Conflict of Interest Statement

I have received consulting fees for service provided to:

• Pure Encapsulations
• Jay Mac Pharmaceuticals
• Green Plains Laboratory
Suicide: A Public Health Crisis
Obligations and Opportunities for Integrative Medicine

IHS Conference
February 23, 2019
1:30-2:45 p
James Greenblatt
A Million Little Things

A Star Is Born

Integrative Healthcare Symposium
Rising Suicide Rates

Suicide was the 2nd leading cause of death among individuals between the ages of 10 – 34

In 2016 there were more than TWICE AS MANY suicides (44,965) in the U.S. as there were homicides (19,362).

Rising Suicide Rates

Across the study period (2014-2016) rates increased in nearly all states.

The greatest increase in suicide rates at 200%

Twenty-five states had suicide rate increases of more than 30%.

Rising Suicide Rates

The World Health Organization estimates that each year more than 800,000 people die from suicide. Someone in the world commits suicide every 40 seconds. By 2020, the rate of suicide is predicted to increase to one death every 20 seconds.

Anorexia Nervosa

31x more likely to commit suicide than the general population

More than half of AN deaths are a result of suicide

NOT medical complications of self-starvation
A Path to Prevention

- Genetics
- Trauma
- Malnutrition

- Inflammation
- Social Media
- Medications

Integrative Healthcare Symposium
Suicide Prevention

Genetics
Trauma
Medications
Nutritional Deficiencies
Sleep Deprivation
Inflammation
Genetics

A monozygotic twin of a person who attempted suicide has a 17-fold greater risk than a dizygotic twin.

The heritability of suicide risk may be as high as 55%.

Take a Family History

Genetics

“With seven suicides in her family - including those of her grandfather Ernest and her supermodel sister Margaux - Mariel Hemingway hasn’t just been affected by depression and suicide. She has been besieged by it.”
Suicide Prevention

Genetics

Trauma

Medications

Nutritional Deficiencies

Sleep Deprivation

Inflammation
Trauma
Trauma

$4 billion in costs related to the priest sex abuse...

More than 300 accused priests listed in Pennsylvania report on Catholic Church sex abuse

*Catholic Priests Abused 1,000 Children in Pennsylvania, Report Says*

80% of suicide attempts among children and adolescents are attributed to trauma.

64% of suicide attempts among adults are attributable to trauma.

Suicide Prevention

Genetics
Trauma
**Medications**
Nutritional Deficiencies
Sleep Deprivation
Inflammation
Antidepressants

In October 2004, the FDA directed manufacturers of all antidepressants to include a warning stating that antidepressants may increase the risk of suicidal ideation and behavior in children and adolescents.
Antidepressants

2001 Journal of the American Academy of Child & Adolescent Psychiatry

2015 British Medical Journal

The efficacy of paroxetine and imipramine was not different from placebo and increased suicidal behaviors.

Le Noury. *BMJ.* 2015 Sep 16;351:h4320.
Antidepressants
159,810 users of 4 antidepressant drugs

Nonfatal suicidal behavior is 4X more likely to occur within ≤10 days

3X more likely to occur within 10-29 days

Antidepressants

Accutane
Antidepressants
Anticonvulsants
Interferon C
Chantix

And
More…
Suicide Prevention

- Genetics
- Trauma
- Medications
- Nutritional Deficiencies
- Sleep Deprivation
- Inflammation

[Image of a stop sign with FAT and SUICIDE]
Cholesterol

2016 meta-analysis of 65 studies with a total of 510,392 participants

Lowest total cholesterol

112% higher risk of suicidal ideation

123% higher risk of suicide attempt

85% higher risk of suicide completion

### Cholesterol

<table>
<thead>
<tr>
<th>Study Details</th>
<th>Sample Size</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modai. J Clin Psychiatry. 1994</td>
<td>584 inpatient medical records</td>
<td>Patients who had attempted suicide had significantly lower serum cholesterol than nonsuicidal patients</td>
</tr>
<tr>
<td>Kunugi. Biol Psychiatry. 1997</td>
<td>99 suicidal patients, 74 nonsuicidal psychiatric inpatients, 39 controls</td>
<td>Suicide attempters had significantly lower cholesterol compared with other groups</td>
</tr>
<tr>
<td>Partonon. Br J Psychiatry. 1999</td>
<td>29,133 Finish men</td>
<td>Low serum total cholesterol at baseline associated with risk of death from suicide</td>
</tr>
</tbody>
</table>
Cholesterol

Violent suicide completers were found to have lower grey-matter cholesterol content overall compared to non-violent suicides.

Cholesterol

Serum cholesterol in Anorexia Nervosa

“Our findings seem to indicate that cholesterol levels are significantly predictive of suicidal ideation, impulsive self-injurious behavior, and depressive symptoms.”

18 year old male

Daily suicidal thoughts – Multiple attempts including OD’s and hanging

Cholesterol 119
Essential Fats
Essential Fatty Acids

Essential Fatty Acid Deficiency

Anxiety
Depression
Suicide Risk
Psychosis
Distorted Perceptions
Aggression

Suicide Risk
5,689 participants of the Northern Finland 1966 Birth Cohort followed from pregnancy to age 31

Females who seldom ate fish

- 2.6-fold increased risk of depression
- 1.5-fold increased risk of suicidal ideations

Two grams/day of omega-3 for 12 weeks led to a 45% reduction in suicidal thinking and a 30% reduction in depression.

Omega-3

256,118 participants followed for 17 years

Less than daily dietary fish had a 25% greater risk of death from suicide than those who ate fish daily

Omega-3 Polyunsaturated Essential Fatty Acid Status as a Predictor of Future Suicide Risk

Conclusions: A low docosahexaenoic acid percentage and low omega-3 proportions of lipid profile predicted risk of suicidal behavior among depressed patients over the 2-year period. If confirmed, this finding would have implications for the neurobiology of suicide and reduction of suicide risk.

Method: Plasma polyunsaturated fatty acid levels in phospholipids were measured in 33 medication-free depressed subjects.
Suicide in the Military

800 U.S. servicemen and women who committed suicide between 2002 and 2008

Those with low blood levels of DHA were 62% more likely to have been suicide victims than those with the highest levels

80% NEVER DEPLOYED

BRAVO Study

Research: Trial utilizing omega-3 supplements to prevent depression and suicide among at-risk veterans

Researchers conservatively estimate that 20% of subjects in the placebo group will attempt suicide during the study period and this will be reduced to at least 8% in the omega-3 group.
Super Foods
“By modifying natural fats, we have altered the basic building blocks of the human brain – weakening cerebral architecture. And, like unstable buildings that come apart in an earthquake or storm, poorly structured human brains are failing to cope with the mounting stress of modern life.”
Suicide Prevention

Genetics
Trauma
Medications
Nutritional Deficiencies
Sleep Deprivation
Inflammation

Vitamin D
Vitamin D
Vitamin D

Study of active duty US military personnel, comparing vitamin D levels of 495 verified suicide cases and 495 matched controls.

Subjects with Vitamin D <15.5 ng/mL were 50% more likely to die from suicide.
Vitamin D

vitamin D levels compared in suicide attempters, non-suicidal depressed patients, and healthy controls

58% of suicide attempters were vitamin D deficient

Negative correlation between vitamin D and markers of inflammation for all subjects

Many Americans taking too much vitamin D

Data from a population-based survey

Participants self-reported their daily supplemental vitamin D intake for the past 30 days

0 lab tests completed!

Biochemical Individuality

“For scarcely two persons have the same complaints and where there is found some conformity in symptoms, the order of their appearance has been totally different.”
Suicide Prevention

Genetics  
Trauma  
Medications  
**Nutritional Deficiencies**  
Sleep Deprivation  
Inflammation
13.8 Billion Years

Helium

Hydrogen

Lithium
Cosmic dust
Lithium is an Element

Alkali metal; lightest of all the metals

Swedish chemist Johan August Arfvedson isolated the salt in 1817
Lithium

Deficient

Maintenance

Pharmaceutical

Toxic

< 1 mg/d

600-2000 mg

> 2000 mg

1-30 mg

Courtesy of Laura Mischley
<table>
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<th>Study</th>
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<tr>
<td>Cipriani. <em>BMJ</em>. 2013; 346:f3646.</td>
<td>48 RCTs: 6,674 participants with depression or bipolar disorder</td>
<td>Lithium reduces risk of death and suicide by more than 60% compared with placebo</td>
</tr>
<tr>
<td>Guzzetta. <em>J Clin Psychiatry</em>. 2007; 68(3):380-3.</td>
<td>8 studies: 329 patients with recurrent MDD; 4.56 years on and 6.27 years off lithium</td>
<td>Risk of suicides and suicide attempts was 88.5% lower with vs. without lithium</td>
</tr>
<tr>
<td>Baldessarini. <em>Bipolar Disorders</em>. 2006; 8(5 Pt 2):625-39.</td>
<td>31 studies on patients with major affective disorders</td>
<td>80% lower risk of completed and attempted suicide during treatment with lithium for an average of 18 months</td>
</tr>
<tr>
<td>Tondo &amp; Baldessarini. 2014. <em>A concise guide to understanding suicide</em>. p. 217-228.</td>
<td>&gt;30,000 patients on either lithium or anticonvulsants</td>
<td>Analysis of RCTs yielded nearly a 3-fold superiority favoring lithium over anticonvulsants</td>
</tr>
</tbody>
</table>
Trace Lithium Across the Globe

Suicide rate inversely associated with lithium levels

- 9 cities in Lithuania (2017)
- 27 Texas counties (1990)
- 99 Austrian districts (2011)
- 145 sites in Italy (2015)
- 226 Texas counties (2013)
- 18 Japanese municipalities (2016)
- 34 prefectures of Greece (2013)
Suicide Prevention

Genetics
Trauma
Medications
Nutritional Deficiencies
Sleep Deprivation
Inflammation
Sleep Disturbances

Review of 19 studies

Patients with comorbid sleep disturbances were twice as likely to report suicidal behaviors

Sleep Disturbances

50 college students aged 18-23 years with a suicide attempt history

78% insomnia
36% nightmares

Sleep Disturbances Predict Suicide

Clin Psychiatry. 2017

Sleep Disturbances

The relationship held controlling for severity of depression, substance use, and severity of suicidal symptoms at baseline

_Clin Psychiatry_. 2017

Sleep Deprivation and Inflammation

Modest sleep restriction: 6 h/night for 1 wk

25 young, healthy, normal sleepers (12 men and 13 women) were studied for 12 consecutive nights

Modest sleep loss is associated increased secretion of pro-inflammatory cytokines

Suicide Prevention

Genetics
Trauma
Medications
Nutritional Deficiencies
Sleep Deprivation
Inflammation
Inflammation
Inflammation

A physiological process activated in a similar manner by a diverse range of environmental factors

A diverse range of *depressogenic*, environmental factors and

A risk factor for suicide!
Inflammation

2015 meta-analysis of 18 studies comprising:
583 psychiatric patients with suicidality
315 psychiatric patients without suicidality
845 control subjects

Cytokine levels were significantly increased in blood and postmortem brain samples of patients with suicidality

39,349 participants followed for a mean of 8.6 years
26 deaths ascribed to suicide

Those in the highest inflammation group were 4.2x more likely to die by suicide

Batty. JAMA Psychiatry. 2016 Sep 1;73(9):993-5.
Trauma

Childhood maltreatment, abuse, social isolation, economic hardship affects immune functioning

Individuals experiencing stress in childhood are twice as likely to suffer chronic inflammation

Social Media and At-Risk Adolescents

On a typical day, 70% of teens ages 12 to 17—17 million teenagers—spend from a minute to hours using social networking sites. 98% of 18-24 year olds use social media.

Depression and Screen Time

Teens who spent 5+ hours a day online were 71% more likely to have at least one suicide risk factor.

Overall, suicide risk factors rose significantly after 2+ hours a day of time online.

Eating Disorders and Suicide

Individuals suffering from eating disorders are 5x more likely to die as a result of suicide, than as a result of the eating disorder itself or complications arising from it.

Aokigahara Forest - Japan

“Logan Paul”

More U.S. middles school students dying of suicide than car crashes
We Can Do BETTER

Genetics
Trauma
Malnutrition
Social Media

Substance Abuse
Medications
Inflammation
Sleep Deprivation
The Tomato Effect

Rejection of Highly Efficacious Therapies

James S. Goodwin, MD, Jean M. Goodwin, MD, MPH

JAMA May 11, 1984 Vol. 251, No. 18
Nutrition and Health

Understanding the role of Nutrition and Health is not Alternative Medicine
What Can We Do?

Family history

Genetic testing

Laboratory testing

- Cytokines
- C-reactive protein (CRP)
- Vitamin D
- Cholesterol
- Essential fatty acids
Integrative Psychiatry

Nourishing the Brain and Nurturing the Mind
Suicide Risk may be seen as a reflection of multiple errors in physiology.

If we understand the causes, we will have models for prevention.

We can do better.
PSYCHIATRY REDEFINED

PsychiatryRedefined.com
JamesGreenblattMD.com