

Purpose

More than 10% of the Canadian population suffers from asthma. This results in a significant human and socio-economic burden. Asthma education is a most important measure to improve asthma management but still only a minority of Canadians benefit from such intervention.

"Asthme à la carte", is an educational game-based learning program on the Internet, developed to promote prevention, optimal management of asthma and general health in the asthmatic population. The program targets a large audience, including health professionals, patients and their family, the general public and specifically Native communities.

Methods

With the support of « Inukshuk Sans-fil », *Asthme à la carte* is an initiative of the Centre d'expertise et de recherche sur l'apprentissage à vie (SAVIE) et du Centre de développement professionnel continu (CDPC- Faculty of Medicine, Université Laval), in collaboration with partners such as Le Centre d'amitié autochtone de Québec, le Réseau québécois de l'asthme et de la maladie pulmonaire obstructive chronique, le Réseau de valorisation de l'enseignement de l'Université Laval (RVE).

The team is involved with the development of 60 learning tools and 6 on-line games with a highly interactive multimedia content. These resources are adapted to each of the targeted populations mentioned above. Different aspects related to asthma and its management are presented using various didactic methods.

Example : A Learning Tool on Asthma control targeting Adolescents with Asthma

When playing participants are invited to complete a short questionnaire (mini-quiz)

During the last week

1) How many times was the rescue inhaler (fast-acting bronchodilator) used?

- Never
 3 times a week or less
 4 times a week or more
 Everyday

2) How often were you waking up because of asthma symptoms (wheezing, cough, difficult breathing or chest tightness)?

- Never
 Less than once a week
 More than once a week
 About every night

3) How many times did you feel asthma symptoms during the day ?

- Never
 3 times a week or less
 4 times a week and more
 Daily

4) Did you need to consult a physician urgently for asthma symptoms?

- Yes No

5) Was there any limitation in daily activities (professional activity, physical exertion, cleaning, etc) because of respiratory symptoms?

- Yes No

After completing the questionnaire, players receive immediate feedback. Their answers are highlighted in green, yellow or red and they receive comments according to the asthma control level.

1) Bravo ! Your asthma is well controlled



Your asthma seems to be optimally controlled right now. The risks of exacerbation of asthma are small unless there is a change in the environment or a respiratory infection.

You seem to respect environmental control measures and avoid contact with triggering factors. A treatment is followed regularly. Congratulations, you should continue!

2) Your asthma is not well controlled.



The control of asthma should be improved. Were you exposed recently to allergen to which you are allergic to ? Did you have a respiratory infection ? Do you know how to control your environment? Do you take your medication as prescribed?

In regard to this test, the control of asthma should be improved. We invite you to check environmental measures proposed and if you took your treatment as recommended. Additional information will be found in capsule "triggering factors of asthma and environmental control".

2) Your asthma is very poorly controlled.



Be careful, you are in a very risky situation. When asthma is out of control, severe exacerbations of asthma can occur and the disease can markedly impair the quality of life and affect daily activities. This may result in absenteeism from work or school and you can lose a precious time for your personal life. You should react promptly and consult a physician.

Which colour are you?

At the quiz, you responded yes to none (0) of the questions and you have obtained a total of X points

Green zone: You are able to perform your current activities without respiratory distress. You do not wake up at night or in the morning because of asthma symptoms. Your asthma is well controlled.

You are in the green zone of your action plan. Continue the treatment base as prescribed by your physician to keep asthma control.

At the quiz, you responded yes to one (1) or more questions or you have obtained a total of Y points

Yellow zone: Are you short of breath while performing current activities? Are you using a bronchodilator almost daily? Are you waking up in the morning with asthma symptoms? Your asthma is not controlled. Consult your action plan or remember the recommendations of your physician. When your asthma is less well controlled than usual and you are in the yellow zone of your action plan, which medications should you increase? How much time for the progression? If you have any doubt, phone an Asthma Education Center or consult a physician.

At the quiz, you have obtained a total of X points

Red zone: Are you short of breath when you speak? Is your asthma troubling your sleep? Is the bronchodilator effective less than two hours? You should act quickly, this is urgent!

Your action plan will recommend you to consult a physician without any delay or go to an Emergency Department. You will receive recommendations on the medications that you should take. Do not postpone any visit to the Emergency Department or to a physician if your asthma is worsening. Act promptly.

Control of asthma

What does mean a good asthma control ?

In general, a good asthma control means :

- You are able to perform physical activity and your current activities without respiratory distress
- You do not wake up at night or in the morning because of asthma symptoms. .
- You use your short-action bronchodilator no more than three times per week

Asthma Control Criteria

Players are also provided with information related to asthma control criteria.

Parameters	Acceptable control	Good control
Daily symptoms	< 3 days /week	None
Night-time symptoms	< 1 night / week	No night awakening
Physical activity	Normal	Normal
Exacerbations	Mild, infrequent	None
Absenteeism	None	None
Need for β 2-agonist	< 3 times / week	None*
FEV1 and FEV1/VC	- 90% of personal best	Normal
PEF	- 90% of personal best	Normal
PEF diurnal variation	< 10% of daily variation [†]	
- 5 days / week	< 10% of daily variation	
- 5 days / week		
FEV1 : Forced expiratory volume in 1 second		
VC: Vital capacity		
PEF: Peak expiratory flow		
* : can use an amount per day for the prevention of the symptoms caused by the effort		
† : Diurnal variation calculated as being the highest PEF minus low divided by the PEF more raised and multiplied by 100.		

An action plan as a guide

Many decide to stop their medication when they have no more asthma symptoms. This is a bad idea ! Indeed, even without symptoms, inflammation may still persist in the airways and should be controlled.

If you stop your asthma medication or do not take those regularly as prescribed, asthma may worsen.

You should consult your physician to know how you can progressively reduce the medication when improving and when. An action plan should also be discussed; it includes important information on how to re-introduce or increase the medication if asthma recurs or worsens and other measures.

The action plan has 3 zones: green, yellow and red (as for traffic lights) according to your symptoms, their frequency and other criteria (e.g. Peak Flows). Each indicate what to do according to what happens when your asthma is in those zones. It should be ideally written as verbal plans are often forgotten.

A game for a better impact

As these capsules and questions are integrated in a game, answers have an impact for the player. For example, the player can move his/her pawn according to the results of the mini-quiz. An asthmatic in the green zone can move his/her pawn as many squares (boxes) than the total addition of his/her dices, if the asthma is in the yellow zone, half of the points are attributed and the red zone cannot move his/her pawn.

60 learning capsules will be developed. Different aspects related to asthma and its management are presented using various didactic methods. Some examples:

- The various figures of asthma (multimedia exposé)
- Statistics on asthma
- Measure your asthma – mini-quiz
- What is asthma?
- Triggering factors of asthma – observational game
- How to eliminate triggering factors of asthma – suggestions to find them
- Mastering asthma and action plan
- Treatment of asthma – identification of drugs and their usefulness
- Demonstration of inhalation technique - find the mistake
- Asthma and smoking – statistics and testimonies

Results

The Asthme à la carte program will soon be available on the Internet and its multimedia content and interactive games will become progressively available to the various groups targeted across Canada. Online learning resources will offer immediate visualisation, quick feedback and real-time interactive animation.

Discussion

This series of educational tool has been developed for various targeted population in other to improve their understanding of asthma and its control. Game-based learning is a new approach to increase the interaction with the participants in communicating key-messages, an important recommendation on diseases and their treatment in the context of a play that could be both entertaining and useful to increase knowledge and self-management skills for particularly chronic conditions. The assessment of the usefulness of such tool remains to be assessed and its adaptation to the needs and environmental of the various populations should be pursued.

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Davis RS, Bukstein DA, Luskin AT, Kailin JA, Goodenow G. Changing physician prescribing patterns through problem-based learning: an interactive, teleconference case-based education program and review of problem-based learning. Ann Allergy Asthma Immunol 2004;93:237-42.

Conclusion

These interactive learning tools will facilitate knowledge transfer on asthma to a large audience in order to promote adequate health behaviour and improve quality of life of patients and their family

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