Towards tailored and targeted asthma self-management using mobile technologies

MY AIR COACH

PREDICTIVE
SELF-MANAGEMENT
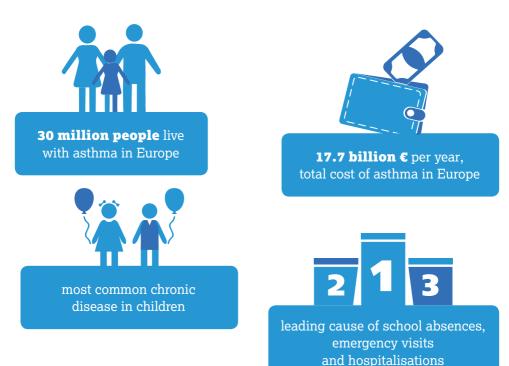OF ASTHMA

Asthma: the problem

Asthma is a lifelong chronic disease caused by inflammation of the airways, affecting people of all ages, races and genders. Asthma attacks cause breathlessness, wheezing and cough. Understanding the triggers for asthma attacks and how to avoid them is important for improving the quality of life of asthma patients.

There are many different forms of asthma, some more severe than others. The triggers, and reactions to these triggers, differ greatly between patients. We think that asthma can only be effectively controlled through individualised treatment and effective patient self-management. We want to find out if the use of modern tools to guide asthma patients in their own environment holds the promise of patient empowerment towards improving their asthma control.

30 million people live with asthma in Europe

17.7 billion € per year, total cost of asthma in Europe

most common chronic disease in children

leading cause of school absences, emergency visits and hospitalisations

myAirCoach: asthma control through mobile health technology

MyAirCoach is aiming to provide a novel support for patients, their families and healthcare professionals. It will help them take the right steps at the right time to prevent asthma attacks.

MyAirCoach is a three-year EU research project funded by the Horizon 2020 Research and Innovation framework programme. Twelve European partners are involved in the project and through collaboration with a group of patients will develop a new user-friendly mobile health system that aims to transform asthma management.

MyAirCoach sensor-based approach will increase patients' awareness of their asthma and use the collected information in order to support their decisions and help them improve adherence with and effectiveness of their asthma treatment plan.

myAirCoach uniqueness

[WHAT]
Intelligent sensing and automated transmission for patient ease-of-use

MyAirCoach device will be able to monitor various aspects affecting asthma through novel sensing technology measuring the patients' physiological, environmental and behavioural information, enabling both patient and carers to better understand how to manage their asthma.

MyAirCoach inhaler will connect with the patients' smartphone and send all collected information to a platform that will not only predict uncontrolled asthma but will also provide guidance to patients on how to manage and reduce asthma risks accordingly.

[WHY]
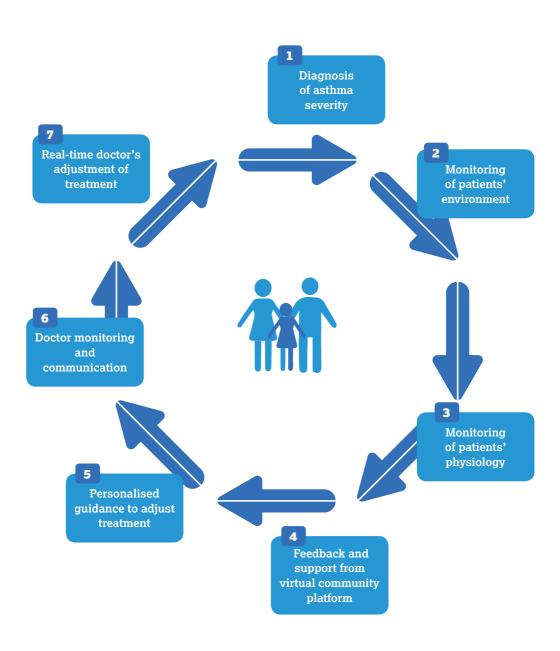### To improve asthma control, adherence and management
Patients need to be equipped to measure early indications of important risk factors and changes in the lungs to better cope with their asthma. Thanks to the patients' direct, personalised and real-time information, myAirCoach will make accurate estimations of the patient's disease progression, helping patients and clinicians to predict the worsening of asthma.

[HOW]
Through a digital patient-centric environment supported by health professionals
MyAirCoach system will support asthma patients to get insight into their health condition, to get feedback and support and interact with healthcare professionals. The personal guidance system will guide patients to optimise treatment and lifestyle in line with their personalised goals.

myAirCoach optimal treatment

1 Diagnosis of asthma severity

2 Monitoring of patients' environment

3 Monitoring of patients' physiology

4 Feedback and support from virtual community platform

5 Personalised guidance to adjust treatment

6 Doctor monitoring and communication

7 Real-time doctor's adjustment of treatment

myAirCoach in practice

MyAirCoach will work as a centralised system to guide asthma patients towards managing their own health. MyAirCoach consortium covers all the multidisciplinary skills necessary to develop a wireless body sensor network that will assess asthma and provide guidance to control it.

MyAirCoach solution will be built in three interconnected project phases:

1. Designing myAirCoach framework

To provide a personalised mHealth system to guide patients, carers and healthcare professionals towards optimal monitoring and asthma control, myAirCoach partners will design a three layers system architecture:

- **The body layer** will collect physiological, environmental and behavioural parameters that influence asthma through an inhaler sensing module and the patient's smartphone.
- **The application layer** will feature myAirCoach patient support functionalities based on modern modelling, decision support and visual analytics approaches.
- **The knowledge layer** will aggregate the collected data for each individual user and will be responsible for correlating patterns such as user profiles, action plans and treatments.

2. Integrating myAircoach components

Each component will be connected to an integrated system that will be continuously optimised to increase usability and protect users' privacy.

- **Body sensors** will provide the picture of the patient's physiological status, lifestyle and environment.
- **Personalized patient models** will be used to optimise the selected treatment, detect possible risk factors of asthma exacerbations, and support the prediction of the asthma condition based on the collected history of the patient.
- **Automated guidance** will be presented to the patients in an intuitive manner, including information regarding risks that may compromise their treatment, helping them to modify their behaviour.

3. Demonstrating and evaluating myAirCoach system

To ensure myAirCoach addresses the needs of the asthma community, researchers will consult patients and other users to validate myAirCoach features. This user-centred approach will allow fine-tuning in the development and integration of the system, and will serve as a basis to detect potential extensions of the system based on user's suggestions.

The evaluation and validation will be based on real-life application scenarios and use cases that will form the test campaigns of the project. The final system will be tested for performance, quality, feasibility in everyday use, and possible improvements in the patients' asthma control.

4. Deploying myAirCoach solution

The myAirCoach project is aiming to go beyond the project timeframe and contribute to the deployment of a novel solution for asthma management and prediction. The commercialisation of the project outcomes will be evaluated through a market, cost benefit and cost effectiveness analysis that will be fed into a business plan.

myAirCoach benefits

Patient	Family	Caregivers	National Health System	Scientific Community	SMEs, MNOs	Pharma Industries
Better quality of life	Involvement in managing the health of their relatives	Reduced workload	Reduced hospitalization and cost	Methodology for the treatment of asthma and diseases of the respiratory system	Open and standardized mHealth platform	New sensor–based & smart inhaler devices
Reassurance and self esteem	Cost saving	Better management of the treatment and support the best possible decision	Better quality of services	Availability of the myAirCoach approach as open source for further research	New market areas	Lower costs implementing clinical trials
Personal involvement in health management	Tranquility		Contribution to cope with the growing request of health services		Convincing business models	
					New mHealth services	

myAirCoach project partners

Medical partners

Imperial College London

MANCHESTER 1824
The University of Manchester

LUMC
LEIDEN UNIVERSITY MEDICAL CENTER

ICT research and academic organisations

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

ihp

ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ
UNIVERSITY OF PATRAS

Asthma patients' organisations

EFA
European Federation of Allergy and Airways Diseases Patients Associations

asthma UK

Private health partners

Aerocrine

ALLERTEC
HELLAS S.A.
PHARMACEUTICAL PRODUCTS

CNet
SVENSKA AB

MEDVISION

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