A Cascade of Care Model for Suicide Prevention

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Abstract

The rising rates of suicide in the United States, particularly among young people of color, requires urgent attention. While the healthcare system is a critical service sector for suicide prevention given high levels of utilization by people at risk of suicide, it is not sufficient. Only approximately 50% of those identified as at-risk in an Emergency Department, agree to be connected to outpatient services, with even small proportions engaging in these services. This "care cascade" parallels health services challenges in other domains, such as HIV. Corresponding Cascade of Care (COC) models have been galvanizing public health frameworks, as they can be utilized to track both patient-level outcomes and leveraged to form aspirational goals to improve systems of care for those in need. We aim to delineate a COC model specific to suicide prevention efforts, to help frame existing challenges and unify efforts to address these gaps. Given the complexity of suicidal thoughts and behaviors, solutions are needed that address care at multiple levels of the socio-ecological framework and build multisectoral networks into an integrated system of care. Defining and delineating this COC model can help structure local and national efforts to comprehensively address the suicide epidemic in the United States.

Highlights:

- Despite existing efforts focused on multi-component suicide prevention strategies, there has been little progress in reducing suicide rates, particularly for racial, ethnic, and sexual minority populations and among individuals with disabilities.
- Service connection, utilization, and engagement are key to changing these trends but have remained a persistent program in suicide prevention efforts.
- We propose a Cascade of Care model, specifically focused on suicide prevention, to track patient progress, drive population-level health goals, and aims to connect multiple sectors to create a system of care for individuals at risk.

Introduction

Suicide remains the second leading cause of death for young people in the United States (US) and rates have increased dramatically in the last 10 years compared to decreasing rates in other regions of the world (1). While overall in the US there have been signs of decreasing rates in 2019 and 2020 compared to previous years, rates have increased in several racial, ethnic and sexual, and gender minority populations groups (2). The magnitude of suicide deaths and attempts in the US and the disproportionate burden on marginalized groups, calls for a unified and strategic national response.

Suicide prevention efforts to date have primarily centered on the health system because 83% of suicide decedents had contact with the health system in the year prior to death (3). In the year prior to their death studies have shown that 18.3% had contact with in-patient mental health services, 26.1% had contact with outpatient mental health services (4), 54% with primary care, and 31.1% with an emergency department (ED) (5). However, approximately 50% of patients seen in an ED for a suicide attempt, refuse outpatient treatment upon discharge (6). Across studies, only 29.5% of patients with past-year suicide ideation, plan, or attempt utilized any type of mental health service (7), despite the fact that frequency and volume of mental health care visits have been shown to be protective (8). Even among those who do make it to outpatient care, only 40% participate in more than one outpatient session (6,9). We also know that recurrence of thoughts and behaviors is relatively common with studies showing that up to 25% of individuals who are seen in the ED for an attempt go on to have a subsequent attempt (10). The gap in service utilization and engagement is even more problematic in individuals from racial, ethnic, or sexual minority populations or among youth with disabilities (11,12). This “cascade of care” from the health system to the community (Figure 1), represents an urgent need to not only focus

on the healthcare sector, but take a more unifying socio-ecological approach across the multiple sectors in which individuals can be identified early and linked with mental health services or identified while experiencing crises and receive care, such as families, schools, communities, and workplaces.

The suicide burden and associated care gap mirror the challenges we have faced in other public health domains - most notably the HIV/AIDs pandemic and the Opioid Epidemic. Cascade of Care (COC) models have been central in organizing efforts to respond to these and other major health challenges. COC models are applied using a multi-level framework to track progress towards goals ranging from the individual- to population-level targets. Several COC models have incorporated prevention and treatment for health issues such as Hepatitis C (13,14), diabetes (15), and recently for Opioid Use Disorder (16).

The HIV COC model (17) serves as a potentially grounding model for the development of a Suicide COC. The HIV COC model starts with a diagnosis and ends with maintaining viral suppression through three intervening care steps. Proportionately smaller numbers of people make it to each of the care steps in the HIV COC model, with only 19% of people infected with HIV in the US reaching an undetectable viral load (17). More recent versions of the HIV COC model reflect the cyclical nature of engagement, disengagement, and re-engagement with HIV care that more closely aligns with the reality for many HIV patients (18). In the context of suicide, recurrences or escalations of suicidal thoughts and behaviors (STB) often remain, and risk increases during care transitions (19). As such, a cyclical Suicide Prevention COC model might also better reflect the patterns of treatment engagement among people who experience STB, while also guiding efficient prevention and intervention efforts that connect suicidal people with the least restrictive level of care.

Collectively, COC models inform funding priorities, drive consensus towards research and resource targets, and organize multidisciplinary stakeholders towards a common goal. For example, the Joint United Nations Programme on HIV/AIDS (UNAIDS), based on decades of work to prove our ability to fight AIDS, uses a COC model as its basis for setting the "95-95-95" goal of 95% of people whose HIV status is known, 95% receiving treatment, and 95% with adequately suppressed viral load to ultimately end the HIV epidemic as a public health threat (20). These are ambitious targets that have been built on decades of work and previous targets that have been met. Moreover, they are unifying in that many countries adopt these goals and track progress. Clinicians, healthcare systems, and other sectors serving suicidal individuals can track their own progress towards ensuring the highest quality of care.

This COC model can help guide the planning of policies and programming and delineate the target population and programs that address different levels of the care continuum from promotion through recovery and ultimately transform population-level suicide outcomes. A COC model could identify barriers and track progress towards addressing care gaps across sectors. Our proposed COC model provides a unifying framework that not only focuses on quality of care in the health system level but links those approaches to the community to create a system of care for individuals at risk of suicide. Finally, the World Health Organization's suicide prevention implementation guide focuses on four strategies: 1) Limit access to the means of suicide; 2) Interact with the media for responsible reporting of suicide; 3) Foster socio-emotional life skills in adolescents; 4) Early identify, assess, manage, and follow up anyone who is affected by suicidal behaviors. The suicide prevention COC model compliments all of these strategies but in particular the last by explicitly identifying the gap that needs to be addressed to help ensure that those identified as at risk, receive appropriate and comprehensive care.

IV. Stages in the Cascade Model for Suicide Prevention

For suicide prevention, we propose a five staged cyclical cascade (Figure 2): 1) Identification and characterization of risk; 2) Immediate intervention; 3) Linkages to care; 4) Secondary prevention, tertiary prevention, postvention, and treatment; and 5) Recovery & resilience (Figure 2). The cyclical aspect of the cascade is critical - at each stage, individuals may or may not reach services and/or disengage during or after the stage. Individuals may also experience a recurrence of STB resulting in re-entry into different stages of the cascade, depending on where in the model they dropped out of care and the type and magnitude of the barriers to care they encountered. For example, given the high-risk period post-discharge (21), an individual may experience a recurrence of STB and be brought back to the ED. Similarly, if a person starts outpatient care, but then drops out after one session, they may need additional support to re-engage in care. The recurring nature of suicidal risk and care gaps makes these types of experiences common and critical to address through coordinated and proactive outreach and intervention approaches.

Within each stage, the intensity of intervention should be commensurate with the level of risk. For example, at Stage 1, some patients might be immediately transferred to an in-patient setting, while others may be offered a brief intervention or still others discharged with lethal means counseling and a gun lock, a safety plan, and provided with referrals. The proposed stages do not delineate the types of interventions that are offered at each stage, but the assumption is that the interventions delivered are supported by rigorous evidence generated through research that is representative to a given population, appropriate to the individual's risk level and can feasibly be embedded into service systems and sustained. Examples of these types of approaches

may include, but are not limited to use of patient/peer/family navigators to facilitate linkages to care, development of data systems that can integrate across sectors (e.g., school and healthcare), and possibly alert the system to emerging risk, caring contacts-based approaches, use of evidence-based therapies in outpatient settings, and strengths-based approaches that promote a strong connection and engagement with prevention activities.

V. Applications

Careful delineation of these stages could allow us to elucidate the specific barriers and gaps in care overall in a population and in specific subgroups and when and where re-entry driven by a recurrence of STB is most needed and likely to occur. We can pose novel and timely research questions. For example, Which stages see the largest proportions of people disengage with care? When are people most likely to relapse? Are there certain subgroups of the population where disengagement is more likely at certain stages? How does this impact the overall trajectory towards recovery and resilience?

Within this care cascade framework, we can also propose policy and programmatic solutions to test and study. Given the complexity of STB, the solutions needed to address care at multiple levels of the socio-ecological framework should include multiple coordinated components (Figure 3). Multi-component interventions combine prevention programs at the universal, selective, and targeted/indicated level so that these approaches are integrated within and across systems to drive down rates of suicide through a synergistic approach. The Zero Suicide Model, for example, focuses on seven core components that health systems can work towards in their efforts to reduce suicide. While the Zero Suicide Model is heavily focused on health systems, other similar programs in Australia and Europe (e.g. LifeSpan (22), the European

Alliance Against Depression (23), and the White Mountain Apache Tribe's Celebrating Life Program (24), including community- and school-based initiatives in combination with components at the health system (25). Ultimately, because people cross and interact with different levels of their socio-ecological environment naturally, our prevention efforts need to mirror this dynamic and act across multiple levels of the model at the same time (26).

VI. Conclusion and Future Directions

The adoption of a suicide prevention COC model provides a framework to optimize care at the individual, health care system, and across service system levels, and simultaneously set goals for population health targets. For example, at the individual level, a clinician can track how a patient who is discharged continues through their care continuum and work to mobilize resources or a response if and when they disengage. At the health system level, careful tracking of patients at risk of suicide after discharge is not only critical to care but also central to the ongoing quality of care initiatives (27). From a policy perspective, this framework allows the setting of realistic and aspirational goals towards establishing comprehensive systems of care to prevent suicide.

To understand why we continually fall short of changing suicidal behavior patterns, we need to focus on the frequency and the circumstances within which people enter and leave care. Our efforts thus far have focused on building and testing the interventions across socio-ecological levels and levels of care from prevention to treatment, but as we have learned from decades of research, interventions are only good if people use them and policies work when implemented and sustained at high quality (28). In other words, "Knowing what to do" does not ensure we actually do it nor that people will actually come. By delineating a suicide prevention

COC framework, we hope to facilitate structured local and national efforts by identifying key barriers to the progression along the cascade, interventions, and quality indicators across populations and settings to help truly move the needle on preventing suicide and saving lives.

References

1. Suicide worldwide in 2019: Global Health Estimates. World Health Organization, 2021

2. Curtin S, Hedegaard H: Provisional numbers and rates of suicide by month and demographic characteristics: United States, 2020. National Center for Health Statistics (U.S.), 2021Available from: https://stacks.cdc.gov/view/cdc/110369

3. Ahmedani BK, Simon GE, Stewart C, et al.: Health care contacts in the year before suicide death. J Gen Intern Med 29: 870–877, 2014.Available from: https://pubmed.ncbi.nlm.nih.gov/24567199/

4. Walby FA, Myhre MØ, Kildahl AT: Contact With Mental Health Services Prior to Suicide: A Systematic Review and Meta-Analysis. Psychiatr Serv 69: 751–759, 2018.Available from: http://dx.doi.org/10.1176/appi.ps.201700475

5. Schaffer A, Sinyor M, Kurdyak P, et al.: Population-based analysis of health care contacts among suicide decedents: identifying opportunities for more targeted suicide prevention strategies. World Psychiatry 15: 135–145, 2016.Available from: http://dx.doi.org/10.1002/wps.20321

6. Lizardi D, Stanley B: Treatment engagement: a neglected aspect in the psychiatric care of suicidal patients. Psychiatr Serv 61: 1183–1191, 2010.Available from: http://dx.doi.org/10.1176/ps.2010.61.12.1183

7. Hom MA, Stanley IH, Joiner TE Jr: Evaluating factors and interventions that influence help-seeking and mental health service utilization among suicidal individuals: A review of the literature. Clin Psychol Rev 40: 28–39, 2015.Available from: http://dx.doi.org/10.1016/j.cpr.2015.05.006

8. Fontanella CA, Warner LA, Steelesmith D, et al.: Clinical Profiles and Health Services Patterns of Medicaid-Enrolled Youths Who Died by Suicide. JAMA Pediatr 174: 470–477, 2020.Available from: http://dx.doi.org/10.1001/jamapediatrics.2020.0002

9. Larkin GL, Beautrais AL: Emergency departments are underutilized sites for suicide prevention. Crisis 31: 1–6, 2010.Available from: http://dx.doi.org/10.1027/0227-5910/a000001

10. Beautrais AL: Further suicidal behavior among medically serious suicide attempters. Suicide Life Threat Behav 34: 1–11, 2004.Available from: http://dx.doi.org/10.1521/suli.34.1.1.27772

11. Berona J, Horwitz AG, Czyz EK, et al.: Predicting suicidal behavior among lesbian, gay, bisexual, and transgender youth receiving psychiatric emergency services. J Psychiatr Res 122: 64–69, 2020.Available from: http://dx.doi.org/10.1016/j.jpsychires.2019.12.007

12. Ryan TC, Suskida R, Cwik M, et al.: Frequent Emergency Department Visits among Youth

Identified as at Risk for Suicide, 2015.

13. Safreed-Harmon K, Blach S, Aleman S, et al.: The Consensus Hepatitis C Cascade of Care: Standardized Reporting to Monitor Progress Toward Elimination. Clin Infect Dis 69: 2218–2227, 2019.Available from: http://dx.doi.org/10.1093/cid/ciz714

14. Thomas DL: State of the Hepatitis C Virus Care Cascade. Clin Liver Dis 16: 8–11, 2020.Available from: http://dx.doi.org/10.1002/cld.915

15. Kazemian P, Shebl FM, McCann N, et al.: Evaluation of the Cascade of Diabetes Care in the United States, 2005-2016. JAMA Intern Med 179: 1376–1385, 2019.Available from: http://dx.doi.org/10.1001/jamainternmed.2019.2396

16. Williams AR, Nunes EV, Bisaga A, et al.: Development of a Cascade of Care for responding to the opioid epidemic. Am J Drug Alcohol Abuse 45: 1–10, 2019.Available from: http://dx.doi.org/10.1080/00952990.2018.1546862

17. Gardner EM, McLees MP, Steiner JF, et al.: The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infect Dis 52: 793–800, 2011.Available from: http://dx.doi.org/10.1093/cid/ciq243

18. Ehrenkranz P, Rosen S, Boulle A, et al.: The revolving door of HIV care: Revising the service delivery cascade to achieve the UNAIDS 95-95-95 goals. PLoS Med 18: e1003651, 2021.Available from: http://dx.doi.org/10.1371/journal.pmed.1003651

19. Chung D, Hadzi-Pavlovic D, Wang M, et al.: Meta-analysis of suicide rates in the first week and the first month after psychiatric hospitalisation. BMJ Open 9: e023883, 2019.Available from: http://dx.doi.org/10.1136/bmjopen-2018-023883

20. Fast-Track strategy to end the AIDS epidemic by 2030Available from: https://www.unaids.org/en/resources/campaigns/World-AIDS-Day-Report-2014

21. Chung DT, Ryan CJ, Hadzi-Pavlovic D, et al.: Suicide Rates After Discharge From Psychiatric Facilities: A Systematic Review and Meta-analysis. JAMA Psychiatry 74: 694–702, 2017.Available from: http://dx.doi.org/10.1001/jamapsychiatry.2017.1044

22. An evidence-based systems approach to suicide prevention: guidance on planning, commissioning and monitoring. The Black Dog Institute, 2016

23. Hegerl U, Wittmann M, Arensman E, et al.: The “European Alliance Against Depression (EAAD)”: a multifaceted, community-based action programme against depression and suicidality. World J Biol Psychiatry 9: 51–58, 2008.Available from: http://dx.doi.org/10.1080/15622970701216681

24. Cwik MF, Barlow A, Goklish N, et al.: Community-Based Surveillance and Case Management for Suicide Prevention: An American Indian Tribally Initiated System. Am J Public Health 104: e18–e23, 2014.Available from: http://ajph.aphapublications.org/doi/10.2105/AJPH.2014.301872

25. Guntuku S: The need for shift in approach to suicide prevention in Australia. Open Journal of Social Sciences 150–157, 2020.Available from: https://www.scirp.org/journal/paperinformation.aspx?paperid=102290

26. The Social-Ecological Model: A Framework for Prevention, 2021.Available from: https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html

27. Wadhera RK, Joynt Maddox KE, Kazi DS, et al.: Hospital revisits within 30 days after discharge for medical conditions targeted by the Hospital Readmissions Reduction Program in the United States: national retrospective analysis. BMJ 366: l4563, 2019.Available from: http://dx.doi.org/10.1136/bmj.l4563

28. Proctor EK, Geng E: A new lane for science. Science 374: 659–659, 2021.Available from: https://www.science.org/doi/abs/10.1126/science.abn0184

Captions for figures:
Figure 1: An approximate cascade of care for individuals at risk of suicide
Figure 2: A cascade of care model for suicide prevention
Figure 3: Interventions at multiple socio-ecological levels to address the cascade of care

Figure 1.

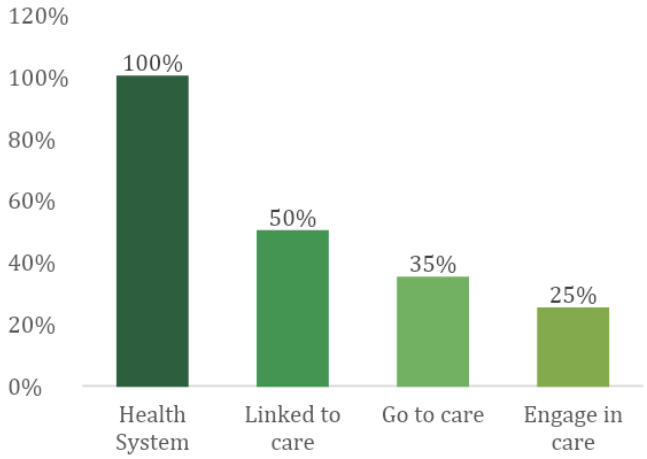


Figure 2.

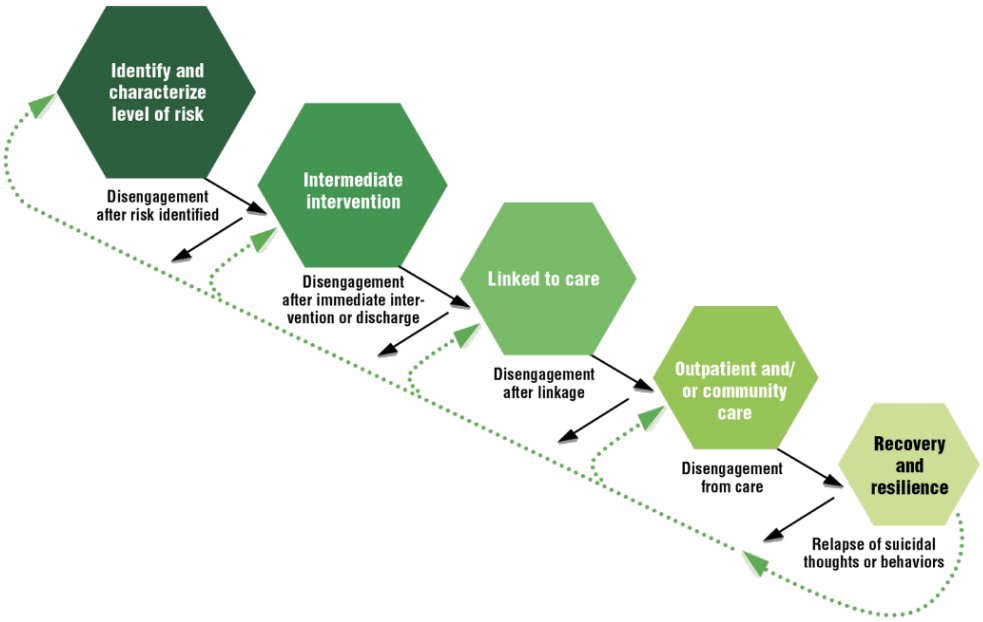
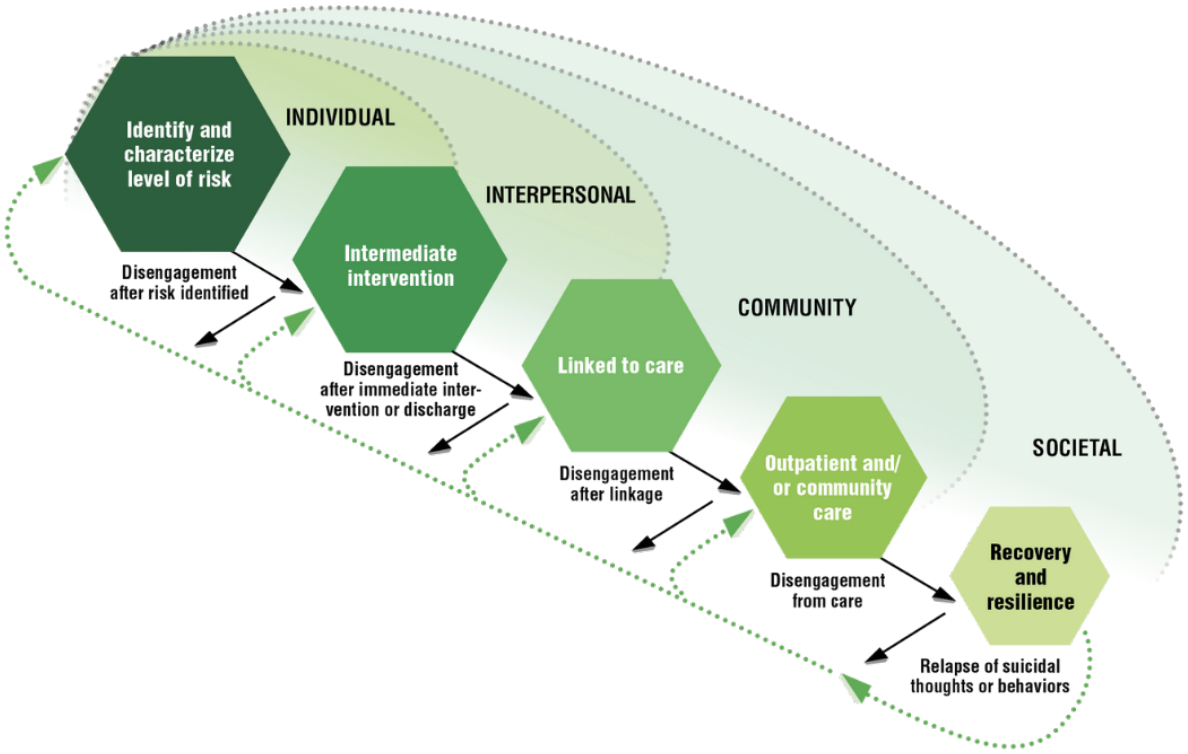


Figure 3.


Identify and characterize level of risk
INDIVIDUAL
Intermediate intervention
INTERPERSONAL
Linked to care
COMMUNITY
Outpatient and/or community care
SOCIETAL
Recovery and resilience
Disengagement after risk identified
Disengagement after immediate intervention or discharge
Disengagement after linkage
Disengagement from care
Relapse of suicidal thoughts or behaviors