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# Ibero-American consensus on learning outcomes for the acquisition of competencies by medical students through clinical simulation

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**Abstract. – OBJECTIVE: Our aim was to reach expert consensus on specific learning outcomes (LOs) that can be achieved through clinical simulation aimed at developing the competencies that medical students need to be able to successfully manage patients and assume general clinical responsibilities.**

**MATERIALS AND METHODS: The six-member scientific committee peer-reviewed Spanish reference documentation (in line with the Bologna Process) on required competencies in medical undergraduate students to select an initial set of 16 competencies that could feasibly be developed through simulation and a corresponding set of 75 LOs. Snowball sampling was used to identify candidates for an international panel of simulation experts. Applying a set of pre-defined criteria, 19 panelists from seven Spanish-speaking regions were recruited to participate in a modified two-round Delphi procedure based on electronic questionnaires and aimed at reaching formal consensus on appropriate LOs for simulated medical training.**

**RESULTS: Final agreement between the panelists was high: no mean score fell below 7.26 of a maximum of 9, and all 75 LOs were agreed on, 74 in the first round and only one requiring the second round. The 16 LOs with mean scores in the top 25th percentile were selected as a set of core LOs to attain via simulation.**

**CONCLUSIONS: This Ibero-American consensus on observable and measurable LOs, reflecting competencies that can feasibly be developed via clinical simulation, is a framework that aims at helping medical schools' plans and delivering specific kinds of undergraduate medical training through simulation. It is also proposed in a set of core LOs as a starting point for less experienced schools to design a simulated training program.**

*Key Words:*

Education medical undergraduate, Consensus, Learning outcomes, Clinical competence, Simulation training.

## Introduction

Doctors need a broad range of technical and skills to undertake clinical tasks, such as taking medical histories, performing physical examinations, diagnosing diseases, establishing prognoses, and prescribing treatments. They therefore need to develop competencies related to organization and planning, information management, problem-solving, teamwork, leadership, critical thinking, ethical commitment, and interpersonal communication. Such competencies should be developed as part of the undergraduate Medical degree, according to the Bologna Process agreements aimed at unifying criteria and standardizing academic procedures across 46 European Higher Education Area (EHEA) countries based on the principles of quality, mobility, diversity, and competitiveness[1,2]. However, many medical students feel that their education does not offer sufficient opportunities for personal training in clinical practice, while many countries legally restrict autonomous interaction between medical students and patients[3].

In the last 30 years, simulation has been widely used to train students in the competencies required for healthcare professionals. As defined by Gaba[4], "simulation is a technique – not a technology – to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner".

Clinical simulation used with undergraduate medical students has many potential advantages. In line with healthcare ethical commitments[5], it is safe for both patients and students, as the students operate in a risk-free but real-



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istic setting, can repeat procedures until objectives are achieved, and have time and space to reflect on mistakes as a learning opportunity[6]. From the teaching perspective, scenarios can be adapted to particular needs and can include infrequent clinical situations. Finally, objectives and standardized evaluations of simulation performance help developing a culture of patient safety and professional humility in future doctors.

Simulation can contribute to closing the educational gap between medical knowledge and clinical competences in undergraduate education. Its usefulness has been demonstrated in terms of enhanced knowledge acquisition and more effective patient management[7], clinical communication, and teamwork[8]. Students can also acquire experience of urgent medical scenarios that simulate real-life clinical practice, where, for safety reasons, student participation is usually token and insignificant.

Several simulation experiences have been reported for medical schools in recent years, focusing on different competencies and clinical situations at different stages of the undergraduate medical curriculum. However, no clear guidelines exist as to which cross-curricular clinical competencies could be effectively learned in simulated settings, nor a well-established academic consensus on the learning outcomes (LOs) that could be used to assess competencies exists.

Critical to guiding the design of simulated clinical scenarios for medical students is a clear LO map and objective tests that measure competency attainment, whether in relation to subjects, academic years, clinical clerkships and rotations, etc. In 42 medical Spanish schools, for instance, a simulation proposal would standardize simulation in objective structured clinical examination (OSCE) testing of end-of-degree clinical competence[9,10].

Our aim was to achieve international expert consensus on LOs for cross-curricular clinical competencies that need to be acquired by undergraduate medical students and that could feasibly be developed using simulation as a substitute for real-world experience. We propose our research as a starting point for developing and standardizing simulation procedures in medical schools wishing to include simulation in their curricula. Our specific focus is the Ibero-American cultural sphere, i.e., Spain and other American countries where Spanish is a vehicular language[11].

## Materials and Methods

### Consensus Procedure Overview

We conducted an expert consensus study using the modified Delphi technique[12-14] in two survey rounds. Delphi panelists responded to a questionnaire containing a battery of possible LOs that could be trained through clinical simulation, which they scored according to a single ordinal agreement/disagreement scale; panelists were also able to include explanatory comments and express opinions. Before the second round, experts received a detailed statistical report on the first-round results, so that they could reconsider their positions in view of the collective intelligence of all the panelists in the second round.

The anonymity of the experts and confidentiality of their data was assured to avoid undue influence among the panelists. The electronic questionnaires were administered *via* a dedicated survey website. Standard statistical criteria were used to determine consensus, as described below.

### Questionnaire Development

A list of undergraduate medical competencies and LOs that could potentially be developed through simulation was drawn up in various rounds by the Project's Scientific Committee (the six authors of this paper), based on an initial proposal made by the group coordinator (SE). Two documents were used as a framework for the list: the Spanish ministerial decree establishing requirements for official university medical degrees[15] and the White Paper on the Undergraduate Degree in Medicine, published by the National Agency for Quality Assessment and Accreditation (ANECA, the state body responsible for authorization, assessment and accreditation of university programs and instructors in Spain)[16]. The 23 pre-selected competencies (11 cross-curricular and 12 specific) and 76 LOs were reviewed by the scientific committee and, based on criteria of applicability in different settings, reduced to 16 competencies and 75 LOs.

### Panelist Recruitment

An international panel of experts was selected according to the following criteria: clinical and/or scientific leadership, breadth of knowledge and interest in clinical simulation, scientific attitude and aptitude, teaching merit, simulation teaching experience, ability and willingness to work in a team, and a high level of intrinsic motivation[17-19]. Selection commenced with a review by the scientific committee members of professional contacts with clinical simulation expertise in the targeted study area (Ibero-America). Candidates received a cold-call email invitation that included a brief description of the project's objectives and methodology. Recruited panelists from the initial list were asked to act as key informants in identifying and endorsing further eligible candidates in their region. This process was repeated three times, applying an exponential non-discriminative snowball sampling technique[20].

### Evaluation Scales, Data Analysis, and Consensus Criteria

Using a Likert-style 9-point ordinal scale, the panelists assessed the suitability of the proposed LOs according to their professional judgement and personal teaching experience. To facilitate interpretation, the scale, ranging from 1 = "not at all appropriate" to 9 = "highly appropriate", was divided into three agreement categories (UCLA-RAND Corporation)[18,19,21,22] as follows: 1-3 = "inappropriate"; 4-6 = "questionable" (neither appropriate nor inappropriate, no defined personal criteria); and 7-9 = "appropriate". In addition to scores, each panelist could add explanatory comments and opinions.

After each Delphi round, the median score in each of the three above-mentioned scoring categories (1-3, 4-6, 7-9) was used to establish the majority opinion. Consensus depended on how panelists' scores were distributed in each scoring category. A LO was considered to have achieved consensus (i.e., agreement of opinion among the panelists) when less than 1/3 scored outside the three-point category containing the group median, classifying the LO as "inappropriate" (median ≤3), "appropriate" (median ≥7) or "questionable" (median 4-6). Discrepancy was defined as 1/3 or more panelists scoring 1-3 and another 1/3 or more scoring 7-9. LOs classified as "questionable" and "discrepant" and LOs for which opinions ranged widely [interquartile range (IQR) ≥4 points] were submitted to the second Delphi round[18,20].

The arithmetic means of the panelists' scores were used to rank the different LOs according to their relative importance in terms of expert criteria[17,23]. Based on this ranking, LOs in the top quartile of the ranking (25% of items with the highest mean scores) were considered to be core LOs, i.e., they were considered to be essential clinical simulation LOs for medical students.

### Qualitative Analysis

Comments made by the panelists during the Delphi survey were independently analyzed by two of the authors (SE and DM) and were then inductively coded and grouped into a final list of semantic categories through a peer-review process.

## Results

As a result of the snowball sampling procedure, we pre-selected 30 candidates who had either received several nominations or who fully complied with our criteria. Before recruitment, we asked the candidates to be sure that they had sufficient time and no conflict of interest. Of the 30 candidates, 11 declined for various reasons (mainly issues of time or personal circumstances), leaving 19 experts who participated as panelists. The panelists were based in Spain (9) and other countries where Spanish is a vehicular language, namely, Argentina and Mexico (2 each), Chile, Ecuador, Paraguay (1 each), and the USA (3). All 19 panelists completed the two Delphi rounds.

The panel agreed on 74 of the 75 LOs in the first round, and the remaining LO (#58: "Ask the patient about their expectations of treatment") was agreed on in the second round. **Supplementary Table I** describes the 16 competency categories and 75 LOs and shows scoring means, medians, IQRs, and the percentages of scores that did not concur with the median (opinions that contradicted the majority opinion).

Table II lists the 16 "core competencies" of the LOs (with scores rounded to a single decimal point) that achieved the greatest consensus among the panelists, i.e., the core (highest scoring) LOs corresponding to the upper quartile of the mean (>8.28 points). The 16 LOs correspond to the following six competency categories: "Leadership", "Obtains and compiles a medical record containing all relevant information", "Performs a physical examination and mental health assessment", "Recognizes and treats urgent life-threatening and others condition requiring immediate attention", "Clearly writes up medical records and other healthcare documents", and "Communicates in an efficient and empathetic manner with patients, relatives, and colleagues". The maximum disagreement among panelists regarding the 16 LOs was 5.56% for four LOs (#26, #38, #45, and #53), while disagreement was null for the remaining 12 LOs.

**Table I.** Core learning outcomes included in the top 25th percentile of means (mean score >8.28).

| | Competencies (CO) and learning outcomes (LO) | Mean | Median | IQR | % outside median |
|---|---|---|---|---|---|
| CO VI | LEADERSHIP | | | | |
| LO26 | Fosters a working environment based on respect and listening. | 8.4 | 9 | 1 | 5.56 |
| CO IX | Obtains and compiles a medical record containing all relevant information | | | | |
| LO37 | Openly asks for the reason for the consultation and records it in the medical record. | 8.7 | 9 | 1 | 0 |
| LO38 | Takes a history of the current illness. | 8.3 | 9 | 1 | 5.56 |
| LO40 | Lists the patient's personal history in the medical record. | 8.4 | 8.5 | 1 | 0 |
| CO X | Conducts a physical examination and mental health assessment | | | | |
| LO43 | Explains the examination to the patient, as well as the reason and where it will be carried out. | 8.3 | 9 | 1.5 | 0 |
| LO45 | Checks vital signs (heart rate, respiratory rate, blood pressure, temperature, etc), as appropriate to the case. | 8.5 | 9 | 1 | 5.56 |
| LO46 | Performs a physical examination appropriate to the medical problem. | 8.6 | 9 | 1 | 0 |
| LO47 | Examines the patient thoroughly following a systematic approach (by organs and systems, etc), performing a physical examination, palpation, percussion, and auscultation as appropriate. | 8.5 | 9 | 1 | 0 |
| CO XII | Recognizes and treats life-threatening and other conditions requiring immediate attention | | | | |
| LO53 | Carries out a systematic airway, breathing, circulation, disability, exposure (ABCDE) assessment for severity, and, for obvious bleeding, changes ABCDE to CABDE. | 8.6 | 9 | 0.5 | 5.56 |
| LO54 | Implements life-support measures (airway, ventilation, circulation, brain injury prevention) and manages changes in test results that may indicate immediate surgery. | 8.5 | 9 | 1 | 0 |
| CO XV | Clearly writes up medical records and other healthcare documents | | | | |
| LO61 | Describes the main reason for the consultation. | 8.5 | 9 | 1 | 0 |
| LO62 | Describes the patient's history, conditions, surgeries, medications, allergies, and social and family history in an orderly manner using different headings. | 8.3 | 8 | 1 | 0 |
| LO65 | Organizes how the physical examination is described (by either region or function), headed by a description of vital signs. | 8.3 | 8 | 1 | 0 |
| CO XVI | Communicates in an effective and empathetic manner with patients, relatives, and colleagues | | | | |
| LO68 | Introduces himself/herself at the beginning of the simulation scenario. | 8.7 | 9 | 1 | 0 |
| LO72 | Respects patients and colleagues as they are, without making value judgements or showing prejudice. | 8.5 | 9 | 1.5 | 0 |
| LO75 | Maintains receptive body language during encounters with the patient and team, in accordance with the verbal language used. | 8.3 | 9 | 1.5 | 0 |

*Note:* Reported means are rounded to one decimal point.

The panelists made 81 and 29 comments (total 110) in the first and second Delphi rounds, respectively, classified by the scientific committee into six categories. Two thirds of comments (71) expressed agreement with the wording of the item. The remaining comments (39) – which did not lead to any changes in wording – were as follows: explanations for disagreeing with an LO (7), questioning of the intelligibility of wording and requests for clarification (4), suggested LO reformulations (3), and expressions of interest in including other LOs (2), although with no further details; the remaining 22 comments were proposals for scenarios and ways of implementing LOs in practice. Comments were processed and returned to the panelists after the corresponding rounds to give the panelists an opportunity to reconsider their previous decisions.

## Discussion

The main contributions of this study are two: the achievement of expert consensus on 75 LOs in 16 categories reflecting cross-curricular and specific competencies that can be developed and assessed in medical students through simulation, and a list of 16 core LOs – from one cross-curricular and five specific competency categories – for which consensus was greatest.

Our study – which addresses a challenge posed by the EHEA Bologna Process agreements several years ago[2,22,24] – proposes practical reflection on how clinical simulation can contribute to the university learning process: over and above the simple transmission of knowledge, students, through simulation, can develop the specific competences required of their profession.

Developing a competency-based curriculum requires defining LOs in advance, specifically: deciding the desirable qualities of a future medical professional, and deciding the knowledge and skills needed to enable successful transition to the chosen specialized medical field. Basic clinical competence, which encompasses all the knowledge, skills, attitudes, and judgements needed to resolve clinical problems, is an increasingly complex multidimensional construct. This competence is acquired by students along a pathway that, according to Miller's pyramid[25], progresses from 'knows' (knowledge), to 'knows how' (competence), to 'shows how' (performance), to 'does' (action).

In traditional medical education, students advance to the upper levels of the Miller's pyramid *via* clinical clerkships and rotations that enable them to observe their instructors and practice their skills on patients. However, this scenario can lead to discomfort and safety issues for both patients and students. Clinical practice, in a simulated training environment, avoids those issues and enables the trainee to perform autonomously in unusual or complex clinical scenarios. Our study attempts to highlight where simulation could best contribute to competence attainment by students.

Our international expert Delphi panelists have proposed a comprehensive list of 75 LOs for observable medical competencies that can be developed through clinical simulation. Clarifying the nature and usefulness of our consensus, our primary purpose was not to develop a specific checklist of clinical competencies developed through simulation (e.g., as used in the OSCE tests), but to provide medical schools with an outline of which aspects of clinical competencies could feasibly be trained *via* simulation as a substitute for real-life practice. Others interested in using all or some of our proposed LOs as an assessment tool should, however, first analyze and establish the psychometric properties of their new constructs.

Our proposal can serve as a framework to set local learning objectives and devise a simulation design. From this starting point, teaching, learning, and assessment activities based on simulation can be rationally integrated in an undergraduate medical curriculum. We suggest that academic planners should focus on where simulation can be most useful, and especially on competencies for which training cannot be guaranteed for students, whether due to the low prevalence of a disease, the high risk associated with a procedure, unrealistic cost, or other reasons.

Properly assessing and highlighting the novelty of this consensus requires its aims and content to be distinguished from other useful university-level simulation initiatives. The medical literature reports various simulation experiences in medical schools[26], discussing activities to develop competencies[27], making proposals for simulation integration in the curriculum[28], and recommending the most appropriate types of simulation[29]. However, what has not been clearly established to date is a consensual proposal of aspirational clinical simulation goals for undergraduate medical students. Our study attempts to fill this gap, focusing on a specific geographical framework (Spanish-speaking countries).

The orderly design of any simulation program requires a set of reference LOs. Only by predefining the pursued LOs we can adequately focus on the following simulation blueprint components: selecting appropriate objectives and contents, planning the necessary training activities (scenarios, resources, methods), and designing assessment procedures appropriate to the predefined aims[30,31]. In our experience, the lack of a clear map of agreed LOs is an impediment to the organization of rational undergraduate programs by instructors, even when they have previous advanced expertise in simulation, e.g., in postgraduate or specialized settings. For instance, activities may be too complex or sophisticated, or may overestimate trainees' medical knowledge, leaving students feeling uncertain about what they are doing or are supposed to do, feeling dissatisfaction, and rejecting simulation activities[32,33].

Our comprehensive LO proposal covers all competency dimensions (cognitive, psychomotor, and attitude/emotional). Although clinical simulation is usually associated with manual and equipment operation skills, our LO proposal also works on cognitive LOs in the highest taxonomic categories proposed by Bloom (applying, synthesizing, and evaluating)[34]; for instance, LO #3 requires students to defend what they consider a priority at any given time, and LO #18 requires students to reflect about mistakes made as a learning opportunity. We believe that our proposal can enrich simulation programs that focus almost exclusively on developing instrumental skills.

Fully acknowledging that the full set of 75 LOs may seem daunting to any instructor, we suggest that each medical school, in designing its simulation activities, chooses the most appropriate LOs for its particular context, i.e., suitable for its students and depending on the resources and faculty expertise available. To facilitate prioritization, we propose the 16 LOs that achieved the highest agreement among the Delphi panelists (Table I) as a set of core LOs that could be considered as an aspiration and/or a departure point for the design of a simple simulation programme[35-37]. This reduced set of LOs will be especially useful in universities that have not yet begun implementing this teaching method and so need to start on a small scale.

The reduced set of 16 LOs – which focus on students developing competencies that cover exercising leadership, clarifying the reasons for consultations and taking histories, completing medical records with essential clinical information (verbal and exploratory), performing physical and mental assessments, deploying interpersonal communications that transmit respect and empathy and avoid value judgements or prejudices, and recognizing and guiding the initial management of life-threatening conditions – reflect aptitudes and attitudes that would enable student to successfully transition to their chosen specialized training[38,39]. As experienced instructors of medical residents can confirm, however, current university programs in many countries cannot guarantee that basic student profile, as reflected in the 16 LOs, on graduation. Our proposal could respond, therefore, to a genuine educational need for change in the traditional medical education model.

The COVID-19 pandemic, as yet ongoing, has not only broken down traditional medical education barriers by preventing medical students from going to classrooms and hospitals for training, but it has also made possible to critically evaluate the current medical education model. In a social distancing context, simulation has become an invaluable tool for training students, as it has allowed them to develop competencies in a low risk environment[40], even if tele-simulated[41,42]. Our list of LOs that can be assessed through simulation contributes to this new form of distance learning.

As for critical assessment of methodological issues pertinent to the validity of our study, the initial step for this kind of study is typically the literature review, with a broad update of all available scientific evidence launching the consensus process regarding clinical practice[13]. However, because the primary information source needed to be the comprehensive legal framework on competencies for undergraduate medical education in Spain, we did not carry out a conventional literature review. Instead, the scientific committee (an experienced Spanish university-level simulation group) peer-reviewed the reference documents to select competencies that would be especially suited to simulated training. Situations for which real-life training could entail unacceptable risk were prioritized, also those that would expose students to low-prevalence scenarios (e.g., life-threatening conditions), and those for which pre-training in advance of clinical clerkships or rotations was advisable. We understand our final set of observable and measurable LOs to be in line with other European documents[1], and to reflect what the learner is expected to know, understand, and be able to do by the end of the learning period.

The international panelists, without exception, readily accepted the European origin of the reviewed reference documents from the EHEA; this acceptance was probably facilitated by the similarities in academic medical programs between Spain and most Latin American countries (six-year Flexner based curriculum[43], clear separation between preclinical and clinical periods, and similar subjects and clinical practices). Undoubtedly, the countries of the non-Spanish panelists benefit from mutual recognition of qualifications and possibilities for student mobility, as well as share other cultural and political links. Sharing the same vehicular language (Spanish) also avoided problems related to translation of the questionnaires.

The validity of our conclusions can be objectively assessed by the provision of some technical details on the Delphi method and on panel composition. One of the main strengths of the Delphi method is iteration in rounds, as this encourages panelists to reflect on their opinions once they become aware of the opinions of others. The method does not intend to establish truths but to foster convergence of different perspectives on a controversial issue with the goal of demarcating common ground acceptable to a majority. In other words, reaching consensus about an issue does not imply 'correct' answers, but experts making proposals that help uncertain others taking decisions.

As for the panelists, the reliability and validity of the consensus results depends, among other things, on their number and profile[44,45]. There is no evidence to suggest that increasing the number of experts leads to different results than those obtained with 15 to 22 experts[46] (our panel was composed of 19 experts). The critical issue is whether or not the panelists are genuine experts and influential in their respective fields. We accordingly defined explicit inclusion criteria that profiled the ideal panelist as an expert on clinical simulation in undergraduate medical education. Outside of those criteria, some panelists were selected more subjectively – *via* endorsement by trusted peers – through an exponential non-discriminative snowball sampling process whereby recruited panelists recruited others for the research study[47,48]. Unlike probability sampling (not feasible or practical in our case), non-probability sampling is non-random, as sampling is based on accessibility. This approach is particularly suitable when it is difficult to reach, and to compile a sample from, the population of interest. Snowball sampling is therefore a useful way for researchers to identify candidates that may not have otherwise been targeted.

Although sampling began with a convenience sample of the initial experts, the chain-referral-sampling process, to some extent controlled for selection bias, due to the desire and influence over who manages the consensus[47,48]. This approach, however, runs a small risk of generating a biased sample, as experts with a significant number of social connections may refer to other researchers similar to them. We ameliorated this risk by initiating a separate snowball process in each country where the scientific committee identified its initial experts. We also limited the process to three recruitment waves in each country. The fact that Spanish panelists were in the majority was a consequence of a higher affirmative response rate to the initial cold-call invitation.

Finally, the LOs in the first- and second-round questionnaires sent to the Delphi panelists were individually judged according to scores, which, when summed, resulted in an indicator of appropriateness, acceptability, and feasibility for each LO. To guarantee the validity of the results, we applied the standard reinforced majority criterion, i.e., group agreement was established when fewer than 1/3 of the experts scored outside the three-point category containing the group median[18,49]. Despite this demanding constraint, final agreement between the panelists was high: no mean score fell below 7.26 of a maximum of 9, and all 75 LOs agreed, 74 in the first round and only one (#58) requiring the second round. That level of homogeneity for a dispersed anonymous group with no face-to-face contact may seem surprising, yet we are of the opinion that, in choosing the survey content, the drafters demonstrated both academic expertise and realistic expectations regarding the international feasibility of their proposals.

We hope that this broad LO consensus achieves wide diffusion as an inspirational simulation framework for undergraduate medical students. In the same geographical area and with identical scope, similar proposals defining teaching objectives for undergraduate medical education have found success in recent years, e.g., a proposal for LOs on clinical communication skills for Spanish and Latin American medical schools[50,51]. We also hope that our LO consensus can contribute to standardizing clinical simulation by medical schools and promote academic exchanges between teachers and students in Spanish-speaking environments.

## Conclusions

This Ibero-American consensus on simulation LOs aimed at developing medical competencies is designed as a framework to help medical schools plan and offer appropriate training through simulation to undergraduate students. A core set of 16 essential LOs is identified as a starting point for the design of simulation programs for less experienced universities. Our proposal is especially targeted at Spain and Latin American countries sharing Spanish as a common language.

Finally, we propose several lines of research into simulation inspired by this research.

To just list a few: what specific clinical scenarios are most effective in achieving LOs? How many simulation activities should be included and how should they be sequenced? What summative assessment criteria should be used for simulated activities and what weight should they be given in the overall assessment of medical student competence? What additional measurable advantages does clinical simulation have over traditional training in specific vital competencies (e.g., management of life-threatening conditions). What is the ideal training profile for simulation instructors that will optimize simulation outcomes?

Our proposal, we hope, can be an initial step towards standardized LOs and a shared simulation teaching pathway that will enable universities to compare their results and spread best practices[46,48].


### Conflict of Interest

The Authors declare that they have no conflict of interests.

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### Consensus Panel Members

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### Authors' Contribution

Salvador Espinosa-Ramirez: conception and design of the study, acquisition, analysis and interpretation of data, writing the article, literature review, validation and final approval of the version of the article to be published. Diana Monge-Martín: design of the study, acquisition, analysis and interpretation of data, writing the article, validation and final approval of the version of the article to be published. Sophia Denizón-Arranz: analysis and interpretation of data, writing the article. Emilio Cervera-Barba: analysis and interpretation of data, writing the article. Alonso Mateos-Rodriguez: analysis and interpretation of data, writing the article. Fernando Caballero-Martínez: design of the study, writing the article, writing the article, validation and final approval of the version of the article to be published.


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