

# Evidence-Based Interventions for Medical Student, Trainee and Practicing Physician Wellbeing: A CHARM Annotated Bibliography

For the Collaborative for Healing and Renewal in Medicine (CHARM) *Best Practices Subgroup*

Thomas L<sup>1</sup>, Harry E<sup>2</sup>, Quirk R<sup>3</sup>, Gooding H<sup>4</sup>, Ripp J<sup>5</sup>, James T<sup>6</sup>, Kosub KY<sup>7</sup>, Pinto-Powell RC<sup>8</sup>, Orrange S<sup>9</sup>, Panagioti M<sup>10</sup>, Duckles AB<sup>11</sup>, Brown C<sup>12</sup>, Feingold J<sup>13</sup>, Co JP<sup>14</sup>, Wallach S<sup>15</sup>, Tan WW<sup>16</sup>, McManamon AC<sup>17</sup>, Palamara K<sup>18</sup>, Block L<sup>19</sup>, Quinn M<sup>20</sup>, Lukela M<sup>21</sup>, Tomescu O<sup>22</sup>

<sup>1</sup>Larissa Thomas, MD, MPH; University of California San Francisco; San Francisco, CA USA

<sup>2</sup>Elizabeth Harry, MD; Harvard Medical School; Boston, MA USA

<sup>3</sup>Rosemary Quirk, MD; Hennepin County Medical Center; Minneapolis, MN USA

<sup>4</sup>Holly Gooding, MD, MSc; Harvard Medical School; Boston, MA USA

<sup>5</sup>Jonathan Ripp, MD, MPH; Icahn School of Medicine at Mount Sinai; NY, NY USA

<sup>6</sup>Tricia James, MD; Providence Portland Medical Center; Portland, Oregon USA

<sup>7</sup>Kristy Y Kosub, MD; UT Health San Antonio; San Antonio, TX USA

<sup>8</sup>Roshini C. Pinto-Powell, MD; Geisel School of Medicine; Dartmouth, NH USA

<sup>9</sup>Susan M. Orrange, PhD; Jacobs School of Medicine and Biomedical Sciences; University at Buffalo; Buffalo, NY USA

<sup>10</sup>Maria Panagioti, PhD; NIHR School for Primary Care Research; University of Manchester; Manchester, UK

<sup>11</sup>Anne Duckles, MD/MSCR candidate; Perelman School of Medicine at the University of Penn.; Philadelphia, PA USA

<sup>12</sup>Courtney Brown, Research Assistant; Boston Children's Hospital; Boston, MA USA

<sup>13</sup>Jordyn Feingold, MAPP, MD/MSCR candidate; Icahn School of Medicine at Mount Sinai; New York, NY USA

<sup>14</sup>John Patrick T. Co, MD, MPH; Harvard Medical School; Boston, MA USA

<sup>15</sup>Sara Wallach MD; Seton Hall Hackensack Meridian School of Medicine; Trenton, NJ USA

<sup>16</sup>Winston W. Tan MD; Mayo Clinic Florida; Jacksonville, FL USA

<sup>17</sup>Alyssa C. McManamon, MD; Uniformed Services University of the Health Sciences; Bethesda, MD USA

<sup>18</sup>Kerri Palamara, MD; Massachusetts General Hospital, Harvard Medical School; Boston, MA, USA

<sup>19</sup>Lauren Block MD MPH; Donald and Barbara Zucker School of Medicine at Hofstra/Northwell; Hempstead, NY USA

<sup>20</sup>Mariah Quinn, MD MPH; University of Wisconsin School of Medicine and Public Health; Madison, WI USA

<sup>21</sup>Michael Lukela, MD; University of Michigan; Ann Arbor, MI USA

<sup>22</sup>Oana Tomescu, MD, PhD; Perelman School of Medicine at the University of Pennsylvania; Philadelphia, PA USA

**Correspondence to:** Oana Tomescu, MD, PhD, Division of General Internal Medicine, Hospital of the University of Pennsylvania; Perelman School of Medicine at the University of Pennsylvania; Philadelphia, PA 19104  
E-mail: oana.tomescu@uphs.upenn.edu

## EMOTIONAL HEALTH INTERVENTIONS

### *Mindfulness Training*

#### *Medical Students*

Dyrbye LN, Shanafelt TD, Werner L, et al. **The impact of a required longitudinal stress management and resilience training course for first-year medical students.** *J Gen Intern Med* 2017. [Epub ahead of print 31 Aug 2017]. doi: [10.1007/s11606-017-4171-2](https://doi.org/10.1007/s11606-017-4171-2).

**Impetus:** Prior studies using mindfulness-based stress reduction in trainees and practicing physicians have shown reductions in burnout. However, in prior studies, these interventions were voluntary. This study evaluates whether incorporation of a longitudinal curriculum based on mindfulness-based stress reduction (MBSR) as a required component of the first year medical school curriculum improved wellbeing.

**Description:** All first year students at Mayo Clinic School of Medicine in 2014 and 2015 participated in a MBSR course using the Stress Management and Resilience Training (SMART) program previously used in two randomized trials, which included a total of 12 curricular hours for the 2014 cohort and 10 hours for the 2015 cohort. The course was revised based on student feedback between 2014 and 2015. Content was delivered through small groups led by inter-disciplinary with content and small-group facilitation expertise, and included a check in, reflection activity, group discussion, and skills training. Students completed a pre- and post- survey with the Maslach Burnout Inventory, Medical Outcomes Study Short Form, Perceived Stress Scale, Connor-Davidson Resilience Scale, and Happiness and Gratitude Scale. Paired analysis was available for 43.1% of students. Compared to baseline at the start of the year, stress significantly increased and happiness and quality of life significantly declined. Empathy also declined, although the decline was only significant in the 2014 cohort. Burnout increased, although the increase was not statistically significant, and resilience did not change significantly. Students appreciated efforts to incorporate wellness into the curriculum but felt that it took time away from other efforts. Although direct comparison to prior classes was not possible, the changes in wellbeing were not improved compared to a pre-intervention cohort. Overall, this required curriculum did not improve resilience or clearly mitigate the impact of the rigors of medical school on wellbeing.

**Contribution:** This study's strength included its design using validated outcome measures of wellbeing and the use of a required, embedded curriculum for an entire cohort of medical students. Given the discrepancy between this finding and prior studies of volunteers, the authors suggest that the benefits that have been seen in opt-in interventions may not translate into improvements in wellbeing when participation is required. They highlight the need to offer a variety of options that students can select, in addition to programmatic interventions that improve the learning environment.

**Cost:** The authors note that funding and resources to support the curriculum were included in the student affairs budget but do not specify the amount.

Dobkin PL and Hutchinson TA. **Teaching mindfulness in medical school: where are we now and where are we going?** *Med Educ* 2013;47(8):768–79. doi: [10.1111/medu.12200](https://doi.org/10.1111/medu.12200).

**Impetus:** Prior to this publication, past studies have shown that teaching mindfulness in medical school reduces distress, and has the potential to decrease burnout and increase quality of life. The purpose of this

review was to describe which schools teach mindfulness, and to determine the extent to which these programs are carried out with medical students.

**Description:** This article summarizes 14 medical school programs that teach mindfulness to medical and dental students and residents. Programs were identified and program or course directors were contacted for more information. A wide range of formats were used to teach mindfulness including simple lectures, day-long workshops, and 8-10-week programs in mindfulness-based stress reduction. Two medical schools had integrated mindfulness into their curriculum: the University of Rochester School of Medicine and Dentistry (USA) and the Monash Medical School (Australia).

**Contribution:** This publication describes the multiple different ways mindfulness was being taught in medical schools and provides ideas for integrating mindfulness-based stress reduction programs and training into medical education. The article also provides links to various programs as well as faculty contact information. The variability of the delivery of mindfulness interventions highlights the heterogeneity of this body of literature; the authors suggest more rigorous studies are needed to further evaluate how this intervention can best be incorporated into medical school curricula.

**Cost:** Unknown.

**Warnecke E, Quinn S, Ogden K, et al. A randomized controlled trial of the effects of mindfulness practice on medical student stress levels. *Med Educ* 2011;45(4):381-8. doi: [10.1111/j.1365-2923.2010.03877.x](https://doi.org/10.1111/j.1365-2923.2010.03877.x).**

**Impetus:** Mindfulness interventions have been shown to reduce stress in medical students and physicians. However, these interventions are often time consuming and require determination and commitment. This study aimed to examine whether an audio CD of guided mindfulness practice could be used to decrease stress, anxiety and depression in senior medical students.

**Description:** This study was a multicenter, randomized controlled trial with intention-to-treat analysis in three medical schools attached to the University of Tasmania in Hobart, Tasmania. Sixty-six students were randomized to either usual care or the intervention group. The intervention group received an audio CD of guided mindfulness practice and were instructed to use the CD daily over eight weeks. The impact of the intervention was measured by the Perceived Stress Scale (PSS) and Depression, Anxiety and Stress Scale (DASS). The intervention group had a significant decrease in perceived stress (on the PSS) and anxiety (on the DASS). A borderline significant effect was observed on the stress component of the DASS ( $p = 0.05$ ). The significant effects were maintained at eight weeks follow up.

**Contribution:** This study contributed significantly to literature on mindfulness and stress among medical students. First, the study confirmed that medical students experience higher rates of stress than their age-matched peers. Second, it is the first randomized controlled trial to examine an audio CD mindfulness intervention for stress management. This intervention requires less time and fewer resources than traditional mindfulness-based stress reduction, and is self-guided by students, making it more accessible for their schedules. The randomized structure also strengthens this study.

**Cost:** Funding was provided by a seed grant awarded by the Australian and New Zealand Association for Health Professional Educators (ANZAHPE); detailed cost data not provided.

Rosenzweig S, Reibel DK, Greeson JM, *et al.* Mindfulness-based stress reduction lowers psychological distress in medical students. *Teach Learn Med* 2003;15(2):88-92. doi: [10.1207/S15328015TLM1502\\_03](https://doi.org/10.1207/S15328015TLM1502_03).

**Impetus:** Research has demonstrated that mindfulness-based stress reduction (MBSR) as an educational intervention improves coping skills and reduces emotional distress in medical students. This study aimed to examine the effectiveness of MBSR as an intervention in a prospective, non-randomized study.

**Description:** This study was conducted at Jefferson Medical College from 1996-2000. Second-year medical students could self-select to participate in a MBSR program offered as one choice among several electives; approximately 18% of each class chose the MBSR elective. MBSR students (n=140) were taught a variety of mindfulness meditation practices (including body scan, breath awareness, mindful stretching, eating meditation, walking meditation, and guided imagery), and were expected to practice 20 min of formal meditation six days/week. The control group students (n=162) participated in a didactic course on complementary and alternative medicine. All students were administered the Profile of Mood States (POMS) instrument pre- and post-course. MBSR students experienced an 18% decrease (pre-course to post-course) in Total Mood Disturbance (TMD), whereas control students experienced a 38% increase. Improvements in several POMS subscale scores were also seen in MBSR students, whereas declines were seen in several subscale scores in the control students. Of the MBSR students surveyed, 98% said they would recommend the course to other medical students.

**Contribution:** This study contributes to literature on mindfulness-based stress reduction for medical students. Results from this study reveal that MBSR is an effective stress management intervention for medical students.

**Cost:** Unknown.

#### *Interns/ Residents /Fellows*

Taylor M, Hageman JR, Brown M. A mindfulness intervention for residents: relevance for pediatricians. *Pediatric Ann.* 2016;45(10):e373–e376. doi: [10.3928/19382359-20160912-01](https://doi.org/10.3928/19382359-20160912-01).

**Impetus:** Given the growing prevalence and impact of physician burnout in the modern health care system, targeted interventions designed to reduce burnout and promote wellbeing are necessary in medical training and practice. Mindfulness interventions have demonstrated efficacy, but many of the successful programs documented in research demand a significant time commitment that presents a limiting factor for busy providers. This study aimed to evaluate the feasibility and potential impact of a brief intervention in mindfulness meditation via a smartphone application for a pediatric resident population.

**Description:** This uncontrolled study consisted of 33 volunteer participants recruited from the University of Chicago pediatric residency program. The intervention consisted of ten 10-minute recorded sessions delivered over a 10-day period via the free smartphone application Headspace. Each session was comprised of educational material and a short guided meditation. Quantitative measures included pre- and post-intervention abbreviated Maslach Burnout Inventory (aMBI) and the Mindful Attention Awareness Scale. Outcome measures indicated no statistically significant change in pre- to post-intervention aMBI measures of personal accomplishment, depersonalization, emotional exhaustion, or job satisfaction; however, this negative result was limited by the small number of participating residents (n=33), 11 of whom completed the post-intervention survey. The majority of participants (84%) cited lack of time as a perceived barrier to regular mindfulness meditation practice. After the intervention, more residents perceived mindfulness as useful and planned to discuss potential therapeutic benefits with their patients. Limitations include small

sample size, potential selection bias, and self-reported data that was not objectively confirmed by researchers.

**Contribution:** This research supports the well-documented evidence that burnout is a significant problem facing physicians and trainees. The brief intervention in mindfulness meditation offered convenience in its delivery via a smartphone application, but residents clearly identified time limitations as the most significant barrier to incorporating meditation into their daily practice. Future research should evaluate the potential impact of integrating mindfulness training into formal educational curriculum to alleviate the burden of residents' time limitation.

**Cost:** Unknown.

**Goldhagen BE, Kingsolver K, Stinnett SS, Rosdahl JA. Stress and burnout in residents: impact of mindfulness-based resilience training. *Adv Med Educ Prac* 2015;6:525-32. doi: [10.2147/AMEP.S88580](https://doi.org/10.2147/AMEP.S88580).**

**Impetus:** Several mindfulness-based interventions have been shown to be effective for reducing burnout in primary care physicians and medical students. However, these time-intensive programs have limited practicality for busy residents. This study attempted to develop a shortened mindfulness-based intervention for residents with hopes of reducing burnout, depression and anxiety, and increasing mindfulness.

**Description:** Residents from several different residencies at Duke University (Family Medicine, Psychiatry, and Anesthesia) participated in two or three 1-hour sessions that introduced mindful awareness and included practical exercises that nurtured resilience. The intervention fit into resident schedules, and impact was measured by validated scales evaluating burnout (Oldenburg Burnout Inventory, OLBI); depression, anxiety and stress (DASS-21); and mindfulness (MAAS). Data was limited: 47 residents completed the pre-intervention survey, 30 completed the immediate post-intervention survey, and only 7/30 completed the 1-month follow-up survey. There were no significant changes in burnout or mindfulness. However, for female and PGY1-2 residents, there was a trend towards decrease in the DASS-21 score. In addition, those that reported higher baseline stress had a trend towards a reduction in stress and burnout.

**Contribution:** This study demonstrated that a shortened mindfulness-based program was not effective in reducing burnout among medicine residents; however, results are likely to be skewed by fairly small sample sizes. While the intervention did not demonstrate the expected effect, the paper did comment on ways that the program could change in order to become more effective. While studies that demonstrate change are often the only studies that are published, knowing which interventions that are not effective is equally important. In agreement with prior research, these results also show that at baseline, female residents experience significantly higher depression, anxiety and stress (as measured by DASS-21 scores), as well as emotional exhaustion (as measured by OLBI scores).

**Cost:** Unknown.

**Rosdahl JA and Kingsolver KO. Mindfulness training to increase resilience and decrease stress and burnout in ophthalmology residents: a pilot study. *Invest Ophthalmol Vis Sci* 2014;55(13):5579. Abstract**

**Impetus:** Stress and burnout are prevalent problems in ophthalmology residents. Practical ways to improve both of these measures are needed at the residency level. This abstract publication evaluates whether a 3-hour mindfulness training can impact depression, anxiety, stress and burnout.

**Description:** The intervention was a 3-hour session that introduced mindful awareness and included practical exercises that nurtured resilience. Standard web-based validated instruments of depression/anxiety/stress (DASS-21) and burnout (Oldenburg Burnout Inventory; OLBI) were administered prior to, and four to six weeks after, the intervention was delivered. Twelve of 18 ophthalmology residents completed the initial baseline assessment; eight of these residents participated in the intervention, but only 5/8 completed the post-intervention survey. Despite the small number, 80% of the intervention participants showed improvement in both outcome measures.

**Contribution:** The results of this small pilot study show promise for an abbreviated 3-hour mindfulness-based intervention for decreasing stress and burnout in residents.

**Cost:** Unknown.

*Practicing Physicians*

**Dobkin PL, Bernardi NF, Bagnis CI. Enhancing clinicians' wellbeing and patient-centered care through mindfulness. *J Contin Educ Health Prof* 2016;36(1):11-6. doi: [10.1097/CEH.000000000000021](https://doi.org/10.1097/CEH.000000000000021).**

**Impetus:** This study evaluated the impact of a mindfulness-based stress reduction (MBSR) course on provider wellness, burnout, and mindfulness. The authors also sought to evaluate whether this program improved physician communication with patients.

**Description:** This longitudinal study was conducted at the Pitié-Salpêtrière Hospital in Paris from September to December 2014. The full 8-week MBSR course was the intervention provided. The authors used pre- and post-intervention validated questionnaires to measure burnout (Maslach Burnout Inventory, MBI), depression (Beck Depression Inventory II, BDI), stress (Perceived Stress Scale, PSS), meaningfulness (Sense of Coherence), and mindfulness (Five Facet Mindfulness Questionnaire, FFMQ) in physicians. The authors also asked patients to evaluate their physicians' communication pre- and post-intervention, using the Rochester Communication Rating Scale. Lastly, several patient encounters were audio-recorded, transcribed, and analyzed using a Roter Interaction Analysis System (RIAS) to provide qualitative analysis of patient-physician encounters. This study included providers from multiple disciplines: physicians, psychologists, nurses, dieticians, an osteopath, and a research coordinator participated. Two people dropped out, leaving 25 participants in the data analysis. The communication evaluation included 18 participants, due to poor patient follow-up. The physicians who participated were from different specialties: cardiology, addiction medicine, internal medicine, oncology, pediatric psychiatry, and family medicine. The authors found significant reductions in burnout, as well as increases in mindfulness and meaningfulness among clinicians after the MBSR. They also found that patients' perceptions of clinical encounters improved, suggesting that patient-centered care improved after MBSR.

**Contribution:** This paper not only demonstrated the effectiveness of MBSR in improving provider-centered outcomes, but also tied these changes to improvements in patient care. Despite its small size, it was a well-done study that provides helpful information.

**Cost:** Unknown.

**Podgurski L, Claxton R, Greco CM, et al. Brief mindfulness-based self-care curriculum for an interprofessional group of palliative care providers (FR469-B). *J Pain Sym Man* 2015;49(2):384–385. Abstract <http://dx.doi.org/10.1016/j.jpainsymman.2014.11.138>.**

**Impetus:** Mindfulness-based initiatives have demonstrated self-care benefits among hospice and palliative care clinicians. Many established programs require a significant time investment (18-52 hours of instruction), limiting their utility among primary care clinicians. This research focused on the potential efficacy of a brief mindfulness-based intervention among a group of inter-professional palliative care providers.

**Description:** The mindfulness self-care curriculum consisted of five monthly 1-hour sessions. The efficacy of the intervention was evaluated based on pre- and post-intervention surveys that assessed mindfulness, burnout, and stress using validated scales, as well as satisfaction and narrative data. Given the abstract format, data was not included. Reported results indicate that participants were highly satisfied with this intervention and showed significant improvements in both mindfulness (on three of five subscales) and burnout levels (on one of three subscales). Narrative evaluation demonstrated retention of curricular concepts, and participants expressed interest in continuing elements of the program in ongoing activities.

**Contribution:** This research suggests that that time-intensive mindfulness curricula can be successfully adapted to a more brief initiative delivered within the regular workday, making it much more feasible for busy clinicians to participate and potentially benefit from a mindfulness-based program. Larger studies are needed.

**Cost:** Unknown.

**Amutio A, Martinez-Taboada C, Delgado LC, et al. Acceptability and effectiveness of a long-term educational intervention to reduce physicians' stress-related conditions. *J Contin Educ Health Prof* 2015;35(4):255-60. doi: [10.1097/CEH.0000000000000002](https://doi.org/10.1097/CEH.0000000000000002).**

**Impetus:** Learning mindfulness has been shown to successfully reduce stress-related symptoms, including burnout, in health professionals. Most studies have focused on the short-term impact of interventions, and have studied only emotional symptom improvements. This study evaluated the effectiveness of a two-phase mindfulness intervention (8-week initial treatment plus 10-month maintenance phase) in reducing work stress-related emotional and physical symptoms (burnout, heart rate and blood pressure) in physicians.

**Description:** This was a randomized-control study of 42 physicians in Spain who were randomized to the intervention (n=21) or to a waitlist control (n=21). Surveys (Maslach Burnout Inventory, MBI; Five Facet Mindfulness Questionnaire) were administered pre-intervention, immediately following Phase 1 and Phase 2. Blood pressure and heart rate were checked before and after each session for the intervention group throughout the 10-month period. After the completion of the eight weeks of treatment, the intervention

group showed significant increases in mindfulness, decreases in the emotional exhaustion component of the burnout measure, and improvements in heart rate and blood pressure. The effects on depersonalization and personal accomplishment were non-significant. Over the 10-month maintenance period, the improvements were maintained in the intervention group especially for mindfulness and systolic blood pressure. Acceptance was high, as indicated by low attrition rate and high compliance with program activities.

**Contribution:** This study substantiates prior evidence that mindfulness-like interventions can decrease emotional exhaustion and increase mindfulness in physicians. The findings add to evidence that this type of intervention can also positively impact heart rate and blood pressure. Additionally, this study showed sustained positive effects during a maintenance phase that extended the intervention to 12 months total.

**Cost:** Unknown.

**Asuero AM, Queralto JM, Pujol-Ribera E, et al. Effectiveness of a mindfulness education program in primary health care professionals: a pragmatic controlled trial. *J Contin Educ Health Prof* 2014;34(1);4-12. doi: [10.1002/chp.21211](https://doi.org/10.1002/chp.21211).**

**Impetus:** This study was designed to assess the effectiveness of a Mindfulness-Based Stress Reduction (MBSR) program in reducing burnout and mood disturbance and improving empathy and mindfulness among primary health care professionals in Spain.

**Description:** This randomized controlled trial used validated surveys to measure pre- and post-intervention burnout (Maslach Burnout Inventory, MBI), mindfulness (Baer's Five Facet Mindfulness Questionnaire), empathy (Jefferson Scale of Physician Empathy), and mood disturbance (Profile of Mood States). Sixty-eight primary health care professionals (physicians, nurses, social workers and clinical psychologists) were randomized into intervention (n=43) and control (n=25). The intervention was the standard 8-week mindfulness-based stress reduction (MBSR) course. Results showed that intervention participants improved in all four scales. The magnitude of change was large in total mood disturbance and mindfulness and moderate in burnout and empathy scales. No significant differences were found in the control group.

**Contribution:** This randomized controlled trial was able to show the effectiveness of a mindfulness-based stress reduction program for primary health care professionals in Spain. The authors demonstrated a decrease in burnout and mood disturbance over the course of the 8-week program, as well as an increase in compassion and mindfulness.

**Cost:** Unknown.

**Moody K, Kramer D, Santizo RO, et al. Helping the helpers: mindfulness training for burnout in pediatric oncology--a pilot program. *J Pediatr Oncol Nurs* 2013;30(5):275–84. doi: [10.1177/1043454213504497](https://doi.org/10.1177/1043454213504497).**

**Impetus:** The prevalence of burnout among pediatric oncology staff is documented between 40% and 60%. Despite the urgent need for modifying interventions, there is little research on successful interventions to prevent or reduce burnout symptoms among pediatric oncology providers. Additionally, the time-intensive mindfulness-based stress reduction (MBSR) intervention has limited its utilization. This study was planned as a feasibility pilot study to evaluate the impact of an abbreviated mindfulness-based course (MBC) on

burnout, stress, and depression among pediatric oncology clinical staff (including nurses, social workers, physicians, nurse practitioners, psychologists, and child-life specialists), who were recruited from two academic programs: The Children's Hospital in Montefiore in NYC and the Schneider Children's Hospital in Petach Tikva, Israel.

**Description:** This randomized controlled study measured the impact of an abbreviated mindfulness-based course (MBC) based on Kabat-Zinn's concept of mindfulness. The intervention was a structured skills-training program with weekly meetings consisting of an introductory 6-hour session, six weekly 1-hour follow-up sessions, and a final 3-hour wrap-up session, for a total of 15 contact hours, significantly fewer hours than other courses that entail an investment of 30 to 60 hours. A total of 48 people enrolled, 23 of whom were in the intervention arm (12 in U.S., 11 in Israel). Sessions were delivered in a group setting at each hospital. Participants received formal instruction in a variety of mindfulness practices, including body scan, sitting meditation, mindful movement, the STOP mini-meditation technique and loving-kindness meditation. They were provided with CD recordings to guide home practice and asked to practice these techniques and journal their experience daily between course sessions. Qualitative review of journals from the intervention arm suggested that participants were experiencing expected benefits of mindfulness training. However, quantitative outcome measures based on pre-post course completion of the Maslach Burnout Inventory (MBI), the Perceived Stress Scale-14 (PSS), and the Beck Depression Inventory (BDI) showed no significant differences between the control and intervention groups at baseline and follow-up. The authors suggest that the severity of the stress and burnout within the pediatric oncology specialty may in part explain the lack of improvement in objective measures. At baseline, the sample in this study was significantly more stressed and burned out compared to samples from other similarly-designed studies that have shown benefit with other groups of healthcare professionals. The authors suggest that future interventions for this population may need to be more robust or may benefit from additional stress reduction or relaxation techniques. Research limitations include relatively small sample size and lack of blinding.

**Contribution:** This research suggests that mindfulness-based training does offer some apparent subjective benefits for pediatric oncology clinical staff, but has not demonstrated significant objective improvements in measures of stress, burnout, and depression. The abbreviated nature of the intervention may also have limited its effectiveness.

**Cost:** Unknown.

**Fortney L, Luchterhand C, Zakletskaia L, et al. Abbreviated mindfulness intervention for job satisfaction, quality of life, and compassion in primary care clinicians: A pilot study. *Ann Fam Med* 2013;11(5):412–20. doi: [10.1370/afm.1511](https://doi.org/10.1370/afm.1511).**

**Impetus:** Burnout, attrition and poor work satisfaction are pervasive issues among primary care physicians that can negatively influence patient care. However, interventions for improving work-life balance are limited in scope and evaluation. This study aimed to understand the potential impact of an abbreviated mindfulness course for 30 primary care physicians at University of Wisconsin-Madison.

**Description:** This uncontrolled study measured the impact of an abbreviated version of the established Mindfulness-Based Stress Reduction (MBSR) program on primary care physicians by comparing self-reported pre-post survey results. The abbreviated program was completed in approximately half the time required for the typical MBSR program. Thirty physicians (family medicine, internal medicine, and

pediatrics) were recruited. Data was collected at four different time points (baseline and one day, eight weeks and nine months post-intervention) and 5 validated measures were used: Maslach Burnout Inventory (MBI); the Depression Anxiety Stress Scales-21 (DASS-21); the Perceived Stress Scale (PSS); the 14-item Resilience Scale (RS-14); and the Santa Clara Brief Compassion Scale (SCBC). Retention in the intervention was high (29/30); 28 (93%) of the participants gave responses for survey 2, and 23 (77%) gave responses for surveys 3 and 4. Results showed significant improvements in the MBI and DASS-21 measures at all 3 time points. However, there was no significant change in the RS-14 or SCBC scores. Impressively, at the 9-month post-intervention time-point, participants showed sustained significant improvements in emotional exhaustion, depersonalization, personal accomplishment, depression, anxiety, stress, and perceived stress.

**Contribution:** This research suggests that an abbreviated MBSR program may be a time- and resource-efficient tool to achieve significant improvements in clinician stress and burnout symptoms, and to positively influence physicians' work satisfaction. Additionally, this study evaluated physicians in three different primary care specialties and added a website portion, which allowed physicians to directly apply their mindfulness lessons to their clinical practice. Most impressively, improvements in burnout, stress and work satisfaction were sustained at nine months post-intervention, without any maintenance phase.

**Cost:** Unknown.

**Goodman MJ and Schorling JB. A mindfulness course decreases burnout and improves wellbeing among healthcare providers. *Intern J Psychiatry Med* 2012;43(2):119–28. doi: [10.2190/PM.43.2.b](https://doi.org/10.2190/PM.43.2.b).**

**Impetus:** This study aimed to understand the potential impact of a continuing education course in mindfulness for a broad range of multidisciplinary healthcare providers near Charlottesville, Virginia.

**Description:** This uncontrolled study measured the impact of an eight-week continuing education course modeled after the established Mindfulness-Based Stress Reduction (MBSR) program and offered formal instruction in a variety of mindfulness practices. The course was taught 11 times between 2004-2010, with a total of 93 participants (51 physicians, 42 non-physician providers) for a tuition cost of \$400 for all enrollees and a \$200 discount for residents/fellows. Common themes emerging throughout the years include perfectionism, self-criticism, guilt, feelings of not doing enough, feeling powerless to help, and frustration with patients who are unable or unwilling to make lifestyle changes. Quantitative outcome measures based on pre-post course completion of the Maslach Burnout Inventory (MBI) and the Short Form-12v2 showed significant improvements in emotional exhaustion, depersonalization, personal accomplishment, and mental health. The physical health SF-12v2 subscale, however, was not significantly changed.

**Contribution:** This study reports aggregate data over the course of six years with 93 participants, and shows that the traditional MBSR courses seems to be an effective tool for achieving significant improvements in burnout scores and mental wellbeing among a diverse range of healthcare providers. Offering the MBSR course for continuing education credits may aid in its implementation and in physician engagement, given the time-intensive intervention. Further research should include a control group.

**Cost:** Unknown, although tuition cost of \$400 for all enrollees, with a \$200 discount for residents/fellows

Beckman HB, Wendland M, Mooney C, *et al.* The impact of a program in mindful communication on primary care physicians. *Acad Med* 2012;87(6):815-19. doi: [10.1097/ACM.0b013e318253d3b2](https://doi.org/10.1097/ACM.0b013e318253d3b2).

**Impetus:** This qualitative study sought to understand the impact of a mindful communication program on patient-centered care and physician wellbeing. The intervention was given to primary care physicians in Rochester, NY.

**Description:** This paper reports the qualitative themes obtained on exit interviews of 20 primary care physicians after participation in a mindful communication program. The program consisted of eight weekly sessions, a silent retreat, and 10 monthly sessions, totaling 52 hours. The course focused on mindfulness meditation, self-awareness exercises, narratives of clinical experiences, didactic material, and discussion. The authors randomly selected 20 physicians from those who had completed at least four weekly and four monthly sessions. They then interviewed 15 physicians in person and five over the phone. Analysis of the interviews revealed three main themes: (1) sharing experiences of medical practice with colleagues reduced professional isolation, (2) mindfulness skills improved physicians' ability to perform patient-centered care, and (3) developing greater self-awareness was a positive step towards personal and professional growth.

**Contribution:** The study identified important themes in understanding the impact of a mindfulness program on primary care physicians. The authors indicated that future research should explore the impact of mindfulness interventions on patient outcomes and physicians' actual behaviors.

**Cost:** Unknown.

Irving JA, Dobkin PL, Park J. Cultivating mindfulness in health care professionals: a review of empirical studies of mindfulness-based stress reduction (MBSR). *Complement Ther Clin Pract* 2009;15(2):61–6. doi: [10.1016/j.ctcp.2009.01.002](https://doi.org/10.1016/j.ctcp.2009.01.002).

**Impetus:** Stress and burnout symptoms are endemic among health care professionals and have been shown to have a negative influence on providers, patients and the health care system. This review was designed to evaluate the effectiveness of mindfulness-based stress reduction (MBSR) programs aimed at promoting clinicians' wellbeing and self-care skills.

**Description:** Mindfulness-based stress reduction is an 8-week psycho-educational program that consists of seven weekly 2.5 hour-long classes including instruction in various meditation practices (e.g. body scan, sitting and walking meditation, hatha yoga) as well as didactic material (e.g. relationship of stress to illness). Participants are encouraged to make a significant time commitment to home practice of techniques during and after completion of the program. This approach was developed by Kabat-Zinn and colleagues at the University of Massachusetts Medical Center and has demonstrated efficacy among a variety of clinical populations (e.g. patients with chronic pain, cancer, generalized anxiety). The authors reviewed ten published studies that examined the effectiveness of MBSR on students and clinicians from multiple disciplines. Overall findings indicate that MBSR seems to reduce stress, anxiety, and burnout among students and clinicians. However, the authors identify some significant conceptual and methodological limitations in the existing literature. Gaps for further study include the following: specific aspects of the program that were most effective; mechanisms through which MBSR may contribute to positive outcomes; dose-response relationships (based on home practice time commitment); influence of behavior variables on

outcomes; qualitative measures; physiological measures; potentially harmful or negative effects; effects in diverse populations; and impacts on patient care.

**Contribution:** Research suggests that MBSR programs may be an effective and viable tool for promoting self-care skills and the wellbeing of trainees and clinicians. However, the existing body of research has some significant conceptual and methodological limitations. The authors call for further research to better understand the application of mindfulness training and provide evidence-based recommendations for optimizing outcomes.

**Cost:** Unknown.

**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);1284-93. doi: [10.1001/jama.2009.1384](https://doi.org/10.1001/jama.2009.1384).**

**Impetus:** This study was designed to evaluate the effectiveness of an intensive educational program focused on mindful communication.

**Description:** This intervention consisted of eight weekly sessions, a silent retreat, and 10 monthly maintenance sessions, totaling 52 hours. Participants did not have to pay for the course and also received CME credits for participating and \$250 for survey completion. The course focused on mindfulness meditation, self-awareness exercises, narratives of clinical experiences, didactic material, and discussion. The effectiveness of the program was evaluated using validated scales measuring mindfulness (2-Factor Mindfulness Scale), burnout (Maslach Burnout Inventory· MBI), empathy (Jefferson Scale of Physician Empathy), psychosocial orientation (Physician Belief Scale), personality (Mini-markers of the Big Five Factor Structure), and mood (Profile of Mood States, POMS). These surveys were distributed at a total of five time points: (1) at the time of registration (a mean of 37 days before the start of the program); (2) at the beginning of the first session; (3) at the conclusion of the eighth weekly session; (4) at the conclusion of the last monthly session; and (5) three months after the program ended. There were improvements in all the validated outcome measures; mindfulness scores had the largest effect sizes. The Maslach Burnout Inventory had a medium-sized improvements across all three subscales. Empathy also significantly improved. Additionally, the physician belief scale improved significantly, suggesting a shift toward greater value placed on understanding the patient's emotional and social life in addition to disease-related factors. The Profile of Mood States showed moderate effect sizes in the total score and the depression, anger and fatigue subscales, with a smaller effect size for vigor. Personality traits of conscientiousness and emotional stability showed small to moderate improvements.

**Contribution:** The authors of this study found that participation in an intensive mindful communication program was beneficial for primary care physicians. This study showed improvements in all of the tested outcome measures, and the benefits of this program were shown to be sustained over time. While the intervention was shown to be effective, the uncontrolled nature of the study limits its methodological strength.

**Cost:** Unknown, although participants did not have to pay for the course and received CME credits for participating and \$250 for survey completion.

**Oman D, Hedberg J, Thoresen CE. Passage meditation reduces perceived stress in health professionals: A randomized, controlled trial. *J Consult Clin Psychol* 2006;74(4):714–9. doi: [10.1037/0022-006X.74.4.714](https://doi.org/10.1037/0022-006X.74.4.714).**

**Impetus:** Meditation interventions have increasingly been associated with stress reduction and improved health outcomes in clinical populations in scientific literature. However, critics have argued that much of this research suffers from methodological shortcomings. This randomized controlled trial aimed to understand the potential impact of passage meditation training on perceived stress reduction for health professionals.

**Description:** This randomized controlled study measured the impact of an eight-week training for health professionals using secular, spiritually-based tools based on the Eight-Point Program (EPP) meditation. EPP utilizes a variety of methods to integrate meditation into daily living: (1) passage meditation, the silent repetition of an inspirational passage from major religious tradition of one's choosing; (2) repetition of a holy word or mantra; (3) slowing down; (4) practicing focused, one-pointed attention; (5) training the senses; (6) putting others first; (7) spiritual association with others following EPP; and (8) inspirational reading from major spiritual figures and religious scriptures. Participants were recruited via in-service talks, flyers, and word-of-mouth communication, and subsequently randomized to the intervention arm (n=27) or the wait list control arm (n=31). The intervention group included physicians, nurses, chaplains, and other health professionals who met for two-hour weekly sessions. Participants completed surveys pre-and post-intervention, and at 8- and 19-week follow-up intervals with eight validated measures: Perceived Stress Scale, Maslach Burnout Inventory, the mental health and vitality subscales from the Medical Outcomes Study, and Satisfaction With Life Scale (SWLS). Results showed beneficial effects on mental health and a large decrease in perceived stress that was sustained through the 19-week follow-up. Interestingly, findings indicate that the stress reduction and mental health benefits were greater for participants who identified as only moderately or less spiritual relative to those who identified as highly spiritual. Limitations included the small sample size and the lack of assessment of participants' prior practices.

**Contribution:** This research suggests that secular, spiritually-based tools based on the Eight-Point Program (EPP) meditation may benefit health professionals by reducing perceived stress and improving mental health. This study was a randomized trial with excellent retention (90%). Future research should evaluate generalizability and sustainability, and include qualitative analysis to study potential moderating variables (e.g., personality) that may influence outcomes.

**Cost:** Unknown.

## *Mind-Body Interventions*

### *Medical Students*

**Kraemer MK, Luberto CM, O'Bryan EM, et al. Mind-body skills training to improve distress tolerance in medical students: a pilot study. *Teach Learn Med* 2016;28(2):219-228. doi: [10.1080/10401334.2016.1146605](https://doi.org/10.1080/10401334.2016.1146605).**

**Impetus:** Throughout medical education, stressful work environments can result in high rates of psychological distress for learners. However, distress tolerance, defined as the ability to withstand emotional distress, is considered to be protective against psychological distress and can be improved through mind-body training. This study aimed to describe the facets of distress tolerance in medical students

who engaged in the mind-body training, to examine the relationship between psychological distress and distress tolerance, and to report the students' perceptions of the mind-body intervention.

**Description:** The intervention was an 11-week skills training workshop that focused on mind-body skills such as biofeedback, guided imagery, relaxation, meditation, breathing exercises, and autogenic training. The study recruited 52 first and second year medical students who were enrolled in either the mind-body intervention or a control group. All participants completed the Distress Tolerance Scale (DTS), Cognitive and Affective Mindfulness Scale-revised (CAMS-R), Perceived Stress Scale (PSS-10), and Positive Affect Negative Affect Schedule (PANAS) before and after the 11-week period. The authors found that the students in the mind-body group showed a modest improvement in all distress tolerance subscales over time; the control group showed no change. In addition, they demonstrated that improvements in distress tolerance was also associated with improvements in psychological symptoms.

**Contribution:** The authors demonstrated that the 11-week mind-body training improved distress tolerance and was correlated with a decrease in psychological distress. They postulate that this is a novel way to improve the wellbeing of medical students and reduce the impact of psychological distress.

**Cost:** Unknown.

**Bond AR, Mason HF, Lemaster CM, et al. Embodied health: the effects of a mind-body course for medical students. *Med Educ Online* 2013;8:1-8. doi: [10.3402/meo.v18i0.20699](https://doi.org/10.3402/meo.v18i0.20699).**

**Impetus:** Medical students are known to experience high rates of stress during their education, with consequent decline in empathy, negative impact on patient relationships, and symptoms of burnout. Mindfulness-based stress reduction (MBSR) programs have been shown to improve anxiety and increase empathy in medical learners. Mind-body practices, including meditative breathing and relaxation, have been shown to enhance self-efficacy and self-regulation.

**Description:** The intervention was an 11-week elective course, Embodied Health, that combined sessions in yoga, meditation, and neuroscience didactics about mind-body practices for 27 first and second year medical students at Boston University School of Medicine. Students completed pre- and post-course surveys that evaluated four areas: empathy (Jefferson Scale of Physician Empathy), perceived stress (Perceived Stress Scale), self-regulation and goal achievement (Self-Regulation Questionnaire), and self-compassion (Self-Compassion Scale). Students also wrote a reflective post-course essay. Statistically significant changes were seen in self-regulation and self-compassion; a positive but non-significant trend was seen in empathy and perceived stress scores. Results were reinforced by themes within the students' reflective essays, including mind-body reconnection, increased sense of camaraderie with peers, improvement in mindfulness, confidence in using mind-body skills in future patient interactions, and management of stress.

**Contribution:** This novel course incorporates experiential and didactic teaching of mind-body medicine, but is limited by a small and self-selected sample size, lack of control group, a high empathy baseline rating in students, and no long-term post-course data on student wellbeing. This study suggests a small favorable short-term effect of mind-body medicine on medical student wellbeing.

**Cost:** Unknown.

Hassed C, de Lisle S, Sullivan G, Pier C. Enhancing the health of medical students: outcomes of an integrated mindfulness and lifestyle program. *Adv Health Sci Educ Theory Pract* 2009;14:387-98. <http://dx.doi.org/ucsf.idm.oclc.org/10.1007/s10459-008-9125-3>.

**Impetus:** Poor mental health during medical training has been linked to poor personal health behaviors and burnout later in professional careers, as well as lower quality of care indicators, such as prescribing errors. This article explores a wellness curriculum at a medical school aimed at reducing burnout and increasing emotional intelligence through mindfulness-based self-care.

**Description:** Monash University in Australia developed its Health Enhancement Program (HEP) for their first year medical students in 2002, implemented during the second half of the first semester for the 315 medical students in each class. The curriculum includes mindfulness and mind-body techniques and the “ESSENCE” model for a healthy lifestyle (including of education, stress management, spirituality, exercise, nutrition, connectedness, and environment). The eight core lectures are supplemented by six 2-hour tutorials and self-directed learning. Students keep a journal and meet regularly with a tutor and in small groups. These elements are integrated into other elements of the core curriculum through lecture series, case-based learning, and assessment integrated into assessment of other components of the curriculum and the OSCE. Overall, the HEP curriculum is a significant portion of the first year curriculum, accounting for 10% of the total assessment load. Data before and after the intervention were available for 148 (55%) of students. 90% reported applying mindfulness practice, and there were statistically significant improvements in the depression, hostility, and General Severity Index of the Symptom Checklist-90, and in the psychological domain of the World Health Organization Quality of Life scale.

**Contribution:** This intervention is one of the longest-standing wellness curricula to be integrated into a core curriculum of a medical school, and although limited by its non-randomized design, demonstrated improvements in wellbeing measures before and after intervention. The assessment strategies are also integrated into the overall medical school assessments in order to avoid marginalizing the wellness curriculum.

**Cost:** Unknown.

Rakel DP and Hedgecock J. Healing the healer: a tool to encourage student reflection towards health. *Med Teach* 2008;30(6):633-5. doi: [10.1080/01421590802206754](https://doi.org/10.1080/01421590802206754).

**Impetus:** Research has shown that students’ health and healthy behaviors decline while in medical school and residency. This study aimed to create and evaluate the results of a web-based tool for medical students that would encourage self-reflection, promote positive lifestyle habits, and educate on the foundations of health.

**Description:** The American Medical Student Association (AMSA) received NIH funding to create a web-based health tool to help medical students develop their own health plan. The tool’s objectives were to encourage self-reflection, promote positive lifestyle habits, and educate on the foundations of health. Students who completed the module were provided with a summary of their self-written health plan and were then asked to complete a questionnaire to assess the effectiveness of the tool. Of the first 500 students and residents to complete the questionnaire, 89.4% of respondents agreed with the statement that the tool improved their understanding of how to maintain personal health, 38.5% agreed that the module would

change their behavior toward improved health, 50.6% agreed that what they learned would help them communicate health concepts to future patients and 83% indicated they learned something new from the module.

**Contribution:** This study contributes significantly to the literature on self-care and wellbeing of medical students and trainees. The results show that having medical students develop their own health plans can be an effective method towards encouraging self-care and understanding foundational concepts of health and wellbeing.

**Cost:** Unknown.

**Finkelstein C, Brownstein A, Scott C, Lan YL. Anxiety and stress reduction in medical education: an intervention. *Med Educ* 2007;41(3):258-64. doi: [10.1111/j.1365-2929.2007.02685.x](https://doi.org/10.1111/j.1365-2929.2007.02685.x).**

**Impetus:** Stress and burnout are common throughout medicine for practicing doctors, residents and students. Stress reduction programs in medical training have been found to reduce stress in medical students; however, previous studies had no control groups and lacked longer term follow-up. This study aimed to assess the effectiveness of a stress reduction elective on second year medical students, and to determine if improvements would be sustainable.

**Description:** In 2004, an elective entitled “Mind–Body Medicine: an Experiential Elective” was offered at the University of Washington School of Medicine. The study compared 30 second-year medical students who self-selected to enroll in a 10-week mind body elective to 46 student volunteers who did not enroll in the elective. Students in both groups completed four validated instruments before and after the elective, and three months later: (SCL-90 Anxiety Subscale, Profile of Mood States (POMS), 2-Item Depression Index, and Perceived Stress of Medical School (PSMS). Before the mind body elective, participating students scored significantly higher on the PSMS and SCL-90 instruments than control students, indicating that the elective may have attracted students with more stress and anxiety. At the end of the elective and three months later, there were no differences in scores between the elective and control students in any of the instruments.

**Contribution:** This study contributes significantly to research surrounding stress-reduction programs in medical training. The positive results of this study support the conclusion that medical students who take a stress-reduction elective course develop sustainable coping skills that help them reduce anxiety and stress.

**Cost:** Funded by an NIH-NCCAM R25 grant (R25 AT 0813–04).

### *Interns/Residents/Fellows*

**Ospina-Kammerer V and Figley CR. An evaluation of the Respiratory One Method (ROM) in reducing emotional exhaustion among family physician residents. 2003;5(1):29-32. PMID: [12722487](https://pubmed.ncbi.nlm.nih.gov/12722487/).**

**Impetus:** In the early 2000’s, many studies had already been published highlighting the increasing amount of stress and burnout experienced by resident physicians. This study was one of the earliest to evaluate the impact of a stress reduction technique, the Respiratory One Method (ROM), on the levels of burnout of family medicine residents. ROM is a meditation technique designed to mitigate the impact of emotional arousal and promote relaxation of the mind and body. The technique involves first taking slow, deep

breaths, then on the exhalation, the practitioner mentally repeats the word “one” (or any other phrase; e.g. “let go”).

**Description:** Residents who consented to participate in the study were assigned to the intervention group (n=14) or a control group (n=10). This was not a true randomized controlled trial because the residents who were recruited first were immediately assigned to the intervention group, which ran first. The intervention group met once per week for four consecutive weeks. The length of time spent during these weekly meeting was not mentioned, nor how long participants were told to practice the technique. The Maslach Burnout Inventory (MBI) was administered before and immediately after the intervention, and the results of the Emotional Exhaustion subscale were reported. Results showed that participation in the intervention led to a significant improvement in the emotional exhaustion subscale of the MBI.

**Contribution:** This small, controlled study showed that teaching family medicine residents a breath awareness technique, such as the ROM, could lower emotional exhaustion at the end of the 4 week intervention. However several limitations could influence the interpretation of the results: it is not clear how long the weekly sessions lasted, nor for how long (or frequently) the intervention participants were asked to practice the ROM. Additionally, all four group means fall in the low range of the MBI subscale, so whether the intervention can improve moderate or severe emotional exhaustion is unclear.

**Cost:** Unknown.

#### *Practicing Physicians*

**Kemper KJ and Khirallah M. Acute effects of online mind-body skills training on resilience, mindfulness, and empathy. *J Evid Based Complementary Altern Med* 2015;20(4):247-53. doi: [10.1177/2156587215575816](https://doi.org/10.1177/2156587215575816).**

**Impetus:** Prior to this study, several investigations had shown positive impact of mind-body interventions on stress/distress of medical professionals. This study sought to evaluate the effects of 1-hour online elective mind–body skills training modules for health professionals.

**Description:** This was a prospective study using data collected as part of an ongoing online elective educational program in Mind-Body Skills Training (MBST) at Ohio State University. There were 12 1-hour modules, three for each of four types of mind–body skills: focused attention meditation (relaxation response), mindfulness, guided imagery and hypnosis (including autogenic training), and positive affect–generating meditation (such as gratitude and loving-kindness). The study enrolled 513 professionals: dietitians, nurses, physicians, social workers, clinical trainees, and health researchers. Outcome measures were the Perceived Stress Scale, Cognitive and Affective Mindfulness Scale–Revised, Mindful Attention Awareness Scale, Brief Resilience Scale, and the Interpersonal Reactivity Index (empathic concern and perspective taking subscales). There was a low completion rate: of the 1031 total MBST registrants, 513 completed one or more modules and 42 completed all 12 modules; therefore, the authors analyzed data from the five modules that had at least 100 enrollees within the study period. Significant improvement was seen in mindfulness, perceived stress, empathic concern and perspective taking.

**Contribution:** This study showed that the completion of online MBST modules may be beneficial to a variety of health professionals. Completion rates were low, so only the 5 modules with 100 participants

were evaluated for impact. However, positive effects were seen in multiple domains. Web-based modules should be further studied.

**Cost:** Unknown.

## *Stress Management*

### *Interns/Residents/Fellows*

**Martins AE, Davenport MC, Del Valle MP, et al. Impact of a brief intervention on the burnout levels of pediatric residents. *J Pediatr (Rio J)* 2011;87(6):493–8. doi: [10.2223/JPED.2127](https://doi.org/10.2223/JPED.2127).**

**Impetus:** Most successful interventions for reducing burnout are lengthy and impractical for the busy clinical schedules of resident physicians. This study aimed to estimate the prevalence of burnout among pediatric residents at a tertiary care pediatric hospital (Hospital General de Niños Pedro de Elizalde in Buenos Aires, Argentina) and to evaluate the effectiveness of a short intervention to reduce burnout among resident physicians.

**Description:** Seventy-four pediatric residents were recruited for this randomized controlled trial. The intervention included two 2.5-hour self-care workshops over the course of two months that focused on repercussions of burnout, recognition of burnout risk, and coping mechanisms. All residents completed the Maslach Burnout Inventory (MBI) at the beginning and end of the intervention period. The authors demonstrated that the prevalence of burnout among pediatric residents was 66% and was significantly higher among third-year residents. The brief intervention had a statistically significant impact on depersonalization among residents who participated in the brief intervention, but not on emotional exhaustion.

**Contribution:** This study demonstrated that 66% of pediatric residents in a tertiary hospital in Argentina experience burnout. While there was no significant improvement in overall burnout, residents participating in the intervention had less depersonalization. The study provides important lessons for developing future interventions for resident physicians.

**Cost:** Unknown.

**Milstein JM, Raingruber BJ, Bennett SH, et al. Burnout assessment in house officers: evaluation of an intervention to reduce stress. *Med Teach* 2009;31(4):338–341. doi: [10.1080/01421590802208552](https://doi.org/10.1080/01421590802208552).**

**Impetus:** Medical house officers are vulnerable to stressors that can lead to burnout, professional ineffectiveness, illnesses, and psychiatric morbidities. This study aimed to evaluate the efficacy of a self-administered psychotherapeutic intervention in reducing burnout symptoms over a three-month period for pediatric residents at the University of California Davis Health System.

**Description:** This study assigned 15 pediatric residents to a control or intervention group and evaluated baseline Maslach Burnout Inventory (MBI) scores for both groups. Residents assigned to the intervention group attended a 45-minute didactic session on the use of the self-administered **BATHE** psychotherapeutic technique, where one reflects on the **B**ackground of a stressful situation, examines one's **A**ffect, analyzes **T**roublesome aspects of the situation, reflects upon how one **H**andled the situation, and provides oneself

Empathy. Baseline survey results were similar for both control and intervention groups. Post-intervention, the MBI scores did not change significantly in the intervention group. Qualitative interviews indicated that residents experienced stressors related to their work; some reported already utilizing elements of the BATHE tool, while other felt they were too busy to implement it regularly.

**Contribution:** The self-reflective exercise, BATHE, was not shown to reduce burnout among pediatric residents. Time constraints were a reported barrier.

**Cost:** Unknown.

### *Practicing Physicians*

**Wetzel C, George A, Hanna GB, et al. Stress management training for surgeons-a randomized controlled, intervention study. *Ann Surg* 2011;253(3):488-94. doi: [10.1097/SLA.0b013e318209a594](https://doi.org/10.1097/SLA.0b013e318209a594).**

**Impetus:** Among surgeons, the impact of stress on surgical performance is well established. Effective coping with stress has been shown to positively impact surgical outcomes. This study, conducted on surgical residents training at St. Mary's Hospital in London, England, sought to measure the impact of Stress Management Training (SMT) on reducing stress and improving surgeon performance.

**Description:** In this randomized controlled intervention study, 16 surgical residents (of whom 15 were male) were enrolled and underwent two simulations of emergencies in carotid endarterectomies. The intervention group received training on surgical coping strategies, mental rehearsal, and relaxation techniques. Outcome measurements included direct observation of performance, heart rate measurement, salivary cortisol levels, and an anxiety questionnaire (state-trait-anxiety-inventory). The number of applied surgical coping strategies was assessed using a questionnaire. Results show that SMT improved teamwork, increased coping skills and reduced stress (measured by HRV, heart rate variability). There was a trend towards improved technical skills and operative outcome.

**Contribution:** This study nicely demonstrated that an organized training paradigm can reduce stress, improve team performance and enhance coping skills in surgery residents. It is unclear what impact the intervention had on short- or long-term standard measures of physician wellbeing; however, the intervention was well received.

**Cost:** No costs were discussed. This study was done within a residency program and investigated stress reduction using simulations.

**Sood A, Prasad K, Schroeder D, Varkey P. Stress management and resilience training among Department of Medicine faculty: A pilot randomized clinical trial. *J Gen Intern Med* 2011;26(8):858-61.**

**doi: [10.1007/s11606-011-1640-x](https://doi.org/10.1007/s11606-011-1640-x).**

**Impetus:** Physician distress, anxiety, and burnout are known to lead to medical errors, physician attrition, loss of empathy, poor mental health, and loss of idealism. Academic physicians are particularly at risk for increased stress and burnout. This study investigates the utility of Stress Management and Resiliency Training (SMART) in promoting resilience and decreasing stress among Department of Medicine faculty.

**Description:** This pilot study randomized 40 faculty members from the Department of Medicine at the Mayo Clinic in Rochester, Minnesota into either the SMART intervention or wait-list control group. The

intervention consisted of a single 90-minute one-on-one training in the SMART program, which was adapted from Attention and Interpretation Therapy (AIT), and involved attention- and flexible-approach training, as well as training in relaxation using paced breathing meditation. Each participant completed pre- and post-study validated outcome measures: Connor Davidson Resilience Scale (CDRS), Perceived Stress Scale (PSS), Smith Anxiety Scale (SAS) and Linear Analog Self-Assessment Scale (LASA). The SMART Intervention group reported a significant improvement in resilience, stress, anxiety, and overall quality of life.

**Contribution:** This study demonstrated that physician anxiety, stress, resilience and overall quality of life significantly improved in practicing physicians who participated in SMART. Most remarkable is that the intervention was a single 90-minute program; however, the one-on-one format potentially limits generalizability to large number of participants. Group sessions using SMART should next be evaluated.

**Cost:** Unknown.

**Rowe MM. Four-year longitudinal study of behavioral changes in coping with stress. *Am J Health Behav* 2006;30(6):602-12. <https://doi.org/10.5993/AJHB.30.6.7>.**

**Impetus:** Health care workers are at risk for stress, anxiety, and burnout. Coping skills play an important role in enabling health care workers to effectively deal with stress. This study examines the effect on health care performance of stress-management training designed to enhance coping skills.

**Description:** This longitudinal 4-year study examined the effect of “stress management /adaptive coping training” on health care worker performance using validated measurement tools: Cognitive Hardiness Scale, Stress Assessment Inventory, and Maslach Burnout Inventory. 108 health care professionals were randomly divided into three groups after taking the initial survey. Group 1 received training once per week lasting ninety minutes over the course of six weeks. Group 2 received the same training as Group 1, but also received a one hour refresher course at five months, 11 months and 17 months. Group 3 was the control group and received no training. All three groups completed the questionnaire packet pre- and 2-weeks post-intervention, as well as at 6 and 12 months, and 2, 2.5 years and 4 years from the initiation of the study. The control group’s emotional exhaustion scores were significantly higher than those of both experimental groups, and emotional exhaustion scores in Group 2 were significantly lower than those in Group 1 at the 1-year mark and in subsequent measurements. The control group’s depersonalization scores were higher than the scores in both experimental groups at the 6-month mark, but at the 1-year mark, only Group 2 had significantly lower depersonalization scores. Sense of personal accomplishment was significantly lower in the control group, but only at the 2 month and 6 month marks compared to Group 1, and at the 1, 2 and 2.5 year marks compared to Group 2.

**Contribution:** The authors concluded that health care workers can be taught and trained to develop coping skills that reduce stress and risk for burnout. Refresher courses were effective in maintaining and strengthening coping skills over the four years of the study.

**Cost:** The costs were not discussed. However, a masters’ level stress management instructor conducted the training. Health care workers were given time off from their work schedules to complete this course.

Milstein JM, Gerstenberger AE, Barton S. Healing the caregiver. *J Altern Complement Med* 2002;8(6):917–20. doi: [10.1089/10755530260511919](https://doi.org/10.1089/10755530260511919).

**Impetus:** Physicians must cope with significant stress, especially after a critical incident. Poor emotional processing has been associated with burnout, drug and alcohol addiction, mood disorders and suicide.

**Description:** The authors present BATHE, a debriefing system to be used by physicians after any challenging encounter. BATHE is an acronym for a psychotherapeutic technique, where one reflects on the **B**ackground of a stressful situation, examines one's **A**ffect (names the predominant emotion felt), analyzes **T**roublesome aspects of the situation, reflects upon how one **H**andled the situation, and provides oneself **E**mpathy. This publication used a case-presentation format to introduce the technique to residents. No outcomes were measured.

**Contribution:** Although limited by a lack of outcome data, this strategy introduce a strategy to help physicians cope with grief, sadness and the challenges of taking care of seriously ill patients. BATHE may help the caregiver address emotions and stress on their own or within a small group and offers a practical and simple strategy to increase awareness of one's own suffering, leading to heightened attentiveness to one's wellbeing and self-care.

**Cost:** Unknown.

Winefield H, Farmer E, Denson L. Work stress management for women general practitioners: an evaluation. *Psychol Health Med* 1998;3(2):163–70. <http://dx.doi.org/10.1080/13548509808402232>.

**Impetus:** Sources of stress can be gender-specific. The publication addresses the unique challenges of female general practitioners (GP) in Australia, by examining the impact of an educational intervention.

**Description:** Twenty women general practitioners in Australia participated in a stress management intervention delivered through a series of three 3-hour seminars. The seminars were conducted every two weeks in the evenings, each focusing on relevant topics such as satisfaction of work, social support, changing expectations. Participants completed standardized evaluations and measures of psychological distress, job satisfaction, burnout at baseline and four weeks after the seminar. Participants had high psychological distress, high job satisfaction, and high emotional exhaustion at baseline. The follow-up survey showed statistically significant improvements in job-related distress and emotional exhaustion.

**Contribution:** This study showed that baseline psychological distress and burnout were high in a small group of female general practitioners in Australia. The intervention reduced work-related distress and emotional exhaustion in these GPs.

**Cost:** Unknown.

## *Counseling Services*

### *Medical Students*

**Thompson D, Goebert D, Takeshita J. A program for reducing depressive symptoms and suicidal ideation in medical students. *Acad Med* 2010;85(10):1635–9. doi: [10.1097/ACM.0b013e3181f0b49c](https://doi.org/10.1097/ACM.0b013e3181f0b49c).**

**Impetus:** The University of Hawaii John A. Burns School of Medicine, Honolulu, Hawaii found high rates of depression and suicidal ideation in a confidential survey of third year medical students. The purpose of this study was to develop an intervention that would reduce depressive symptoms and suicidal ideation in their third year students.

**Description:** The intervention was multi-pronged and consisted of (1) increased individual counseling for students, (2) faculty education about recognizing and responding to student depression, and (3) a specialized curriculum for students, including lectures and a student handbook. In particular, focus was made on having anonymous counseling available to students. The Center for Epidemiologic Studies Depression Scale and a question about suicidal ideation from the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire was used to measure depressive symptoms both before and after the intervention. Investigators saw a 35% reduction in depressive symptoms and a 27% reduction in suicidal ideation.

**Contribution:** This study corroborates other studies demonstrating that minimal interventions helping students and faculty to recognize depression and connect to care can be effective in decreasing suicide ideation.

**Cost:** The Queen Emma Research Fund at the Queen's Medical Center supported this project. Students were able to see psychologists, psychiatrists, and master-level counselors staff the University Counseling Center free of charge through their health benefit (usually limited to 12 sessions) or to request outside referrals at the rate of \$25 per session without supplemental funding.

### *Interns/ Residents/Fellows*

**Guille C, Zhao Z, Krystal J, et al. Web-based Cognitive Behavioral Therapy intervention for the prevention of suicidal ideation in medical interns: a randomized clinical trial. *JAMA Psychiatry* 2015;72(12):1192-8. doi: [10.1001/jamapsychiatry.2015.1880](https://doi.org/10.1001/jamapsychiatry.2015.1880).**

**Impetus:** Data from the American Foundation for Suicide Prevention show that approximately one physician dies by suicide every day in the US (300-400 annually). Suicidal ideation is common during all of training, and may be especially high during internship. This study examines whether participation in a web-based Cognitive Behavioral Therapy (wCBT) intervention can decrease suicidal ideation (SI) among interns.

**Description:** This RCT was performed in 2 large academic centers (Yale University and University of Southern California) and enrolled interns in many different disciplines (internal medicine, surgery, obstetrics/gynecology, pediatrics, psychiatry, neurology, emergency medicine, and medicine/pediatrics). Interns were randomized to the wCBT group (n=100) or an Attention Control Group (n=99); randomization was successful. The intervention group were directed via email each week for 4 weeks to the intervention website <http://moodgym.anu.edu.au> to complete a CBT module each week. The control group received an email once weekly for four weeks with information about the symptoms of mental illness and where to

obtain local mental health treatment. Brief refresher emails were sent at months 2, 5, 8 and 11: the wCBT participants were asked to return to the website and review a module of their choice, while the control group was sent the same email as before. SI was measured using the question from the PHQ-9 “thoughts that you would be better off dead, or hurting yourself”. The response was considered positive if the intern responded to frequencies of “several days” “more than half the days” or “nearly every day” over past two weeks. Results showed that uptake of the intervention was good: 88% (88/100) completed at least one wCBT module; 78% completed two; 65% completed three; 51% completed all four modules; and 82% went back and reviewed at least one module. The wCBT interns were 60% less likely to endorse SI during the entire year (RR 0.40; 95% CI 0.17-0.91;  $P=0.03$ ). Effect size was 1.97. The NNT was 11, meaning that for every 11 interns, taking part in the intervention would prevent one intern from having SI. This protective effect was sustained over the entire year.

**Contribution:** This exceptionally well done study shows that participation in a web-based CBT intervention can significantly decrease SI in interns in a variety of medical specialties.

**Cost:** The intervention web site is free and the reminder emails can be coordinated by a program administrator. The cost-benefit ratio for this study is outstanding.

#### *Practicing Physicians*

**Isaksson Ro KE, Tyssen R, Hoffart A, et al. A three-year cohort study of the relationships between coping, job stress and burnout after a counselling intervention for help-seeking physicians. *BMC Public Health* 2010;10:213. doi: [10.1186/1471-2458-10-213](https://doi.org/10.1186/1471-2458-10-213).**

**Impetus:** Prior to this study, the efficacy of counseling interventions in physicians had not been well studied. This is a 3-year study evaluating the how coping strategies, job stress and personality traits can impact burnout.

**Description:** This is a prospective cohort study of 227 physicians who were enrolled in one of two possible counseling interventions for burnout while at the Resource Centre Villa Sana, Norway from 2003-2005. Physicians chose to participate in one of two different interventions. The first was a single 6-7 hour counselling session for one physician with a psychiatrist or a specialist in occupational medicine (MD). The second intervention was a five day, group-based course led by a counsellor in collaboration with an occupational therapist. Assessments were taken at baseline, one-year, and three-year after the intervention. The main outcome measures studied were emotional exhaustion (Maslach Burnout Inventory, emotional exhaustion (EE) subscale, but scored using Norwegian standards), job stress (Cooper Job Stress Questionnaire), coping strategies (Ways of Coping Checklist) and the personality trait of neuroticism (Eysenck's abbreviated personality questionnaire with six items for neuroticism). 169/227 (74%) participants submitted data for all three time-points. Despite this relatively good retention, the participants lost to follow-up were more often men and had higher levels of distress (emotional exhaustion and job stress) at baseline. Results show significantly reduced level of emotional exhaustion, job stress and emotion-focused coping both at 1-year and 3-years post intervention, with a moderate effect size in the reductions of all three outcomes. Additionally, there was a significant reduction in the proportion of participants who were on sick leave at follow-up (both at one- and three-years) compared with baseline; this finding indicates a possible enhanced work capacity.

**Contribution:** This paper adds to a growing body of literature that suggests that giving physicians effective coping strategies helps over the long-term, even if these interventions are short bursts and do not have longitudinal follow-up. Additionally, it provides a cost-benefit argument for sustained funding of the intervention.

**Cost:** Unknown. The Resource Centre is available for all Norwegian physicians. It is funded by the Norwegian Medical Association and is located at a psychiatric facility, Modum Bad.