CRISIS TEXT LINE

Understanding Suicide Means in Real Time



Restricting access to lethal means saves lives. Knowing which methods people are planning to use lets responders tailor intervention accordingly, and that depends on how old a person is, and their gender. Across 34,465 crisis conversations in the U.S., the Crisis Text Line research team found that planned suicide methods shifted by age, by gender, and for some of the most common methods, by both together.

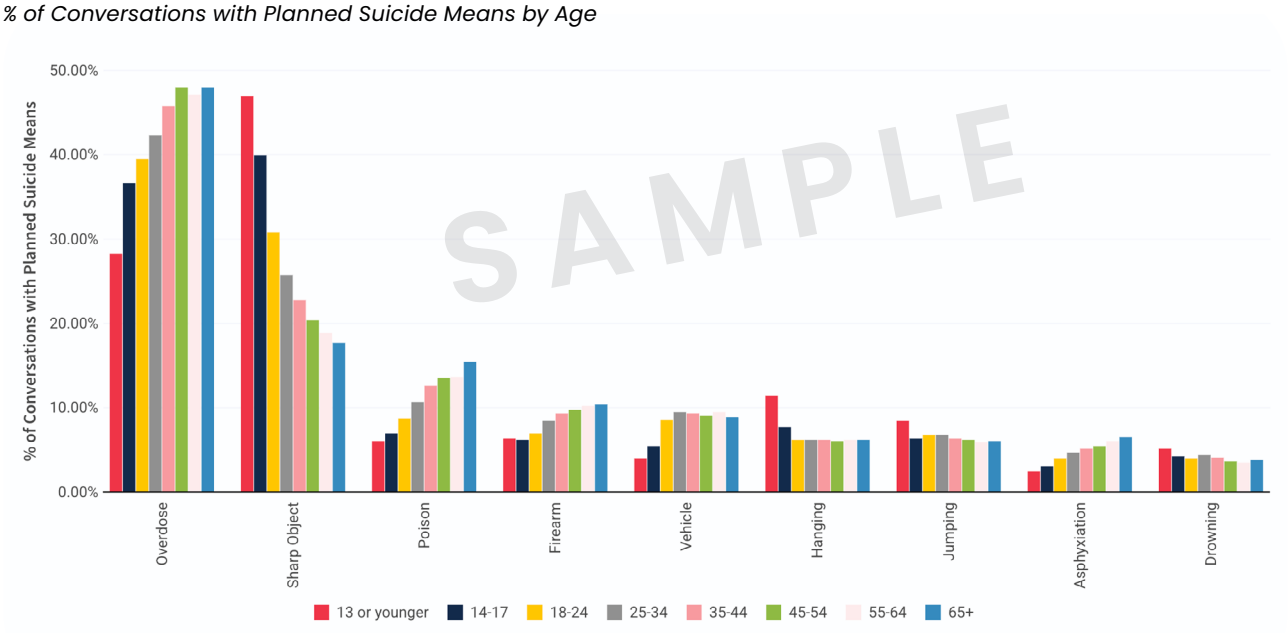
From Research to Immediate Insights

Current methods for suicide means detection and monitoring rely on death records and emergency department records, both of which are measures which lag and can take years to reach the people trying to act on them. This research[1] demonstrated something beyond the finding itself: the ability to build a monitoring system that tracks emerging planned-suicide-method trends in near real time, using the same natural language processing and machine learning (NLP/ML) pipeline validated in the study. The team already uses this capability for continuous internal monitoring and for alerting external partners who can act on emerging trends. The team has also retrained and expanded the pipeline to run in Spanish. A dashboard built (Fig. 1) on this monitoring system was designed to safely give public health officials timely information about emerging methods, opening new avenues for rapid intervention. Potential future applications include community-level trend alerts and geographic breakdowns.

Figure 1

Example Suicide Means Dashboard

% of Conversations with Planned Suicide Means by Age



[1]Tripodi, I. J., Buda, G., Török, L., Meagher, M., & Olson, E. A. (2025). Planned Suicide Methods in Crisis Conversations: Effects of Age and Gender. JAACAP Open, 3(4), 996–1005.

The Research

Published in JAACAP Open (2025), the team asked whether the suicide method someone is planning depends on their age, their gender, or both together, and whether gender differs across age groups. To answer these questions, researchers analyzed 34,465 U.S. crisis conversations from 2017 to 2024, using a natural language processing and machine learning pipeline to detect and sort each mentioned method into one of ten categories.

Overdose (51.7%) and sharp objects (34.6%) were the most common methods overall. Age affected every means identified: sharp objects, hanging, jumping, and drowning were more common among younger texters; overdose, firearms, vehicles, poison, and asphyxiation among older ones. Gender alone mattered too; for example, firearms and hanging were more common among boy/man texters, overdose among girl/woman texters, and poison among among transgender or gender diverse (TGD) texters. For three methods specifically, overdose, firearms, and sharp objects, the effect of gender itself changed depending on age.

How we used machine learning to extract and classify planned suicide means

- First, we identified where in each deidentified conversation a crisis responder asked the texter about planned suicide methods, using a sentence classifier built on the RoBERTa language model, a leading open-source language model at the time of the study.
- Next, we extracted the texter's actual answer to that question, using a Transformer-based named entity recognition (NER) model, also built on RoBERTa, trained to extract planned suicide methods from the texter's response to the crisis responder's questions identified in the previous step.
- Finally, we grouped those extracted mentions into categories using unsupervised clustering with BERTopic, which groups similar mentions by their underlying meaning rather than exact wording, arriving at nine specific categories, plus "other".

Authors Tripodi, Buda, Török, Meagher, and Olson found significant age main effects for all 10 methods (all $p<.00001$); significant gender main effects for 8 of 10 categories; significant age by gender interactions for overdose ($\chi^2(6)=33.10$, $p=.00001$), firearms ($\chi^2(6)=30.48$, $p=.00003$), and sharp objects ($\chi^2(6)=21.82$, $p=.0013$), Bonferroni corrected. Gender distribution in this sample skews heavily toward girl/woman texters (67.9%) relative to boy/man texters (14.9%), noted by the authors as not reflecting general population gender distribution.

Who This Helps

Two groups in this U.S. dataset are rarely studied at this scale. More than 6,700 texters were 13 or younger, a population usually missing from suicide method research entirely, and they were significantly more likely to plan methods that involved sharp objects, hanging, jumping, and drowning than any older group. Nearly 6,000 texters identified as TGD, making this one of the largest samples of its kind; prior research on suicide methods in this population has been limited to small, adult-only samples. TGD texters showed a distinct pattern: they were significantly more likely than other genders to plan poisoning, specifically.

For both groups, the findings translate directly into who notices and how fast. A parent, teacher, counselor, or crisis responder in the U.S. working with a child 13 or under, or with a transgender or gender diverse texter, now has specific, age- and identity-informed guidance on what to watch for and ask about when assessing and restricting access to means. Local communities know their own youth best, and getting them this information as it emerges, rather than years later, widens who's positioned to step in, in schools, in neighborhoods, and alongside public health responders.

Learn More

For more information, contact research@crisistextline.org.