

Chapter 4

Best Practice in Educational Design for Patient Learning



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*The mediocre teacher tells. The good teacher explains.
The superior teacher demonstrates. The great teacher inspires.*
— William Arthur Ward

You are running late during your busy morning clinic. Does your patient understand her new asthma inhaler? How can you be sure? And if you send her down the hall to a medical team member for “education,” how well do you know what goes on down there?

You are asked to deliver a presentation to patients in pulmonary rehabilitation. Some old slides are available... but should you even use them? What exactly are you trying to accomplish? How do you make the most out of this time investment by the learners and yourself?

You are assigned to a “clinical pathway” team to reduce chronic obstructive pulmonary disease (COPD) readmissions at your hospital. One box to check on the flowsheet is “patient education.” Where do you begin? How will you know if you have been successful?

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Education is a key component of patient care, with significant potential to positively impact health outcomes through patient empowerment and behavior change. Chronic diseases are responsible for 60% of global deaths and half of its disability [1]. A majority of patients misunderstand their prescription immediately after their doctor's visit [2]. Even inpatients' knowledge about their hospitalization is poor [3]. Nonadherence to therapy resulting in hospitalizations and additional care may incur \$100–300 billion in *avoidable* costs annually [4]. Of course, more important to the patient than this financial impact is the harm to quality and quantity of life. Patient empowerment through education has the potential to improve all of these outcomes. Indeed, a 2018 review of chronic illnesses [5] found 46 of 56 published patient education interventions meeting inclusion criteria showed reduced hospitalizations and clinic visits, improved quality adjusted life years, or productivity. In an era of increasing demands while time and other resources decrease, best evidence-based practices in educational design for patient care are necessary. Proving specific patient education models that are of value is important; however, this has been challenging due to the heterogeneity of interventions and populations studied. However, this should be viewed as a significant opportunity rather than a limitation. A recent study [6] of callers with COPD to a smoking cessation line found that over two-thirds wanted disease-specific information and less than one-third had received instructions on key elements of non-pharmacologic management. Such patients' desire for educational opportunities to improve their health can and should be leveraged. The expanding diversity of educational design options creates an exciting mandate to transform patient education. As a disclaimer, our following discussion of design comes from medical education, which can be generalizable to patients as long as potential literacy, culture, and physiological obstacles are kept in mind.

Analogous to clinical care, patient education should consist of making a diagnosis (needs assessment), an intervention (in this case educational activities and teaching moments), and then follow-up for effect (re-assessment). An educational “diagnosis” involves (1) recognizing what your patient needs to know (cognitive), feel (affect), or do (psychomotor skills), (2) deciding if they are motivated and able to do so, and (3) reflecting on your own teaching capacity (your own skills and institutional support) to determine how the intervention can be designed. The therapeutic “intervention” of education is the content and method of delivery (format). Like all therapies in medical practice, education could have risks (misinformation), side effects (increased patient anxiety), and unintended consequences (increased utilization). Formal assessment to see if the educational therapy worked or not, and how to improve, should be part of patient “follow-up.” Finally, education should be culturally responsive and free of bias [7].

“Diagnosing” Your Learner – Patient

The ultimate goal of patient education is to provide an experience that is transformative and improves HRQoL. While much well-intentioned time and resources are spent on delivery of information to patients, more thought should go into understanding

beforehand who the learner is and what the learning objectives should be. What does your patient already know, and what else do they need to know and why? What needs to be learned depends on a patient's capacity to change his/her health behavior, such as for safe discharge or a new medication regimen. Most pulmonary professional societies provide information for patients based on expert consensus or intuition. These can be an excellent source of initial guidance for clinicians designing a program of patient education. These, usually free, resources prevent you from “reinventing the wheel” (Box 4.1). But not all topics may be considered relevant by patients, and some relevant topics, such as financial and social support issues, are often not included.

Box 4.1 Potential Resources

Links as you develop your education materials

Health literacy guides, resources, and tools

<https://www.plainlanguage.gov/resources/content-types/healthcare/>

Patient Education Materials Assessment Tool (PMAT)

<https://www.ahrq.gov/professionals/prevention-chronic-care/improve/self-mgmt/pemat/index.html>

Links to share with patients:

American Association of Cardiovascular and Pulmonary Rehabilitation

<https://www.aacvpr.org/Resources/Resources-for-Patients/Pulmonary-Rehab-Patient-Resources>

CHEST Foundation – American College of Chest Physicians

<https://foundation.chestnet.org/patient-education-resources/>

American Thoracic Society

<https://www.thoracic.org/patients/patient-resources/>

American College of Chest Physicians – Patient Education Center

<https://www.acponline.org/practice-resources/patient-education/online-resources/breathing-and-lung-health-respiratory>

Lung Foundation Australia Pulmonary rehabilitation toolkit (COPD)

<https://pulmonaryrehab.com.au/importance-of-education/resources/>

Learning should be contextualized, being where an individual patient's circumstances (their context) are identified and learning is tailored to the circumstances and needs of the individual. To do this, you must first assess a patient's starting point or knowledge baseline. This can begin with open-ended inquiry during your patient interview. Taking the time to ask questions about lived experiences associated with their pulmonary diagnosis, other past medical conditions, confidence and capability with using technology, digital technology access at home, and about degree of success navigating the healthcare system develops your understanding of their health literacy. In addition, several validated questionnaires are available to support the clinician to quantitatively evaluate knowledge, health literacy, or digital literacy. Patient demonstration of skills can be done using a checklist (see assessment section

below). Using a teach-back method [8] can be especially enlightening. This is also known as “show-me” method, in which the patient tells or shows what was just taught to them, allowing the healthcare professional to confirm comprehension and understanding.

Simply knowing what your patient needs to know is not enough for transformation of behavior and improved health outcomes. As Redman points out in her book, *The Practice of Patient Education* [9], individual motivation and cognition must also be considered. The patient must be motivated to expend the energy required (for new knowledge, skills, or attitudes) to ultimately change behavior. Motivation can be an intrinsic need to be competent, autonomous, and related to others, but also to any external reinforcement. Personality also comes into play, as there are patients who are “monitors” who benefit from more details versus “blunters” who may do better with less information [10]. Learning new skills increases motivation and a sense of self-efficacy. Self-efficacy has been associated with better HRQoL and better disease-specific health status during pulmonary rehabilitation [11]. But repeated failure can break one’s self-efficacy. Instruction should match the patient’s stage of readiness at any one time. Chapter 6 explores the power of motivational interviewing, while Chap. 11 explores self-management strategies bringing further insights to these concepts that can influence learning and behavior change. Mood disorders are increased in some pulmonary conditions, such as depression (8–80%) and/or anxiety (6–74%) in COPD [12], so Chap. 5 provides insights into assessment of mental well-being, while Chap. 7 provides guidance on interventions to support people with clinical anxiety and depression. Additional strategies must be considered during learning activities when motivation and mental health may be impacting the capacity to learn.

Adding to this challenge, 61% of patients with COPD have some cognitive impairment [13], which could impact on their capacity to remember, perform skills, and make decisions – all of which are essential to transformative learning. When a patient does not understand their diagnosis or treatment plan, adherence is compromised [14]. This does not mean that education should not be attempted. Instead, special attention to timing, method, and frequency of reinforcement may have to be adjusted. Assessment of cognitive capacity is essential prior to commencing an educational intervention. Readily available screening tools can support the process, including the Montreal Cognitive Test (MoCA) that can be administered in under 10 minutes, or the Mini-Cog (clock drawing test plus 3-item word recall) is even faster [15]. Clinicians sometimes avoid assessment of cognition, fearing it to be too confrontational, but focus groups suggest patients with pulmonary disease understand and appreciate the need to do so [13]. By understanding where the patient is commencing their learning journey, educational activities can be designed to meet that person’s level. Failing to do this can result in educational disengagement, which can damage learning, self-efficacy, and behavior change.

Finally, reflection is at the core of learning, and it takes reflective practice to diagnose one’s own efficacy in teaching and learning. Do you have the requisite knowledge, skills, and time to do this teaching and facilitate patient learning and behavior change? If not, how will you get it? Or whom do you refer the patient to?

Clinician educators' self-efficacy has been linked to their perceptions of students' competencies [16]. Developing your teaching capabilities across your career lifetime may positively impact patient outcomes. Further, you are role modeling learning to your patients. Role modeling is a powerful mediator in transformative learning, as respectful relationships underpin learning.

The “Therapy” (Designing the Educational Intervention)

Patient education, like any other therapy, requires the healthcare professional to start with the end in mind. What capabilities does the patient need to have (i.e., knowledge, skills and attitudes) by the end of your time together? Prioritization is necessary as not all aspects of learning can be addressed at once. Some things may be desirable but not absolutely necessary to know (aspirational), while others would be mortifying to you if your patient were unaware. Which capabilities should be developed first as core to improvement or foundational for further learning?

In the education field, starting with the end in mind is referred to as backwards design [8]. Learning goals and objectives are decided first before any teaching materials. This keeps focus on outcomes instead of teaching styles or processes. Such a thoughtful approach is necessary, as educational interventions may not be entirely benign. If not done well they can lead to confusion and loss of a learner's sense of self-efficacy and confidence. In a 2017 Cochrane review [17], self-management interventions in COPD were even associated with a slight excess in respiratory-related (but not all-cause) mortality. Of course, other factors might have also influenced the outcome, but results demonstrate the potential for adverse effects. Education therefore should be “prescribed” with evidence-informed approaches and monitoring of effect.

Backwards design for creating educational activities involves three fundamental components: (i) objectives – identifying what the patient needs to know and/or do, (ii) assessment – determining how the healthcare professional will know if this knowledge has been attained, and (iii) teaching methods – utilizing the best teaching modality for that content and situation.

Effective objectives are the necessary first step to focus the education process, identifying what capabilities the patient needs to have, know, and (depending on the circumstance) do. Ultimately, one needs to convey “who, will do, how much or how well, of what, by when” [11] in order to consider your patient education to be successful. This is what makes objectives well “formulated” or follow the best formula. For the patient, the objectives focus attention on critical elements. For the healthcare professional, objectives guide what to teach, suggest the effective instructional methods to use, and enable evaluation of the teaching provided. It is important to note that writing objectives is an iterative process. The healthcare professional should re-visit their formulated objectives frequently, reflecting on outcomes to ensure the three components (objectives, assessment, and teaching methods) are in continual alignment.

There are many different ways that educators talk about writing objectives. Specific, Measurable, Achievable, Relevant, and Time Bound (SMART) [18] is one of the most common and simple methods for writing them, and aligns with patient-centered goal frameworks frequently used in healthcare:

Specific – who is being taught and what is being taught and to what extent. Is it the patient, a caregiver, or both? The depth and breadth of content shared is important given the duration of a patient’s visit, the capacity of the patient to absorb information at that moment, and the patient’s prior knowledge.

Measurable – what action can the learner take to satisfy your objective?

Achievable – can the patient accomplish this? How much content can the patient absorb in the time you have together? Is it feasible to do within your clinical setting?

Relevant – is this important and practical for the patient? Getting such buy-in is an important component of adult learning.

Time Bound – what is learned should be something your patient has to use in a timely fashion – not be applicable years from now. When should the objective be complete? Usually, it is by the end of your educational session, though should be reinforced over time.

One example would be teaching a frail patient and his spouse (specific) the eight steps in ideal rescue inhaler use (measurable with a checklist) in clinic today by the respiratory therapist with 15 minutes after pulmonary function tests are completed (achievable), so that the patient may have some relief from exacerbations of his dyspnea (relevant), and that he can demonstrate proper usage at the end of clinic visit and then when seen at start of next appointment in 6 weeks (time bound).

SMART learning objectives require an active, measurable verb and the articulation of observable and specific knowledge, skills, and/or attitudes. Identifying an appropriate and descriptive verb is critical for setting clear expectations around precisely what a patient is intended to know and do. For example, the verb “understand” COPD exacerbations is passive and vague. But “list” three signs (change in cough, dyspnea, wheezing) is active and clear. Bloom’s taxonomy [19, 20] (See Fig. 4.1) provides a hierarchy of active verb choices that can be aligned with a measurable assessment. Choosing the best verb requires determining what type of thinking and/or actions the patient needs. Generally, learners need to be capable of the lower levels of the taxonomy before moving up the pyramid. As such, healthcare education should consider the lower level thought processes and capabilities of patients to be foundational, and assess and develop these before proceeding further.

Kern’s textbook [10] on curriculum development recommends making a table to structure the design process. Whether it is a cognitive (knowledge), affective (belief, value or behavior), or psychomotor (skill) outcome, the educational designer needs to list the learning objective, the method and practice of teaching it (referred to as pedagogy), the reinforcement (what you will do to prevent decay of any learning that was achieved), and then the resources required by the teacher and learner. See Fig. 4.2 for one such table with one example in each of the three domains for COPD. The resources element cannot be overemphasized, as it impacts all others.

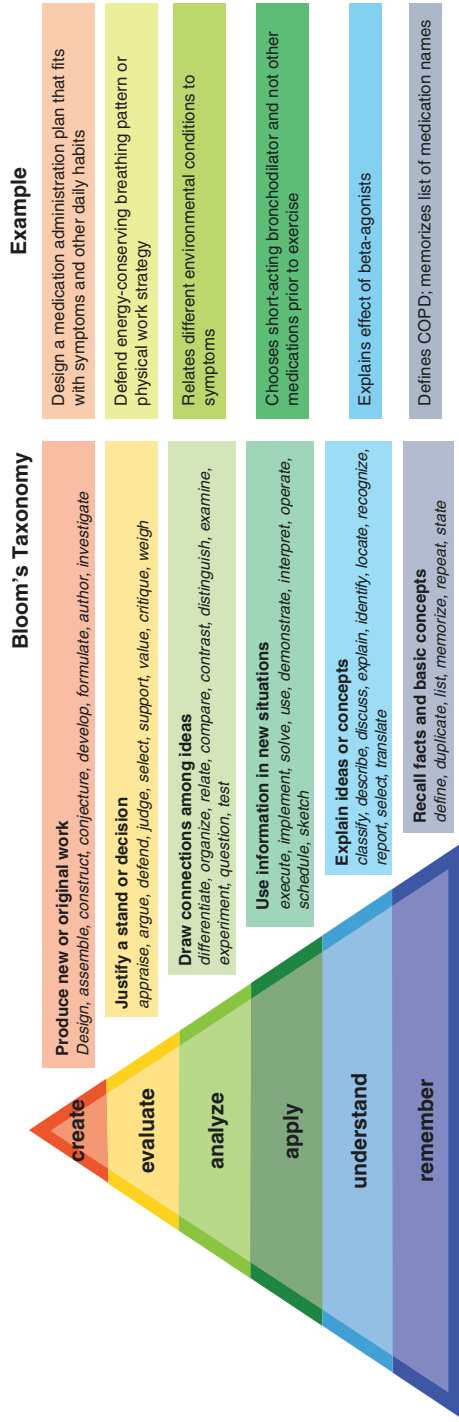


Fig. 4.1 Clinical predictors of biphasic anaphylaxis

	Cognitive (Knowledge)	Affective (Attitudinal)	Psychomotor (Skill or Performance)
Specific measurable objectives	<ol style="list-style-type: none"> 1. Recall the primary medications used in the management of COPD 2. Understand the process by which the medications affect the lungs to improve symptoms 	<ol style="list-style-type: none"> 1. Understand the necessity for adherence with medication routines 2. Recall the adverse events associated with lack of adherence with medications 3. Adhere with personal medication routine for at least 1 week 	<ol style="list-style-type: none"> 1. Accurately self-administer X medication using Y inhaler device
Educational method to achieve learning objective	<ol style="list-style-type: none"> 1. Lecture to the group giving overview 2. Small group discussion among peers, completing interactive activity on how the lungs work and different drugs influence their function. 	<ol style="list-style-type: none"> 1. Development of medication routines, that are individually tailored and structured by the patient with support from the PR professional 2. Peer discussion on the issues when medication routines are not followed. 	<ol style="list-style-type: none"> 1. Demonstration of technique for inhaler use—live during the PR class, and available as an online video for viewing at home 2. Repetitive practice with peer observation and review 3. Patient films self, taking inhaler and uploads to YouTube for peers or PR professional to review and provide feedback. 4. Final review by PR professional to confirm technique correct—if incorrect, repetitive practice with peer feedback then repeat assessment by PR professional until correct technique
Educational method to prevent decay	<ol style="list-style-type: none"> 1. Quiz on the different respiratory medications and modes of delivery 2. Quiz on the process by which medications influence the lungs 	<ol style="list-style-type: none"> 1. Review of medication routine 2. Diary of medication use for 1 week, with peer discussion on when medication routines are not followed—what are the challenges and how can you overcome? 	<ol style="list-style-type: none"> 1. Review of inhaler technique weekly for 4 weeks to ensure remains correct—practice in front of peers, then assessment by PR professional.
Resources required	<ol style="list-style-type: none"> 1. Microsoft PowerPoint 2. Data projector and lap top 3. Activity sheet for completion during the class—includes discussion activities that foster development of understanding not just memorizing. 	<ol style="list-style-type: none"> 1. Diary to document medication routine. 2. Diary to document medication adherence over the week following. 	<ol style="list-style-type: none"> 1. Placebo inhalers 2. Online platform with video of PR professional, for example YouTube clip 3. Instruction sheets for reading of steps to take medication.

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; PR = pulmonary rehabilitation

Fig. 4.2 Exemplar of curriculum design for pulmonary rehabilitation: inhaled respiratory medication use. (<https://www.thoracic.org/statements/resources/copd/copd-disease-education-in-pr.pdf>)

Pedagogy is the method or practice by which a teacher will engage with a learner to support the process of learning. There are many different approaches described in educational literature including didactic, inquiry-based, partnership, and learner-centered. Pedagogies vary greatly as they reflect different social, cultural, and political contexts. Indeed, consideration of the culture of the learner is critical considering the health and healthcare disparities observed across cultural groups globally. Extensive exploration of pedagogical approaches is beyond the scope of this chapter, although readers are encouraged to consider their current strategies and how to enrich their patient’s learning experiences, with additional patient education texts available for further reading [9, 21–23].

Education is often experienced in group settings, which has the advantage of efficiency, but more importantly allows for sharing experiences and peer modeling. Group-based activities usually consist of lectures or presentations, or group

discussions exploring cases/scenarios, or practicing psychomotor skills development. Lectures or “large group didactics” are common for cognitive domains (knowledge) because they are so feasible due to the small teacher: patient ratio and little necessary special equipment. PowerPoint slides are frequently used but can be counterproductive if containing too much text, red-green colors, or distracting fonts or animations. Published guides [24] are available to support you in creating slides for learners that support avoidance of animations, of certain fonts and colors, and of excessive text. Group teaching can also decrease social isolation, and “social comparison theory” (peer pressure) can improve performance [25]. While large group teaching is efficient at delivering content, it relies heavily on the speaker’s skills to engage in one-way communication leading to disengagement and inattention. Opening with a story and strong voice and ending with a call to action are a few of the recommendations of speaking coaches. Case-based learning can be more engaging, where learners are provided with a scenario and given structured questions to discuss and answer about the case. Case-based learning can be structured to first require individual learning at home (and often online), then individuals come together for discussion and to make meaning of the material they have been provided. This “flipped” classroom model [26] brings efficiency to the face-to-face education session but relies on motivated learners to complete the prework.

Learner attention wanes after 15–20 minutes, so it is important to insert breaks or engaging activities (for examples, see below) to reset this clock, for both online and face-to-face learning activities. A one-hour video online is rarely watched in entirety. Rather 7–10 minute online experiences can be completed as small learning “moments.” This attention span challenge is even greater when cognitive impairment is present. Learners with poor memory can be helped with even shorter, more frequent sessions, use of memory aids such as pillboxes (medication container labeled with days of the week to indicate to the patient which medications are to be taken when), and diaries to record their activities and support their reflections for learning.

A related phenomenon to consider in the delivery of educational experiences is the primacy-recency effect. Learners will most remember the beginning of an educational activity, followed by the end, and may miss much of the middle. So start out with the most important principles in order to not squander this precious peak-attention time. One no-cost way to engage an audience is the “pause procedure” [18] where one stops and gives learners 2 minutes to review their own notes or just think about what has been presented. This can also be done in the form of a “pair-share” where they briefly discuss with their neighbor in the group. Audience response systems [27], such as several hand-held “clicker” devices or free applications on smart phones, can maintain attention with the forced choices helping to encode memories. Even a show of fingers can be used to answer multiple-choice questions (“A” is one finger, “B” is two, and so on) and directly engage the audience in thought about the topic. This also gives the teacher real-time visualization of how well the group understands the concepts being presented and whether learning is taking place. The presenter can then either re-visit the concept during this presentation or later make modifications to the presentation considering the audience

engagement and ability to grasp concepts. A final, and critical, component of a teaching encounter is the closing [28]. This involves recapping the key points and then providing patients with the opportunity to clarify their understanding.

Discussion so far has referred to live educational activities. Frequent attempts are made at informing patients through the asynchronous use of printed, video, and/or online resources. In a 2008 survey [29], 75% of healthcare professionals reported routinely handing out patient education materials. However, many media-related educational resources are sub-optimal, with 30–100% written above the recommended sixth-grade reading level [30]. Half of the population may struggle with reading, and actual reading level may be five grades below the patient-reported grade level completed. The Institute for Healthcare Improvement provides a readability checklist [31] covering seven design elements for printed materials you may be creating or considering using. Tips include use of second-person voice, bulleted main points, and images. The Agency for Healthcare Research and Quality developed the Patient Education Materials Assessment Tool (PEMAT) [32] to evaluate the understandability and actionability for either written or audiovisual material.

Use of health information on the internet is a specific subset of literacy, and this digital or “e-literacy” in the United States is also low, ranging from 26% to 50% of the population (90 million people) [32]. Online health sources are used by more than 70% of people surveyed and are often the first source used. But publicly available websites frequently exceed the recommended reading level. In one study of lung cancer [33], the mean reading level of websites was eleventh grade. Reviewing the available online resources for people with COPD, Stollefson et al. [34] (2014) and Paige et al. [35] (2015) found, through a social media content analysis of YouTube and Pinterest, respectively, that content and quality varied significantly with many low-quality resources readily available to patients. Also, many websites are not yet mobile-enabled, which misses out on the growing portion of the population that conduct all of their business exclusively on smartphones or tablets – and an opportunity for us to seamlessly insert incidental education as they do so. These findings demonstrate that online learning design is not a simple “make a website” approach for patient education. Experts in digital and technology-enabled learning are available to support healthcare professionals in shaping content for efficient online learning that is active and appropriately presented through digital media. Digital educational experts should be consulted when creating online learning activities as healthcare professionals should not be expected to necessarily have this expertise. Well-designed virtual education and “telehealth” may help compensate when face-to-face education options for patients with chronic illness are less viable or accessible [36]. A 2018 systematic review suggested this was as, or more, effective than usual care in outcomes including knowledge, self-care, HRQoL, and healthcare utilization [37].

Affective domains, being attitude changes, require even more time and reflection such as diaries and journals in a continuous reflective cycle. Reviewing one’s own adverse events or listening to such stories of peers can be an effective emotional trigger for patients that provides motivation for behavior change. A disease flare up including hospital admission can be a significant life event, creating a “teachable

moment” because of emotional activation and perceived relevance for learning. For example, patients admitted with a COPD exacerbation randomly assigned to patient education had improvements in *global* HRQoL – which was relatively unique to this study population [38]. The use of reflective frameworks, for example, Gibbs Reflective Cycle [39] to support learning, can guide both the patient and the teacher through a reflective process and support transformative learning.

An emerging new area of educational design is “games for learning.” As the digital world shapes society and how we function, it also shapes how we learn and provides new opportunities for connection. Video games appear to be an effective media as they are a powerful tool to manipulate behavior. Engagement, rapid feedback loops, and their visual nature (as compared to passive reading of information) encourage active learning. “Leaderboards” dynamically rank an individual patient “player” as compared to their peers (peer pressure or “peer comparison” effect). If use of quiz questions with a leaderboard can improve glucose control in patients with diabetes [40, 41], think of the potential for those with obstructive pulmonary disease. Other game “mechanics” include giving a digital badge or reward for good performance. A main limiting factor in gaming for patient education is resources to create the interactive digital platform. However, as technology expands and costs associated with computer hardware and software decrease, the potential for gaming in healthcare increases. The challenge will then be in understanding the most effective educational design features needed in gaming for learning to change health behavior. Lessons can be learned from the higher education sector on the theoretical foundations for gaming for learning [42] to pilot new educational interventions with patients and establish the evidence for gaming as a new model for patient education.

Developing Better Teachers Through Feedback

Published focus groups describe the best patient educators are those who demonstrate sensitivity and provide individualized education, noting that a supportive environment and intrinsic motivation are key factors [43]. To maximize the capabilities of the healthcare professional leading educational activities, and thereby their educational impact, one’s own teaching skills require direct observation and feedback. Videotaping education sessions for later personal reflection can be effective. Peer review, inviting a colleague to support your reflection and debrief afterwards, can also be a rich learning experience for the presenter. Learners are an invaluable source of feedback on teaching approach, and taking the time to gather the patients’ perspective is essential for professional development in the practice of facilitating learning [44]. Feedback from multiple perspectives is more comprehensive (“360 degrees”). This evaluation can be through formal surveys or focus groups at the conclusion of learning activities. Just simply asking a patient for feedback at the end of a teaching session or the entire PR course may also provide insights for improvement of both the activities used and your own teaching.

The Follow-Up (Assessment of Educational Effectiveness)

It is important to assess whether your educational intervention actually worked, confirming attainment of the learning outcomes originally planned. The ultimate outcomes would be the individual's or community's health and healthcare utilization. But shorter term measures of the educational intervention are more feasible, such as score on a checklist of observed inhaler usage technique at the end of a teaching session or NIV compliance data at the end of a month. There are many ways that a patient can be assessed for learning [45], including validated learning needs questionnaires, such as the Lung Information Needs Questionnaire (LINQ) [46] measuring change in knowledge scores pre- and post-education. However, these questionnaires are limited to the patients' perception of knowledge and do not measure learning of skills or changes in affective domains. Teach-back, or "show me" method, as discussed above [8], is an easy method in which the patient has to repeat, in their own words, what they have done. This closed loop communication is a quick, real-time tool during the patient encounter and can include knowledge, skills, and affective domains in the review of learning. Other tools, which are usually designed specifically for the educational activity, depend on measurements aligned with that table you completed during the planning phase. Quizzes are best for testing medical knowledge. Knowing there will be a quiz later can improve learning by adding emotional accountability, even when a test is considered to be low stakes. Team-based or anonymous quiz answering can remove any patient anxiety and still serve to assess the teaching program, but are less useful in assuring that any one individual benefited. Test question writing, especially multiple-choice format, requires considerable thought, as there are several pitfalls that need to be avoided [47]. True-false questions encourage guessing, while emphasis on trivia is not practical. As in other aspects of education, a clear link between the test-question and the learning outcome being measured is necessary. Finally, a procedural checklist, especially if validated [48], used when a patient is demonstrating a skill such as inhaler usage is the best way to quantify and trend skills improvement over time.

Setting small frequent goals can be reinforcing for both the patient and the teacher. Learner satisfaction is considered a low-level outcome but is important in patients' recall and can affect their motivation for ongoing involvement in educational activities and maintenance of behavior change. In one study of asthma patients, satisfaction seemed to improve with longer and more intense educational sessions with no "saturation" or ceiling effect [49].

Conclusion

Patient education is a longitudinal, iterative commitment that can improve patient health including HRQoL and reduce utilization. It may contribute to "high value care" or at least sometimes reduce low value care. It has been said, "management of chronic airways disease is 10% medication and 90% education" [50]. Just like your

approach to any clinical dilemma presentation, your patients' educational needs require a diagnosis (needs assessment), a therapeutic intervention (education guided by SMART objectives), and then follow-up to see if outcomes were achieved (assessment).

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