

## REVIEWS

## Burnout in Inpatient-Based Versus Outpatient-Based Physicians: A Systematic Review and Meta-analysis

Daniel L. Roberts, MD<sup>1\*</sup>, Keith J. Cannon, MD<sup>1</sup>, Kay E. Wellik, MLS, AHIP, FMLA<sup>2</sup>, Qing Wu, ScD<sup>3</sup>, Adriane I. Budavari, MD<sup>1</sup>

<sup>1</sup>Division of Hospital Internal Medicine, Mayo Clinic Hospital, Phoenix, Arizona; <sup>2</sup>Division of Education Administration, Mayo Clinic, Scottsdale, Arizona; <sup>3</sup>Division of Health Sciences Research, Mayo Clinic, Scottsdale, Arizona.

**BACKGROUND:** Burnout is a syndrome affecting the entirety of work life and characterized by cynicism, detachment, and inefficacy. Despite longstanding concerns about burnout in hospital medicine, few data about burnout in hospitalists have been published.

**PURPOSE:** A systematic review of the literature on burnout in inpatient-based and outpatient-based physicians worldwide was undertaken to determine whether inpatient physicians experience more burnout than outpatient physicians.

**DATA SOURCES:** Five medical databases were searched for relevant terms with no language restrictions. Authors were contacted for unpublished data and clarification of the practice location of study subjects.

**STUDY SELECTION:** Two investigators independently reviewed each article. Included studies provided a measure of burnout in inpatient and/or outpatient nontrainee physicians.

**DATA EXTRACTION:** Fifty-four studies met inclusion criteria, 15 of which provided direct comparisons of inpatient and outpatient physicians. Twenty-eight studies used the same burnout measure and therefore were amenable to statistical analysis.

**DATA SYNTHESIS:** Outpatient physicians reported more emotional exhaustion than inpatient physicians. No statistically significant differences in depersonalization or personal accomplishment were found. Further comparisons were limited by the heterogeneity of instruments used to measure burnout and the lack of available information about practice location in many studies.

**CONCLUSIONS:** The existing literature does not support the widely held belief that burnout is more frequent in hospitalists than outpatient physicians. Better comparative studies of hospitalist burnout are needed. *Journal of Hospital Medicine* 2013;8:653–664. © 2013 Society of Hospital Medicine

Hospital medicine is a rapidly growing field of US clinical practice.<sup>1</sup> Almost since its advent, concerns have been expressed about the potential for hospitalists to burn out.<sup>2</sup> Hospitalists are not unique in this; similar concerns heralded the arrival of other location-defined specialties, including emergency medicine<sup>3</sup> and the full-time intensivist model,<sup>4</sup> a fact that has not gone unnoted in the literature about hospitalists.<sup>5</sup>

The existing international literature on physician burnout provides good reason for this concern. Inpatient-based physicians tend to work unpredictable schedules, with substantial impact on home life.<sup>6</sup> They tend to be young, and much burnout literature suggests a higher risk among younger, less-experienced physicians.<sup>7</sup> When surveyed, hospitalists have expressed more concerns about their potential for burnout than their outpatient-based colleagues.<sup>8</sup>

In fact, data suggesting a correlation between inpatient practice and burnout predate the advent of the US hospitalist movement. Increased hospital time was reported to correlate with higher rates of burnout in internists,<sup>9</sup> family practitioners,<sup>10</sup> palliative physicians,<sup>11</sup> junior doctors,<sup>12</sup> radiologists,<sup>13</sup> and cystic fibrosis caregivers.<sup>14</sup> In 1987, Keinan and Melamed<sup>15</sup> noted, “Hospital work by its very nature, as compared to the work of a general practitioner, deals with the more severe and complicated illnesses, coupled with continuous daily contacts with patients and their anxious families. In addition, these physicians may find themselves embroiled in the power struggles and competition so common in their work environment.”

There are other features, however, that may protect inpatient physicians from burnout. Hospital practice can facilitate “favorable social relations involving colleagues, co-workers, and patients,”<sup>16</sup> a factor that may be protective.<sup>17</sup> A hospitalist schedule also can allow more focused time for continuing medical education, research, and teaching,<sup>18</sup> which have all been associated with reduced risk of burnout in some studies.<sup>17</sup> Studies of psychiatrists<sup>19</sup> and pediatricians<sup>20</sup> have shown a lower rate of burnout among physicians with more inpatient duties. Finally, a practice model involving a seemingly stable cadre of inpatient physicians has existed in Europe for decades,<sup>2</sup> indicating at least a degree of sustainability.

\*Address for correspondence and reprint requests: Daniel L. Roberts, MD, Division of Hospital Internal Medicine, Mayo Clinic Hospital, 5777 E. Mayo Blvd, Phoenix, AZ 85054; Telephone: (480) 342-1387; FAX: (480) 342-1388; E-mail: roberts.daniel@mayo.edu

Additional Supporting Information may be found in the online version of this article.

Received: January 15, 2013; Revised: September 5, 2013; Accepted: September 13, 2013

2013 Society of Hospital Medicine DOI 10.1002/jhm.2093

Published online in Wiley Online Library (Wileyonlinelibrary.com).

Information suggesting a higher rate of burnout among inpatient physicians could be used to target therapeutic interventions and to adjust schedules, whereas the opposite outcome could refute a pervasive myth. We therefore endeavored to summarize the literature on burnout among inpatient versus outpatient physicians in a systematic fashion, and to include data not only from the US hospitalist experience but also from other countries that have used a similar model for decades. Our primary hypothesis was that inpatient physicians experience more burnout than outpatient physicians.

It is important to distinguish burnout from depression, job dissatisfaction, and occupational stress, all of which have been studied extensively in physicians. Burnout, as introduced by Freudenberg<sup>21</sup> and further characterized by Maslach,<sup>22</sup> is a condition in which emotional exhaustion, depersonalization, and a low sense of personal accomplishment combine to negatively affect work life (as opposed to clinical depression, which affects all aspects of life). Job satisfaction can correlate inversely with burnout, but it is a separate process<sup>23</sup> and the subject of a recent systematic review.<sup>24</sup> The importance of distinguishing burnout from job dissatisfaction is illustrated by a survey of head and neck surgeons, in which 97% of those surveyed indicated satisfaction with their jobs and 34% of the same group answered in the affirmative when asked if they felt burned out.<sup>25</sup>

One obstacle to the meaningful comparison of burnout prevalence across time, geography, and specialty is the myriad ways in which burnout is measured and reported. The oldest and most commonly used instrument to measure burnout is the Maslach Burnout Inventory (MBI), which contains 22 items assessing 3 components of burnout (emotional exhaustion, depersonalization, and low personal accomplishment).<sup>26</sup> Other measures include the Copenhagen Burnout Inventory<sup>27</sup> (19 items with the components personal burnout, work-related burnout, and client-related burnout), Utrecht Burnout Inventory<sup>28</sup> (20-item modification of the MBI), Boudreau Burnout Questionnaire<sup>29</sup> (30 items), Arbeitsbezogenes Verhalten und Erlebensmuster<sup>30</sup> (66-item questionnaire assessing professional commitment, resistance to stress, and emotional well-being), Shirom-Melamed Burnout Measure<sup>31</sup> (22 items with subscales for physical fatigue, cognitive weariness, tension, and listlessness), and a validated single-item questionnaire.<sup>32</sup>

## METHODS

Electronic searches of MEDLINE, EMBASE, PsycINFO, SCOPUS, and PubMed were undertaken for articles published from January 1, 1974 (the year in which burnout was first described by Freudenberg<sup>21</sup>) to 2012 (last accessed, September 12, 2012) using the Medical Subject Headings (MeSH) terms “stress, psychological”; “burnout, professional”; “adaptation,

psychological”; and the keyword “burnout.” The same sources were searched to create another set for the MeSH terms “hospitalists,” “physician’s practice patterns,” “physicians/px,” “professional practice location,” and the keyword “hospitalist#.” Where exact subject headings did not exist in databases, comparable subject headings or keywords were used. The 2 sets were then combined using the operator “and.” Abstracts from the Society of Hospital Medicine annual conferences were hand-searched, as were reference lists from identified articles. To ensure that pertinent international literature was captured, there was no language restriction in the search.

A 2-stage screening process was used. The titles and abstracts of all articles identified in the search were independently reviewed by 2 investigators (D.L.R. and K.J.C.) who had no knowledge of each other’s results. An article was obtained when either reviewer deemed it worthy of full-text review.

All full-text articles were independently reviewed by the same 2 investigators. The inclusion criterion was the measurement of burnout in physicians who are stated to or can be reasonably assumed to spend the substantial majority of their clinical practice exclusively in either the inpatient or the outpatient setting. Studies of emergency department physicians or specialists who invariably spend substantial amounts of time in both settings (eg, surgeons, anesthesiologists) were excluded. Studies limited to trainees or nonphysicians were also excluded. For both stages of review, agreement between the 2 investigators was assessed by calculating the  $\kappa$  statistic. Disagreements about inclusion were adjudicated by a third investigator (A.I.B.).

Because our goal was to establish and compare the rate of burnout among US hospitalists and other inpatient physicians around the world, we included studies of hospitalists according to the definition in use at the time of the individual study, noting that the formal definition of a hospitalist has changed over the years.<sup>33</sup> Because practice patterns for physicians described as primary care physicians, family doctors, hospital doctors, and others differ substantially from country to country, we otherwise included only the studies where the practice location was stated explicitly or where the authors confirmed that their study participants either are known or can be reasonably assumed to spend more than 75% of their time caring for hospital inpatients, or are known or can be reasonably assumed to spend the vast majority of their time caring for outpatients.

Data were abstracted using a standardized form and included the measure of burnout used in the study, results, practice location of study subjects, and total number of study subjects. When data were not clear (eg, burnout measured but not reported by the authors, practice location of study subjects not clear), authors were contacted by email, or when no current email address could be located or no response was

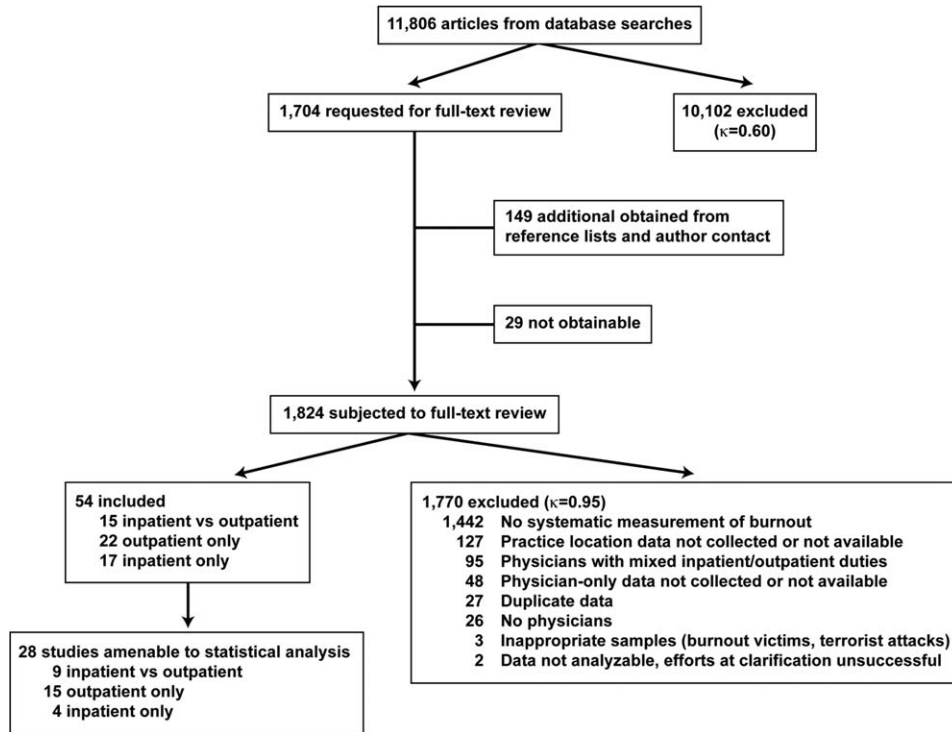


FIG. 1. Flow chart of study selection.

received, by telephone or letter. In instances where burnout was measured repeatedly over time or before and after a specific intervention, only the baseline measurement was recorded. Because all studies were expected to be nonrandomized, methodological quality was assessed using a version of the tool of Downs and Black,<sup>34</sup> adapted where necessary by omitting questions not applicable to the specific study type (eg randomization for survey studies)<sup>35</sup> and giving a maximum of 1 point for the inclusion of a power calculation.

Two a priori analyses were planned: (1) a statistical comparison of articles directly comparing burnout among inpatient and outpatient physicians, and (2) a statistical comparison of articles measuring burnout among inpatient physicians with articles measuring burnout among outpatient physicians by the most frequently reported measure—mean subset scores for emotional exhaustion, depersonalization, and personal accomplishment on the MBI.

The primary outcome measures were the differences between mean subset scores for emotional exhaustion, depersonalization, and personal accomplishment on the MBI. All differences are expressed as (outpatient mean – inpatient mean). The variance of each outcome was calculated with standard formulas.<sup>36</sup> To calculate the overall estimate, each study was weighted by the reciprocal of its variance. Studies with fewer than 10 subjects were excluded from statistical analysis but retained in the systematic review.

For studies that reported data for both inpatient and outpatient physicians (double-armed studies), Cochran Q test and the  $I^2$  value were used to assess

heterogeneity.<sup>37,38</sup> Substantial heterogeneity was expected because these individual studies were conducted for different populations in different settings with different study designs, and this expectation was confirmed statistically. Therefore, we used a random effects model to estimate the overall effect, providing a conservative approach that accounted for heterogeneity among studies.<sup>39</sup>

To assess the durability of our findings, we performed separate multivariate meta-regression analyses by including single-armed studies only and including both single-armed and double-armed studies. For these meta-regressions, means were again weighted by the reciprocal of their variances, and the arms of 2-armed studies were considered separately. This approach allowed us to generate an estimate of the differences between MBI subset scores from studies that did not include such an estimate when analyzed separately.<sup>40</sup>

We examined the potential for publication bias in double-armed studies by constructing a funnel plot, in which mean scores were plotted against their standard errors.<sup>41</sup> The trim-and-fill method was used to determine whether adjustment for publication bias was necessary. In addition, Begg's rank correlation test<sup>42</sup> was completed to test for statistically significant publication bias.

Stata 10.0 statistical software (StataCorp, College Station, TX) was used for data analyses. A  $P$  value of 0.05 or less was deemed statistically significant. The Preferred Reporting Items for Systematic Reviews and Meta-analysis checklist was used for the design and execution of the systematic review and meta-analysis.<sup>43</sup>

**TABLE 1.** Summaries of Studies of Outpatient-Based Physicians Meeting Inclusion Criteria

Lead Author, Publication Year	Study Population and Location	Instrument	No. of Participants	EE Score (SD)*	DP Score (SD)	PA Score (SD)	Other Results
Schweitzer, 1994 <sup>12</sup>	Young physicians of various specialties in South Africa	Single-item survey	7				6 (83%) endorsed burnout
Aasland, 1997 <sup>54†</sup>	General practitioners in Norway	Modified MBI (22 items; scale, 1–5)	298	2.65 (0.80)	1.90 (0.59)	3.45 (0.40)	
Grassi, 2000 <sup>58</sup>	General practitioners in Italy	MBI	182	18.49 (11.49)	6.11 (5.86)	38.52 (7.60)	
McManus, 2000 <sup>59†</sup>	General practitioners in United Kingdom	Modified MBI (9 items; scale, 0–6)	800	8.34 (4.39)	3.18 (3.40)	14.16 (2.95)	
Yaman, 2002 <sup>60</sup>	General practitioners in 8 European nations	MBI	98	25.1 (8.50)	7.3 (4.92)	34.5 (7.67)	
Cathébras, 2004 <sup>61</sup>	General practitioners in France	MBI	306	21.85 (12.4)	9.13 (6.7)	38.7 (7.1)	
Goehring, 2005 <sup>63</sup>	General practitioners, general internists, pediatricians in Switzerland	MBI	1755	17.9 (9.8)	6.5 (4.7)	39.6 (6.5)	
Esteva, 2006 <sup>64</sup>	General practitioners, pediatricians in Spain	MBI	261	27.4 (11.8)	10.07 (6.4)	35.9 (7.06)	
Gandini, 2006 <sup>65†</sup>	Physicians of various specialties in Argentina	MBI	67	31.0 (13.8)	10.2 (6.6)	38.4 (6.8)	
Ozyurt, 2006 <sup>66</sup>	General practitioners in Turkey	Modified MBI (22 items; scale, 0–4)	55	15.23 (5.80)	4.47 (3.31)	23.38 (4.29)	
Deighton, 2007 <sup>67†</sup>	Psychiatrists in several German-speaking nations	MBI	19	30.68 (9.92)	13.42 (4.23)	37.16 (3.39)	
Dunwoodie, 2007 <sup>68†</sup>	Palliative care physicians in Australia	MBI	21	14.95 (9.14)	3.95 (3.40)	38.90 (2.88)	
Sorgaard, 2007 <sup>69†</sup>	Psychiatrists in 5 European nations	MBI	22	19.41 (8.08)	6.68 (4.93)	39.00 (4.40)	
Sosa Oberlin, 2007 <sup>66†</sup>	Physicians of various specialties in Argentina	Author-designed instrument	33				26 (78.8%) had ≥4 burnout symptoms, 6.15 symptoms per physician
Voltmer, 2007 <sup>57†</sup>	Physicians of various specialties in Germany	AVEM	46				
Ádám, 2008 <sup>70†</sup>	Physicians of various specialties in Hungary	MBI	163	17.45 (11.12)	4.86 (4.91)	36.56 (7.03)	
Di Iorio, 2008 <sup>71†</sup>	Dialysis physicians in Italy	Author-designed instrument	54				11 (23.9%) exhibited burnout (type B) pattern  Work: 2.6 (1.5), Material: 3.1 (2.1), Climate: 3.0 (1.1), Objectives: 3.4 (1.6), Quality: 2.2 (1.5), Justification: 3.2 (2.0)
Lee, 2008 <sup>49†</sup>	Family physicians in Canada	MBI	123	26.26 (9.53)	10.20 (5.22)	38.43 (7.34)	
Truchot, 2008 <sup>72</sup>	General practitioners in France	MBI	259	25.4 (11.7)	7.5 (5.5)	36.5 (7.1)	
Twellaar, 2008 <sup>73†</sup>	General practitioners in the Netherlands	Utrecht Burnout Inventory	349	2.06 (1.11)	1.71 (1.05)	5.08 (0.77)	
Arigoni, 2009 <sup>17</sup>	General practitioners, pediatricians in Switzerland	MBI	258	22.8 (12.0)	6.9 (6.1)	39.0 (7.2)	
Bernhardt, 2009 <sup>75</sup>	Clinical geneticists in United States	MBI	72	25.8 (10.01) <sup>‡</sup>	10.9 (4.16) <sup>‡</sup>	34.8 (5.43) <sup>‡</sup>	
Bressi, 2009 <sup>76†</sup>	Psychiatrists in Italy	MBI	53	23.15 (11.99)	7.02 (6.29)	36.41 (7.54)	
Krasner, 2009 <sup>77</sup>	General practitioners in United States	MBI	60	26.8 (10.9) <sup>§</sup>	8.4 (5.1) <sup>§</sup>	40.2 (5.3) <sup>§</sup>	
Lasalvia, 2009 <sup>55†</sup>	Psychiatrists in Italy	Modified MBI (16 items; scale, 0–6)	38	2.37 (1.27)	1.51 (1.15)	4.46 (0.87)	
Peisah, 2009 <sup>79†</sup>	Physicians of various specialties in Australia	MBI	28	13.92 (9.24)	3.66 (3.95)	39.34 (8.55)	
Shanafelt, 2009 <sup>80†</sup>	Physicians of various specialties in United States	MBI	408	20.5 (11.10)	4.3 (4.74)	40.8 (6.26)	
Zantinge, 2009 <sup>81</sup>	General practitioners in the Netherlands	Utrecht Burnout Inventory	126	1.58 (0.79)	1.32 (0.72)	4.27 (0.77)	
Voltmer, 2010 <sup>83†</sup>	Psychiatrists in Germany	AVEM	526				114 (21.7%) exhibited burnout (type B) pattern
Maccacaro, 2011 <sup>85†</sup>	Physicians of various specialties in Italy	MBI	42	14.31 (11.98)	3.62 (4.95)	38.24 (6.22)	
Lucas, 2011 <sup>84†</sup>	Outpatient physicians periodically staffing an academic hospital teaching service in United States	MBI (EE only)	30	24.37 (14.95)			
Shanafelt, 2012 <sup>87†</sup>	General internists in United States	MBI	447	25.4 (14.0)	7.5 (6.3)	41.4 (6.0)	
Kushnir, 2004 <sup>62</sup>	General practitioners and pediatricians in Israel	MBI (DP only) and SMBM	309		9.15 (3.95)		SMBM mean (SD), 2.73 per item (0.86)
Vela-Bueno, 2008 <sup>74†</sup>	General practitioners in Spain	MBI	240	26.91 (11.61)	9.20 (6.35)	35.92 (7.92)	
Lesic, 2009 <sup>78†</sup>	General practitioners in Serbia	MBI	38	24.71 (10.81)	7.47 (5.51)	37.21 (7.44)	
Demirci, 2010 <sup>82†</sup>	Medical specialists related to oncology practice in Hungary	MBI	26	23.31 (11.2)	6.46 (5.7)	37.7 (8.14)	
Putnik, 2011 <sup>86†</sup>	General practitioners in Hungary	MBI	370	22.22 (11.75)	3.66 (4.40)	41.40 (6.85)	

NOTE: Abbreviations: AVEM, Arbeitsbezogenes Verhaltens und Erlebensmuster; DP, depersonalization subset of MBI; EE, emotional exhaustion subset of MBI; MBI, Maslach Burnout Inventory; PA, personal accomplishment subset of MBI; SMBM, Shirom-Melamad Burnout Measure; SD, standard deviation.

\*High scores of EE and DP and low scores of PA are features of burnout.

†Data obtained directly from authors 2010–2012.

‡SDs calculated from published standard errors. Personal accomplishment scale reversed to match other studies.

§SDs calculated from published CIs.

Subgroup analyses based on location were undertaken a posteriori. All data (double-armed meta-analysis, meta-regression of single-armed studies, and

meta-regression of single- and double-armed studies) were analyzed by location (United States vs other; United States vs Europe vs other).



**TABLE 2.** Summary of Studies of Inpatient Physicians Meeting Inclusion Criteria

Lead Author, Publication Year	Study Population and Location	Instrument	No. of Participants	EE Score (SD)*	DP Score (SD)	PA Score (SD)	Other Results
Varga, 1996 <sup>88</sup>	Hospital doctors in Spain	MBI	179	21.61 <sup>†</sup>	7.33 <sup>†</sup>	35.28 <sup>†</sup>	
Aasland, 1997 <sup>54</sup>	Hospital doctors in Norway	Modified MBI (22 items; scale, 1–5)	582	2.39 (0.80)	1.81 (0.65)	3.51 (0.46)	
Bargellini, 2000 <sup>89</sup>	Hospital doctors in Italy	MBI	51	17.45 (9.87)	7.06 (5.54)	35.33 (7.90)	
Grassi, 2000 <sup>58</sup>	Hospital doctors in Italy	MBI	146	16.17 (9.64)	5.32 (4.76)	38.71 (7.28)	
Hoff, 2001 <sup>33</sup>	Hospitalists in United States	Single-item survey <sup>‡</sup>	393				12.9% burned out (>4/5), 24.9% at risk for burnout (3–4/5), 62.2% at no current risk (mean, 2.86 on 1–5 scale)
Trichard, 2005 <sup>90</sup>	Hospital doctors in France	MBI	199	16 (10.7)	6.6 (5.7)	38.5 (6.5)	
Gandini, 2006 <sup>65§</sup>	Hospital doctors in Argentina	MBI	290	25.0 (12.7)	7.9 (6.2)	40.1 (7.0)	
Dunwoodie, 2007 <sup>68§</sup>	Palliative care doctors in Australia	MBI	14	18.29 (14.24)	5.29 (5.89)	38.86 (3.42)	
Sørgaard, 2007 <sup>89§</sup>	Psychiatrists in 5 European nations	MBI	18	18.56 (9.32)	5.50 (3.79)	39.08 (5.39)	
Sosa Oberlin, 2007 <sup>56§</sup>	Hospital doctors in Argentina	Author-designed instrument	3				3 (100%) had ≥4 burnout symptoms, 8.67 symptoms per physician
Voltmer, 2007 <sup>57§</sup>	Hospital doctors in Germany	AVEM	271				77 (28.4%) exhibited burnout (type B) pattern
Ádám, 2008 <sup>70†</sup>	Physicians of various specialties in Hungary	MBI	194	19.23 (10.79)	4.88 (4.61)	35.26 (8.42)	
Di Iorio, 2008 <sup>71§</sup>	Dialysis physicians in Italy	Author-designed instrument	62				Work, mean (SD), 3.1 (1.4); Material, mean (SD), 3.3 (1.5); Climate, mean (SD), 2.9 (1.1); Objectives, mean (SD), 2.5 (1.5); Quality, mean (SD), 3.0 (1.1); Justification, mean (SD), 3.1 (2.1) Mean Copenhagen Burnout Inventory, mean (SD), 46.90 (18.45)
Fuss, 2008 <sup>91§</sup>	Hospital doctors in Germany	Copenhagen Burnout Inventory	292				
Marnier, 2008 <sup>92§</sup>	Psychiatrists and 1 generalist in United States	MBI	9	20.67 (9.75)	7.78 (5.14)	35.33 (6.44)	
Shehabi, 2008 <sup>93§</sup>	Intensivists in Australia	Modified MBI (6 items; scale, 1–5)	86	2.85 (0.93)	2.64 (0.85)	2.58 (0.83)	
Bressi, 2009 <sup>76§</sup>	Psychiatrists in Italy	MBI	28	17.89 (14.46)	5.32 (7.01)	34.57 (11.27)	
Brown, 2009 <sup>94</sup>	Hospital doctors in Australia	MBI	12	22.25 (8.59)	6.33 (2.71)	39.83 (7.31)	
Lasalvia, 2009 <sup>55§</sup>	Psychiatrists in Italy	Modified MBI (16 items; scale, 0–6)	21	1.95 (1.04)	1.35 (0.85)	4.46 (1.04)	
Peisah, 2009 <sup>79§</sup>	Hospital doctors in Australia	MBI	62	20.09 (9.91)	6.34 (4.90)	35.06 (7.33)	
Shanafelt, 2009 <sup>80§</sup>	Hospitalists and intensivists in United States	MBI	19	25.2 (11.59)	4.4 (3.79)	38.5 (8.04)	
Tunc, 2009 <sup>95</sup>	Hospital doctors in Turkey	Modified MBI (22 items; scale, 0–4)	62	1.18 (0.78)	0.81 (0.73)	3.10 (0.59) <sup>††</sup>	
Cocco, 2010 <sup>96§</sup>	Hospital geriatricians in Italy	MBI	38	16.21 (11.56)	4.53 (4.63)	39.13 (7.09)	
Doppia, 2011 <sup>97§</sup>	Hospital doctors in France	Copenhagen Burnout Inventory	1,684				Mean work-related burnout score, 2.72 (0.75)
Glasheen, 2011 <sup>98</sup>	Hospitalists in United States	Single-item survey	265				Mean, 2.08 on 1–5 scale 62 (23.4%) burned out
Lucas, 2011 <sup>84§</sup>	Academic hospitalists in United States	MBI (EE only)	26	19.54 (12.85)			
Thorsen, 2011 <sup>99</sup>	Hospital doctors in Malawi	MBI	2	25.5 (4.95)	8.5 (6.36)	25.0 (5.66)	
Hinami, 2012 <sup>50§</sup>	Hospital doctors in United States	Single-item survey	793				Mean, 2.24 on 1–5 scale 261 (27.2%) burned out
Quenot, 2012 <sup>100§</sup>	Intensivists in France	MBI	4	33.25 (4.57)	13.50 (5.45)	35.25 (4.86)	
Ruitenburt, 2012 <sup>101</sup>	Hospital doctors in the Netherlands	MBI (EE and DP only)	214	13.3 (8.0)	4.5 (4.1)		
Seibt, 2012 <sup>102§</sup>	Hospital doctors in Germany	Modified MBI (16 items; scale, 0–6, reported per item rather than totals)	2,154	2.2 (1.4)	1.4 (1.2)	5.1 (0.9)	
Shanafelt, 2012 <sup>87§</sup>	Hospitalists in United States	MBI	130	24.7 (12.5)	9.1 (6.9)	39.0 (7.6)	

NOTE: Abbreviations: AVEM, Arbeitsbezogenes Verhaltens und Erlebensmuster; DP, depersonalization subset of MBI; EE, emotional exhaustion subset of MBI; MBI, Maslach Burnout Inventory; PA, personal accomplishment subset of MBI; SD, standard deviation.

\*High scores of EE and DP and low scores of PA are features of burnout.

<sup>†</sup>SDs not available; study therefore excluded from statistical comparisons.

<sup>‡</sup>Different survey item than other studies in this table using a single-item, 5-point burnout measure.

<sup>§</sup>Data obtained directly from authors 2010–2012.

<sup>††</sup>Personal accomplishment scale reversed to match other studies.

## RESULTS

The search results are outlined in Figure 1. In total, 1704 articles met the criteria for full-text review. A

review of pertinent reference lists and author contacts led to the addition of 149 articles. Twenty-nine references could not be located by any means, despite

**TABLE 3.** Summary of Studies Including Both Inpatient-Based and Outpatient-Based Physicians Meeting Inclusion Criteria

Lead Author, Publication Year	Location	Instrument	Inpatient-Based Physicians		Outpatient-Based Physicians	
			No.	Results, Score (SD)*	No.	Results, Score (SD)*
Aasland, 1997 <sup>54†</sup>	Norway	Modified MBI (22 items; scale, 1–5)	582	EE, 2.39 (0.80); DP, 1.81 (0.65); PA, 3.51 (0.46)	298	EE, 2.65 (0.80); DP, 1.90 (0.59); PA, 3.45 (0.40)
Grassi, 2000 <sup>58</sup>	Italy	MBI	146	EE, 16.17 (9.64); DP, 5.32 (4.76); PA, 38.71 (7.28)	182	EE, 18.49 (11.49); DP, 6.11 (5.86); PA, 38.52 (7.60)
Gandini, 2006 <sup>65†</sup>	Argentina	MBI	290	EE, 25.0 (12.7); DP, 7.9 (6.2); PA, 40.1 (7.0)	67	EE, 31.0 (13.8); DP, 10.2 (6.6); PA, 38.4 (6.8)
Dunwoodie, 2007 <sup>68†</sup>	Australia	MBI	14	EE, 18.29 (14.24); DP, 5.29 (5.89); PA, 38.86 (3.42)	21	EE, 14.95 (9.14); DP, 3.95 (3.40); PA, 38.90 (2.88)
Sørgaard, 2007 <sup>69†</sup>	5 European nations	MBI	18	EE, 18.56 (9.32); DP, 5.50 (3.79); PA, 39.08 (5.39)	22	EE, 19.41 (8.08); DP, 6.68 (4.93); PA, 39.00 (4.40)
Sosa Oberlin, 2007 <sup>56†</sup>	Argentina	Author-designed instrument	3	3 (100%) had ≥4 burnout symptoms, 8.67 symptoms per physician	33	26 (78.8%) had ≥4 burnout symptoms, 6.15 symptoms per physician
Voltmer, 2007 <sup>57†</sup>	Germany	AVEM	271	77 (28.4%) exhibited burnout (type B) pattern	46	11 (23.9%) exhibited burnout (type B) pattern
Ádám, 2008 <sup>70†</sup>	Hungary	MBI	194	EE, 19.23 (10.79); DP, 4.88 (4.61); PA, 35.26 (8.42)	163	EE, 17.45 (11.12); DP, 4.86 (4.91); PA, 36.56 (7.03)
Di Iorio, 2008 <sup>71†</sup>	Italy	Author-designed instrument	62	Work: 3.1 (1.4); material: 3.3 (1.5); climate: 2.9 (1.1); objectives: 2.5 (1.5); quality: 3.0 (1.1); justification: 3.1 (2.1)	54	Work: 2.6 (1.5); material: 3.1 (2.1); climate: 3.0 (1.1); objectives: 3.4 (1.6); quality: 2.2 (1.5); justification: 3.2 (2.0)
Bressi, 2009 <sup>76†</sup>	Italy	MBI	28	EE, 17.89 (14.46); DP, 5.32 (7.01); PA, 34.57 (11.27)	53	EE, 23.15 (11.99); DP, 7.02 (6.29); PA, 36.41 (7.54)
Lasalvia, 2009 <sup>55†</sup>	Italy	Modified MBI (16 items; scale, 0–6)	21	EE, 1.95 (1.04); DP, 1.35 (0.85); PA, 4.46 (1.04)	38	EE, 2.37 (1.27); DP, 1.51 (1.15); PA, 4.46 (0.87)
Peisah, 2009 <sup>79†</sup>	Australia	MBI	62	EE, 20.09 (9.91); DP, 6.34 (4.90); PA, 35.06 (7.33)	28	EE, 13.92 (9.24); DP, 3.66 (3.95); PA, 39.34 (8.55)
Shanafelt, 2009 <sup>80†</sup>	United States	MBI	19	EE, 25.2 (11.59); DP, 4.4 (3.79); PA, 38.5 (8.04)	408	EE, 20.5 (11.10); DP, 4.3 (4.74); PA, 40.8 (6.26)
Lucas, 2011 <sup>84†</sup>	United States	MBI (EE only)	26	EE, 19.54 (12.85)	30	EE, 24.37 (14.95)
Shanafelt, 2012 <sup>87†</sup>	United States	MBI	130	EE, 24.7 (12.5); DP, 9.1 (6.9); PA, 39.0 (7.6)	447	EE, 25.4 (14.0); DP, 7.5 (6.3); PA, 41.4 (6.0)

NOTE: Abbreviations: AVEM, Arbeitsbezogenes Verhaltens und Erlebensmuster; DP, depersonalization subset of MBI; EE, emotional exhaustion subset of MBI; MBI, Maslach Burnout Inventory; PA, personal accomplishment subset of MBI; SD, standard deviation.

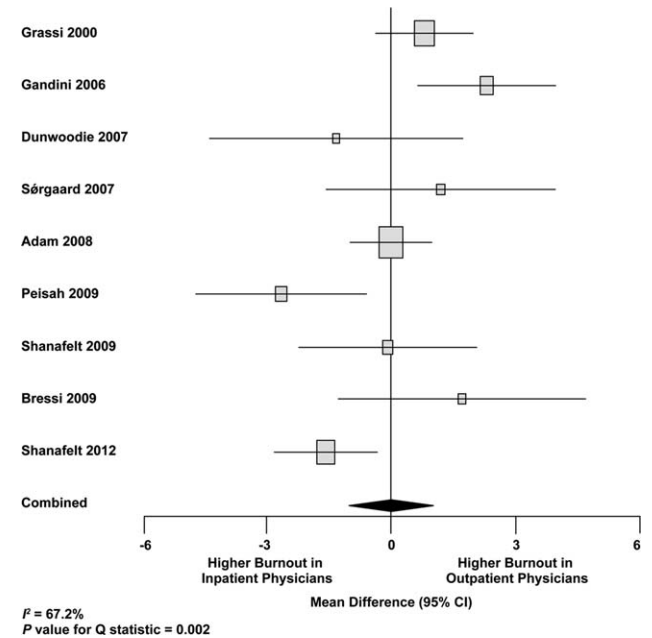
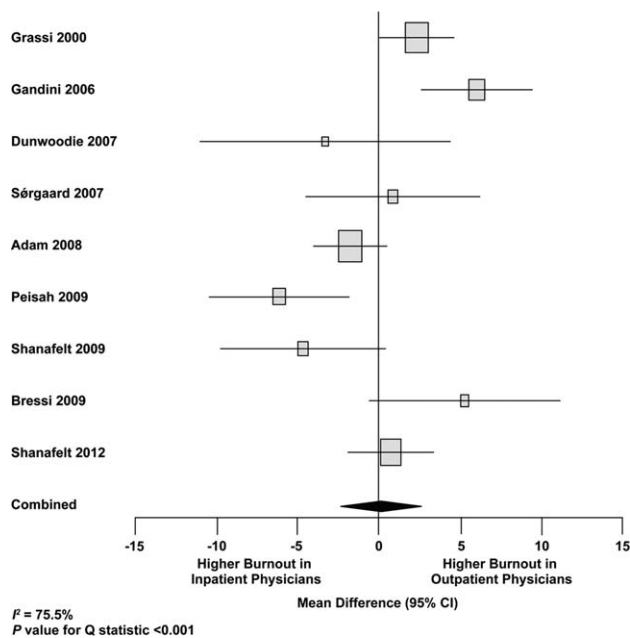
\*High scores of EE and DP and low scores of PA are features of burnout.

†Data obtained directly from authors from 2010–2012.

repeated attempts. Therefore, 1824 articles were subjected to full-text review by the 2 investigators.

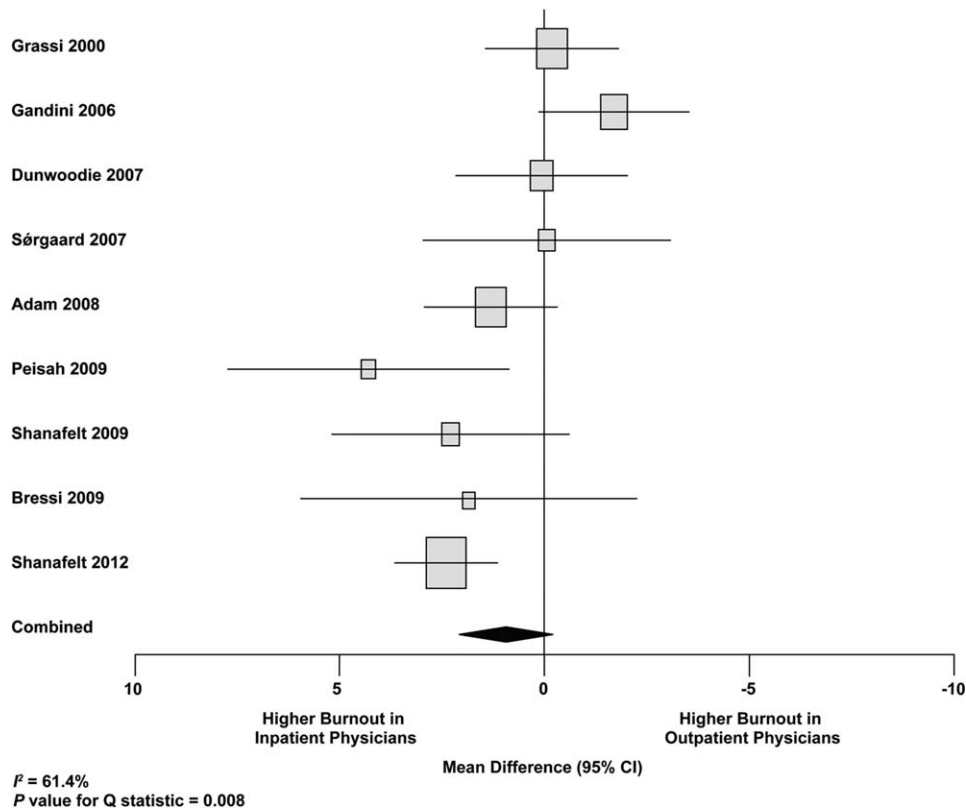
Initially, 57 articles were found that met criteria for inclusion. Of these, 2 articles reported data in formats that could not be interpreted.<sup>44,45</sup> When efforts to clarify the data with the authors were unsuccessful, these

studies were excluded. A study specifically designed to assess the response of physicians to a recent series of terrorist attacks<sup>46</sup> was excluded a posteriori because of lack of generalizability. Of the other 54 studies, 15 reported burnout data on both outpatient physicians and inpatient physicians, 22 reported data on outpatient



**FIG. 2.** Forest plot for double-armed studies reporting Maslach Burnout Inventory scores for emotional exhaustion. The size of the square represents study size, and the bars represent the 95% confidence interval (CI).

**FIG. 3.** Forest plot for double-armed studies reporting Maslach Burnout Inventory scores for depersonalization. The size of the square represents study size and the bars represent the 95% confidence interval (CI).



**FIG. 4.** Forest plot for double-armed studies reporting Maslach Burnout Inventory scores for personal accomplishment. The size of the square represents study size and the bars represent the 95% confidence interval (CI). The direction of the y-axis has been reversed so that greater burnout in outpatient physicians remains to the right.

physicians only, and 17 reported data on inpatient physicians only. Table 1 summarizes the results of the 37 studies involving outpatient physicians; Table 2 summarizes the 32 studies involving inpatient physicians.

Table 3 summarizes the results of the 15 studies that reported burnout data for both inpatient and outpatient physicians, allowing direct comparisons to be made. Nine studies reported MBI subset totals with standard deviations, 2 used different modifications of the MBI, 2 used different author-derived measures, 1 used only the emotional exhaustion subscale of the MBI, and 1 used the Arbeitsbezogenes Verhaltens und Erlebensmuster. Therefore, statistical comparison was attempted only for the 9 studies reporting comparable MBI data, comprising burnout data on 1390 outpatient physicians and 899 inpatient physicians.

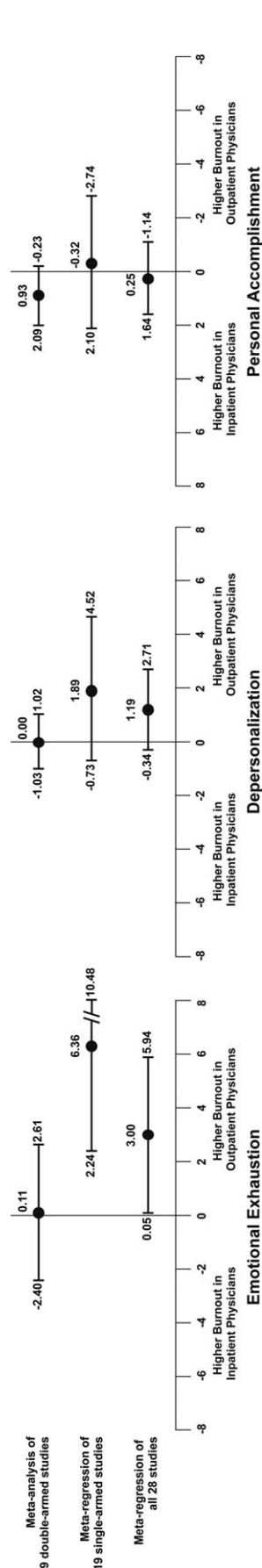
Figure 2 shows that no significant difference existed between the groups regarding emotional exhaustion (mean difference, 0.11 points on a 54-point scale; 95% confidence interval [CI], -2.40 to 2.61;  $P = 0.94$ ). In addition, there was no significant difference between the groups regarding depersonalization (Figure 3; mean difference, 0.00 points on a 30-point scale; 95% CI, -1.03 to 1.02;  $P = 0.99$ ) and personal accomplishment (Figure 4; mean difference, 0.93 points on a 48-point scale; 95% CI, -0.23 to 2.09;  $P = 0.11$ ).

We used meta-regression to allow the incorporation of single-armed MBI studies. Whether single-armed

studies were analyzed separately (15 outpatient studies comprising 3927 physicians, 4 inpatient studies comprising 300 physicians) or analyzed with double-armed studies (24 outpatient arms comprising 5318 physicians, 13 inpatient arms comprising 1301 physicians), the lack of a significant difference between the groups persisted for the depersonalization and personal accomplishment scales (Figure 5). Emotional exhaustion was significantly higher in outpatient physicians when single-armed studies were considered separately (mean difference, 6.36 points; 95% CI, 2.24 to 10.48;  $P = 0.002$ ), and this difference persisted when all studies were combined (mean difference, 3.00 points; 95% CI, 0.05 to 5.94,  $P = 0.046$ ).

Subgroup analysis by geographic location showed US outpatient physicians had a significantly higher personal accomplishment score than US inpatient physicians (mean difference, 2.38 points; 95% CI, 1.22 to 3.55;  $P < 0.001$ ) in double-armed studies. This difference did not persist when single-armed studies were included through meta-regression (mean difference, 0.55 points, 95% CI, -4.30 to 5.40,  $P = 0.83$ ).

Table 4 demonstrates that methodological quality was generally good from the standpoint of the reporting and bias subsections of the Downs and Black tool. External validity was scored lower for many studies due to the use of convenience samples and lack of information about physicians who declined to participate.



**FIG. 5.** Forest plots comparing results of meta-analysis of 9 double-armed studies, meta-regression of 19 single-armed studies, and meta-regression of all 28 studies reporting Maslach Burnout Inventory scores. The direction of the y-axis of the personal accomplishment plot has been reversed so that higher burnout in outpatient physicians remains to the right. Error bars represent the 95% confidence interval.

Funnel plots were used to evaluate for publication bias in the meta-analysis of the 8 double-armed studies (Figure 6). We found no significant evidence of bias, which was supported by Begg’s test *P* values of 0.90 for emotional exhaustion, >0.99 for depersonalization, and 0.54 for personal accomplishment. A trim-and-fill analysis determined that no adjustment was necessary.

**DISCUSSION**

There appears to be no support for the long-held belief that inpatient physicians are particularly prone to burnout. Among studies for which practice location was stated explicitly or could be obtained from the authors, and who used the MBI, no differences were found among inpatient and outpatient physicians with regard to depersonalization or personal accomplishment. This finding persisted whether double-armed studies were compared directly, single-armed studies were incorporated into this analysis, or single-armed studies were analyzed separately. Outpatient physicians had a higher degree of emotional exhaustion when all studies were considered.

There are several reasons why outpatient physicians may be more prone to emotional exhaustion than their inpatient colleagues. Although it is by no means true that all inpatient physicians work in shifts, the increased availability of shift work may allow some inpatient physicians to better balance their professional and personal lives, a factor of work with which some outpatient physicians have struggled.<sup>47</sup> Inpatient practice may also afford more opportunity for teamwork, a factor that has been shown to correlate with reduced burnout.<sup>48</sup> When surveyed about burnout, outpatient physicians have cited patient volumes, paperwork, medicolegal concerns, and lack of community support as factors.<sup>49</sup> Inpatient physicians are not immune to these forces, but they arguably experience them to different degrees.

The absence of a higher rate of depersonalization among inpatient physicians is particularly reassuring in light of concerns expressed with the advent of US hospital medicine—that some hospitalists would be prone to viewing patients as “an impediment to the efficient running of the hospital,”<sup>2</sup> the very definition of depersonalization.

Although the difference in the whole sample was not statistically significant, the consistent tendency toward a greater sense of personal accomplishment among outpatient physicians is also noteworthy, particularly because post hoc subgroup analysis of US physicians did show statistical significance in both 2-armed studies. Without detailed age data for the physicians in each study, we could not separate the possible impact of age on personal accomplishment; hospital medicine is a newer specialty staffed by generally younger physicians, and hospitalists may not have had time to develop a sense of



**TABLE 4.** Assessment of Methodologic Quality

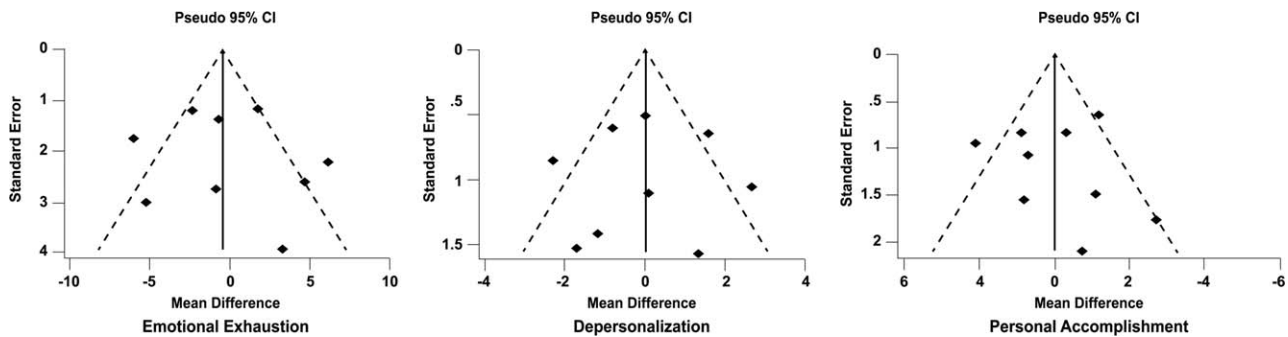
Lead Author, Publication Year	Reporting	External Validity	Internal Validity: Bias	Internal Validity: Confounding	Power
Schweitzer, 1994 <sup>12</sup>	5 of 6 points	1 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Varga, 1996 <sup>88</sup>	5 of 6 points	1 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Aasland, 1997 <sup>54</sup>	3 of 6 points	2 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Bargellini, 2000 <sup>89</sup>	5 of 6 points	0 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Grassi, 2000 <sup>58</sup>	6 of 6 points	0 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
McManus, 2000 <sup>59</sup>	5 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Hoff, 2001 <sup>33</sup>	6 of 6 points	2 of 2 points	2 of 4 points	1 of 1 point	0 of 1 point
Yaman, 2002 <sup>60</sup>	5 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Cathébras, 2004 <sup>61</sup>	6 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Kushnir, 2004 <sup>62</sup>	5 of 6 points	0 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Goehring, 2005 <sup>63</sup>	6 of 6 points	1 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Trichard, 2005 <sup>90</sup>	3 of 6 points	1 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Esteva, 2006 <sup>64</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Gandini, 2006 <sup>65</sup>	6 of 6 points	1 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Ozyurt, 2006 <sup>66</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Deighton, 2007 <sup>67</sup>	5 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Dunwoodie, 2007 <sup>68</sup>	5 of 6 points	2 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Sørgaard, 2007 <sup>69</sup>	6 of 6 points	0 of 2 points	3 of 4 points	1 of 1 point	1 of 1 point
Sosa Oberlin, 2007 <sup>56</sup>	4 of 6 points	0 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Voltmer, 2007 <sup>57</sup>	4 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Ádám, 2008 <sup>70</sup>	5 of 6 points	2 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Di Iorio, 2008 <sup>71</sup>	6 of 6 points	0 of 2 points	2 of 4 points	0 of 1 point	0 of 1 point
Fuss, 2008 <sup>91</sup>	6 of 6 points	0 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Lee, 2008 <sup>49</sup>	4 of 6 points	2 of 2 points	4 of 4 points	0 of 1 point	1 of 1 point
Mamer, 2008 <sup>92</sup>	6 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Shehabi, 2008 <sup>93</sup>	3 of 6 points	1 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Truchot, 2008 <sup>72</sup>	5 of 6 points	1 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Twellaar, 2008 <sup>73</sup>	6 of 6 points	2 of 2 points	3 of 4 points	0 of 1 point	0 of 1 point
Vela-Bueno, 2008 <sup>74</sup>	5 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Arigoni, 2009 <sup>17</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Bernhardt, 2009 <sup>75</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Bressi, 2009 <sup>76</sup>	6 of 6 points	0 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Brown, 2009 <sup>94</sup>	6 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Krasner, 2009 <sup>77</sup>	9 of 11 points	0 of 3 points	6 of 7 points	1 of 2 points	1 of 1 point
Lasalvia, 2009 <sup>55</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Lesic, 2009 <sup>78</sup>	5 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Peisah, 2009 <sup>79</sup>	6 of 6 points	2 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Shanafelt, 2009 <sup>90</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Tunc, 2009 <sup>95</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Zantinge, 2009 <sup>81</sup>	5 of 6 points	0 of 2 points	3 of 4 points	1 of 1 point	0 of 1 point
Cocco, 2010 <sup>96</sup>	4 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Demirci, 2010 <sup>82</sup>	6 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Voltmer, 2010 <sup>83</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Doppia, 2011 <sup>97</sup>	5 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Glasheen, 2011 <sup>98</sup>	5 of 6 points	0 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Lucas, 2011 <sup>84</sup>	10 of 11 points	2 of 3 points	7 of 7 points	5 of 6 points	1 of 1 point
Maccacaro, 2011 <sup>85</sup>	5 of 6 points	0 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Putnik, 2011 <sup>86</sup>	6 of 6 points	1 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Thorsen, 2011 <sup>99</sup>	6 of 6 points	0 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Hinami, 2012 <sup>50</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	1 of 1 point
Quenot, 2012 <sup>100</sup>	8 of 11 points	1 of 3 points	6 of 7 points	1 of 2 points	0 of 1 point
Ruitenburg, 2012 <sup>101</sup>	6 of 6 points	2 of 2 points	4 of 4 points	0 of 1 point	0 of 1 point
Seibt, 2012 <sup>102</sup>	6 of 6 points	0 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point
Shanafelt, 2012 <sup>87</sup>	6 of 6 points	2 of 2 points	4 of 4 points	1 of 1 point	0 of 1 point

NOTE: For survey studies (all studies except Krasner,<sup>77</sup> Lucas,<sup>84</sup> and Quenot<sup>100</sup>), questions regarding interventions were omitted. For uncontrolled studies (all studies except Lucas<sup>84</sup>), questions regarding controls were omitted. The presence of a power calculation was awarded 1 point.

accomplishment. When surveyed about job satisfaction, hospitalists have also reported the feeling that they were “treated as glorified residents,”<sup>50</sup> a factor that, if shared by other inpatient physicians, must surely affect their sense of personal accomplishment. The lack of longitudinal care for patients and the

substantial provision of end-of-life care also may diminish the sense of personal accomplishment among inpatient physicians.

Another important finding from this systematic review is the marked heterogeneity of the instruments used to measure physician burnout. Many of the



**FIG. 6.** Funnel plots for the 8 double-armed studies that reported Maslach Burnout Inventory scores for emotional exhaustion, depersonalization, and personal accomplishment. Abbreviations: CI, confidence interval.

identified studies could not be subjected to meta-analysis because of their use of differing burnout measures. Drawing more substantial conclusions about burnout and practice location is limited by the fact that, although the majority of studies used the full MBI, the largest study of European hospital doctors used the Copenhagen Burnout Inventory, and the studies thus far of US hospitalists have used single-item surveys or portions of the MBI. Not reflected in this review is the fact that a large study of US burnout and job satisfaction<sup>51</sup> did not formally address practice location (M. Linzer, personal communication, August 2012). Similarly, a large study of British hospital doctors<sup>52</sup> is not included herein because many of the physicians involved had substantial outpatient duties (C. Taylor, personal communication, July 2012). Varying burnout measures have complicated a previous systematic review of burnout in oncologists.<sup>53</sup> Two studies that directly compared inpatient and outpatient physicians but that were excluded from our statistical analysis because of their modified versions of the MBI,<sup>54,55</sup> showed higher burnout scores in outpatient physicians. Two other studies that provided direct inpatient versus outpatient comparisons but that used alternative burnout measures<sup>56,57</sup> showed a greater frequency of burnout in inpatient physicians, but of these, 1 study<sup>56</sup> involved only 3 inpatient physicians.

Several limitations of our study should be considered. Although we endeavored to obtain information from authors (with some success) about specific local practice patterns and eliminated many studies because of incomplete data or mixed practice patterns (eg, general practitioners who take frequent hospital calls, hospital physicians with extensive outpatient duties in a clinic attached to their hospital), it remains likely that many physicians identified as outpatient provided some inpatient care (attending a few weeks per year on a teaching service, for example) and that some physicians identified as inpatient have minimal outpatient duties.

More importantly, the dataset analyzed is heterogeneous. Studies of the incidence of burnout are naturally observational and therefore not randomized.

Inclusion of international studies is necessary to answer the research question (because published data on US hospitalists are sparse) but naturally introduces differences in practice settings, local factors, and other factors for which we cannot possibly account fully.

Our meta-analysis therefore addressed a broad question about burnout among inpatient and outpatient physicians in various diverse settings. Applying it to any 1 population (including US hospitalists) is, by necessity, imprecise.

Post hoc analysis should be viewed with caution. For example, the finding of a statistical difference between US inpatient and outpatient physicians with regard to personal accomplishment score is compelling from the standpoint of hypothesis generation. However, it is worth bearing in mind that this analysis contained only 2 studies, both by the same primary author, and compared 855 outpatient physicians to only 149 hospitalists. This difference was no longer significant when 2 outpatient studies were added through meta-regression.

Finally, the specific focus of this study on practice location precluded comparison with emergency physicians and anesthesiologists, 2 specialist types that have been the subject of particularly robust burnout literature. As the literature on hospitalist burnout becomes more extensive, comparative studies with these groups and with intensivists might prove instructive.

In summary, analysis of 24 studies comprising data on 5318 outpatient physicians and 1301 inpatient physicians provides no support for the commonly held belief that hospital-based physicians are particularly prone to burnout. Outpatient physicians reported higher emotional exhaustion. Further studies of the incidence and severity of burnout according to practice location are indicated. We propose that in future studies, to avoid the difficulties with statistical analysis summarized herein, investigators ask about and explicitly report practice location (inpatient vs outpatient vs both) and report mean MBI subset data and standard deviations. Such information about US hospitalists would allow comparison with a robust (if heterogeneous) international literature on burnout.

## Acknowledgments

The authors gratefully acknowledge all of the study authors who contributed clarification and guidance for this project, particularly the following authors who provided unpublished data for further analysis: Olaf Aasland, MD; Szilvia Ádám, PhD; Annalisa Bargellini, PhD; Cinzia Bressi, MD, PhD; Darrell Campbell Jr, MD; Ennio Cocco, MD; Russell Deighton, PhD; Senem Demirci Alanyali, MD; Biagio Di Iorio, MD, PhD; David Dunwoodie, MBBS; Sharon Einav, MD; Madeleine Estryn-Behar, PhD; Bernardo Gandini, MD; Keiki Hinami, MD; Antonio Lasalvia, MD, PhD; Joseph Lee, MD; Guido Maccacaro, MD; Swati Marner, EdD; Chris McManus, MD, PhD; Carmelle Peisah, MBBS, MD; Katarina Putnik, MSc; Alfredo Rodríguez-Muñoz, PhD; Yahya Shehabi, MD; Evelyn Sosa Oberlin, MD; Jean Karl Soler, MD, MSc; Knut Sørgaard, PhD; Cath Taylor; Viva Thorsen, MPH; Mascha Twellaar, MD; Edgar Voltmer, MD; Colin West, MD, PhD; and Deborah Whippen. The authors also thank the following colleagues for their help with translation: Dusanka Anastasijevic (Norwegian); Joyce Cheung-Flynn, PhD (simplified Chinese); Ales Hlubocky, MD (Czech); Lena Jungheim, RN (Swedish); Erez Kessler (Hebrew); Kanae Mukai, MD (Japanese); Eliane Purchase (French); Aaron Shmookler, MD (Russian); Jan Stepanek, MD (German); Fernando Tondato, MD (Portuguese); Laszlo Vaszar, MD (Hungarian); and Joseph Verheide, PhD (Dutch). Finally, the authors thank Cynthia Heltne and Diana Rogers for their expert and tireless library assistance, Bonnie Schimek for her help with figures, and Cindy Laureano and Elizabeth Jones for their help with author contact.

## References

- Siegal EM. Just because you can, doesn't mean that you should: a call for the rational application of hospitalist comanagement. *J Hosp Med.* 2008;3(5):398–402.
- Fitzgerald FT. Hospitalists. *Hospitalist.* 1998;1(4):5–6.
- Dorevitch S, Forst L. The occupational hazards of emergency physicians. *Am J Emerg Med.* 2000;18(3):300–311.
- Fields AI, Cuerdon TT, Brasseux CO, et al. Physician burnout in pediatric critical care medicine. *Crit Care Med.* 1995;23(8):1425–1429.
- Schroeder SA, Schapiro R. The hospitalist: new boon for internal medicine or retreat from primary care? *Ann Intern Med.* 1999;130(4 pt 2): 382–387.
- Maillard MF, Iwatsubo Y, Grimon G, et al. Enquete sur les horaires et la charge de travail des medecins dans un etablissement de l'Assistance Publique-Hopitaux de Paris. *Arch Mal Prof.* 1996;57:438–444.
- Bohle A, Baumgartel M, Gotz ML, Muller EH, Jocham D. Burn-out of urologists in the county of Schleswig-Holstein, Germany: a comparison of hospital and private practice urologists. *J Urol.* 2001; 165(4): 1158–1161.
- Wetterneck TB, Linzer M, Halls JJ, et al. Satisfaction and worklife of academic hospitalist and non-hospitalist attendings on general medical inpatient rotations. *J Gen Intern Med.* 2006;21(S4):128.
- Saint S, Zemencuk JK, Hayward RA, Golin CE, Konrad TR, Linzer M; SGIM Career Satisfaction Group. What effect does increasing inpatient time have on outpatient-oriented internist satisfaction? *J Gen Intern Med.* 2003;18(9):725–729.
- Lemkau J, Rafferty J, Gordon R Jr. Burnout and career-choice regret among family practice physicians in early practice. *Fam Pract Res J.* 1994;14(3):213–222.
- Graham J, Ramirez AJ, Cull A, Finlay I, Hoy A, Richards MA. Job stress and satisfaction among palliative physicians. *Palliat Med.* 1996; 10(3):185–194.
- Schweitzer B. Stress and burnout in junior doctors. *S Afr Med J.* 1994; 84(6):352–354.
- Lim RC, Pinto C. Work stress, satisfaction and burnout in New Zealand radiologists: comparison of public hospital and private practice in New Zealand. *J Med Imaging Radiat Oncol.* 2009;53(2):194–199.
- Lewiston NJ, Conley J, Blessing-Moore J. Measurement of hypothetical burnout in cystic fibrosis caregivers. *Acta Paediatr Scand.* 1981; 70(6):935–939.
- Keinan G, Melamed S. Personality characteristics and proneness to burnout: a study among internists. *Stress Med.* 1987;3(4):307–315.
- Hoff T, Whitcomb WF, Nelson JR. Thriving and surviving in a new medical career: the case of hospitalist physicians. *J Health Soc Behav.* 2002;43(1):72–91.
- Arigoni F, Bovier PA, Mermillod B, Waltz P, Sappino AP. Prevalence of burnout among Swiss cancer clinicians, paediatricians and general practitioners: who are most at risk? *Support Care Cancer.* 2009; 17(1): 75–81.
- Arora V, Fang MC, Kripalani S, Amin AN. Preparing for "diastole": advanced training opportunities for academic hospitalists. *J Hosp Med.* 2006;1(6):368–377.
- Prosser D, Johnson S, Kuipers E, Szmukler G, Bebbington P, Thornicroft G. Mental health, "burnout" and job satisfaction among hospital and community-based mental health staff. *Br J Psychiatry.* 1996;169(3):334–337.
- McPhillips HA, Stanton B, Zuckerman B, Stapleton FB. Role of a pediatric department chair: factors leading to satisfaction and burnout. *J Pediatr.* 2007;151(4):425–430.
- Freudenberger HJ. Staff burn-out. *J Soc Iss.* 1974;30(1):159–165.
- Maslach C. Burned-out. *Hum Behav.* 1976;5(9):16–22.
- Keyes LE. Underpaid women, stressed out men, satisfied emergency physicians. *Ann Emerg Med.* 2008;51(6):729–731.
- Scheurer D, McKean S, Miller J, Wetterneck T. U.S. physician satisfaction: a systematic review. *J Hosp Med.* 2009;4(9):560–568.
- Johnson JT, Wagner RL, Rueger RM, Goepfert H. Professional burnout among head and neck surgeons: results of a survey. *Head Neck.* 1993;15(6):557–560.
- Maslach C, Jackson SE. The measurement of experienced burnout. *J Occup Behav.* 1981;2(2):99–113.
- Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work Stress.* 2005;19(3):192–207.
- Schaufeli WB, Van Dierendonck D. Handleiding van de Utrechtse Burnout Schaal (UBOS). Lisse, the Netherlands: Swets Test Services; 2000.
- Goodfellow RL. Alberta Physician Burnout [master's thesis]. Alberta, Canada: The University of Lethbridge; 2003.
- Schaarschmidt U, Fischer AW. Arbeitsbezogenes Verhaltensstudie Erlebnismuster AVEM. Frankfurt, Germany: Swets Test Services; 2003.
- Lundgren-Nilsson A, Jonsdottir IH, Pallant J, Ahlberg G Jr. Internal construct validity of the Shirom-Melamed Burnout Questionnaire (SMBQ). *BMC Public Health.* 2012;12:1.
- Rohland BM, Kruse GR, Rohrer JE. Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. *Stress Health.* 2004;20(2):75–79.
- Hoff TH, Whitcomb WF, Williams K, Nelson JR, Cheesman RA. Characteristics and work experiences of hospitalists in the United States. *Arch Intern Med.* 2001;161(6):851–858.
- Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health.* 1998;52(6):377–384.
- Reeves BC, Deeks JJ, Higgins JPT, Wells GA. Including nonrandomized studies. In: Higgins JPT, Green S, eds. *Cochrane Handbook for Systematic Reviews of Interventions.* Version 5.0.1. The Cochrane Collaboration; 2008. Available at: [www.cochrane-handbook.org](http://www.cochrane-handbook.org). Accessed July 24, 2013.
- Kahn HA, Sempos CT. *Statistical Methods in Epidemiology.* New York, NY: Oxford University Press; 1989.
- Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat Med.* 2002;21(11):1539–1558.
- Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ.* 2003;327(7414):557–560.
- Furukawa TA, Guyatt GH, Griffith LE. Can we individualize the "number needed to treat"? An empirical study of summary effect measures in meta-analyses. *Int J Epidemiol.* 2002;31(1):72–76.
- Allen IE, Olkin I. Applications of estimating treatment effects in metaanalyses with missing data. Technical Report No. 2000-25, 2000. Available at: <http://statistics.stanford.edu/~ckirby/techreports/GEN/2000/2000-25.pdf>. Accessed July 22, 2013.
- Sterne JA, Gavaghan D, Egger M. Publication and related bias in meta-analysis: power of statistical tests and prevalence in the literature. *J Clin Epidemiol.* 2000;53(11):1119–1129.
- Begg CB, Mazumdar M. Operating characteristics of a rank correlation test for publication bias. *Biometrics.* 1994;50(4):1088–1101.
- Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ.* 2009; 339:b2700.
- Sobreques J, Cebria J, Segura J, Rodriguez C, Garcia M, Juncosa S. Job satisfaction and burnout in general practitioners [in Spanish]. *Aten Primaria.* 2003;31(4):227–233.
- Curriel-Garcia JA, Rodriguez-Moran M, Guerrero-Romero F. Burnout syndrome among health staff [in Spanish]. *Rev Med Inst Mex Seguro Soc.* 2006;44(3):221–226.
- Einav S, Shalev AY, Ofek H, Freedman S, Matot I, Weiniger CF. Differences in psychological effects in hospital doctors with and without post-traumatic stress disorder. *Br J Psychiatry.* 2008;193(2):165–166.
- Miedema B, Easley J, Fortin P, Hamilton R, Tatemichi S. Crossing boundaries: family physicians' struggles to protect their private lives. *Can Fam Physician.* 2009;55(3):286–287.e5.
- Estryn-Behar M, Doppia MA, Guetarni K, Fry C, Mchet G, Pelloux P, et al. Emergency physicians accumulate more stress factors than other physicians: results from the French SESMAT study. *Emerg Med J.* 2011 May;28(5):397–410. Epub 2010 Dec 1.
- Lee FJ, Stewart M, Brown JB. Stress, burnout, and strategies for reducing them: what's the situation among Canadian family physicians? *Can Fam Physician.* 2008;54(2):234–235.



50. Hinami K, Whelan CT, Wolosin RJ, Miller JA, Wetterneck TB. Worklife and satisfaction of hospitalists: toward flourishing careers. *J Gen Intern Med.* 2012;27(1):28–36.
51. Linzer M, Manwell LB, Williams ES, Bobula JA, Brown RL, Varkey AB, et al; MEMO (Minimizing Error, Maximizing Outcome) Investigators. Working conditions in primary care: physician reactions and care quality. *Ann Intern Med.* 2009 Jul 7;151(1):28–36.
52. Ramirez AJ, Graham J, Richards MA, Cull A, Gregory WM. Mental health of hospital consultants: the effects of stress and satisfaction at work. *Lancet.* 1996 Mar 16;347(9003):724–8.
53. Mukherjee S, Beresford B, Glaser A, Sloper P. Burnout, psychiatric morbidity, and work-related sources of stress in paediatric oncology staff: a review of the literature. *Psycho-Oncology.* 2009 Oct;18(10):1019–28.
54. Aasland OG, Olff M, Falkum E, Schweder T, Ursin H. Health complaints and job stress in Norwegian physicians: the use of an overlapping questionnaire design. *Soc Sci Med.* 1997;45(11):1615–1629.
55. Lasalvia A, Bonetto C, Bertani M, et al. Influence of perceived organisational factors on job burnout: survey of community mental health staff. *Br J Psychiatry.* 2009;195(6):537–544.
56. Sosa Oberlin EN. Frecuencia de los síntomas del síndrome de burn-out en profesionales médicos. *Rev Med Rosario.* 2007;73:12–20.
57. Voltmer E, Kieschke U, Spahn C. Work-related behaviour and experience patterns of physicians compared to other professions. *Swiss Med Wkly.* 2007;137(31-32):448–453.
58. Grassi L, Magnani K. Psychiatric morbidity and burnout in the medical profession: an Italian study of general practitioners and hospital physicians. *Psychother Psychosom.* 2000;69(6):329–334.
59. McManus IC, Gordon D, Winder BC. Duties of a doctor: UK doctors and good medical practice. *Qual Health Care.* 2000;9(1):14–22.
60. Yaman H, Soler JK. The job related burnout questionnaire: a multinational pilot study. *Aust Fam Physician.* 2002;31(11):1055–1056.
61. Cathébras P, Begon A, Laporte S, Bois C, Truchot D. Burn out among French general practitioners [in French]. *Presse Med.* 2004;33(22):1569–1574.
62. Kushnir T, Levhar C, Cohen AH. Are burnout levels increasing? The experience of Israeli primary care physicians. *Isr Med Assoc J.* 2004;6(8):451–455.
63. Goehring C, Bouvier Gallacchi M, Kunzi B, Bovier P. Psychosocial and professional characteristics of burnout in Swiss primary care practitioners: a cross-sectional survey. *Swiss Med Wkly.* 2005;135(7-8):101–108.
64. Esteva M, Larraz C, Jimenez F. Mental health in family doctors: effects of satisfaction and stress at work [in Spanish]. *Rev Clin Esp.* 2006;206(2):77–83.
65. Gandini BJ, Paulini SS, Marcos IJ, Jorge S, Luis F. The professional wearing down or syndrome of welfare labor stress (“burnout”) among health professionals in the city of Cordoba [in Spanish]. *Rev Fac Cien Med Univ Nac Cordoba.* 2006;63(1):18–25.
66. Ozyurt A, Hayran O, Sur H. Predictors of burnout and job satisfaction among Turkish physicians. *QJM.* 2006;99(3):161–169.
67. Deighton RM, Gurrin N, Traue H. Factors affecting burnout and compassion fatigue in psychotherapists treating torture survivors: is the therapist’s attitude to working through trauma relevant? *J Trauma Stress.* 2007;20(1):63–75.
68. Dunwoodie DA, Auret K. Psychological morbidity and burnout in palliative care doctors in Western Australia. *Intern Med J.* 2007;37(10):693–698.
69. Sørgaard KW, Ryan P, Hill R, Dawson I, OSCAR Group. Sources of stress and burnout in acute psychiatric care: inpatient vs. community staff. *Soc Psychiatry Psychiatr Epidemiol.* 2007;42(10):794–802.
70. Adam S, Gyorffy Z, Susanszky E. Physician burnout in Hungary: a potential role for work-family conflict. *J Health Psychol.* 2008;13:847–856.
71. Di Iorio B, Cillo N, Cucciniello E, Bellizzi V. Burn-out in the dialysis unit. *J Nephrol.* 2008;21(suppl 13):S158–S162.
72. Truchot D. Career orientation and burnout in French general practitioners. *Psychol Rep.* 2008;103(3):875–881.
73. Twellaar M, Winants Y, Houkes I. How healthy are Dutch general practitioners? Self-reported (mental) health among Dutch general practitioners. *Eur J Gen Pract.* 2008;14(1):4–9.
74. Vela-Bueno A, Moreno-Jimenez B, Rodriguez-Munoz A, et al. Insomnia and sleep quality among primary care physicians with low and high burnout levels. *J Psychosom Res.* 2008;64(4):435–442.
75. Bernhardt BA, Rushton CH, Carrese J, Pyeritz RE, Kolodner K, Geller G. Distress and burnout among genetic service providers. *Genet Med.* 2009;11(7):527–535.
76. Bressi C, Porcellana M, Gambini O, et al. Burnout among psychiatrists in Milan: a multicenter survey. *Psichiatria Serv.* 2009;60(7):985–988.
77. Krasner MS, Epstein RM, Beckman H, et al. Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA.* 2009;302(12):1284–1293.
78. Lesic AR, Stefanovic NP, Perunicic I, Milenkovic P, Tosevski DL, Bumbasirevic MZ. Burnout in Belgrade orthopaedic surgeons and general practitioners, a preliminary report. *Acta Chir Jugosl.* 2009;56(2):53–59.
79. Peisah C, Latif E, Wilhelm K, Williams B. Secrets to psychological success: why older doctors might have lower psychological distress and burnout than younger doctors. *Aging Ment Health.* 2009;13(2):300–307.
80. Shanafelt TD, West CP, Sloan JA, et al. Career fit and burnout among academic faculty. *Arch Intern Med.* 2009;169(10):990–995.
81. Zantinge EM, Verhaak PF, de Bakker DH, van der Meer K, Bensing JM. Does burnout among doctors affect their involvement in patients’ mental health problems? A study of videotaped consultations. *BMC Fam Pract.* 2009;10:60.
82. Demirci S, Yildirim YK, Ozsaran Z, Uslu R, Yalman D, Aras AB. Evaluation of burnout syndrome in oncology employees. *Med Oncol.* 2010;27(3):968–974.
83. Voltmer E, Schwappach DL, Frank E, Wirsching M, Spahn C. Work-related behavior and experience patterns and predictors of mental health in German physicians in medical practice. *Fam Med.* 2010;42(6):433–439.
84. Lucas B, Trick W, Evans A, et al. Emotional exhaustion, life stress, and perceived control among medicine ward attending physicians: a randomized trial of 2- versus 4-week ward rotations [abstract]. *J Hosp Med.* 2011;6(4 suppl 2):S43–S44.
85. Maccacaro G, Di Tommaso F, Ferrai P, Bonatti D, Bombana S, Merseburger A. The effort of being male: a survey on gender and burnout [in Italian]. *Med Lav.* 2011;102(3):286–296.
86. Putnik K, Houkes I. Work related characteristics, work-home and home-work interference and burnout among primary healthcare physicians: a gender perspective in a Serbian context. *BMC Public Health.* 2011;11:716.
87. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med.* 2012;172(18):1377–1385.
88. Varga ED, Urdaniz AP, Canti GF. Burnout syndrome in general hospital doctors. *Eur J Psychiatr.* 1996;10:207–213.
89. Bargellini A, Barbieri A, Rovesti S, Vivoli R, Roncaglia R, Borella P. Relation between immune variables and burnout in a sample of physicians. *Occup Environ Med.* 2000;57(7):453–457.
90. Trichard A, Danel T, Sobaszek A. Epuisement professionnel et consommation de psychotropes chez les medecins hospitaliers. *Alcoologie et Addictologie.* 2005;27(4):303–308.
91. Fuss I, Nubling M, Hasselhorn HM, Schwappach D, Rieger MA. Working conditions and Work-Family Conflict in German hospital physicians: psychosocial and organisational predictors and consequences. *BMC Public Health.* 2008;8:353.
92. Marner S. The Role of Empathy and Witnessed Aggression in Stress Reactions Among Staff Working in a Psychiatric Hospital [dissertation]. New Brunswick, NJ: Rutgers University; 2008.
93. Shehabi Y, Dobb G, Jenkins I, Pascoe R, Edwards N, Butt W. Burnout syndrome among Australian intensivists: a survey. *Crit Care Resusc.* 2008;10(4):312–315.
94. Brown R, Dunn S, Byrnes K, Morris R, Heinrich P, Shaw J. Doctors’ stress responses and poor communication performance in simulated bad-news consultations. *Acad Med.* 2009;84(11):1595–1602.
95. Tunc T, Kutanis RO. Role conflict, role ambiguity, and burnout in nurses and physicians at a university hospital in Turkey. *Nurs Health Sci.* 2009;11(4):410–416.
96. Cocco E. How much is geriatric caregivers burnout caring-specific? Questions from a questionnaire survey. *Clin Pract Epidemiol Ment Health.* 2010;6:66–71.
97. Doppia MA, Estryn-Behar M, Fry C, Guetarni K, Lieutaud T; comite de pilotage de l’enquete SESMAT. Burnout in French doctors: a comparative study among anaesthesiologists and other specialists in French hospitals (SESMAT study) [in French]. *Ann Fr Anesth Reanim.* 2011;30(11):782–794.
98. Glasheen JJ, Misky GJ, Reid MB, Harrison RA, Sharpe B, Auerbach A. Career satisfaction and burnout in academic hospital medicine. *Arch Intern Med.* 2011;171(8):782–785.
99. Thorsen VC, Tharp AL, Meguid T. High rates of burnout among maternal health staff at a referral hospital in Malawi: a cross-sectional study. *BMC Nurs.* 2011;10:9.
100. Quenot JP, Rigaud JP, Prin S, et al. Suffering among careers working in critical care can be reduced by an intensive communication strategy on end-of-life practices. *Intensive Care Med.* 2012;38:55–61.
101. Ruitenburg MM, Frings-Dresen MH, Sluiter JK. The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: a cross-sectional study. *BMC Health Serv Res.* 2012;12:292–298.
102. Seibt R, Hubler A, Steputat A, Scheuch K. Effort-reward-ratio and burnout risk among female teachers and hospital-employed female physicians: a comparison between professions [in German]. *Arbeitsmed Sozialmed Umweltschad.* 2012;47:396–406.