

1 **Title: Web-based Intervention for the Prevention of Suicidal Ideation and**
2 **Depression in Medical Interns**
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4
5 **Specific Aim**

6 There is a dramatic increase in suicidal ideation and depression found among
7 medical trainees from pre-internship to intern year and very few physicians seek mental
8 health treatment due to barriers-to-care unique to this population (Sen, 2010; Guille,
9 2010). Physicians are at high risk for suicide (Center, 2003) and depression among
10 training physicians is associated with medical errors, burnout and poor quality of patient
11 care. Yet, to date, no treatment intervention with this population has been conducted.

12
13 **Aim 1: To evaluate the feasibility and efficacy of a web-based CBT intervention for**
14 **the prevention of suicidal ideation and depression in medical interns.**

15 We will conduct a randomized controlled trial to test the feasibility and efficacy
16 of an existing web-based CBT intervention against a control group. We
17 hypothesize that interns assigned to the intervention will be less likely to endorse
18 suicidal ideation or depressive symptoms during intern year than interns assigned
19 to the control group. An exploratory aim will be to evaluate the incidence of
20 medical errors in the intervention and control groups.

21
22 **Background and Significance**

23 **Physicians have a Very High Risk of Suicide**

24 Physicians are at high risk for suicide compared to the general population (Center,
25 2003). A meta-analysis of physician suicide revealed that male physicians are 1.41 times
26 more likely and female physicians are 2.27 times more likely to die by suicide compared
27 to their counterparts in the general population (Schernhammer, 2004). According to the
28 American Foundation for Suicide Prevention, 300 to 400 physicians die by suicide each
29 year equating to approximately one doctor dying by suicide every day (www.afsp.org).

30 **Training Physicians have a Very High Risk of Suicidal ideation**

31 Physicians in training are at high risk for suicide and suicidal ideation. A review
32 of prospective studies conducted during 1982-2002 identified high rates of depression
33 and suicidal ideation among doctors during their first postgraduate year, or internship
34 year (Tyssen, 2002). These findings are consistent with several studies demonstrating
35 elevated rates of depression and suicidal ideation in medical trainees (Bellini 2002;
36 Schneider, 1993; Dyrbye, 2008).

37 **Training Physicians have a Very High Risk of Developing Depression**

38 Depression among residents is elevated (28-49%) compared to graduate students
39 and young adults in the general population (8%-15%) (Center, 2003). Our prospective
40 investigation into the relation between stress and depression during medical internship,
41 the Intern Health Study, found that the proportion of interns who met criteria for
42 depression increases from 3.9% prior to internship to 27.1%, 23.3%, 25.7% and 26.6% at
43 the 3, 6, 9 and 12-month time points of intern year (Sen, 2010). Depression among
44 training physicians has been associated with reduced quality of life and increased burnout
45 (Fahrenkopf, 2008) resulting in poor quality of patient care and decline in the physician
46 work force (Williams, 2007).

47 **Untreated Depression may also Increase Medical Errors**

48 High rates of depression found among training physicians is concerning; data
49 indicate that depression is associated with cognitive dysfunction and work impairment,
50 with increasing severity of depression relating to increasing levels of dysfunction (Adler,
51 2006; Wang, 2004). Investigators have found a strong association between depression
52 and perceived medical errors (Fahrenkopf, 2008; West, 2006) and that self-reported
53 medical errors, a valid proxy for actual errors (O'Neil, 1993), are of a magnitude relevant
54 to patient safety (West, 2009). Medical errors are costly; 1.5 million people are harmed
55 each year by medical errors, resulting in \$3.5 billion in medical costs annually (Studdert,
56 2006). Our Intern Health Study revealed a bi-directional relation between medical errors
57 and depression (Sen, 2010). Little research has been done to address mental health needs
58 of young physicians in training and the care of their patients.

59 **Few Physicians Access Services for Depression**

60 Despite the elevated prevalence of suicide, suicidal ideation and depression,
61 physicians are often reluctant to seek mental health treatment (Guille, 2010; Tyssen,
62 2004). Physicians often seek treatment only when their psychological distress or
63 performance has garnered the attention of third parties such as insurance companies,
64 police, and review boards (Rø, 2007). The most frequently cited barriers to mental health
65 treatment among our interns included limited time (91.5%), preference to manage
66 problems on their own (75.1%), lack of convenient access (61.8%) and concerns about
67 confidentiality (57.3%); these findings underscore the need for a treatment approach that
68 overcomes these barriers (Guille, 2010).

69 **Web Interventions are a Promising Alternative with Potential to Overcome Key**
70 **Barriers**

71 Recently, investigators have begun to use web interventions to provide mental
72 health treatment to difficult-to-reach populations. The effect size of interventions for a
73 variety of anxiety and mood disorders delivered over the internet is high (Amstadter,
74 2009). In particular, web-based CBT interventions have shown to be effective for
75 depression in community samples, compared to a control condition (Christensen, 2004).
76 This delivery format has many potential benefits over in-person treatment for medical
77 interns: it enhances confidentiality, is no cost, allows for flexibility in timing of access,
78 obviates travel burden, provides tools for interns to manage problems on their own, and
79 has little association with psychiatry. Interventions with these characteristics are likely to
80 increase service utilization among medical trainees.

81 **CBT Can Prevent Depression in High Risk Populations; It is Ideal for Training**
82 **Physicians**

83 Prevention programs for depression are effective for high risk groups (Beekman,
84 2010) and a recent meta-analysis of 19 RCTs found that psychological interventions
85 employing CBT reduced the incidence of depression by 22% (Cuijpers, 2008). Leading
86 experts in treating physician mental illness suggest that physicians are well suited for
87 preventative interventions that use CBT to reduce the incidence of depression and
88 suicide, especially during medical training, where stressors are distinct and predictable
89 (Myers, 2006). Personal vulnerability to depression among physicians is well defined
90 (e.g., perfectionism, self-doubt, feelings of guilt, exaggerated sense of responsibility)
91 (Myers, 2006). The culture of medicine further exacerbates these psychological
92 tendencies, especially during training where perfection is impossible, but expected and

93 rewarded, and teaching methods can contribute to feelings of shame and humiliation.
94 CBT helps users to identify personal traits and ways of thinking that lead to maladaptive
95 reactions and teaches evidenced-based strategies that result in more adaptive responses to
96 difficult situations.

97

98 **Research Methods**

99

100 PART I – Subject identification and recruitment:

101

102 Subjects for our study will be drawn from incoming interns in the traditional and primary
103 care internal medicine, general surgery, pediatrics, obstetrics/gynecology, neurology and
104 psychiatry residency programs at Yale University and the University of Southern
105 California residency programs. Following the residency match, each respective residency
106 program director will provide the study investigator a list of names and email addresses
107 of incoming interns. Prior to commencing internship, potential subjects will be contacted
108 via email, given a brief description of the study and invited to participate. If subjects are
109 interested in participating they will be directed to a secure website containing the study's
110 informed consent document. Once informed consent is obtained via the web, participants
111 who agree to enroll in the study, will then be directed to another website to complete
112 online questionnaires (See PART II). Once participants complete the baseline
113 questionnaires they will be randomly assigned to an interactive web-based cognitive
114 behavioral therapy website or control condition (See Part III).

115

116 PART II – Questionnaires:

117 In addition to providing general demographic information each participant will complete
118 the following instruments prior to beginning internship; 1) Neuroticism (measured
119 through the NEO-Five Factor Inventory (Costa and McCrae 2000)) 2) Alcohol use
120 (measured through the Alcohol Use Disorders Identification Test (AUDIT) (Saunders,
121 1993)) 3) Lifetime history of mental health treatment and Major depression (derived
122 from the DSM-IV criteria) with further evaluation of suicidal ideation if endorsed on the
123 PHQ (measured by The Positive and Negative Suicide Inventory (Osman et al, 2002)) 4)
124 Current depressive symptoms (measured through the Patient Health Questionnaire (PHQ)
125 (Spitzer et al 1999)) 5) Perceived Stress (measured through the Perceived Stress Scale
126 (PSS) (Cohen et al. 1983)) 6) Sleep behavior (measured through the Pittsburgh Sleep
127 Assessment Scale (Buysse et al. 1989)) 7) Cognitive Styles (measured through the
128 Sociotropy Autonomy Scale (Beck1983)) and 8) Early Family Environment (measured
129 through the Risky Families Questionnaire (Taylor et al 2006). Through the course of
130 internship, participants will be contacted via email at months 3, 6, 9 and 12 of their
131 internship year and asked to complete the PHQ-9 and will be queried regarding interim
132 non-residency life stress, medical errors, mental health service utilization, number of
133 hours of sleep during the prior night and prior seven nights and current rotation. The
134 estimated time to complete the baseline questionnaires is 30 minutes and 10 minutes for
135 the follow-up questionnaires. If participants do not respond to the questionnaires, and
136 have not indicated that they do not wish to participate in the study, a reminder email will
137 be sent. Upon completing each set of questionnaires at baseline, months 3, 6, 9, 12,

138 participants will be provided with general information about suicidal ideation and
139 depression as well as a list of resources for mental health counseling and treatment.

140

141 PART III – Intervention:

142 Following completion of the baseline questionnaires, subjects will be randomly assigned
143 to participate in to an interactive web-based CBT for the prevention of depression, a
144 program developed by the Center for Mental Health Research at the Australian National
145 University (MoodGYM.com), or control condition. Each subject in the CBT intervention
146 group will be given their unique non-decodable identification number and asked to logon
147 to a website weekly for 4 weeks prior to starting their house staff duties on July 1st. The
148 intervention group will complete four, 20-40 minute web based modules designed to
149 identify problems with anxiety, depression and dysfunctional thoughts. Through
150 participation in cognitive and behavioral exercises, subjects will develop an
151 understanding of the interplay between their thoughts, emotion and behaviors as well as
152 develop coping skills for the future. Completion of the module will be tracked based on
153 subject’s unique non-decodable identification number and recorded by MoodGym.com
154 for verification of completion of the module and subject reimbursement. At three-month
155 intervals throughout intern year, current endorsement of suicidal ideation and depressive
156 symptoms will be assessed via the PHQ-9 (September, December, March and June) (See
157 Part PART II- Questionnaires). Subjects assigned to the CBT intervention will be asked
158 to revisit MoodGym.com at least 6 weeks before completing follow-up assessments
159 (approximately during the months of August, November, February and May) to review
160 one of the four modules to refresh or ‘booster’ their memory of the main CBT concepts
161 and coping skills. Completion of the module will be tracked based on subject’s unique
162 non-decodable identification number and recorded by MoodGym.com for verification of
163 the ‘booster’ session for subject reimbursement.

164

165 PART III – Control:

166 Participants assigned to the control condition will receive weekly emails for four weeks
167 prior to the start of internship year. All emails will include information about the
168 prevalence of depression and suicide among physicians, as well as described symptoms
169 of depression and suicide and encouraged participants to seek treatment locally, if
170 necessary. Contact information for local, confidential, and free mental health services
171 was included in each email. Additional information describing the prevalence and
172 symptoms of anxiety, substance abuse and other mood disorders will be included in the
173 second, third and fourth email, respectively. At three-month intervals throughout intern
174 year, current endorsement of suicidal ideation and depressive symptoms will be assessed
175 via the PHQ-9 (September, December, March and June) (See Part PART II-
176 Questionnaires). Subjects assigned to the control condition will receive an email at least 6
177 weeks prior to completing the these assessments (approximately during the months of
178 August, November, February and May) which will include information about the
179 prevalence of depression and suicide among physicians, and describe symptoms of
180 depression and suicidal ideation and encouraged participants to seek treatment locally, if
181 necessary. Contact information for local, confidential, and free mental health services
182 will be included in each email.

183

184 **Number of Subjects**

185 Subjects for our study will be drawn from incoming intern classes in the
186 traditional and primary care internal medicine, general surgery, pediatrics,
187 obstetrics/gynecology and psychiatry residency programs at University and Community
188 residency programs. Assuming a recruitment rate of 60-80%, this population will provide
189 200 subjects.

190

191 **Statistical Power**

192 Assuming a 5% type I error rate and an effect size similar to previous studies, a
193 sample size of 200 subjects (100 randomized to control and 100 randomized to the CBT
194 intervention group), we will have 90% power to detect differences between groups of 3
195 points on the PHQ-9 and 50% reduction in cases of suicidal ideation, at $\alpha = 0.05$.

196

197 **Data Analysis**

198 Aim 1) To evaluate the feasibility and efficacy of an internet based CBT web site for the
199 prevention of suicidal ideation and depression among medical interns:

200 To investigate whether there is a lower incidence of suicidal ideation in the
201 intervention compared to the control group, we will use a stepwise logistic regression
202 model to identify significant predictors while accounting for collinearity among
203 variables. Intervention assignment was included in the model to determine the impact of
204 the intervention on suicidal ideation during internship year.

205 To investigate whether there are lower mean depressive symptoms in the
206 intervention compared to the control group, we will use a stepwise linear regression
207 model to identify significant predictors while accounting for collinearity among
208 variables. Intervention assignment will be included in the model to determine the impact
209 of the intervention on mean depressive symptoms during internship year.

210

211 **Inclusion Criteria**

212 Incoming interns in the traditional and primary care internal medicine, general
213 surgery, pediatrics, obstetrics/gynecology and psychiatry residency programs at two
214 University residency programs.

215

216 **Exclusion Criteria**

217 Subjects who are not incoming interns will be excluded from the study.

218

219 Study personnel will determine participants' eligibility based on the above criteria. Only
220 participants who meet eligibility will be contacted.

221

222 **Protection of Human Subjects**

223 Private identifiable information will not be collected or used. Research data will
224 be collected via online questionnaires. Data will be coded with currently available
225 encryption technology will be used to generate a non-trackable code number to maintain
226 the anonymity of subjects. We will employ an honest broker to maintain the ID, name,
227 and email address of the subject, so that subject completion can be verified but not linked
228 to their data. No limits on confidentiality exist. There will be a substantial lag time
229 between data collection and analysis. We will also not be able to identify individuals

230 based on their questionnaire data. Therefore, we will not be able to act in a timely
231 manner on potentially concerning information provided (e.g., suicidal ideation,
232 depression). Participants will be provided with a list of mental health and counseling
233 centers in their area at the beginning of the study and at 8 other study contact points
234 during the intern year. No external individuals or agencies will have access to this data.

235 **Subject Reimbursement**

236 All participants will receive a \$60 gift certificate to Amazon prior to the start of
237 intern year for participation in assigned group. Participants will receive a \$10 gift
238 certificate to Amazon following completion of the ‘booster’ session or if assigned to
239 control condition.

240

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