

# Chapter 3

## Currently emerging possibilities of effective suicide prevention

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### Abstract

Although more than 120 years have passed since the first scientific work on suicide, humanity is still struggling to effectively reduce the number of suicides and counteract self-destructive behavior. WHO reports from 2010 [51] and 2014 [52] on the prevention of suicide indicate the directions and areas of preventive actions, but they also stipulate that – with a few exceptions – they are unable to indicate clearly proven prevention methods. This work, which is based on analysis of the latest literature (mainly from 2015–2019) shows the upcoming changes in the way we look at the possibilities of such prevention. Literature data suggest that the problem of suicide prevention cannot be effectively solved without changing the paradigm and focusing on new technologies. The current paradigm, which is based on so-called causal modeling, does not work when diagnosing the threat of suicide because the problem of suicide is too complex. Hence, it is proposed that machine learning based on large amounts of data (largely from biological material) should be used to create appropriate diagnostic algorithms. In the future, appropriate smartphone applications could be used to guide patients at risk of suicide. The Zero Suicide model described in the literature draws attention to the organizational needs of preventive therapy and the appropriate motivation of people participating in this therapy. The summary of the work contains the idea that – unfortunately, as in many other health issues, but also in the area of suicide prevention – success will depend not so much on the efforts of researchers and clinicians (because they are usually motivated enough), but on the good will and common sense of political decision-makers.

**Key words:** suicide, suicide theories, suicide prevention, new technologies, effectiveness

## Introduction

Suicidal behavior, including committed suicides, is a global phenomenon and is considered to be one of the most important problems facing health care systems [51–53]. A particular burden on society is this type of behavior in adolescents [54,55] and women in the postpartum period [56,57]. It is believed that suicidal behavior can be effectively prevented [51,52], but in practice the proven preventive measures turned out to only hinder access to suicide-facilitating tools, firearms and readily available poisons [51]. Various other preventive measures are used, but their effectiveness generally lacks sufficient evidence [58], mainly because the observed groups are too small and the results of different work must be compiled and developed in the form of meta-analyses, or because the effects of a given intervention may be also attributed to other factors.

Poland has one of the highest suicide rates, especially suicides committed by young people [52, 59]. Hence, Poland should particularly approve the World Health Organization (WHO) directives on counteracting suicidal behavior, and these documents recommended to the member countries of the United Nations to reduce their annual suicide rate by 10% in 2013–2020 [52, 60]. Unfortunately, the annual suicide rates in Poland remain roughly the same. The WHO data available on the internet shows that this indicator for Poland in 2020 is 16.2 per 100,000 inhabitants and is one of the highest in the European Union.

Considering the topicality of the issue of suicide prevention, this work tries first to reflect contemporary views on the essence and mechanisms of suicidal behavior, and secondly to indicate, on the basis of available literature, current and anticipated possibilities of preventing such behavior.

## The phenomenon of suicide and other self-destructive behaviors and their definition

Suicide and self-destructive behavior that does not lead to death are multidimensional phenomena that usually have many reasons [51–53, 61].

Holyst [53, p. 128] describes the propensity to commit suicide as a function of at least five variables: *energy* (treated by this author as an individual property and, as one might guess, related to broadly understood neurobiology and individual experiences); *superstition* (“culturally inherited social pressure”); *religion* (“spiritual strength of belief shaped by the community”); *philosophy* (“forced by logic, rigor of philosophical arguments inherent in the consciousness of the individual”); and *science* (“perception of own findings of natural sciences”). Of course, the decisive factor here is the stress caused by a specific variable for each individual [cf. 53, p. 123], a configuration of adverse external factors or a disease, including, first of all, mental disorders. In the concepts of self-destructive behaviors presented by Kubacka-Jasiecka [61], “energy” can sometimes dominate the individual (typically a young person), thus leading to acting-out reactions, as evidenced by the quotations that the author collected from such people when they explained how they came to attempt suicide [61, pp. 179–181]. In psychiatric terms, such a reaction (suicide attempt, or in less fortunate cases, suicide) could be diagnosed as a special case of acute stress response (F 43.0 according to ICD-10).

The issue of the role of “energy” in the mechanism of undertaking suicidal actions is even more pronounced when dealing with such action in a person suffering from a serious mental disorder, because in him suicidal thoughts, which by definition should precede the act of suicide [62–66], may be drastically unusual. For example, in schizophrenia, these may be “bothersome auditory hallucinations, partially silenced by the patient, delusions or religious voices that induce lethal actions”, etc. [67, p. 23, tab. 3.4]. It is worth emphasizing here that in connection with the definition rigor, which will be discussed below, not every death inflicted by “one’s own hand” should be classified as suicide.

One of the authors (L.P.) is familiar with the case of a patient who was brought to a Hospital Emergency Department with a serious self-inflicted stabbing that required immediate specialist treatment. As a would-be “suicide”, the patient, after a stay in the thoracic surgery ward, was transferred to a psychiatric ward. There, it turned out that inflicting a blow to the

chest near the heart with a knife (if not for fortunate immediate help from the family, the wound would have to be fatal) the patient was convinced that... he saves his life. As he explained, a “demonic being” wanted to rip his heart out, so he – wanting to save himself – decided to damage his heart so that it would have no value for the “demonic being”.

The first scientific definition of suicide was formulated by Durkheim in 1897 [53, 68]. The French-English translation is: “all cases of death resulting directly or indirectly from a positive or negative act of the victim himself, which he knows will produce this result” [68]. Since then, at least 14 other definitions of suicide have been created [68], which shows how extremely difficult it is to clearly define this phenomenon [68,69]. Similarly, it is with other self-destructive behaviors [68, 69], which, in the opinion of eminent world experts in the field of suicidology, is extremely detrimental to the development of this field [68, 69].

The main problem that tries to solve various new – in relation to the first, “classical” – definitions is the problem of “the victim’s knowledge of the result of the act”. It is very different with this, especially in psychiatric patients (see the case described above) and in children who still have an immature central nervous system [70] and probably therefore – incomplete awareness of the irrevocability of death [53, p. 1262]. In people who are under the influence of alcohol or other intoxicating substances (and they very often attempt suicide), their awareness of the effects of their behavior may also be questionable.

In view of the persistent conceptual chaos associated with the non-uniformity of the terminology used in specialist literature [68, 69], WHO provides its own “working” definitions of self-destructive behavior. According to these definitions, **suicide** is the act of deliberately killing oneself; **attempted suicide** means any non-fatal suicide bombing (*suicide attempt is used to mean any non-fatal suicidal behavior and refers to intentional self-inflicted poisoning, injury or self-harm which may or may not have a fatal intent or outcome*); **suicidal behavior** refers to a series of activities (behaviors) related to the idea of suicide, such as thinking about suicide (imagining suicide), planning suicide, attempting suicide and committing

suicide (*suicidal behavior refers to a range of behaviors that include thinking about suicide (or ideation), planning suicide, attempting suicide and suicide itself*) [52].

Although thoughts about suicide have “always” accompanied man, their descriptions were of a philosophical or legal nature [53]. The first theoretical description of this phenomenon is attributed to Durkheim, who approached the issue from the perspective of a sociologist [53]. Later, psychoanalysts and psychiatrists started working on the problem of suicidality and self-destructive behavior [53, 61, 71]. The first experimental works from psychiatric clinics, using so-called psychological autopsy, showed that people who commit suicide suffer from serious mental disorders, mainly bipolar disorder and alcoholism [71]. The percentage of people in whom no diseases could be demonstrated in this work was not more than 2% [71]. Supported by an official WHO document from 1968, a conviction arose that in its essence suicide is closely related to mental illness, mainly depression [53, p. 507]. Therefore, to prevent suicide, you need to fight the symptoms of depression. It was only the results of the Mann group [72] and Philips et al. [73] from the turn of the 21st century that strongly undermined this conviction. The Mann Group showed that there is no correlation between the severity of suicidal behavior and the severity of other symptoms of depression (and generally other symptoms characteristic of a given psychiatric disorder), when it also has such (i.e. suicidal) behavior. Philips et al. stated, however, that in China, where the attitude towards suicide is more “liberal” than in the so-called West, as much as 37% of all cases of suicide assessed by psychological autopsy (511 randomly selected cases from various provinces of China were assessed) did not show any symptoms of mental illness prior to suicide. The results of these last two works and the results of neurochemical and neuroimaging studies allowed Maria Oquendo and her colleagues to formulate a neurobiological theory of suicide [74], and even propose a separate psychiatric diagnostic unit focused on suicidal behavior [75,76]. This proposal, at least in part, was reflected in the latest edition of the American DSM classification [77].

Although research on the neurobiological basis of self-destructive behavior is attracting more and more attention from researchers and their sponsors due to the urgent need to find markers of threatening suicide and to synthesize appropriate drugs [78], the current theories of suicide are three psychological theories proposed in 2005–2015 and currently subject to verification [62–66]. Their novelty, compared to the previous theories, is their strict adherence to the “from idea to action” paradigm, therefore these are “processual” theories.

The most important concepts of Thomas Joiner’s theory [62,63] are *thwarted belongingness* and *perceived burdensomeness*. If these feelings occur together, suicidal thoughts arise, i.e. a process begins that can lead to suicide. In order for a suicide to happen, a third condition must be met: the ability to overcome the pain and fear associated with such an attack (*acquired capability*). According to this theory, this ability an individual may have innate, but more often acquires it in connection with previous aversion experiences (getting used to pain), such as difficult childhood, self-mutilation, experience of violence, military service, etc.

The focal point of O’Connor’s concept [64,65], which is more elaborate than Joiner’s theory, is the feeling of “being trapped” (*entrapment*). His suicidal behavior model has three parts. The first depicts the “ground” that characterizes the individual (genetic, environmental and bio-related conditions). The feeling of “entrapment”, which is placed in the middle of the second part of the model, occurs due to a previous sense of “defeat and humiliation” if the latter is strengthened by appropriate moderating factors. These moderating factors may, for example, be difficulties in solving social problems, memory distortions, psychological ruminations, etc. If a sense of “being trapped” does exist, it may encounter ***motivational moderators***, such as a sense of loneliness and of being a burden taken into account in Joiner’s theory, and others. These moderators (of course, in the presence of a sense of “being trapped”) lead to suicidal thoughts and plans, especially in the absence of some important protective factors (natural resilience, social

support, etc.). Liberating the implementation of these plans is associated with ***volitional motivators***, which may have a psychological, social, physiological or environmental nature and be associated with the availability of appropriate means, lack of fear of death, increased sensitivity to pain, impulsiveness, previous suicidal behavior, etc. By the act of suicide bombing itself (no matter if it ends in death or not) they are presented by O'Connor graphically in the third part of the model.

The last of the modern theories of suicide, formulated in 2015 in the same paradigm as the previous two, was proposed by Klonsky and May [66]. According to these authors, suicidal ideation appears when a person ***simultaneously*** feels distress (pain) and has a sense of hopelessness. The condition for the emergence of strong suicidal ideation in such a situation is a feeling of a lack of *connectedness*; this is not only about connectedness with other people, but also with some idea, activity, etc. In turn, the condition for the implementation of such ideas, if they appear, there is the ability to attempt suicide, which in this theory is understood quite broadly, more broadly than in Joiner's, because it is both about pain resistance and the availability of funds, skills in using them, etc.

As can be seen from the above, all the theories described here are quite similar, but at the same time they provide somewhat differently stressed hints as to the possible prevention of suicide. The importance of one of them (preventing the acquisition of resistance to pain) seemed to be noted by the Prime Minister of Great Britain, Theresa May, when in January 2017 she talked about the implementation of the new national strategy for suicide prevention. She emphasized at the time that great efforts would be made to treat self-harming young people [79]. It has been known for a long time that self-harm is one of the strongest predictors of suicide [80]. To what extent the theories presented prove to be useful for preventive actions, and which of them will prove to be the most inspiring in practice in this respect, will only be shown by the results of the research.

## Social costs of suicidal behavior

Suicidal behavior, which is rarely mentioned, has considerable social costs. Unlike natural death, suicide requires thorough forensic investigation, which involves many people and sometimes requires expensive specialist research. It is necessary here to rule out murder and accidents; if we exclude these two, it then becomes necessary to exclude or confirm the indirect participation of others (inciting suicide is punishable by law). The costs of forensic investigations, of course, include the costs of funerals and therapeutic interventions in relation to people from the deceased's surroundings (for example, in the case of a student, such activities sometimes have to cover the entire school in addition to the immediate family). Other, i.e. not ending, self-destructive behaviors often require sick leave and long-term treatment; they may also result in long-term disabilities that are difficult to compensate. Even suicidal thoughts, which according to the WHO definition [52] are also considered suicidal behavior, if persistent, result in a decrease in productivity at work and a decrease in the creativity of the individual experiencing them. If the person who has committed suicide or permanent, serious self-harm is young, then the costs listed above are increased due to the fact that this person might be permanently employed, and these costs can be counted, and are the highest.

A paper from Australia [81] calculated the average cost of a young person's suicide (average age at death – 20 years, 4 months and 24 days) in 2014. It amounted to 2,884,426 Australian dollars: \$9,721 direct costs, \$86,460 related to caring for people in mourning, and \$2,788,245 related to loss of productivity. As reported in this work, in Australia, the total cost of suicides of young people is about \$511 million a year. Similarly, the total cost of all suicides and non-fatal self-destructive behaviors in Australia in 2014 was \$6.73 billion [82]. The authors of this last work also calculated that the average profit of every dollar invested in the prevention of suicide and non-suicidal self-destructive behavior should return about one and a half dollars (1.11–3.07 dollars). It is worth noting here that although these costs are huge, they might theoretically be underestimated. In the



given works, there is no reflection on the possibility of losing, as a result of suicide, extremely gifted people, even geniuses. This is likely because the propensity to commit suicide is a typical feature of bipolar disorder [83], and in turn people with extraordinary creativity often develop it [84].

## Summary of research results to date on suicide prevention

As indicated in the Introduction, suicide can be prevented [51,52]. Unfortunately, recent meta-analyses of previously published results differ in their conclusions as to the type of the most effective interventions. While some authors show the effectiveness of proper education of doctors and removing access to dangerous tools (firearms, strong poisons) or places [85], others suggest that to this difficult access, whose effectiveness is confirmed, some pharmacological interventions (clozapine, lithium salts) and relevant school programs [86], and yet others only confirm the effectiveness of one of the psychological and sociological interactions [58]. These differences may result from the fact that these summaries concerned papers published in a slightly different period, and furthermore the methodological details of the studies differed. For example, Mann et al. [85] analyzed the results of articles published in 1966–2005, Zalsman et al. [86] analyzed articles published in 2005–2014, and Riblet et al. [58] analyzed all articles available in EMBASE, Medline, CINAHL, PsycINFO and Cochrane Library from the beginning of these databases to the end of 2015. From the methodological details given here, it seems that the most authoritative study should be the meta-analysis conducted by Riblet et al. [58], and they gave only one intervention (WHO BIC), which the results of meta-analytical calculations indicate as certain. This means that the effectiveness of the preventive methods used so far is poor.

Initially, states attempted to prevent suicidal behavior by criminalizing it and treating suicide bombings as a crime, and survivors were punished [53, 87]. Because this did not bring many results but only falsified statistics, and because suicides were carefully hidden, in the mid-twentieth century most countries abandoned the penalization of suicides, punishing

only those who encouraged it [87]. In about thirty countries where suicide is still illegal (mainly Muslim countries), the current situation does not allow conclusions to be drawn about the preventive effectiveness of such a method; in about half of these countries, the suicide rate is much lower than the world average, but in the other half it is much higher [87]. In countries that refrained from criminalizing suicide after a corresponding amendment to legislation, the suicide rate clearly decreased [87].

After withdrawing from the criminalization of suicidal behavior, some countries replaced it with national strategies for preventing suicide [52, 88], which are modernized from time to time [52, 79]. According to WHO 2014 data [52], 28 countries have introduced such strategies, but, unfortunately, Poland is not one of them. The adopted strategies are usually based on two very similar models, described exactly by Holyst [53]: PST (from the angelic – Primary, Secondary, Tertiary) and USI (from the English words: Universal, Selective, Indicated). It seems that the latter model, proposed in 1994 by the Institute of Medicine in Washington [53], is now more widespread [cf. 51, 52]. “Universal” prevention within the meaning of this model refers to the general population of a given country (e.g. limiting access to firearms, poisons, adequate protection of bridges, high-rise buildings and metro networks, and adequate information for the public). “Selective” prevention focuses on subpopulations which, for one reason or another, may be at particular risk of suicide (e.g. persons with mental disorders, persons performing certain specific professions, persons subject to violence, etc.). On the other hand, “Indicative” prevention applies to individuals and not to entire groups. A model example of this last intervention is people who have attempted suicide and who subsequently enter psychiatric care facilities.

A comparison of four countries that have introduced national suicide prevention strategies against four other countries that are very similar in all respects but differ only in terms of the absence of such a strategy leads to the conclusion that the adoption of this type of national strategy significantly reduces the suicide rate, albeit mostly among men [88]. Nevertheless, the overall result of this comparison is still significant because usually

(a significant exception is China [52]) there are 3–5 suicides among men for each woman's suicide [51,52,88]. The results of the work cited here [88] suggest that men in the age groups 25–44 years and 45–64 years benefit most from the suicide strategy. The fact that suicide prevention strategies to have their intended effect undoubtedly has to be enjoyed, but unfortunately another fact has to worry: despite the implementation of an appropriate strategy, recently an increase in suicide has been observed in young (10–24 years) women [89] as well as in children.

One of the most frequently cited publications is the joint work [90] of authors from three excellent American universities, most of them from Harvard University. In accordance with the current methodology of conducting meta-analyses, these authors have thoroughly analyzed all prospective works on suicides that have appeared in the last 50 years, mainly in terms of determining significant predictors of suicidal behavior. Their study shows that at present we do not have such predictors, and therefore the effects of all previous preventive actions are quite mediocre [90]. The work cited here draws attention to the erroneous assumptions that unfortunately many researchers in the field of suicidology make. This applies primarily to misunderstanding the term “risk factor”. The authors of the study claim that most suicidologists upgrade ordinary correlates to “risk factors”; however, for a “correlate” (obtained in a transverse study) to be promoted to a “risk factor”, it must be checked in a prospective study with a control group (if it “proves” its impact, it will be promoted). And only when in a prospective study with an appropriate control group we prove that manipulation of the “risk factor” changes the statistically observed comparison result, we can “promote the risk factor” to a “predictor” [90]. The discussed work draws attention to a fact that has been highlighted as a result of the analyses that at present none of the correlates of suicidal behavior, either individually or in a team, can be considered as a reliable predictor of such behavior [90]. They propose an innovative solution to the problem of the exact predictability of suicide: abandoning the search for predictors and replacing it with the search for appropriate algorithms [90].

## Emerging opportunities to prevent suicide more effectively

Specialists involved in suicide are rather optimistic about the possibility of far more effective prevention of self-destructive behavior than is currently the case [91]. “Swallows heralding spring” are: 1) the effectiveness of the “Zero Suicide” program [92]; 2) the discovery of an extremely fast antidepressant, and above all the anti-suicidal action of ketamine [93,94]; 3) the experimentally confirmed anti-suicidal effectiveness of some forms of psychotherapy [58, 95, 96]; 4) the experimentally confirmed effectiveness of some interventions carried out in the school environment [97]; 5) the constantly growing pool of potential biological markers of self-destructive behavior, where markers that are already recognized and described [74,98] are constantly new, e.g. genetic variations not described previously that may affect the function of oxytocin [99,100], changes in the mutual proportion and levels of biometals, such as molybdenum, nickel, ruthenium, selenium, strontium and zinc [101], changes in the field of non-coding RNA fragments circulating in the blood, so-called microRNAs [102], and changes related to so-called gamma oscillations in EEG [103]; 6) the emergence of new technologies that on one hand can help to recognize a patient at risk of suicide who requires immediate assistance, and on the other hand, carriers of therapeutic content and at the same time tools to monitor patients’ current state [104].

Let’s start at the end of this list. The groundbreaking work of Franklin et al. [90] showed that the basic difficulty in preventing suicide bombings is the unpredictability of such an event in the sense of its exact location on the timeline. Based on the accumulation of so-called risk factors, we diagnose that “the patient is seriously threatened with suicide”, but we do not know when this suicide will occur, whether in three days or, for example, five years, and yet what we should do depends on this decision [90]. New technologies (machine learning) will most likely soon allow us to solve this problem [105–108]. By entering a huge amount of all possible data about people who have committed suicide into a computer, we will be able to obtain algorithms that in the future, based on data about a specific

person, will be able to indicate whether this person is at risk of suicide or not, and, if yes, when exactly this suicide (unless we intervene) will occur. This “machine diagnosis” will allow doctors of the future to make rational therapeutic decisions such as forcing involuntary hospital treatment, leaving outpatient treatment, and maybe even choosing the right “personalized” therapy. The role of these new technologies does not end with diagnosis. Smartphone applications allow continuous monitoring of a patient’s emotional state [109] and remote delivery of therapeutic content [109, 110]. Experts believe that such a “smartphone” approach may in the future be even better than traditional methods due to the extraordinary acceptance observed in modern youth of everything that is related to such technology [55, p. 87].

Therefore, what was said earlier about machine learning and the “substantive” basis for creating appropriate algorithms (i.e. the need to have as much different data as possible), the fifth point of the enumeration basically requires no comment. The neurobiological theory of suicide [74] reminded us that much depends on neurobiological parameters, and that such parameters that are associated with self-destructive behavior should be intensively sought. Of course, it is best when these parameters are readily available from electrophysiological methods such as EEG [103], neuro-imaging methods, or methods that can determine the genetic, epigenetic, hormonal and biochemical condition of the body using body fluid samples, mainly blood. Such methods are already becoming widely available [111], and bioinformatics techniques are being developed to improve them [112].

Suicidologists have long been interested in the possibility of using interventions targeted at specific social groups to prevent self-destructive behavior, because on the one hand it is technically easier to reach a selected group (e.g. schoolchildren) than all of society; on the other hand, such intervention can be profiled depending on the type of recipient by examining in advance which occupational or employee groups are most at risk. Hence, the identification of professional groups most at risk of suicide is one of the most important points of modern preventative solutions [113].

Schoolchildren have recently become the object of special concern for suicidologists, because even in countries where the overall suicide rate is decreasing, for this age group and “professional” is increasing [52,54,55], which of course must be worrying. Therefore, there is a growing interest in programs that could stop this negative tendency.

The European Union has recently funded a huge research program called SEYLE (Saving and Empowering Young Lives in Europe [SEYLE] study), in which 10 EU countries took part (Austria, Estonia, France, Germany, Hungary, Ireland, Italy, Romania, Slovenia and Spain), Israel and Sweden as a coordination center [97]. As a result of the implementation of this program, implemented, which is very important, on the basis of RTC (randomized controlled trial), and in which 168 schools and approx. 12 thousand students aged 14–16 years took part, it was found that at least one of the assessed interventions, called YAM (Youth Aware Mental Health), proved to be effective, clearly reducing the number of suicide attempts in the teenagers covered [97]. In addition to the many other interesting results that this study provided, one more finding deserves attention: reading books and watching movies acts as a protective factor against suicidal thoughts and plans [114].

One of the most important ways of preventing suicidal behavior is therapy for people directly at risk of suicide. This applies to people with mental disorders, including addicts or self-mutilators, but above all it applies to people who have already attempted suicide as well as people currently in crisis caused by the loss of some goods, the death of a loved one, etc. The methods used so far have shown moderate and even dubious effectiveness [58]. The antidepressants that are very often used in such situations [115] do not take effect for some time (usually 2–3 weeks) and do not show special specificity [51,94,115]. Also, as demonstrated in healthy volunteers [116], they are able to intensify aggressive and auto-aggressive behaviors themselves, which is most likely related to their ability to evoke akathisia [117]. Such akathisia may occur in people who exhibit genetically conditioned (by polymorphism) characteristics of the P450 cytochrome system that differ from the average [117]. Other drugs, such

as mood-stabilizing lithium salts or neuroleptic clozapine are effective in patients with suicidal tendencies affected by bipolar disorder or schizophrenia, respectively, [93,94], but they do not take effect immediately, only after prolonged period of use [93]. Therefore, the great discovery made in 2000 and later confirmed by the results of control studies was the discovery of the immediate anti-suicidal effect of ketamine [93,94]. Unfortunately, ketamine, which is called a dissociative anesthetic and has been used in anesthesiology for quite some time, is known to cause hallucinations and has some addictive potential [94]. Currently, there is a search for a drug that acts on suicidal behavior like ketamine but without its side effects. The prophylactic effect of ketamine on suicidal behavior is so spectacular that one of its stereoisomers, esketamine, which is still more effective than ketamine [93,94], is currently being introduced to treatment (under the trade name Spravato). It is worth adding here that the intensive search for biomarkers of depression and the risk of suicide, which was mentioned earlier, can not only contribute to more accurate diagnoses of people potentially at risk of suicide, but also to the creation of new drugs that are more beneficial than ketamine. This is indicated by the conclusions drawn from a review of research results on this topic which was conducted in 2019 by Kalkman [118].

In addition to a promising new drug (esketamine), the results of recent meta-analyses indicate that at least two psychotherapeutic approaches are also effective in those at risk of suicide. These are the short intervention and contact of BIC recommended by WHO [58], and cognitive-behavioral therapy (CBT) [86,95,96]. Zalsman et al. [86] and Jobes et al. [95,96] list several other promising therapies, primarily dialectic-behavioral therapy (DBT).

Although, as it results from the above, we are not completely deprived of the methods and means needed to counteract suicidal behavior; however, the use of those already available unfortunately does not translate, as so far, into a significant decrease in the suicide rate and the self-harm rate. It seems that the reason for this is, above all, the imperfect organization of suicide prevention [119], for which managers and politicians

are primarily responsible. Unfortunately, politicians are not interested in activities that may significantly increase social welfare but are not necessarily popular; moreover, they are difficult to implement and have little political value [120]. Jobes and Chalker [96] are convinced that with well-organized care for people at risk of suicide, much better results can be obtained than those observed so far; they suggest that the most important factor is a diverse but individualized approach to such people. In the work cited here [96], they present an original, stepped model of care for such at-risk people, A Stepped Care Model for Suicide Care, which is the “embodiment” of such an approach and whose concept was born in connection with their involvement in the “Zero Suicide” program. This program led to the development of model management of patients at risk of suicide and implementation of this model into the therapeutic management of a large number of American psychiatric units.

The principles of the Zero Suicide model were described by Brodsky and colleagues [92]. The model is based primarily on proven methods of diagnosis and intervention, a friendly and individualized approach to the patient and the iron consequence of the actions taken, obliging medical staff regarding the order and conscientiousness of performing specific procedures. Briefly speaking, the model is based on two slogans: *Identify, Engage, Treat* and keep in touch after discharge (*Transition*), which concerns the method of providing care; *Lead, Train, Improve*, which relates to the attitudes of staff who take care of such patients, not only doctors but also nurses. Diagnosis of suicide risk is based on tools such as The Columbia Suicide Severity Rating Scale (C-SSRS) and The Suicide Assessment Five-step Evaluation and Triage (SAFE-T). CBT, DBT and CAMS (Collaborative Assessment and Management Suicidality) interventions are used as methods of working with the patient, as well as SPI (Safety Plan Intervention) and Crisis response planning. After discharge from the ward, the patient is monitored for about two years and is kept in contact (phone, letters, postcards, e-mails, text messages). If needed, he can count on the support of social workers. The whole procedure has 10 stages. Three levels relate to the diagnosis process (assessment of the patient's



risk of suicide); three relate to the intervention process (creation of an individual safety plan based on cooperation, training in dealing with difficult situations, integrated therapy specific for people at risk of suicide); and four relate to the process of post-discharge monitoring (determining the manner of contact, monitoring contacts in times of increased risk, involvement of the family or appropriate social factors, calling the patient for clinical evaluation). As can be seen from the above description, the Zero Suicide program does not use any extraordinary methods, but rather distinguishes itself from other “therapies as usual” due to the caring attitude of the treatment staff and the appropriately planned and implemented treatment process.

## Summary

The hopes presented here for the future approach to the therapy of self-destructive behavior bring hope that in the near future people at risk of suicide will be precisely diagnosed and effectively treated. Unfortunately, only where decision-makers will care about it, because in addition to changing the way of thinking and traditionally understood causal modeling [cf. 53, p. 71], innovative diagnosis and treatment will have to also involve considerable costs and organizational skills. Hence, as expected, such an innovative approach (this is mainly about precise diagnosis based on large amounts of data and machine learning) will first be introduced in the US Army, which is already beginning to apply machine learning and diagnostic algorithms [107]. It should be hoped, however, that when the US military develops appropriate, highly effective methods, over time they will become broadly available in medicinal civilian units, not only in the United States, but also in other countries, including Poland. It also seems that universal and selective strategies regarding suicide prevention might still have some value. Diagnosis through current epidemiological studies [113] of particular, more at risk than other social groups (e.g. students [55,97], construction workers [121], etc.), and then addressing them to properly prepared and checked programs, such as the YAM program [97]

will also translate into a decrease in suicide rates for these groups and, consequently, for the overall population. It is worth recalling here that in those countries that have implemented a national strategy on suicide prevention and therefore carry out various activities of this type, suicide rates tend to be decreasing [88]. Poland, which has no such strategy, is therefore exposed to an increase in this indicator. This country seems to be “negatively modeled” in other respects as well. There are at least two reasons here that make it possible to predict not only the lack of a decline, but even an increase in the suicide rate in a group which should be of special concern, namely young people. The recent education reforms have caused frustration among teachers because, according to scientific evidence [122], should move to students, resulting in additional stress and epigenetic modification, making them more susceptible to suicide not only now but even in future generations [122]. The second premise is the so-called “LGBT free zones” in Poland. When adopting resolutions to include their administrative unit in such a zone, which is a phenomenon on a global scale [123], local authorities are most likely not aware of the fact that in all probability they will contribute to an increase in the number of suicides among young people who have sexual orientation or gender identification issues, because such people, being particularly sensitive to rejection, commit suicide much more often [55,124]. These last two examples show that one cannot think about effective implementation of suicide prevention without politicians’ effective and intelligent involvement.