Can social media help mental health practitioners prevent suicides?

Anecdotal evidence suggests that analyzing Facebook posts can lead to earlier intervention

Suicide is the tenth leading cause of death among Americans and the third leading cause among those age 15 to 24.[1] As many as 36% of suicide victims leave a suicide note.[2] Researchers have analyzed such notes with the aim of identifying specific content and patterns that might aid in creating more effective strategies for preventing suicide.[3-5]

One study found that the presence of a suicide note is an indicator of serious intent; that is, when the initial attempt fails, those who had left a suicide note were found to be at increased risk of subsequent completed suicide.[4] Researchers also found that 75% of suicide notes contained the theme "apology/shame," suggesting that many suicide victims might have welcomed an alternative to suicide to solve their personal predicament. Tragically, however, most suicide notes are not discovered until suicide has been attempted or completed.[4]
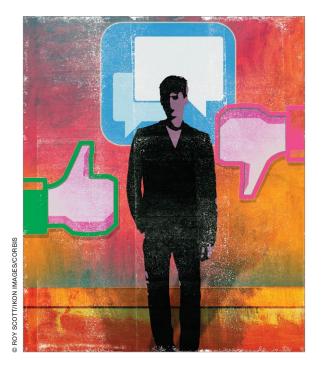
That's where social media comes in. As platforms for self-expression, social networking sites such as Facebook, Twitter, and Tumblr are sources of real-time information that could aid in suicide prevention.[6] With that in mind, we:

- present 2 cases in which a patient announced her suicidal ideation on Facebook
- consider the opportunities that social media present for early intervention
- propose high-tech monitoring methods for high-risk patients.

CASE 1

Major depressive disorder (MDD) and nonadherence

Ms. S, age 24, has a 4-year history of MDD and treatment non-adherence. She had no history of suicide attempt or inpatient

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Suicide and social media

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Box 1

Facebook and suicide prevention

"How do I help someone who has posted suicidal content on the site?" is a question found in Facebook's Help Center.[12,a]

The answer? Anyone who encounters a direct threat of suicide on Facebook is advised to immediately contact law enforcement. A link also is provided on Facebook to allow someone to report the full name of the person who posted the link and to submit a link to the content or a screen shot of the post.[12]

Facebook follows up on such reports with an e-mail encouraging the person who posted the suicidal content to call the National Suicide Prevention Lifeline or to click on a link to begin a confidential chat session with a crisis intervention worker. The person who found the suicidal content is urged to call the lifeline as well.

[a]The Facebook Help Center (https://www.facebook.com/help) might not be not easy for all visitors to find while navigating the site. The link to this specific question is: https://www.facebook.com/notes/american-foundation-for-suicide-prevention/how-to-report-suicidal-contentthreats-on-facebook/10150090259398144

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treatment, but she had briefly engaged in psychotherapy before discontinuing visits. Physically healthy and employed as a security officer, Ms. S recently broke up with her boyfriend who had abused her physically—and against whom she had an order of protection.

On the day in question, Ms. S posted several status updates on Facebook expressing hopelessness, which, over the course of the day, escalated to expression of frank suicidal ideation:

- "I am ugly, no man would ever want to live with me."
- "I have made no effect on the world and I'm just a waste of space."
- "It's sad that I want to die but such is life. We all die one day."
- "I'm going to kill myself. It was nice knowing you world. Goodbye everyone."

CASE 2

Substance abuse and previous suicide attempt

Ms. B, age 21, had a remote (approximately age 16) history of a suicide attempt and was actively abusing 3,4-methylenedioxymethamphetamine (MDMA ["Ecstasy," "Molly"]) and *Cannabis*. She was not receiving outpatient

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care. One afternoon, Ms. B walked into the emergency department (ED) and said she had just taken 17 ibuprofen pills with the intent of killing herself.

On initial evaluation, Ms. B was irritable and uncooperative, denying all psychiatric symptoms and refusing to divulge details of her recent behavior. Her mother, who had not accompanied her daughter to the ED, reported that Ms. B had engaged in excessive risk-taking—speeding, driving while intoxicated, having multiple sex partners—for the past 5 years, resulting in several arrests for minor offenses, and she had been depressed and was sleeping and eating poorly in the 2 weeks leading up to the suicide attempt.

Two days ago, her mother added, Ms. B had posted disturbing notes on Facebook: "Life is useless," she declared in one post; "I'd be better off dead," in another.

Suicidal content online

Worldwide, Facebook has 1.35 billion active users each month.[7] Thus far, a limited number of posts indicating suicidal intent have been reported in the lay press,[8] but evidence suggests that the use of social media for this purpose is an emerging trend.[9]

A search of the literature yielded only 3 case reports.[8,10,11] In one case, a delayed response to a suicide note resulted in a failure to prevent the suicide.[8] In another, a clinician's discovery of a patient's explicitly suicidal Facebook post led to what the team leader described as a more meaningful therapeutic relationship.[10] The clinician's discovery might have been pivotal in preventing the patient from committing suicide.

The authors of these case reports explored the idea of using Facebook for suicide prevention, raising a number of practical and ethical issues. Among them are the potential for immediate intervention by other Facebook users and the extent to which suicidal posts on social media sites induce copycat suicides.[8]

Issues associated with clinicians' use of social media to follow or monitor patients include the ethical concepts of beneficence and nonmaleficence, privacy and confidentiality, clinical judgment, and informed consent,[8,10] including potential benefit and

harm and the difference between actual and perceived privacy violations. Bennett et al[11] recommend developing guidelines for the use of social media to enhance medical care and provide appropriate protections to both patients and providers.

Reporting suicidal content. Although the primary purpose of Facebook is to give users the opportunity to share life events and thoughts with friends and family, the company does address the question of suicidal content in its Help Center (*Box 1*).[12] As our 2 cases illustrate, however, intervention can be significantly delayed.

CASE 1 CONTINUED
Call to 911
Fortunately for Ms. S, a friend who read her Facebook posts called 911; even then, however, 16 hours passed between the initial postings and the patient's arrival at the ED. When emergency medical services brought Ms. S to the Comprehensive Psychiatry Emergency Program, she acknowledged suicidal ideation without an active plan. Other symptoms included depressed mood, a sense of hopelessness, feelings of worthlessness lasting >2 months, low self-esteem, dissatisfaction with body image, and a recent verbal altercation with a friend.

Ms. S was admitted to the inpatient unit for further observation and stabilization.

CASE 2 CONTINUED
No one answered her calls
Ms. B, who did not arrive at the ED until 2 days after her suicidal posts, corroborated the history given by her mother. She also reported that she had attempted to reach out to her friends for support, but no one had answered her phone calls. She felt hurt because of this, Ms. B said, and impulsively ingested the pills.

Ms. B said she regretted the suicide attempt. Nevertheless, in light of her recent attempt and persistent distress, she was admitted to the inpatient unit for observation and stabilization.

Can artificial intelligence help?
There is no effective means of tracking high-risk patients after their first contact with the mental health system, despite the fact that (1) those who attempt suicide are at high risk

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Box 2

Sensing emotions, saving lives

Applications of affective computing (AC) include the development of systems that can detect user emotions; express what a human would perceive as an emotion (eg, through an avatar or a robot); and even "feel," or experience, an emotion. Although a wide range of behavioral cues can be used to sense human emotion, attempts at AC using textual content from blog/microblog posts, forum discussions, and social networking sites have been reported to identify the emotion expressed as often as 65% of the time.[14]

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of subsequent suicide attempts[3] and (2) we have the potential to prevent future attempts based on self-expressed online cues. We propose *machine learning algorithms*—a branch of artificial intelligence—to capture and process suicide notes on Facebook in real time.

Machine learning can be broadly defined as computational methods using experience to improve performance or make accurate predictions. In this context, "experience" refers to past information, typically in the form of electronic data collected and analyzed to design accurate and efficient predictive algorithms. Machine learning, which incorporates fundamental concepts in computer science, as well as statistics, probability, and optimization, already has been established in a variety of applications, such as detecting e-mail spam, natural language processing, and computational biology.[13]

Affective computing, known as emotion-oriented computing, is a branch of artificial intelligence that involves the design of systems and devices that can recognize, interpret, and process human moods and emotions (*Box 2*).[14]

Prediction models, developed by Poulin et al[15] to estimate the risk of suicide (based on keywords and multiword phrases from unstructured clinical notes from a national sample of U.S. Veterans Administration medical records), resulted in an inference accuracy of ≥65%. Pestian et al[16] created and annotated a collection of suicide notes—a

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Clinical Point

We have the potential to prevent future suicide attempts based on patients' self-expressed online cues—possibly by using machine learning algorithms

vital resource for scientists to use for machine learning and data mining. Machine learning algorithms based on such notes and clinical data might be used to capture alarming social media posts by high-risk patients and activate crisis management, with potentially life-saving results.

But limitations remain

It is not easy to identify or analyze people's emotions based on social media posts; emotions can be implicit, based on specific events or situations. To distinguish among different emotions purely on the basis of keywords is to deal in great subtlety. Framing algorithms to include multiple parameters—the duration of suicidal content and the number of suicidal posts, for example—would help mitigate the risk of false alarms.

Another problem is that not all Facebook profiles are public. In fact, only 28% of users share all or most of their posts with anyone other than their friends.[17] This limitation could be addressed by urging patients identified as being at high risk of suicide during an initial clinical encounter with a mental health provider to "friend" a generic Web page created by the hospital or clinic to protect patients' privacy.

As Levahot et al[10] wrote in their report of the patient whose clinician discovered a patient's explicitly suicidal Facebook post, the incident "did not hinder the therapeutic alliance." Instead, the team leader said, the discovery deepened the therapeutic relationship and helped the patient "better understand his mental illness and need for increased support."

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Clinical Point

Machine learning algorithms based on suicide notes and clinical data could be used to capture alarming social media posts by high-risk patients

Bottom Line

Machine learning algorithms offer the possibility of analyzing status updates from patients who express suicidal ideation on social media and alerting clinicians to the need for early intervention. There are steps clinicians can take now, however, to take advantage of Facebook, in particular, to monitor and potentially prevent suicide attempts by those at high risk.