, Pascal Demoly, MD, Philippe Devillier, MD, Mark S. Dykewicz, MD, Yehia El-Gamal, MD, Esben Eller, MD, Joao A. Fonseca, MD, Jean-Francois Fontaine, MD, Wytske J. Fokkens, MD, Maria-Antonieta Guzmán, MD, Tari Haashtela, MD, Magdalena Illario, MD, Juan-Carlos Ivancevich, MD, Jocelyne Just, MD, Igor Kaidashev, MD, Musa Khaitov, PhD, Omer Kalayci, MD, Thomas Keil, MD, Ludger Klimek, MD, Marek L. Kowalski, MD, Piotr Kuna, MD, Violeta Kvedariene, MD, Desiree Larenas-Linnemann, MD, Daniel Laune, PhD, Lan TT. Le, MD, Kai-Hakon Carlsen, MD, Olga Lourenço, PhD, Bassam Mahboub, MD, Alpana Mair, PhD, Enrica Menditto, PhD, Branislava Milenkovic, MD, Mario Morais-Almeida, MD, Ralp Mösges, MD, Joaquim Mullol, MD, Ruth Murray, PhD, Robert Naclerio, MD, Leyla Namazova-Baranova, MD, Ettore Novellino, PhD, Robyn E. O’Hehir, MD, Ken Ohta, MD, Yoshitaka Okamoto, MD, Ken Okubo, MD, Gabrielle L. Onorato, MSc, Susanna Palkonen, MD, Petr Panzner, MD, Nikos G. Papadopoulos, MD, Hae-Sim Park, MD, Ema Paulino, PhD, Ruby Pawankar, MD, Oliver Pfaar, MD, Davor Plavec, MD, Ted A. Popov, MD, Paul Potter, MD, Emmanuel P. Prokopakis, MD, Menachem Rottem, MD, Dermot Ryan, MD, Johanna Salimäki, MSc, Boleslaw Samolinski, MD, Mario Sanchez-Borges, MD, Holger J. Schunemann, MD, Aziz Sheikh, MD, Juan-Carlos Sisul, MD, Rojin Rajabian-Söderlund, PhD, Talant Sooronbaev, MD, Cristina Stellato, MD, Teresa To, PhD, Ana-Maria Todo-Bom, MD, Peter-Valentin Tomazic, MD, Sanna Toppila-Salmi, MD, Antonio Valero, MD, Arunas Valiulis, MD, Erkka Valovirta, MD, Maria-Teresa Ventura, MD, Martin Wagenmann, MD, De Yun Wang, MD, Dana Wallace, MD, Susan Waserman, MD, Magnus Wickman, MD, Arzu Yorgancioglu, MD, Luo Zhang, MD, Nanshan Zhong, MD, Mihaela Zidarn, MD, Torsten Zuberbier, MD

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ARIA Phase 4 (2018): Change management in allergic rhinitis and asthma multimorbidity using mobile technology


1. University Hospital, Montpellier, France.
2. MACVIA-France, Fondation partenariale FMC VIA-LR, Montpellier, France.
3. VIMA INSERM U 1168, VIMA: Ageing and chronic diseases Epidemiological and public health approaches, Villejuif, Université Versailles St-Quentin-en-Yvelines, UMR-S 1168, Montigny le Bretonneux, France and Euforea, Brussels, Belgium.
4. Laboratory of Clinical Immunology, Department of Microbiology and Immunology, KEU Leuven, Leuven, Belgium.
5. Transylvania University Brasov, Brasov, Romania.
6. Epidemiology of Allergic and Respiratory Diseases, Department Institute Pierre Louis of Epidemiology and Public Health, INSERM and UPMC Sorbonne Université, Medical School Saint Antoine, Paris, France.
7. Department of Allergy and Immunology, Hospital Quirón Bilbao, Erandio, Spain.
8. ISGlobal, Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain.
9. IMIM (Hospital del Mar Research Institute), Barcelona, Spain.
10. CIBER Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain.
11. Universitat Pompeu Fabra (UPF), Barcelona, Spain.
12. Upper Airways Research Laboratory, ENT Dept, Ghent University Hospital, Ghent, Belgium.
13. Department of Medicine, University of Cape Town, Cape Town, South Africa.
14. Dept of Respiratory Medicine, National Institute of Diseases of the Chest and Hospital, Dhaka, Bangladesh.
15. iQ4U Consultants Ltd, London, UK.
16. Department of Dermatology and Allergy Centre, Odense University Hospital, Odense Research Center for Anaphylaxis (ORCA), Odense, Denmark.
17. Woolcock Institute of Medical Research, University of Sydney and Woolcock Emphysema Centre and Local Health District, Glebe, NSW, Australia.
18. Allergist, La Rochelle, France.
19. Department of Health Research Methods, Evidence, and Impact, Division of Immunology and Allergy, Department of Medicine, McMaster University, Hamilton, ON, Canada.
20. Department of Medical Sciences, Allergy and Clinical Immunology Unit, University of Torino & Mauriziano Hospital, Torino, Italy.
21. Personalized Medicine Clinic Asthma & Allergy, Humanitas University, Humanitas Research Hospital, Rozzano, Milan, Italy.
22. Allergy Section, Department of Internal Medicine, Hospital Vall d’Hebron, Barcelona, Spain and ARADyAL Spanish Research Network, Barcelona, Spain.
23. Division of Allergy/Immunology, University of South Florida, Tampa, Fla.
24. Allergy and Immunology Laboratory, Metropolitan University, Simon Bolivar University, Barranquilla, Colombia and SLaai, Sociedad Latinoamericana de Allergia, Asma e Immunologia, Barranquilla, Columbia.
25. Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, The Netherlands
26. SOS Allergology and Clinical Immunology, USL Toscana Centro, Prato, Italy.
27. Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Braga, Portugal; ICVS/3B’s, PT Government Associate Laboratory, Braga/Guimarães, Portugal.
28. UCIBIO, REQUINTE, Faculty of Pharmacy and Competence Center on Active and Healthy Ageing of University of Porto (Porto4Ageing), Porto, Portugal.
29. ProAR – Nucleo de Excelencia em Asma, Federal University of Bahia, Brasil and WHO GARD Planning Group, Brazil.
30. Medical Consulting Czarlewska, Levallois, France.
31. EFA European Federation of Allergy and Airways Diseases Patients’ Associations, Brussels, Belgium
32. Department of Medicine, Surgery and Dentistry "Scuola Medica Salernitana", University of Salerno, Salerno, Italy.
33. Department of Respiratory Diseases, Montpellier University Hospital, France.
34. Laboratoire de Pharmacologie Respiratoire UPRES EA220, Hôpital Foch, Suresnes, Université Versailles Saint-Quentin, Université Paris Saclay, France.
35. Section of Allergy and Immunology, Saint Louis University School of Medicine, Saint Louis, Missouri, USA.
36. Pediatric Allergy and Immunology Unit, Children’s hospital, Ain Shams University, Cairo, Egypt.
37. CINTESIS, Center for research in health technologies and information systems, Faculdade de Medicina da Universidade do Porto, Porto, Portugal and MEDIDA, Lda, Porto, Portugal.
38. Allergist, Reims, France.
39. Department of Otorhinolaryngology, Academic Medical Centres, AMC, Amsterdam, the Netherlands.
40. Immunology and Allergy Division, Clinical Hospital, University of Chile, Santiago, Chile.
41. Skin and Allergy Hospital, Helsinki University Hospital and University of Helsinki, Helsinki, Finland.
42. Division for Health Innovation, Campania Region and Federico II University and Hospital Naples (DISMET and R1D Unit) Naples, Italy
43. Servicio de Alergia e Immunologia, Clinica Santa Isabel, Buenos Aires, Argentina.
44. Allergology department, Centre de l’Asthme et des Allergies Hôpital d’Enfants Armand-Trousseau (APHP); Sorbonne Université, UPMC Univ Paris 06, UMR_S 1136, Institut Pierre Louis d’Épidémiologie et de Santé Publique, Equipe EPAR, Paris, France.
45. Ukrainina Medical Stomatological Academy, Poltava, Ukraine.
46. National Research Center, Institute of Immunology, Federal Medicobiological Agency, Laboratory of Molecular immunology, Moscow, Russian Federation.
47. Pediatric Allergy and Asthma Unit, Hacettepe University School of Medicine, Ankara, Turkey.
48. Institute of Social Medicine, Epidemiology and Health Economics, Charité - Universitätsmedizin Berlin, Berlin, and Institute for Clinical Epidemiology and Biometry, University of Wuerzburg, Germany.
<table>
<thead>
<tr>
<th>No.</th>
<th>Institution/Department/Division/Faculty/Institute/…</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.</td>
<td>Center for Rhinology and Allergology, Wiesbaden, Germany.</td>
</tr>
<tr>
<td>50.</td>
<td>Department of Immunology and Allergy, Healthy Ageing Research Center, Medical University of Lodz, Poland.</td>
</tr>
<tr>
<td>51.</td>
<td>Division of Internal Medicine, Asthma and Allergy, Barlicki University Hospital, Medical University of Lodz, Poland.</td>
</tr>
<tr>
<td>52.</td>
<td>Faculty of Medicine, Vilnius University, Vilnius, Lithuania.</td>
</tr>
<tr>
<td>53.</td>
<td>Center of Excellence in Asthma and Allergy, Médica Sur Clinical Foundation and Hospital, México City, Mexico.</td>
</tr>
<tr>
<td>54.</td>
<td>Kyomed, Montpellier, France.</td>
</tr>
<tr>
<td>56.</td>
<td>Oslo University Hospital, Department of Paediatrics, Oslo, and University of Oslo, Faculty of Medicine, Institute of Clinical Medicine, Oslo, Norway.</td>
</tr>
<tr>
<td>57.</td>
<td>Faculty of Health Sciences and CICS – UBI, Health Sciences Research Centre, University of Beira Interior, Covilhã, Portugal.</td>
</tr>
<tr>
<td>58.</td>
<td>Department of Pulmonary Medicine, Rashid Hospital, Dubai, UAE.</td>
</tr>
<tr>
<td>59.</td>
<td>DG for Health &amp; Social Care, Scottish Government, Edinburgh, UK.</td>
</tr>
<tr>
<td>60.</td>
<td>CIRFF, Federico II University, Naples, Italy.</td>
</tr>
<tr>
<td>61.</td>
<td>Clinic for Pulmonary Diseases, Clinical Center of Serbia, Faculty of Medicine, University of Belgrade, Serbian Association for Asthma and COPD, Belgrade, Serbia.</td>
</tr>
<tr>
<td>62.</td>
<td>Allergy Center, CUF Descobertas Hospital, Lisbon, Portugal.</td>
</tr>
<tr>
<td>63.</td>
<td>Institute of Medical Statistics, and Computational Biology, Medical Faculty, University of Cologne, Germany and CRI-Clinical Research International-Ltd, Hamburg, Germany.</td>
</tr>
<tr>
<td>64.</td>
<td>Rhinology Unit &amp; Smell Clinic, ENT Department, Hospital Clinic; Clinical &amp; Experimental Respiratory Immunology and Allergy, IDIBAPS, CIBERES, University of Barcelona, Spain.</td>
</tr>
<tr>
<td>65.</td>
<td>Director, Medical Communications Consultant, MedScript Ltd, Dundalk, Co Louth, Ireland.</td>
</tr>
<tr>
<td>66.</td>
<td>Johns Hopkins School of Medicine, Baltimore, Maryland, USA.</td>
</tr>
<tr>
<td>67.</td>
<td>Scientific Centre of Children’s Health under the MoH, Moscow, Russia.</td>
</tr>
<tr>
<td>68.</td>
<td>Director of Department of Pharmacy of University of Naples Federico II, Naples, Italy.</td>
</tr>
<tr>
<td>69.</td>
<td>OHEHIR. Department of Allergy, Immunology and Respiratory Medicine, Alfred Hospital and Central Clinical School, Monash University, Melbourne, Victoria, Australia; Department of Immunology, Monash University, Melbourne, Victoria, Australia.</td>
</tr>
<tr>
<td>70.</td>
<td>National Hospital Organization, Tokyo National Hospital, Tokyo, Japan.</td>
</tr>
<tr>
<td>71.</td>
<td>Dept of Otorhinolaryngology, Chiba University Hospital, Chiba, Japan.</td>
</tr>
<tr>
<td>72.</td>
<td>Dept of Otolaryngology, Nippon Medical School, Tokyo, Japan.</td>
</tr>
<tr>
<td>73.</td>
<td>Department of Immunology and Allergology, Faculty of Medicine in Pilsen, Charles University Prague, Czech Republic.</td>
</tr>
<tr>
<td>74.</td>
<td>Center for Pediatrics and Child Health, Institute of Human Development, Royal Manchester Children’s Hospital, University of Manchester, Manchester, UK and Allergy Department, 2nd Pediatric Clinic, Athens General Children’s Hospital &quot;P&amp;A Kyriakou,&quot; University of Athens, Athens, Greece.</td>
</tr>
<tr>
<td>75.</td>
<td>Department of Allergy and Clinical Immunology, Ajou University School of Medicine, Suwon, South Korea.</td>
</tr>
<tr>
<td>76.</td>
<td>Farmacias Holon, Lisboa, Portugal.</td>
</tr>
<tr>
<td>77.</td>
<td>Department of Pediatrics, Nippon Medical School, Tokyo, Japan.</td>
</tr>
<tr>
<td>78.</td>
<td>Center for Rhinology and Allergology, Wiesbaden, Germany.</td>
</tr>
<tr>
<td>79.</td>
<td>Department of Otorhinolaryngology, Head and Neck Surgery, Universitätsmedizin Mannheim, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany.</td>
</tr>
<tr>
<td>80.</td>
<td>Children’s Hospital Srebrnjak, Zagreb, School of Medicine, University J.J. Strossmayer, Osijek, Croatia.</td>
</tr>
<tr>
<td>81.</td>
<td>University Hospital ‘Sv Ivan Rilski’”, Sofia, Bulgaria.</td>
</tr>
<tr>
<td>82.</td>
<td>Allergy Diagnostic and Clinical Research Unit, University of Cape Town Lung Institute, Cape Town, South Africa.</td>
</tr>
<tr>
<td>83.</td>
<td>Department of Otorhinolaryngology University of Crete School of Medicine, Heraklion, Greece.</td>
</tr>
<tr>
<td>84.</td>
<td>Division of Allergy Asthma and Clinical Immunology, Emek Medical Center, Afula, Israel.</td>
</tr>
<tr>
<td>85.</td>
<td>Honorary Clinical Research Fellow, Allergy and Respiratory Research Group, The University of Edinburgh, Edinburgh, Past President SLAAI, FACAAI, UK.</td>
</tr>
<tr>
<td>86.</td>
<td>Association of Finnish Pharmacies, Finland.</td>
</tr>
<tr>
<td>87.</td>
<td>Department of Prevention of Environmental Hazards and Allergology, Medical University of Warsaw, Poland.</td>
</tr>
</tbody>
</table>

MASK STUDY GROUP:

1. University Hospital, Montpellier, France.
2. MACVIA-France, Fondation partenariale FMC VIA-LR, Montpellier, France.
3. VIMA INSERM U 1168, VIMA : Ageing and chronic diseases Epidemiological and public health approaches, Villejuif, Université Versailles St-Quentin-en-Yvelines, UMR-S 1168, Montigny le Bretonneux, France and Eurofors, Brussels, Belgium.
4. Laboratory of Clinical Immunology, Department of Microbiology and Immunology, KU Leuven, Belgium.
5. Department of Dermatology, Medical University of Graz, Austria.
6. Transylvania University Brasov, Brasov, Romania.
7. Swiss Institute of Allergy and Asthma Research (SIAF), University of Zurich, Davos, Switzerland.
8. Project Manager, Chairman of the Council of Municipality of Salerno, Italy.
9. Center for Health Technology and Services Research, CINTESIS, Faculdade de Medicina, Universidade do Porto; and Medida, Lda Porto, Portugal.
10. Allergology department, Centre de l’Asthme et des Allergies Hôpital d’Enfants Armand-Trousseau (APHP); Sorbonne Université, UPMC Univ Paris 06, UMR_S 1136, Institut Pierre Louis d’Épidémiologie et de Santé Publique, Equipe EPAR, Paris, France.

11. Innovación y nuevas tecnologías, Salud Sector sanitario de Barbastro, Barbastro, Spain.

12. Epidemiology of Allergic and Respiratory Diseases, Department Institute Pierre Louis of Epidemiology and Public Health, INSERM and UPMC Sorbonne Université, Medical School Saint Antoine, Paris, France.

13. Department of Allergy and Immunology, Hospital Quirón Bizkaia, Erandio, Spain.

14. ISGlobAL, Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain.

15. IMIM (Hospital del Mar Research Institute), Barcelona, Spain.

16. CIBER Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain.

17. Universitat Pompeu Fabra (UPF), Barcelona, Spain.

18. Kyomed, Montpellier, France.

19. Argentine Society of Allergy and Immunopathology, Buenos Aires, Argentina.

20. Clinical Immunology and Allergy Unit, Department of Medicine Solna, Karolinska Institutet, Stockholm, and Astrid Lindgren Children’s Hospital, Department of Pediatric Pulmonology and Allergy, Karolinska University Hospital, Stockholm, Sweden.

21. David Hide Asthma and Allergy Research Centre, Isle of Wight, United Kingdom.

22. Regionie Puglia, Bari, Italy.

23. Regione Liguria, Genoa, Italy.

24. Upper Airways Research Laboratory, ENT Dept, Ghent University Hospital, Ghent, Belgium.

25. Department of Biomedical Sciences, Humanitas University, Milan, Italy.

26. PNDR, Portuguese National Programme for Respiratory Diseases, Faculdade de Medicina de Lisboa, Lisbon, Portugal.

27. Director of the Geriatric Unit, Department of Internal Medicine (DIBIMIS), University of Palermo, Italy.

28. Telbios SRL, Milan, Italy.

29. Universidade do Estado do Pará, Belem, Brazil.

30. Department of Medicine, University of Cape Town, Cape Town, South Africa.

31. Hospital Civil de Guadalajara Dr Juan I Menchaca, Guadalara, Mexico.

32. iQ4U Consultants Ltd, London, UK.

33. Section of Respiratory Disease, Department of Oncology, Haematology and Respiratory Diseases, University of Modena and Reggio Emilia, Modena, Italy.

34. Department of Respiratory Medicine, Academic Medical Center (AMC), University of Amsterdam, The Netherlands.

35. Charité - Universitätsmedizin Berlin; Berlin Institute of Health, Comprehensive Allergy Center, Department of Dermatology and Allergy, Global Allergy and Asthma European Network (GA²LEN), Berlin, Germany.

36. Dept of Respiratory Medicine, National Institute of Diseases of the Chest and Hospital, Dhaka, Bangladesh.

37. Centre for Individualized Medicine, Department of Pediatrics, Faculty of Medicine, Linköping, Sweden.

38. Department of Prevention of Environmental Hazards and Allergology, Medical University of Warsaw, Poland.

39. BIEBER. Department of Dermatology and Allergy, Rheinische Friedrich-Wilhelms-University Bonn, Bonn, Germany

40. Dept of Biochemistry and Clinical Chemistry- Faculty of Pharmacy with the Division of Laboratory Medicine Division, Warsaw Medical University, Poland.

41. Department of Dermatology and Allergy Centre, Odense University Hospital, Odense Research Center for Anaphylaxis (ORCA), Odense, Denmark.

42. Department of Respiratory Medicine and Allergology, University Hospital, Lund, Sweden.

43. Department of Geriatrics, Montpellier University Hospital, Montpellier, France.

44. EA 2991, Euromov, University Montpellier, France.

45. Department of Pathophysiology and Transplantation, University of Milan, IRCCS Fondazione Ca’Granda Ospedale Maggiore Policlinico, Milan, Italy.

46. Argentine Association of Respiratory Medicine, Buenos Aires, Argentina.

47. Division of Internal Medicine, Asthma and Allergy, Barlicki University Hospital, Medical University of Lodz, Poland.

48. Pediatric Department, University of Verona Hospital, Verona, Italy.
49. Department of Public Health and Infectious Diseases, Sapienza University of Rome, Italy.
50. Second University of Naples and Institute of Translational Medicine, Italian National Research Council.
51. Woolcock Institute of Medical Research, University of Sydney and Sydney Local Health District, Glebe, NSW, Australia.
52. Allergist, La Rochelle, France.
53. Associate professor of clinical medicine, Laval's University, Quebec city, Head of medicine department, Hôpital de la Malbaie, Quebec, Canada.
54. Quebec Heart and Lung Institute, Laval University, Québec City, Quebec, Canada.
55. Centre Hospitalier Valenciennes, France.
56. Head of Department of Clinical Pharmacy of Lithuanian University of Health Sciences, Kaunas, Lithuania.
57. Institute of Lung Health, Respiratory Biomedical Unit, University Hospitals of Leicester NHS Trust, Leicestershire, UK; Department of Infection, Immunity and Inflammation, University of Leicester, Leicester, UK.
58. Department of Health Research Methods, Evidence, and Impact, Division of Immunology and Allergy, Department of Medicine, McMaster University, Hamilton, ON, Canada.
59. Chief of the University Pneumology Unit- AOU Molinette, Hospital City of Health and Science of Torino, Italy.
60. Universitätmedizin der Johannes Gutenberg-Universität Mainz, Mainz, Germany.
61. Pharmacist, Municipality Pharmacy, Sarno, Italy.
63. Instituto de Pediatría, Hospital Zambrano Hellion Tec de Monterrey, Monterrey, Mexico.
64. Imperial College and Royal Brompton Hospital, London, UK.
65. Centro Medico Docente La Trinidad, Caracas, Venezuela.
66. Regional Director Assofarm Campania and Vice President of the Board of Directors of Cofaser, Salerno, Italy.
67. Service de pneumologie, CHU et université d’Auvergne, Clermont-Ferrand, France.
68. Department of Respiratory Diseases, Montpellier University Hospital, France.
69. Imperial College London - National Heart and Lung Institute, Royal Brompton Hospital NHS, London, UK.
70. Federal University of Minas Gerais, Medical School, Department of Pediatrics, Belo Horizonte, Brazil.
71. Assistant Director General, Montpellier, Région Occitanie, France.
72. Mayor of Sarno and President of Salerno Province, Director, Anesthesiology Service, Sarno.
73. "Martiri del Villa Malta" Hospital, Italy.
74. Allergy Section, Department of Internal Medicine, Hospital Vall d’Hebron, Barcelona, Spain and ARADyAL Spanish Research Network, Barcelona, Spain.
75. Department of Paediatrics, Oslo University Hospital and University of Oslo, Oslo, Norway.
77. Regional Ministry of Health of Andalusia, Seville, Spain.
78. Allergy and Asthma Associates of Southern California, Mission Viejo, CA, USA.
79. ASA - Advanced Solutions Accelerator, Clapiers, France.
80. Celentano pharmacy, Massa Lubrense, Italy.
81. SOS Allergology and Clinical Immunology, USL Toscana Centro, Prato, Italy.
82. Allergy and Immunology Laboratory, Metropolitan University, Simon Bolivar University, Barranquilla, Colombia and SLaaa, Sociedad Latinoamericana de Allergia, Asma e Immunologia, Branquilla, Columbia.
83. Department of Public Health and Primary Care, Leiden University Medical Center, Leiden, The Netherlands.
84. Capital Institute of Pediatrics, Chaoyang district, Beijing, China.
85. School of Medicine, University CEU San Pablo, Madrid, Spain.
86. David Tvlldiani Medical University - AIETI Highest Medical School, David Tatishvili Medical Center Tbilisi, Georgia.
87. Pulmonology Research Institute FMBA, Moscow, Russia and GARD Executive Committee, Moscow, Russia.
88. National Heart & Lung Institute, Imperial College, London, UK.
89. Specialist social worker, Sorrento, Italy.
90. Argentine Federation of Otorhinolaryngology Societies, Buenos Aires, Argentina.
91. Eskisehir Osmangazi University, Medical Faculty, ENT Department, Eskisehir, Turkey.
92. Medicine Department, IRCCS-Azienda Ospedaliera Universitaria San Martino, Genoa, Italy.
93. Universidade Federal da Bahia, Escola de Enfermagem, Brazil.
94. Plateforme Transversale d’Allergologie, Institut du Thorax, CHU de Nantes, Nantes, France.
95. LANAU International Healthcare Consultancy, Northern Ireland, UK.
96. Innovación y nuevas tecnologías, Salud Sector sanitario de Barbastro, Barbastro, Spain.
97. Innovation and Research Office, Department of Health and Social Solidarity, Autonomous Province of Trento, Italy.
98. Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Braga, Portugal; ICVS/3B’s, PT Government Associate Laboratory, Braga/Guimarães, Portugal.
99. Guadalara, Mexico.
100. FIMMG (Federazione Italiana Medici di Medicina Generale), Milan, Italy.
101. UCIBIO, REQUANTE, Faculty of Pharmacy and Competence Center on Active and Healthy Ageing of University of Porto (Porto4Ageing), Porto, Portugal.
102. Mexico City, Mexico.
103. IMT Mines Alès, Université Montpellier, Alès, France.
104. Department of Medicine, Nova Southeastern University, Davie, University of Miami Dept of Medicine, Miami, Florida, USA.
105. Regional Director Assofarm Campania and Vice President of the Board of Directors of Cofaser, Salerno, Italy.
106. ProAR – Nucleo de Excelencia em Asma, Federal University of Bahia, Brasil and WHO GARD Planning Group, Brazil.
107. Centre for Respiratory Medicine and Allergy, Institute of Inflammation and Repair, University of Manchester and University Hospital of South Manchester, Manchester, UK.
108. Medical Consulting Czarlewski, Levallois, France.
109. The Centre for Allergy Research, The Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden.
110. Azienda Provinciale per i Servizi Sanitari di Trento (APSS-Trento), Italy.
111. Department of Internal Medicine and Allergy Clinic of Pr Plydoro Ernani de Sao Thiago University Hospital, Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil.
112. Sleep Unit, Department of Neurology, Hôpital Gui-de-Chauliac Montpellier, Inserm U1061, France.
113. Department of Dermatology and Allergy, Technische Universität München, Munich, Germany; ZAIM-Center for Allergy and Environment, Helmholtz Center Munich, Technische Universität München, Munich, Germany.
114. Allergy Division, Chest Disease Department, University Hospital of Strasbourg, Strasbourg, France.
115. EFA European Federation of Allergy and Airways Diseases Patients’ Associations, Brussels, Belgium.
116. AQuAS, Barcelona, Spain & EUREGHA, European Regional and Local Health Association, Brussels, Belgium.
118. Department of Medicine, Surgery and Dentistry "Scuola Medica Salernitana", University of Salerno, Salerno, Italy.
120. Social workers coordinator, Sorrento, Italy.
121. Federal University of the State of Rio de Janeiro, School of Medicine and Surgery, Rio de Janeiro, Brazil.
122. Allergology and Immunology Discipline, "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania.
123. Department of Medicine, Division of Clinical Immunology and Allergy, McMaster University, Hamilton, Ontario, Canada.
124. Laboratoire de Pharmacologie Respiratoire UPRES EA220, Hôpital Foch, Suresnes, Université Versailles Saint-Quentin, Université Paris Saclay, France.
125. Farmacie Dei Golfi Group, Massa Lubrense, Italy.
126. Rangueil-Larrey Hospital, Respiratory Diseases Department, Toulouse, France.
127. University Clinic of Pulmology and Allergy, Medical Faculty Skopje, R Macedonia.
128. Mexico City, Mexico.
129. Service de Pneumo-Allergologie, Centre Hospitalo-Universitaire de Béni-Messous, Algiers, Algeria.
130. Clinic of infectious, chest diseases, dermatology and allergology, Vilnius University, Vilnius, Lithuania.
131. Allergy and Clinical Immunology National Heart and Lung Institute, Imperial College London, UK.
132. Guy’s and st Thomas’ NHS Trust, Kings College London, UK.
133. Section of Allergy and Immunology, Saint Louis University School of Medicine, Saint Louis, Missouri, USA.
134. Pediatric Allergy and Immunology Unit, Children's Hospital, Ain Shams University, Cairo, Egypt.
135. Department of Computing Science, Umeå University, Sweden and Four Computing Oy, Finland.
136. Clinic of Children’s Diseases, Faculty of Medicine, Vilnius University, Vilnius, Lithuania.
137. University of São Paulo Medical School, São Paulo, Brazil
139. Global Allergy and Asthma Platform GAAPP, Vienna, Austria.
140. Division of Allergy, Department of Pediatric Medicine - The Bambino Gesù Children’s Research Hospital Holy see, Rome, Italy.
141. Department of Otorhinolaryngology, Academic Medical Centre, Amsterdam, the Netherlands.
143. Allergist, Reims, France.
144. Hospital general regional 1 "Dr Carlos MacGregor Sanchez Navarro" IMSS, Mexico City, Mexico.
145. Regional hospital of ISSSTE, Puebla, Mexico.
146. National Center for Disease Control and Public Health of Georgia, Tbilisi, Georgia.
147. Guadalara, Mexico.
148. Allergy Clinic, National Institute of Respiratory Diseases, Mexico City, Mexico.
149. Department of Pulmonary Diseases, Istanbul University, Cerrahpasa Faculty of Medicine, Turkey.
150. Allergology unit, UHATEM "NPIrogov", Sofia, Bulgaria.
151. Medical University, Faculty of Public Health, Sofia.
152. Allergy and Immunology Division, Clinica Ricardo Palma, Lima, Peru.
153. Department of Internal Medicine, section of Allergology, Erasmus MC, Rotterdam, The Netherlands.
154. Allergy & Asthma Unit, Hospital San Bernardo Salta, Argentina.
155. Allergy Clinic, Hospital Regional del ISSSTE 'Lic. López Mateos', Mexico City, Mexico.
156. Head and Professor, Centro Regional de Excelencia CONACYT y WAO en Alergia, Asma e Inmunologia, Hospital Universitario, Universidad Autónoma de Nuevo León, Monterrey NL, Mexico.
157. Center of Allergy and Immunology, Georgian Association of Allergology and Clinical Immunology, Tbilisi, Georgia.
158. Latvian Association of Allergists, Center of Tuberculosis and Lung Diseases, Riga, Latvia.
159. Federal District Base Hospital Institute, Brasilia, Brazil.
160. Institute of Health Policy and Management IBMG, Erasmus University, Rotterdam, The Netherlands.
161. University Hospital Olomouc – National eHealth Centre, Czech Republic.
162. Immunology and Allergy Division, Clinical Hospital, University of Chile, Santiago, Chile.
163. Skin and Allergy Hospital, Helsinki University Hospital, University of Helsinki, Helsinki, Finland.
165. Autonomous University of Baja California, Ensenada, Baja California, Mexico.
166. Department of Paediatrics and Child Health, University College Cork, Cork, Ireland.
167. Hospital General Regional 1 “Dr. Carlos MacGregor Sánchez Navarro” IMSS, Mexico City, Mexico.
168. Université Paris-Sud; Service de Pneumologie, Hôpital Bicêtre; Inserm UMR_S999, Le Kremlin Bicêtre, France.
169. Dipartimento di medicina, chirurgia e odontoiatria, università di Salerno, Italy.
170. Division for Health Innovation, Campania Region and Federico II University Hospital Naples (R&D and DISMET) Naples, Italy.
171. Servicio de Alergia e Immunologia, Clínica Santa Isabel, Buenos Aires, Argentina.
172. President, Libra Foundation, Buenos Aires, Argentina.
173. Medical University of Gdańsk, Department of Allergology, Gdansk, Poland.
174. Airway Disease Infection Section, National Heart and Lung Institute, Imperial College; MRC & Asthma UK Centre in Allergic Mechanisms of Asthma, London, UK.
175. Dept of Respiratory Medicine, Ghent University Hospital, Ghent, Belgium.
176. Hallym University College of Medicine, Hallym University Sacred Heart Hospital, Gyeonggi-do, South Korea.
177. Department of Clinical Immunology, Wroclaw Medical University, Poland.
178. Ukrainina Medical Stomatological Academy, Poltava, Ukraine.
179. Pediatric Allergy and Asthma Unit, Hacettepe University School of Medicine, Ankara, Turkey.
180. Hacettepe University, School of Medicine, Department of Chest Diseases, Immunology and Allergy Division, Ankara, Turkey.
181. Allergy Centre, Tampere University Hospital, Tampere, Finland.
182. First Department of Family Medicine, Medical University of Lodz, Poland.
183. Institute of Social Medicine, Epidemiology and Health Economics, Charité - Universitätsmedizin Berlin, Berlin, and Institute for Clinical Epidemiology and Biometry, University of Wuerzburg, Germany.
184. Department of Medicine, McMaster University, Health Sciences Centre 3V47, West, Hamilton, Ontario, Canada.
185. National Research Center, Institute of Immunology, Federal Medicobiological Agency, Laboratory of Molecular Immunology, Moscow, Russian Federation.
186. GARD Chairman, Geneva, Switzerland.
187. Allergy & Asthma Center Westend, Berlin, Germany.
188. Center for Rhinology and Allergology, Wiesbaden, Germany.
189. Department of Immunology, Rheumatology and Allergy, Medical University of Lodz, and HARC, Poland.
190. Children's Hospital and University of Helsinki, Finland.
191. Department of Clinical Science and Education, Sodersjukhuset, Karolinska Institutet, Stockholm and Sach's Children and Youth Hospital, Sodersjukhuset, Stockholm, Sweden.
192. Faculty of Medicine, Vilnius University, Vilnius, Lithuania.
193. Department of Prevention of Environmental Hazards and Allergology, Medical University of Warsaw, Poland.
194. Center of Excellence in Asthma and Allergy, Medica Sur Clinical Foundation and Hospital, Mexico City, Mexico.
195. Presidente CMMC, Milano, Italy.
196. Head of the Allergy Department of Pedro de Elizalde Children’s Hospital, Buenos Aires, Argentina.
198. Federal University of Bahia, Brazil.
199. Sifmed, Milano, Italy.
200. State Key Laboratory of Respiratory Diseases, Guangzhou Institute of Respiratory Disease, the First Affiliated Hospital of Guangzhou Medical University, Guangzhou, China.
201. Departments of Internal Medicine and Pediatrics (Divisions of Allergy and Immunology), University of Tennessee College of Medicine, Germantown, TN, USA.
202. Scottish Centre for Respiratory Research, Cardiovascular & Diabetes Medicine, Medical Research Institute, Ninewells Hospital, University of Dundee, UK.
203. Oslo University Hospital, Department of Paediatrics, Oslo, and University of Oslo, Faculty of Medicine, Institute of Clinical Medicine, Oslo, Norway.
204. Department of Pulmonary Medicine, CHU Sart-Tilman, and GIGA I3 research group, Liege, Belgium.
205. Faculty of Health Sciences and CICS – UBI, Health Sciences Research Centre, University of Beira Interior, Covilhã, Portugal.
206. Department of Philosophical, Methodological and Instrumental Disciplines, CUIC, University of Guadalajara, Guadalajara, Mexico.
207. Department of Pulmonary Medicine, Rashid Hospital, Dubai, UAE.
208. Biomax Informatics AG, Munich, Germany.
209. Directorate of Finance, eHealth & Pharmaceuticals, Scottish Government Health Department, Edinburgh, UK.
210. Department of Respiratory Medicine, University of Bratislava, Bratislava, Slovakia.
211. Coimbra Institute for Clinical and Biomedical Research (ICBR), Faculty of Medicine, University of Coimbra, Portugal; Ageing@Coimbra EIP-AHA Reference Site, Coimbra, Portugal.
212. Medical center Iskar Ltd Sofia, Bulgaria.
213. Department of Medicine (RCSI), Bon Secours Hospital, Glasnevin, Dublin, Ireland.
214. Kronikgune, International Centre of Excellence in Chronicity Research Barakaldo, Bizkaia, Spain
215. Division of Clinical Immunology and Allergy, Laboratory of Behavioral Immunology Research, The University of Mississippi Medical Center, Jackson, Mississippi, USA.
216. Tobacco Control Research Centre; Iranian Anti Tobacco Association, Tehran, Iran.
217. Argentine Association of Allergy and Clinical Immunology, Buenos Aires, Argentina.
218. Mexico City, Mexico.
219. University of Southeast Bahia, Brazil.
220. Allergie-Centrum-Charité at the Department of Dermatology and Allergy, Charité - Universitätsmedizin Berlin, Germany
221. Maputo Central Hospital--Department of Paediatrics, Mozambique.
222. Veracruz, Mexico.
223. Sachs’ Children and Youth Hospital, Södersjukhuset, Stockholm and Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden.
224. Allergy and Asthma Medical Group and Research Center, San Diego, California, USA.
225. CIRFF, Federico II University, Naples, Italy.
226. Department of Physiology, CHRU, University Montpellier, Vice President for Research, PhyMedExp, INSERM U1046, CNRS UMR 9214, France.
227. Croatian Pulmonary Society.
228. National Institute of Pneumology M Nasta, Bucharest, Romania.
229. Clinic for Pulmonary Diseases, Clinical Center of Serbia, Faculty of Medicine, University of Belgrade, Serbian Association for Asthma and COPD, Belgrade, Serbia.
230. Regione Piemonte, Torino, Italy.
231. Col Jardines de Sta Monica, Tlalnepantla, Mexico.
232. National Center for Research in Chronic Respiratory Diseases, Tishreen University School of Medicine, Latakia, Syria.
235. Lead Respiratory Physician Mater Dei Hospital Malta, Academic Head of Dept and Professor of Medicine University of Malta, Deputy Dean Faculty of Medicine and Surgery University of Medicine, La Valette, Malta.
236. Department of Medical Sciences, Allergy and Clinical Immunology Unit, University of Torino & Mauriziano Hospital, Torino, Italy.
237. Instituto de Prevision Social IPS HC, Socia de la SPAAI, Tesorera de la SLAAI, Asuncion, Paraguay.
238. Allergy Center, CUF Descobertas Hospital, Lisbon, Portugal.
239. Universidade de São Paulo, Sao Paulo, Brazil.
240. Institute of Medical Statistics, and Computational Biology, Medical Faculty, University of Cologne, Germany and CRI-Clinical Research International-Ltd, Hamburg, Germany.
241. General Pathology Institute, Faculty of Medicine, University of Coimbra, Portugal; Ageing@Coimbra EIP-AHA Reference Site, Coimbra, Portugal.
242. Federal University of Bahia, Brazil.
243. Rhinology Unit & Smell Clinic, ENT Department, Hospital Clinic; Clinical & Experimental Respiratory Immunology, IDIBAPS, CIBERES, University of Barcelona, Spain.
244. Danish Committee for Health Education, Copenhagen East, Denmark.
245. Food Allergy Referral Centre Veneto Region, Department of Women and Child Health, Padua General University Hospital, Padua, Italy.
246. Director, Medical Communications Consultant, MedScript Ltd, Dundalk, Co Louth, Ireland.
247. Johns Hopkins School of Medicine, Baltimore, Maryland, USA.
248. General Manager of COFASER - Pharmacy Services Consortium, Salerno, Italy.
249. Scientific Centre of Children’s Health under the MoH, Russian National Research Medical University named Pirogov, Moscow, Russia.
250. Director of Center of Allergy, Immunology and Respiratory Diseases, Santa Fe, Argentina Center for Allergy and Immunology, Santa Fe, Argentina.
251. Dept of Otorhinolaryngology, Medical University of Vienna, AKH, Vienna, Austria.
252. Hospital of the Hospitaller Brothers in Buda, Budapest, Hungary.
253. Die Hautambulanzen and Rothhaar study center, Berlin, Germany.
254. Neumología y Alergología Infantil, Hospital La Fe, Valencia, Spain.
255. Center for Health Technology and Services Research - CINTESIS and Department of Internal Medicine, Centro Hospitalar Sao Joao, Porto, Portugal.
256. Caisse d’assurance retraite et de la santé au travail du Languedoc-Roussillon (CARSAT-LR), Montpellier, France.
257. Director of Department of Pharmacy of University of Naples Federico II, Naples, Italy.
258. ENT Department, University Hospital of Kinshasa, Kinshasa, Congo.
259. Department of Allergy, Immunology and Respiratory Medicine, Alfred Hospital and Central Clinical School, Monash University, Melbourne, Victoria, Australia; Department of Immunology, Monash University, Melbourne, Victoria, Australia.
261. National Hospital Organization, Tokyo National Hospital, Tokyo, Japan.
262. Dept of Otorhinolaryngology, Chiba University Hospital, Chiba, Japan.
263. Dept of Otolaryngology, Nippon Medical School, Tokyo, Japan.
264. Jalisco, Guadalara.
265. Centre Hospitalier Universitaire Pédiatrique Charles de Gaulle, Ouagadougou, Burkina Faso.
266. Dept of Comparative Medicine; Messerli Research Institute of the University of Veterinary Medicine and Medical University, Vienna, Austria.
267. Center for Pediatrics and Child Health, Institute of Human Development, Royal Manchester Children’s Hospital, University of Manchester, Manchester, UK Allergy Department, 2nd Pediatric Clinic, Athens General Children’s Hospital "P&A Kyriakou," University of Athens, Athens 11527, Greece.
268. Department of Allergy and Clinical Immunology, Ajou University School of Medicine, Suwon, South Korea.
269. Respiratory Medicine, Department of Medical Sciences, University of Ferrara, Ferrara, Italy.
270. Allergy and Respiratory Diseases, Ospedale Policlinico San Martino -University of Genoa, Italy.
271. Farmacias Holon, Lisbon, Portugal.
272. Department of Pediatrics, Nippon Medical School, Tokyo, Japan.
273. University of Southern Denmark, Kolding, Denmark.
274. Université Grenoble Alpes, Laboratoire HP2, Grenoble, INSERM, U1042 and CHU de Grenoble, France.
275. Allergy Unit, CUF-Porto Hospital and Institute; Center for Research in Health Technologies and information systems CINTESIS, Universidade do Porto, Portugal.
276. Sociologist, municipality area n33, Sórento, Italy.
277. Center for Rhinology and Allergology, Wiesbaden, Germany.
278. Department of Otorhinolaryngology, Head and Neck Surgery, Universitätsmedizin Mannheim, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany.
279. Centre for empowering people and communities, Dublin, UK.
281. Société de Pneumologie de Langue Française, Espace francophone de Pneumologie, Paris, France.
282. Département de pédiatrie, CHU de Grenoble, Grenoble France.
283. Medical School, University of Cyprus, Nicosia, Cyprus.
284. Children’s Hospital Srebrnjak, Zagreb, School of Medicine, University J.J. Strossmayer, Osijek, Croatia.
285. Karl Landsteiner Institute for Clinical and Experimental Pneumology, Hietzing Hospital, Vienna, Austria.
286. University Hospital ‘Sv. Ivan Rilski’", Sofia, Bulgaria.
287. Allergy Diagnostic and Clinical Research Unit, University of Cape Town Lung Institute, Cape Town, South Africa.
288. Vice-Presidente of IML, Milano, Italy.
289. Centre of Academic Primary Care, Division of Applied Health Sciences, University of Aberdeen, Aberdeen, U K; Observational and Pragmatic Research Institute, Singapore, Singapore.
290. Department of Otorhinolaryngology University of Crete School of Medicine, Heraklion, Greece.
291. European Forum for Research and Education in Allergy and Airway Diseases (EUFOREA), Brussels, Belgium.
292. Cancun, Quintana Roo, Mexico.
294. LungenzClinic Grosshansdorf, Airway Research Center North, Member of the German Center for Lung Research (DZL), Grosshansdorf, Germany Department of Medicine, Christian Albrechts University, Airway Research Center North, Member of the German Center for Lung Research (DZL), Kiel, Germany.

295. Department of Nephrology and Endocrinology, Karolinska University Hospital, Stockholm, Sweden.


297. St Vincent’s Hospital and University of Sydney, Sydney, New South Wales, Australia.

298. Puebla, Mexico.

299. Serviço de Pneumologia-Hosp das Clinicas UFPE-EBSERH, Recife, Brazil.

300. Universidade Federal de São Paulo, São Paulo, Brazil.

301. Centre of Pneumology, Coimbra University Hospital, Portugal.

302. Polibienestar Research Institute, University of Valencia, Valencia, Spain.

303. Pediatric Allergy and Clinical Immunology, Hospital Angeles Pedregal, Mexico City, Mexico.

304. Getafe University Hospital Department of Geriatrics, Madrid, Spain.


306. Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil.

307. Primary Care Respiratory Research Unit Instituto de Investigación Sanitaria de Palma IdisPa, Palma de Mallorca, Spain.

308. Allergy Unit, Presidio Columbus, Rome, Catholic University of Sacred Heart, Rome and IRCCS Oasi Maria SS, Troina, Italy.

309. Mexico City, Mexico.

310. Regione Piemonte, Torino, Italy.

311. Medical University of Graz, Department of Internal Medicine, Graz, Austria.

312. Serviço de Imunoalergologia Hospital da Luz Lisboa Portugal.

313. Hospital de Clinicas, University of Parana, Brazil.

314. Division of Allergy Asthma and Clinical Immunology, Emek Medical Center, Afula, Israel.

315. Honorary Clinical Research Fellow, Allergy and Respiratory Research Group, The University of Edinburgh, Edinburgh, Past President SLAAI, FACAAI, UK.

316. Showa University School of Medicine, Tokyo, Japan.


318. Allergy and Clinical Immunology Department, Centro Médico-Docente la, Trinidad and Clínica El Avila, Caracas, Venezuela.

319. Faculty of Medicine, Autonomous University of Madrid, Spain.

320. The Royal National TNE Hospital, University College London, UK.

321. DIBIMIS, University of Palermo, Italy.

322. Allergy Unit, Department of Dermatology, University Hospital of Zurich, Zürich, Switzerland.

323. Asthma Reference Center, Escola Superior de Ciencias da Santa Casa de Misericordia de Vitoria - Esperito Santo, Brazil.

324. Allergy and Respiratory Research Group, Centre for Population Health Sciences, The University of Edinburgh, Medical School, UK.

325. Department of Pediatrics & Child Health, Department of Immunology, Faculty of Medicine, University of Manitoba, Winnipeg, Manitoba, Canada.

326. INSERM, Université Grenoble Alpes, IAB, U 1209, Team of Environmental Epidemiology applied to Reproduction and Respiratory Health, Université Joseph Fourier, Grenoble, France.

327. Sociedad Paraguaya de Alergia Asma e Inmunología, Paraguay.

328. Division of Allergy, Clinical Immunology and Rheumatology, Department of Pediatrics, Federal University of São Paulo, São Paulo, Brazil.

329. European Health Futures Forum (EHFF), Isle of Wright, UK.

330. ENT, Aachen, Germany.


332. University Hospital Olomouc, Czech Republic.

333. Department of Paediatric and Adolescent medicine, University Hospital of North Norway, Tromsø, Paediatric Research Group, Department of Clinical Medicine, Faculty of Health Sciences,UiT The Arctic University of Norway, Tromsø, Norway.

334. Presidente, IML (Lombardy Medical Initiative), Bergamo, Italy.

335. Pulmonary Division, Heart Institute (InCor), Hospital da Clinicas da Faculdade de Medicina da Universidade de Sao Paulo, Sao Paulo, Brazil.
336. Public Health Institute of Vilnius University, Vilnius, Lithuania.
337. Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro - Brazil
338. RNSA (Réseau National de Surveillance Aérobiologique), Brussel, France.
339. The Hospital for Sick Children, Dallal Ana School of Public Health, University of Toronto, Canada.
340. Imunoalergologia, Centro Hospitalar Universitário de Coimbra and Faculty of Medicine, University of Coimbra, Portugal.
341. Department of ENT, Medical University of Graz, Austria.
342. Campania Region, Division on Pharmacy and devices policy, Naples, Italy.
343. Department of Respiratory Medicine, Hvidovre Hospital & University of Copenhagen, Denmark.
344. Universidade Federal dos Pampas, Uruguaiana, Brazil.
345. Division of Immunopathology, Department of Pathophysiology and Allergy Research, Center for Pathophysiology, Infectiology and Immunology, Medical University of Vienna, Vienna, Austria.
346. Pneumology and Allergy Department CIBERES and Clinical & Experimental Respiratory Immunology, IDIBAPS, University of Barcelona, Spain.
347. Vilnius University Institute of Clinical Medicine, Clinic of Children’s Diseases, and Institute of Health Sciences, Department of Public Health, Vilnius, Lithuania; European Academy of Paediatrics (EAP/UEMS-SP), Brussels, Belgium.
348. Department of Lung Diseases and Clinical Immunology Allergology, University of Turku and Tervestalo allergy clinic, Turku, Finland.
349. PELyon; HESPER 7425, Health Services and Performance Research - Université Claude Bernard Lyon, France.
350. Immunology and Allergy Unit, Department of Medicine Solna, Karolinska Institutet and University Hospital, Stockholm.
351. Department of Chest Medicine, Centre Hospitalier Universitaire UCL Namur, Université Catholique de Louvain, Yvoir, Belgium.
352. University of Bari Medical School, Unit of Geriatric Immunology and Allergy, Bari, Italy.
353. Pulmonary Unit, Department of Medical Specialties, Arcispedale S Maria Nuova/IRCCS, AUSL di Reggio Emilia, Italy.
354. FIHLA, Finnish Lung Association, Helsinki, Finland.
355. Pulmonary Environmental Epidemiology Unit, CNR Institute of Clinical Physiology, Pisa, Italy; and CNR Institute of Biomedicine and Molecular Immunology "A Monroy", Palermo, Italy.
356. Medical University, Plovdiv, Bulgaria, Department of Otorhinolaryngology, Plovdiv, Bulgaria.
357. Sotiria Hospital, Athens, Greece.
358. Dept of Otorhinolaryngology, Universitätsklinikum Düsseldorf, Germany.
360. Nova Southeastern University, Fort Lauderdale, Florida, USA.
361. Department of Otolaryngology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore.
362. Department of Medicine, Clinical Immunology and Allergy, McMaster University, Hamilton, Ontario, Canada.
363. Division of Immunodermatology and Allergy Research, Department of Dermatology and Allergy, Hannover Medical School, Hannover, Germany.
364. Department of Medicine Solna, Immunology and Allergy Unit, Karolinska Institutet and Department of ENT diseases, Karolinska University Hospital, Stockholm, Sweden.
365. Eschelman School of Pharmacy, University of North Carolina, Chapel Hill, NC, USA.
366. International Primary Care Respiratory Group IPCRG, Aberdeen, Scotland.
368. Allergologyst - Medical College of Medical Faculty, Thracian University, Stara Zagora, Bulgaria.
369. Department of Research, Olmsted Medical Center, Rochester, Minnesota, USA.
370. Cyprus International Institute for Environmental & Public Health in Association with Harvard School of Public Health, Cyprus University of Technology, Limassol, Cyprus; Department of Pediatrics, Hospital "Archbishop Makarios III", Nicosia, Cyprus.
371. Celal Bayar University Department of Pulmonology, Manisa, Turkey.
372. The Allergy and Asthma Institute, Pakistan.
373. Department of Paediatrics and Child Health, Red Cross Children’s Hospital, and MRC Unit on Child & Adolescent Health, University of Cape Town, Cape Town, South Africa.
374. Department of Otolaryngology Head and Neck Surgery, Beijing Tong Ren Hospital and Beijing Institute of Otolaryngology, Beijing, China.
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Address for correspondence
Professor Jean Bousquet
CHU Arnaud de Villeneuve, 371 Avenue du Doyen Gaston Giraud, 34295 Montpellier Cedex 5, France  Tel +33 611 42 88 47, Fax :+33 467 41 67 01  jean.bousquet@orange.fr

Conflict of interest
F Amat reports grants and personal fees from Novartis, non-financial support from Zambon, Stallergènes Greer, outside the submitted work.
C Bachert reports personal fees from Uriach, Mylan, outside the submitted work.
F de BLAY reports grants from Stallergenes-Greer, personal fees from Novartis, ALK, Mundipharma, Astra Zeneca, Boehringer, Teva, other from Stallergenes-Greer, Novartis, ALK, Medapharma, Teva, Boehringer, Astra Zeneca, outside the submitted work.
S Bosnic-Anticevich reports personal fees from Teva, Boehringer Ingelheim, Sanofi, AstraZeneca, GSK, grants from Teva, Meda, outside the submitted work.
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W Carr reports other from Regeneron/Sanofi, AstraZeneca, Teva, Glenmark Pharmaceuticals, Boehringer Ingelheim, Optinose, outside the submitted work.
G Correia-de-Sousa reports other from Boehringer Ingelheim, Novartis, grants from AstraZeneca outside the submitted work.
A Cruz reports grants and personal fees from GSK, personal fees from Boehringer Ingelheim, AstraZeneca, Novartis, Chiesi, Eurofarma, Mylan, personal fees from Merck, Sharp & Dohme, Sanofi-Aventis, outside the submitted work.
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P Kuna reports personal fees from Adamed, Boehringer Ingelheim, AstraZeneca, personal fees from Chiesi, FAES, Berlin Chemie, Novartis, Polpharma, Allergopharma outside the submitted work.
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D Larenas Linnemann reports personal fees from GSK, AstraZeneca, MEDA, Boehringer Ingelheim, Novartis, Grunenthal, UCB, Amstrong, Siegfried, DBV Technologies, MSD, Pfizer grants from Sanofi, AstraZeneca, Novartis, UCB, GSK, Teva, Chiesi, Boehringer Ingelheim outside the submitted work.
R Mösges reports personal fees from ALK, allergopharma, Allergy Therapeutics, Friulchem, Hexal, Servier, Klosterfrau, Bayer, FAES, GSK, MSD, Johnson&Johnson, Meda, Stada, UCB, Nuvo, grants from ASIT biotech, Leti, Optima, BitopAG, Hulka, Ursapharm, grants and personal fees from Bencard, Stallergenes, personal fees and non-financial support from Lofarma, Novartis, non-financial support from Atmos, Roxall, Bionorica, Otonomy, Ferrero, outside the submitted work.
R Naclerio reports fees from advisory boards Sanofi and Novartis.
Y Okamoto reports personal fees from Shionogi Co Ltd, Torii Co Ltd, GSK, MSD, Kyowa Co Ltd, from Eizai Co Ltd, grants and personal fees from Kyorin Co Ltd, Tiho Co Ltd, grants from Yakuruto Co Ltd, Yamada Bee Farm, outside the submitted work.

N Papadopoulos reports personal fees from Abbvie Novartis, Faes Farma, BIOMAY, HAL, Nutricia Research, Menarini, Novartis, MEDA, MSD, Omega Pharma, Danone, grants from Menarini outside the submitted work.

JL Pépin reports grants from Air Liquide Foundation, AGIR à dom, AstraZeneca, Fisher & Paykel, Mutualia, Philips, Resmed, Vitalaire, other from AGIR à dom, AstraZeneca, Boehringer Ingelheim, Jazz Pharmaceutical, Night Balance, Philips, Resmed, Sefam, outside the submitted work.

O Pfaar reports grants and personal fees from ALK-Abelló, Allergopharma, Stallergenes Greer, HAL Allergy Holding BV/HAL Allergie GmbH, Bencard Allergie GmbH/Allergy Therapeutics, Lofarma, ASIT Biotech Tools SA, Laboratorios LETI/LETI Pharma, Anergis SA, grants from Biomay, Nuvo, Circassia, Glaxo Smith Kline; personal fees from Novartis Pharma, MEDA Pharma, Mobile Chamber Experts (a GA2LEN Partner), Pohl-Boskamp, Indoor Biotechnologies, outside the submitted work.

D Plavec reports grants and personal fees from GlaxoSmithKline, personal fees from Menarini, Pliva, AbbVie, Novartis, MSD, Chiesi, Revenio personal fees and non-financial support from Boehringer Ingelheim, non-financial support from Philips, outside the submitted work.

D Price reports grants and personal fees from Aerocrine, from Almirall, Amgen, Cipla, GlaxoSmithKline, Kyorin, Merck, Mylan, Skyepharma; grants from AKL Research and Development Ltd., Respiratory Effectiveness Group, British Lung Foundation, UK National Health Service, grants and personal fees from AstraZeneca, Boehringer Ingelheim, Chiesi, Mundipharma, Napp, Novartis, Pfizer, Teva, Theravance, Zentiva; non-financial support from Efficacy and Mechanism Evaluation programme, Health Technology Assessment, outside the submitted work; and stock/stock options from AKL Research and Development Ltd which produces phytopharmaceuticals; and owns 74% of the social enterprise Optimum Patient Care Ltd (Australia, Singapore, and UK) and 74% of Observational and Pragmatic Research Institute Pte Ltd (Singapore), outside the submitted work.

D Ryan reports personal fees from MEDA, personal fees from Stallergenes outside the submitted work.

R Stelmach reports grants from São Paulo Research Foundation, MSD, grants and personal fees from Novartis, grants, personal fees and non-financial support from AstraZeneca, Chiesi; personal fees and non-financial support from Boheringer Ingelheim, outside the submitted work.

Todo Bom reports grants and personal fees from Novartis, Boehringer Ingelheim, Mundipharma, GSK, personal fees from Teva Pharma, AstraZeneca, grants from Leti outside the submitted work.

M Wagenmann reports personal fees from AstraZeneca, Bionorica SE, HAL Allergy, MEDA Pharma, Stallergenes, Teva, ALK-Abelló, grants and personal fees from Allergopharma, Sanofi-Aventis, grants from Allakos, grants from F Hoffmann-La Roche, GlaxoSmithKline, Otonomy, Strekin, outside the submitted work.

S Waserman reports personal fees from Merck, GSK, Novartis, Behring, Shire, Sanofi, Barid Aralez, Mylan Meda, Pediphiarm outside the submitted work.

T Zuberbier reports and Organizational affiliations: Committee member: WHO-Initiative “Allergic Rhinitis and Its Impact on Asthma” (ARIA) - Member of the Board: German Society for Allergy and Clinical Immunology (DGAKI) - Head: European Centre for Allergy Research Foundation (ECARF) - Secretary General: Global Allergy and Asthma European Network (GA2LEN) - Member: Committee on Allergy Diagnosis and Molecular Allergology, World Allergy Organization (WAO), outside the submitted work.

The other authors have no COI to declare.
Abstract

Allergic Rhinitis and its Impact on Asthma (ARIA) has evolved from a guideline using the best approach to integrated care pathways (ICPs) using mobile technology in AR and asthma multimorbidity. The proposed next phase of ARIA is Change Management (CM) with the aim of providing an active and healthy life to rhinitis sufferers and to those with asthma multimorbidity across the life cycle whatever their gender or socio-economic status in order to reduce health and social inequities incurred by the disease. ARIA has followed the 8-step model of Kotter to assess and implement the impact of rhinitis on asthma multimorbidity and to propose multimorbid guidelines. A second change management strategy is proposed by ARIA Phase 4 to increase self-medication and shared decision making in rhinitis and asthma multimorbidity. An innovation of ARIA has been the development and validation of IT evidence-based tools (MASK: Mobile Airways Sentinel Network) that can inform patient decisions on the basis of a self-care plan proposed by the health care professional.

Article type: Rostrum

Key words: Change management, rhinitis, asthma, ARIA.

Word count: 3852

1 Table

4 Figures

Abstract word count: 165
Abbreviations

AHA: Active and Healthy Ageing
AIRWAYS ICPs: Integrated care pathways for airway diseases
AIT: Allergen immunotherapy
AR: Allergic rhinitis
ARIA: Allergic Rhinitis and its Impact on Asthma
BAMSE: Barn Allergi Milj. Stockholm Epidemiolog Projekter
CDSS: Clinical decision support system
CM: Change management
CM2: Second phase of change management
DG CONNECT: Directorate General for Communications Networks, Content & Technology
DG Santé: Directorate General for Health and Food Safety
DG: Directorate General
EAACI: European Academy of Allergy and Clinical Immunology
EFA: European Federation of Allergy and Airways Diseases Patients’ Associations
EGEA: Epidemiological study on the Genetics and Environment of Asthma, bronchial hyperresponsiveness and atopy
EIP on AHA: European Innovation Partnership on Active and Healthy Ageing
EIP: European Innovation Partnership
ELF: European Lung Foundation
EQ-5D: Euroquol
ERS: European Respiratory Society
EUFOREA: European Forum for Research and Education in Allergy
GARD: WHO Global Alliance against Chronic Respiratory Diseases
HCP: Health care professional
ICP: Integrated care pathway
ICT: Information and communication technology
IT: Information technology
JA-CHRODIS: Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle
MACVIA-LR: contre les MAadies Chroniques pour un Vieillissement Actif (Fighting chronic diseases for AHA)
MASK: Mobile Airways Sentinel network
MAS: German Multicenter Allergy Study
MeDALL: Mechanisms of the Development of Allergy
mHealth: mobile health
OTC: Over the counter
POLLAR: Impact of air POLLution on Asthma and Rhinitis
QOL: Quality of life
SCUAD: Severe chronic upper airway disease
SDM: Shared decision making
TRL: Technology Readiness level
VAS: Visual analogue scale
WPAI-AS: Work Productivity and Activity questionnaire
Introduction

Allergic Rhinitis and its Impact on Asthma (ARIA) has evolved from a guideline using the best approach \(^1\) to integrated care pathways (ICPs) using mobile technology in AR and asthma multimorbidity \(^6\). The term co-morbidity is commonly used for allergic diseases, but multimorbidity might be more appropriate. Comorbidity is the presence of one or more additional diseases co-occurring with a primary disease or the effect of such additional disorders or diseases. Multimorbidity is a term which means co-occurring diseases in the same patient \(^7\), \(^8\).

ARIA provides an evidence-based approach for managing the patient’s needs but real-life data have shown that few patients use guidelines and that they often self-medicate (Menditto, in preparation). Moreover, patients largely use OTC medications dispensed in pharmacies \(^9\), \(^11\). Self-care and shared decision making (SDM) centered around the patient should be used more frequently.

Change is inevitable in health care. ARIA has followed a change management (CM) strategy in the past, but a new revised plan should be considered in order to fill the gaps of knowledge translation into practice and to increase the benefits of self-care in care pathways (ICPs) using the currently-available ICT tools \(^12\). These changes should prepare and support individuals, teams and organizations in making organizational change centered around the patient for more efficient care.

1- Background

1-1- The four ARIA phases

ARIA was initiated during a World Health Organization (WHO) workshop in 1999 \(^2\) and has evolved in four phases:

Phase 1: Development of an evidence-based document to provide a guide for the diagnosis and management of AR and asthma multimorbidity \(^1\), \(^2\). In 2008, ARIA was updated using the same recommendation system \(^1\), \(^13\). ARIA has been disseminated and is implemented in over 70 countries around the world \(^14\).

Phase 2: 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 and recommendation methodology for guidelines \(^3\), \(^5\). When guidelines are made using the same methodology, the recommendations are similar \(^5\), \(^15\).
Phase 3: ARIA focused on the implementation of emerging technologies for individualized and predictive medicine to develop ICPs for the management of AR and asthma by a multi-disciplinary group centered around the patients\textsuperscript{16,19,20,23} (MASK: Mobile Airways Sentinel Network).

The proposed ARIA phase 4 is CM to provide an active and healthy life to rhinitis and asthma sufferers across the life cycle whatever their gender or socio-economic status with the aim to reduce health and social inequities globally.

1-2- Shared decision making and patient empowerment

In SDM, both the patient and the physician contribute to the medical decision-making process, placing the patient at the centre of the decision-making paradigm\textsuperscript{24}. Physicians explain treatments and alternatives to patients who then choose the treatment option that best aligns with their beliefs, lifestyles and goals along with the benefits and risks\textsuperscript{25}. In contrast to SDM, the traditional medical care system places physicians in a position of authority, with patients playing a passive role in care. Patients want greater involvement in SDM\textsuperscript{26}. An innovation of SDM in ARIA is the use of IT evidence-based tools that can inform patient decisions on the basis of a guided self-management plan proposed by their health care professionals\textsuperscript{27}. In asthma, the effectiveness of four SDM studies shows improvement of control and some other parameters but more studies are needed to confirm the data\textsuperscript{28}.

1-3- Change management

Change is inevitable in health care. However, many change projects fail due to varied belief and cultural circumstances, poor planning, unmotivated staff, deficient communication, or excessively frequent changes\textsuperscript{29}.

CM aims to prepare and support individuals, teams and organizations in making organizational change. It proposes methods redirecting or redefining resources, business processes, budget allocation and/or modes of operation. When properly applied, CM significantly changes healthcare and its organization. However, health systems differ largely between countries or even regions and a combination of CM with ICPs may be more relevant allowing each organization to use the CM principles according to their needs and regulations. CM deals with different disciplines from healthcare, behavioral and social sciences to IT and business solutions.

Although theories may seem abstract and impractical for healthcare practice, they can help in planning solutions to common healthcare problems\textsuperscript{29}. The Lewin’s 3-Step model is widely used\textsuperscript{30,31}: unfreezing, moving, and refreezing\textsuperscript{31}. Lippitt\textsuperscript{32} and Kotter\textsuperscript{12} have added intermediate steps (Table 1)
Several models of organizational and personal change have been reviewed for respiratory diseases. Kotter’s theory has been applied to different fields of medicine and pharmacies.

2- ARIA Phases 1 and 2 followed the Kotter’s 8-step change model

2-1- Goals

Guidelines such as GINA (Global INitiative for Asthma), GOLD (Global initiative for Lung Diseases), EPOS and ARIA developed a CM strategy that was very effective and produced many updates and revisions while having a positive impact on clinical care and influencing research priorities.

Most guidelines are condition specific but ARIA was unique as it included for the first time the multimorbid component of the airway diseases. Although it followed the patient’s perspectives, epidemiologic evidence and some supporting mechanistic studies, this concept was not accepted by the leadership of GINA who considered neither the asthma-rhinitis multimorbidity concept nor the benefit for the patients.

2-2- The 8-step model

2-2-1- Establish a sense of urgency

The sense of urgency should identify and highlight the potential threats and the repercussions that might arise in the future by examining the opportunities which can be tapped through effective interventions. In AR and asthma, in the 1990s, the sense of urgency was to provide guidelines that could reduce both the burden of the diseases and the deaths (in asthma). Although there were papers indicating the links between the upper and lower airways, the impact of rhinitis on asthma was not fully recognized and ARIA was initiated to better recognize the inter-relationships between the two diseases and to propose multimorbid guidelines.

2-2-2- Create a guiding coalition

The ARIA working group was initiated during a WHO meeting (December 1999) and evolved as a powerful group with 400 members in 70 countries. Members have been working together for years and include all stakeholders needed for CM. The patients’ organization EFA (European Federation of Allergy and Airways Diseases Patients’ Associations) has always been an active member of ARIA.

2-2-3- Develop a vision and strategy
The ARIA vision has always been to provide a guide for the diagnosis and management of AR and asthma multimorbidity, including developing countries, using the best available evidence. ARIA has established two major targets: the recognition and implementation of the asthma-rhinitis multimorbidity as well as a new classification (intermittent-persistent and mild-moderate severe AR) to meet patients’ expectations. Moreover, ARIA priorities have always included primary care physicians, pharmacists and patients’ organizations.

2-2-4- Communicate the change vision

One of the ARIA strengths has been to communicate its vision effectively worldwide. Over 1,000 papers have been posted on Pubmed from over 50 countries using the ARIA recommendations. The number of training sessions in over 70 countries cannot be counted. ARIA has been endorsed by many governments and international organizations: ARIA recommendations have been used for the labeling of allergen immunotherapy by the European Medicine Agency.

2-2-5- Empower others to act on the vision

Organizational processes and structures are in place and are aligned with the overall organizational vision. However, a continuous check is needed for barriers and for people who are resisting change. We have implemented proactive actions to remove the obstacles involved in the process of change.

ARIA has been recognized as the major rhinitis and asthma multimorbidity guideline for years in most countries except for the US and Japan. However, the recent US guidelines are using the evidence-based approach of ARIA (GRADE: Grading of Recommendations, Assessment, Development and Evaluation), and the recommendations are similar to those of ARIA. The recent Japanese guidelines for AR are also making bridges with ARIA.

2-2-6- Generate short-term wins

As proposed by Kotter, creating short-term wins early in the change process, instead of having one long-term goal, can give a feeling of victory in the early stages of change, which will reinforce support to the strategy.

The concept of asthma and rhinitis multimorbidity is now globally accepted in developed and developing countries. It is now recognized that multimorbidity is independent of IgE-mediated allergy and new phenotypes of severe airway disease have been identified. The implementation of the multimorbid concept in clinical practice has a direct benefit for the patient whose nasal symptoms are often more bothersome than asthma.
2-2-7- Consolidate gains and produce more change

The goals of step 7\textsuperscript{12} are to achieve continuous improvement by analysing the success stories individually and improving from those individual experiences. These goals are exactly those that have been followed by ARIA for the past 18 years.

2-2-8- Anchor new approaches in the culture and institutionalize the changes

The goals of step 8\textsuperscript{12} are met by the ARIA strategy:

1. Discuss widely the successful stories related to change initiatives.
2. Ensure that the change becomes an integral part of the practice and is highly visible.
3. Ensure that the support of the existing as well as the new leaders continues to extend towards the change.

2-3- Results, drawbacks and solutions

ARIA has fully achieved its goals following the 8-step Kotter’s model of (Figure 1). The outcome assessment can be measured (i) by the numbers of citations of ARIA. ARIA 2001 has been cited 1750 times, ARIA 2008 over 2300 times (only paper in asthma cited >200 times a year) and ARIA 2010 710 times. This initiative is far better cited than GINA. (ii) By the countries that have endorsed ARIA in their national allergy program: Finland, Malaysia, Philippines, Portugal, Singapore. (iii) By the approval of treatments by agencies: The European Medicines Agency used the ARIA classification in the approval of Acarizax® (mite sublingual immunotherapy).

Some drawbacks have been pointed out in Kotter’s change model\textsuperscript{12}. In particular, the model is essentially top-down and may discourage any scope for participation or co-creation. In ARIA, we considered that the first CM model was a great success but that it’s life cycle had come to an end. It was then decided within the coalition to propose a new CM model based on patients’ needs and emerging technologies (CM2 model).

Since the Kotter model cannot be redesigned, we proposed a new maturity CM model based on the same Kotter’s 8-step change model\textsuperscript{12}. We used ARIA Phase 3 (care pathways for rhinitis and asthma multimorbidity using mobile technology)\textsuperscript{6} to better plan the second CM model (CM2 model) and make new assumptions with a patient’s centered approach.

3- The Allergy Diary strengthens change management
In 2012, the European Commission launched the European Innovation Partnership on Active and Healthy Ageing (DG Santé and DG CONNECT) (52). The B3 Action Plan, devoted to innovative integrated care models for chronic diseases, selected integrated care pathways for airway diseases (AIRWAYS ICPs) with a life cycle approach as the model of chronic diseases. An AIRWAYS ICPs Action Plan was devised, implemented and scaled up. AIRWAYS ICPs is a GARD (WHO Global Alliance for Chronic Respiratory Diseases) research demonstration project (Figure 2).

MASK, the ARIA Phase 3, is an AIRWAYS ICPs tool. It represents a Good Practice focusing on the implementation of multi-sectoral care pathways using emerging technologies with real life data in rhinitis and asthma multi-morbidity. MASK follows the JA-CHRODIS (Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle, 2nd EU Health Programme 2008-2013) recommendations for good practices.

MASK was initiated to reduce the global burden of rhinitis and asthma, by giving the patient a simple tool to better prevent and manage respiratory allergic diseases. More specifically, MASK should help to (i) understand the disease mechanisms and the effects of air pollution in allergic diseases (ii) better appraise the burden incurred by medical needs but also indirect costs, (iii) propose novel multidisciplinary care pathways integrating pollution and patients’ literacy, (iv) improve work productivity, (v) propose the basis for a sentinel network at the EU level for pollution and allergy and (vi) assess the societal implications of the project to reduce health and social inequalities globally.

The mobile technology of MASK is the Allergy Diary, an App (Android and iOS) freely available for AR and asthma sufferers in 23 countries (16 EU countries, Argentina, Australia, Brazil, Canada, Mexico, Switzerland and Turkey) and 16 languages (translated and back-translated, culturally adapted and legally compliant) (Figure 3). Anonymized users fill in a simple questionnaire on asthma and rhinitis upon registration and daily assess the impact of the disease using a visual analogue scale (VAS) for global allergy symptoms, rhinitis, conjunctivitis, asthma and work. Moreover, a questionnaire is applied every week to assess disease impact on patients’ QOL (EQ-5D).

Data of pilot studies in up to 17,000 users and over 95,000 days are available. The Allergy Diary has been validated and has shown that (i) totally anonymized geolocation can be used in 23 countries (in preparation), (ii) data can be analyzed in 23 countries and 17 languages, (iii) sleep, work productivity and daily activities are impaired in AR, (iv) daily work productivity is associated with AR severity, (v) the everyday use of medications can be monitored proposing a novel assessment of
treatment patterns \(^{20}\), (vi) novel patterns of multimorbidity have been identified \(^{22}\) and confirmed in epidemiological studies \(^{8,62}\) and (vii) over 70\% of AR patients self-medicate and are non-adherent to medications (Menditto, in preparation).

The **Allergy Diary** (TRL 9, Technology Readiness level 9) represents a validated mHealth tool for the management of AR. Asthma has also been monitored but data have not yet been analyzed. Economic impact can be monitored using work productivity. The results of the Allergy Diary have made innovative approaches of AR possible and are directly strengthening CM strategies in ARIA.

### 3-3- Transfer of Innovation of MASK

A Transfer of Innovation (Twining) project has been funded by the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) using MASK in 25 Reference Sites or regions across Europe, Argentina, Australia, Brazil, Columbia and Mexico \(^{63}\). The number of countries is increasing and MASK should be rapidly operative in the US, China, India (in English only) and Japan. This will improve the understanding, assessment of burden, diagnosis and management of rhinitis in old age by comparison with an adult population. The Twining has been tested in Germany (Region Kohln-Bonn) in a pilot study that has now been extended to the other German cities and countries of the Twining project.

### 3-4- Clinical decision support system

Clinical decision support systems (CDSS) are software algorithms that advise health care providers on the diagnosis and management of patients based on the interaction of patient data and medical information. They should be based on the best evidence to aid patients and health care professionals to jointly determine treatment (SDM). In allergic rhinitis, the MASK CDSS is incorporated into a tablet interoperable with the **Allergy Diary** \(^{64}\) for health care professionals (ARIA Allergy Diary Companion) \(^{6,59}\). This is based on an algorithm to aid clinicians to select pharmacotherapy for AR patients and to stratify their disease severity \(^{65}\). This approach will be adapted for the patient’s guided self-care in a context of SDM.

### 3-5- POLLAR

Interactions between air pollution, sleep and allergic diseases are clear but insufficiently understood. POLLAR (Impact of Air POLLution in Asthma and Rhinitis) is a new Horizon 2020 project of the EIT Health (European Institute of Innovation and Technology for Health) that will embed environmental data into the **Allergy Diary**. POLLAR aims at combining emerging technologies (including the **Allergy Diary**, Technology Readiness level TRL9 meaning that the system is proven in operational environment) with machine learning to (i) understand the effects of air pollution in AR and
its impact on sleep, work and asthma, (ii) assess societal consequences, shared with citizens, and professionals (iii) propose preventive strategies including a sentinel network and (iv) develop participative policies.

4- ARIA Phases 3 and 4 deploy a novel Kotter’s 8-step change model

4-1- Goals

Although the first CM model developed by the ARIA Initiative was a great success, there are still unmet needs in the treatment of asthma and rhinitis multimorbidity. In ARIA Phase 4, we encourage the participation of all the stakeholders.

4-2- The 8-step model

4-2-1- Establish a sense of urgency

ICPs will include multi-disciplinary structured care plans detailing the key steps of patient care including self-care as proposed by AIRWAYS ICPs (Integrated care pathways for airway diseases). GRADE-based guidelines for physicians are available for AR and their recommendations are similar. However, they are based on the assumption that patients regularly use their treatment and are not tested with real-life data. Unfortunately, adherence to treatment is very low and real-life studies do not necessarily accord with all recommendations. New-generation guidelines embedding real life data are being developed.

4-2-2- Create a guiding coalition

The ARIA working group initiated in 1999 includes over 500 members in 70 countries. A successful coalition working on CM2 has been identified within the group.

The AIRWAYS ICPs coalition was established in 2014 and is part of the European Innovation Partnership on Active and Healthy Ageing (DG Santé and DG CNECT). Moreover, many national and European scientific societies (European Academy of Allergy and Clinical Immunology (EAACI), European Respiratory Society (ERS) and International Primary Care Respiratory Group (IPCRG)), and other patients’ organization (European Lung Foundation (ELF), Asthma UK) have joined the coalition. It is a WHO GARD (WHO Global Alliance against Chronic Respiratory Diseases) demonstration project. Finally, the transfer of innovation of ARIA has been carried out to the Reference Sites of the European Innovation Partnership on Active and Healthy Ageing.
This CM2 guiding coalition is already in place in EUFOREA (European Forum for Research and Education in Allergy and Airways Diseases, http://www.euforea.eu)\(^6\).

**4-2-3- Develop a vision and strategy**

The vision of ARIA phase 4 is to provide CM2 for AR and asthma multimorbidity in order to develop SDM with the ultimate goal of improving AR and asthma control while maintaining quality-of-life and reducing costs, using mobile technology and real-time data management to inform decisions.

The strategy for realizing the changes is based on the patient-centered implementation of ICPs\(^5\) using IT solutions such as the *Allergy Diary\(^6\).*

**4-2-4- Communicate the change vision**

The updated vision (CM2) will use the experience of the first CM strategy. It has already been discussed among the ARIA CM coalition members and the present paper is the first to be published. However, it takes time to address the concerns of all stakeholders, and papers published recently on the Allergy Diary may help to convince many. ARIA is involving a maximum number of people to deploy the CM vision.

The integration of new paths of understanding health and change is a requirement for the strategy. The CM2-model clearly expands and strengthens the potential for actual change to occur and take hold in all kinds of organizations and institutions. Supplemenitary to the ambition of change in existing practices and institutions, it is also important to consider the integration of other modes of communication and dissemination on the basis of healthy behaviour. A central example is the general need to raise the level of health literacy in society. The general public should clearly not be perceived simply as “patients waiting for something to happen”. They should have the ability to navigate and understand health messages, an essential tool for self-managing wellbeing, even before any actual condition or major challenge actually occurs. But to do so, one must consider how to improve this health literacy by integrating it much better into the educational system and cultural settings to which it applies. This is a very long-term investment in self-care and prevention. A later target audience with a higher level of health literacy will naturally also ensure an easier adoption of subsequent health messages, possibly using ICT\(^ 67\). The basis for understanding is simply enhanced compared to the previous scenario. In a similar line of thinking, one could also consider a wider community-oriented approach to dissemination. This could also cover social media and self-help groups, as some of the later patients would benefit not only from both personal previous experience and knowledge about these ailments, but also from a supportive environment, that would be better able to support and help these citizens/friends/family members – regardless of age – in their attempt to adapt to new modes of
behavior. This is a wider application of the CM2-model and should also be considered in our work to help patients and citizens.

4-2-5- Empower others to act on the vision

Organizational processes and structures are in place and are aligned with the overall organizational vision. However, we need to continuously check for barriers and for those who are resistant to change and focus on the education of both physicians and patients on how to achieve the best outcomes of treatment. We are acting proactively to remove the obstacles involved in the process of change.

4-2-6- Generate short-term wins

We propose to create new short-term (e.g. 12 months) and medium-term (e.g. 24 months) targets. In 2018, a high-level meeting organized by POLLAR will approach the improvement in care pathway design to enhance patient participation, health literacy and self-care through technology-assisted ‘patient activation’. In this meeting, rhinitis and asthma multimorbidity will be used as a model of non-communicable disease (Figure 4). Three major aspects of ICPs will be considered: self-care, pharmacy care and next-generation guidelines in which the recommendations of the GRADE-guidelines on AR will be tested in real life using MASK.

4-2-7- Consolidate gains and produce more change

Most of the goals of Kotter’s change model step-7 have been met by the ARIA CM and will be further developed in CM2.

Conclusions

For the past 18 years, ARIA has had the major goal of providing a guide for the diagnosis and management of AR and asthma multimorbidity applicable to developing countries using the best evidence. ARIA Phases 1 and 2 were developed in accordance to Kotter’s 8 step change model and can be used as a model of CM in chronic diseases. However, there are still unmet needs for the management of rhinitis and asthma in real life.

A second CM model has been proposed by ARIA Phases 3 and 4. It was initiated by the development in 23 countries of an App that showed partly unexpected results. Patients with AR (and possibly with asthma) do not follow physicians’ advice: they self-medicate. There is an urgent need to harness this information and to update our concept of treatment as well as treatment adherence using mobile technology and care pathways. This is the goal of ARIA Phase 4 and the second wave of CM.
References


Table 1: Examples of planned change management models. Adapted from (31)

<table>
<thead>
<tr>
<th>Lewin (68)</th>
<th>Kotter (12)</th>
<th>Lippitt (32)</th>
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<tbody>
<tr>
<td><strong>Unfreezing</strong></td>
<td><strong>Moving</strong></td>
<td><strong>Refreezing</strong></td>
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<td><strong>Step 1</strong>: Establish a sense of urgency</td>
<td><strong>Step 4</strong>: Communicate the change vision</td>
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<td><strong>Step 3</strong>: Develop a vision and strategy</td>
<td><strong>Step 6</strong>: Generate short-term wins</td>
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<td><strong>Phase 1</strong>: Diagnose the problem</td>
<td><strong>Phase 2</strong>: Assess motivation and capacity for change</td>
<td><strong>Phase 3</strong>: Assess change agent’s motivation and resources</td>
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<td><strong>Phase 2</strong>: Assess motivation and capacity for change</td>
<td><strong>Phase 3</strong>: Assess change agent’s motivation and resources</td>
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<td><strong>Phase 4</strong>: Select a progressive change objective</td>
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<td><strong>Phase 5</strong>: Choose appropriate role of the change agent</td>
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<td><strong>Phase 6</strong>: Terminate the helping relationship</td>
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Figure 1: Change management strategy of ARIA Phases 1 and 2


Figure 2: Links between ARIA and MASK for change management


Figure 3: The Allergy Diary

GPDR: General Data Protection Regulation (https://www.eugdpr.org)

Figure 4: Change management based on next-generation ICPs
Current knowledge (2000)

- Clinical practice: allergic multi-morbidity is common and represents a patient’s need
  - ECRHS: epidemiologic evidence for allergic multi-morbidity
  - Nasal and bronchial biopsies confirm commonalities in rhinitis and asthma

Mechanistic, epidemiological and clinical studies reinforcing the ARIA multi-morbidity concept

- Multi-morbidity not occurring by chance, independent of IgE
- T2 origin of multi-morbidity
- Multi-morbid polysensitized phenotype
- Novel multi-morbid patterns

ARIA-GRADE guideline
Clinical practice
Birth cohorts (BAMSE, MAS...)
SDM

Change management: allergic multi-morbidity is adopted in clinical practice worldwide
The Allergy Diary: **MASK-air**

The Allergy Diary was developed in collaboration between MACVIA-LR and ARIA.

MACVIA-LR (Contre les Maladies Chroniques pour un Vieillissement Actif en Languedoc-Roussillon, France) is a reference site of the European Innovation Partnership on Active and Healthy Ageing aimed at fighting chronic disease.

The ARIA (Allergic Rhinitis and its Impact on Asthma) initiative aims to educate and implement evidenced-based management of allergic rhinitis in conjunction with asthma.

23 countries (+3)  
17 languages  
25,000 users  
180,000 VAS days  

GPDR

Free on Android and iOS
Patient with allergic rhinitis symptoms

Improvement in care pathway design to enhance patient participation, health literacy and self-care through technology assisted ‘patient activation’

ARIA in the pharmacy

Next-generation ARIA-WAO guidelines

General practitioner

Specialist

Emergency care (asthma)