令和7年度 厚生労働科学研究費
長時間労働の医師への健康確保措置に関するマニュアル改訂のための研究
分担研究報告書

医師における長時間労働・睡眠負債とバーンアウトに関するレビュー

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研究要旨:

医師の長時間労働と睡眠負債はバーンアウトの主要なリスク因子であり、医療の質・患者安全にかかわる喫緊の課題である。本研究は、直近約 10 年間（2016〜2026 年）に発表された医師の長時間労働・睡眠負債とバーンアウトに関する文献 202 件を包括的に検討した。PubMed および Web of Science による初期検索で 1,939 件を同定し、二段階スクリーニングを経て 202 件を分析対象とした。

長時間労働とバーンアウトの間には正の関係が確認され、一部の研究では非線形的かつ閾値依存的な関係も示唆されていた。また、医師の平均睡眠時間は推奨値を大きく下回り、睡眠不足はバーンアウトと強い正の関連を示すとともに、長時間労働とバーンアウトの関係を媒介することが確認された。COVID-19 パンデミック下では労働時間の延長・睡眠の質低下・バーンアウトの悪化が同時に生じ、その複合的影響が特に顕著であった。

以上の知見は、医師のバーンアウト対策として、労働時間上限規制の厳格化、睡眠を中核とした回復機会の制度的保障、および勤務設計の最適化を組み合わせた多層的・予防的アプローチの必要性を示唆するものである。

A. 研究目的

医師の長時間労働は、世界的な医療政策における喫緊の課題として広く認識されている。人命に直結する職務の特性上、医師は不規則な勤務体制や慢性的な過重労働に曝されやすく、結果として深刻な睡眠負債を生じやすい環境に置かれている（Lockley et al., 2004）。睡眠負債は単なる疲労の蓄積にとどまらず、注意力・判断力・記憶力といった認知機能の顕著な低下をもたらし、医療過誤リスクの増大と患者安全の脅威に影響を及ぼす可能性が指摘されている（Van Dongen et al., 2003; Landrigan et al., 2004）。

過度の業務負担は、エネルギーなどの個人資源を枯渇させ、バーンアウトのリ

スクを高める（Bakker et al., 2023）。バーンアウトは情緒的消耗感、脱人格化、個人的達成感の低下に特徴づけられる症候群であり（Maslach et al., 2001）、メンタルヘルスの不調（Tóth-Király et al., 2021）、休職（Ahola et al., 2008）、離職意向（Leineweber et al., 2021）などネガティブなアウトカムと関連している。医師のバーンアウトは医師個人の精神的健康を損なうのみならず、医療サービスの質的低下を通じて、医療システム全体に深刻な影響を及ぼす（West et al., 2018）。

令和４年度厚生労働科学特別研究事業「長時間労働医師への健康確保措置に関するマニュアルの改訂のための研究」研究班で実施した調査では、医師のバーンアウトの有病率は研修医を含め、極めて高く、その要因には長時間労働、過重な業務負担、サポート不足といった組織的課題が深く関与していることが明らかとなった。本稿では、直近約 10 年間（2016～2026 年）の医師における長時間労働、睡眠負債、及びバーンアウトの関連に関する研究レビューし、最新のエビデンスを整理する。

B. 研究方法

1.文献検索

PubMed および Web of Science を対象にデータベース検索を実施した。検索式は「医師・研修医・外科医・内科医」等に関する MeSH 用語・自由語と、「睡眠剥奪、不眠、疲労、睡眠負債、短時間睡眠」および「労働時間、過重労働、当直、夜勤、シフト勤務」に関する検索語を組み合わせ、これにバーンアウトを掛け合わせた複合式を用いた（Appendix 参照）。対象は 2016 年～2026 年の文献とし、英語または日本語の原著論文に限定した。検索の結果、1,939 件（PubMed = 1,854 件; Web of Science = 85 件）の文献が同定された。

2.スクリーニング

図 1（巻末に記載）は、レビューの流れを示している。重複文献 56 件を除外した後、1,883 件をタイトルおよび抄録に基づく一次スクリーニングの対象とした。その結果、1,369 件を除外し、514 件を全文精査の対象とした。このうち 9 件は全文を入手できなかったため、残る 505 件について適格性評価を行った。さらに二次スクリーニングにより 303 件を除外し、最終的に 202 件の論文をレビュー対象とした。

C. 研究結果

表 1（巻末に記載）は、対象論文の著者名、発行年、タイトル、研究手法、研究対象者、ならびにバーンアウトと長時間労働および睡眠負債との関連に関するエ

ビデンスの有無を示している。研究手法の内訳は、横断研究が 146 件（72.3%）と大半を占め、次いでレビュー／メタ分析が 32 件（15.8%）、縦断研究が 12 件（5.9%）、質的研究が 7 件（3.5%）、介入研究が 3 件（1.5%）、混合研究法が 2 件（1.0%）であった。発行年の推移を見ると、2019 年以降（COVID-19 流行期）に顕著な増加が認められ、2025 年が 35 件で最多であった。バーンアウトと関連要因の検討状況については、長時間労働との関連を扱った文献が 191 件（94.6%）と最も多く、睡眠負債との関連を検討した文献は 91 件（45.0%）、両要因を同時に扱った文献は 80 件（39.6%）であった。

1. 長時間労働とバーンアウト

医師の長時間労働の実態は複数の研究で明らかにされている。日本の医師を対象とした調査では、年間 200 日以上勤務するフルタイム医師のうち、週 60 時間以上の長時間労働に従事する者は 42%に達し、全職業平均（14%）を大きく上回っていた（Ishikawa, 2022a）。さらに、国内の 40 代および 50 代の常勤病院勤務医と同年代の大企業勤務者を比較した研究では、週平均労働時間は会社員の 46.0 時間に対し勤務医では 57.0 時間であり、週 60 時間以上働く者の割合は会社員の 6.2%に対して勤務医では 51.1%と過半数を占めていた（Suzuki, 2017）。

労働時間とバーンアウトとの関連については多くの研究で正の関連が示されている（e.g., Algethami et al., 2025; Corrigan et al., 2020; Graham et al., 2025; Seehusen et al., 2025; Shalaby et al., 2023; Wada et al., 2025）。日本人医師を対象とした研究では、週労働時間が 10 時間増加するごとにバーンアウト重症度スコアが 0.40 ポイント上昇することが示されている（Wada et al., 2025）。同様に、研修医を対象としたメタ分析では、週 80 時間を超えて勤務する医師は、それ未満の医師と比較してバーンアウトリスクが約 16.4 倍に増加することが報告されている（Shalaby et al., 2023）。また、長時間労働の影響は若年の研修医において顕著であり、若手医師はシニア医師と比較して長時間労働に伴うバーンアウトのリスクが高いことが報告されている（e.g., Christiansen et al., 2024; Matsuo et al., 2021; Pius, 2023; Youssef, Youssef et al., 2022）。キャリア初期の医師は、高度かつ複雑な臨床技能の習得と過度な役割期待への対応を同時に求められるため、心理的資源を早期に消耗しやすい状況にある（Zhang et al., 2020）。加えて、経験不足によりストレス対処能力が十分に確立されていないことから、業務負担が心理的損耗へと直結しやすいことも指摘されている（Matsuo et al., 2021; Pius, 2023）。

縦断研究のエビデンスは、労働時間とバーンアウトの関係が経時的かつ累積的である可能性を示唆している。台湾の医療従事者を対象とした4年間の研究では、バーンアウトの水準が週労働時間の変動に応じて変化し、労働時間の減少に伴いバーンアウトが低下し、増加に伴い悪化することが確認された（Lee et al., 2025）。加えて、いくつかの研究では、労働時間とバーンアウトの関係が非線形である可能性も示唆されている。台湾の大規模研究において、週40時間を基準とした場合、週60時間超でバーンアウトのオッズ比は2.02、74時間超で3.01、84時間超では4.05に上昇することが示された（Lin et al., 2021）。同様の知見は米国の大規模横断研究でも報告されており、週40時間未満を基準とした調整オッズ比は、週40〜49時間で1.45、50〜59時間で1.83、60時間以上で2.87と段階的に増加した（Seehusen et al., 2025）。

こうした知見を踏まえると、長時間労働の是正はバーンアウト軽減の重要な介入対象であると考えられる。実際、労働時間の制限や短縮を目的とした介入（ワークフローの最適化や勤務スケジュールの再設計など）は、バーンアウト低減に有効であることが報告されている（e.g., Busireddy et al., 2017; Mansour et al., 2026; Quirk et al., 2021）。また、労働時間制限に関する介入研究を統合した体系的レビューでは、労働時間の削減がバーンアウトの中核症状である情緒的疲弊を有意に改善し、バーンアウト発生オッズを約40%低下させることが示されている（Busireddy et al., 2017）。しかしながら、単純な労働時間の短縮は、業務密度を高めてしまう可能性もあることから、こうした対策がかえって仕事負担を増大させ、バーンアウトを悪化させるリスクも指摘されている (Busireddy et al., 2017)。

一方で、労働時間とバーンアウトとの有意な関連を認めなかった研究も存在する。米国の研修医を対象とした横断研究では、労働時間はストレスの増加とは関連していたものの、バーンアウトとは関連していなかった（Tan et al., 2026）。同様の結果は、ブラジルの麻酔科医（Barbosa et al., 2017）、米国の入院患者専門医（Warner et al., 2025）、および日本の脳神経内科医（Shimohata et al., 2021）を対象とした研究でも報告されている。さらに、ブラジルの医師を対象とした研究では、週60時間以上勤務する医師の方が、週51〜60時間勤務の医師よりもバーンアウト率が低いという逆説的な結果も報告されている（Prestes et al., 2025）。しかしながら、これらの知見は主に横断研究デザインに基づいていることに留意が必要である。

2. 睡眠負債とバーンアウト

国際的なエビデンスは、医師が慢性的な睡眠負債に直面していることを示唆している。一般成人に推奨される睡眠時間が 7〜9 時間であるのに対し、医師の平均睡眠時間は約 6.5 時間にとどまる（Hassinger et al., 2024）。さらに、国やキャリア段階によってはこれを下回り、日本の医師や米国・シンガポールの研修医では約 6.0〜6.1 時間（Wada et al., 2025）、タイの初期研修医では平均 5.58 時間と報告されている（Surawattanasakul et al., 2025）。加えて、睡眠の質の低下や睡眠障害も深刻な問題となっている（e.g., Firew et al., 2025; Hacimusalar et al., 2021; Hassinger et al., 2022; Medisauskaite & Kamau, 2019; Prestes et al., 2025; Stewart et al., 2021）。医師は、夜間当直やオンコールやシフト勤務に伴う概日リズムの攪乱によって、健康的な睡眠が著しく害されている（e.g., Ballesio et al., 2021; Coleman et al., 2023; Gohar et al., 2022; Hassinger et al., 2024; Stewart & Arora, 2019）。米国の研修医を対象とした研究では、理想的な睡眠タイミング（睡眠中央値が午前 2:24〜3:30）を維持できている者は 18%に過ぎず、睡眠パターンの高度な不規則性が示されている（Hassinger et al., 2024）。また、米国の医療従事者 963 名を対象とした別の調査では、95.5%が睡眠の質不良（PSQI スコア ≥ 5）と判定され、約 30%が中等度から重度の不眠症状を呈していた（Stewart et al., 2021）。

医師が抱える深刻な睡眠負債は、医療現場における過酷な勤務形態や心理的社会的ストレスなど、複数の要因が複合的に絡み合うことで引き起こされている。長時間労働や過重な業務負担は心身の回復に充てるべき睡眠機会を直接的に奪う中心的な要因である (Lipps et al., 2025)。また、電子カルテの記録作業や早朝会議といった付随的なタスクや事務作業も睡眠時間を大幅に制限している(Pamidi et al., 2025)。加えて、夜間当直や不規則なシフト勤務は、概日リズムと睡眠時間帯との間にズレを生じさせ、睡眠の質を著しく低下させる (e.g., Ballesio et al., 2021; Coleman et al., 2023; Gohar et al., 2022; Hacimusalar et al., 2021; Stewart & Arora, 2019)。オンコールという特殊な勤務形態は、実際の電話や呼び出しによって睡眠を妨げるだけでなく、「いつ呼ばれるか分からない」という心理的な緊張を生じさせることで睡眠を害する(Coleman et al., 2024)。また、長時間労働によるワーク・ライフ・コンフリクトや患者のケアに関わるプレッシャーといった日常的なストレスは、仕事に対する反芻や不安につながり、入眠困難や中途覚醒を引き起こす (Medisauskaite & Kamau, 2019)。

睡眠負債はバーンアウトと強い正の関連を示すことが複数の研究において確認されている（e.g., Feng et al., 2021; Ji et al., 2025; Kabunga et al., 2024; Prestes et al., 2025; Trockel et al., 2020）。ウガンダの医療従事者を対象とした研究では、毎日の睡眠時間が 6 時間未満などの不十分な状態は、情緒的消耗感や脱人格化の高いスコアと関連しており、睡眠が不十分な個人は、十分な睡眠をとる個人と比較しての高いバーンアウトを経験する確率が約 7 倍高かった (Kabunga et al., 2024)。また、いくつかの研究では自己申告の睡眠時間以上に、睡眠の質がバーンアウトと関連していることも示されてされている（e.g., Hassinger et al., 2024; Stocchetti et al., 2021）。同様の結果は客観的な指標を用いた研究でも報告されている。ウェアラブル端末で測定された非オンコール時の総睡眠時間とバーンアウトの間に有意な関連は見出されなかった一方で、オンコール中の実睡眠時間の短さはバーンアウトの各サブスコアの悪化と強く関連していた(Feng et al., 2021)。同様に、精神運動ビジランステストを用いた調査では、睡眠時間そのものよりも、睡眠負債によって生じる客観的な覚醒度の低下（注意力の欠如）がバーンアウトの重症度と関連していた (Wada et al., 2025)。

さらに、台湾の医療従事者に関する横断研究では、睡眠負債は、長時間労働とバーンアウトの関係をつなぐ媒介要因として機能していることが示されている (Lin et al., 2021)。同様の結果は急性期外科医を対象とした 6 ヶ月間の追跡研究でも報告されており、睡眠は院内当直（長時間の連続勤務）とバーンアウトの関係を媒介した (Coleman et al., 2023)。また、睡眠負債とバーンアウトの間には相互関連も見出されており、睡眠負債がバーンアウトにつながり、バーンアウトがさらに睡眠負債を増大させるという負のサイクルの存在が指摘されている (Khammissa et al., 2022)。深刻な睡眠負債と慢性的なバーンアウトは、うつ病の発症率を高め、医師の健康を著しく害し、重大な医療過誤のリスクを増大させる(Trockel et al., 2020)。

介入研究のエビデンスでは、勤務体制の改善がもたらすポジティブな効果が示されている。集中治療室に夜間専従医を配置して主治医の夜間負担を軽減したランダム化比較試験では、客観的な注意力テストの結果に差はなかったものの、睡眠時間が有意に増加し、医師の主観的な肉体的疲労感や眠気が軽減してウェルビーイングが改善することが確認された (Bakhru et al., 2019)。また、眼科研修医において当直明けの実質的な休息（ポストコール・リリーフ）を義務化した介入研

究では、夜間の睡眠量に変化はなかったものの、当直明けの昼寝時間や身体活動量が有意に増加したことで、バーンアウトの中核症状である情緒的消耗感およびストレススコアの大幅な低下が見られた(Feng et al., 2023)。さらに、内科研修医に対して緊急時のバックアップ体制の導入や当直スケジュールの見直しといった多角的な環境改善を長期間実施したプログラム介入においても、睡眠不足による日中の問題や他者への共感力、ピアサポートが有意に改善したことが報告されている (Quirk et al., 2021)。

3. COVID-19 の影響

COVID-19 パンデミックは、医師の労働環境に前例のない変化をもたらし、仕事の負担を増加させた（e.g., Çevik & Ungan, 2021; Izdebski et al., 2023; Ji et al., 2025; Kase et al., 2022; Serrão et al., 2022; Stocchetti et al., 2021）。感染患者の急増や同僚の隔離に起因する深刻な人員不足により、多くの医師が専門外領域（例：COVID-19 専用病棟）への配置転換や高強度の当直業務を余儀なくされ、勤務スケジュールは一層不規則化した（Ji et al., 2025）。このような労働条件の悪化と、収束時期の見通しが立たない状況に伴う持続的心理的プレッシャーは、心身の回復に不可欠な睡眠を著しく阻害し、単なる睡眠時間の短縮にとどまらず、不眠症の増加や睡眠効率の低下といった重篤な睡眠負債を引き起こした（Prestes et al., 2025）。結果として、医療現場におけるバーンアウトは過去に例を見ない水準にまで増大した（Izdebski et al., 2023）。

COVID-19 パンデミックの発生に伴う患者の急増やスタッフの不足は、医師の労働時間を大幅に延長させることにつながった (Teo et al., 2021; Lee et al., 2025)。例えば、台湾の 1,486 の医療従事者を対象とした調査では、全体の約 75%が週に 1 日分以上の追加労働を余儀なくされたことを報告している (Lee et al., 2025)。さらに同研究は、パンデミックの各波に対応した週労働時間の変動が、バーンアウト水準の時間的変動と連動していることを示しており、労働時間の増減がバーンアウトの動態に直接的影響を及ぼす可能性を示唆している。加えて、過酷な労働環境および心理的負荷は睡眠の質にも深刻な影響を及ぼした。米国の最前線医療従事者を対象とした調査では、90%以上が睡眠の質の低下を報告し、約 30%が中等度から重度の不眠症状を呈していた。さらに、睡眠障害を有する医師は、そうでない医師と比べてバーンアウトを経験する確率が有意に高かった（Stewart et al., 2021）。ブラジルの全国調査においても、パンデミック期に医師のバーンアウト有

病率が 18.9%から 31.3%へと上昇する中で、睡眠時間および睡眠の質の双方が悪化した群では、バーンアウトのオッズ比が 6.39 に達していた（Prestes et al., 2025）。中国における調査では、パンデミックによる業務負担の急増によって 1 日の睡眠時間が 6 時間未満であることは、深刻なバーンアウトを引き起こす独立した強力なリスク因子として特定された (Ji et al., 2025)。総じて、これらの知見は、COVID-19 パンデミックが、労働時間の延長、睡眠負債の増大、そしてバーンアウトの悪化という相互に関連する経路を通じて、医師の健康と職業機能に複合的かつ増幅的な影響を及ぼしたことを示している。

D. 考察

1. レビュー結果の考察

本レビューは、医師における長時間労働及び睡眠負債とバーンアウトに関する計 202 件の研究を包括的に検討した。

医師のバーンアウト有病率に関して、先行の代表的な系統的レビューでは、医師のバーンアウト有病率は平均 43%と報告されている（Rotenstein et al., 2018）。本レビューにおいても、研究デザインや対象集団の異質性を踏まえつつ、医師集団における高いバーンアウト負担が一貫して確認された。この結果は、バーンアウトが個別の環境や制度に依存する問題にとどまらず、医療システムに広く内在する構造的課題であるという観点を支持するものである。

長時間労働とバーンアウトの関連について、本レビューの知見は既存のエビデンスと一致している。過重な業務量および長時間労働が主要な組織的リスク因子であることは、複数の系統的レビューによって繰り返し指摘されてきている（West et al., 2018; Imo et al., 2017）。また、労働時間の制限がバーンアウトの低減に寄与する可能性を示唆する介入研究のエビデンスも長時間労働とバーンアウトの著明な関連を裏付けるものである。一方で、労働時間とバーンアウトの関係が単純な線形関係ではなく非線形的かつ閾値依存的であることを示すエビデンスは（Lin et al., 2021; Seehusen et al., 2025)、特定の労働時間を境としたバーンアウトリスクの加速的増加の可能性を示唆しており、新たな視点を提供する。これらの研究で見出された特定の閾値は、政策立案において優先的に取り組むべき安全基準の設定に参考となる知見を提供するものである。

睡眠負債と医師のバーンアウトの関連については、睡眠とバーンアウトの密接な関連を明示したアメリカ睡眠医学会（AASM）ポジションステートメントと一致して (Kancherla et al., 2020)、本レビ

ューでも両者の間に明確な正の関係が認められた（e.g., Feng et al., 2021; Ji et al., 2025; Kabunga et al., 2024; Prestes et al., 2025; Trockel et al., 2020）。また、複数の研究において、長時間労働が睡眠への影響を介してバーンアウトと関連することが示されている（Coleman et al., 2023; Lin et al., 2021）。加えて、睡眠負債とバーンアウトの関係は双方向的であることを示唆するエビデンスもあり（Khammissa et al., 2022）、睡眠負債がバーンアウトにつながるだけでなく、バーンアウトがさらに睡眠負債を悪化させストレスを蓄積させるという負のサイクルの存在が示唆される。さらに、一部の研究では、睡眠時間そのものよりも睡眠の質や、睡眠負債によって生じる客観的な覚醒度の低下がバーンアウトとより強く関連しているとの報告もあり（e.g., Wada et al., 2025; Feng et al., 2021）、単純に睡眠時間を確保するだけでなく、睡眠の質を高めるための介入（規則的な生活リズム、ストレス管理、シフト設計の改善等）の重要性が示唆される。

最後に、COVID-19 パンデミックに関する知見は、労働時間という指標の本質的な限界を浮き彫りにする。パンデミック下では、PPE 着用による身体的負荷、急速に変化する診療体制への適応、専門外業務への配置転換、さらには患者死亡への反復的曝露といった負荷が顕著に増大した (e.g., Çevik & Ungan, 2021; Izdebski et al., 2023; Ji et al., 2025; Kase et al., 2022; Serrão et al., 2022; Stocchetti et al., 2021)。これらは労働時間の延長とは独立して心理的資源を消耗させる要因であり、従来の時間ベースの評価指標のみでは把握しきれない（Prestes et al., 2025）。同様に、睡眠負債も単なる睡眠時間の不足にとどまらず、感染への恐怖や社会的孤立といったストレス要因による睡眠の質の低下を伴っていた。このような複合的悪化のもとでは、睡眠の量と質が同時に損なわれた場合にバーンアウトのリスクが大幅に増加することが示されており（Prestes et al., 2025）、両者が相乗的に作用する可能性が示唆される。

2. 理論的示唆

本レビューの知見は、仕事の要求度・資源（JD-R）理論（Bakker et al., 2023）の観点から、労働時間の増加という形での仕事の要求度の増大と職務資源（自律性、ソーシャル・サポートなど）の不足がバーンアウトを引き起こすプロセスとして理解できる。また、長時間労働が睡眠を妨げることでバーンアウトを引き起こすという媒介経路は（Coleman et al., 2023; Lin et al., 2021）、仕事の要求度が生理学的な個人資源に悪影響を及ぼすことでバーンアウトを増加させるというメカニズム

を示唆するものであり、JD-R 理論が仮定する仕事の要求度と個人資源の負の関連を支持するものである。さらに、労働時間の閾値効果（週 60 時間、80 時間）は、要求度が資源の補償能力を超えた臨界点において急激な悪化が生じるという理論的予測と整合する。COVID-19 の状況で労働時間が大幅に拡大し、バーンアウトの有病率が顕著に高まったことは（e.g., Gnerre et al., 2025; Ji et al., 2025; Pius, 2023）、危機的状況では仕事のデマンドが顕著に増加し、その悪影響が拡大するという Demerouti & Bakker (2023) の理論的示唆と一致している。一方、睡眠負債とバーンアウトの双方向的関連は (Khammissa et al., 2022)、資源保存理論（Hobfoll et al., 2018）の観点から説明できる。同理論によれば、個人は資源の喪失に対して敏感であり、初期の資源損失はさらなる資源損失につながる（損失スパイラル）。つまり、睡眠の質の低下や回復機会の減少は、情緒的な疲弊を引き起こし、それがさらに睡眠負債を増大させるという悪循環を形成すると考えられる。

3. 実践的示唆

本レビューの知見は、医師のバーンアウト対策に向けた政策と実践への複数の重要な示唆を提供する。第一に、週労働時間 60 時間および 80 時間を安全基準として据えた上限規制の整備と厳格な遵守が重要と考えられる。本レビューが確認した非線形的な閾値効果（Lin et al., 2021）はこの基準設定に定量的根拠を与えており、日本における 2024 年 4 月施行の医師の働き方改革（A 水準：年間時間外労働 960 時間の上限、週労働時間換算で概ね 60 時間程度に相当）はこの科学的根拠と整合的な政策判断と評価できる。第二に、事務的負担の抜本的軽減（AI 支援による記録効率化、事務スタッフの増員、診療外業務の委譲等）が、長時間労働を縮減するうえで有効と考えられる。第三に、睡眠健康を産業保健の中核として位置づけ、当直やシフト設計における睡眠確保の組織的保護と勤務後の回復時間取得の義務化の検討が求められる。Busireddy et al.（2017）の研究では、こうした勤務条件の改善がバーンアウト発生オッズを約 40%低下させる効果を持つことが示されており、介入の有効性を示す重要な根拠となる。第四に、Shanafelt & Noseworthy (2017) が提唱する組織的ウェルビーイング戦略（職場コミュニティの強化、職務自律性の付与、意味のある仕事の促進）を、各国・各医療機関の実情に即して制度化することが重要である。第五に、Panagioti et al.（2018）や Hall et al. (2020) が実証したバーンアウトと患者安全の密接な関連を踏まえれば、医師のウェルビ

ーイング投資は個人の福祉にとどまらず患者安全の確保という観点からも正当化される。これらの対策は、個人、チーム、組織、制度という複数の階層に同時に働きかける多層的・包括的アプローチとして展開されることで、その効果が最大化される（West et al., 2018; Shanafelt & Noseworthy, 2017）。

4. 限界

本レビューには、いくつかの重要な方法論的限界が存在する。第一に、採用文献の大部分が横断研究であり、変数間の因果方向性の推論には慎重を期する必要がある。第二に、バーンアウトの評価指標が研究によって異なり、研究間での直接的な比較が困難である。この問題はRotenstein et al.（2018）の系統的レビューにおいても指摘されている。第三に、ほとんどの研究が自己申告式の労働時間や睡眠測定に基づいているため、社会的望ましさや記憶バイアスの影響が懸念される。今後は、ウェアラブル端末等を用いた客観的な労働時間及び睡眠の評価などを取り入れ、エビデンスを強化することが求められる。

E. 結論

本レビューを通して、医師における長時間労働と睡眠負債の深刻な実態とそれらのバーンアウトとの密接な関連が示唆された。特に、パンデミックのような危機的状況下では、患者の急増により労働時間がさらに延長され、緊急対応の必要性から睡眠がよりとりづらくなり、バーンアウトのリスクが顕著に増大する。

以上の知見を総合すると、医師のバーンアウト対策には、①労働時間の上限規制の厳格化、②睡眠を中核とした回復機会の制度的保障、③勤務設計および業務構造の最適化を組み合わせた、多層的かつ予防的アプローチが重要と考えられる。これらの対策は、医師個人の健康維持にとどまらず、医療の質および患者安全の確保という観点からも、医療システム全体の持続可能性を支える基盤として位置づけられるべきである。

F. 研究発表

１．論文発表

なし

２．学会発表

なし

G. 知的財産権の出願・登録状況（予定を含む。）

該当せず。

H. 文献

Abera, H., Hunt, M., & Levin, J. H. (2023).

Sleep deprivation, burnout, and acute care surgery. *Current Trauma Reports*, *9*(2), 40–46. https://doi.org/10.1007/s40719-023-00253-9

Agarwal, S. D., Pabo, E., Rozenblum, R., & Sherritt, K. M. (2020). Professional dissonance and burnout in primary care: A qualitative study. *JAMA Internal Medicine*, *180*(3), 395–401. https://doi.org/10.1001/jamainternmed.2019.6326

Aggarwal, A., Lazarow, F., Anzai, Y., Elsayed, M., Ghobadi, C., Dandan, O. A., Griffith, B., Straus, C. M., & Kadom, N. (2021). Maximizing value while volumes are increasing. *Current Problems in Diagnostic Radiology*, *50*(4), 451–453. https://doi.org/10.1067/j.cpradiol.2020.02.011

Ahola, K., Kivimäki, M., Honkonen, T., Virtanen, M., Koskinen, S., Vahtera, J., & Lönnqvist, J. (2008). Occupational burnout and medically certified sickness absence: A population-based study of Finnish employees. *Journal of Psychosomatic Research*, *64*(2), 185–193. https://doi.org/10.1016/j.jpsychores.2007.06.022

Akerstrom, M., Wessberg, A., Hadžibajramović, E., Graner, S., Carlsson, Y., Andersson, O., Jonsson, M., Naurin, E., Veje, M., Sengpiel, V., & Linden, K. (2025). Maintaining operability at a high personal cost: A mixed method study on maternal healthcare workers' experiences during the COVID-19 pandemic. *BMC Health Services Research*, *25*(1), 173. https://doi.org/10.1186/s12913-025-12337-0

Al Rekabi, A., Chen, M., Patel, N., Morgan, R., McCafferty, I., Haslam, P., & Hamady, M. (2023). Well-being and burnout amongst interventional radiologists in the United Kingdom. *Cardiovascular and Interventional Radiology*, *46*(8), 1053–1063. https://doi.org/10.1007/s00270-023-03455-5

Alenezi, N. K., Alyami, A. H., Alrehaili, B. O., Arruhaily, A. A., Alenazi, N. K., & Al-Dubai, S. A. R. (2022). Prevalence and associated factors of burnout among Saudi resident doctors: A multicenter cross-sectional study. *Alpha Psychiatry*, *23*(4), 173–183. https://doi.org/10.5152/alphapsychiatry.2022.21361

Algethami, A. M., Basha, S., Noor Mohamed, R., Alqarni, A., Alhazmi, A. O., Alsharari, T., Algahtani, F. S., Shawli, H. T., Alzamil, A. A., Alosaimi, A. S., & Alharbi, A. A. (2025). Burnout and associated factors among dental students, interns, and dental practitioners in Saudi Arabia: A cross-sectional study. *Healthcare*, *13*(13), 1602. https://doi.org/10.3390/healthcare13131602

AlHefdhi, H. A., Mahmood, S. E., Alshumrani, Z. G., Alzailaie, A. K., Al-Aslai, S. A., Alghamdi, A. M., Alahmari, M. D., Alasmari, B. A., Saleh, M. M. A., Abdullah, M. M. S., & Abusahba, N. A. (2025). Relation of burnout to on-call duties among Saudi board residents in Aseer region: A cross-sectional study. *Medicine*, *104*(44), e45422. https://doi.org/10.1097/MD.0000000000045422

Almarzouki, A. F. (2024). Impact of on-call shifts on working memory and the role of burnout, sleep, and mental well-being in trainee physicians. *Postgraduate Medicine*, *136*(3), 312–317. https://doi.org/10.1080/00325481.2024.2347195

Amanullah, S., & Shankar, R. R. (2020). The impact of COVID-19 on physician burnout globally: A review. *Healthcare*, *8*(4), 421. https://doi.org/10.3390/healthcare8040421

Amellah, A., Menouni, A., Chbihi, K.,

Chetouani, H., Abou-Said, S., Abchouch, T., Godderis, L., El Jaafari, S., & Amane, M. (2025). Occupational stress and burnout among public health professionals during the COVID-19 pandemic in Morocco. *Healthcare*, *13*(21), 2700. https://doi.org/10.3390/healthcare13212700

Aourarh, B., Adioui, T., Berrag, S., Nejjari, F., Aourarh, A., & Tamzaourte, M. (2025). Work-life conflict and its health effects on Moroccan gastroenterologists: A cross-sectional study. *Therapeutic Advances in Gastroenterology*, *18*, 17562848251340264. https://doi.org/10.1177/17562848251340264

Ayyala, R. S., Ahmed, F. S., Ruzal-Shapiro, C., & Taylor, G. A. (2019). Stressors contributing to burnout amongst pediatric radiologists: Results from a survey of the society for pediatric radiology. *Pediatric Radiology*, *49*(6), 714–722. https://doi.org/10.1007/s00247-019-04370-z

Azoulay, E., Pochard, F., Reignier, J., Argaud, L., Bruneel, F., Courbon, P., Cariou, A., Klouche, K., Labbé, V., Barbier, F., Guitton, C., Demoule, A., Kouatchet, A., Guisset, O., Jourdain, M., Papazian, L., Van Der Meersch, G., Reuter, D., Souppart, V., Resche-Rigon, M., … FAMIREA Study Group (2021). Symptoms of mental health disorders in critical care physicians facing the second COVID-19 wave: A cross-sectional study. *Chest*, *160*(3), 944–955. https://doi.org/10.1016/j.chest.2021.05.023

Bagshaw, S. M., Opgenorth, D., Potestio, M., Hastings, S. E., Hepp, S. L., Gilfoyle, E., McKinlay, D., Boucher, P., Meier, M., Parsons-Leigh, J., Gibney, R. T., Zygun, D. A., & Stelfox, H. T. (2017). Healthcare provider perceptions of causes and consequences of ICU capacity strain in a large publicly funded integrated health region: A qualitative study. *Critical Care Medicine*, *45*(4), e347–e356. https://doi.org/10.1097/CCM.0000000000002093

Bakhru, R. N., Basner, M., Kerlin, M. P., Halpern, S. D., Hansen-Flaschen, J., Rosen, I. M., Dinges, D. F., & Schweickert, W. D. (2019). Sleep and work in ICU physicians during a randomized trial of nighttime intensivist staffing. *Critical Care Medicine*, *47*(7), 894–902. https://doi.org/10.1097/CCM.0000000000003773

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands–resources theory: Ten years later. *Annual Review of Organizational Psychology and Organizational Behavior*, *10*, 25–53. https://doi.org/10.1146/annurev-orgpsych-120920-053933

Ballesio, A., Lombardo, C., Lucidi, F., & Violani, C. (2021). Caring for the carers: Advice for dealing with sleep problems of hospital staff during the COVID-19 outbreak. *Journal of Sleep Research*, *30*(1), e13096. https://doi.org/10.1111/jsr.13096

Banerjee, S., Califano, R., Corral, J., de Azambuja, E., De Mattos-Arruda, L., Guarneri, V., Hutka, M., Jordan, K., Martinelli, E., Mountzios, G., Ozturk, M. A., Petrova, M., Postel-Vinay, S., Preusser, M., Qvortrup, C., Volkov, M. N. M., Tabernero, J., Olmos, D., & Strijbos, M. H. (2017). Professional burnout in European young oncologists: Results of the European Society for Medical Oncology (ESMO) Young Oncologists Committee Burnout Survey. *Annals of Oncology*, *28*(7), 1590–1596. https://doi.org/10.1093/annonc/mdx196

Barbosa, F. T., Eloi, R. J., Santos, L. M., Leão, B. A., Lima, F. J., & Sousa-Rodrigues, C. F. (2017). Correlation between weekly working time and burnout syndrome among anesthesiologists of Maceió-AL. *Brazilian Journal of Anesthesiology*, *67*(2),

115–121. https://doi.org/10.1016/j.bjane.2015.06.001

Bastian, M. B., Fröhlich, L., Wessendorf, J., Scheschenja, M., König, A. M., Jedelska, J., & Mahnken, A. H. (2024). Prevalence of burnout among German radiologists: A call to action. *European Radiology*, *34*(9), 5588–5594. https://doi.org/10.1007/s00330-024-10627-5

Benson, M. A., Peterson, T., Salazar, L., Morris, W., Hall, R., Howlett, B., & Phelps, P. (2016). Burnout in rural physician assistants: An initial study. *The Journal of Physician Assistant Education*, *27*(2), 81–83. https://doi.org/10.1097/JPA.0000000000000069

Blasche, G., Arlinghaus, A., & Crevenna, R. (2022). The impact of rest breaks on subjective fatigue in physicians of the general hospital of Vienna. *Wiener Klinische Wochenschrift*, *134*(3-4), 156–161. https://doi.org/10.1007/s00508-021-01949-1

Bodendieck, E., Jung, F. U., Conrad, I., Riedel-Heller, S. G., & Hussenoeder, F. S. (2022). The work-life balance of general practitioners as a predictor of burnout and motivation to stay in the profession. *BMC Primary Care*, *23*(1), 218. https://doi.org/10.1186/s12875-022-01831-7

Boo, Y. L., Liam, C. C. K., Lim, S. Y., Look, M. L., Tan, M. H., Ching, S. M., Wan, J. L., Chin, P. W., & Hoo, F. K. (2018). Stress and burnout syndrome in health-care providers treating dengue infection: A cross-sectional study. *The Medical Journal of Malaysia*, *73*(6), 371–375.

Brainch, N., Schule, P., Laurel, F., Bodic, M., & Jacob, T. (2018). Psychiatric emergency services: Can duty-hour changes help residents and patients?. *The Psychiatric Quarterly*, *89*(4), 771–778. https://doi.org/10.1007/s11126-018-9579-2

Busireddy, K. R., Miller, J. A., Ellison, K., Ren, V., Qayyum, R., & Panda, M. (2017). Efficacy of interventions to reduce resident physician burnout: A systematic review. *Journal of Graduate Medical Education*, *9*(3), 294–301. https://doi.org/10.4300/JGME-D-16-00372.1

Butler, L. D., Carello, J., & Maguin, E. (2017). Trauma, stress, and self-care in clinical training: Predictors of burnout, decline in health status, secondary traumatic stress symptoms, and compassion satisfaction. *Psychological Trauma: Theory, Research, Practice and Policy*, *9*(4), 416–424. https://doi.org/10.1037/tra0000187

Caramello, V., Gariglio, V., Di Salvo, G., Maina, G., & Boccuzzi, A. (2023). Longitudinal assessment of mental health consequences of the COVID-19 pandemic long-term exposure on health care workers from a north west Italian hospital. *Disaster Medicine and Public Health Preparedness*, *17*, e378. https://doi.org/10.1017/dmp.2023.42

Çevik, H., & Ungan, M. (2021). The impacts of the COVID-19 pandemic on the mental health and residency training of family medicine residents: findings from a nationwide cross-sectional survey in Turkey. *BMC Family Practice*, *22*(1), 226. https://doi.org/10.1186/s12875-021-01576-9

Chen, Y. H., Jong, G. P., Yang, C. W., & Lee, C. H. (2025). Prolonged overtime predicts worsening burnout among healthcare workers: A 4-year longitudinal study in Taiwan. *Healthcare*, *13*(15), 1859. https://doi.org/10.3390/healthcare13151859

Chênevert, D., Kilroy, S., Johnson, K., & Fournier, P. L. (2021). The determinants of burnout and professional turnover intentions among Canadian physicians: Application of the job demands-resources model. *BMC Health Services Research*, *21*(1),

993. https://doi.org/10.1186/s12913-021-06981-5

Chow, O. S., Sudarshan, M., Maxfield, M. W., Seese, L. M., Watkins, A. A., Fleishman, A., & Gangadharan, S. P. (2021). National survey of burnout and distress among cardiothoracic surgery trainees. *The Annals of Thoracic Surgery*, *111*(6), 2066–2071. https://doi.org/10.1016/j.athoracsur.2020.06.062

Christiansen, F., Gynning, B. E., Lashari, A., Johansson, G., & Brulin, E. (2024). Associations between effort-reward imbalance and risk of burnout among Swedish physicians. *Occupational Medicine*, *74*(5), 355–363. https://doi.org/10.1093/occmed/kqae039

Chu, W. M., Ho, H. E., Lin, Y. L., Li, J. Y., Lin, C. F., Chen, C. H., Shieh, G. J., Chan, W. C., & Tsan, Y. T. (2023). Risk factors surrounding an increase in burnout and depression among health care professionals in Taiwan during the COVID-19 pandemic. *Journal of the American Medical Directors Association*, *24*(2), 164–170.e3. https://doi.org/10.1016/j.jamda.2022.12.010

Chuang, C. H., Tseng, P. C., Lin, C. Y., Lin, K. H., & Chen, Y. Y. (2016). Burnout in the intensive care unit professionals: A systematic review. *Medicine*, *95*(50), e5629. https://doi.org/10.1097/MD.0000000000005629

Coleman, D. M., Money, S. R., Meltzer, A. J., Wohlauer, M., Drudi, L. M., Freischlag, J. A., Hallbeck, S., Halloran, B., Huber, T. S., Shanafelt, T., Sheahan, M. G., & SVS Wellness Task Force (2021). Vascular surgeon wellness and burnout: A report from the society for vascular surgery wellness task force. *Journal of Vascular Surgery*, *73*(6), 1841–1850.e3. https://doi.org/10.1016/j.jvs.2020.10.065

Coleman, J. J., Robinson, C. K., von Hippel, W., Holmes, K. E., Kim, J., Pearson, S., Lawless, R. A., Hubbard, A. E., & Cohen, M. J. (2023). What happens on call doesn't stay on call. The effects of in-house call on acute care surgeons' sleep and burnout: Results of the surgeon performance (SuPer) trial. *Annals of Surgery*, *278*(4), 497–505. https://doi.org/10.1097/SLA.0000000000005971

Coleman, J. J., Robinson, C. K., von Hippel, W., Lawless, R. A., McMasters, K. M., & Cohen, M. J. (2024). Home is not always where the sleep is: Effect of home call on sleep, burnout, and surgeon well-being. *Journal of the American College of Surgeons*, *238*(4), 417–422. https://doi.org/10.1097/XCS.0000000000000975

Corrigan, L., O'Leary, C., Kroes, J., Farooq, A. R., Horgan, A., Calvert, P., & O'Connor, M. (2020). Professional burnout, work patterns and career satisfaction in medical oncologists in Ireland. *Irish Journal of Medical Science*, *189*(2), 711–718. https://doi.org/10.1007/s11845-019-02088-3

de Jong, M. A., Nieuwenhuijsen, K., & Sluiter, J. K. (2016). Common mental disorders related to incidents and behaviour in physicians. *Occupational Medicine*, *66*(7), 506–513. https://doi.org/10.1093/occmed/kqw030

Delle Donne, V., Massaroni, V., Ciccarelli, N., Borghetti, A., Ciccullo, A., Baldin, G., Giuliano, G., Dusina, A., Visconti, E., Tamburrini, E., & Di Giambendetto, S. (2023). Differences in the long-term impact of the COVID-19 pandemic on the mental health and professional quality of life of resident and specialist physicians. *La Medicina del Lavoro*, *114*(2), e2023012. https://doi.org/10.23749/mdl.v114i2.13829

Demerouti, E., & Bakker, A. B. (2023). Job demands-resources theory in times of crises: New propositions. *Organizational*

Psychology Review, 13(3), 209-236. https://doi.org/10.1177/20413866221135022

Dholakia, J., Narayanan, A., & Smith, N. (2025). Prevalence and contributory factors to burnout in the New Zealand surgical specialist and registrar population. *Frontiers in Public Health*, *13*, 1541892. https://doi.org/10.3389/fpubh.2025.1541892

Douplat, M., Subtil, F., Termoz, A., Jacquin, L., Verbois, F., Potinet, V., Hernu, R., Landel, V., Mazza, S., Berthiller, J., Haesebaert, J., & Tazarourte, K. (2024). Mental health consequences of the COVID-19 outbreak among emergency department healthcare workers. *BioMed Research International*, 8871959. https://doi.org/10.1155/2024/8871959

Dye, M. E., Runyan, P., Scott, T. A., Dietrich, M. S., Hatch, L. D., France, D., & Alrifai, M. W. (2024). Small patients but a heavy lift: Workload and burnout of advanced practice providers and physicians in a level IV neonatal intensive care unit. *The Journal of Perinatal & Neonatal Nursing*, *38*(2), 192–200. https://doi.org/10.1097/JPN.0000000000000804

Elay, G., Bahar, I., Demirkiran, H., & Oksüz, H. (2019). Severe burnout among critical care workers in Turkey. *Saudi Medical Journal*, *40*(9), 943–948. https://doi.org/10.15537/smj.2019.9.24520

Elliott, J., Hodges, C., Boots, M., Pattinson, R., Gillen, E., Whybrow, D., & Bundy, C. (2024). Mixed shift rotations, sleep, burnout and well-being in professions similar to radiographers: A systematic review. *Radiography*, *30*(4), 1194–1200. https://doi.org/10.1016/j.radi.2024.05.016

Elmariah, H., Thomas, S., Boggan, J. C., Zaas, A., & Bae, J. (2017). The burden of burnout. *American Journal of Medical Quality*, *32*(2), 156–162. https://doi.org/10.1177/1062860615625802

Elmore, L. C., Jeffe, D. B., Jin, L., Awad, M. M., & Turnbull, I. R. (2016). National survey of burnout among US general surgery residents. *Journal of the American College of Surgeons*, *223*(3), 440–451. https://doi.org/10.1016/j.jamcollsurg.2016.05.014

Elsaie, M. L., Hussein, S. M., Zaky, M. S., Hanafy, N. S., & Jafferany, M. (2020). Therapeutic implications of prevalence and predictor risk factors for burn out syndrome in Egyptian dermatologists: A cross sectional study. *Dermatologic Therapy*, *33*(6), e14327. https://doi.org/10.1111/dth.14327

Erickson, T. S., & Durr, M. L. (2025). Sleep & wellness for the otolaryngologist. *Otolaryngologic Clinics of North America*, *58*(6), 993–1002. https://doi.org/10.1016/j.otc.2025.06.002

Eyı, İ., & Büyükakinci, B. Y. (2025). A cross-sectional study of musculoskeletal discomfort and burnout syndrome in physicians and nurses at a university hospital in Turkey. *Malawi Medical Journal*, *37*(3), 180–188. https://doi.org/10.4314/mmj.v37i3.8

Feeley, A. A., Timon, C., Feeley, I. H., & Sheehan, E. (2024). Extended-duration work shifts in surgical specialties: A systematic review. *The Journal of Surgical Research*, *293*, 525–538. https://doi.org/10.1016/j.jss.2023.08.024

Feng, S., Davis, J. A., Chowdhary, A., Lomazow, W., Yi, J. S., Huang, J., Ding, L., & Taravati, P. (2023). The effect of mandatory post-call relief on sleep and wellness in ophthalmology residents. *BMC Medical Education*, *23*(1), 955. https://doi.org/10.1186/s12909-023-04947-1

Feng, S., Yi, J. S., Deitz, G., Ding, L., Van Gelder, R. N., & Menda, S. (2021). Relationships between sleep, activity, and burnout in ophthalmology residents.

Journal of Surgical Education, *78*(3), 1035–1040. https://doi.org/10.1016/j.jsurg.2020.09.003

Ferguson, C., Low, G., & Shiau, G. (2020). Resident physician burnout: Insights from a Canadian multispecialty survey. *Postgraduate Medical Journal*, *96*(1136), 331–338. https://doi.org/10.1136/postgradmedj-2019-137314

Firew, T., Miranda, M., Fray, N., Gonzalez, A., Sullivan, A. M., Cannone, D., Schwartz, J. E., Karp, J. F., Chang, B. P., & Shechter, A. (2025). Examining how gender, race/ethnicity, and clinical roles moderate the association between sleep and burnout. *Journal of the American College of Emergency Physicians Open*, *6*(1), 100004. https://doi.org/10.1016/j.acepjo.2024.100004

Fowler, L. A., & Ellis, S. (2019). The effect of 12 hour shifts, time of day, and sleepiness on emotional empathy and burnout in medical students. *Clocks & Sleep*, *1*(4), 501–509. https://doi.org/10.3390/clockssleep1040038

Ghaseminejad, F., Rich, K., Rosenbaum, D., Rydz, E., Chow, L., Salmon, A., Palepu, A., Dodek, P., Leitch, H. A., Townson, A., Lacaille, D., Varshney, V., Stanger, E., & Khan, N. (2025). Organisational factors associated with burnout among emergency and internal medicine physicians: A qualitative study. *BMJ Open*, *15*(1), e085973. https://doi.org/10.1136/bmjopen-2024-085973

Gnerre, P., Para, O., Di Massimo, D. S., Attardo, T. M., Manfellotto, D., & Dentali, F. (2025). Prevalence, risk factors and clinical impact of burnout in internal medicine units: A call to action. *Monaldi Archives for Chest Disease*, *95*(4). https://doi.org/10.4081/monaldi.2024.3069

Gohar, A. A., Knauert, M., Kalot, M. A., Khan, A., Sider, D., Javed, M. A., Wooldridge, D., Eck, L., Buckhold, F., Colaco, B., Bhat, A., Castillo, D. M., Newman, R., & Mustafa, R. A. (2022). Influence of medical trainee sleep pattern (chronotype) on burn-out and satisfaction with work schedules: A multicentre observational study. *Postgraduate Medical Journal*, *98*(1166), 936–941. https://doi.org/10.1136/postgradmedj-2021-140975

Goyal, P., Rustagi, N., & Belkić, K. (2021). Physicians' total burden of occupational stressors: More than threefold increased odds of burnout. *Southern Medical Journal*, *114*(7), 409–415. https://doi.org/10.14423/SMJ.0000000000001277

Graham, N. J., Cabral, J. D., Meeks, W. D., Galen, E., Singer, E. A., Harris, A. M., North, A. C., Skolarus, T. A., Quallich, S., & Modi, P. K. (2025). Urological procedures and impact on advanced practice provider burnout, job satisfaction, and salary: AUA census analysis. *Urology Practice*, *12*(6), 769–778. https://doi.org/10.1097/UPJ.0000000000000889

Gribben, J. L., Kase, S. M., Guttmann, K. F., Waldman, E. D., & Weintraub, A. S. (2023). Impact of the SARS-CoV-2 pandemic on pediatric subspecialists' well-being and perception of workplace value. *Pediatric Research*, *94*(2), 581–587. https://doi.org/10.1038/s41390-023-02474-9

Győrffy, Z., Dweik, D., & Girasek, E. (2016). Workload, mental health and burnout indicators among female physicians. *Human Resources for Health*, *14*, 12. https://doi.org/10.1186/s12960-016-0108-9

Győrffy, Z., Dweik, D., & Girasek, E. (2018). Willingness to migrate-a potential effect of burnout? A survey of Hungarian physicians. *Human Resources for Health*, *16*(1), 36.

https://doi.org/10.1186/s12960-018-0303-y

Hacimusalar, Y., Misir, E., Civan Kahve, A., Demir Hacimusalar, G., Guclu, M. A., & Karaaslan, O. (2021). The effects of working and living conditions of physicians on burnout level and sleep quality. *La Medicina del Lavoro*, *112*(5), 346–359. https://doi.org/10.23749/mdl.v112i5.11268

Hall, L. H., Johnson, J., Heyhoe, J., Watt, I., Anderson, K., & O'Connor, D. B. (2020). Exploring the impact of primary care physician burnout and well-being on patient care: A focus group study. *Journal of Patient Safety*, *16*(4), e278–e283. https://doi.org/10.1097/PTS.0000000000000438

Han, R., Hahn, E., Done, S. J., Pun, C., Shivji, S., & Lu, F. I. (2023). Resident depression and burnout during the COVID-19 pandemic: A survey of Canadian laboratory medicine trainees. *Archives of Pathology & Laboratory Medicine*, *147*(3), 368–375. https://doi.org/10.5858/arpa.2021-0501-EP

Harkin, D., Alzayyat, S., Kiernan, A., Ryan, Á., Boland, F., Renton, S., Wales, L., Imray, C., & Vascular Society Workforce Committee (2022). Vascular surgeon burnout and resilience in the United Kingdom: A report from the vascular society workforce committee. *Annals of Vascular Surgery*, *84*, 169–178. https://doi.org/10.1016/j.avsg.2022.01.032

Harolds, J. A. (2020). Quality and safety in healthcare, Part LXI: Burnout and wellness in residents. *Clinical Nuclear Medicine*, *45*(9), 679–680. https://doi.org/10.1097/RLU.0000000000002886

Harrell, M., Selvaraj, S. A., & Edgar, M. (2020). DANGER! crisis health workers at risk. *International Journal of Environmental Research and Public Health*, *17*(15), 5270. https://doi.org/10.3390/ijerph17155270

Hasan, F., Daraghmeh, T., Jaber, M., & Shawahna, R. (2024). Prevalence of burnout syndrome among anesthesiologists, anesthesia technicians, and intensive care unit nurses in Palestinian hospitals: A cross-sectional study. *BMC Psychiatry*, *24*(1), 740. https://doi.org/10.1186/s12888-024-06196-y

Hassinger, A. B., Breuer, R. K., & Mishra, A. (2022). Sleep patterns of US healthcare workers during the first wave of the COVID-19 pandemic. *Sleep & Breathing*, *26*(3), 1351–1361. https://doi.org/10.1007/s11325-021-02515-9

Hassinger, A. B., Velez, C., Wang, J., Mador, M. J., Wilding, G. E., & Mishra, A. (2024). Association between sleep health and rates of self-reported medical errors in intern physicians: An ancillary analysis of the Intern Health Study. *Journal of Clinical Sleep Medicine*, *20*(2), 221–227. https://doi.org/10.5664/jcsm.10820

Helfrich, C. D., Simonetti, J. A., Clinton, W. L., Wood, G. B., Taylor, L., Schectman, G., Stark, R., Rubenstein, L. V., Fihn, S. D., & Nelson, K. M. (2017). The association of team-specific workload and staffing with odds of burnout among VA primary care team members. *Journal of General Internal Medicine*, *32*(7), 760–766. https://doi.org/10.1007/s11606-017-4011-4

Hobfoll, S. E., Halbesleben, J., Neveu, J.-P., & Westman, M. (2018). Conservation of resources in the organizational context: The reality of resources and their consequences. *Annual Review of Organizational Psychology and Organizational Behavior*, *5*, 103–128. https://doi.org/10.1146/annurev-orgpsych-032117-104640

Huang, E. C., Pu, C., Huang, N., & Chou, Y. J. (2019). Resident burnout in Taiwan hospitals and its relation to physician felt trust from patients. *Journal of the Formosan*

Medical Association, *118*(10), 1438–1449. https://doi.org/10.1016/j.jfma.2018.12.015

Huang, L., Caspari, J. H., Sun, X., Thai, J., Li, Y., Chen, F. Z., & Zhao, X. D. (2020). Risk and protective factors for burnout among physicians from standardized residency training programs in Shanghai: A cross-sectional study. *BMC Health Services Research*, *20*(1), 965. https://doi.org/10.1186/s12913-020-05816-z

Huang, P. C., Lin, C. Y., Huang, R. Y., Chen, J. S., Griffiths, M. D., Strong, C., Wang, H. W., Chen, C. Y., Ko, N. Y., & Shieh, S. J. (2024). The effect of social support and resource support on emotional exhaustion, insomnia, and suicidal ideation among allied health trainees and post-graduate year doctors in Taiwan. *BMC Psychology*, *12*(1), 322. https://doi.org/10.1186/s40359-024-01811-9

Imo, U. O. (2017). Burnout and psychiatric morbidity among doctors in the UK: A systematic literature review of prevalence and associated factors. *BJPsych Bulletin*, *41*(4), 197–204. https://doi.org/10.1192/pb.bp.116.054247

Ishikawa, M. (2022a). Overwork among resident physicians: National questionnaire survey results. *BMC Medical Education*, *22*(1), 729. https://doi.org/10.1186/s12909-022-03789-7

Ishikawa, M. (2022b). Relationships between overwork, burnout and suicidal ideation among resident physicians in hospitals in Japan with medical residency programmes: A nationwide questionnaire-based survey. *BMJ Open*, *12*(3), e056283. https://doi.org/10.1136/bmjopen-2021-056283

Izdebski, Z., Kozakiewicz, A., Białorudzki, M., Dec-Pietrowska, J., & Mazur, J. (2023). Occupational burnout in healthcare workers, stress and other symptoms of work overload during the COVID-19 pandemic in Poland. *International Journal of Environmental Research and Public Health*, *20*(3), 2428. https://doi.org/10.3390/ijerph20032428

Jackson, T. N., Morgan, J. P., Jackson, D. L., Cook, T. R., McLean, K., Agrawal, V., Taubman, K. E., & Truitt, M. S. (2019). The crossroads of posttraumatic stress disorder and physician burnout: A national review of united states trauma and non-trauma surgeons. *The American Surgeon*, *85*(2), 127–135.

Jean, W. C., Ironside, N. T., Felbaum, D. R., & Syed, H. R. (2020). The impact of work-related factors on risk of resident burnout: A global neurosurgery pilot study. *World Neurosurgery*, *138*, e345–e353. https://doi.org/10.1016/j.wneu.2020.02.115

Jenner, W. J., Brown, O. I., Moore, A., Gilpin, T., Morgan, H., Bowater, S., Braganza, D., & Camm, C. F. (2024). Health, burnout and well-being of UK cardiology trainees: Insights from the British Junior Cardiologists' Association Survey. *Heart*, *110*(22), 1327–1335. https://doi.org/10.1136/heartjnl-2024-324418

Ji, W., Liu, Y., Sun, Q., Wu, D., Liu, T., & Sun, P. (2025). Burnout and job stress in healthcare professionals: a single-centre cross-sectional study in an East China tertiary hospital after COVID-19 policy adjustment. *BMJ Open*, *15*(9), e099854. https://doi.org/10.1136/bmjopen-2025-099854

Kabunga, A., Kigongo, E., Musinguzi, M., Tumwesigye, R., Akello, A. R., Acup, W., Asiimwe, M. G., & Nalwoga, V. (2024). Level of burnout and associated factors among healthcare workers in central Uganda: A facility-based cross-sectional study. *PloS One*, *19*(10), e0309701. https://doi.org/10.1371/journal.pone.03097

01

Kahharov, A., Tsimafeyeu, I., Kaidarova, D., Polatova, D., Guliyev, F., Ongarbayev, B., Abdrakhmanov, R., & Mitin, T. (2025). Increase in workload among genitourinary oncologists drives burnout: Insights from the BUCARE survey. *Urologic Oncology*, *43*(5), 324–327. https://doi.org/10.1016/j.urolonc.2025.03.019

Kancherla, B. S., Upender, R., Collen, J. F., Rishi, M. A., Sullivan, S. S., Ahmed, O., Berneking, M., Flynn-Evans, E. E., Peters, B. R., Abbasi-Feinberg, F., Aurora, R. N., Carden, K. A., Kirsch, D. B., Kristo, D. A., Malhotra, R. K., Martin, J. L., Olson, E. J., Ramar, K., Rosen, C. L., Rowley, J. A., … Gurubhagavatula, I. (2020). Sleep, fatigue and burnout among physicians: An American Academy of Sleep Medicine position statement. *Journal of Clinical Sleep Medicine*, *16*(5), 803–805. https://doi.org/10.5664/jcsm.8408

Kartsonaki, M. G., Georgopoulos, D., Kondili, E., Nieri, A. S., Alevizaki, A., Nyktari, V., & Papaioannou, A. (2023). Prevalence and factors associated with compassion fatigue, compassion satisfaction, burnout in health professionals. *Nursing in Critical Care*, *28*(2), 225–235. https://doi.org/10.1111/nicc.12769

Kase, S. M., Gribben, J. L., Guttmann, K. F., Waldman, E. D., & Weintraub, A. S. (2022). Compassion fatigue, burnout, and compassion satisfaction in pediatric subspecialists during the SARS-CoV-2 pandemic. *Pediatric Research*, *91*(1), 143–148. https://doi.org/10.1038/s41390-021-01635-y

Kenton, E. J., Culebras, A., Fayad, P. B., Goldstein, L. B., Kaskie, B., Leira, E. C., Lutsep, H. L., Wechsler, L. R., Biller, J., Katzan, I. L., Stevens, J. C., Wang, D. Z., Adams, N., Cahill, C., & AAN Vascular Neurology Stroke Practice Resources Workgroup (2018). Impact of stroke call on the stroke neurology workforce in the United States: Possible challenges and opportunities. *Journal of Stroke and Cerebrovascular Diseases*, *27*(7), 2019–2025. https://doi.org/10.1016/j.jstrokecerebrovasdis.2018.02.063

Khammissa, R. A. G., Nemutandani, S., Feller, G., Lemmer, J., & Feller, L. (2022). Burnout phenomenon: Neurophysiological factors, clinical features, and aspects of management. *The Journal of International Medical Research*, *50*(9), 3000605221106428. https://doi.org/10.1177/03000605221106428

Kuhlmann, E., Bruns, L., Hoeper, K., Richter, M., Witte, T., Ernst, D., & Jablonka, A. (2023). Work situation of rheumatologists and residents in times of COVID-19: Findings from a survey in Germany. *Zeitschrift für Rheumatologie*, *82*(4), 331–341. https://doi.org/10.1007/s00393-021-01081-5

Kwok, C. (2021). Depression, stress, and perceived medical errors in Singapore psychiatry residents. *Academic Psychiatry*, *45*(2), 169–173. https://doi.org/10.1007/s40596-020-01376-w

Landrigan, C. P., Rothschild, J. M., Cronin, J. W., Kaushal, R., Burdick, E., Katz, J. T., Lilly, C. M., Stone, P. H., Lockley, S. W., Bates, D. W., & Czeisler, C. A. (2004). Effect of reducing interns' work hours on serious medical errors in intensive care units. *New England Journal of Medicine*, *351*(18), 1838–1848. https://doi.org/10.1056/NEJMoa041406

Landstad, B. J., Kvangarsnes, M., Thunqvist, E., Löfman, B., Nygren, Å., & Brulin, E. (2025). Physicians' experiences of the process leading to their sick leave for exhaustion disorder in Sweden: A narrative design. *BMJ Open*, *15*(5), e097179.

https://doi.org/10.1136/bmjopen-2024-097179

Lee, S. Y., Hsu, W. T., Ho, W. C., Lin, Y. L., Lin, C. F., Wang, C. L., Ho, H. E., Fu, P. K., Chu, W. M., & Tsan, Y. T. (2025). Longitudinal trends in burnout among healthcare professionals during the COVID-19 pandemic: A 4-year prospective cohort study in a tertiary medical centre in Taiwan. *BMJ Open*, *15*(11), e095648. https://doi.org/10.1136/bmjopen-2024-095648

Lee, Y. G., Maeng, C. H., Kim, D. Y., & Kim, B. S. (2020). Perspectives on professional burnout and occupational stress among medical oncologists: A cross-sectional survey by Korean Society for Medical Oncology (KSMO). *Cancer Research and Treatment*, *52*(4), 1002–1009. https://doi.org/10.4143/crt.2020.190

Leineweber, C., Bernhard-Oettel, C., Eib, C., Peristera, P., & Li, J. (2021). The mediating effect of exhaustion in the relationship between effort-reward imbalance and turnover intentions: A 4-year longitudinal study from Sweden. *Journal of occupational health*, *63*(1), e12203. https://doi.org/10.1002/1348-9585.12203

Lichstein, P. M., He, J. K., Estok, D., Prather, J. C., Dyer, G. S., Ponce, B. A., & Collaborative Orthopaedic Educational Research Group (2020). What is the prevalence of burnout, depression, and substance use among orthopaedic surgery residents and what are the risk factors? A collaborative orthopaedic educational research group survey study. *Clinical Orthopaedics and Related Research*, *478*(8), 1709–1718. https://doi.org/10.1097/CORR.0000000000001310

Lin, R. T., Lin, Y. T., Hsia, Y. F., & Kuo, C. C. (2021). Long working hours and burnout in health care workers: Non-linear dose-response relationship and the effect mediated by sleeping hours-A cross-sectional study. *Journal of Occupational Health*, *63*(1), e12228. https://doi.org/10.1002/1348-9585.12228

Lin-Siegler, X., Lovett, B. J., Wang, K., Hadis, S., DeGaetano, A. C., Williamson, T., Duerr, E., & Levy, E. I. (2024). Under pressure: Emotional reactions to stress of neurosurgeons and neurosurgical trainees. *World Neurosurgery*, *189*, e184–e190. https://doi.org/10.1016/j.wneu.2024.06.016

Lindsäter, E., Svärdman, F., Wallert, J., Ivanova, E., Söderholm, A., Fondberg, R., Nilsonne, G., Cervenka, S., Lekander, M., & Rück, C. (2022). Exhaustion disorder: Scoping review of research on a recently introduced stress-related diagnosis. *BJPsych Open*, *8*(5), e159. https://doi.org/10.1192/bjo.2022.559

Lipps, C., Lawson, M. M., McKibben, N. S., Brady, J., & Working, Z. M. (2025). The impact of sleep deprivation on orthopaedic surgeons: A systematic review. *Journal of Sleep Research*, *34*(6), e70025. https://doi.org/10.1111/jsr.70025

Liu, Z., Yao, Q., Wang, P., Shen, L., Li, H., Zhang, J., Jiang, M., Yang, Z., Wang, Z., Zheng, J., Zhu, J., & Wu, Y. (2024). The price of pressure: nationwide survey on lifestyle disturbances, occupational burnout and compromised perceived-competency among radiology residents in China. *Frontiers in Public Health*, *12*, 1472397. https://doi.org/10.3389/fpubh.2024.1472397

Lockley, S. W., Cronin, J. W., Evans, E. E., Cade, B. E., Lee, C. J., Landrigan, C. P., Rothschild, J. M., Katz, J. T., Lilly, C. M., Stone, P. H., Aeschbach, D., & Czeisler, C. A. (2004). Effect of reducing interns' weekly work hours on sleep and attentional failures. *New England Journal of Medicine*, *351*(18), 1829–1837. https://doi.org/10.1056/NEJMoa041404

Lou, S. S., Lew, D., Harford, D. R., Lu, C., Evanoff, B. A., Duncan, J. G., & Kan-

nampallil, T. (2022). Temporal associations between EHR-derived workload, burnout, and errors: A prospective cohort study. *Journal of General Internal Medicine*, *37*(9), 2165–2172. https://doi.org/10.1007/s11606-022-07620-3

Lou, S. S., Liu, H., Warner, B. C., Harford, D., Lu, C., & Kannampallil, T. (2022). Predicting physician burnout using clinical activity logs: Model performance and lessons learned. *Journal of Biomedical Informatics*, *127*, 104015. https://doi.org/10.1016/j.jbi.2022.104015

Low, J. M., Tan, M. Y., See, K. C., & Aw, M. M. (2018). Sleep, activity and fatigue reported by Postgraduate Year 1 residents: A prospective cohort study comparing the effects of night float versus the traditional overnight on-call system. *Singapore Medical Journal*, *59*(12), 652–655. https://doi.org/10.11622/smedj.2018036

Ma, H., Qiao, H., Qu, H., Wang, H., Huang, Y., Cheng, H., Teng, C., Diao, K., Zhang, X., & Zhang, N. (2020). Role stress, social support and occupational burnout among physicians in China: A path analysis approach. *International Health*, *12*(3), 157–163. https://doi.org/10.1093/inthealth/ihz054

Mallick, S., Douglas, P. S., Shroff, G. R., Karim, R., Sullivan, E., Sinsky, C., Nankivil, N., Shah, P., Brown, R., & Linzer, M. (2024). Work environment, burnout, and intent to leave current job among cardiologists and cardiology health care workers: Results from the national coping with COVID survey. *Journal of the American Heart Association*, *13*(18), e034527. https://doi.org/10.1161/JAHA.123.034527

Maniero, C., Ng, S. M., Collett, G., Godec, T., Siddiqui, I., Antoniou, S., Kumar, A., Janmohamed, A., Nair, S., Kotecha, A., Khan, R., Khanji, M. Y., Kapil, V., Gupta, J., & Gupta, A. K. (2024). Differential impact of COVID-19 on mental health and burnout. *Occupational Medicine*, *74*(1), 45–52. https://doi.org/10.1093/occmed/kqad011

Mansour, A., Englert, G., Moore, T., & Tabaie, S. A. (2026). Misconceptions of work-life balance in orthopaedic surgery: Addressing burnout and sustainable career practices. *The Journal of the American Academy of Orthopaedic Surgeons*, *34*(4), e498–e503. https://doi.org/10.5435/JAAOS-D-25-00286

Marchalik, D., Goldman, C. C., Carvalho, F. F. L., Talso, M., Lynch, J. H., Esperto, F., Pradere, B., Van Besien, J., & Krasnow, R. E. (2019). Resident burnout in USA and European urology residents: An international concern. *BJU International*, *124*(2), 349–356. https://doi.org/10.1111/bju.14774

Marchalik, R., Marchalik, D., Wang, H., & Pasieka, H. (2021). Drivers and sequelae of burnout in U.S. dermatology trainees. *International Journal of Women's Dermatology*, *7*(5Part B), 780–786. https://doi.org/10.1016/j.ijwd.2021.05.001

Marek, A. P., Nygaard, R. M., Liang, E. T., Roetker, N. S., DeLaquil, M., Gregorich, S., Richardson, C. J., & Van Camp, J. M. (2019). The association between objectively-measured activity, sleep, call responsibilities, and burnout in a resident cohort. *BMC Medical Education*, *19*(1), 158. https://doi.org/10.1186/s12909-019-1592-0

Marine, L., Retamales, B., Vargas, J. F., Prato, J. A., Salas, C., Bergoeing, M., & Marine, M. (2025). Vascular surgeon burnout in Chile: A cross-sectional national study. *Annals of Vascular Surgery*, *114*, 283–292. https://doi.org/10.1016/j.avsg.2025.02.004

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, *52*, 397–422. https://doi.org/10.1146/annurev.psych.52.1

.397

Matsuo, T., Takahashi, O., Kitaoka, K., Arioka, H., & Kobayashi, D. (2021). Resident burnout and work environment. *Internal Medicine*, *60*(9), 1369–1376. https://doi.org/10.2169/internalmedicine.5872-20

Matsuo, T., Yoshioka, T., Okubo, R., Nagasaki, K., & Tabuchi, T. (2022). Burnout and its associated factors among healthcare workers and the general working population in Japan during the COVID-19 pandemic: A nationwide cross-sectional internet-based study. *BMJ Open*, *12*(11), e064716. https://doi.org/10.1136/bmjopen-2022-064716

Mayne, R. S., Biddle, G. J. H., Edwardson, C. L., Hart, N. D., Daley, A. J., & Heron, N. (2024). The relationship between general practitioner movement behaviours with burnout and fatigue. *BMC Primary Care*, *25*(1), 60. https://doi.org/10.1186/s12875-024-02289-5

McClelland, L., Plunkett, E., McCrossan, R., Ferguson, K., Fraser, J., Gildersleve, C., Holland, J., Lomas, J. P., Redfern, N., & Pandit, J. J. (2019). A national survey of out-of-hours working and fatigue in consultants in anaesthesia and paediatric intensive care in the UK and Ireland. *Anaesthesia*, *74*(12), 1509–1523. https://doi.org/10.1111/anae.14819

McManus, B., Galbraith, J. W., Heaton, K., Mrug, S., Ponce, B. A., Porterfield, J. R., Jr, Schall, M. C., Jr, & Stavrinos, D. (2020). Sleep and stress before and after duty across residency years under 2017 ACGME hours. *American Journal of Surgery*, *220*(1), 83–89. https://doi.org/10.1016/j.amjsurg.2019.10.049

Medisauskaite, A., & Kamau, C. (2019). Does occupational distress raise the risk of alcohol use, binge-eating, ill health and sleep problems among medical doctors? A UK cross-sectional study. *BMJ Open*, *9*(5), e027362. https://doi.org/10.1136/bmjopen-2018-027362

Mendelsohn, D., Despot, I., Gooderham, P. A., Singhal, A., Redekop, G. J., & Toyota, B. D. (2019). Impact of work hours and sleep on well-being and burnout for physicians-in-training: The resident activity tracker evaluation study. *Medical Education*, *53*(3), 306–315. https://doi.org/10.1111/medu.13757

Menéndez, M. D., & Papasidero, M. (2019). Stress factors associated with burnout syndrome in a hospital emergency service: An observational study. *Journal of Acute Medicine*, *9*(1), 8–15. https://doi.org/10.6705/j.jacme.201903_9(1).0002

Moen, J. (2025). The recovery deficit: A simulation model of physician performance under sleep deprivation. *Cureus*, *17*(10), e95729. https://doi.org/10.7759/cureus.95729

Mu, H., Deng, Y., Li, Y., Xie, Q., Na, J., Mao, C., Geng, Y., Sun, W., Yan, L., & Pan, G. (2024). Cross-sectional study of the association between burnout and work overload and work-life imbalance among medical personnel in Liaoning, China: Role of specialty. *BMJ Open*, *14*(6), e079304. https://doi.org/10.1136/bmjopen-2023-079304

Nakao, H., Nomura, O., Kubota, M., & Ishiguro, A. (2022). Long-term impact of overnight shiftwork implementation on pediatric residents' mental wellness: A repeated cross-sectional survey. *Journal of Occupational Health*, *64*(1), e12349. https://doi.org/10.1002/1348-9585.12349

Ng, A. P. P., Chin, W. Y., Wan, E. Y. F., Chen, J., & Lau, C. S. (2020). Prevalence and severity of burnout in Hong Kong doctors up to 20 years post-graduation: A

cross-sectional study. *BMJ Open*, *10*(10), e040178. https://doi.org/10.1136/bmjopen-2020-040178

O'Dea, B., O'Connor, P., Lydon, S., & Murphy, A. W. (2017). Prevalence of burnout among Irish general practitioners: A cross-sectional study. *Irish Journal of Medical Science*, *186*(2), 447–453. https://doi.org/10.1007/s11845-016-1407-9

Oftung, B., & Tyssen, R. (2025). Occupational stress among Norwegian physicians: A literature review of long-term prospective studies 2007-2019. *Scandinavian Journal of Public Health*, *53*(3), 302–310. https://doi.org/10.1177/14034948241243164

Oskrochi, Y., Maruthappu, M., Henriksson, M., Davies, A. H., & Shalhoub, J. (2016). Beyond the body: A systematic review of the nonphysical effects of a surgical career. *Surgery*, *159*(2), 650–664. https://doi.org/10.1016/j.surg.2015.08.017

Otukoya, E. Z., Amiri, A., & Alimohammadi, E. (2025). Surgeon well-being: A systematic review of stressors, mental health, and resilience. *BMC Surgery*, *25*(1), 430. https://doi.org/10.1186/s12893-025-03180-5

Pacheco, J. P., Giacomin, H. T., Tam, W. W., Ribeiro, T. B., Arab, C., Bezerra, I. M., & Pinasco, G. C. (2017). Mental health problems among medical students in Brazil: A systematic review and meta-analysis. *Revista Brasileira de Psiquiatria*, *39*(4), 369–378. https://doi.org/10.1590/1516-4446-2017-2223

Panagioti, M., Geraghty, K., Johnson, J., Zhou, A., Panagopoulou, E., Chew-Graham, C., Peters, D., Hodkinson, A., Riley, R., & Esmail, A. (2018). Association between physician burnout and patient safety, professionalism, and patient satisfaction: A systematic review and meta-analysis. *JAMA Internal Medicine*, *178*(10), 1317–1330. https://doi.org/10.1001/jamainternmed.2018.3713

Pamidi, S., Mehra, R., Gurubhagavatula, I., & Teodorescu, M. (2025). Initial self-reported data on sleep and burnout in pulmonary, critical care and sleep medicine: An initiative the Assembly on Sleep and Respiratory Neurobiology of the American Thoracic Society. *Respiratory Research*, *26*(1), 100. https://doi.org/10.1186/s12931-025-03112-0

Park, K. M., Kim, J., Kyong, T., Han, H. Y., Song, S. Y., & Park, S. Y. (2025). Prevalence, risk and protective factors of burnout among Korean hospitalists. *PloS One*, *20*(4), e0320128. https://doi.org/10.1371/journal.pone.0320128

Pius, R. E., Ajuluchukwu, J. N., & Roberts, A. A. (2023). Prevalence and correlates of burn-out among Nigerian medical doctors during the COVID-19 pandemic: A cross-sectional study. *BMJ Open*, *13*(11), e076673. https://doi.org/10.1136/bmjopen-2023-076673

Plantinga, L. C., Bender, A. A., Urbanski, M., Hoge, C., Joseph, J., Damron, K. C., Douglas-Ajayi, C. J., Rickenbach, F., Morgan, J. C., & Jaar, B. G. (2023). Work experiences of the interdisciplinary dialysis workforce in the United States: A cross-sectional survey. *American Journal of Nephrology*, *54*(3-4), 145–155. https://doi.org/10.1159/000530553

Prakash, A. J., Agarwal, V., Kar, S. K., & Dalal, P. K. (2023). The psychological impact of COVID-19 duty among resident doctors working in a COVID-hospital: A short-term follow-up study. *Indian Journal of Psychiatry*, *65*(1), 107–112. https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_159_22

Pranckeviciene, A., Tamasauskas, A., Deltuva, V. P., & Bunevicius, A. (2016). Professional burnout and its correlates in Lithuanian neurosurgeons. *Acta Neurochirurgica*, *158*(8), 1437–1445. https://doi.org/10.1007/s00701-016-2869-2

Prestes, R. M., Drager, L. F., Conway, S. G., Tavares Junior, A. R., Assis, M., Rego, A. F. B., & Moreno, C. R. C. (2025). Increase in burnout among physicians and associated factors in the period before and during the COVID-19 pandemic. *Revista Brasileira De Medicina Do Trabalho*, *23*(2), e20251442. https://doi.org/10.47626/1679-4435-2025-1442

Quirk, R., Rodin, H., & Linzer, M. (2021). Targeting causes of burnout in residency: An innovative approach used at Hennepin healthcare. *Academic Medicine*, *96*(5), 690–694. https://doi.org/10.1097/ACM.0000000000003940

Raftopulos, M., Wong, E. H., Stewart, T. E., Boustred, R. N., Harvey, R. J., & Sacks, R. (2019). Occupational burnout among otolaryngology-head and neck surgery trainees in Australia. *Otolaryngology Head and Neck Surgery*, *160*(3), 472–479. https://doi.org/10.1177/0194599818822987

Ramani, D., Konopasky, A., Artino, A., Durning, S., & Mikita, J. (2020). An exploratory assessment of sleep patterns, burnout and perceived stress of a cohort of active duty military physicians. *MedEdPublish*, *9*, 145. https://doi.org/10.15694/mep.2020.000145.1

Ramírez, M. R., Ontaneda, M. P., Otero, P., Ortega-Jiménez, D., Blanco, V., & Vázquez, F. L. (2025). Burnout, associated factors, and mental health measures among ecuadorian physicians: A cross-sectional study. *Journal of Clinical Medicine*, *14*(7), 2465. https://doi.org/10.3390/jcm14072465

Rashid, F., Erfan Uddin, R. A. M., Mehedi, H. M. H., Dhar, S., Bhuiyan, N. H., Sattar, M. A., & Chowdhury, S. (2022). Burnout syndrome among frontline doctors of secondary and tertiary care hospitals of Bangladesh during COVID-19 pandemic. *PloS One*, *17*(11), e0277875. https://doi.org/10.1371/journal.pone.0277875

Ratnakaran, B., Prabhakaran, A., & Karunakaran, V. (2016). Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: A cross-sectional study. *Journal of Postgraduate Medicine*, *62*(3), 157–161. https://doi.org/10.4103/0022-3859.184274

Rivas-García, A., Míguez-Navarro, M. C., Ferrero-García-Loygorri, C., Marañón, R., Vázquez-López, P., & en representación del Grupo para el estudio del Burnout de la Red de Investigación de la Sociedad española de Urgencias Pediátricas (RISeuP-SPERG) (2023). Burnout syndrome in paediatricians working in paediatric emergency care settings. Prevalence and associated factors: A multilevel analysis. *Anales de pediatria*, *98*(2), 119–128. https://doi.org/10.1016/j.anpede.2023.01.004

Rotenstein, L. S., Torre, M., Ramos, M. A., Rosales, R. C., Guille, C., Sen, S., & Mata, D. A. (2018). Prevalence of burnout among physicians: A systematic review. *JAMA*, *320*(11), 1131–1150. https://doi.org/10.1001/jama.2018.12777

Saavedra Rionda, I., Cortés-García, L., & de la Villa Moral Jiménez, M. (2021). The role of burnout in the association between work-related factors and perceived errors in clinical practice among Spanish residents. *International Journal of Environmental Research and Public Health*, *18*(9), 4931. https://doi.org/10.3390/ijerph18094931

Salihu, M. O., Makanjuola, A. B., Abiodun, O. A., & Kuranga, A. T. (2023). Predictors of burnout among resident doctors in a Nigerian teaching hospital. *The South African Journal of Psychiatry*, *29*, 2017. https://doi.org/10.4102/sajpsychiatry.v29i0.2017

Sasidharan, S., & Dhillon, H. S. (2021). Stress and burnout among health-care workers in the coronavirus disease 2019 intensive care unit. *International Journal of Critical Illness and Injury Science*, *11*(4), 257–261. https://doi.org/10.4103/ijciis.ijciis_45_21

Seo, H. S., Kim, H., Hwang, S. M., Hong, S. H., & Lee, I. Y. (2016). Predictors of job satisfaction and burnout among tuberculosis management nurses and physicians. *Epidemiology and Health*, *38*, e2016008. https://doi.org/10.4178/epih.e2016008

Serrão, C., Martins, V., Ribeiro, C., Maia, P., Pinho, R., Teixeira, A., Castro, L., & Duarte, I. (2022). Professional quality of life among physicians and nurses working in Portuguese hospitals during the third wave of the COVID-19 pandemic. *Frontiers in Psychology*, *13*, 814109. https://doi.org/10.3389/fpsyg.2022.814109

Shah, H. P., Salehi, P. P., Ihnat, J., Kim, D. D., Salehi, P., Judson, B. L., Azizzadeh, B., & Lee, Y. H. (2023). Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change. *Otolaryngology--Head and Neck Surgery*, *168*(2), 165–179. https://doi.org/10.1177/01945998221076482

Shalaby, R., Oluwasina, F., Eboreime, E., El Gindi, H., Agyapong, B., Hrabok, M., Dhanoa, S., Kim, E., Nwachukwu, I., Abba-Aji, A., Li, D., & Agyapong, V. I. O. (2023). Burnout among residents: Prevalence and predictors of depersonalization, emotional exhaustion and professional unfulfillment among resident doctors in Canada. *International Journal of Environmental Research and Public Health*, *20*(4), 3677. https://doi.org/10.3390/ijerph20043677

Shanafelt, T. D., & Noseworthy, J. H. (2017). Executive leadership and physician well-being: Nine organizational strategies to promote engagement and reduce burnout. *Mayo Clinic Proceedings*, *92*(1), 129–146. https://doi.org/10.1016/j.mayocp.2016.10.004

Shawahna, R., Maqboul, I., Ahmad, O., Al-Issawy, A., & Abed, B. (2022). Prevalence of burnout syndrome among unmatched trainees and residents in surgical and nonsurgical specialties: A cross-sectional study from different training centers in Palestine. *BMC Medical Education*, *22*(1), 322. https://doi.org/10.1186/s12909-022-03386-8

Shimohata, T., Kubo, M., Aiba, I., Hattori, N., Yoshida, K., Unno, Y., Yokoyama, K., Ogawa, T., Kaseda, Y., Koike, R., Shimizu, Y., Tsuboi, Y., Doyu, M., Misawa, S., Miyachi, T., Toda, T., Takeda, A., & Committee for Career Development Promotion, Japanese Society of Neurology (2021). Current and future strategies for burnout in Japanese neurologists [脳神経内科医におけるバーンアウトの現状と対策—第 1 報—]. *Rinsho Shinkeigaku*, *61*(2), 89–102. https://doi.org/10.5692/clinicalneurol.cn-001533

Shinan-Altman, S., Cohen, M., Rasmussen, V., Turnell, A., & Butow, P. (2018). Burnout among psychosocial oncologists in Israel: The direct and indirect effects of job demands and job resources. *Palliative & Supportive Care*, *16*(6), 677–684. https://doi.org/10.1017/S1478951517001006

Singh, N., Knight, K., Wright, C., Baird, M., Akroyd, D., Adams, R. D., & Schneider, M. E. (2017). Occupational burnout among radiographers, sonographers and

radiologists in Australia and New Zealand: Findings from a national survey. *Journal of Medical Imaging and Radiation Oncology*, *61*(3), 304–310. https://doi.org/10.1111/1754-9485.12547

Singh, N., Wright, C., Knight, K., Baird, M., Akroyd, D., Adams, R. D., & Schneider, M. E. (2017). Occupational burnout among radiation therapists in Australia: Findings from a mixed methods study. *Radiography*, *23*(3), 216–221. https://doi.org/10.1016/j.radi.2017.03.016

Sliwa, J. A., Clark, G. S., Chiodo, A., Kinney, C. L., Raddatz, M. M., Francisco, G. E., Micheo, W., & Robinson, L. R. (2019). Burnout in diplomates of the American board of physical medicine and rehabilitation-prevalence and potential drivers: A prospective cross-sectional survey. *PM & R: The Journal of Injury, Function, and Rehabilitation*, *11*(1), 83–89. https://doi.org/10.1016/j.pmrj.2018.07.013

Smith, L., Christopher, M., MacInnis, C., Yasay, J., Secord, K., Banks, P., Breitkreutz, C., Mackie, A., & Leach, M. (2025). Perspectives of Yukon's frontline health care workers during the COVID-19 pandemic. *International Journal of Circumpolar Health*, *84*(1), 2444118. https://doi.org/10.1080/22423982.2024.2444118

Starmer, A. J., Frintner, M. P., & Freed, G. L. (2016). Work-life balance, burnout, and satisfaction of early career pediatricians. *Pediatrics*, *137*(4), e20153183. https://doi.org/10.1542/peds.2015-3183

Stewart, N. H., & Arora, V. M. (2019). The impact of sleep and circadian disorders on physician burnout. *Chest*, *156*(5), 1022–1030. https://doi.org/10.1016/j.chest.2019.07.008

Stewart, N. H., Koza, A., Dhaon, S., Shoushtari, C., Martinez, M., & Arora, V. M. (2021). Sleep disturbances in frontline health care workers during the COVID-19 pandemic: Social media survey study. *Journal of Medical Internet Research*, *23*(5), e27331. https://doi.org/10.2196/27331

Stocchetti, N., Segre, G., Zanier, E. R., Zanetti, M., Campi, R., Scarpellini, F., Clavenna, A., & Bonati, M. (2021). Burnout in intensive care unit workers during the second wave of the COVID-19 pandemic: A single center cross-sectional Italian study. *International Journal of Environmental Research and Public Health*, *18*(11), 6102. https://doi.org/10.3390/ijerph18116102

Stodolska, A., Wójcik, G., Barańska, I., Kijowska, V., & Szczerbińska, K. (2023). Prevalence of burnout among healthcare professionals during the COVID-19 pandemic and associated factors: A scoping review. *International Journal of Occupational Medicine and Environmental Health*, *36*(1), 21–58. https://doi.org/10.13075/ijomeh.1896.02007

Sun, H., Warner, D. O., Macario, A., Zhou, Y., Culley, D. J., & Keegan, M. T. (2019). Repeated cross-sectional surveys of burnout, distress, and depression among anesthesiology residents and first-year graduates. *Anesthesiology*, *131*(3), 668–677. https://doi.org/10.1097/ALN.0000000000002777

Sun, H., Zhang, T., Wang, X., Wang, C., Zhang, M., & Song, H. (2023). The occupational burnout among medical staff with high workloads after the COVID-19 and its association with anxiety and depression. *Frontiers in Public Health*, *11*, 1270634. https://doi.org/10.3389/fpubh.2023.1270634

Surawattanasakul, V., Siviroj, P., & Kiratipaisarl, W. (2024). Resident physician burnout and association with working conditions, psychiatric determinants, and medical errors: A cross-sectional study. *PloS One*, *19*(10), e0312839. https://doi.org/10.1371/journal.pone.0312839

Surawattanasakul, V., Siviroj, P., Kiratipaisarl, W., Sirikul, W., Phetsayanavin, V., Pholvivat, C., Auernaruemonsuk, N., & Lamlert, C. (2025). Physician burnout, associated factors, and their effects on work performance throughout first-year internships during the COVID-19 pandemic in Thailand: A cross-sectional study. *BMC Public Health*, *25*(1), 1967. https://doi.org/10.1186/s12889-025-23172-7

Sutherland, M., Kinslow, K., Boneva, D., McKenney, M., & Elkbuli, A. (2021). Perceived burnout among burn surgeons: Results from a survey of American burn association members. *Journal of Burn Care & Research*, *42*(2), 186–192. https://doi.org/10.1093/jbcr/iraa146

Suttle, M. L., Chase, M. A., Sasser, W. C., 3rd, Moore-Clingenpeel, M., Maa, T., Werner, J. A., Bone, M. F., Boyer, D. L., Marcdante, K. J., Mason, K. E., McCabe, M. E., Mink, R. B., Su, F., Turner, D. A., & Education in Pediatric Intensive Care (E.P.I.C.) Investigators (2020). Burnout in pediatric critical care medicine fellows. *Critical Care Medicine*, *48*(6), 872–880. https://doi.org/10.1097/CCM.0000000000004290

Suzuki, S. (2017). Exhausting physicians employed in hospitals in Japan assessed by a health questionnaire [勤務医は心身とも疲弊している—健康チェック票 THI の結果から]. *Sangyo Eiseigaku Zasshi*, *59*(4), 107–118. https://doi.org/10.1539/sangyoeisei.16-022-E

Szcześniewska, S., Zaręba, K., Zgliczyński, W. S., Ciebiera, M., & Feduniw, S. (2025). Occupational burnout among obstetrics and gynaecology residents: A systematic review. *Frontiers in Public Health*, *13*, 1666659. https://doi.org/10.3389/fpubh.2025.1666659

Tan, S. F., Siddiqui, H., Pinto, A., Paur, B., Chen, G., Elfenbein, D. M., Minichiello, V., Barrett, B., Davidson, R. J., & Goldberg, S. B. (2026). Work hours, stress, and burnout among resident physicians. *JAMA Network Open*, *9*(1), e2553974. https://doi.org/10.1001/jamanetworkopen.2025.53974

Teo, I., Chay, J., Cheung, Y. B., Sung, S. C., Tewani, K. G., Yeo, L. F., Yang, G. M., Pan, F. T., Ng, J. Y., Abu Bakar Aloweni, F., Ang, H. G., Ayre, T. C., Chai-Lim, C., Chen, R. C., Heng, A. L., Nadarajan, G. D., Ong, M. E. H., See, B., Soh, C. R., Tan, B. K. K., … Tan, H. K. (2021). Healthcare worker stress, anxiety and burnout during the COVID-19 pandemic in Singapore: A 6-month multi-centre prospective study. *PloS One*, *16*(10), e0258866. https://doi.org/10.1371/journal.pone.0258866

Tironi, M. O., Teles, J. M., Barros, D. S., Vieira, D. F., Silva Filho, C. M., Martins Júnior, D. F., Matos, M. A., & Nascimento Sobrinho, C. L. (2016). Prevalence of burnout syndrome in intensivist doctors in five Brazilian capitals [Prevalência de síndrome de burnout em médicos intensivistas de cinco capitais Brasileiras]. *Revista Brasileira de Terapia Intensiva*, *28*(3), 270–277. https://doi.org/10.5935/0103-507X.20160053

Tóth-Király, I., Morin, A. J. S., & Salmela-Aro, K. (2021). Reciprocal associations between burnout and depression: An 8-year longitudinal study. *Applied Psychology: An International Review*, *70*(4), 1691–1727. https://doi.org/10.1111/apps.12295

Tran, A. N. P., To, Q. G., Huynh, V. N., Le, K. M., & To, K. G. (2023). Professional quality of life and its associated factors among Vietnamese doctors and nurses. *BMC Health Services Research*, *23*(1), 924. https://doi.org/10.1186/s12913-023-09908-4

Trockel, M. T., Menon, N. K., Rowe, S. G., Stewart, M. T., Smith, R., Lu, M., Kim, P. K., Quinn, M. A., Lawrence, E., Marchalik, D., Farley, H., Normand, P., Felder, M., Dudley, J. C., & Shanafelt, T. D. (2020). Assessment of physician sleep and wellness, burnout, and clinically significant medical errors. *JAMA Network Open*, *3*(12), e2028111. https://doi.org/10.1001/jamanetworkopen.2020.28111

Tsai, Y. L., Tung, Y. C., & Cheng, Y. (2018). Surveys of burnout among physicians in Taiwan. *Journal of Acute Medicine*, *8*(3), 86–98. https://doi.org/10.6705/j.jacme.201809_8(3).0002

Ullah, H., Arbab, S., Liu, C. Q., Khan, S. A., Shahzad, S., & Li, K. (2024). Professional quality of life and psychological impact on frontline healthcare worker during the fourth wave of COVID-19. *Journal of Nursing Management*, *2024*, 2865063. https://doi.org/10.1155/2024/2865063

Van Dongen, H. P. A., Maislin, G., Mullington, J. M., & Dinges, D. F. (2003). The cumulative cost of additional wakefulness: Dose-response effects on neurobehavioral functions and sleep physiology from chronic sleep restriction and total sleep deprivation. *Sleep*, *26*(2), 117–126. https://doi.org/10.1093/sleep/26.2.117

Wada, H., Basner, M., Cordoza, M., Dinges, D., & Tanigawa, T. (2025). Objective alertness, rather than sleep duration, is associated with burnout and depression: A national survey of Japanese physicians. *Journal of Sleep Research*, *34*(1), e14304. https://doi.org/10.1111/jsr.14304

Wang, Q., Ding, J., Dai, Y., Yang, S., & Zhou, Z. (2025). Occupational stress, burnout, and fatigue among healthcare workers in Shanghai, China: A questionnaire-based cross-sectional survey. *Healthcare*, *13*(13), 1600. https://doi.org/10.3390/healthcare13131600

Warner, M. E., Weinstein, A. A., Venkatesan, C., de Avila, L., Taori, M., & Younossi, Z. M. (2025). The work environment and hospitalist work well-being and burnout. *Journal of Hospital Medicine*, *20*(3), 229–237. https://doi.org/10.1002/jhm.13506

Watanabe, S., Uemura, T., Iwata, Y., Yagasaki, H., Itakura, J., & Suzuki, T. (2023). Psychological distress among early medical residents: A 2-year longitudinal cohort study over seven years in Japan. *Comprehensive Psychiatry*, *127*, 152425. https://doi.org/10.1016/j.comppsych.2023.152425

Weigl, M., & Schneider, A. (2017). Associations of work characteristics, employee strain and self-perceived quality of care in emergency departments: A cross-sectional study. *International Emergency Nursing*, *30*, 20–24. https://doi.org/10.1016/j.ienj.2016.07.002

Welp, A., Rothen, H. U., Massarotto, P., & Manser, T. (2019). Teamwork and clinician burnout in Swiss intensive care: The predictive role of workload, and demographic and unit characteristics. *Swiss Medical Weekly*, *149*, w20033. https://doi.org/10.4414/smw.2019.20033

West, C. P., Dyrbye, L. N., & Shanafelt, T. D. (2018). Physician burnout: Contributors, consequences and solutions. *Journal of Internal Medicine*, *283*(6), 516–529. https://doi.org/10.1111/joim.12752

Yang, L., Lei, Y., Zhang, R., Mukhtar, F., Lim, P. Y., Jiang, J., Li, Z., Zhang, Y., & Anita, A. R. (2025). Common antecedents and outcomes of burnout among healthcare workers in the emergency department: A scoping review. *The American Journal of Emergency Medicine*, *96*, 140–150. https://doi.org/10.1016/j.ajem.2025.06.039

Yoo, P. S., Tackett, J. J., Maxfield, M. W., Fisher, R., Huot, S. J., & Longo, W. E. (2017). Personal and professional well-being of surgical residents in New England. *Jour-*

nal of the American College of Surgeons, *224*(6), 1015–1019. https://doi.org/10.1016/j.jamcollsurg.2016.12.024

Yousefi, V. (2025). Prevalence of burnout and impact of workload on physician wellness: A cross-sectional survey of hospitalists in British Columbia, Canada. *Journal of Hospital Medicine*, *20*(7), 688–700. https://doi.org/10.1002/jhm.13577

Youssef, D., Abou-Abbas, L., & Youssef, J. (2022). Feeling the burn in the era of COVID-19: cross-cultural adaptation and validation of the Arabic version of the Copenhagen Burnout Inventory among community pharmacists. *Journal of Pharmaceutical Policy and Practice*, *15*(1), 21. https://doi.org/10.1186/s40545-022-00419-x

Youssef, D., Youssef, J., Abou-Abbas, L., Kawtharani, M., & Hassan, H. (2022). Prevalence and correlates of burnout among physicians in a developing country facing multi-layered crises: A cross-sectional study. *Scientific Reports*, *12*(1), 12615. https://doi.org/10.1038/s41598-022-16095-5

Yuguero, O., Forné, C., Esquerda, M., Pifarré, J., Abadías, M. J., & Viñas, J. (2017). Empathy and burnout of emergency professionals of a health region: A cross-sectional study. *Medicine*, *96*(37), e8030. https://doi.org/10.1097/MD.0000000000008030

Zaheer, F., Aziz, I., Arif, S., Khan, M. O., Khan, A. A., Osama, M., Naseer, S., & Sheikh, M. Y. (2020). Predicament of doctors: Discerning burnout level amongst surgical residents of Karachi, Pakistan. *Journal of Ayub Medical College*, *32*(3), 331–335.

Zhang, H., Tang, L., Ye, Z., Zou, P., Shao, J., Wu, M., Zhang, Q., Qiao, G., & Mu, S. (2020). The role of social support and emotional exhaustion in the association between work-family conflict and anxiety symptoms among female medical staff: A moderated mediation model. *BMC Psychiatry*, *20*(1), 266. https://doi.org/10.1186/s12888-020-02673-2

Zhang, Q., Pan, R., Pan, Q., Qian, Y., Zhou, X., & Chen, Q. (2024). Psychological status and related factors of resident physicians during the release of COVID-19 pandemic restrictions in China. *Frontiers in Public Health*, *12*, 1322742. https://doi.org/10.3389/fpubh.2024.1322742

Zhang, S., Ramalingam, N. D., & Chandran, C. (2023). Unmasking resident physician burnout during the COVID-19 era. *The Permanente Journal*, *27*(2), 179–183. https://doi.org/10.7812/TPP/23.024

Zhou, Y., Gu, W., Tao, R., & Chen, C. (2020). The impact of gender and working hours on pulmonary physician burnout. *Annals of Translational Medicine*, *8*(18), 1166. https://doi.org/10.21037/atm-20-5827

Zhuge, R., Wang, Y., Gao, Y., Wang, Q., Wang, Y., Meng, N., Cui, Y., Huang, Q., Wang, K., & Wu, Q. (2024). Factors influencing the turnover intention for disease control and prevention workers in Northeast China: An empirical analysis based on logistic-ISM model. *BMC Health Services Research*, *24*(1), 1264. https://doi.org/10.1186/s12913-024-11738-x

Zimmermann, K., Rodríguez-Lago, I., Sidhu, R., Heinrich, H., Sousa, P., Dieninyte, E., Duijvestein, M., Hann, A., Gemilyan, M., Knüttel, H., Nowak, A., Montalto, P., Shiha, M. G., Krčálová, P., Vanek, P., Skuja, V., Duricek, M., Manza, F., Ong, J., Tiniakos, D., … Müller, M. (2026). Promoting well-being among gastroenterologists: A call for systemic action. *United European Gastroenterology Journal*, *14*(1), e70149.

https://doi.org/10.1002/ueg2.70149

Appendix

検索式

("Physicians"[Mesh] OR "Physicians, Hospital"[Mesh] OR "Internship and Residency"[Mesh]
OR physician*[tiab] OR doctor*[tiab] OR surgeon*[tiab] OR "medical resident*"[tiab] OR intern*[tiab] OR "junior doctor*"[tiab] OR "house staff"[tiab] OR trainee*[tiab] OR fellow*[tiab] OR hospitalist*[tiab])
AND
(("Sleep Deprivation"[Mesh] OR "Insomnia"[Mesh] OR "Sleepiness"[Mesh] OR "Fatigue"[Mesh] OR "sleep debt"[tiab] OR sleep depriva*[tiab] OR sleep loss[tiab] OR "sleep restriction"[tiab] OR "restricted sleep"[tiab] OR "short sleep"[tiab] OR "short sleep duration"[tiab] OR "insufficient sleep"[tiab] OR "inadequate sleep"[tiab] OR insomnia[tiab] OR sleepiness[tiab] OR drowsiness[tiab] OR fatigue[tiab] OR tiredness[tiab] OR "daytime sleepiness"[tiab]) OR ("Workload"[Mesh] OR "Work Schedule Tolerance"[Mesh] OR "Shift Work Schedule"[Mesh] OR "Personnel Staffing and Scheduling"[Mesh] OR "work hour*"[tiab] OR "working hour*"[tiab] OR "work hours"[tiab] OR overtime[tiab] OR "duty hour*"[tiab] OR "long hour*"[tiab] OR "long work hour*"[tiab] OR "long working hour*"[tiab] OR "extended shift*"[tiab] OR "long shift*"[tiab] OR "24-hour shift"[tiab] OR "on-call"[tiab] OR "night duty"[tiab] OR "night shift"[tiab] OR overwork[tiab] OR overload[tiab] OR "work overload"[tiab] OR "extended work"[tiab] OR "shift work"[tiab]))
AND
("Burnout, Professional"[MeSH] OR burnout[tiab])

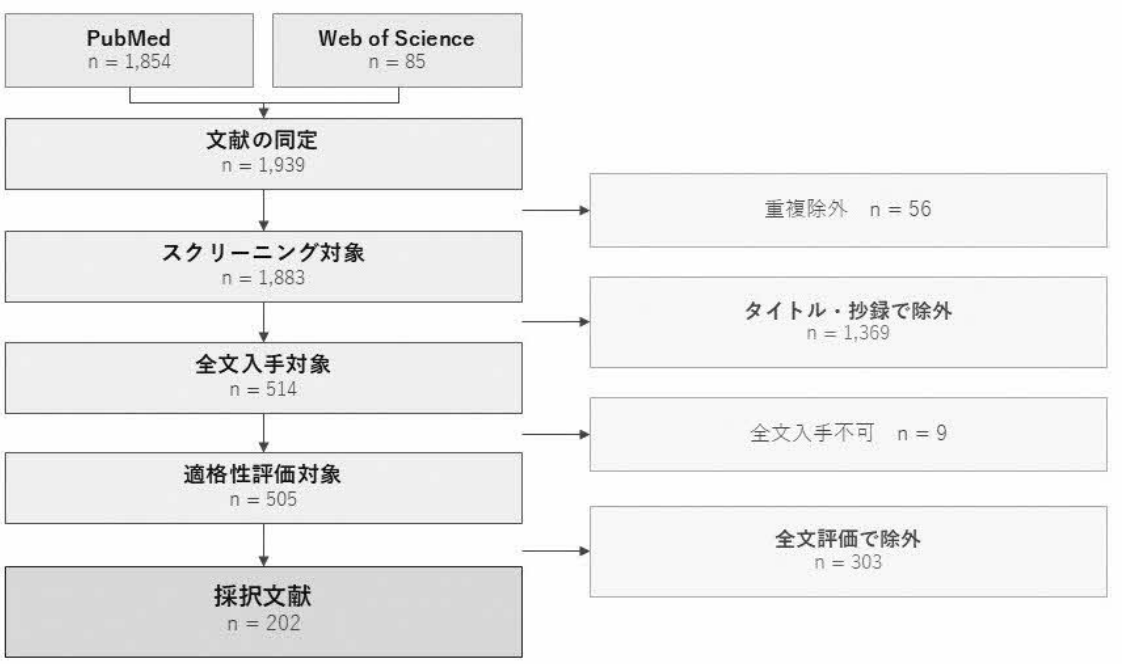


図１．システマティックレビューの流れ

表１．レビュー対象論文の基礎情報

No.	著者	発行年	タイトル	研究手法	研究対象者	長時間労働との関係	睡眠負債との関係
1	Eyi et al.	2025	A cross-sectional study of musculoskeletal discomfort and burnout syndrome in physicians and nurses at a university hospital in Turkey	横断研究	医師、看護師	○	○
2	McClelland et al.	2019	A national survey of out-of-hours working and fatigue in consultants in anaesthesia and paediatric intensive care in the UK and Ireland	横断研究	麻酔科と小児集中治療科のコンサルタント（専門医）	○	○
3	Ramani et al.	2020	An exploratory assessment of sleep patterns, burnout and perceived stress of a cohort of active duty military physicians	横断研究	軍医	×	○
4	Trockel et al.	2020	Assessment of physician sleep and wellness, burnout, and clinically significant medical errors	横断研究	医師など	×	○
5	Hassinger et al.	2024	Association between sleep health and rates of self-reported medical errors in intern physicians: An ancillary analysis of the Intern Health Study	横断研究	研修医	○	○
6	Christiansen et al.	2024	Associations between effort-reward imbalance and risk of burnout among Swedish physicians	横断研究	医師	○	×
7	Weigl & Schneider	2017	Associations of work characteristics, employee strain and self-perceived quality of care in emergency departments: A cross-sectional study	横断研究	救急医療従事者（医師、看護師、事務職員）	○	×
8	Oskrochi et al.	2016	Beyond the body: A systematic review of the nonphysical effects of a surgical career	レビュー	外科医	○	×
9	Shalaby et al.	2023	Burnout among residents: Prevalence and predictors of depersonalization, emotional exhaustion and professional unfulfillment among resident doctors in Canada	横断研究	研修医	○	×

10	Shinan-Altman et al.	2018	Burnout among psychosocial oncologists in Israel: The direct and indirect effects of job demands and job resources	横断研究	腫瘍医	○	×
11	Algethami et al.	2025	Burnout and associated factors among dental students, interns, and dental practitioners in Saudi Arabia: A cross-sectional study	横断研究	歯学生、歯科医など	○	×
12	Matsuo et al.	2022	Burnout and its associated factors among healthcare workers and the general working population in Japan during the COVID-19 pandemic: A nationwide cross-sectional internet-based study	横断研究	医療従事者（医師、看護師、薬剤師、その他の医療スタッフ）と一般労働者	○	×
13	Ji et al.	2025	Burnout and job stress in healthcare professionals: a single-centre cross-sectional study in an East China tertiary hospital after COVID-19 policy adjustment	横断研究	医療従事者（医師、看護師、技師、薬剤師、事務職員）	○	○
14	Imo et al.	2017	Burnout and psychiatric morbidity among doctors in the UK: A systematic literature review of prevalence and associated factors	レビュー	一般医、専門医、研修医など	○	×
15	Sliwa et al.	2019	Burnout in diplomates of the American board of physical medicine and rehabilitation-prevalence and potential drivers: A prospective cross-sectional survey	横断研究	リハビリ専門医	○	×
16	Stocchetti et al.	2021	Burnout in intensive care unit workers during the second wave of the COVID-19 pandemic: A single center cross-sectional Italian study	横断研究	ICU 医師、看護師	×	○
17	Suttle et al.	2020	Burnout in pediatric critical care medicine fellows	横断研究	小児集中治療科フェロー	×	○
18	Benson et al.	2016	Burnout in rural physician assistants: An initial study	横断研究	内科医アシスタント	○	×
19	Chuang et al.	2016	Burnout in the intensive care unit professionals: A systematic review	レビュー	ICU 専門職	○	×

20	Khammissa et al.	2022	Burnout phenomenon: Neurophysiological factors, clinical features, and aspects of management	レビュー	労働者（レビュー）	×	○
21	Rashid et al.	2022	Burnout syndrome among frontline doctors of secondary and tertiary care hospitals of Bangladesh during COVID-19 pandemic	横断研究	二次・三次医療施設の現場医師	×	○
22	Rivas-García et al.	2023	Burnout syndrome in paediatricians working in paediatric emergency care settings. Prevalence and associated factors: A multilevel analysis	横断研究	小児科医	○	×
23	Ramírez et al.	2025	Burnout, associated factors, and mental health measures among ecuadorian physicians: A cross-sectional study	横断研究	エクアドルの医師	○	○
24	Ballesio et al.	2021	Caring for the carers: Advice for dealing with sleep problems of hospital staff during the COVID-19 outbreak	レビュー	病院スタッフ	○	○
25	Yang et al.	2025	Common antecedents and outcomes of burnout among healthcare workers in the emergency department: A scoping review	レビュー	救急医療従事者（医師、看護師、技術者）	○	○
26	de Jong et al.	2016	Common mental disorders related to incidents and behaviour in physicians	レビュー	医師	×	○
27	Kase et al.	2022	Compassion fatigue, burnout, and compassion satisfaction in pediatric subspecialists during the SARS-CoV-2 pandemic	横断研究	小児科専門医	○	×
28	Barbosa et al.	2017	Correlation between weekly working time and burnout syndrome among anesthesiologists of Maceió-AL	横断研究	麻酔科医	○	×
29	Mu et al.	2024	Cross-sectional study of the association between burnout and work overload and work-life imbalance among medical personnel in Liaoning, China: Role of specialty	横断研究	医療従事者（医師、看護師）	○	×
30	Harrell et al.	2020	DANGER! crisis health workers at risk	レビュー	医療従事者	○	×

31	Kwok	2021	Depression, stress, and perceived medical errors in Singapore psychiatry residents	横断研究	精神科研修医	○	○
32	Delle Donne et al.	2023	Differences in the long-term impact of the COVID-19 pandemic on the mental health and professional quality of life of resident and specialist physicians	横断研究	研修医、専門医	○	×
33	Maniero et al.	2024	Differential impact of COVID-19 on mental health and burnout	横断研究	医療従事者（医師、看護師、パラメディカル、アシスタント）	×	○
34	Medisauskaite & Kamau	2019	Does occupational distress raise the risk of alcohol use, binge-eating, ill health and sleep problems among medical doctors? A UK cross-sectional study	横断研究	医師	○	○
35	Marchalik et al.	2021	Drivers and sequelae of burnout in U.S. dermatology trainees	横断研究	皮膚科研修医	○	○
36	Busireddy et al.	2017	Efficacy of interventions to reduce resident physician burnout: A systematic review	レビュー	研修医	○	×
37	Yuguero et al.	2017	Empathy and burnout of emergency professionals of a health region: A cross-sectional study	横断研究	救急医療従事者（医師、看護師）	○	×
38	Firew et al.	2025	Examining how gender, race/ethnicity, and clinical roles moderate the association between sleep and burnout	横断研究	救急医療従事者（医師、看護師、高度実践医療者、管理者など）	×	○
39	Lindsäter et al.	2022	Exhaustion disorder: Scoping review of research on a recently introduced stress-related diagnosis	レビュー	ストレス障害患者	○	○
40	Hall et al.	2020	Exploring the impact of primary care physician burnout and well-being on patient care: A focus group study	質的研究	プライマリケア医	○	×

41	Feeley et al.	2024	Extended-duration work shifts in surgical specialties: A systematic review	レビュー	外科医	○	○
42	Zhuge et al.	2024	Factors influencing the turnover intention for disease control and prevention workers in Northeast China: An empirical analysis based on logistic-ISM model	横断研究	CDC 職員	○	×
43	Youssef et al.	2022	Feeling the burn in the era of COVID-19: cross-cultural adaptation and validation of the Arabic version of the Copenhagen Burnout Inventory among community pharmacists	横断研究	地域の薬剤師	○	×
44	Jenner et al.	2024	Health, burnout and well-being of UK cardiology trainees: Insights from the British Junior Cardiologists' Association Survey	横断研究	循環器科研修医	○	×
45	Bagshaw et al.	2017	Healthcare provider perceptions of causes and consequences of ICU capacity strain in a large publicly funded integrated health region: A qualitative study	質的研究	ICU 医療従事者と関係者	○	×
46	Teo et al.	2021	Healthcare worker stress, anxiety and burnout during the COVID-19 pandemic in Singapore: A 6-month multi-centre prospective study	縦断研究	医療従事者（医師、看護師、その他の医療専門職、管理・運営スタッフ）	○	×
47	Coleman et al.	2024	Home is not always where the sleep is: Effect of home call on sleep, burnout, and surgeon well-being	横断研究	外科医	○	○
48	Kenton et al.	2018	Impact of stroke call on the stroke neurology workforce in the United States: Possible challenges and opportunities	横断研究	脳卒中専門医	○	○
49	Almarzouki	2024	Impact of on-call shifts on working memory and the role of burnout, sleep, and mental well-being in trainee physicians	横断研究	研修医	○	○
50	Gribben et al.	2023	Impact of the SARS-CoV-2 pandemic on pediatric subspecialists' well-being and perception of workplace value	横断研究	小児科専門医	○	×

51	Mendelsohn et al.	2019	Impact of work hours and sleep on well-being and burnout for physicians-in-training: The resident activity tracker evaluation study	横断研究	研修医・指導医	○	○
52	Prestes et al.	2025	Increase in burnout among physicians and associated factors in the period before and during the COVID-19 pandemic	横断研究	内科医	○	○
53	Kahharov et al.	2025	Increase in workload among genitourinary oncologists drives burnout: Insights from the BUCARE survey	横断研究	泌尿器腫瘍医	○	×
54	Gohar et al.	2022	Influence of medical trainee sleep pattern (chronotype) on burn-out and satisfaction with work schedules: A multicentre observational study	横断研究	研修医	○	○
55	Pamidi et al.	2025	Initial self-reported data on sleep and burnout in pulmonary, critical care and sleep medicine: An initiative the Assembly on Sleep and Respiratory Neurobiology of the American Thoracic Society	横断研究	呼吸器・睡眠専門医	○	○
56	Kabunga et al.	2024	Level of burnout and associated factors among healthcare workers in central Uganda: A facility-based cross-sectional study	横断研究	医療従事者（医師、看護師、医療技術者）	○	○
57	Lin et al.	2021	Long working hours and burnout in health care workers: Non-linear dose-response relationship and the effect mediated by sleeping hours-A cross-sectional study	横断研究	医療従事者（医師、看護師、技術スタッフ、管理職員）	○	○
58	Nakao et al.	2022	Long-term impact of overnight shiftwork implementation on pediatric residents' mental wellness: A repeated cross-sectional survey	横断研究	小児科研修医	○	○
59	Caramello et al.	2023	Longitudinal assessment of mental health consequences of the COVID-19 pandemic long-term exposure on health care workers from a north west Italian hospital	縦断研究	医療従事者（医師、看護師、医療助手、技師、事務職員、警備員）	○	○
60	Lee et al.	2025	Longitudinal trends in burnout among healthcare professionals during the COVID-19 pandemic: A 4-year prospective cohort study in a tertiary medical centre in Taiwan	縦断研究	医療従事者（医師、看護師、医療技術者、事務職員）	○	○

61	Akerstrom et al.	2025	Maintaining operability at a high personal cost: A mixed method study on maternal healthcare workers' experiences during the COVID-19 pandemic	混合法	母子保健医療従事者（医師、助産師）	○	×
62	Aggarwal et al.	2021	Maximizing value while volumes are increasing	レビュー	放射線科医	○	×
63	Douplat et al.	2024	Mental health consequences of the COVID-19 outbreak among emergency department healthcare workers	横断研究	救急医療従事者（医師、パラメディカル、事務職員）	○	○
64	Pacheco et al.	2017	Mental health problems among medical students in Brazil: A systematic review and meta-analysis	レビュー/メタアナリシス	医学生	×	○
65	Mansour et al.	2026	Misconceptions of work-life balance in orthopaedic surgery: Addressing burnout and sustainable career practices	横断研究	整形外科医	○	×
66	Elliott et al.	2024	Mixed shift rotations, sleep, burnout and well-being in professions similar to radiographers: A systematic review	レビュー	放射線技師等	○	○
67	Elmore et al.	2016	National survey of burnout among US general surgery residents	横断研究	一般外科研修医	○	×
68	Chow et al.	2021	National survey of burnout and distress among cardiothoracic surgery trainees	横断研究	心臓胸部外科研修医	○	×
69	Wada et al.	2025	Objective alertness, rather than sleep duration, is associated with burnout and depression: A national survey of Japanese physicians	横断研究	内科医	○	○
70	Raftopulos et al.	2019	Occupational burnout among otolaryngology-head and neck surgery trainees in Australia	横断研究	耳鼻科研修医	○	○
71	Izdebski et al.	2023	Occupational burnout in healthcare workers, stress and other symptoms of work overload during the COVID-19 pandemic in Poland	横断研究	医療従事者（医師、看護師、救命救急	○	×

					士、その他の医療関係者、非医療職）		
72	Amellah et al.	2025	Occupational stress and burnout among public health professionals during the COVID-19 pandemic in Morocco	横断研究	公衆衛生専門職	○	○
73	Wang et al.	2025	Occupational stress, burnout, and fatigue among healthcare workers in Shanghai, China: A questionnaire-based cross-sectional survey	横断研究	医療従事者（医師、看護師、その他）	○	○
74	Szcześniewska et al.	2025	Occupational burnout among obstetrics and gynaecology residents: A systematic review	レビュー	産婦人科研修医	○	×
75	Singh et al.	2017	Occupational burnout among radiation therapists in Australia: Findings from a mixed methods study	混合法	放射線治療医	○	×
76	Singh et al.	2017	Occupational burnout among radiographers, sonographers and radiologists in Australia and New Zealand: Findings from a national survey	横断研究	診療放射線技師、超音波検査士、放射線科医	○	×
77	Oftung & Tyssen	2025	Occupational stress among Norwegian physicians: A literature review of long-term prospective studies 2007-2019	レビュー	内科医	○	×
78	Ghaseminejad et al.	2025	Organisational factors associated with burnout among emergency and internal medicine physicians: A qualitative study	質的研究	救急・内科医	○	×
79	Ishikawa	2022a	Overwork among resident physicians: National questionnaire survey results	横断研究	研修医	○	×
80	Stodolska et al.	2023	Prevalence of burnout among healthcare professionals during the COVID-19 pandemic and associated factors: A scoping review	レビュー	医療従事者（医師、看護師、その他のパラメディカル、事務職員など）	○	○

81	Sutherland et al.	2021	Perceived burnout among burn surgeons: Results from a survey of American burn association members	横断研究	熱傷外科医	○	×
82	Yoo et al.	2017	Personal and professional well-being of surgical residents in New England	質的研究	外科研修医	○	○
83	Smith et al.	2025	Perspectives of Yukon's frontline health care workers during the COVID-19 pandemic	質的研究	医師、看護師	○	×
84	Lee et al.	2020	Perspectives on professional burnout and occupational stress among medical oncologists: A cross-sectional survey by Korean Society for Medical Oncology (KSMO)	横断研究	腫瘍内科医	○	×
85	West et al.	2018	Physician burnout: Contributors, consequences and solutions	レビュー	医師	○	×
86	Surawattanasakul et al.	2025	Physician burnout, associated factors, and their effects on work performance throughout first-year internships during the COVID-19 pandemic in Thailand: A cross-sectional study	横断研究	研修医	○	×
87	Goyal et al.	2021	Physicians' total burden of occupational stressors: More than threefold increased odds of burnout	横断研究	内科医	○	×
88	Landstad et al.	2025	Physicians' experiences of the process leading to their sick leave for exhaustion disorder in Sweden: A narrative design	質的研究	内科医	○	○
89	Zaheer et al.	2020	Predicament of doctors: Discerning burnout level amongst surgical residents of Karachi, Pakistan	横断研究	外科研修医	○	×
90	Lou et al.	2022	Predicting physician burnout using clinical activity logs: Model performance and lessons learned	横断研究	内科医	○	×
91	Salihu et al.	2023	Predictors of burnout among resident doctors in a Nigerian teaching hospital	横断研究	研修医	○	○

92	Seo et al.	2016	Predictors of job satisfaction and burnout among tuberculosis management nurses and physicians	横断研究	結核管理看護師、内科医	○	×
93	Alenezi et al.	2022	Prevalence and associated factors of burnout among Saudi resident doctors: A multicenter cross-sectional study	横断研究	研修医	○	○
94	Dholakia et al.	2025	Prevalence and contributory factors to burnout in the New Zealand surgical specialist and registrar population	横断研究	外科専門医	○	×
95	Pius	2023	Prevalence and correlates of burn-out among Nigerian medical doctors during the COVID-19 pandemic: A cross-sectional study	横断研究	医師	○	×
96	Youssef et al.	2022	Prevalence and correlates of burnout among physicians in a developing country facing multi-layered crises: A cross-sectional study	横断研究	内科医	○	○
97	Kartsonaki et al.	2023	Prevalence and factors associated with compassion fatigue, compassion satisfaction, burnout in health professionals	横断研究	医療従事者（医師、看護師および助産師、サポートスタッフ）	○	×
98	Ng et al.	2020	Prevalence and severity of burnout in Hong Kong doctors up to 20 years post-graduation: A cross-sectional study	横断研究	医師	○	○
99	Rotenstein et al.	2018	Prevalence of burnout among physicians: A systematic review	レビュー	内科医	○	×
100	Bastian et al.	2024	Prevalence of burnout among German radiologists: A call to action	横断研究	放射線科医	○	×
101	O’Dea et al.	2017	Prevalence of burnout among Irish general practitioners: A cross-sectional study	横断研究	一般医	○	×
102	Yousefi	2025	Prevalence of burnout and impact of workload on physician wellness: A cross-sectional survey of hospitalists in British Columbia, Canada	横断研究	内科医	○	×

103	Ratnakaran et al.	2016	Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: A cross-sectional study	横断研究	研修医	○	✕
104	Hasan et al.	2024	Prevalence of burnout syndrome among anesthesiologists, anesthesia technicians, and intensive care unit nurses in Palestinian hospitals: A cross-sectional study	横断研究	麻酔科医、ICU 看護師	○	○
105	Shawahna et al.	2022	Prevalence of burnout syndrome among unmatched trainees and residents in surgical and nonsurgical specialties: A cross-sectional study from different training centers in Palestine	横断研究	研修医	○	○
106	Tironi et al.	2016	Prevalence of burnout syndrome in intensivist doctors in five Brazilian capitals	横断研究	集中治療医	○	✕
107	Park et al.	2025	Prevalence, risk and protective factors of burnout among Korean hospitalists	横断研究	入院患者専任医	○	○
108	Gnerre et al.	2025	Prevalence, risk factors and clinical impact of burnout in internal medicine units: A call to action	レビュー	内科病棟の医師、看護師	○	✕
109	Agarwal et al.	2020	Professional dissonance and burnout in primary care: A qualitative study	質的研究	プライマリケア医	○	✕
110	Serrão et al.	2022	Professional quality of life among physicians and nurses working in Portuguese hospitals during the third wave of the COVID-19 pandemic	横断研究	内科医、看護師	○	✕
111	Ullah et al.	2024	Professional quality of life and psychological impact on frontline healthcare worker during the fourth wave of COVID-19	横断研究	医療従事者（医師、看護師、技師、アシスタント）	○	✕
112	Pranckeviciene et al.	2016	Professional burnout and its correlates in Lithuanian neurosurgeons	横断研究	神経外科医	○	✕
113	Banerjee et al.	2017	Professional burnout in European young oncologists: Results of the European Society for Medical Oncology (ESMO) Young Oncologists	横断研究	若手腫瘍医	○	✕

			Committee Burnout Survey				
114	Corrigan et al.	2020	Professional burnout, work patterns and career satisfaction in medical oncologists in Ireland	横断研究	腫瘍医	○	×
115	Tran et al.	2023	Professional quality of life and its associated factors among Vietnamese doctors and nurses	横断研究	医師、看護師	○	○
116	Chen et al.	2025	Prolonged overtime predicts worsening burnout among healthcare workers: A 4-year longitudinal study in Taiwan	縦断研究	医療従事者（医師、看護師、技師、管理者）	○	○
117	Zimmermann et al.	2026	Promoting well-being among gastroenterologists: A call for systemic action	レビュー	消化器科医	○	×
118	Brainch et al.	2018	Psychiatric emergency services: Can duty-hour changes help residents and patients?	横断研究	研修医	○	×
119	Watanabe et al.	2023	Psychological distress among early medical residents: A 2-year longi-tudinal cohort study over seven years in Japan	縦断研究	初期研修医	○	○
120	Zhang et al.	2024	Psychological status and related factors of resident physicians during the release of COVID-19 pandemic restrictions in China	横断研究	研修医	○	○
121	Harolds	2020	Quality and safety in healthcare, Part LXI: Burnout and wellness in residents	レビュー	研修医	○	×
122	AlHefdhi et al.	2025	Relation of burnout to on-call duties among Saudi board residents in Aseer region: A cross-sectional study	横断研究	研修医	○	×
123	Feng et al.	2021	Relationships between sleep, activity, and burnout in ophthalmology residents	横断研究	眼科研修医	○	○

124	Ishikawa	2022b	Relationships between overwork, burnout and suicidal ideation among resident physicians in hospitals in Japan with medical residency programmes: A nationwide questionnaire-based survey	横断研究	研修医	○	×
125	Seehusen et al.	2025	Relationships of educational debt with hours worked and burnout symptoms among early-career family physicians	横断研究	若手家庭医	○	×
126	Sun et al.	2019	Repeated cross-sectional surveys of burnout, distress, and depression among anesthesiology residents and first-year graduates	横断研究	麻酔科研修医	○	×
127	Shah et al.	2023	Resident burnout and well-being in otolaryngology and other surgical specialties: Strategies for change	レビュー	外科研修医	○	×
128	Matsuo et al.	2021	Resident burnout and work environment	横断研究	研修医	○	○
129	Han et al.	2023	Resident depression and burnout during the COVID-19 pandemic: A survey of Canadian laboratory medicine trainees	横断研究	臨床検査医学の研修医	○	○
130	Huang et al.	2019	Resident burnout in Taiwan hospitals and its relation to physician felt trust from patients	横断研究	研修医	○	×
131	Marchalik et al.	2019	Resident burnout in USA and European urology residents: An international concern	横断研究	泌尿器科研修医	○	×
132	Surawattanasakul et al.	2024	Resident physician burnout and association with working conditions, psychiatric determinants, and medical errors: A cross-sectional study	横断研究	研修医	○	○
133	Ferguson et al.	2020	Resident physician burnout: Insights from a Canadian multispecialty survey	横断研究	研修医	○	×
134	Chu et al.	2023	Risk factors surrounding an increase in burnout and depression among health care professionals in Taiwan during the COVID-19 pandemic	横断研究	医療従事者（指導医、研修医、看護師、技師）	○	○

135	Huang et al.	2020	Risk and protective factors for burnout among physicians from standardized residency training programs in Shanghai: A cross-sectional study	横断研究	研修医	○	○
136	Ma et al.	2020	Role stress, social support and occupational burnout among physicians in China: A path analysis approach	横断研究	内科医	○	✕
137	Elay et al.	2019	Severe burnout among critical care workers in Turkey	横断研究	ICU スタッフ（医師、看護師、その他のスタッフ）	○	✕
138	Erickson et al.	2025	Sleep & wellness for the otolaryngologist	レビュー	医師全般	○	○
139	Abera et al.	2023	Sleep deprivation, burnout, and acute care surgery	レビュー	急性期外科医	○	○
140	Stewart et al.	2021	Sleep disturbances in frontline health care workers during the COVID-19 pandemic: Social media survey study	横断研究	医療従事者（医師、医師助手、看護師、薬剤師、その他のコメディカルスタッフ）	○	○
141	Bakhru et al.	2019	Sleep and work in ICU physicians during a randomized trial of nighttime intensivist staffing	介入研究	ICU 医師	○	○
142	McManus et al.	2020	Sleep and stress before and after duty across residency years under 2017 ACGME hours	縦断研究	研修医	○	○
143	Hassinger et al.	2022	Sleep patterns of US healthcare workers during the first wave of the COVID-19 pandemic	横断研究	医療従事者（医師、看護師、技師、管理スタッフ）	○	○
144	Low et al.	2018	Sleep, activity and fatigue reported by Postgraduate Year 1 residents: A prospective cohort study comparing the effects of night float versus the traditional overnight on-call system	縦断研究	研修医	○	○

145	Dye et al.	2024	Small patients but a heavy lift: Workload and burnout of advanced practice providers and physicians in a level IV neonatal intensive care unit	横断研究	新生児集中治療室の高度実践医療従事者と医師	○	✕
146	Menéndez et al.	2019	Stress factors associated with burnout syndrome in a hospital emergency service: An observational study	横断研究	救急医	○	✕
147	Sasidharan et al.	2021	Stress and burnout among health-care workers in the coronavirus disease 2019 intensive care unit	横断研究	ICU 医療従事者	○	✕
148	Boo et al.	2018	Stress and burnout syndrome in health-care providers treating dengue infection: A cross-sectional study	横断研究	内科、小児科、救急科の医師	○	✕
149	Ayyala et al.	2019	Stressors contributing to burnout amongst pediatric radiologists: Results from a survey of the society for pediatric radiology	横断研究	小児放射線科医	○	✕
150	Otukoya et al.	2025	Surgeon well-being: A systematic review of stressors, mental health, and resilience	レビュー	外科医	○	✕
151	Tsai et al.	2018	Surveys of burnout among physicians in Taiwan	レビュー	内科医	○	✕
152	Azoulay et al.	2021	Symptoms of mental health disorders in critical care physicians facing the second COVID-19 wave: A cross-sectional study	横断研究	集中治療医	○	✕
153	Quirk et al.	2021	Targeting causes of burnout in residency: An innovative approach used at Hennepin healthcare.	介入研究	研修医	○	✕
154	Welp et al.	2019	Teamwork and clinician burnout in Swiss intensive care: The predictive role of workload, and demographic and unit characteristics	横断研究	ICU の医師、看護師	○	✕
155	Lou et al.	2022	Temporal associations between EHR-derived workload, burnout, and errors: A prospective cohort study	縦断研究	研修医	○	○

156	Helfrich et al.	2017	The association of team-specific workload and staffing with odds of burnout among VA primary care team members	横断研究	プライマリケアチーム（医師、看護師、助手、事務職員など）	○	×
157	Elmariah et al.	2017	The burden of burnout	縦断研究	内科研修医	○	×
158	Jackson et al.	2019	The crossroads of posttraumatic stress disorder and physician burnout: A national review of united states trauma and nontrauma surgeons	レビュー	外科医	○	○
159	Fowler & Ellis	2019	The effect of 12 hour shifts, time of day, and sleepiness on emotional empathy and burnout in medical students	横断研究	医学生	○	○
160	Amanullah & Shankar	2020	The impact of COVID-19 on physician burnout globally: A review	レビュー	医師	○	○
161	Lipps et al.	2025	The impact of sleep deprivation on orthopaedic surgeons: A systematic review	レビュー	整形外科医	○	○
162	Stewart & Arora	2019	The impact of sleep and circadian disorders on physician burnout	レビュー	内科医	○	○
163	Jean et al.	2020	The impact of work-related factors on risk of resident burnout: A global neurosurgery pilot study	横断研究	脳神経外科研修医	○	×
164	Moen	2025	The recovery deficit: A simulation model of physician performance under sleep deprivation	横断研究	医師（シミュレーション）	○	○
165	Saavedra Rionda et al.	2021	The role of burnout in the association between work-related factors and perceived errors in clinical practice among Spanish residents	横断研究	研修医	○	×
166	Marek et al.	2019	The association between objectively-measured activity, sleep, call responsibilities, and burnout in a resident cohort	縦断研究	研修医	○	○

167	Chênevert et al.	2021	The determinants of burnout and professional turnover intentions among Canadian physicians: Application of the job demands-resources model	横断研究	内科医	○	✕
168	Feng et al.	2023	The effect of mandatory post-call relief on sleep and wellness in ophthalmology residents	介入研究	眼科研修医	○	○
169	Huang et al.	2024	The effect of social support and resource support on emotional exhaustion, insomnia, and suicidal ideation among allied health trainees and post-graduate year doctors in Taiwan	横断研究	初期研修医	○	○
170	Hacimusalar et al.	2021	The effects of working and living conditions of physicians on burnout level and sleep quality	横断研究	内科医	○	○
171	Zhou et al.	2020	The impact of gender and working hours on pulmonary physician burnout	横断研究	呼吸器科医	○	✕
172	Blasche et al.	2022	The impact of rest breaks on subjective fatigue in physicians of the general hospital of Vienna	横断研究	内科医	○	○
173	Çevik & Ungan	2021	The impacts of the COVID-19 pandemic on the mental health and residency training of family medicine residents: findings from a nationwide cross-sectional survey in Turkey	横断研究	家庭医療研修医	○	✕
174	Sun et al.	2023	The occupational burnout among medical staff with high workloads after the COVID-19 and its association with anxiety and depression	横断研究	医師、看護師	○	○
175	Liu et al.	2024	The price of pressure: nationwide survey on lifestyle disturbances, occupational burnout and compromised perceived-competency among radiology residents in China	横断研究	放射線科研修医	○	○
176	Prakash et al.	2023	The psychological impact of COVID-19 duty among resident doctors working in a COVID-hospital: A short-term follow-up study	縦断研究	研修医	○	○

177	Mayne et al.	2024	The relationship between general practitioner movement behaviours with burnout and fatigue	横断研究	一般開業医	○	○
178	Zhang et al.	2020	The role of social support and emotional exhaustion in the association between work-family conflict and anxiety symptoms among female medical staff: A moderated mediation model	横断研究	女性医師、看護師	○	×
179	Warner et al.	2025	The work environment and hospitalist work well-being and burnout	横断研究	入院患者専任医	○	×
180	Bodendieck et al.	2022	The work-life balance of general practitioners as a predictor of burnout and motivation to stay in the profession	横断研究	一般開業医	○	×
181	Elsaie et al.	2020	Therapeutic implications of prevalence and predictor risk factors for burn out syndrome in Egyptian dermatologists: A cross sectional study	横断研究	皮膚科医	○	×
182	Butler et al.	2017	Trauma, stress, and self-care in clinical training: Predictors of burnout, decline in health status, secondary traumatic stress symptoms, and compassion satisfaction	横断研究	臨床研修医	○	×
183	Lin-Siegler et al.	2024	Under pressure: Emotional reactions to stress of neurosurgeons and neurosurgical trainees	横断研究	脳神経外科医、研修医	○	×
184	Zhang et al.	2023	Unmasking resident physician burnout during the COVID-19 era	横断研究	研修医	○	×
185	Graham et al.	2025	Urological procedures and impact on advanced practice provider burn-out, job satisfaction, and salary: AUA census analysis	横断研究	医療従事者（医師アシスタント、看護師）	○	×
186	Harkin et al.	2022	Vascular surgeon burnout and resilience in the United Kingdom: A report from the vascular society workforce committee	横断研究	血管外科医	○	×
187	Marine et al.	2025	Vascular surgeon burnout in Chile: A cross-sectional national study	横断研究	血管外科医	○	○

188	Coleman et al.	2021	Vascular surgeon wellness and burnout: A report from the society for vascular surgery wellness task force	横断研究	血管外科医	○	×
189	Al Rekabi et al.	2023	Well-being and burnout amongst interventional radiologists in the United Kingdom	横断研究	放射線科医	○	×
190	Coleman et al.	2023	What happens on call doesn't stay on call. The effects of in-house call on acute care surgeons' sleep and burnout: Results of the surgeon performance (SuPer) trial	縦断研究	急性期外科医	○	○
191	Lichstein et al.	2020	What is the prevalence of burnout, depression, and substance use among orthopaedic surgery residents and what are the risk factors? A collaborative orthopaedic educational research group survey study	横断研究	整形外科研修医	○	○
192	Kancherla et al.	2020	What is the role of sleep in physician burnout?	レビュー	内科医	×	○
193	Győrffy et al.	2018	Willingness to migrate-a potential effect of burnout? A survey of Hungarian physicians	横断研究	内科医	○	×
194	Mallick et al.	2024	Work environment, burnout, and intent to leave current job among cardiologists and cardiology health care workers: Results from the national coping with COVID survey	横断研究	循環器専門医	○	×
195	Plantinga et al.	2023	Work experiences of the interdisciplinary dialysis workforce in the United States: A cross-sectional survey	横断研究	透析医療従事者（医師、看護師、管理栄養士、ソーシャルワーカーなど）	○	×
196	Tan et al.	2026	Work hours, stress, and burnout among resident physicians	横断研究	研修医	○	○
197	Kuhlmann et al.	2023	Work situation of rheumatologists and residents in times of COVID-19: Findings from a survey in Germany	横断研究	リウマチ専門医	○	×

198	Starmer et al.	2016	Work-life balance, burnout, and satisfaction of early career pediatricians	横断研究	若手小児科医	○	×
199	Aourarh et al.	2025	Work-life conflict and its health effects on Moroccan gastroenterologists: A cross-sectional study	横断研究	消化器科医	○	×
200	Győrffy et al.	2016	Workload, mental health and burnout indicators among female physicians	横断研究	女性内科医	○	○
201	Shimohata et al.	2021	Current and future strategies for burnout in Japanese neurologists	横断研究	神経内科医	○	○
202	Suzuki	2017	Exhausting physicians employed in hospitals in Japan assessed by a health questionnaire	横断研究	勤務医・開業医	○	○