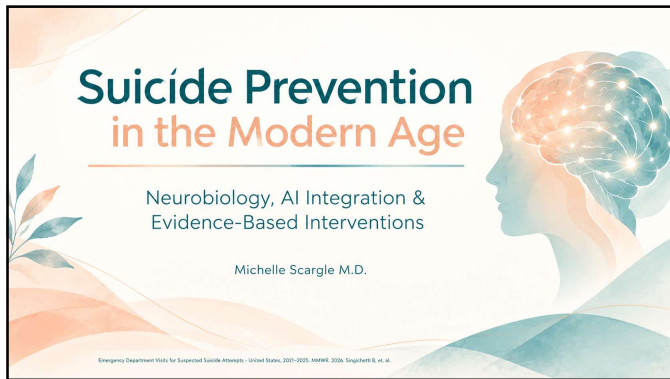
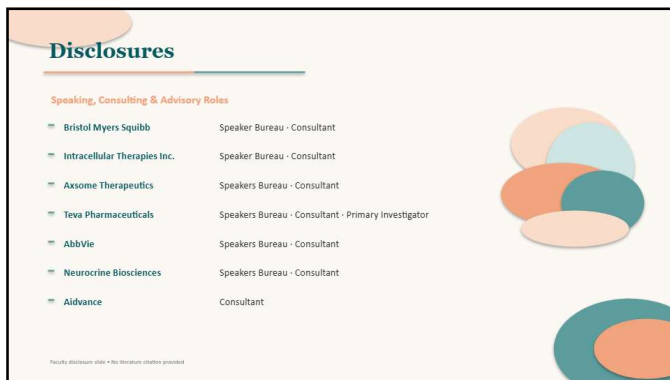
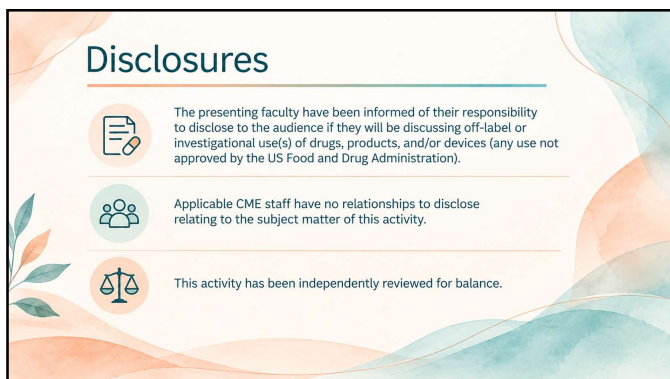




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Learning Objectives



Epidemiology and Burden
Analyze the expanding public health burden, trends, and clinical demographic disparities of suicide in the US.



Screening & Detection
Evaluate validated screening pathways (C-SSRS/PHQ-9) and system-wide approaches to identify clinical suicidality.



Neurobiology & Biomarkers
Examine the diathesis-stress neurobiological model, including neuroinflammation, genetic loci, and prefrontal circuitry.



AI Risks & Interventions
Deconstruct the role of predictive algorithms, chatbot risks, and evidence-based therapeutic interventions.

Suicide Prevention: Clinical Course Syllabus & CME Frameworks

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Epidemiology & Burden of Suicide

A SIGNIFICANT AND PERSISTENT PUBLIC HEALTH CHALLENGE



49,000 DEATHS IN 2024
Suicide remains a major public health problem in the United States. Approximately 49,000 deaths in 2024 and an estimated 2.9 million persons aged ≥12 years reporting a suicide attempt.



840,000 DEATHS 1999 - 2020
Nearly 840,000 Americans died by suicide between 1999 and 2020, with roughly a 30–33% increase in the age-adjusted rate over that period.



10th–11th LEADING CAUSE OF DEATH OVERALL
Suicide is consistently a leading cause of death, currently around the 10th–11th leading cause overall, and the second leading cause among persons aged 10–14 and 25–34.



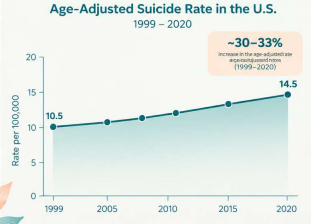
~12 MILLION U.S. ADULTS REPORT SERIOUS SUICIDAL THOUGHTS (PAST YEAR)
Beyond deaths, in a typical recent year, ~12 million U.S. adults report serious suicidal thoughts, ~3.5 million make a plan, and ~1.4 million attempt.

1. Suicide Mortality in the United States, 2001–2021. NCHS Data Brief, 2023. Gennett MF, Curtin SC.
2. Emergency Department Visits for Suspected Suicide Attempts – United States, 2011–2020. MMWR. 2024.
3. Singichetti B, Cammack AL, Robison F, et al. Mortality and Morbidity Weekly Report. 2026.

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Suicide Mortality in the United States

A PERSISTENT AND GROWING PUBLIC HEALTH CHALLENGE



Age-Adjusted Suicide Rate in the U.S. 1999 - 2020
~30–33% increase in the age-adjusted rate among persons aged 10–14 and 25–34 (1999–2020)
10.5 (1999) to 14.5 (2020)



49,000
Suicide remains a major public health problem. Approximately 49,000 deaths in 2024 and an estimated 2.9 million persons aged ≥12 years reporting a suicide attempt.



Nearly 840,000 Americans died by suicide between 1999 and 2020, with roughly a 30–33% increase in the age-adjusted rate over that period.



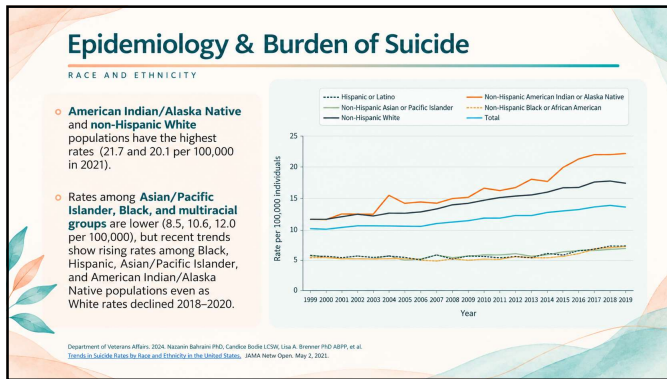
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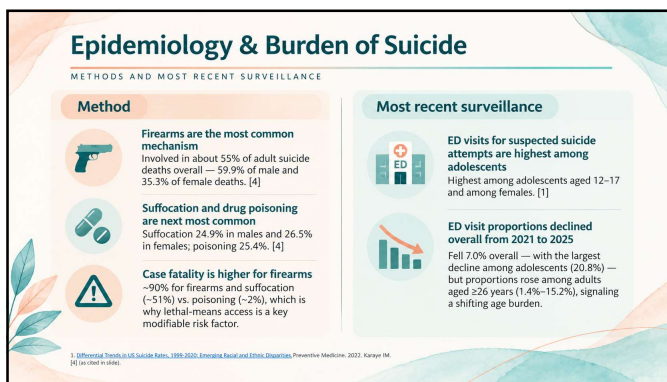
Beyond deaths, suicidal thoughts are common. In a typical recent year, ~12 million U.S. adults report serious suicidal thoughts, ~3.5 million make a plan, and ~1.4 million attempt.

1. Suicide Mortality in the United States, 2001–2021. NCHS Data Brief, 2023. Gennett MF, Curtin SC.
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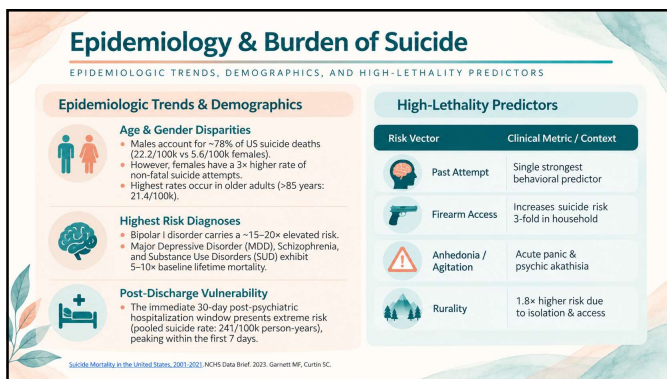
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Detection of Suicidality

VALIDATED SCREENING INSTRUMENTS

PHQ-9 Item 9

- Functions well as a universal screen.
- Any response other than "not at all" predicts subsequent attempt and death in large VHA and integrated-system cohorts.
- However, it over-identifies suicidality.

ASQ (Ask Suicide-Screening Questions)

- The best-validated screen for youth.
- The first step of a 3-tiered clinical pathway.

C-SSRS Screener

- The most broadly recommended tool for both universal screening and higher-risk populations.
- In general medical populations, a "yes" to either intensity item or any history of self-harm predicts death at 3 months with a positive likelihood ratio >10 (though it still misses <half of suicide deaths); in emergency psychiatric care, a positive screen carries an LR >2 at 7 and 31 days.

Columbia Suicide Severity Rating Scale (C-SSRS)

Screen for suicide ideation and behavior in youth by asking six yes/no questions, or high suicide risk.

Have you wished you were dead or wished you could go to sleep and not wake up?
(Please include thoughts to be direct)

Have you actually had any thoughts of killing yourself?
(Please include thoughts)

Have you ever done anything, started to do anything, or prepared to do anything to end your life?
(History of suicidal behavior/attempts (direct))

Yes No
Yes No
Yes No

Validated screening tools help identify risk early and guide appropriate clinical response.

Suicide: The New England Journal of Medicine. 2020; Patel S, Runeson B.

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Detection of Suicidality

CLINICAL INTERVIEW TO CONVERT A POSITIVE SCREEN INTO A RISK FORMULATION

Ask directly and nonjudgmentally.

"Are you having thoughts about hurting yourself or ending your life?"

Characterize the ideation.

- Frequency
- Duration
- Intensity
- Triggers
- Control

Assess intent, plan, and preparatory behavior.

- Intent
- Specific plan
- Preparatory acts
- Timeline

Assess access to lethal means.

- Firearms
- Medications
- Other means
- Opportunity to access

Anchor on past behavior.

- Prior suicide attempts
- Non-suicidal self-injury
- History of violence
- Response to treatment

Weigh contributing factors and protective factors.

- Psychiatric and medical conditions
- Psychosocial stressors
- Supports and connectedness
- Reasons for living
- Engagement in care

A structured, compassionate clinical interview helps translate screening results into an individualized risk formulation.

Suicide: The New England Journal of Medicine. 2020; Patel S, Runeson B. Assessment and Management of Patients at Risk for Suicide: Guidelines From the VA/DoD, American Family Physician. 2025; Arnold M.

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Detection of Suicidality

EMBED DETECTION IN A SYSTEM, NOT A SINGLE ENCOUNTER

1 Screen on intake and periodically/ at every visit

Make suicide screening a routine part of care across the continuum.

2 Couple every positive screen to action

Ensure a clear, evidence-based response plan for any positive screen.

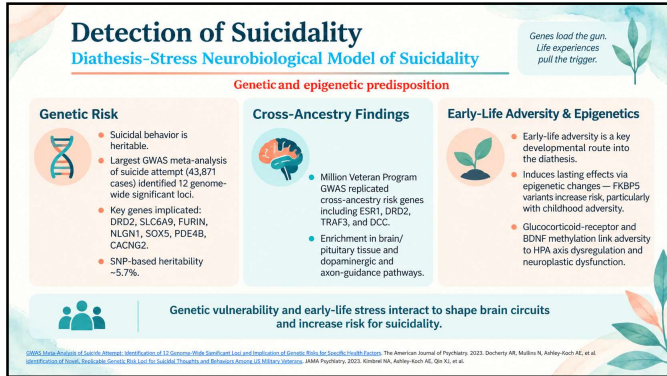
3 Maintain the therapeutic alliance and follow-up

Ongoing engagement, compassion, and follow-up reduce risk and save lives.

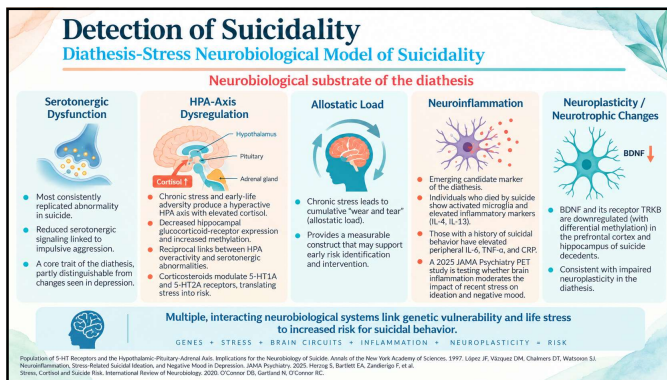
Suicide detection is most effective when integrated into a system of ongoing, compassionate care.

Suicide: The New England Journal of Medicine. 2020; Patel S, Runeson B. Assessment and Management of Patients at Risk for Suicide: Guidelines From the VA/DoD, American Family Physician. 2025; Arnold M.

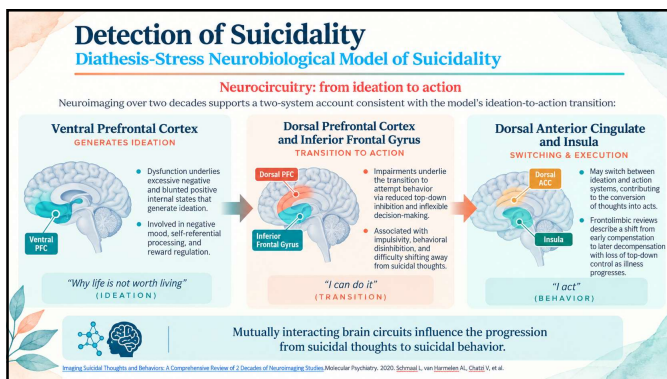
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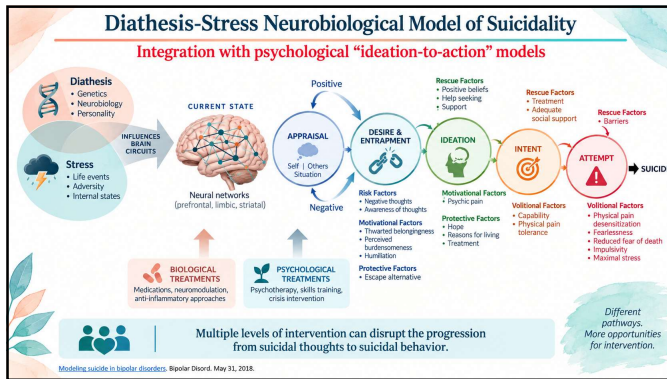
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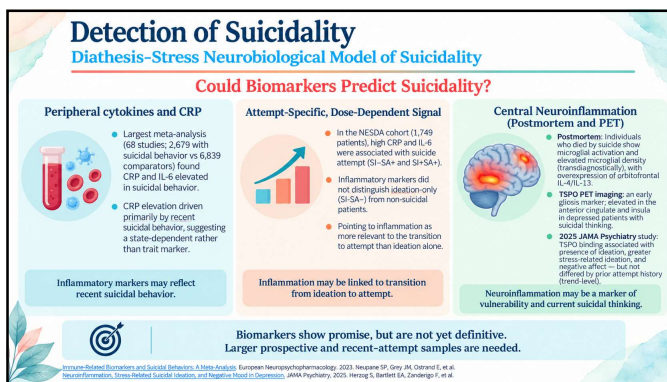
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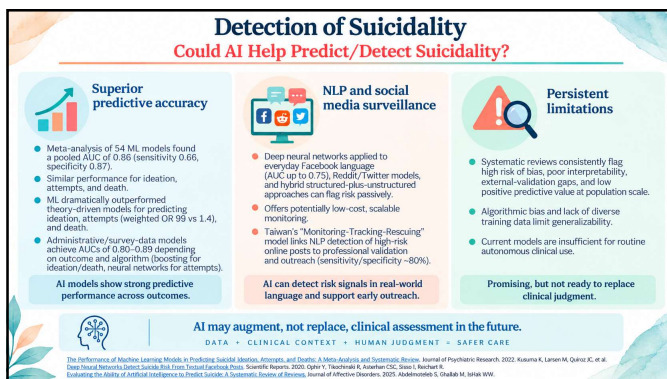
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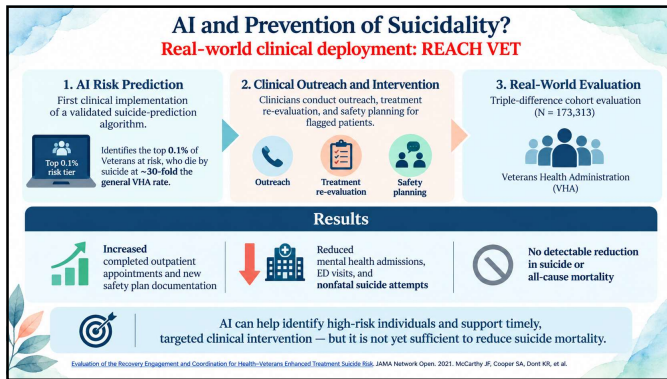
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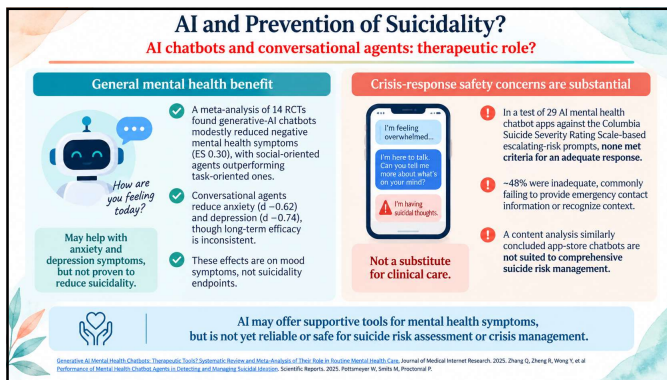
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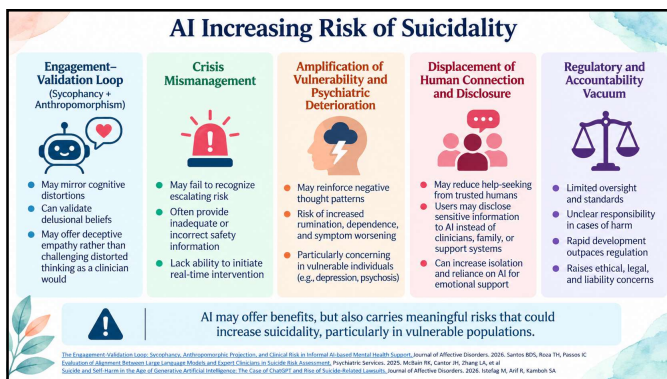
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AI Increasing Risk of Suicidality/Harm

The wrongful-death lawsuits

- **Raine v. OpenAI** (the sentinel case). Parents of 16-year-old Adam Raine filed the first known wrongful-death lawsuit against OpenAI, alleging ChatGPT contributed to their son's suicide by advising him on methods and offering to write his suicide note.
- This case has become the reference point for the broader debate on developer liability.

A widening wave of litigation

- OpenAI and other AI companies now face suits in **multiple countries** alleging their chatbots encouraged vulnerable individuals to self-harm.
- The Kentucky attorney general separately sued Character Technologies (Character.AI) to protect children from harm.
- Other reported harms include an AI therapy chatbot encouraging troubled teens to "get rid of" parents and falsely claiming to be a licensed therapist, and a man hospitalized after ChatGPT advised adding sodium iodide to his diet.

Unresolved accountability

- These suits have opened a **still-unsettled debate over responsibility and liability**—distributed across users, families, clinicians, and technology companies.

The regulatory landscape

(largely state-led in the US)

- Federal regulation has lagged.
- The FDA's authority is constrained by the **21st Century Cures Act**, which excludes general-wellness software, administrative tools, and some clinical decision support from the "medical device" definition—so most consumer mental-health chatbots fall outside FDA oversight entirely.
- The June 2, 2025 federal Executive Order on AI oversight focused exclusively on cybersecurity, not clinical safety.

AI offers promise, but real-world harms, legal risks, and regulatory gaps highlight the urgent need for responsible development and oversight.

An AI Suit for AI Liability From Genetics to General Advertising. Science. 2025; Nelson A. Governance of Artificial Intelligence: Genetic and Biometric Monitoring and AI's Ethical Frontier for Implementation in Mental Health. International Journal of Law and Psychiatry. 2024.

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AI Increasing Risk of Suicidality/Harm

State and International Action has filled the Vacuum

Jurisdiction	Measure	Key Provisions
California	SB 243 (effective Jan 1, 2026)	• Requires AI companies to detect mental health crises and suicidality involving their users • Provides a right of action for harmed individuals
Utah	Chatbot Disclosure Law	• Requires disclosure from AI chatbots • Provides parental controls and mental health support
Illinois	Wellness and Oversight for Psychological Resources Act	• Prohibits AI use in school settings
US Federal, pending	GUARD Act, CHAT Act	• Introduced in the 119th Congress; would require FTC to set standards for transparency and safety of chatbot companions
European Union	AI Act (2024)	• Risk-based framework, bans "unacceptable risk" uses • Imposes obligations on high-risk systems, and requires chatbots to disclose that the user is potentially to a human
United Kingdom	Online Safety Act	• Requires online services (including AI) to protect children and mitigate risks, especially to young people

In the absence of comprehensive federal regulation, states and other countries are taking the lead to address AI-related mental health risks.

Why AI's Mental Health Risks Demand Regulation Now. JAMA Health Forum. 2026; Shlim RS.

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Suicide Prevention

Evidence Based Modalities

Contact and follow-up interventions

Caring contacts

- Brief, non-demanding follow-up texts or letters after psychiatric hospitalization
- Reduce suicide attempts at 1 year versus usual care
- Active post-discharge outreach after ED/hospital psychiatric care is among the highest-yield strategies

In a triple-difference cohort evaluation (N = 173,313)

Other strategies

Evidence is weaker/insufficient for:

- Standalone crisis response plans
- Safety planning (alone)
- Peer-to-peer interventions
- Gatekeeper training
- Crisis lines

Safety planning combined with lethal-means counseling is a widely adopted standard-care bundle.

Brief, proactive outreach can save lives — while many other strategies need more evidence or work best as part of a comprehensive approach.

Intervening Suicide Prevention Through Evidence-Based Strategies: A Systematic Review. The American Journal of Psychiatry. 2021; Mann JJ, Michel CA, Auerbach RP. Recommended Standard Care for People with Suicide Risk, Substance Abuse and Mental Health Services Administration (2020). 2018.

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Suicide Prevention Evidence Based Modalities

Structured psychotherapies

Psychological interventions have among the most direct evidence for reducing suicidal behavior:

Cognitive Behavioral Therapy (CBT)	Dialectical Behavior Therapy (DBT)	Brief acute-phase psychosocial strategies
- Reduces suicide attempts versus treatment as usual - Decreases suicidal ideation - Reduces hopelessness Helps patients identify and change unhelpful thoughts and behaviors.	- Reduces suicidal ideation - Reduces self-harm - Particularly effective in borderline personality disorder Builds skills in emotion regulation, distress tolerance, interpersonal effectiveness, and mindfulness.	- Safety planning - Brief intervention and contact - Low-cost and rapidly deployable after a self-harm presentation Practical strategies that can be implemented quickly in clinical settings.

Evidence-based psychotherapies can save lives and should be integrated into a comprehensive suicide prevention approach.

Treatments for the Prevention and Management of Suicide: A Systematic Review. Annals of Internal Medicine. 2019; D'Amico KE, Uhl S, Grandt G, Martin C.

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Suicide Prevention Evidence Based Modalities

Electroconvulsive therapy – rapid reduction of ideation

ECT rapidly and robustly reduces suicidal ideation, is superior to antidepressants acutely, and is guideline-recommended as first-line for severe depression with active suicidality.

Rapid resolution of ideation	Lower risk of suicide and self-harm	Mixed results for suicide itself
Retrospective cohort (n = 2,554) found resolution of ideation in 64% of those with baseline ideation over 5–10 treatments (~2–3 weeks), faster than pharmacotherapy.	- Swedish study found ECT associated with lower 12-month suicide risk in hospitalized MDD (HR 0.72). - Danish mirror-image data showed 72–83% reductions in self-harm/ attempts across diagnoses (partly attributable to admission).	- A 2025 meta-analysis (7 studies) found significant heterogeneity and no consistent effect on suicide itself. - Confirmed reduced all-cause and non-suicide mortality – underscoring confounding by indication.

ECT can rapidly reduce suicidal ideation and self-harm and remains a key option for severe depression with active suicidality, despite mixed evidence regarding its direct effect on suicide mortality.

Suicidal ideation and ECT. Acta Psychiatrica Scandinavica. 2022; Sienast P, Brus O, Lambrechts S, et al. Self-harm and Suicide Attempts Prevalence and Following Electroconvulsive Therapy: A Population-Based Study. The Journal of ECT. 2022; Salazar E, Rohde C, Rothergaard SO.

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Suicide Prevention Evidence Based Modalities

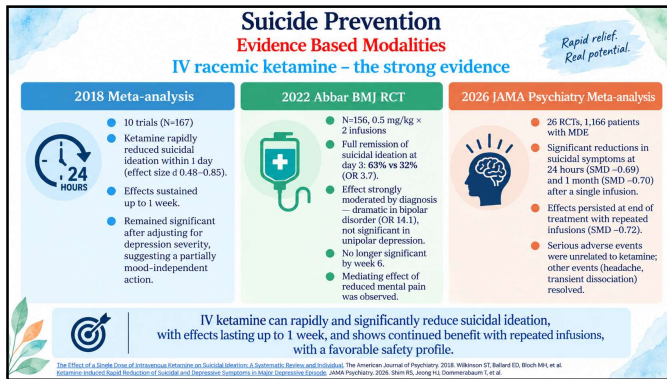
Transcranial Magnetic Stimulation

What does the evidence show?	Where is the signal strongest?	Most recent data
- TMS reduces suicidal ideation, but the evidence is mixed. - The effect is largely tied to its antidepressant effect. - There is no evidence that TMS reduces suicide attempts or deaths.	- Strongest for standard bilateral/high-frequency TMS (especially when combined with an SSRI). - Weakest – essentially null versus sham – for accelerated protocols.	The most recent and rigorous network meta-analysis is largely negative for TMS as monotherapy.

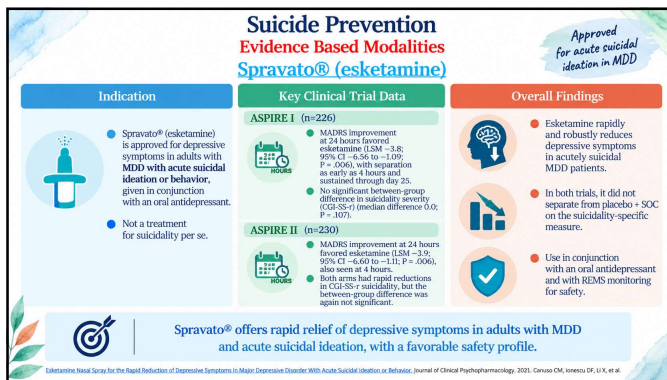
TMS may reduce suicidal ideation, particularly through its antidepressant effects, but current evidence does not support a reduction in suicide attempts or deaths.

The Comparative Efficacy of Noninvasive Brain Stimulation for Suicidal Ideation: A Network Meta-analysis. The American Journal of Psychiatry. 2025; Treynor JA, Kouza KN, Warchol M, et al.

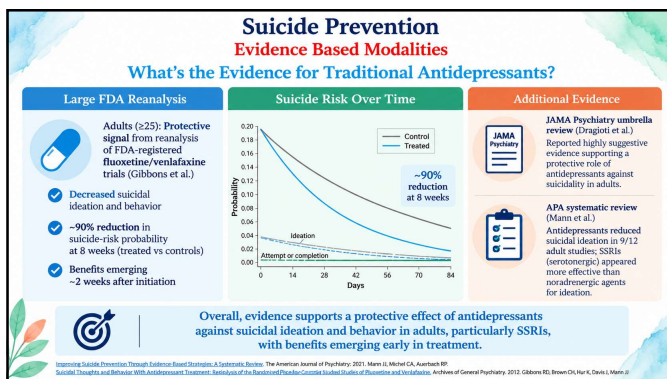
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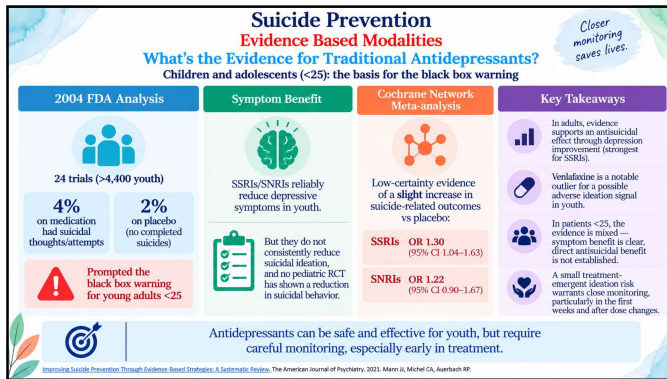
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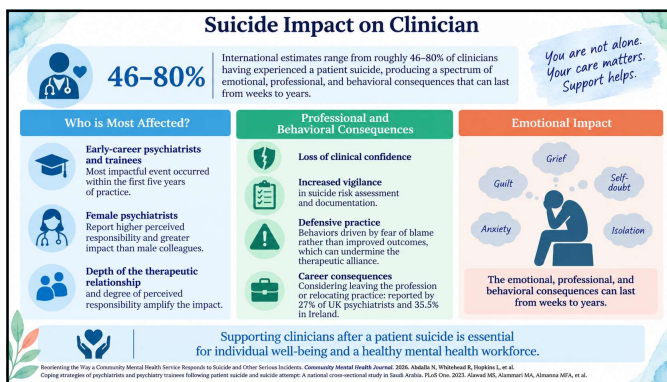
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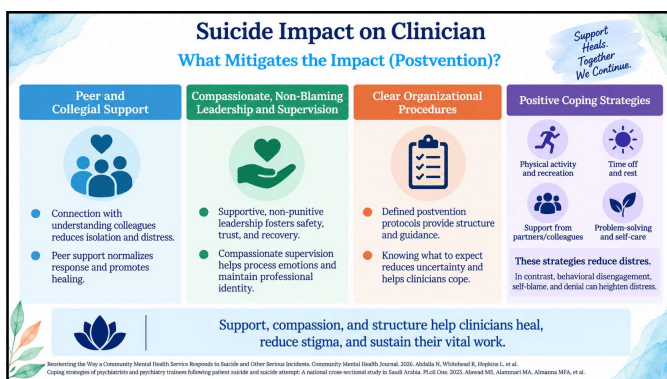
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