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## 121. Improving education for the healthcare team and patients

P1272

### Bronchoscopic inter-operator diagnostic yield for lung malignancy: benchmarking for trainees

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**Introduction:** British Thoracic Society guidelines suggest that in cases of endoscopically visible malignancy, bronchoscopists should aim for a minimum diagnostic yield of 80%. There is no recommendation however for the diagnostic yield that trainees should achieve before becoming independent bronchoscopists. We conducted a preliminary study in our bronchoscopy unit, comparing inter-operator diagnostic yield for cases of definite endoscopically visible malignancy, aiming to introduce a benchmark for trainees.

**Method:** We retrospectively looked at 775 bronchoscopies performed by three experienced bronchoscopists. Data was collected on the type of abnormality seen, the likelihood of malignancy, sampling modalities used and positivity rate of samples (histology/cytology) i.e. the diagnostic yield.

**Results:** A total of 114 bronchoscopies were reported as definite tumours, of which 103 were diagnosed as lung malignancies. The diagnostic yield when a definite tumour was seen on bronchoscopy was 90.9% (60/66) for operator 1, 72.8% (8/11) for operator 2, and 94.6% (35/37) for operator 3, with an overall average of 86.1%. The standard deviation for bronchoscopist success ratio was calculated at 9.55, making the lower limit for success (percentage of positive diagnostic yield) 75%.

**Conclusion:** Locally our experienced bronchoscopists are exceeding the 80% diagnostic yield in cases of a definite tumour. Using the lower limit for success, we suggest that 95% of trainee bronchoscopists should be achieving a minimum diagnostic yield of 75%. More data is needed in order to obtain more robust statistical data which can be developed into realistic benchmarks and assessment tools to measure trainee competency.

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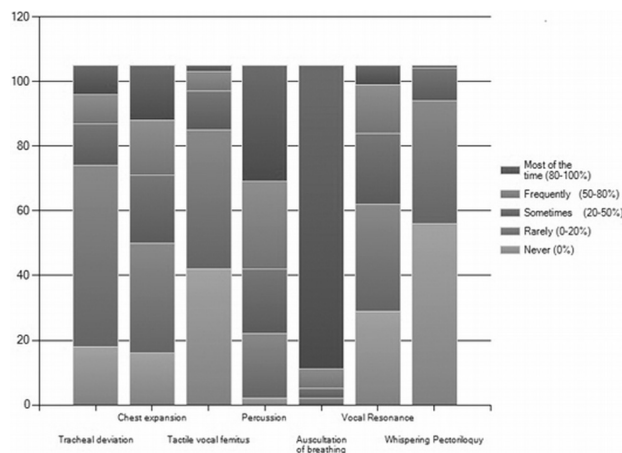
### Rational clinical examination: The clinical epidemiology of physical signs taught in respiratory medicine

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**Background:** Current clinical epidemiology research defines precision and accuracy of items of clinical examination [Stone H, Mukherjee R. Evidence based clinical teaching in respiratory medicine. Proceedings of the Association for Medical Education in Europe. 2007; 2: 5. (AMEE 2007: Trondheim, Norway)]. We set out to examine if doctors naturally carry out the more precise items of respiratory clinical examination from the repertory they learn as part of routine education.

**Methods:** An online questionnaire was emailed to doctors in the Heart of England NHS Foundation trust to all grades of doctors.

**Results:** Responses were received from 105 participants from a range of specialties and grades. The majority frequently carried out the respiratory examination as a routine with some items of high precision, although the kappa values of individual items (signifying precision) tend to correlate with items of routine respiratory examination which doctors naturally think are more useful.



**Conclusion:** Practising doctors tend to develop their own rational examination routine which can be improved by adding items of high precision (e.g. crico-sternal

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distance), which are not routinely taught. Explicit teaching of the rationale for clinical examination and the quantitative aspect of clinical reasoning based on evidence can be included in the clinical teaching of undergraduate medical students to make it relevant and useful.

#### P1274

##### Training of junior doctors into pleural procedures – The impact of a new pleural service

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The British Thoracic Society and Royal College of Radiologists have set up guidelines for pleural services (PS). Specialist registrars (SpR) in Wales rotate every 12-18 months.

**Aims:** To evaluate 1. PS across Welsh Hospitals; 2. the impact of a PS on the training into pleural procedures.

**Methods:** 1. A questionnaire was sent to all 16 hospitals where SpRs train in Wales; 2. Pleural procedures, supervision, use of pleural ultrasound (US), timing of the procedure from admission to hospital were compared for a year prior to and following the setting up of a PS in a large hospital (630,000 - 21% population of Wales).

**Results:** 61.5% had one respiratory Consultant trained at level 1 pleural US, 46.2% had US in clinic. 76.9% had practical training. A PS reduced the waiting time from admission to pleural aspiration (PA) and intercostal chest drain (ICD) insertion; mean (range) 2.9 (0-12) and 4.5 (0-15) days before the PS to within 24 and 48 hours respectively. Prior to the PS respiratory trainees (all grades) performed a mean of 5 pleural procedures (4 ICDs) per month, none Consultant supervised. After the PS started SpRs performed a mean of 4.6 PA - in-patients, 3.9 - out-patients and 4.5 ICDs per month. 50% of PA and 30.2% of ICDs were Consultant supervised, all done under US guidance after PS was set up, none before). pH was done on 20% of samples and 26.6% had no cytology on initial sample; after PS cytology was performed on 100% of samples sent and pH on 90%.

In conclusion, the provision of PS and training varies across hospitals in Wales. The opening of a PS reduced waiting times and improved the analysis of the samples. The referrals to PS, number of procedures, use of US and supervision increased.

#### P1275

##### E-learning: Are all users in front of the computer all of the time?

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**Introduction:** E-learning has been shown to be an effective useful tool in medical education.

**Aim:** To assess if medical students using e-learning are in front of the screen while using the E-lectures.

**Method:** 87 Final year medical students were encouraged to complete and online respiratory course (13 streamed lectures + 13 quizzes). A moodle E-learning management system, collected data regarding login and logout times, number of slides viewed, total time on module, and quiz scores. Project was part financed through EU funds ESF1.19(Malta). Articulate software was used for streaming.

**Results:** 6 lectures with corresponding quizzes were analysed for 43 medical students who completed all modules. 65.5% (Male – 66.7%, Female 64.1%) of the lectures were completed within expected time frame; 19% of lectures logged in for a period less than the duration of the lecture, while in 14.7% duration was longer than twice the total duration of the lecture. Data for 0.8% was not available. Only 16.3% of students completed all the lectures within the established period. 27.9%, 20.9%, 18.6%, missed on one 1,2,3 lectures respectively, while 16.3% missed more than 4 lectures. For log-in less than total duration, the percentage time of lecture completed inversely correlated with the actual total duration of the lecture ( $R^2=0.82$ ). 71.6% of those who completed lectures within the established time completed the quizzes within one hour of completing the lecture.

**Conclusion:** 83.7% found a way to skim through the slides for at least one lecture and/or were not physically available during presentation of the lecture all of the time. The e-learning management systems should be robust so as detect this kind of behaviour before certification.

#### P1276

##### The impact of hands-on respiratory management for physicians in clinical practice and its future perspective

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**Introduction:** To respond the demands of systemic mechanical ventilation management education, the Respiratory Management Hands-on Workshop for Physicians in-training (RMWP) began in November of 2010 as an extracurricular program, followed by the Brush-up workshop for supervisory doctors in July of 2011.

**Objectives:** To evaluate the impacts and the value of RMWP on clinical practice and to establish a future direction, we conducted a pre/post-test, a questionnaire on the contents, and a post-survey of the workshop attendees via the Web.

**Methods:** The pre/post-test and the anonymous questionnaire were conducted during the workshops. As for the post-survey, the e-mail with questions regarding workshop was sent in September 2011 to the attendees of the workshop and the first 1-day brush-up workshop for advisory doctors'.

**Results:** The attendees' knowledge base requiring for respiratory management was not correlated with experiences of mechanical ventilation. In regard to the post-survey, a total of the 55% (61 out of 111) answered. There are two remarkable findings. Firstly, the number of physicians using Assist-Control mode increased, whereas SIMV mode decreased. Secondly, the lecture of Graphic monitoring & Lung mechanics, although the lecture had been marked as less useful than others in the questionnaire taken right after the workshop, was marked as the most useful lecture in their practice.

**Conclusions:** The results of post-survey indicated the potential to change physicians' behavior in respiratory management. RMWP should provide both lectures and practice sessions with expert eyes to overcome the physicians' misunderstandings and lack of the whole picture.

#### P1277

##### The translation of simulated training into practical experience

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Training of junior doctors in the UK has changed considerably recently. Simulated procedures have been proposed to help provide more practical exposure. Transfer of skills to clinical practice has been difficult to show.

**Aim:** To see if a group who had simulated training on Seldinger chest drain placement in our teaching hospital were able to gather sufficient onward experience.

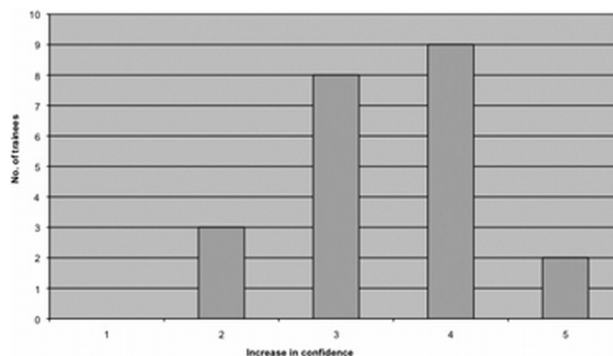


**Method:** Anonymous questionnaires about their experience and self reported confidence rating were distributed 6 months after training to a cohort of 46, year 2 doctors in 2010.

**Results:** 26 (57%) responded.

The chest drain insertions performed were negligible; trainees retrospectively rated the session positively.

No. of occasions chest drain attempted	No. of trainees	No. of unsuccessful attempts
1	4	1
2	1	–



**Conclusion:** The high self-perceived relevance of the session for these doctors would suggest that there is a strong feeling that this training is important in their development, but they struggle to gather further experience.

Issues around working hours, and other factors are unlikely to change and we must continue to explore how best to provide practical training, and which groups to focus on.

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## P1278

**Patients' knowledge and prejudices about chronic obstructive pulmonary disease**

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**Background:** Proper patients' (Pts) knowledge on a chronic disease is an important issue in successful disease management.

**Aim:** To estimate Pts' knowledge and prejudices about chronic obstructive pulmonary disease (COPD).

**Methods:** Observational, questionnaire based study included 68 pts (mean age 63 yr, M/F=41/27) treated for COPD at University hospital in Belgrade, Serbia, from June to December 2011. Pts completed the 9-item questionnaire voluntarily and anonymously.

**Results:** A total of 50 (73.5%) pts underestimate recommended respiratory rehabilitation and have not used it; 28 (41.2%) pts prefer teophyllin compared to the other therapy; 41 (60.2%) pts have not get vaccinated against influenza to reduce exacerbation of the disease; 33 (48.5%) pts used more frequently short-acting  $\beta_2$  agonists instead advised therapy scheme; 29 (42.6%) pts had correct technique of using inhalation therapy; 22 (32.4%) pts overreact in using antibiotics during exacerbation; 53 (77.9%) Pts do not seek help for symptoms of depression in COPD; 20 (29.1%) pts cut down therapy themselves; 36 (52.9%) Pts are active smokers and one third of them do not recognize tobacco smoking as risk factor for pulmonary disease.

**Conclusion:** COPD Pts' knowledge about the disease should be improved to achieve their better adherence to treatment, quality of life and more successful disease management.

## P1279

**Pleural procedures – Are junior doctors struggling to gain experience?**

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**Introduction:** BTS guidelines and UK training curricula highlight the importance of gaining experience in pleural procedures. By the end of core medical training (CMT), trainees are required to demonstrate competency in pleural aspiration and Seldinger chest drain insertion.

**Aim:** To investigate the self-reported competency of junior doctors in performing pleural procedures

**Method:** 'On the spot' questionnaires were randomly distributed to 64 doctors training in a large university teaching hospital. Participants graded their level of competence in performing a variety of pleural procedures and possible reasons for lack of experience.

**Results:** Response rate was 91%; 7 Speciality trainees (ST3-7), 17CMTs, 12 Foundation Year 2 (FY2) and 22 FY1 trainees. 36% reported independent ability to perform pleural tap, 31% aspiration, 21% chest drain insertion, 22% pleurodesis, 45% removal and 34% flushing of chest drains. All STs reported competence, but, 76% of trainees felt they were struggling to gain sufficient practical experience. Those with respiratory experience were more likely to report competence (p=0.001) although only 1/3 could insert a chest drain independently. Top reasons for 'struggling' were increasing use of ultrasound (US) (33%), followed by perceived lack of senior encouragement (17%).

**Conclusion:** Our data suggest that the majority of trainee physicians do not feel competent to undertake pleural procedures independently. With increasing use of US for pleural procedures, trainees are having difficulty gaining experience. For CMTs, UK curricula now state mandatory competency in chest drain insertion for pneumothorax only, but training programmes must ensure adequate exposure to important pleural procedures.

## P1280

**Beyond PROs – Using narrative techniques to understand the real life of patients with COPD**

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**Background:** The experience of living with COPD is complex and emotional [1,2]. Knowledge of illness experience is different from biological disease [3]. Traditional COPD questionnaires were based around patient-reported outcomes, but did not have enough focus on patient-reported information about the illness [4]. Narrative capture technique [5] could offer new insights. It has been applied outside of health care in anthropology, defence and development contexts. Unlike structured PROs it accepts the patient giving information as a story, a narrative. And in narrative capture technique, the person telling the story is also the person explaining its meaning.

**Method:** Asking patients daily to enter stories, and to indicate the meaning of each of these stories through labeling.

**Conclusion:** This narrative technique may be a feasible one for understanding how COPD fits into the patient's overall life.

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## P1281

**Impact of a structured educational program for nursing staff on chest drain care**

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**Background:** At the 2011 ERS congress we presented findings from a survey of nursing staff regarding chest drain knowledge, care and management in our tertiary care centre. Worryingly we found only 17% felt they had adequate training in chest drain care. We present our intervention and subsequent feedback.

**Intervention:** Unlike doctors in the UK, nursing staff usually do not have a structured training program. We developed an interactive self-directed workbook on chest drain knowledge and management, based on the adult learning principles of Andragogy. The instructional design theories used to help learning included constructivism and the use of cognitivism and behaviourist design which allowed efficient construction and transfer of knowledge. Nursing staff based on respiratory wards were asked to complete the workbook and a self assessment at the end. They also attended a workshop which included 30mins of lectures followed by 30mins of group discussion. Structured forms were used to collect feedback.

Feedback: 24 feedback forms were analysed. 96% 'agreed' or 'strongly agreed':

1. The workbook was relevant to their current role
2. The activities and tasks helped to improve their understanding of the topic
3. The training provided them with new knowledge on chest drain management.
4. Completion of the training improved their confidence in dealing with chest drains.

Subjectively we felt patient care and safety improved on the wards.

**Conclusion:** Formal training sessions of nursing staff on chest drain care has proved very popular and productive for nursing staff and we recommend other hospitals should consider developing similar sessions to improve the standard of care.

## P1282

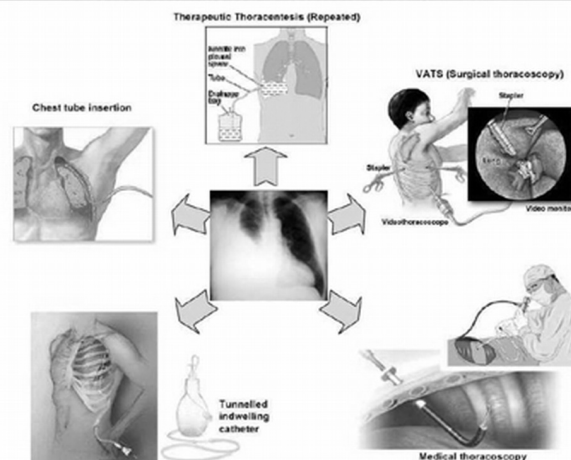
**A pleural information programme: For patients and training**

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**Background:** Pleural effusions usually signify advanced disease, increased symptom load and limited life expectancy when malignant. They need prompt effective management, safely and with least possible inconvenience and discomfort. Patient choice is key and informed consent is crucial because of possible risks related to the invasive pleural intervention.

**Aim:** To develop an interactive tool for healthcare professionals to illustrate and explain the various pleural modalities to patients and trainees.

Please click on picture for more information





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**Method & Results:** We initially used a focus group to determine the key areas, and then piloted it firstly amongst respiratory nurses, then amongst medical and non-medical persons and lastly amongst patients; all the while incorporating feedback into the final version. This was then reviewed and approved by the Trust's "Patient Information Group" panel.

**Conclusion:** This is an easy to use programme that helps inform patients of the available management options, what they entail and the procedural steps, providing a platform for an open and informed discussion of the pros and cons of each procedure and the possible risks. It has also been proven to be a useful training tool as well.

We hope to demonstrate the programme on tablets or screens at the ERS and disseminate and share amongst colleagues.

#### P1283

##### Survey of bronchoscope disinfection practices by chest physicians attending IP CME in Navi Mumbai, Maharashtra

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**Aim:** To study various methods used for disinfecting bronchoscope by delegates attending a CME on Interventional Pulmonology.

**Methods:** A 25 question survey was divided into sub groups like location of bronchoscopy suite, disinfecting techniques, bronchoscope care and sedation practices. The survey was distributed to participants from Western India in a CME on Interventional Pulmonology.

**Results:** 31 out of 40 participants completed the questionnaire. One was excluded from the study as it was incomplete, 8 questionnaires were completed by medical director of bronchoscopy suite, 18 by chest physicians and 5 by the fellows.

**Conclusion:** Increased awareness and education is required for Bronchoscopy disinfection techniques and adherence to guidelines.

#### P1284

##### Online selfmanagement in patients with COPD or asthma: With or without the healthcare provider?

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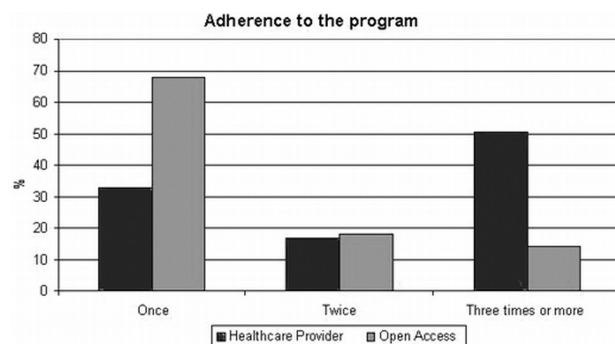
**Introduction:** Selfmanagement plays a key role in integrated care strategies for chronic diseases. Curavista Health is an online patient self-management platform for several chronic diseases, including asthma and COPD: MyCOPDonline & Myasthmaonline which consists of 3 basic-elements:

1. Health status; 2. Self management; 3. eConsult.

We incorporated the program into our daily hospital routine for outpatients. Patients however also can participate without health care provider, as open access program.

**Aim:** The aim of the study was to retrospectively analyze the adherence to the program of patients with or without health care provider.

**Results:** The content of the program was identical in both groups. Age and gender were comparable. In the group without coaching (n=831), 68% used the program



Abstract P1283 – Table 1

Questions	Response, n (%)
Location of bronchoscope disinfection?	Suite 18 (60%), Operating room 8 (26.6%), Don't know 3 (13.4%)
Preclean with an enzymatic cleaner?	Yes 15 (50%), No 11 (37%), Don't know 4 (13%)
Manual/automated disinfection system?	Manual 19 (64%), Automated 1 (3%), Don't know 10 (33%)
Sterile tap/filtered water rinse (final)?	Yes 25 (83%), No 2 (7%), Don't know 3 (10%)
Final alcohol rinse?	Yes 13 (43%), No 14 (47%), Don't know 3 (10%)
Blow air at the end of the process?	Yes 24 (80%), No 3 (10%), Don't know 3 (10%)
Familiar with any guidelines for disinfecting bronchoscope?	Yes 13 (43%), No 17 (57%)
Cultures of bronchoscope?	Yes 14 (47%), No 12 (40%), Don't know 4 (13%)
Frequency of culture?	Monthly 10 (71%), Yearly 1 (7%), Don't know 3 (22%)
Reagent used for disinfection?	Glutaraldehyde 26 (87%), Ethylene oxide gas sterilization 1 (3%), Don't know 3 (10%)

<sup>a</sup>For those who answered yes to the above question.

once, 18% twice and 14% three times or more. In the group with coaching (n=95), 33% used the program once, 17% twice and 50% three times or more (p<0.001).

**Discussion:** "Self-management" suggests that patients manage themselves and the role of the professional is limited. In contrast, these data suggest that participants make better use of eHealth programmes when supported by healthcare professionals. Therefore eHealth should be embedded into regular care. It might imply not only a role change for patients to achieve self management, but also for the health care professional in transition from "medication manager" to coach.

#### P1285

##### The general practitioners knowledge and educational programs efficiency in antibiotic use

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**Aim:** To study and compare the level of general practitioners (GPs) knowledge in questions covered problems of rationale antibiotic (AB) use in pulmonology in different regions. To estimate the importance of rational AB use educational and control programs (ECP).

**Methods:** During 2006-2012 ECP were developed and carried out among 58 GPs in Dnipropetrovsk region (DN), 35 – in Labytnangi (LA) and 31 – in Belgorod (BE). Special questionnaire included 10 complex tasks with a set of questions has been created to estimate an initial and final levels of medical staff awareness (LMSA). The knowledge of AB groups, dosage, frequency and indications of usage, combinations, timing of therapy, cancellation and replace of AB was assessed.

**Results:** After GPs completed questionnaire at the first time, the level of correct answers (LCA) has totaled 48.6%, in DN – 51.6%, LA – 39.8% (p<0.05), BE – 53.1%. Taking into account the results of received data there have been developed and carried out special ECP. Comparative exercise was repeated year later. Summary LCA was statistically (p<0.05) increased to 62.5% (in DN – 62.7%, LA – 60.1%, BE – 64.9%) without statistically differences between regions. The validity of AB prescribing, quality of treatment was statistically increasing, and on the opposite, quantity of GPs mistakes was statistically decreasing (p<0.05). The most difficult questions were the following: rationale combinations, empirical therapy, pneumonia therapy and MO sensitivity.

**Conclusions:** There is a necessity to carry out the rationale AB use ECP among GPs to increase LMSA and quality of treatment, and to decrease mistakes. Therefore, the most difficult questions are to be studied more deeply.

#### P1286

##### Tele-education in asthma management. What are the benefits?

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The aim was to research two approaches of asthma' education and to find the most effective one.

98 mild asthmatic patients have been involved randomly so far (age 41.0±15.2 yrs). We study 3 groups according to the type of chosen education: 1st-group have passed the ordinary asthma education (were educated by physician) (n=22), 2nd-have passed tele-education asthma program (n=36), 3<sup>d</sup>-didn't have any advantage (n=40). Criteria to objectify the effectiveness were: asthma control assessed by ACT and ACQ, life quality level, lung function, Cooperation Index (CI), the cost of intervention, self-management, knowledge control test results.

The majority of patients initially had partly controlled asthma (43.9%) and current working social status (60.6%). Finally we have detected that patients of the 1st and 2nd groups have obtained significantly higher control level, higher life quality values, decrease in taking reliever medications in comparison with the 3<sup>d</sup> group (p<0.05). The higher Cooperation Index was observed in the 1st group (Mean=67.0%, p<0.05). Cost of ordinary asthma education, performed by physician (the 1st group) was 20.1 € and tele-education (the 2nd group) -10.7 €. There were significant correlations in the 2nd group between results of asthma control (ACT™ and ACQ scores) and knowledge control test results (r<sub>ACT</sub>=0.77, p<0.05 and r<sub>ACQ</sub>=0.68, p<0.05). ACT and ACQ results were significantly lower in the 3rd group (Mean<sub>ACT</sub>=16.3 pts, Mean<sub>ACQ</sub>=1.8, p<0.05).

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**Conclusion:** So, each of the approaches to asthma education leads to higher asthma control. Besides this, tele-education has shown more cost effectiveness. This instrument is required to be available to each patient.

## P1288

**Semantic pattern analysis of patient perceptions using automated co-occurrence information mapping**

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**Background:** The majority of patients with chronic diseases seek additional information from the internet following medical consultations. Text analytics is a widely recognized, validated system for modelling the structure and information content of text. Here we describe a unique method for identifying and analysing linguistic information from the internet to provide quantitative, unprompted insights into patients' sentiments about their conditions.

**Methods:** Boolean- and thesaurus-based, machine-learning software is used to conduct an iterative nonlinear search of the web for all relevant texts containing broad keywords related to a given chronic disease. Texts are then analysed by Leximancer (v4.0), a text-mining tool that identifies themes and concepts from large bodies of text using a statistics-based algorithm.

**Results:** This innovative approach ensures that a comprehensive disease-specific dataset is captured from the web. Leximancer automatically identifies commonly occurring concepts (weighted combinations of words that co-occur within the text). These are presented visually as maps, showing the strength of the relationship between different concepts (relative frequency and inter-connectedness) to facilitate semantic classification. Positive and negative sentiments about specific aspects of the disease and its management can be identified and selected for statistical analysis, demonstrating the validity of this technique.

**Conclusion:** The internet is a data-rich source of patient-to-patient and patient-to-healthcare professional communications. The sentiment analysis method described can facilitate broader understanding of patient perceptions of their disease and its management.

## P1289

**Home telemonitoring of CPAP: A feasibility study**

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**Background:** The most commonly used treatment for sleep apnea syndrome (SAS) is the application of constant positive airway pressure (CPAP) during sleep. Compliance is an essential element of CPAP efficiency. Compliance is dependent on the quality of the coverage care and on the information of the patients. With the telemedicine emergence, telemonitoring of the CPAP makes its appearance, in France.

**Methods:** This study is observational and multi centers. The main aim of this study was to evaluate the feasibility of CPAP telemonitoring in SAS patients (n=90). During the installation of equipment, patients receive the instruction to connect the CPAP SD card to a connecting box named twitoo, every week during 2 months. The data transmission is made towards the study coordinator, the home care provider named SADIR, by the way of a telemedicine platform, located in France. Actual numbers and frequency of remote-monitoring box connexions are quantified.

**Results:** 92% of patients (n=62) connected SD card to twitoo at least once. We expected a maximum of 8 connections with a frequency of one connection every 7 days. We observed a mean of 6.2 connections during the 2 months, with a frequency of one connection every 7.6 days.

**Conclusion:** This study demonstrated good adhesion of the patients to this new tool of data transmission, by telemonitoring, of their CPAP treatment. Its efficacy on treatment compliance has to be evaluated in a larger group using a randomized procedure.

## P1290

**The influence of parents' level of general education on the efficiency of childhood asthma educational program**

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**Aim:** To investigate how important parent's level of general education was for the success of organized Asthma Educational Intervention (AEI) program.

**Methodology:** We assessed parents' knowledge of asthma by questionnaire before, immediately after and 12 months after AEI in hospital settings. The Intervention I group of parents (N 231) received full AEI (audiovisual education about all the aspects of asthma and proper use of asthma medications, and workshop/panel discussions with the hand-on book "Meet your asthma"). The Control C group of

parents (N 171) received instructions for proper medications inhalation technique and the hand-on book.

**Results:** There was no difference in the knowledge of asthma between I and C groups at the beginning of the study. The knowledge of asthma in I group significantly increased immediately after the AEI ( $\chi^2=144.14$ ,  $p<0.01$ ), and did not change ( $t=1.45$ ,  $p>0.05$ ) during 12 months period after the AEI. The knowledge of asthma in C group did not improve during the study ( $Z=0.73$ ,  $p=0.17$ ). According to their level of general education, we had four groups in I group of parents: with low (<8), middle (8-12), high (13-15), and very high education (>15 years of education). The final knowledge of asthma was significantly higher in I group ( $t=7.79$ ,  $p=0.01$ ) compared to C group, and did not differ between parents according to the parent's level of general education ( $p>0.05$ ).

**Conclusion:** Parent's level of general education was not relevant for the AEI. The C group of parents did not read hand-on book and did not improve asthma knowledge. Audiovisual education/workshop/discussion was successful way to transfer knowledge of asthma to I group of parents.