

**MESTRADO INTEGRADO EM MEDICINA**

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Helena Sobral Coelho

Anxiety and burnout in Portuguese Medical students in the final year  
of medical school: A narrative review

Ansiedade e burnout nos estudantes portugueses do último ano  
do curso de Medicina: uma revisão narrativa

Março, 2024

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Anxiety and burnout in Portuguese Medical students in the final year of medical school: A narrative review

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Faculdade de Medicina da Universidade do Porto, 22/03/2024

Assinatura conforme cartão de identificação:

Helena Sobral Coelho

# **Anxiety and burnout in Portuguese Medical students in the final year of medical school: A narrative review**

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## Abstract

**Purpose:** Mental health has been increasingly addressed in medical students, with high percentages of anxiety and burnout noted. Due to the known consequences for individuals themselves and their patients, evaluating the impact of the final year of medical school on the well-being of these students is essential. This period is atypical, with increased demands and higher levels of pressure. The aim of this study was to synthesize data on anxiety and burnout levels in medical students in their final year, emphasizing levels among Portuguese medical students in their final (6<sup>th</sup> year) of study, as well as identifying potential contributing factors and areas of interest for future research in this field.

**Method:** A search was conducted in four databases (PubMed, Scopus, Web of Science Core Collection, and PsycInfo) using the following search terms: "(last year" OR "final year") AND (anxiety OR burnout) AND (medical students)", along with a filter for studies involving the Portuguese population: "(anxiety OR burnout) AND (medical students) AND (Portugal)".

**Results:** Following the application of the inclusion and exclusion criteria, the search yielded 14 publications referring, predominantly, to observational and cross-sectional studies. Final-year medical students exhibited generally high levels of stress and anxiety. However, there is a scarcity of studies on anxiety and, specially, addressing burnout in final year medical students. Burnout was detected in 27.6% of final-year medical students in Cyprus.

**Conclusion:** More high-quality research about anxiety and burnout in final-year medical students is warranted, preferably employing longitudinal designs and multi-institutional settings. The elevated levels of anxiety and burnout observed in some studies underscore the necessity for the implementation of cost-effective prevention methods, to ensure that newly-arrived professionals are equipped to deliver optimal care.

## Purpose

According to the World Health Organization, health is a state of complete physical, mental, and social well-being, and not merely the absence of disease.<sup>1</sup> A state of mental well-being implies that individuals have the necessary capabilities to overcome life's challenges, with the competence to recognize their abilities, learn and work well, and contribute to the community.<sup>2</sup> In 2013, Portugal ranked as the second country in Europe with the highest prevalence of psychiatric disorders (affecting 22.9% of Portuguese individuals), with anxiety disorders being the most prevalent (16.5% of the population).<sup>3</sup>

Anxiety involves the anticipation of a future threat, real or imaginary, usually being an adaptive and natural mechanism of human life. However, it may require clinical attention when it becomes disproportionate to the threat, is severe, long-lasting, and disrupts normal human functioning.<sup>4</sup> It is often an underdiagnosed and undertreated disorder, further emphasizing the need for special attention to individuals at higher risk of developing such disorders for timely diagnosis and treatment.<sup>5</sup>

Burnout, on the other hand, is a psychological syndrome that arises in response to prolonged stress stimuli associated with work and/or study. It is characterized by three dimensions: emotional exhaustion, depersonalization/cynicism, and feelings of inefficacy or lack of personal accomplishment.<sup>6,7</sup>

Mental health in university students has increasingly become a topic of interest and research, with a high prevalence of mental illnesses noted in this population, particularly among medical students.<sup>8,9</sup>

The final year of the medical school in Portugal (6th year) is an atypical year compared to the others because, in addition to requiring adequate attendance at clinical rotations and the



completion of assessment tasks for them, it also involves the execution of a master's dissertation and an unprecedented, continued study for the “Prova Nacional de Acesso” (PNA), which determines the future of young doctors in terms of their specialty choices, with insufficient openings available for everyone each year. Given this heavy workload, difficulties arise in simultaneously maintaining a healthy lifestyle (including proper nutrition and physical activity), an active social life, and pursuing other possible interests students may have simultaneously. Thus, it is expected that this academic year may exacerbate or potentiate mental illnesses.

Medical students in their final year are about to attend to patients as doctors. Addressing this situation can facilitate appropriate treatment when needed and the exploration of preventive measures, including the potential institutional adjustments to current academic requirements. The consequences of anxious disorders and burnout not only impact individuals and their interpersonal relationships, but also affect clinical practice, by diminishing essential qualities for the practice of the medical profession, such as altruism and empathy, while increasing negative attitudes, such as dishonesty.<sup>10</sup>

Given the high prevalence of psychiatric symptomatology in medical students and the unique challenges of the final year of this course, including the increased pressure to achieve success, this narrative review undertakes a literature review aiming to synthesize data regarding anxiety and burnout levels in final-year medical students. The goal is also to draw conclusions regarding Portuguese medical students in their 6th year, identify contributing factors, and highlight areas of interest for future research in this field.

## Methods

This narrative review was conducted by searching four databases on 03/14/2024, using the following search terms, separated by Boolean operators:

- **PubMed:** ("last year" OR "final year") AND (anxiety OR burnout) AND (medical students)

This search yielded 123 publications.

- **Scopus:** TITLE-ABS-KEY ("last year" OR "final year") AND (anxiety OR burnout) AND (medical students)

This search resulted in 164 publications.

- **Web of Science Core Collection:** (Topic) ("last year" OR "final year") AND (anxiety OR burnout) AND (medical students)

This search produced 163 publications.

- **PsycInfo:** ("last year" OR "final year") AND (anxiety OR burnout) AND (medical students)

This search generated 34 publications.

Additionally, to filter studies conducted on medical students in Portugal, and obtain research previously conducted on the study population and their respective results, the following searches were performed:

- **PubMed:** (anxiety OR burnout) AND (medical students) AND (Portugal)

This search resulted in 56 publications.

- **Scopus:** TITLE-ABS-KEY (anxiety OR burnout) AND (medical AND students) AND (Portugal OR "in Portugal")

This search yielded 33 publications.

- **Web of Science Core Collection:** (Topic) (anxiety OR burnout) AND (medical students) AND (Portugal)

This search produced 20 publications.

- **PsycInfo:** (anxiety OR burnout) AND (medical students) AND (Portugal)

This search resulted in 17 publications.

Additionally, a search was conducted using the terms ("last year" OR "final year") in all fields of research, with the previous terms combined.

The defined inclusion criteria were articles addressing the themes of stress, anxiety, and/or burnout, and their determinants in final-year medical students.

The exclusion criteria were articles that specifically assessed these parameters during the COVID-19 pandemic, as it represents an atypical condition and does not reflect the current conditions of medical school; articles not focusing on the final year of medical school; articles addressing health students in general, without specifying medical students; and articles not in languages other than English or Portuguese. No temporal limits were applied.

After removing duplicates and applying the inclusion and exclusion criteria, 58 articles remained. Upon review, a total of 27 articles were identified. However, only 14 publications specifically addressed final-year medical students and were included in the review.

## Results

The 14 publications included in this review spanned from the year 2011 to 2023. The studies predominantly had observational and cross-sectional designs, with only one study adopting a longitudinal approach (covering the beginning, middle, and end of one semester). All articles relied on previously validated questionnaires to assess the parameters under study.

The articles addressing the topics of stress, anxiety, and burnout are summarized in **Table 1**, including the values found in the described studies.

A study conducted in Ireland aimed to evaluate the objective and subjective variables affecting the psychological well-being of final-year medical students, using the Perceived Stress Scale (PSS) and Subjective Stress Scale (SSS) questionnaires. Despite the majority of students demonstrating positive coping strategies for stress (such as engaging in non-study-related activities, maintaining contact with family and friends, exercising, managing thoughts, and utilizing relaxation/meditation techniques), they still exhibited high levels of stress (65.2% on the PSS and 65% on the SSS).<sup>11</sup>

Another study was conducted in Turkey, where the medical curriculum also has a final exam for specialty access, like in Portugal. This study sheds light on how optional preparatory courses for the final exam (to later access a specialty) and their duration impact students' mental health. The findings revealed that students who did not take these preparatory courses scored lower on depression levels measured by the Depression, Anxiety, and Stress Scale (DASS-21). Additionally, those who prepared for less than six months exhibited higher stress levels. The authors suggested that this could be attributed to student insecurities, with insecure individuals more likely to seek preparatory courses, and shorter preparation times leading to increased insecurity and higher stress levels.<sup>12</sup>

At Erciyes Medical School, a study focused solely on final-year students, using the DASS-24 questionnaire, revealed that 50.3% of them experienced anxiety.<sup>13</sup>

In a medical school in Brazil, utilizing the Beck's Anxiety Inventory (BAI) questionnaire, 27% of final-year medical students exhibited symptoms of anxiety. Interestingly, only 21% of these students acknowledged emotional needs, while 41% recognized academic needs as

contributing to their anxiety.<sup>14</sup>

In Pakistan, a study including both a public and a private medical school found, through the DASS-21 questionnaire, that 74% of final-year medical students suffered from moderate to extremely severe anxiety, and 57.7% experienced moderate to extremely severe stress. Although they did not assess the family influence on career pressure was not assessed, the authors highlighted this as common occurrence in this population.<sup>15</sup>

In Iran, while specific data on anxiety or burnout were not provided in a study, the General Health Questionnaire (GHQ-8) identified mild psychiatric disorders in 48.4% of final-year medical students.<sup>16</sup>

In Cyprus, a study aimed at evaluating burnout levels in medical students, using the Maslach Burnout Inventory – Student Survey (MBI-SS), identified burnout in 27.6% of final-year medical students.<sup>17</sup>

In Italy, using the Hospital Anxiety and Depression Scale (HADS), an anxiety prevalence of 85% was detected among final-year students.<sup>18</sup>

In Spain, employing the MBI-SS questionnaire, final-year students exhibited an average value of 25.0 ( $SD = 6.5$ ) in emotional exhaustion, 15.1 ( $SD = 6.2$ ) in depersonalization, and 19.6 ( $SD = 6.2$ ) in academic inefficacy. In comparison, the general population (all years of medical school) showed scores of 27.50 ( $SD = 7.16$ ) in emotional exhaustion, 14.83 ( $SD = 7.09$ ) in depersonalization, and 22.38 ( $SD = 6.89$ ) in academic efficacy.<sup>19</sup>

In Sri Lanka, using the Oldenburg Burnout Inventory (OLBI), a mean score of 42.5 (95% CI 41.5-43.5) was observed among final-year students, while first-year students recorded a mean score of 40.1 (95% CI 38.4-41.9).<sup>20</sup>

A study in Brazil, comparing anxiety prevalence and intensity between first and final-year

medical students, detected symptoms in only 9.4% of final-year students with symptoms, while in the first year, the percentage was 30.8% (with symptoms being 3.27 times more severe). However, the authors found a higher alcohol and drug consumption among final-year medical students.<sup>21</sup>

Most studies conducted in Portugal have addressed mental health in medical students broadly, without a specific focus on final-year students (6th year).<sup>22,23,24</sup>

The only study specifically targeting this population (final-year medical students in Portugal), aimed to assess stress levels using the PSS questionnaire. This research had a cross-sectional design and was conducted nationally. While moderate and high stress levels detected by the PSS accounted for 82.2% of the population, the authors defined the 80th percentile of results as the upper limit of normal, defining pathological stress. This study revealed that nearly half of the final-year medical students exhibited pathological levels of stress (49.9%), with these levels considered extremely high in 20.8% of cases. Pathological stress levels were associated with poor sleep habits, time management difficulties, dissatisfaction with social life and academic experience. Additionally, individuals with pathological stress levels were more concerned about their future and perceived the PNA as more intimidating (comparing to the previous selection exam).<sup>22</sup>

A recent nationwide cross-sectional study involving all medical students in Portugal aimed to assess determinants of poor mental health. It identified difficulties in academic work organization, physical health, academic performance, and financial problems as contributing factors. Anxiety was evaluated using the State-Trait Anxiety Inventory—Y Form, which assesses anxiety as both a current state and a personality trait, with a defined cut-off point of 52/54 for severe symptoms, respectively. The average state anxiety score in the 6th year was 48.97 ( $SD =$

4.761), with statistically significant differences observed only in first-year students, averaging 49.41 ( $SD = 5.349$ ). The remaining years showed average scores ranging from 48.44 to 49.01.<sup>23</sup>

Burnout, assessed by MBI-SS, revealed a mean score of 15.69 ( $SD = 6.917$ ) in emotional exhaustion, 9.07 ( $SD = 6.090$ ) in cynicism, and 21.10 ( $SD = 5.815$ ) in academic inefficacy. Statistically significant differences were found in emotional exhaustion in the 2nd year (mean of 18.32), cynicism in the 2nd and 3rd years (mean values of 9.77 each), and academic inefficacy in the 3rd year (mean of 21.19). The study used the 75th percentile as a cutoff to define "cases" but did not provide the percentage of 6th-year individuals exceeding this threshold or specify the exact value of the 75th percentile. Additionally, it highlighted that students experiencing burnout were at high risk for anxiety symptoms.<sup>23</sup>

Another study conducted in Portugal, this time with a longitudinal design and solely at Faculdade Medicina Universidade Lisboa, was developed in three distinct phases. With the aim of assessing burnout in medical students using the MBI-SS, this study indicated that first-year medical students initially exhibited low levels of burnout (compared to other students) at the beginning of the academic year, but there was a statistically significant increase in burnout levels in the 2nd phase (mid-semester) and the 3rd phase (pre-exams and first week of exams). In contrast, sixth-year individuals consistently had higher levels of burnout across all three phases. Some identified predictors of increased risk included economic concerns, dietary habits, physical activity, sleep habits, living away from home, academic performance, social support, mental health, perception of mental health-related stigma, and tranquilizer use. The overall percentage of burnout (across the six years of the medical course) was 28.2% in the first phase, 34% in the second phase, and 39.5% in the third phase. The average scores of total burnout (across the six years of the course) were 2.45 ( $SD = 1.00$ ) in the first phase, 2.65 ( $SD = 0.96$ ) in the second

phase, and 2.83 ( $SD = 1.00$ ) in the third phase. Regarding the sixth year specifically, the average total burnout score in the first phase was 3.24 ( $SD = 0.15$ ), in the second phase was 3.42 ( $SD = 0.17$ ), and in the third phase was 3.58 ( $SD = 0.21$ ). Burnout was defined as above the 66th percentile in exhaustion and cynicism and below the 33rd percentile in efficacy. However, the study did not provide the percentage of final-year individuals who were cases.<sup>24</sup>

Some of the associated factors highlighted in the development of stress, anxiety, and burnout include difficulty in time management due to a heavy workload, challenges in balancing social life and work, maintaining physical activity, and adhering to proper sleep and dietary habits. Additionally, economic concerns are also emphasized. The factors associated identified in these previous studies are summarized in **Table 2**.

## Discussion

In the articles included in this review, the percentage of stress and anxiety detected in final-year medical students is notably high, affecting approximately around half or more than half of the population in several studies. The results from Brazil stood out as an exception (with only 27% and 9.2% of final-year students exhibiting symptoms of anxiety). This difference may lie in the fact that the populations are distinct (with different medical programs), or even in cultural factors, alongside potential variability arising from the assessment instrument used. These studies were the only ones in this review to employ the Beck Anxiety Inventory for evaluation.

Both studies utilizing the Perceived Stress Scale (PSS) revealed stress percentages ranging from 49.9% to 65.2%. Research employing the Depression, Anxiety, and Stress Scale (DASS) reported average scores of 19.1 (with 74% showing moderate to extremely high anxiety), 14.5, and 9.1 (the latter with 50.3% displaying anxious symptoms). Discrepancies in values obtained



using the same assessment tools may be attributed to inherent characteristics of the program itself and/or cultural factors specific to regions.

Regarding burnout, there are limited studies focusing on the target population, and those that exist do not provide conclusive data regarding the percentage of final-year medical students experiencing the syndrome. The studies found suggest a greater impact in the final year of the course compared to the other academic years, emphasizing the relevance of research in final-year medical students.

Regarding the specific context in Portugal, studies are limited and cover different topics, with only one study on stress, one on anxiety, and two on burnout. The average score on the STAY-I for 6th-year medical students was 48.97, with a cut-off point of 52 for defining pathological cases. The proximity to the cut-off point, coupled with it being an average value, suggests that Portuguese students in the 6th year experience anxiety, emphasizing the need for focused attention on their well-being. The other two studies in Portugal both assessed burnout; however, the lack of information regarding the values surpassing the defined percentiles prevents conclusions.

Studies in other countries such as Cyprus, Spain, Sri Lanka, Iran, Trinidad and Tobago, have shown higher levels of burnout towards the end of the medical school curriculum.<sup>17,19,20,25,26</sup> However, a study in Pakistan indicated no association between academic year and burnout development.<sup>27</sup> Additionally, research on Italian medical students revealed a decrease in anxiety symptoms from the first to the fifth year, followed by an increase in the sixth (final) year, with students attributing the high study load as a primary stress factor.<sup>18</sup> Another study highlighted higher anxiety levels in the final year compared to the first year.<sup>28</sup> Nonetheless, there are studies showing contrasting results.<sup>21,29</sup> Sixth-year students also exhibit higher consumption of illicit

substances, with authors suggesting that lower anxiety levels in the final year could be influenced by the preventive effects of these substances.<sup>21</sup> This suggests an overall trend towards deteriorating mental health among final-year medical students compared to other academic years.

The findings indicate a significant percentage of students (up to 27% of individuals) experiencing burnout, with notable lack of self-awareness regarding their own burnout status (36% reported not feeling burnt out despite high questionnaire scores).<sup>30</sup> This underscores the need for focused attention as lack of awareness may delay access to healthcare.

The high levels of stress, anxiety, and burnout among final-year medical students, coupled with feelings of inadequate time management due to heavy responsibilities, may lead students to resort to pharmacological means to enhance academic productivity. Individuals preparing for the PNA showed higher consumption of prescribed cognitive enhancers compared to pre-graduate participants (a threefold difference, representing 14% of individuals). The consumption aimed primarily at improving students' concentration and memory capacity according to the study results.<sup>31</sup>

### **Associated Factors**

The studies included in this review emphasize the role of various factors that can contribute to anxiety and burnout in the sixth (final) year of medical school or result from these disorders. There is a significant discrepancy in associated factors noted in the studies, with a focus on time management (work-life balance), social support, and academic year.

The challenge of time management (and dissatisfaction with social life) is a common issue among medical students overall (including those in the 6th year)<sup>11,22,32,33</sup>. Therefore, given the increased academic workload and study demands placed on medical students in the final year,

there is a heightened potential for this year to exacerbate mental well-being issues, underscoring the need to assess the well-being of these students.

Scientific evidence also highlights the impact of personality traits (such as perfectionism often seen in medical students) and coping mechanisms as risk factors for anxiety and burnout development.<sup>34,35,36,37</sup> Additionally, research has explored potential mediators between personality and mental health disorders, such as self-compassion (which significantly reduces the risk of mental health disorders) and repetitive negative thinking.<sup>38,39</sup>

Furthermore, another significant factor is the reluctance to seek help even when necessary. Factors contributing to this detrimental behavior include students perceiving anxiety/stress as normal, only seeking help when they believe their suffering surpasses that of their peers, feeling they are wasting study time by seeking help, difficulty scheduling appointments, the stigma associated with mental illness as a weakness, and fear of confidentiality breaches.<sup>9,14,40,41</sup> A study at a Brazilian medical school revealed that despite access to mental health services, only 33% with anxiety, 27% with depression, and 20% with reduced quality of life sought help.<sup>14</sup> The lack of recognition of one's symptoms and normalization of stress/anxiety in medical school may drive this behavior.

## **Interventions**

Research in the field has suggested intervention in certain personality traits considered risk factors for anxiety and burnout<sup>11,33,42</sup>, as well as in coping mechanisms that may be detrimental (such as alcohol and illicit substance use)<sup>17,41</sup>. It is important to focus on implementing programs that enhance protective characteristics like self-compassion, time management workshops, stress management programs to improve coping skills.<sup>11,43,44</sup> Additionally, considering dietary habits

and financial capabilities as reported factors, promoting workshops on healthy, quick, and cost-effective eating habits could be beneficial. Optional weekly sessions for sharing personal experiences could enhance students' social support, a crucial factor in mental health.<sup>22</sup>

Given the evidence of underutilization of healthcare services, exploring previously undescribed causes to address them later is crucial.<sup>9,14,40,41</sup> Ensuring qualified healthcare professionals and sufficient service capacity institutionally is vital.

While studies indicate that practices like meditation, exercise, and yoga may have only temporary effects when applied briefly and individually, incorporating these activities and support techniques into curricula could be important.<sup>12</sup> Introducing extracurricular activities in universities can serve as effective coping strategies.<sup>45</sup>

## **Limitations**

Most of the studies found are observational and assess the variables under study (anxiety and burnout) in a cross-sectional manner, thus not allowing for definite causal inferences regarding the reasons and factors predisposing to the development of anxiety and burnout.<sup>22,23</sup> The only longitudinal study (limited to one semester) demonstrated that burnout levels in the final year of the course are higher than in other years across the three assessments conducted.<sup>23</sup> However, despite being longitudinal, the chosen assessment phases are not the most relevant for the final year of medical school, as they do not cover potentially critical periods, nor provide continuous monitoring throughout the medical course.

Furthermore, in most studies, participation was voluntary, potentially introducing selection bias, as those who choose to participate may differ from those who opt not to. Additionally, although the same burnout assessment instruments were used, comparisons are challenging due

to the lack of information regarding the cut-off percentiles for case definition. One of the limitations of this narrative review is the limited number of publications addressing anxiety and burnout in sixth (final) year medical students.

## **Future Perspectives**

Given the limited number of studies specifically addressing anxiety and burnout in the final year of medical school, it is crucial to conduct further research to better understand the percentage of Portuguese medical students in their final year affected by these conditions nationally, along with causal factors (through longitudinal studies, for instance).<sup>8,9,22</sup>

It is important to consider when evaluating anxiety and burnout parameters since factors throughout the academic year can influence this analysis (such as nearing exams).<sup>46</sup>

To produce high-quality research, implementing longitudinal studies throughout the final year across multiple institutions is necessary to assess the conditions with the greatest impact on these individuals. Ideally, assessments should occur at three distinct times (beginning of the academic year, during thesis submission/defense, and close to the PNA), to provide additional support during critical periods.

It is essential to consider potential factors that may exacerbate psychiatric comorbidities and determine their prevalence among 6th-year students: clinical rotations-related factors (workload, assessments, credits, time required), aspects of the master's dissertation (time spent, credits, enough academic background, supervisor support), perception of the PNA; timing of study initiation in relation to anxiety and burnout development, participation in preparatory courses (and which), financial difficulties<sup>23</sup>, maintaining a suitable study pace for wishes of future specialties.

Additionally, evaluating these individuals' ability to maintain a healthy lifestyle with an active social life amidst academic demands is crucial. Assessing their quality of life, use of cognitive enhancers to improve academic performance is also important.<sup>31</sup>

Implementing qualitative studies will address previously unconsidered issues and provide a holistic approach to the challenges students face during this academic phase.<sup>32</sup>

Reflecting on the current structure of the medical curriculum in the final year and considering improvements (such as curriculum changes) is vital to ensure individuals reach their full potential in practicing medicine.

## **Conclusion**

The existing research specifically focusing on final-year medical students is limited. The included studies indicate the presence of high levels of stress, anxiety, and burnout among medical students, with a tendency for these levels to increase over the years in the medical course. More high-quality scientific research is needed, particularly through longitudinal, multi-institutional studies and qualitative approaches that explore students' experiences from their own perspectives, assessing previously unconsidered characteristics that affect the mental health of medical students.

Furthermore, there may be a need to reflect on the current organization of medical school curriculum and consider potential changes to prioritize the well-being of these future healthcare professionals. Together, it is essential to implement effective prevention methods, including the introduction of cost-effective measures within the curriculum, to promote the mental health and overall well-being of medical students.

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**Table 1.** Summary of the findings in the studies included in this narrative review

| Author                  | Region    | Questionnaire | Mean score                                                                                                               | Percentage of individuals affected |
|-------------------------|-----------|---------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Stress</b>           |           |               |                                                                                                                          |                                    |
| Lane A et al.           | Ireland   | PSS           | PSS - 16.94 ( <i>SD</i> = 7.06)                                                                                          | PSS - 65.2%*                       |
|                         |           | SSS           | SSS - 4.88 ( <i>SD</i> = 2.62)                                                                                           | SSS - 65%                          |
| Karabacak M et al.      | Turkey    | DASS-21       | 15.50 ( <i>SD</i> = 8.18)                                                                                                | NA                                 |
| Kumar B et al.          | Pakistan  | DASS-21       | 20.92 ( <i>SD</i> = 11.2)                                                                                                | 57.7%*                             |
| Baykan Z et al.         | Turkey    | DASS-24       | 14.2 ( <i>SD</i> = 8.9)                                                                                                  | 39.9%**                            |
| Oura M et al.           | Portugal  | PSS           | 20.2 (95% CI = 19.6 – 20.9)                                                                                              | 82.2%*                             |
| <b>Anxiety</b>          |           |               |                                                                                                                          |                                    |
| Karabacak M et al.      | Turkey    | DASS-21       | 14.55 ( <i>SD</i> = 8.62)                                                                                                | NA                                 |
| Kumar B et al.          | Pakistan  | DASS-21       | 19.15 ( <i>SD</i> = 11.2)                                                                                                | 74%*                               |
| Baykan Z et al.         | Turkey    | DASS-24       | 9.1 ( <i>SD</i> = 6.6)                                                                                                   | 50.3%**                            |
| Leão P et. al.          | Brazil    | BAI           | NA                                                                                                                       | 27%**                              |
| Bassols A et al.        | Brazil    | BAI           | 4.99 ( <i>SD</i> = 5.36)                                                                                                 | 9,4%**                             |
| Bertani DE et. al.      | Italy     | HADS          | NA                                                                                                                       | 85%                                |
| Teixeira V et al.       | Portugal  | STAI-Y        | 48.97 ( <i>SD</i> = 4.761)                                                                                               | NA                                 |
| <b>Burnout</b>          |           |               |                                                                                                                          |                                    |
| Nteveros A et al.       | Cyprus    | MBI-SS        | NA                                                                                                                       | 27.6%                              |
| Teixeira V et al.       | Portugal  | MBI-SS        | <b>EE</b> - 15.69 ( <i>SD</i> = 6.917)<br><b>D</b> - 9.07 ( <i>SD</i> = 6.090)<br><b>AI</b> - 21.10 ( <i>SD</i> = 5.815) | NA                                 |
| Martins M et al.        | Portugal  | MBI-SS        | Phase 1 - 3,24 ( <i>SD</i> = 0,15)<br>Phase 2 - 3,42 ( <i>SD</i> = 0,17)<br>Phase 3 - 3,58 ( <i>SD</i> = 0,21)           | NA                                 |
| Gil-Calderón, J. et al. | Spain     | MBI-SS        | <b>E</b> - 25.0 ( <i>SD</i> = 6.5)<br><b>D</b> - 15.1 ( <i>SD</i> = 6.2)<br><b>AI</b> - 19.6 ( <i>SD</i> = 6.2)          | NA                                 |
| Wimberly CE et. Al.     | Sri Lanka | OLBI          | 42.5 (95% CI 41.5 – 43.5)                                                                                                | NA                                 |

\*moderate severity or above levels

\*\*mild severity or above levels

**Legend:**

PSS = Perceived Stress Scale

SSS = Subjective Stress Scale

DASS = Depression, Anxiety, and Stress Scale

BAI = Beck's Anxiety Inventory

HADS = Hospital Anxiety and Depression Scale

MBI-SS = Maslach Burnout Inventory – Student Survey

STAI-Y = State-Trait Anxiety Inventory—Y Form

EE = Emotional Exhaustion

D = Disbelief

AI = Academic ineffectiveness

OLBI = Oldenburg Burnout Inventory

NA = Non-applicable

**Table 2.** Associated factors with stress, anxiety, burnout identified in the studies included.

| Author               | Region                | Associated Factors                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lane et al.          | Dublin                | <u>Sources of stress:</u><br>Exams; relationships; future; college; finance; work life balance; personal factors; personal health; other.                                                                                                                                                                                                                                                                                                                                             |
| Karabacak et al.     | Turkey                | <u>Anxiety:</u><br>Consider quitting studying; use prescription psychiatric drugs; deprive of sufficient sleep.<br><br><u>Stress:</u><br>Duration of preparation; attendance to a preparatory course; consider quitting studying; prescription psychiatric drugs usage or ongoing psychotherapy; prescription stimulants usage; setting aside time for one- self; setting aside time for family or friends; started to use or increased consumption of cigarettes, alcohol, or drugs. |
| Kumar et al.         | Pakistan              | <u>Stress, anxiety and depression:</u><br>Pressure of studies; pressure of passing exams; pressure to fulfilling family's expectations; fear of stepping into the real world; dissatisfaction with examination criteria; cluelessness about future choices of specialty; missing family / away from home.                                                                                                                                                                             |
| Nteveros et al.      | Cyprus                | <u>Burnout:</u><br>Year of medical education (increased towards the end of studies).                                                                                                                                                                                                                                                                                                                                                                                                  |
| Oura et al.          | Portugal (nationwide) | <u>Stress:</u><br>Being a female; bad sleeping habits; had/has mental illness; bad diet habits; inability to manage time; dissatisfaction with social life and academic experience; worries about the future.                                                                                                                                                                                                                                                                         |
| Teixeira et al.      | Portugal (nationwide) | <u>Anxiety:</u><br>Sexual orientation; burnout.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Martins et al.       | Portugal (FMUL)       | <u>Burnout:</u><br>Economic stress; failing school year; number of failed academic subjects; social support; overall mental health; perception of mental health stigma; physical activity; average hours of sleep per day; perceived adequate sleep for academic performance; use of tranquilizers; living away from home.                                                                                                                                                            |
| Gil-Calderón, et al. | Spain                 | <u>Burnout:</u><br>3 subscales – year of the degree; family support                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bertani et. al.      | Italy                 | <u>Anxiety:</u><br>Increased: sport activities;<br>Decreased: use of supplements as cognitive enhancers; procrastination; request of intermediate tests to break up big exams                                                                                                                                                                                                                                                                                                         |
| Wimberly et al.      | Sri Lanka             | <u>Positive mental health:</u><br>Decreased: Fifth year in school                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bassols et al        | Brazil                | <u>Anxiety:</u><br>Female, first year, physical illness, medication use, dissatisfaction with the course<br>Protective: leisure activities, paid activities, drug and alcohol use                                                                                                                                                                                                                                                                                                     |





## Scale for the Assessment of Narrative Review Articles – SANRA

Please rate the quality of the narrative review article in question, using categories 0–2 on the following scale. For each aspect of quality, please choose the option which best fits your evaluation, using categories 0 and 2 freely to imply general low and high quality. These are not intended to imply the worst or best imaginable quality.

### 1) Justification of the article's importance for the readership

- The importance is not justified. \_\_\_\_\_ 0  
 The importance is alluded to, but not explicitly justified. \_\_\_\_\_ 1  
 The importance is explicitly justified. \_\_\_\_\_ 2

2

### 2) Statement of concrete aims or formulation of questions

- No aims or questions are formulated. \_\_\_\_\_ 0  
 Aims are formulated generally but not concretely or in terms of clear questions. \_\_\_\_\_ 1  
 One or more concrete aims or questions are formulated. \_\_\_\_\_ 2

2

### 3) Description of the literature search

- The search strategy is not presented. \_\_\_\_\_ 0  
 The literature search is described briefly. \_\_\_\_\_ 1  
 The literature search is described in detail, including search terms and inclusion criteria. \_\_\_\_\_ 2

2

### 4) Referencing

- Key statements are not supported by references. \_\_\_\_\_ 0  
 The referencing of key statements is inconsistent. \_\_\_\_\_ 1  
 Key statements are supported by references. \_\_\_\_\_ 2

2

### 5) Scientific reasoning

(e.g., incorporation of appropriate evidence, such as RCTs in clinical medicine)

- The article's point is not based on appropriate arguments. \_\_\_\_\_ 0  
 Appropriate evidence is introduced selectively. \_\_\_\_\_ 1  
 Appropriate evidence is generally present. \_\_\_\_\_ 2

2

### 6) Appropriate presentation of data

(e.g., absolute vs relative risk; effect sizes without confidence intervals)

- Data are presented inadequately. \_\_\_\_\_ 0  
 Data are often not presented in the most appropriate way. \_\_\_\_\_ 1  
 Relevant outcome data are generally presented appropriately. \_\_\_\_\_ 2

2

Sumscore

12

Fig. 1 SANRA - Scale

# SANRA – explanations and instructions

This scale is intended to help editors assess the quality of a narrative review article based on formal criteria accessible to the reader. It cannot cover other elements of editorial decision making such as degree of originality, topicality, conflicts of interest or the plausibility, correctness or completeness of the content itself. SANRA is an instrument for editors, authors, and reviewers evaluating individual manuscripts. It may also help editors to document average manuscript quality within their journal and researchers to document the manuscript quality, for example in peer review research. Using only three scoring options, 0, 1 and 2, SANRA is intended to provide a swift and pragmatic sum score for quality, for everyday use with real manuscripts, in a field where established quality standards have previously been lacking. It is not designed as an exact measurement of the quality of all theoretically possible manuscripts. For this reason, the extreme values (0 and 2) should be used relatively freely and not reserved only for perfect or hopeless articles.

We recommend that users test-rate a few manuscripts to familiarize themselves with the scale, before using it on the intended group of manuscripts. Ratings should assess the totality of a manuscript, including the abstract. The following comments clarify how each question is designed to be used.

## Item 1 – Justification of the article's importance for the readership

Justification of importance for the readership must be seen in the context of each journal's readership.

Consider how well the manuscript outlines the clinical problem and highlights unanswered questions or evidence gaps – thoroughly (2), superficially (1), or not at all (0).

## Item 2 – Statement of concrete/specific aims or formulation of questions

A good paper will propose one or more specific aims or questions which will be dealt with or topics which will be reviewed.

Please rate whether this has been done thoroughly and clearly (2), vaguely or unclearly (1), or not at all (0).

## Item 3 – Description of the literature search

A convincing narrative review will be transparent about the sources of information on which the text is based. Please rate the degree to which you think this has been achieved. To achieve a rating of 2, it is not necessary to describe the literature search in as much detail as for a systematic review (searching multiple databases, including exact descriptions of search history, flowcharts, etc.), but it is necessary to specify search terms, and the types of literature included. A manuscript which only refers briefly to its literature search would score 1, while one not mentioning its methods would score 0.

## Item 4 – Referencing

No manuscript references all statements. However, those that are essential for the arguments of the manuscript – “key statements” – should be backed by references in all or almost all cases. Exceptions could reasonably be made for rating purposes where a key statement has uncontroversial face-validity, such as “Diabetes is among the commonest causes of chronic morbidity worldwide.”

Please rate the completeness of referencing: for most or all relevant key statements (2), inconsistently (1), sporadically (0).

## Item 5 – Scientific reasoning

The item describes the quality of the scientific point made. A convincing narrative review presents evidence for key arguments.

It should mention study design (randomized controlled trial, qualitative study, etc), and where available, levels of evidence.

Please rate whether you feel this has been done thoroughly (2), superficially (1), or hardly at all (0). Unlike item 6, which is concerned with the selection and presentation of concrete outcome data, this item relates to the use of evidence and of types of evidence in the manuscript's arguments.

## Item 6 – Appropriate presentation of data:

This item describes the correct presentation of data central to the article's argument. Which data are considered relevant varies from field to field. In some areas relevant data would be absolute rather than relative risks or clinical versus surrogate or intermediate endpoints. These outcomes must be presented correctly. For example, it is appropriate that effect sizes are accompanied by confidence intervals. Please rate how far the paper achieves this – thoroughly (2), partially (1), or hardly at all (0). Unlike item 5, which relates to the use of evidence and of types of evidence in the manuscript's arguments, this item is concerned with the selection and presentation of concrete outcome data.

**Fig. 2** SANRA—explanations and instructions document

## Types of Manuscripts

### Articles

#### *Requirements*

Articles may vary in style and length. Generally, they are no longer than 3,000 words and no shorter than 1,500 words (this includes the text only; title page, abstract, references, and exhibits are not included in the word count). However, an author should choose the manuscript length and number of references needed to get the message across. The final length and format will be determined by editorial staff during the review process or when the accepted manuscript is edited.

Articles may have up to five exhibits in total; [Supplemental Digital Content](#) may be used if further exhibits are required. The abstract for an Article has no headings and is no longer than 300 words. The number of references should be appropriate to the length and depth of the piece. References should be representative, not comprehensive, and are generally limited to 50. If the manuscript reports the results of a survey you conducted, the full survey instrument should be provided for review along with the manuscript. If the manuscript reports the results of interviews or focus groups, the interview guide should be provided for review along with the manuscript.

Articles cover topics of broad concern to academic medicine; for example, examinations of policies affecting the academic medicine community as a whole; descriptions of institutional mergers or starting new schools; analyses of current educational, political, financial, or social trends affecting or likely to affect academic medicine; and descriptions of well-established innovations with systemic implications for medical education, training, and research.

Articles may also describe topics directly and practically relevant to medical school education, residency training, graduate medical education, or continuing medical education. Such topics include descriptions of well-established innovative programs, medical informatics, information and medical technologies, the history of medical education and training, humanities in medical education, administration or funding innovations, etc.

Articles can combine elements of research and description, where the research is not sufficiently robust or central enough to the Article's message to constitute a full-fledged [Research Report](#).

Additional guidelines for Articles can be found in the [Publication Criteria for Articles and Scholarly Perspectives](#). Additional information on describing well-established innovative

programs is available in the [August 2008 editorial](#); for information on describing pilot or early-stage initiatives, see [Innovation Reports](#). The [For Authors page](#) also offers a resource on preparing Articles.

### *Program evaluations*

Program evaluations may be formatted and submitted as Articles, Research Reports, or Innovation Reports. (See [Articles](#) and [Research Reports](#) for information about those types of program evaluations.) The journal's November 2017 editorial provides further guidance about preparing and submitting program evaluation manuscripts. A program evaluation should be presented as an Article under the following circumstances:

- The purpose is primarily descriptive or conceptual.
- The evaluation is not the main focus of the article.
- The evaluation is focused on a more mature program.
- The manuscript provides rich background and context.
- There is discussion about broad application and improvement through future work.

### **Scholarly Perspectives (formerly Perspectives)**

Scholarly Perspectives may vary in style and length. Generally, they are no longer than 3,000 words and no shorter than 1,500 words (this includes the text only; title page, abstract, references, and exhibits are not included in the word count). However, an author should choose the manuscript length and number of references needed to get the message across. The final length and format will be determined by editorial staff during the review process or when the accepted manuscript is edited.

Scholarly Perspectives generally have few exhibits, if any, though they may have up to five exhibits in total; [Supplemental Digital Content](#) may be used if further exhibits are required. The abstract for a Scholarly Perspective has no headings and is no longer than 300 words. The number of references should be appropriate to the length and depth of the piece. References should be representative, not comprehensive, and are generally limited to 50. If the manuscript reports the results of a survey you conducted, the full survey instrument should be provided for review along with the manuscript. If the manuscript reports the results of interviews or focus groups, the interview guide should be provided for review along with the manuscript.

Scholarly Perspectives describe a considered view about one or more issues in academic medicine, propose and support a new hypothesis, or theorize the implications of as-yet

unimplemented programs or innovations. Scholarly Perspectives, which are peer reviewed, must be scholarly and arguments must be well supported.

Additional guidelines for Scholarly Perspectives can be found in the [Publication Criteria for Articles and Scholarly Perspectives](#).

### **Invited Commentaries**

Invited Commentaries are invited by the editor-in-chief. Authors should not submit an Invited Commentary without receiving a formal invitation to do so from the editor-in-chief. These solicited opinion essays comment on or set the context for an article or articles that have been accepted for publication. They can also be standalone essays framed as calls to action on major challenges. The abstract for an Invited Commentary has no headings and is no longer than 300 words. Invited Commentaries have few references and rely heavily on the author's perspective and experience to support the argument. They should be less than 2,000 words (this includes the text only; title page, abstract, references, and exhibits are not included in the word count) and generally have few exhibits, if any.

### **Research Reports**

#### *Requirements*

Research Reports are reports of original research on any aspect of academic medicine. They may vary in style and length. Generally, Research Reports are no longer than 3,000 words and no shorter than 1,500 words. Qualitative research submissions, which often require more words due to the nature of the data being reported, are generally no longer than 4,000 words. (All word counts include the text only; title page, abstract, references, and exhibits are not included in the word count). However, an author should choose the manuscript length needed to get the message across. The final length and format will be determined by editorial staff during the review process or when the accepted manuscript is edited.

Research Reports may have up to five exhibits in total; [Supplemental Digital Content](#) may be used if further exhibits are required. The abstract for a Research Report should be structured under the headings Purpose, Method, Results, Conclusions, and be no longer than 300 words. The text should be structured under the main-level headings Introduction, Method, Results, and Discussion. Raw numbers should accompany percentages, wherever possible throughout the text and exhibits (see [Data Reporting and Analysis](#)). The number of references should be appropriate to the length and depth of the piece; references should be representative, not comprehensive, and are generally limited to 50. If the manuscript reports the results of a survey you conducted, the full survey instrument should be provided for review along with

the manuscript. If the manuscript reports the results of interviews or focus groups, the interview guide should be provided for review along with the manuscript.

In general, the study must address a serious challenge facing the academic medicine community. Additional guidelines for Research Reports can be found in the [Publication Criteria for Research Reports](#). The [For Authors](#) page offers resources on preparing Research Reports.

### *Program evaluations*

Program evaluations may be formatted and submitted as Articles, Research Reports, or Innovation Reports. (See [Articles](#) and [Research Reports](#) for information about those types of program evaluations.) The journal's November 2017 editorial provides further guidance about preparing and submitting program evaluation manuscripts. A program evaluation should be presented as a Research Report under the following circumstances:

- There is a specific research question(s).
- The manuscript reports rigorous evaluation methods.
- The manuscript provides robust data analysis.
- The findings advance understanding about the topic that was investigated.

## **Innovation Reports**

### *Requirements*

An Innovation Report introduces a new approach to a challenge facing the wider academic medicine community. The goal of an Innovation Report is to highlight first steps toward a larger-scale solution to such a challenge, whether through an innovative pilot or early-stage initiative at a single institution or preliminary research that defines the challenge and/or lays the groundwork for larger-scale approaches to the stated problem. An Innovation Report must demonstrate that the authors' work has significant implications for the continued study of the stated problem. It must also provide enough information to allow the replication of the innovation or continuation of the research in other settings.

Innovation Reports have a strict limit of 2,000 words (this limit applies to the text only; title page, abstract, disclosures, references, and exhibits are not included in the word count). The abstract and text must be organized under the main-level headings Problem, Approach, Outcomes, Next Steps. The abstract should be no longer than 300 words. Innovation Reports may have no more than 10 references and are limited to three total exhibits; [Supplemental Digital Content](#) may be used if further exhibits are required. If the manuscript reports the

results of a survey you conducted, the full survey instrument should be provided for review along with the manuscript. If the manuscript reports the results of interviews or focus groups, the interview guide should be provided for review along with the manuscript.

Additional guidelines for Innovation Reports can be found in the [Publication Criteria for Innovation Reports](#). The [For Authors](#) page offers resources on preparing Innovation Reports.

### *Program evaluations*

Program evaluations may be formatted and submitted as Articles, Research Reports, or Innovation Reports. (See [Articles](#) and [Research Reports](#) for information about those types of program evaluations.) The journal's November 2017 editorial provides further guidance about preparing and submitting program evaluation manuscripts. A program evaluation should be presented as an Innovation Report under the following circumstances:

- The manuscript introduces a new approach to a challenge facing the wider academic medicine community.
- The manuscript gives a glimpse into a program at an early stage of development.
- The manuscript describes a local, novel, often cutting-edge approach that may be generalizable.
- The manuscript emphasizes how a preliminary evaluation of the early experience informs next steps.

### **Literature Reviews**

*Academic Medicine* considers Literature Review submissions that critically review and synthesize the scholarly literature. Literature Reviews should provide new understanding of the topic or provide new ways of thinking about the issues under review. Priority will be given to critical reviews by experts that help advance understanding of a specific topic or problem in academic medicine. Reviews may vary in type and length. Generally, Literature Reviews are no longer than 4,000 words. (Word count includes the text only; title page, abstract, references, disclosures, and exhibits are not included in the word count). However, an author should choose the manuscript length needed to get the message across. The final length and format will be determined by editorial staff during the review process or when the accepted manuscript is edited.

Literature Reviews may have up to five exhibits in total; [Supplemental Digital Content](#) may be used if further exhibits are required. The abstract for a Literature Review should be structured under the headings Purpose, Method, Results, Conclusions, and be no longer than 300 words. The text should be structured under the main-level headings Introduction,



Method, Results, and Discussion. Raw numbers should accompany percentages, wherever possible throughout the text and exhibits (see [Data Reporting and Analysis](#)).

In successful Literature Review submissions, comprehensive parameters are defined and followed for searching the literature, and findings are interpreted and put into context. In general, Literature Review submissions should adhere to the guidelines below. Additional guidelines for Literature Reviews can be found in the [Publication Criteria for Literature Reviews](#). The [For Authors](#) page offers resources on preparing Literature Reviews.

It is recommended that authors consult the review type's relevant guidelines (e.g., for a systematic review, the authors might consider PRISMA.) Guidelines for a wide range of review types are available at: <http://www.equator-network.org/>.

### *Systematic reviews*

Systematic reviews analyze and interpret all available evidence in the literature related to a specific, focused research question. They have the following characteristics:

- Reproducibility and research question: Distinct reproducible research method.  
Requires a testable hypothesis or a focused research question.
- Search and selection process: The search of the literature is systematic and comprehensive; articles are selected for inclusion according to criteria set in advance.
- Analysis: Data are systematically abstracted from the reviewed articles and compiled into evidence tables.
- Interpretation: Data are interpreted in the context of all relevant studies. (Meta-analyses analyze data across studies identified in systematic reviews.)

(Adapted from Lang TA. The value of systematic reviews as research activities in medical education. Acad Med. 2004;79:1067-1072.)

### *Narrative reviews*

Narrative reviews serve to describe the existing literature on a topic without offering systematic analysis of the quality of that literature. They have the following characteristics:

- Reproducibility and research question: Neither systematic nor reproducible.
- Search and selection process: An "expert" selects the articles deemed to be most important.

- Analysis: An "expert" comes to some conclusions based on these articles (as well as his or her own experience).
- Interpretation: An "expert" summarizes his or her understanding of the issues in a review article.

(Adapted from Lang TA. The value of systematic reviews as research activities in medical education. *Acad Med.* 2004;79:1067-1072.)

### *Scoping reviews*

Scoping reviews address broader, exploratory research questions with the ultimate goal of mapping the literature on a topic. They have the following characteristics:

- Reproducibility and research question: Research question is broad and exploratory in nature.
- Search and selection process: Search is systematic and described in detail with flexible inclusion/exclusion criteria.
- Analysis: Studies are not systematically appraised or appraisal is informal.
- Interpretation: Synthesis is typically performed based on qualitative characteristics. No quantitative analysis is performed.

For more on scoping reviews, see [Thomas A, Lubarsky S, Durning SJ, Young ME. Knowledge Synthesis in Medical Education: Demystifying Scoping Reviews. \*Acad Med.\* 2017;92:161-166.](#)

### *Other types of reviews*

This is not an exhaustive list of review types considered by the journal. Other review types are welcome. It is recommended that, no matter the review type selected, the authors clearly state their rationale for selecting the review type and, when possible, consult the review type's relevant guidelines (e.g., for a realist review, authors might consider the RAMSES publication standards). Guidelines for a wide range of literature review types are available at: <http://www.equator-network.org/>.

### **Special Features**

Abstracts are not needed for the items in the following categories; generally, references are not needed either.

### *Cover Art*

The journal issues a call for Cover Art submissions once a year. Submissions are accepted only when the call is open. Search “Cover Art” at [academicmedicineblog.org](http://academicmedicineblog.org) to find details about the process. The next call will be open in 2023.

The journal welcomes photography, sculpture, painting, textile work, and other visual media. Images may be cropped or resized to fit into the allotted cover space. Acceptance is contingent on the artist's signing an AAMC Artist Consent Form provided at the time the offer of publication is extended.

Artists must also submit a related artist's statement as a narrative companion to the artwork, to explain the connection between the work and the current prompt. The related narrative should be no more than 250 words and is subject to editing.

High-resolution TIFF files with a minimum of 300 dpi resolution are required at the time of submission. Images should be 9” x 8” or 1260 x 1084 pixels. If an image is not 9” x 8,” it may be cropped at the editor’s discretion to fit the cover specifications (the image would be reproduced in full with the artist’s statement). Image files must be grayscale or CMYK. Submissions do not require an abstract.

#### *AM Last Page (LP)*

This monthly feature is designed to make the journal's content more accessible to more people by promoting a general understanding of important issues that affect medical schools and teaching hospitals. This feature tells a story—visually and succinctly—through images or figures and complementary text of theories, frameworks, phenomena, controversies, policies, or trends important to medical education or the medical community at large (see recent issues of the journal or search for "AM Last Page" in PubMed for examples). Each LP and all the information on a single LP should answer a single question or satisfy a single objective. LP topics should be timely (i.e., of current or ongoing interest) and evidence based. LPs are not mini-reports, and time-sensitive data should be kept to a minimum.

The number of images used in an LP should be carefully balanced with consideration for the topic and visual appeal or aesthetics. LPs should not be overly dense. The ideal number of images is three, and each LP should have no more than 575 words, possibly fewer depending on the number and size of visual elements. An LP should have no more than four authors.

Submissions do not require an abstract. Not all of the information needs to be new, but it must be combined and presented in a unique way so as to provide new insights to AM readers. (Additional guidelines for information already under copyright can be found in

the [Copyright and Permission](#) section. Authors must provide written permission to reuse any copyrighted materials.) LPs may include up to 4 references.

Photos and graphics must be of print quality (a minimum of 300 dpi) and should be submitted in the file format in which they were created. Submissions undergo peer review and substantive editing.

Additional resources for LPs can be found in the [Publication Criteria for Last Pages](#), the [AM Last Page Tips and Guidelines](#), and the [AM Last Page Template](#).

#### *Letters to the Editor*

Letters can be responses to articles in the journal, replies to other letters, or standalone communications about issues of importance in academic medicine. They must not duplicate other material that has been published or submitted for publication. Letters and replies will be published at the discretion of the editor and are subject to abridgement and editing for style and content.

Letters should be tightly focused and are no longer than 400 words (including references). They have no tables or figures and no more than three authors. Submissions do not require an abstract. The cover letter that accompanies submissions must include the full citation of the article or letter being commented upon.

Authors whose published articles are the subject of a Letter to the Editor will have the opportunity to respond to that letter, in the same issue in which the letter is printed.

#### *Medicine and the Arts (MATA)*

MATA is published on two facing pages. The left-hand page features a literary excerpt or other artwork, such as a poem, a photograph, etc. The right-hand page presents an original commentary that explores the relevance of the artwork to the teaching, learning, and/or practice of medicine. Submissions undergo review and editing, but **submissions that do not meet the submission requirements outlined here will be returned without review.**

The original commentary must be no more than **900 words**, including references. (References are not required, but do count toward the word limit if used.)

The artwork page may feature artwork of any medium, including visual art, poetry, excerpts from literature, etc. Literature excerpts must be no more than **700 words** and may include a very brief introduction as needed. Submissions that feature artwork that is copyrighted elsewhere (e.g., a published poem or literary excerpt, a painting displayed in a museum, etc.)

require a formal licensing agreement to reproduce the work. These submissions cannot be fully accepted until Academic Medicine receives permission to reproduce the work, which often takes many months. Academic Medicine covers reasonable reprint-related fees for submissions that are accepted for publication.

Given the challenges associated with obtaining permission to reproduce artwork in the journal, please consider the following:

- When submitting a manuscript to the MATA section, authors will be asked to provide all relevant and available information about the piece they are explicating, such as contact information for the copyright holder. This enables staff editors to work with authors to complete the process of acquiring permission.
- Priority will be given to submissions that feature original artwork (i.e., work that is not copyrighted elsewhere).
- Journal editors may opt to provide a link to the artwork if it is available elsewhere online (e.g., a museum or gallery website, a recording artist's online song catalog) rather than reproducing it in the journal.

#### *Teaching and Learning Moments (TLM)*

This feature is published on a regular but space-available basis. Pieces vary in style and subject but must be first-person, narrative essays. Typically, the author tells the story of an experience related to the art or science of teaching, learning, or practicing medicine, and reflects on the meaning of that experience, as it pertains to her or his life and work. Essays should be no more than 600 words and must fit on one journal page.

## **Complete Instructions for Authors**

### **Preparing a Manuscript: Requirements and Standards**

#### **General Format**

- All manuscripts must be submitted electronically via Editorial Manager at <http://www.editorialmanager.com/acadmed/>. (See [Submitting a Manuscript](#) for more details.)
- Manuscripts should be double spaced and left-justified, including references. Use 12-point type, Times New Roman font, 1-inch margins, and format for 8 ½ x 11 paper.
- Supply a title page as the first page of the manuscript with the following information:
  1. The manuscript's full title.
  2. An author byline that lists all authors' full names and academic degrees at the master's level and above; for example, "Jane M. Smith, MD, PhD, and John Q. James, MD, MBA."
  3. Sentence-style bios for each author that list position(s) or title(s) and institutional affiliation(s). Bios can also include ORCID IDs, formatted as a hyperlink; ORCID IDs are completely optional. For example, "J.M. Smith is assistant professor, Department of Family Medicine, State University College of Medicine, City, State; ORCID: <https://orcid.org/XXXX-XXXX-XXXX-XXXX>."
  4. Contact information (address and email address, plus telephone if desired) for the corresponding author; you may also include the corresponding author's Twitter handle if it is used primarily for professional purposes. To illustrate, "Correspondence should be addressed to Jane M. Smith, Department of Medicine, State University, 123 Main Street, Box 111, City, State; telephone: 123-456-7890 ; e-mail: [author@institution.org](mailto:author@institution.org); Twitter: @Author1."
- Number all pages, starting with the title page.
- Spell out all acronyms in full at first use.
- Generally, write using the first person, active voice; for example, "We analyzed data," not "Data were analyzed." The [Abstract](#) and [Structured Disclosures](#) are the exceptions to this guideline, and should be written in the third person, active voice: "The authors analyzed," "The authors wish to thank."

#### **File Formats**

### *Initial Manuscript Submission*

Please be aware that all files you submit at this stage will be combined and converted into a PDF by Editorial Manager for peer-review purposes.

| Text Files:                                               | Graphics Files:                                                                                                                          |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• MS Word</li></ul> | <ul style="list-style-type: none"><li>• MS Word</li><li>• TIFF</li><li>• EPS</li><li>• JPEG</li><li>• PDF</li><li>• PowerPoint</li></ul> |

### *Revised Manuscript Submission*

For editing purposes, edit-ready files must be submitted through Editorial Manager.

- Text files must be submitted in MS Word, without any electronic links between in-text reference citations and references. (See [References](#) for more information about *Academic Medicine's* reference style.)
- Table files must be submitted as a separate MS Word file. (See [Tables](#) for more information.)
- Figures must be provided in files that can be opened and edited (e.g., PowerPoint, Excel, or Word [figures that were not created in Word should not be pasted into word; they should be provided in their original format]). In the event that such figure files cannot be provided or editors cannot manipulate the provided files, authors will be required to revise figures as requested during the editorial process. (See [Figures](#) for information about formatting graphics and resolution requirements.)

### **Detailed Instructions**

NOTE: The editor-in-chief and editorial staff will make reasonable allowance for minor deviations from these specifications as long as they do not interfere with reading, reviewing, or editing the manuscript. Corrections or changes may be required of authors if the manuscript undergoes revisions. Major deviations, however, will lead journal staff to send the manuscript back to the authors for corrections before the manuscript is initially processed.

## *Abstract*

- The abstract should be written in the past tense, third person, active voice, and must not exceed 300 words; for example, "The authors interviewed 30 deans."
- The abstract must fully reflect the scope of the manuscript. It should act as a summary, not as an introduction. It cannot contain information that is not also included in the main text and it must not contain any citations.
- The data and findings reported in the abstract must match those reported in the main text.
- The abstract must appear on its own page in the manuscript file, between the title page and the first page of the main text.
- For Research Reports and Literature Reviews only, abstracts must be in the structured form of four paragraphs, with headings Purpose, Method, Results, and Conclusions, and they must include the year of the study.
- For Innovation Reports only, abstracts must be in the structured form of four paragraphs, with headings Problem, Approach, Outcomes, Next Steps, and they must include the time period.

## *Headings*

- All manuscripts: Use main headings and short subheadings as needed. Do not create a heading at the very beginning of the manuscript, since layout constraints make such headings unworkable. At least one full paragraph of text must precede the first heading (e.g., Introduction, Background). Distinguish main-level headings (16-point font, bold, Title Style Capitalization) from subheadings (12-point font, bold, Sentence style capitalization). If subheadings are used, two or more such headings must be used, as in outline style.
- Research Reports and Literature Reviews: Structure the body of the manuscript using the main-level headings Method, Results, and Discussions. Sometimes, additional main-level headings (e.g., Introduction, Conclusions) may be appropriate. Subheadings may be used as needed within each main section as long as there are two such headings within the section.
- Articles and Scholarly Perspectives: Create headings that are substantive or descriptive and interesting and that will give readers a sense of the article's organization. Make headings as short as is feasible. Do not use Research Report/Literature Review headings.
- Innovation Reports: Structure the body of the manuscript using the main-level headings Problem, Approach, Outcomes, and Next Steps. Unlike other manuscripts, Innovation Reports must begin with the Problem heading before the first



paragraph of text. Subheadings may be used as needed within each main section as long as there are at least two such headings within the section.

### *Data and Analysis*

- Percentages: Include raw numbers with percentages; for example, 100 (50%) of the respondents; many respondents (n = 100, 50%); 100 respondents (50%). Round percentages consistently, e.g., to the nearest whole number (50%) or one decimal place (50.0%).
- Confidence intervals: Report appropriate confidence intervals whenever possible.
- Standard deviations: Report standard deviations in parentheses—i.e., "mean (SD)" rather than "mean  $\pm$  SD."
- P values: In general, report actual P values to two decimal places (e.g., P = .01), unless P < .01 or rounding to two places would make a particular value insignificant. In such cases, report the P value to three decimal places. Do not round P values to 0 or 1; instead, use P < .001 and P > .99, respectively. Describe P values as "statistically significant" or "not statistically significant."
- Software: When describing statistical analyses in the Method, please include the name and version of the software used in the text, followed by the manufacturer's name and location in parentheses; for example, "The data were analyzed using Stata SE 13.1 for Windows (Stata Corp, College Station, Texas)." Please do not cite the software in the reference list.
- Data sharing: Authors have the option to share with readers the datasets used in their research. Authors wishing to do so may deposit their data in a publicly accessible repository and include a link to the DOI within the text of the manuscript, as well as in an optional category in the [Structured Disclosures](#) section. For example, "Data sharing: The data analyzed for this study have been deposited in Figshare and are available at <https://doi.org/10.6084/m9.figshare.4884569.v2>."

### *Tables*

- Use tables (1) only when their information cannot easily be stated or summarized in the manuscript, and (2) only when that information concerns a central issue of the manuscript.
- Up to 5 exhibits, total, are permitted for Articles, Scholarly Perspectives, Research Reports, and Literature Reviews; Innovation Reports may have up to 3 exhibits. Additional exhibits may be published at the discretion of the editor-in-chief as [Supplemental Digital Content](#).

- Tables must be created in Word using the table function. Tables created in Excel or informally created in Word with tabbing or spacing will not be accepted.
- Table titles should make the table sufficiently understandable independent of the manuscript. Typically, the title should include type of data, number and type of respondents, place of study, and year of study. Titles should be placed directly above the table, not in a data cell.
- Columns should be clearly labeled and include unit of measure.
- Footnotes: Create one or more table footnotes if information is needed to make the table understandable independent of the text and that information won't easily fit into the table title or data cells. Place footnotes at the bottom of the table, not in a data cell. Define abbreviations in a single table footnote and label it "Abbreviations." Symbols for all other table footnotes are superscript lowercase letters used in alphabetical order (a, b, c, etc.).
- All tables should be separated from the text file, yet bundled into a common file, with individual tables separated by page breaks.
- All tables must be called out in the text.

## *Figures*

*Academic Medicine* does not redraw or create figures. It is the author's responsibility (1) to provide high-quality figures that are ready to be published and (2) to make revisions as requested by staff editors during the review and editing processes. Figures created in Word, PowerPoint, or Excel are preferred; those created in other programs must follow the instructions below.

## Creating Digital Artwork

- Review the publication requirements for digital artwork on the publisher's website: <http://links.lww.com/ES/A42>
- Refer to the Digital Artwork Guideline Checklist, below, as you create, scan, and save your artwork.
- Upload each figure to Editorial Manager with your manuscript text and other exhibits.

## Digital Artwork Guideline Checklist

- Before submitting your digital artwork, make sure it meets the basic format and resolution guidelines below. Note that the staff editors require figure files that can be opened and manipulated during editing. If such files are not provided, the author will be required to make all changes requested by the staff editor.

- Artwork should be saved as TIFF, EPS, or MS Office (DOC, PPT, XLS) files. High resolution PDF files are also acceptable. Do not cut and paste figures into Word; provide figures as DOC files only if they were originally created in Word.
- Crop out any white or black space surrounding the image.
- Diagrams, graphs, and other line art must be provided as live files that can be edited. If that is not possible, they must be vector or saved at a resolution of at least 1200 dpi. If created in an MS Office program, send the native (DOC, PPT, XLS) file.
- Photographs, radiographs, and other halftone images must be saved at a resolution of at least 300 dpi. (This applies only for [Cover Art](#) and [Medicine and the Arts](#) submissions; *Academic Medicine* does not publish photographs as Figures.)
- Photographs and radiographs with text must be saved as postscript or at a resolution of at least 600 dpi. (This applies only for [Cover Art](#) and [Medicine and the Arts](#) submissions; *Academic Medicine* does not publish photographs as Figures.)
- Each figure must be saved and submitted as a separate file. Figures should not be embedded in the manuscript text file.

Remember:

- Use figures (1) only when their information cannot easily be stated or summarized in the manuscript, and (2) only when that information concerns a central issue of the manuscript.
- Up to 5 exhibits, total, are permitted for Articles, Scholarly Perspectives, Research Reports, and Literature Reviews; Innovation Reports may have up to 3 exhibits. Additional exhibits may be published at the discretion of the editor-in-chief as [Supplemental Digital Content](#).
- Figures should be two-dimensional; black-and-white or grayscale; and without gridlines or background shading. X- and Y-axes, if present, must be labeled and should include hatch marks as appropriate.
- Figure legends should make the figure sufficiently understandable independent of the manuscript. Typically, the legend should include type of data, number and type of respondents, place of study, and year of study. Legends should be placed on the last page in the manuscript file, after the reference list.
- All figures must be called out in the text.

## References

- Authors are responsible for the accuracy and completeness of their references and for their in-text citations.

- *Academic Medicine's* reference style for the format and sequence of citations mirrors American Medical Association (AMA) style. (See [American Medical Association Manual of Style: A Guide for Authors and Editors](#).)
- The list of references should be double spaced and placed at the end of the manuscript.
- Number the references according to the order in which they are first cited in the manuscript (do not list alphabetically). Use superscript numerals in the body of the text to indicate the reference list numbers being cited. Do not use footnotes or endnotes; remove any hyperlinks between the in-text citations and the references.
- Any unpublished sources and personal communications should be included as numbered references rather than noted within the text of the manuscript in parentheses. (This is a departure from AMA style.)
- For guidance, see [Examples of Typical References](#). For more comprehensive examples, please consult the [AMA style guide](#) and review published reference lists in recent issues of the journal.

### *Structured Disclosures*

All articles published in *Academic Medicine* must include a structured disclosures section at the end of the text, before the reference list, using the category headings specified below. Each category should appear as a separate paragraph in the following order:

- Acknowledgments: Write author acknowledgments in the third person ("The authors wish to thank..."), or indicate "None."
- Funding/Support: List any external funding, including grant names or numbers, or indicate "None." If required by the funder, include a statement on how readers can access the underlying research materials (e.g. data, samples, models).
- Other disclosures: List any potential conflicts of interests for author(s) of this manuscript that fit [Academic Medicine's Authorial Conflict of Interest Policy](#), or indicate "None."
- Ethical approval: For manuscripts involving studies or evaluations of human participants, either (1) state that ethical approval has been granted (or waived) for studies involving human subjects, provide the name of the reviewing body, and include the date and reference number; or (2) indicate "Not applicable." Please note that program descriptions that include an evaluative component may require ethical approval or exemption from the authors' IRB(s). For more information, review [Ethical Approval for Studies Involving Human Participants](#) and see the journal's [resource on ethical issues to consider](#).
- Disclaimers: Write any disclaimer in the third person, or indicate "None."

- Previous presentations: Report previous presentation of materials in a different form, such as at a conference, with date(s) and location(s), or indicate "None."
- Data: Specify data from outside sources and whether you obtained permission for use from the data source and any necessary review prior to submission.

Authors may also include information about accessing the raw data used in their analyses. This is completely optional and can be added at the author's discretion. If you wish to include such information, create a separate category:

- Data sharing: Additional data can be accessed via XXX at [URL] with the doi:XXX.

### *Supplemental Digital Content (SDC)*

Authors may submit SDC as part of a manuscript submission via Editorial Manager to be considered for online posting. SDC may include standard media such as text documents, graphs, tables, figures, audio, video, etc. On the Attach Files page of the submission process, please select Supplemental Digital Content for your uploaded file as the Submission Item. If an article with SDC is accepted, the publisher's staff will create a URL for the SDC file. The URL will be placed in the call-out within the article. The author is responsible for the accuracy and content of SDC files, which are not edited by journal staff or by the publisher's staff; they will be presented digitally as submitted. For a list of all available file types and detailed instructions, please see the publisher's [Author Checklist for Supplemental Digital Content](#).

### SDC Call-outs

SDC items must be numbered and cited consecutively in the text of the submitted manuscript. Regardless of their structure, all SDC items should be called Supplemental Digital Appendices. Citations in the text should use the full name of the item including the sequential list number (e.g., Supplemental Digital Appendix 1, Supplemental Digital Appendix 2, etc.), and provide a description of the supplemental content. All descriptive text for audio or video files should be included in the call-out as it will not appear elsewhere in the article.

### Examples:

- The complete survey is available as Supplemental Digital Appendix 1.
- We performed many tests on the degrees of flexibility in the elbow (see video, Supplemental Digital Appendix 2, which demonstrates elbow flexibility) and found our results inconclusive.

### SDC File Requirements

All acceptable file types are permissible up to 10 MBs. For audio or video files and any files greater than 10 MBs, authors should first query the journal office for approval. For a list of all available file types and detailed instructions, please see the publisher's [Author Checklist for Supplemental Digital Content](#).