Consensus Recommendations for the Use of Simulation in Therapeutic Patient Education

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Introduction: Simulation is rarely used to help individuals with chronic diseases develop skills. The aim of the study was to provide recommendations for the use of simulation in therapeutic patient education (S-TPE).

Methods: Expert consensus was achieved with the participation of the following 3 groups of experts: (*a*) expert patients and caregivers; (*b*) health professionals specialized in therapeutic patient education (TPE); and (*c*) simulation experts. Each expert received a list of questions by e-mail in 3 iterations. The synthesis of the 2 first questionnaires resulted in 34 first recommendations voted during the consensus conference meeting. Each recommendation was subject to an extensive literature review. The quality of the evidence and the strength of the recommendations were assessed through the evaluation, development, and evaluation criteria categories (GRADE criteria). The third questionnaire selected and illustrated recommendations more specific to the use of S-TPE.

Results: At the end of the process, the experts identified 26 recommendations specific to the use of S-TPE. They proposed examples of skills in different diseases and stressed the importance of adapting the conditions of use (location, equipment, time of the care) to the circumstances of the patient learner and skills to be developed. Experts should exercise great caution as this technique presents ethical considerations related to patient care.

Conclusions: These recommendations underline the fact that simulation could bring added value to TPE. They provide a framework and examples for the experimental use of simulation in TPE. Research into feasibility and acceptability is needed.

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Chronic disease is the leading cause of mortality in Europe. One third of the European population older than 15 years had a chronic disease in 2017, and two thirds of people older than 65 years will develop at least 2 chronic conditions.[1]

Whatever the chronic care model,[2,3] training in self-management is regularly offered so as to enable the patients to actively contribute to their own care. These interventions can be called patient education or therapeutic patient education (TPE).[4] Therapeutic patient education is concrete patient training, which leads the patients and their support network to develop skills in self-care and disease adaptation, as defined by the World Health Organization.[4] Therapeutic patient education has been proven to improve treatment adherence and disease control,[5,6] but at present, no study has pinpointed the best type of intervention, educational method, and context for patient learning.[7] Indeed, although numerous training courses are currently offered, they are overly centered on the development of self-care skills and rarely focus on adaptation to the disease.[8] Furthermore, some skills may be difficult for the educators to develop or for patients and their families to acquire.[9] Similarly, in vulnerable patients, such as low-income patients, TPE should aim at improving communication between patients and health providers.[10] Although there are recommendations on the goals and organization of TPE,[11] there are none for the methods and techniques that should be used to develop these skills.

In contrast, recommendations have been produced for the use of simulation in the field of education for health professionals.[12] Simulation is a useful pedagogical technique when direct teaching is impossible for ethical, economic, or technical reasons. Its goal is to enable participants to learn, in the most realistic and representative situations, the expected behaviors or skills with no risk for patients. Mannequins, specialized devices, virtual reality, and simulated or standardized patients, used alone or in combination, are some of the available tools, which can be used depending on their availability and the selected skills.[13] Simulation, irrespective of the tools used, has to go through the following 3 specific steps: briefing, simulated practice, and debriefing. This approach to simulation has shown its value in helping health professionals develop various technical[14–16] and nontechnical skills.[17,18] We thus did not include learning with serious games in our consensus process, as the 3 key steps are not used. In addition, serious games have other objectives, such as competition or learning by trial and error, and require less reflexivity than simulation.[19]

Several authors have suggested that simulation may be useful in TPE.[7,20,21] Although some studies have reported on the use of simulation in TPE for relatives and natural caregivers,[22–28] none have considered the patients themselves.

To specify in what context, for which skills and under which conditions simulation could bring added value in TPE, we conducted a consensus conference based on a modified Delphi process. This article presents the process and recommendations resulting from this study.

METHODS

Group of Experts

The steering committee was composed of researchers with expertise in TPE (C.M., R.G.), in simulation (M.G.), in consensus methodology (M.B.), and a doctoral researcher (C.P. [chair]). The 24 participants, from France, Belgium, Switzerland, and Canada, were expert patients and family caregivers (n = 6), experts in TPE (n = 13), and experts in simulation (n = 5), who had been identified from the professional networks of the steering committee members.

They were selected because they have (*a*) been working as a caregiver and/or researcher in TPE or in simulation, (*b*) several years of experience, and (*c*) communicated in the form of publication or presentations during meetings.

The group of experts in TPE included 2 nurses, 7 physicians, a nutrition specialist, a health engineer, and a researcher. They were specialized in different chronic and rare diseases: metabolic disorders (obesity, diabetes), respiratory diseases (asthma and chronic obstructive pulmonary disease), cardiovascular diseases (stroke, heart failure, myocardial infarction), neurological disorders (multiple sclerosis, epilepsy), infectious diseases (HIV, hepatitis), mental disease (neuroses, psychoses), cystic fibrosis, and hemophilia.

The selection of expert patients and family caregivers was based on a validated definition: to have developed skills for managing the disease (their own or that of their relative) and to be involved in the improvement of the healthcare system.[29] They had been diagnosed with diabetes (n = 2), cystic fibrosis (n = 1), hemophilia (n = 1), granulomatosis with polyangiitis (n = 1), or ectodermal dysplasia (n = 1).

Two of the simulation experts were trained in TPE. There was 1 nurse, 1 midwife, and 3 physicians. They had between 3 and 34 years of experience in simulation.

Group Process

Using a modified Delphi process,[30,31] the experts were contacted by e-mail twice before the face-to-face consensus conference meeting.

The first questionnaire explored the skills to be achieved by simulation during TPE (S-TPE) as well as the conditions for implementation.

Given the limited literature on the use of simulation in TPE, the first questions were deliberately very broad: (*a*) For which life situations of the patient or caregiver, for which skills, and for which type of learning could simulation be useful? (*b*) What added value do you see in using simulation in TPE?

To help experts in the field that was not theirs, we provided them with information on simulation technique using an illustrative video and also with information on TPE with examples of the skills usually developed in the programs.

The responses to the first questionnaire were synthesized and organized in terms of skills and conditions of use. The second questionnaire asked participants to weigh each proposal on a scale from 0 to 5. The health professionals were asked to rank skills according to how they have already been addressed (from 0 "successfully" addressed to 5 "unsuccessfully"). The expert patients had to identify skills that were still difficult for them to reach (from 0 "not difficult at all" to 5 "very difficult to perform"), and the simulation experts had to identify skills that would be easy to acquire through simulation (from 0 "very difficult" to 5 "quite easy to acquire"). The intention was to triangulate the skills (*a*) not yet developed by patients in TPE but

(*b*) desired and (*c*) achievable through simulation. Responses were averaged by subgroup and for the entire group. The synthesis of these 2 questionnaires yielded the first list of recommendations.

Literature Review

A first literature review on the use of simulation in TPE was carried out on articles published between June 2008 and June 2018 in the following databases: Cochrane, Embase, Cairn, Francis, CINAHL, ERIC, ISIDORE, BDSP, Refdoc, EmConsult, PERSE, and PubMed (research strategy: "Simulation" AND "patient education as topic"). Of 348 articles, 11 were retained for analysis, as they were the only reports combining simulation and TPE with patients.

Given the limited literature on the use of simulation in TPE, each of the recommendations retained after the second round was the subject of a second literature review based on the training of health professionals. Research strategies were developed for each recommendation. We have included articles in English and French from PubMed and Cochrane published between January 2007 and December 2017. Sources of data included narrative and systematic reviews as well as randomized controlled trials.

Two committee members (C.P. and M.B.) rated the level of evidence available and the strength of each recommendation with the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) process.[32]

The Consensus Conference

A 2-day consensus conference meeting was held in November 2017 in Paris, France, chaired by a voting member (C.P.). The first recommendations resulting from the synthesis of the first 2 questionnaires, supplemented by the contributions of the literature, were presented, discussed, and voted. The recommendations were considered accepted if more than 75% of the experts voted a, b, or c (agree strongly, agree moderately, or agree, respectively) on a 5-point scale (with d, disagree moderately and e, disagree strongly).

Conflict of interest statements were obtained from all voting participants before the conference.

The Third Questionnaire

After the voting conference took place, the steering committee reviewed the recommendations that were agreed by the experts. This was done to focus on recommendations specific to the use of simulation in TPE instead of developing general statements on TPE. The recommendations specific to the conditions of use of simulation in TPE were then submitted to the 24 experts. For each recommendation, they could answer "keep it," "don't keep it," or "I don't know." The recommendation was maintained if more than 50% of the experts considered it specific to the S-TPE ("keep it"). Finally, we asked each expert to provide an example of a competence in their field that could be developed with S-TPE.

RESULTS

Results of the First Questionnaire

All of the experts (n = 24) answered the first questionnaire. Sixty-two suggestions regarding the skills that could be developed with simulation were collected (Fig. 1). They were synthesized into a list of 33 patient skills by the steering committee. Overlapping proposals were grouped together. Other proposals that focused on the skills of the health professionals were removed, for example, the use of simulation to harmonize messages or improve their attitudes toward patient education.

We received 86 proposals regarding the conditions of use for simulation. The following 22 proposals were removed: 13 because they reiterated the principles underlying the simulation technique (eg, encourage reflexivity); 4 were relevant for health professionals and not patients (eg, health professional training); and 5 were off-topic (eg, humanization of practices). Finally, 64 proposals were classified into the following 8 categories: target group, simulation management, expected benefits for the patient, the specific contributions of simulation, location of the simulation, the appropriate time for simulation in the patient's care trajectory, implementation method, and ethical conditions.

Results of the Second Questionnaire

All of the experts (n = 24) answered the second questionnaire. A total of 55 proposals relating to the conditions of use of simulation (score > 3) and 14 skills for which simulation could provide added value were selected. The selection of the 14 skills took into account the following 3 types of results:

- Nine of 33 skills obtained an overall average score higher than 3 (average of the averages of each group): an average score higher than 3 for patients and family caregivers, ie, difficult to acquire; an average score higher than 3 for simulation experts, ie, skills easy to develop through simulation; an average score higher than 3 for TPE experts, ie, skill unsuccessfully addressed with TPE.
- Among the skills that obtained an overall average score less than 3 (28/33), patients and simulation experts gave a high score to 5 (average score per expert > 3). They pertained to the following: communication skills (educating those around you, understanding the refusal of others), becoming a partner of the healthcare team (promoting your health choices, identifying your role and limits), integrating new medical technologies into the management of your illness and treatment, managing your stress, and strengthening your self-efficacy. It seems that patients felt they needed to improve these skills, which is possible through simulation, whereas TPE experts believed that they were already being successfully addressed (average score < 3).
- One skill "to develop motivation" seemed particularly difficult to develop for patients and caregivers (score > 4), even if the scores of simulation and TPE experts remain low (average score < 3).

These results led to the formulation of the first 38 recommendations.

Results of the Consensus Conference

Twenty-three experts and 5 members of the steering committee participated in the final vote (n = 28): 22 were present at the conference and 6 voted by e-mail. One expert patient abstained from the final vote for health reasons.

For each recommendation, the results of the literature review on caregiver education and on health professional training were presented. Discussions were held to clarify some recommendations and to consider their transferability to TPE. The experts reported redundancies for 8 recommendations. As a result, 34 recommendations were put to the vote, which was electronic and anonymous. Thirty recommendations scored more than 75%. Four recommendations were rejected: simulation is not

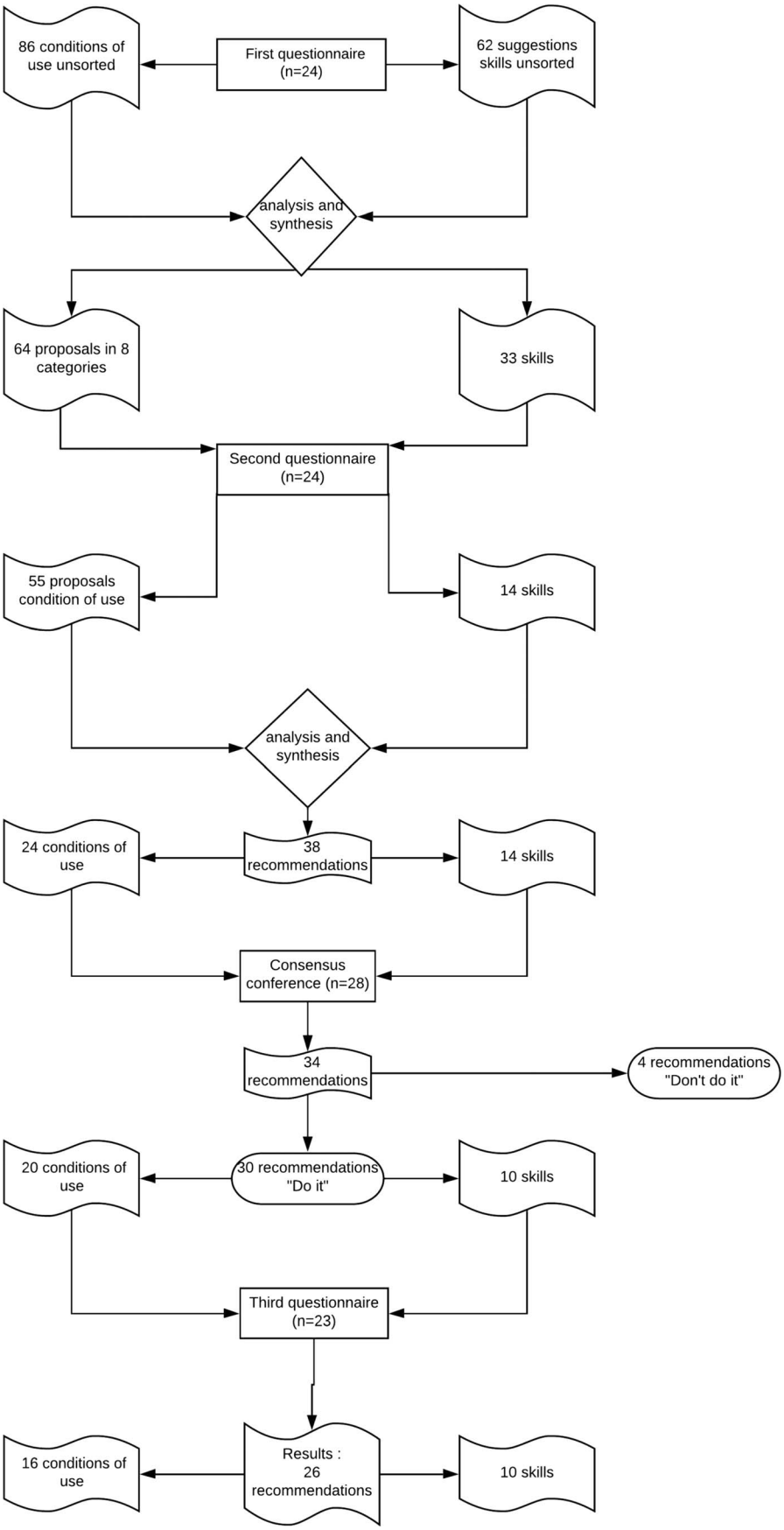

FIGURE 1. A diagram of the results obtained at each stage of the consensus process to provide an overview of the results.

TABLE 1. Final Recommendations on the Conditions of Use of S-TPE and Skills for Which Simulation Brings Added Value to TPE

Learner Characteristics for S-TPE (2 Statements)
A1: Simulation should involve caregivers if they play a role in managing the patient's disease.
Discussion: According to the WHO, TPE concerns patients and their families.[4] To date, the only studies on TPE have focused on natural caregivers caring their children: parents and grandparents[21–27]
A3: Simulation should be used regardless of a patient's cognitive capacities.
Discussion: Simulation being fictitious, one might ask if the patient must be able to distinguish reality from fiction. The experts stated that simulation can be performed with patients presenting cognitive disorders. The goals must be adjusted according to the patient's particular cognitive capacities. If TPE is recommended, the experts agree that simulation can also be offered.
Terms of use of simulation in TPE (11 statements)
B1: It is recommended to select locations for simulation in so-called "white rooms" or in situ depending on the objectives
Discussion In situ simulation takes place in care or living settings, where authenticity is important. In TPE, it is difficult because it would require going to the patients' homes or living areas. However, simulation in a simulation center (white room) makes it possible to reproduce authentic living spaces. For example, this has been done in the past to prepare parents for their child's discharge from a neonatal care service[27]
B2: It is recommended to use online simulation with debriefing to make TPE more accessible
Discussion: As TPE is not accessible in remote areas,[33] online simulation constitutes an alternative. However, patients may have to deal with difficult situations on their own and thus become vulnerable. Means to perform immediate online structured debriefing immediately after the scenario should be found, as it allows feedback and reflective thinking.[34,35] There is a need to further establish the conditions of efficacy and safety of debriefing with online simulation.
B3: It is recommended to use simulation as soon as possible in the course of illness.
Discussion: The experts stated that when simulation is done early, the patients may develop fewer representations, making their learning process easier. If simulation is used early allowing patients to learn in authentic situations, they will be able to build clear representations of the skills they need to develop in their daily lives. The low experience of novices and students can be compared with the early stages of a patient's journey.
B6: Simulation is recommended after informing and/or mobilizing the knowledge of patients and their caregivers.
Discussion: In the caregiver studies, participants received information before the simulation. The interest of learning is situational action, so it is more comfortable to have a minimum level of knowledge.[23,27]
B7: Simulation using scenarios with progressive complexity levels is recommended, in agreement with the patient and the healthcare providers.
Discussion: Scenarios should match the learning objectives[36] and the level of difficulty needs to be adjusted to the trainees' level.[7,37] Education of parents with diabetic children in the management of hypoglycemia has been progressive (from moderate to severe hypoglycemia).[22] When preparing couples for leaving a neonatal care service, the couples experimented with 3 increasingly complex scenarios.[27]
B8: It is recommended to use simulation with groups of no more than 10 people (patients and/or caregivers).
Discussion: In TPE, up to 10 participants can be present. The experts proposed the same number for simulation. In studies on the use of simulation with caregivers (parents, grandparents), the composition of groups is not clearly specified.
B9: Role-play simulation is recommended to develop nontechnical competencies.
Discussion: Role-playing is a technique already used in FTEs to develop communication skills, such as educating others, asking for help, etc.[38] The use of authentic simulation situations could improve patient learning.
B10: Simulation is recommended to help learn techniques or procedures through repetition.
Discussion: For technical skills, the experts insisted on the term "repetition." In the studies conducted with caregivers, participants had the opportunity to repeat the simulation if they did not feel confident.[22,27]
B11: It is recommended to use simulation via virtual interfacing that, through repetition, helps patients learn.
Discussion: Virtual interfaces such as electronic simulators, connected objects, and virtual reality are developing more and more and seem to be ways for patients to learn about possible self-management.[39,40]
B12: It is recommended to develop scenarios with the help of a patient educator.
Discussion Patient educators are expert patients who are trained in TPE and supervision.[29] They share their experiences, knowledge, and competencies and help develop and organize activities. Their role can be extended in designing simulation scenarios and setting the objectives with the healthcare professionals.
B13: It is recommended that simulation be done by people trained in TPE and health simulation.
Discussion: Those developing simulation should have competencies in both simulation and TPE.[7] Reviewing best practices in S-TPE, the experts emphasized the need for training in debriefing.[41]
Ethical conditions for the use of S-TPE (3 statements)
C1: During simulation, it is recommended to avoid using scenarios that provoke undue anxiety.
Discussion: The scenarios should never lead to critical, highly anxiogenic outcomes such as death or decompensation of a patient which could ultimately thwart the simulation session.
C2: Regardless of the simulation method, it is recommended to systematically use briefing and debriefing based on best practices and with consideration for the patient's feelings.
Discussion: Empathy and kindness constitute central values in simulation. Ethically, the learner should not be harmed. Debriefing guidelines emphasize the importance of timing, training the person who conducts this phase with a caring and a respectful attitude, the need for a safe environment and conditions for confidentiality.[41,42]
C3: It is recommended that the professionals be trained to manage emotions.
Discussion: Since simulation might bring up real and sometimes overwhelming emotions or disorders,[7] the experts insisted on the need for professionals trained in emotion management to support the patients.
Skills for which simulation brings added value to TPE (10 statements)
D1: Simulation is recommended for learning to cope with unusual/infrequent situations.
Discussion: An example of an unusual situation is given in the study on the preparation of parents to return home with a child discharged from neonatal care.[26]
D4: Simulation is recommended for developing communication skills.
Discussion: Simulation is effective in developing the ability to communicate by the scenario and the debriefing analysis process.[18]
D5: Simulation is recommended for promoting the integration of new technologies in disease self-management.

TABLE 1. *(Continued)*

Learner Characteristics for S-TPE (2 Statements)	
Discussion:	According to the experts, new technologies constitute an asset to manage certain technical skills in chronic diseases. It has been useful in developing technical skills among the parents of diabetic children (to adapt insulin for example) and in using oxygen at home when a child returns from the neonatal unit[25,27]
D6: Simulation is recommended for promoting partnerships between the care team and the patient for his/her own health or as an expert patient.	
Discussion:	Simulation facilitates integration of the patient as a partner into the care team. It may help resolving the conflicts between health professionals and patients in shared decision-making.[43] The effect of role-playing training on treatment options and strategies remains a challenge because of the impact of culture in various countries.[44]
D7: Simulation is recommended for learning to cope with stress.	
Discussion:	Studies conducted among caregivers found they experienced a real-world stress after using the S-TPE,[23] and a decrease in the fear of coping with hypoglycemia after simulation.[27]
D8: Simulation is recommended for reinforcing the feeling of self-efficacy.	
Discussion:	It has been shown that simulation increased satisfaction and self-efficacy in parents of newly diagnosed type 1 diabetic children.[24] Parents of premature infants who participated in simulation scenarios significantly increased their self-confidence before leaving the hospital with their child.[27]
D9: Simulation is recommended for learning how to adjust treatment.	
Discussion:	TPE aims at enhancing patients' adherence to pharmaceutical and nonpharmaceutical treatment. When analyzing a situation, the reflexive practice allows patients to learn how to adjust their treatment. In caregiver education, simulation helped participants develop the ability to adjust the treatment according to clinical context.[22–24,27]
D10: Simulation is recommended for learning how to manage a crisis or emergency.	
Discussion:	Severe hypoglycemia can be considered an emergency.[24] Simulation is recognized as a way to place the learner in a situation without incurring risk, thus developing the patient's skills without endangering any of the participants.
D11: Simulation is recommended to learn to involve the social network in care.	
Discussion:	The help of a natural caregiver might be needed under certain circumstances, not necessarily limited to care. The committee experts stressed the importance for the patient to learn when and how to involve the caregiver in care as well as in the activities of daily life.
D12: Simulation is recommended for increasing the motivation to take care of oneself.	
Discussion:	The experts clearly said that simulation influences the level of motivation of the patients and helps them act. However, motivation is not considered a skill.

Abbreviation: WHO, World Health Organization.

recommended to help the patient through the stages of grief and to promote resilience, nor is it recommended in patients with generalized anxiety disorders, in denial of their illness, or with inappropriate behaviors that make it impossible to achieve mutually accepted goals.

The recommendations focused on the conditions for using simulation in TPE (20/30): recommendations based on learner characteristics, terms of use for S-TPE, and ethical considerations as well as the skills for which simulation brings added value to TPE (10/30). These recommendations were based on a literature review (see table, Supplemental Digital Content 1, http://links.lww.com/SIH/A463, GRADE process).

Two members of the committee (C.P. and M.B.) graded the level of evidence available using the GRADE process. The level of evidence of each recommendation (see table, Supplemental Digital Content 2, http://links.lww.com/SIH/A464, synthesis of results by recommendations) was analyzed according to the literature, and we provide a summary of these literature search. The results of the votes cast by the experts are given. Recommendations have been classified into the following section: (*a*) learner characteristics; (*b*) the conditions of use; (*c*) ethical conditions; and (*d*) the skills covered by the S-TPE. As literature search mainly found publications reporting on the training of health professionals, level of evidence supporting recommendations will need to be downgraded for indirectness.

Final Recommendations and Examples of Skills

Twenty-three experts completed the third questionnaire by e-mail. One expert patient abstained from the vote for health reasons. Of the 20 recommendations retained concerning the conditions for using simulation in TPE (20/30), 16 were considered important to keep (with >50% of respondents voting to retain them) (see Table 1, which presents 26 final recommendations). Sixteen conditions for using simulation in TPE (2 recommendations based on learner characteristics, 11 terms of use for S-TPE, and 3 ethical considerations) and 10 skills for which simulation brings added value to TPE. For each recommendation, we specify with elements extracted from the discussions among experts and the literature. We also identified examples of the use of S-TPE by skill (see Table 2, which presents examples of disease-specific competencies and potential situations for simulation). These examples are quite explicit and will provide valuable information for educators looking to develop initiatives in this area.

DISCUSSION AND CONCLUSIONS

The consensus conference has resulted in the first set of recommendations on the use of simulation in therapeutic education for patients with chronic conditions. The participation rate of experts remained high throughout the process, reflecting the interest in simulation and TPE.

Twenty-six recommendations were agreed upon and finally kept to clarify the conditions for using simulation in TPE. Simulation in therapeutic patient education can be adapted to the particularities of the patient and family caregivers when TPE is possible. Simulation can be offered to patients after an initial information session in a group of approximately 10 adults, while respecting scenarios of progressive complexity to avoid generating stress in patients. The possibility of repetition that simulation allows is recognized as an asset for the acquisition of certain skills.[45] Some recommendations rejected during the consensus

TABLE 2. Examples of Simulations in TPE (S-TPE) by Skill

General skills	The Specific Disorder and Skill	An Example Situation	Type of Simulation
D1: Simulation is recommended for learning to cope with unusual/infrequent situations.	Asthma: adapting to an unusual situation.	The patient is going on vacation in Africa. He has a coffee while waiting for his flight. When he leaves the café, he realizes that his hand luggage has disappeared.	In a simulation center (white room)
D4: Simulation is recommended for developing communication skills.	Rare hemorrhagic disease: communicating at the emergency department.	Arriving at the emergency department, how to stay calm and inform staff who are not familiar with the disease.	In a simulation center (white room) At a distance (e-learning...)
D5: Simulation is recommended for promoting the integration of new technologies in disease self-management.	Diabetes: Adapt behavior according to sensor glucose readings using a FreeStyle libre device.	At home, the patient is getting ready to do his 30 min of daily cycling, his glucose level is very low.	In a simulation center (white room) In situ: in the patient's environment
D6: Simulation is recommended for promoting partnerships between the care team and the patient for his/her own health or as an expert patient.	Take a position in shared decision-making.	The health care team presents its care plan to the patient, but the patient has other priorities that require a discussion about the goals.	In a simulation center (white room) In situ: in the patient's environment
D7: Simulation is recommended for learning to cope with stress.	Breast cancer: managing stress.	During chemotherapy treatment, the person must manage stress and anxiety when faced with severe adverse effects.	In a simulation center (white room)
D8: Simulation is recommended for reinforcing the feeling of self-efficacy.	Multiple sclerosis: inserting a catheter.	A patient has to insert a catheter in public washrooms.	In a simulation center (white room)
	Peritoneal dialysis: Performing peritoneal dialysis autonomously	A patient must perform peritoneal dialysis as soon as he or she is discharged from hospital. He no longer feels capable of doing it.	
D9: Simulation is recommended for learning how to adjust treatment.	Cystic fibrosis: adjust the dosage of pancreatic extracts	From a sample meal, the patient chooses the dose of pancreatic extracts according to the fat composition.	In situ: in the patient's environment At a distance (e-learning...)
D10: Simulation is recommended for learning how to manage a crisis or emergency.	Food allergy: give an adrenaline injection during an anaphylactic reaction.	A patient has a severe allergic reaction after consuming peanuts.	In a simulation center (white room) At a distance (e-learning...)
D11: Simulation is recommended to learn to involve the social network in care.	Ectodermal dysplasia: including the social circle in care	A patient brings his friends together and takes the opportunity to teach them what to do in case of overheating.	In a simulation center (white room) At a distance (e-learning...)
D12: Simulation is recommended for increasing the motivation to take care of oneself.	The experts did not give any particular example, because they consider that all types of simulation can increase the motivation to take care of oneself.		

conference were more about the evolutionary processes associated with chronic disease than they were about skills. This is the case for the processes of resilience[46] and grief.[47,48] Although simulation is recommended for learning to manage stress, experts rejected the idea of using it in patients with major anxiety disorders. The experts discussed this subject at length because they felt that simulation could potentiate the problem and impede the patient's ability to learn.

The group of experts agreed that simulation should contribute to patients and their caregivers developing skills in the context of TPE. The experts were able to propose some examples of technical or nontechnical skills to be developed in their field. This is especially true for some skills, which are underdeveloped in TPE and considered difficult to acquire, such as "responding to severe hypoglycemia."[9] There are several potential obstacles to skills acquisition. Examples include the stress and emotion that can be generated when learning complex skills,[9] the presence of concomitant health conditions, which complicate self-management,[7] and insufficient contextualization of problem-solving situations, which may limit a patient's ability to apply skills in daily life. Furthermore, educators may show resistance or present a lack of expertise in certain domains, such as managing patients' emotions.[49] According to the experts, and as shown by the first experiences with family caregivers,[41] simulation should make it possible to overcome such difficulties.[22,24–28] Indeed, simulation with a trained educator gives patients the opportunity to experience complex and authentic situations in a risk-free environment.[21] This is the main value of simulation as long as it meets the criteria of both engineering (or physical) and psychological fidelity,[50] depending on the task to be accomplished and the learner's level of training (novice or expert).

All of our experts agreed that regardless of the mode of simulation (in situ, in a dedicated center, or online), the debriefing stage remains essential for learning. Without debriefing, if the patient is left alone, the benefits of simulation in terms of learning would probably be diminished[34,36,41,51] and countered by the additional risk of increased stress or a drop in self-confidence. Hence, simulation should be carefully planned to facilitate the reflexivity and metacognition developed during the debriefing phase.[7,37]

The mode of simulation must be determined in context to allow more relevant access with regard to the targeted skills. Access to S-TPE remains of concern because of the limited number of simulation centers, which are mostly located in big cities. To encourage wider use of S-TPE, additional types

of facilities should be considered for S-TPE. For instance, training centers for health professionals, which are gradually being equipped with rooms or simulation centers, can be used for S-TPE, especially because the simulations will probably not require specific medical devices (such as sophisticated mannequins), but rather a context that resembles the patient's day-to-day environment.

There are some limitations to this consensus conference. Expertise was not distributed equally in the expert group. There were fewer patients and simulation experts than TPE experts. It was difficult to recruit expert patients because of the relatively narrow selection criteria, which were based on the definition of an "expert patient."[29] Indeed, it was challenging to find patients experts in TPE who were willing to participate and dedicate time and effort to the project, especially knowing that their participation could be disrupted by their health status at any time (one of them withdrew from the consensus conference and the third questionnaire because of health issues). Similarly, there were few simulation experts seeing as the development of this technique in Europe is still mainly focused on emergency care and the use of medical equipment. However, our analysis methods (average per group of experts) made it possible to give equal weight to the proposals of each type of expert. The group of experts did not represent all countries, but the use of these recommendations in other populations seems possible. The use of simulation for children with chronic diseases was not studied in this research.

The modified Delphi method includes a meeting to allow and facilitate exchanges. The addition of this step to the Delphi method may seem controversial because the free circulation of speech is linked to ability of the facilitator to encourage conversation. Here, the facilitator was experienced in this type of practice, and the members of the steering committee who were also tasked with encouraging debate supervised her. We believe that the meeting allowed the experts to better understand the expertise of the other groups and the recommendations that resulted from the process.

Because there is little documentation on the use of simulation with patients, the recommendations were mainly supported by research in health professionals training and, rarely, studies on informal caregivers. Thus, the transferability of the results remains to be studied. For these reasons, the recommendations on the use of S-TPE presented herein remain quite broad. However, the examples of skills and simulations proposed by the experts make it possible to envisage the application of these recommendations to specific contexts. Further research is now required to assess the feasibility and acceptability of S-TPE for patients and educators.

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