

# **ASTHMA DIAGNOSIS AND MANAGEMENT: INTERACTIVE CD-ROM FOR UNDERGRADUATE AND POSTGRADUATE TRAINEE**

## **Summary**

The project is developing CD-ROM interactive learning package to assist undergraduate and postgraduate medical students to develop their knowledge and skills in early diagnosis and effective management of people with asthma to reduce morbidity and asthma mortality. The package will be used extensively by all medical students and by other health sciences students at Melbourne and Monash Universities.

The package will provide an easily accessible, integrated and interactive tool, through the following features:

- Integration of material, Quicktime movies/Videos,
- Learning loops and interaction,
- Layers of complexity and

It is envisaged at this point that a hybrid CD-ROM/web-based package would be created. The web-based package will allow users with access to the web to use the modules and Quicktime movies from the web or from a CD-ROM depending upon the bandwidth limitations. This hybrid web-based/CD-ROM package will also allow users without internet access to access the same resources from a CD-ROM. Thus dual delivery options will improve student accessibility to the resources.

## **Aims and objectives**

The proposed package will transform the teaching and learning about asthma by providing an easily accessible, integrated and interactive package to assist the development of high level skills in analysis, synthesis and evaluation of asthma in children and adults. On completion, students will be able to evaluate different types of asthma and recognise deterioration and non-adherence to management plans, to instigate the recommended intervention and reduce unnecessary hospital admissions or Emergency attendances. This will overcome some of the gaps in the current teaching at both Universities, in particular the lack of optimal integration between clinical and basic sciences. The package will adopt a case-based learning approach consistent with the philosophy of the new medical curriculum at both universities. In summary, the package will provide:

1. Integration between basic and clinical sciences.
2. High level interactivity and self-assessment
3. Teaching loops at different levels of complexities
4. User friendly and convenient tool
5. Demonstrations to help students acquire skills to use the most effective delivery devices for asthma.
6. High level skills in analysis and synthesis of information using clues and learning loops
7. Individualised feedback

Learning opportunities to meet the variation in pace for the individual student

## **Features of the packages**

The proposed hybrid web-based/CD-ROM package will provide an easily accessible, integrated and interactive tool, through the following features:

- **Integration of material:** We intend to present physiology, pathology, immunology, anatomy, epidemiology and clinical diagnosis and management, based on the most recent evidence from the National Asthma Council and Clinical Guidelines. High quality images will assist in developing students' knowledge and skills in diagnosis and

management of different patterns of asthma in children and adults. High quality graphics/animations will present the prevalence and mortality of asthma by age group and gender. The information will include the effectiveness of early intervention in GP and Hospital settings.

- **Quicktime movies/ Videos** will be used to demonstrate important clinical features, management and delivery devices. Video will also be used to present asthma patients who portray relevant clinical features that would assist health professionals to identify, diagnose and manage this condition.
- **Learning loops and interaction:** the package will provide opportunities for students to answer questions by click and drag, comparison and contrast of various patterns of asthma, self-testing modules and the provision of text feedback. This will be provided using learning loops triggered by questions and answers, followed by further interactive assessment.
- **Layers of complexity:** students will be able to access different levels of complexity depending on their year level in the medical course.
- **Self-testing and feedback** as to why each answer is correct or incorrect will be provided at each step.
- **Automated Assessment tool:** to explore the potential of using the package in fully automated clinical exams

The package can be housed within existing shells available at The University of Melbourne, in particular the “Skin Cancer CD”, TeleQACE, and Sensitive Examination Technique. This will minimise development costs.

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## Learning Outcomes

On completion of this integrated self-learning package students will be able to:

1. Discuss the causes of and risk factors for asthma in children and adults.
2. Appreciate the burden of asthma in Australia
3. Compare different patterns and severity of asthma
4. Appreciate the role of environmental and psychosocial factors in asthma
5. Explain the pathophysiological and epidemiological characteristics of asthma
6. Identify the early features of asthma and recognise the value of early diagnosis and management
7. Plan appropriate management for different patterns of asthma in children and adults
8. Appraise the barriers to adherence with medication and asthma action plans
9. Demonstrate the effective use of different delivery devices.
10. Identify reasons for and signs of deterioration

## Methods

The proposed web-based/CD-ROM package will be useful for students at many different levels. Beginners may start from the first module and progress through the package in order. Even within the same module, various levels of sophistication will be provided to suit the needs of students from a number of disciplines as well as medicine such as Physiotherapy, Ambulance Paramedic and Postgraduate Nursing at different levels. Students will require only two hours to go through the whole package and learn the required knowledge and skills. For revision only one hour may be required.

The package will start with a site map to help users to navigate through the five modules (see attached Figure). The site map will allow maximum flexibility and feedback, making the

most efficient use of students' time. Initially the package will be recommended and promoted to students of medicine & health sciences.

**Module 1 Asthma overview** will provide background facts and overview of asthma, including clinical, pathophysiological and epidemiological characteristics, which will provide a resource for users to access at any time during the session.

**Modules 2-4** will present three case studies to discuss the clinical diagnosis and management, pathophysiological and epidemiological characteristics of childhood asthma, adolescent asthma, and asthma in older people. The cases will cover all aspects of acute and persistent/ chronic asthma, incorporating current evidence-based practice to focus on critical areas in asthma management and treatment. These cases represent areas of asthma, which are least understood by the practicing clinicians, undergraduate and postgraduate students and should therefore assist in asthma management within the community. After each case, the user will then examine the resources provided in the overview to enhance their knowledge and skills.

**Module 2- Childhood asthma:** the user will be provided with a short history and a Video/ Quicktime movie of a child with frequent episodic asthma. The user will be asked to choose a diagnosis and differentiate between different patterns of asthma in children. Feedback will be given to the user and a learning loop will begin. The questions will cover diagnosis, management and pathophysiology of asthma.

**Module 3- Adolescent asthma,** the emphasis will be on exercise induced asthma. The questions will focus on exercise challenge and other diagnostic and therapeutic tests and on assessment of asthma using primary and secondary features. The case will discuss the severity of asthma attacks and those at high risk of severe attacks. Feed back will be given to indicate whether the responses are correct or not and why.

**Module 4- Chronic asthma in an older person.** The emphasis will be on adherence to medications and avoidance of acute attacks by minimizing exposures to trigger factors. The role of environmental factors such as allergens as well as psychosocial factors will be considered.

**Module 5- Asthma management** will focus on general management issues. Questions will be based on the National Asthma Council's and the Royal Children's Hospital Best Practice Guidelines. The questions will focus on the following:

- Asthma diagnostic tests including Peak Flow measurements, Exercise challenge, Allergy tests and Spirometry
- Asthma Action Plans, Six Step Asthma Management Plan, 3+ visits Asthma Management Plan
- Asthma medications including relievers, preventers and symptom controllers.
- Asthma medication delivery devices including metered dose inhalers (MDI), spacers and nebulisers

The modules will start with coloured slides of a child, adolescent and older person with asthma. They will be administering asthma medications.

**Video/ Quicktime Movie** will also be used to demonstrate the important signs of asthma as well as the correct and incorrect use of delivery devices in children and adults. The demonstration of the whole technique and step-wise approach to the use of metered dose inhalers is a powerful instructional tool. Video/animations and graphics will demonstrate air entry into the bronchi, and compare normal airflow with bronchospasm.

The users can navigate their way according to their needs i.e. a user may view all topics, one topic or a combination of topics. The scoring system and the instant feedback is given

to enhance learning by comparing patterns, severity and management protocols. The demographic and epidemiological determinants of asthma in children and adults will be presented in figures and charts, including the prevalence of asthma by age and gender and the burden and cost of asthma to patients, families and the community.

The package will be flexible to accommodate self-directed learning in the computer lab, tutor-driven learning and lecturer-guided tool for setting the stage, for reviews of respiratory medicine, and for formative assessment tasks. One of the cases in the package will be based on Monash case-based learning on asthma, which is being developed by two members of the team (FT and MA).

## **Evaluation**

Three types of evaluation are planned to assess the package: formative, summative and integrative evaluation. The BMU has developed an extensive program of formative evaluation, which the development team will use to assess the package, while it is under development in order to refine and improve it before implementation. Summative evaluation of students' knowledge and understanding of concepts and principles associated with asthma include results in the written, oral and clinical examinations and oral presentations. Evaluation will be undertaken at all phases of development and implementation. Hence, evaluation (through focus groups and surveys will be performed during the preliminary drafting process, the development phase, as well as implementation phase with Students, Teaching staff and organisations such as the NAC.

Evaluation of the whole package (integrative evaluation) will be done through survey and focus groups (with students and tutors) to consider the uptake of the package, how they are using the program and where improvements can be made with its implementation and integration within curricula. The use of electronic audit trails may also be embedded into the package.