# Training on pulmonary hypertension designed by a collaborative pharmacy practice

## CONTEXT

The management of pulmonary hypertension (PH), a rare and complex disease, requires specific knowledge from physician and pharmacist residents. However, the average knowledge of residents about PH is often limited and this lack of specific knowledge at their arrival could influence PH patient care.

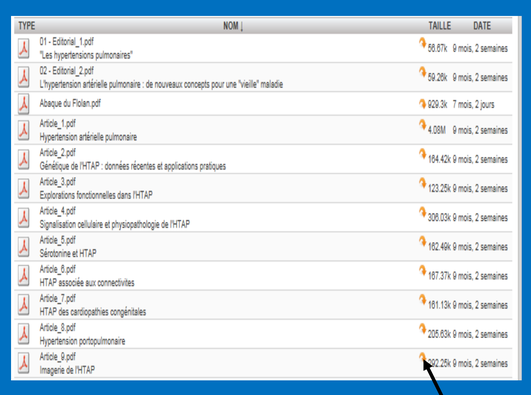
## OBJECTIVE

To design, implement, assess and evaluate an educative program on pulmonary hypertension for pharmaceutical and medical residents before their arrival, in order to optimize patient care

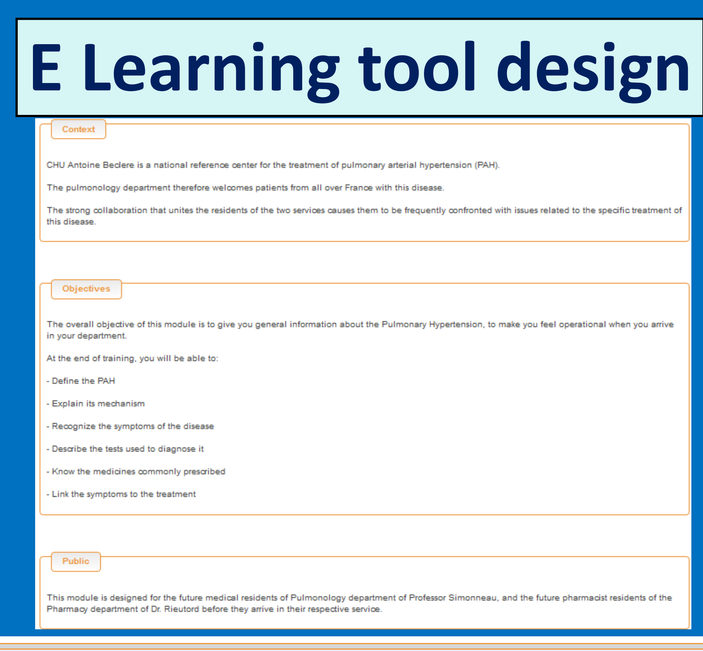
## STUDY DESIGN

From February to June 2011, an e-learning program was designed using Learning Management System (LMS) Dokeos. Web accesses were sent to the residents two weeks prior to their arrival. Qualitative evaluation for e-learning was performed by interviewing residents regarding its form and content. An evaluation on the type of formation was also performed during two semesters.

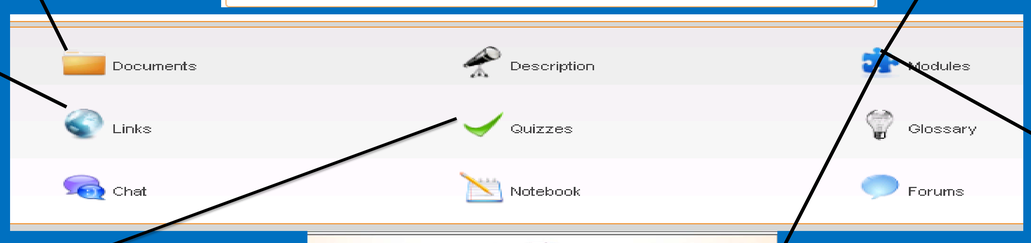
## RESULTS

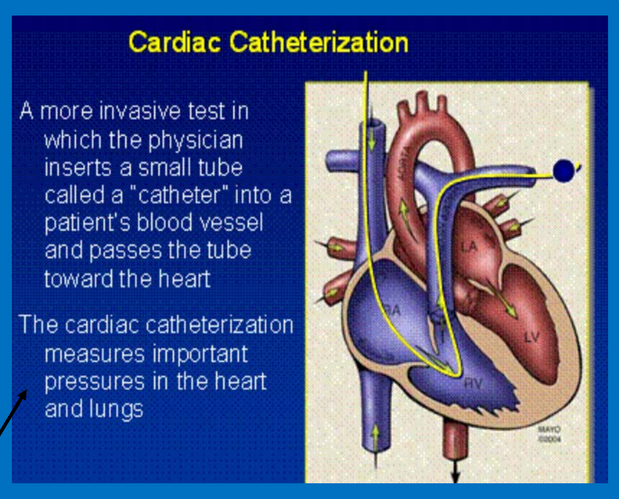



## E Learning tool design








The [ ] is the first step to explain to the patient suffering from PAH.

High altitude and transport by air should be avoided because they represent a risk situation likely to increase the [ ] .

Pregnancy is strongly discouraged. The use of contraception is required, [ ] oral contraception is theoretically against-indicated because of its prothrombotic activity which may aggravate the disease.

Anticoagulant therapy seeks an [ ] between 1.5 to 2.5.

The [ ] is prescribed when there is hypoxemia (PaO2 < 60 mmHg); the objective is mainly symptomatic.

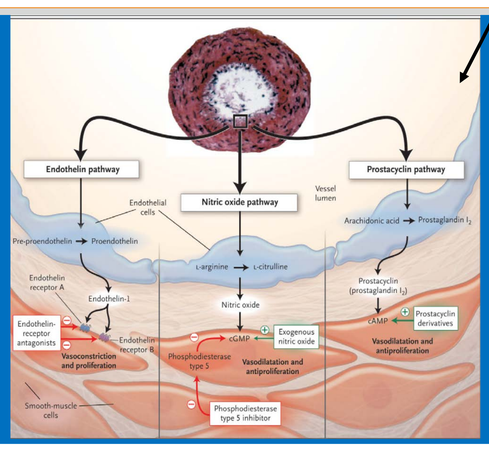



**Table 4** Updated clinical classification of pulmonary hypertension (Dana Point, 2008[1])

**1 Pulmonary arterial hypertension (PAH)**
- 1.1 Idiopathic
- 1.2 Heritable
  - 1.2.1 BMPR2
  - 1.2.2 ALK1, endoglin (with or without hereditary haemorrhagic telangiectasia)
  - 1.2.3 Unknown
- 1.3 Drugs and toxins induced
- 1.4 Associated with (APAH)
  - 1.4.1 Connective tissue diseases
  - 1.4.2 HIV infection
  - 1.4.3 Portal hypertension
  - 1.4.4 Congenital heart disease
  - 1.4.5 Schistosomiasis
  - 1.4.6 Chronic haemolytic anaemia
- 1.5 Persistent pulmonary hypertension of the newborn

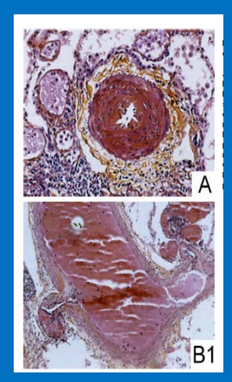
**1′ Pulmonary veno-occlusive disease and/or pulmonary capillary haemangiomatosis**

**2 Pulmonary hypertension due to left heart disease**
- 2.1 Systolic dysfunction
- 2.2 Diastolic dysfunction
- 2.3 Valvular disease

**3 Pulmonary hypertension due to lung diseases and/or hypoxia**
- 3.1 Chronic obstructive pulmonary disease
- 3.2 Interstitial lung disease
- 3.3 Other pulmonary diseases with mixed restrictive and obstructive pattern
- 3.4 Sleep-disordered breathing
- 3.5 Alveolar hypoventilation disorders
- 3.6 Chronic exposure to high altitude
- 3.7 Developmental abnormalities

**4 Chronic thromboembolic pulmonary hypertension**

**5 PH with unclear and/or multifactorial mechanisms**
- 5.1 Haematological disorders: myeloproliferative disorders, splenectomy.
- 5.2 Systemic disorders: sarcoidosis, pulmonary Langerhans cell histiocytosis, lymphangioleiomyomatosis, neurofibromatosis, vasculitis
- 5.3 Metabolic disorders: glycogen storage disease, Gaucher disease, thyroid disorders
- 5.4 Others: tumoural obstruction, fibrosing mediastinitis, chronic renal failure on dialysis




## Evaluation

### Content

- Relevant and suitable tool regarding pedagogical objectives
- Flexible : Despite an erratic knowledge on PH , all residents learnt something new
- Interactive tool

### Type of formation

- All residents were convinced by this type of formation
- E-learning offers more freedom than a conventional formation
- All residents think that e-learning could be use as a complement of traditional courses

### Form

- Clear tool and easy to use
- Learning duration : satisfactory (100%)

N = 10 residents
4 pharmacists
6 pneumonologists

**E-learning facilitated resident integration in the pneumology department in 90 % of cases**

## DISCUSSION - CONCLUSION

The e-learning tool designed in this pilot study by a collaborative pharmacy practice approach improved the resident learning process on PH. Distance learning should be a part of health care professional education in France and could represent in a near future 20-30% of each pharmacist's continuous professional development. As already demonstrated, this paper evidenced the interest of implementing E. learning in association with conventional training.*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* Maisonneuve H, Chabot O. Internet-based continuing medical education: as effective as live continuing medical education. Presse Med. 2009