Improving Use of Suicide Prevention Skills and Screeners: An Evaluation of the Colorado Youth Suicide Prevention Program

Project Overview

Suicide is the second leading cause of death for adolescents 15 to 19 years old in the United States and Colorado[1,2] with 26% of all adolescent (aged 15-24) deaths in Colorado due to suicide in 2023[1,3]. Suicide prevention training for professionals who have the most access to adolescents (e.g. school staff and primary care providers) is necessary to raise awareness of signs of suicidality, enhance knowledge of how to help suicidal individuals, and increase access to mental health resources, with the goal of ultimately reducing death by suicide in adolescents[2,4].

In 2018, Partners for Children's Mental Health (PCMH), a collaboration between Children's Hospital of Colorado (CHCO) and University of Colorado School of Medicine, was established to deliver various mental health trainings, and to support Colorado youth in becoming activists for behavioral health initiatives in the state. As part of PCMH's work, the Colorado (CO) Youth Suicide Prevention program was created, a supplemental funding project tasked with creating and delivering suicide prevention training to pediatric primary care, family medicine practices, and school personnel across Colorado.

Evaluation

Using data collected by the CO Youth Suicide Prevention team (e.g. electronic health record (EHR) data and surveys), as well as project team member and training participant interviews, we evaluated the impact of the CO Youth Suicide Prevention program on confidence and knowledge of suicide prevention skills, suicide screening, and training satisfaction.

Program Elements

The CO Youth Suicide Prevention program received funding in 2019 and began with a two-pronged team structure: pediatric clinic training and middle/high school training. Each prong had two trainers and an evaluator tasked with developing processes and procedures for outreaching, visiting, and training clinics and schools. However, with the COVID-19 pandemic in 2020, the team had to pivot and adapted their plans to virtual offerings. Since then, the team has launched various training (Figure 1) and restructured their team to meet the needs of clinicians and school personnel (Figure 1). In 2025, the CO Youth Suicide Prevention team has eight roles, with a program manager leading the *Pathway to Suicide Prevention (PSP)* training for primary care clinics and another program manager leading the *Dialectical Behavior Therapy (DBT) Skills* training for school personnel, with director and evaluation support for both. *PSP* is a year-long partnership that begins with didactic training of how to implement suicide screenings and care planning in family medicine and pediatric clinics, with monthly follow-ups to solve problems and assess clinician behavior change. *DBT Skills* training covers seven skills from dialectical behavior therapy, a well-established treatment for suicidal individuals, that school personnel can teach to their students. The team also supports a community of practice (CoP) for school mental health professionals and administrators, an Extension for Community Healthcare Outcomes (ECHO) series that serves as an introduction to *PSP*, and the CHCO care transitions program, though these are all implemented outside of PCMH.

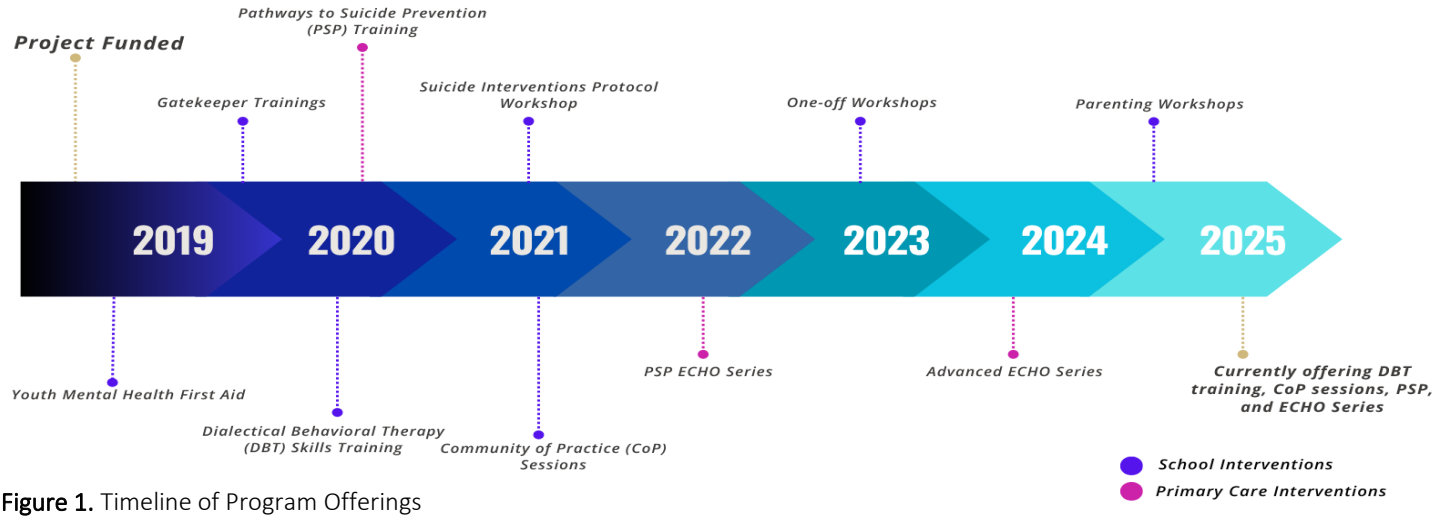

Figure 1. Timeline of Program Offerings

1. Office of Suicide Prevention Fact Sheet | Colorado Department of Public Health and Environment. Accessed March 25, 2025. https://cdphe.colorado.gov/suicide-prevention/office-of-suicide-prevention-fact-sheet
2. Brann KL, Baker D, Smith-Millman MK, Watt SJ, DiOrio C. (2021). A meta-analysis of suicide prevention programs for school-aged youth. *Children and Youth Services Review*; 121.
3. CDC 10 Leading Causes of Death for Colorado Chart for 2023.pdf.
4. Sisler SM, Schapiro NA, Nakaishi M, Steinbuchel P. (2020) Suicide assessment and treatment in pediatric primary care settings. *Child Adoles Psych Nursing*, 33(4):187-200.

QUANTITATIVE ANALYSIS

Methods Overview

The quantitative analysis focused on the training programs developed and are currently being offered by the PCMH team: *Pathway to Suicide Prevention (PSP)* and *Dialectical Behavior Therapy (DBT) Skills*. For *PSP*, training data for sessions held between August 2021 and July 2024 were analyzed. *PSP* providers were asked to complete baseline and post-surveys via Qualtrics to assess confidence around 6 skills covered during the training. Baseline respondent demographics were characterized. Confidence data were aggregated by clinic and compared using a paired two-sided t-test. Descriptive statistics were calculated for screening rates using data obtained from clinic EHR systems.

Data for *DBT Skills* was obtained for training that occurred between 2020 and 2023. *DBT Skills* participants were asked to complete both a baseline and post-survey via Qualtrics to assess knowledge of 7 topics covered during *DBT Skills*. Baseline respondent demographics were characterized. Knowledge data were compared using a paired two-sided t-test.

Results

Pathway to Suicide Prevention (PSP)

Over three years, there were 197 participants (across 14 clinics) that attended a *PSP* training session. Only 107 participants completed the baseline survey (response rate 54%). Most responding providers were advanced practice providers (i.e. physician assistants or nurses; 39.3%), female (89.7%), and identified as White or Caucasian (76.6%).

Table 1: PSP Training Baseline Survey Respondent Characteristics

	Baseline Survey Respondents N = 107	
Clinical Role		
Advanced Practice Providers	42	(39.3%)
MD or DO	29	(27.1%)
Administrative	16	(15.0%)
Behavioral Health Provider	6	(5.6%)
Other/Unknown	14	(13.1%)
Gender		
Female	96	(89.7%)
Male	7	(6.5%)
Other/Unknown	4	(3.7%)
Race		
White or Caucasian	82	(76.6%)
Asian	8	(7.5%)
Black or African American	4	(3.7%)
Other/Unknown	13	(12.1%)

Confidence scores (not at all confident=0 to very confident=3) were aggregated and compared by clinic. However, only 17 providers from 7 clinics completed the post-survey whereas 107 providers from 14 clinics completed the baseline survey. Among respondents, confidence in skills improved significantly from pre-training to post-training ($p<0.05$) (Figure 2).

Figure 2. Baseline and Post Survey Confidence with *PSP* Skills

Average screening rates were available for 8 participating clinics (Table 2). The CO Youth Suicide Prevention Team set a benchmark for screening rates of 80%; 7 of the 8 clinics met or exceeded this benchmark over their follow-up period.

Table 2: Screening Rates by Clinic Over Follow-up Period

	Clinic 1 (14 months)	Clinic 2 (13 months)	Clinic 3 (12 months)	Clinic 4 (13 months)	Clinic 5 (15 months)	Clinic 6 (13 months)	Clinic 7 (15 months)	Clinic 8 (5 months)
Patients Eligible to Be Screened Monthly								
Mean (SD)	103.0 (29.0)	22.3 (12.0)	114.0 (17.3)	240.0 (70.8)	28.9 (13.4)	2.46 (1.90)	473.0 (155)	80.8 (47.0)
Patients Screened Monthly								
Mean (SD)	83.3 (28.7)	22.2 (12.1)	111.0 (17.8)	200.0 (67.8)	24.9 (11.0)	2.08 (1.80)	435.0 (156)	7.20 (4.55)
Monthly Screening Rate								
Mean (SD)	80.0 (9.70)	99.6 (1.55)	97.5 (1.54)	82.8 (10.7)	86.3 (8.09)	83.1 (31.0)	91.4 (7.33)	27.3 (40.9)

Note: Green fill = met or exceeded benchmark; Red fill = did not meet benchmark; Clinic 8 did not finish implementation

Dialectical Behavior Therapy Skills (DBT Skills)

Over four years, *DBT Skills* had 775 participants from 46 counties across Colorado (22.9% rural or frontier). Demographics showed most attendees had a master's degree (42.2%), were women (48.8%), and identified as White (41.8%). However, it is important to note that the surveys had a high rate of missingness (45.5% or higher) for most questions.

Table 3: DBT Skills Training Baseline Survey Respondent Characteristics

	Baseline Survey Respondents N = 775	
Highest Level of Education		
Master degree	327	(42.2%)
Bachelor degree	50	(6.5%)
Doctorate degree	31	(4.0%)
Other or Missing	367	(47.3%)
Sex		
Woman	378	(48.8%)
Man	7	(6.5%)
Other or Missing	359	(46.1%)
Race		
White or Caucasian	324	(41.8%)
Black or African American	24	(3.1%)
Hispanic	56	(7.2%)
Other or Missing	362	(46.7%)
County Type		
Urban	504	(77.1%)
Rural or Frontier	150	(22.9%)
Missing	121	(15.6%)

Knowledge scores (none=0 to a lot=3) were aggregated across participants. Of the 775 survey respondents, only 230 completed both the baseline and post-survey. Among respondents, knowledge across all seven skills improved significantly from pre-training to post-training ($p<0.01$) (Figure 3).

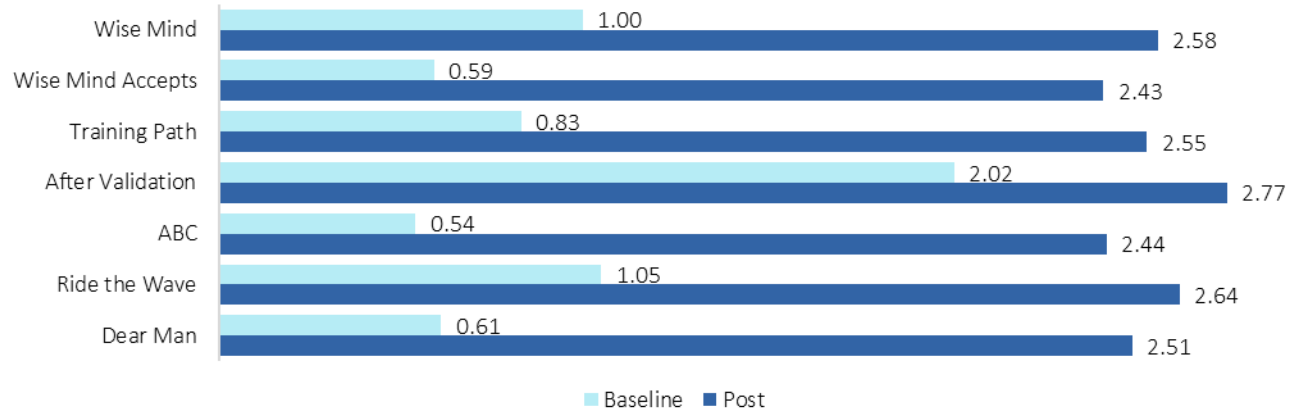

Figure 3. Baseline and Post Survey Knowledge with *DBT Skills*

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QUALITATIVE FEEDBACK FROM PCMH TEAM MEMBERS

Methodology

Interviews were conducted with the six current team members who work on the CO Youth Suicide Prevention program, as well as one Partners for Children's Mental Health team member who used to work on the program. Interviewee roles included program director, two program managers, clinician consultant, youth engagement manager, and two evaluators. Responses were thematically analyzed into two domains: successes and challenges.

Project Successes

Through their training model, the CO Youth Suicide Prevention team believe they have been able to decrease the stigma around youth suicide and improve providers' comfortability to open the dialogue around conversations about suicidality with their adolescent patients. The team has heard from participants that they are appreciative of the training sessions being offered, especially since they can be adapted to the clinic's needs and resources and are offered free of charge. As one team member shared, by standardizing suicide prevention screening as part of the care, it has helped providers "take national guidelines and put them into practice… in a topic area that they're not always the most used to."

"I get to contribute meaningfully to increasing access to mental health care for kids."

Another perceived success from the team was their focus on impacting underserved or under-resourced areas. The CO Youth Suicide Prevention program team specifically targets these areas to offer services to clinics and schools that are serving communities at higher risk for mental health problems or suicidality. When these screenings and skills are used as trained, team members feel like more kids are being reached who may have been overlooked before. The team also prides itself on its community collaboration practices, frequently considering feedback from the clinics and schools, as well as working with them to help solve any problems that may arise while they are implementing the pathway tool or skills in their practice.

A few team members said they believe *Pathway to Suicide Prevention (PSP)* training, in particular, saves lives. Typically, adolescent patients are not screened consistently in primary care, but by using the tools and cadence recommended in *PSP* they're "catching a lot of these kids instead of having them…not getting screened and not getting help." Furthermore, by saving one life, they can save more. As one team member said "if a provider caught that kid and prevented [a suicide] from happening…that's a huge, a huge impact. Because think of how many lives that one child touches."

Project Challenges

Team capacity and turnover were the biggest challenges shared, with team members feeling that the team is small but heavy on the leadership roles, without the infrastructure to support the need for that team design. Turnover is a frequent issue for this team and positions are not always backfilled, leading to gaps in training offerings and data collection, as well as team members feeling like they are acting outside of their roles to ensure work is completed.

"When you don't have a clear brand and you move all the time, it's going to lead to this [lack of direction]."

Shifting priorities were also shared as a common challenge, as it has led to some team members feeling like their skillset is not valued. For example, over the last six years, the training team has shrunk from four to one, and the schools' initiatives have dwindled while primary care work has grown. Team members shared that hiring more trainers and including a larger focus on the schools' work may alleviate some of these feelings. Additionally, the team felt like there was an opportunity to grow their offerings, such as expanding services to ambulatory and specialized clinics.

Outside of internal challenges, the team has faced external challenges with having to pivot their program due to the COVID-19 pandemic, learning to modify their training to each individual clinic's needs, and hesitation from the participating providers due to their own systematic barriers. Team members recognize there will be a never-ending need for this work as they will never be able to address all the resource or systematic barriers that schools or providers face.

FEEDBACK FROM PARTICIPANTS

Methodology

The CO Youth Suicide Prevention team offered baseline and post training surveys via Qualtrics to 111 *Pathway to Suicide Prevention (PSP)* participants who attended the training during the evaluation period. One open-ended question on the baseline survey focused on anticipated challenges for implementing the training skills. The post survey included two open-ended questions focused on successes and challenges with integrating training skills into their practice.

To further elicit participant feedback on successes and challenges, as well as satisfaction with the training, we outreached 11 former trainees for a follow-up interview. This outreach population consisted of 5 primary care providers that attended *PSP* and 6 school counselors, all from the same school district in the Denver Metro Area, who attended *Dialectical Behavior Therapy (DBT) Skills*. Four participants (two providers and two counselors) completed an interview (response rate of 36%).

Pathway to Suicide Prevention Survey Results

Of the 107 baseline survey respondents, 30 provided an answer about anticipated challenges and barriers to implementing training skills. Of the 17 post-survey respondents, 15 provided answers about successes and challenges.

Table 4: Common Themes in PSP Participant Open-Ended Responses

Baseline	Post-survey
Concerns • Time constraints • Limited knowledge with suicide risk assessment • Low confidence in how to handle suicidality • Dealing with hesitancy from both parents and adolescents • Lack of systemwide resources	*Successes* • Increased knowledge and confidence in skills • Comfortability with addressing suicidal concerns within the hospital system • Appreciating the tools the Pathway has to offer *Challenges* • Time constraints • Limited resources • Parent hesitancy

Interview Feedback

"This program literally saved some of our patients."

Overall, interview participants greatly appreciated the training they attended. Though most participants were already somewhat familiar with the skills provided in the training, they felt it served as a helpful refresher and "reinforced a lot of what we were doing." Participants commended the program for giving them the opportunity to talk about actual cases and how to put their skills into practice. One *PSP* provider greatly appreciated the consistent follow-up with the team, as the constant repetition of going through the screenings with the team made it feel like "second nature" to use with patients. The tangible resources provided by the team were also greatly appreciated, as the participants felt they could easily refer to the manuals and handouts that were given to them and give the resources to patients and families as well. Participants also praised the team for providing resources that were pertinent to their area, including how to talk to their community about gun safety.

Participants also shared some suggestions for improvements. Because participants had prior knowledge of the skills they were being trained in, they would want to make sure the curriculum is useful for all trainees' skills levels. Additionally, the school counselors felt that there may be some ways to modify the curriculum and make it more suitable for counselors that see younger age ranges. Some participants also discussed wanting more hands-on instruction, including role-playing cases and having more of the training be in-person. Finally, while participants appreciated the resources they received, they would have liked even more, such as links to videos or handouts that they can more easily reproduce and give to their students/patients.

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EVALUATION SUMMARY

Based on the *Pathway to Suicide Prevention (PSP)* survey data available, the CO Youth Suicide Prevention program is improving clinical personnel confidence with suicide prevention skills in *PSP* participating clinics and hitting screening rate benchmarks in clinics that finish implementation. Based on the *Dialectical Behavior Therapy (DBT) Skills* survey data available, the CO Youth Suicide Prevention program is improving school personnel knowledge of suicide prevention skills in the schools where *DBT Skills* training occurred. Trainees appreciate the training and feel it positively impacts their work.

RECOMMENDATIONS TO THE PROJECT TEAM

While the data available trends toward positive outcomes of the training, several outcomes of interest could not be reliably measured due to missingness or inconsistency of data capture. Additionally, findings with the data and themes from conversations with team members indicate areas for program improvement.

Team turnover led to **different methods for data capture** within the program, meaning our evaluation has several limitations. We were unable to evaluate individual change in confidence for *PSP* since baseline data was at the participant level, but post-survey data was at the clinic level. Additionally, we were unable to assess screening rates for every clinic that participated in *PSP*. Finally, wording on demographics was different between programs (e.g. sex vs. gender).

Recommendation 1: Collect data consistently across subjects and programs. We recommend person-level data collection using validated instruments to collect demographic variables and standardizing program specific questions. Questions should be asked in the same manner across baseline and post surveys, and post survey responses from individuals who did not complete baseline surveys should be kept separate. It is important to document decisions in a team handbook that can be shared with new, onboarding team members so that new processes don't overwrite existing policies. Finally, if new measures are incorporated later (e.g. screening rates), a clear start date for that measure should be noted.

For many programs, particularly those that were implemented before the current project team joined the CO Youth Suicide Prevention program, there are **no records of program offerings or data collected**. We were unable to fully understand all offerings from the entirety of funding because staff turnover led to missing files.

Recommendation 2: Improve team-wide operations around administrative policies and procedures. Decide on consistent storage destinations and rules, ensuring all team members have access to storage locations. Ensure that all programs (current and future) have a synopsis available for implementation and data.

There was a **high-level of missingness to survey questions,** both with *PSP* and *DBT Skills*, and a low response rate to the *PSP* post-survey. This degree of missingness can make it difficult to assess the true program impact.

Recommendation 3: Consider incentivizing respondents to fill out a post-survey, if not already occurring. Additionally, consider whether it's possible to disseminate surveys while clinicians are doing follow-up meetings with the project team, reserving time for it to be completed. Additionally, if not already integrated, utilize forced response or response reminders in Qualtrics to prompt participants to complete questions they may have accidentally overlooked. Another way to possibly improve survey responses is to reduce the number of questions in the survey to receive a more comprehensive response across all questions. Consider improving data capture by making the questions more succinct and specific (i.e., "please select your gender" or "please select your age group" instead of "how would you describe yourself' which may receive a subjective response or no response.)

Many team members shared a **perceived lack of programmatic direction or strategy and feeling underappreciated** when team structure and mission shifts away from utilizing their skillset.

Recommendation 4: Consider evaluating the current mission and finalizing a statement. Then, work with team members to develop a training strategy and team design that supports work toward that mission.