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Empirical Criteria for the Determination of Suicide Manner of Death

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ABSTRACT: A 16-item instrument was constructed as a tool to assist medicolegal officials in their investigations and certifications of suicidal deaths. The Empirical Criteria for the Determination of Suicide (ECDS)—derived from a combined set of the 22 criterion items of the Operational Criteria for the Determination of Suicide (OCDS) and 33 other items obtained from experts and the professional literature—was constructed and validated by using 126 suicide and accident cases obtained from 70 medical examiner participants. Analysis of the cases confirmed that suicide is a manner of death in which there is evidence of both self-infliction and intention to die. The 16 items retained in the ECDS discriminated suicides from accidents best in relation to self-infliction and intention. In analysis of its concurrent validity, the ECDS instrument predicted 100% of the suicides and 83% of the accidents, thus correctly identifying 92% of all cases.

KEYWORDS: psychiatry, jurisprudence, suicide

A number of articles have appeared in the literature which address a range of issues related to the accurate ascertainment and official reporting of suicide as a manner of death [*1–14*]. These authors have expressed a great deal of concern about the process by which suicide is investigated, determined, and subsequently reported as a vital health statistic.

The variability observed in medicolegal practice [*10,15*] and recording procedures [*5,10*] has led to fundamental questions as to whether officially reported suicide statistics are a valid and reliable source of basic epidemiological data. The potential impact of an inaccurate suicide mortality database on research, prevention efforts, and the general public health has been extensively discussed in the literature [*11,13,15*]. In summary, vital health statistics are widely used by public health officials and social researchers to study overall trends to identify those at risk (for example, suicide in youthful or elderly populations). Data which result from such research affects the course of further research, the flow of

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resources, mental health (preventive and interventive) programing, and, ultimately, public health policy.

Estimates of official underreporting of suicide have tended to range from 25% [*3,16*] to 50% [*15,17,18*]. In contrast, others have argued that the degree of underreporting has been greatly exaggerated [*8*] or that the error variation in suicide statistics is randomized in such a way as to not invalidate conclusions drawn from the data [*12,19*].

Although the actual extent and impact of potential inaccuracies of suicide statistics will probably continue to be debated, there seems to be a clear consensus that suicide investigation, certification, and reporting has some degree of potentially problematic variability and error. Therefore, methods or tools which may reduce certification variability while increasing certification validity could be valuable to the medicolegal official and result in a more accurate database.

Sources of Variability

A number of sources have been cited, which may account for the alleged variability and error in the certification of suicide [*7,11*]. Some of these sources may include variability in investigative procedures, lack of suspicion, family pressure and social stigma, difficult-to-determine cases ("equivocal deaths"), and variability among officials and systems (medical examiner versus lay coroner).

A primary, and perhaps the single most important, source of variability and error in suicide statistics may be attributed to the virtual absence of standardized "operational" determination criteria that coroners and medical examiners might use to investigate, evaluate, and determine the suicide manner of death more uniformly. Jobes [*20*] found in a survey of almost 200 medical examiners that only 37% of the participants stated that they used an official or unofficial operational definition of suicide in their medicolegal certifications of equivocal suicides. Critically, 63% of the medical examiners in this survey either "agreed" or "strongly agreed" that standardized operational criteria for the determination of mode of death in equivocal cases would be useful to medical examiners.

Determination Criteria

In recent years, significant efforts have been made to address the preceding concerns. Probably the most notable effort was sponsored by the Centers for Disease Control (CDC) and has been described in a previous issue of this journal [*13*]. Beginning in 1984, the CDC convened a series of meetings with experts who formed the Working Group on Determination and Reporting of Suicide. The group was established to develop a set of suicide determination criteria that could assist in the medicolegal investigation and certification of suicide. The working group was made up of representatives from virtually every professional organization involved in the medicolegal certification of suicide, including the American Association of Suicidology, the National Association of Medical Examiners, the American Academy of Forensic Sciences, the International Association of Coroners and Medical Examiners, the National Center for Health Statistics, the Association of Vital Records and Health Statistics, the National Association of Counties, and the Centers for Disease Control. By obtaining input from leading experts and feedback from their respective organizations, the representatives of the working group produced the Operational Criteria for the Determination of Suicide (OCDS) through a series of meetings and multiple revisions.

As described by Rosenberg et al. [*13*], the OCDS comprises 22 items based on a definition of suicide as a "death arising from an act inflicted upon oneself with intent to kill oneself." The purpose of the OCDS is to improve the validity and reliability of suicide statistics by (*a*) promoting consistent and uniform classifications, (*b*) making the criteria

for decision making in death certification explicit, (*c*) increasing the amount of information used in decision making, (*d*) aiding certifiers in exercising their professional judgment, and (*e*) establishing common standards of practice for the determination of suicide.

As a follow-up to the development of the OCDS, a set of empirically based criteria was developed. The present study is a description of the 16-item Empirical Criteria for the Determination of Suicide (ECDS), which was constructed from a 55-item checklist survey made up of the 22 OCDS items and 33 other potential criteria obtained from experts and the literature.

Method

Using the findings from 69 recently investigated suicides and 57 recently investigated accidents, 70 practicing medical examiners (30% of the original 230 solicited) evaluated whether each item on the 55-item checklist survey was present, absent, not investigated, or investigated but its presence or absence could not be determined (Fig. 1). In terms of the representativeness of the sample, a random sample of follow-up telephone interviews did not reveal meaningful differences between the study participants and nonparticipants. It was requested that participants use cases which, "required relatively in-depth investigation to determine the manner of death." (The cases were similar, in terms of the demographic representativeness of the data, to those seen in the general population—see Jobes [*21*] for details).[5] It was decided that retrospective data would be obtained because the use of the checklist could have biased or influenced subsequent investigations and determinations of the manner of death (a problem with regard to the goal of studying the current investigative practice of medical examiners).

As presented in Fig. 1, the 55 items which made up the Death Investigation Checklist survey can be conceptually grouped into the following six categories: (*a*) forensic variables (Items 1 through 6), (*b*) psychological variables (Items 7 through 18), (*c*) recent behavior variables (Items 19 through 30), (*d*) recent experience variables (Items 31 through 40), (*e*) chronic behavior variables (Items 41 through 47), and (*f*) historic variables (Items 48 through 55). Note that OCDS items are identified in Fig. 1 by an asterisk.

The forensic variables were basic items which are particularly fundamental to an official's certification of cause and manner of death (for example, investigatory or pathological evidence). Psychological variables help make the key distinction between intended and unintended death and tend to depict different premorbid aspects of the decedent's psychological world with regard to personality, thought processes, affect or mood, and psychiatric condition. Recent behavior variables focus on a decedent's premorbid behaviors which may provide information concerning the victim's intent. The recent experience variables focus on potential precipitating factors which may be meaningfully related to a self-inflicted and intended death. In contrast to recent behaviors and experiences, the chronic behavior variables depict long-term factors related to life-long self-destructive patterns. Finally, historic variables may play a role in the development of adult psychopathology and directly or indirectly contribute to the formulation of suicidal intent.

Procedure

Using the Death Investigation Checklist, data were obtained from medical examiners' most recently certified suicide and accident cases through survey mailings. For each case,

[5]The extensive details of the test construction method and results used to develop empirical criteria are presented elsewhere [*21*]. The degree of discussion required to explain fully the test construction of empirical criteria prohibits such a review in the current forum. The present paper highlights central aspects of the development of empirical criteria and examines results related to the validity and reliability of the constructed instrument.

participants were instructed to designate the determined manner of death (suicide or accident) and to fill in basic information related to the decedent (such as age, sex, and method of death) in the section provided at the top of each Death Investigation Checklist survey form (refer to Fig. 1). Based on the findings of their most recently investigated case, medical examiners were instructed to check whether each of the 55 items was "present," "absent," simply "not investigated," or, in fact, investigated but the presence or absence was "not determined." A final page provided the opportunity for participants to fill in relevant items which did not appear among the 55 items (which incidently provided a means to check the comprehensiveness of the checklist). Upon completion of the survey, the participants were instructed to return the research materials in self-addressed stamped envelopes to the investigators.

DEATH INVESTIGATION CHECKLIST

Manner of death: Suicide|____| Accident|____| Date certified:_____
Decedent's age: |____| Sex: Male|____| Female|____|
Race: White|____| Black|____| Other (specify)_____
Marital status: Sing.|____| Married|____| Divorc.|____| Widowed|____|
Mechanism: Gunshot wound|____| Drug overdose|____| Jump/Fall|____|
Hanging/Asphyxia|____| Cut/Stab|____| Drowning|____|
Vehicular|____| Other (specify)_____

	PRES	ABSENT	NOT INVEST	NOT DETERM
* 1) Death was self-inflicted.....	____	____	____	____
* 2) Pathological (autopsy) evidence indicates self-inflicted death.....	____	____	____	____
* 3) Toxicological evidence indicates self-inflicted death.....	____	____	____	____
* 4) Statements by witnesses indicate self-inflicted death.....	____	____	____	____
* 5) Investigatory evidence indicates self-inflicted death (e.g., police report, photos/diagrams from scene of death).....	____	____	____	____
* 6) Evidence that decedent recognized high potential lethality of means of death (e.g., a pharmacist drug overdose).....	____	____	____	____
* 7) Decedent intended to kill self.....	____	____	____	____
* 8) Psychological evidence indicates self-inflicted death (e.g., observed behavior, life style, personality).....	____	____	____	____
* 9) Decedent had suicidal thoughts.....	____	____	____	____
10) Decedent had obsessively ruminated about suicide (e.g., in conversation/writing)..	____	____	____	____
11) Decedent had rigid thought processes (e.g., unwilling to consider options)....	____	____	____	____
12) Decedent had dichotomous (black/white) thought processes (e.g., life or death only alternatives).....	____	____	____	____
13) Decedent had recent and sudden change in affect (emotions).....	____	____	____	____
14) Decedent had recently begun to lose control (impulsive behavior).....	____	____	____	____
*15) Decedent had experienced serious depression or mental disorder.....	____	____	____	____
16) Decedent had a bipolar affective disorder (manic-depressive illness).....	____	____	____	____

FIG. 1—*The Death Investigation Checklist.*

	PRES	ABSENT	NOT INVEST	NOT DETERM
17) Decedent had exhibited psychotic behavior (e.g., hearing voices)				
18) Decedent had recent psychiatric hospitalization				
*19) Statements of the deceased indicate self-inflicted death				
*20) Decedent made explicit verbal expression of intent to kill self				
*21) Decedent had made an expression of farewell, indicated desire to die, or acknowledged impending death				
*22) Decedent had made an expression of hopelessness				
*23) Decedent made explicit nonverbal expression of intent to kill self (e.g., note or drawing)				
*24) Decedent had made preparations for death -- inappropriate to or unexpected in context of decedent's life (e.g., giving away favorite possessions.)				
*25) Decedent had made effort to procure or learn about means of death (e.g., bought gun, inquired about lethal drug dose)				
*26) Decedent had taken precautions to avoid rescue (e.g., locking door)				
*27) Decedent had rehearsed fatal behavior (e.g., discharging empty gun to head)				
28) Decedent had made previous suicide gesture (e.g., placing rope around neck)				
*29) Decedent had made previous suicide threat				
*30) Decedent had made previous suicide attempt				
*31) Decedent had experienced stressful events, significant losses (actual or threatened)				
32) Decedent had recent history of frequent accidents				
33) Decedent had recent experience of academic failure				
34) Decedent had recently lost a job				
35) Decedent had recent financial problems				
36) Decedent had recent experience of incarceration				
37) Decedent had recent interpersonal conflict				
38) Decedent had recent experience of humiliation or guilt				

FIG. 1—*Continued.*

Data Analyses

To analyze results from the Death Investigation Checklist appropriately, a binary random division was used to split the 126 cases into two equivalent sets of data—a set of 63 *normative* cases and a set of 63 *concurrent* cases. The splitting of cases into two equivalent sets provided the means to perform two distinct operations: (*a*) the construction of empirical criteria—which involved initial statistical analyses performed on the *normative* data to select criteria items and develop a scoring system which best discriminated suicide cases from accident cases—and (*b*) the testing of empirical criteria—which involved subsequent analyses performed on the *concurrent* data to determine if the *normatively* constructed empirical criteria proved to be a valid and reliable instrument.

	PRES	ABSENT	NOT INVEST	NOT DETERM
39) Decedent had recent experience of being ostracized by peer group				
40) Decedent had recent experience of knowing someone who died by suicide				
41) Decedent had a reckless life style				
42) Decedent had history of chronic unemployment				
43) Decedent had chronically abused alcohol				
44) Decedent had chronically abused drugs				
45) Decedent had history of addictive behavior (e.g., smoking, drinking, gambling)				
46) Decedent had history of aggressive or assaultive behavior (perpetrator)				
47) Decedent had history of criminal violations (arrests)				
48) Decedent was not integrated into society.				
49) Decedent had experienced general instability in immediate family				
50) Decedent had history of family violence (as victim)				
51) Decedent had history of sexual abuse (as victim)				
52) Decedent had history of previous suicide within family				
53) Decedent had history of generally poor physical health				
54) Decedent had vague physical complaints without discernable cause				
55) Decedent had history of sexual identity conflicts				

Additional items (not on list) which are relevant to case:

56) _____
57) _____
58) _____
59) _____
60) _____

Comments: _____

****

Today's date:_____.
Thank You.

****

* Denotes OCDS items

FIG. 1—*Continued.*

Empirical Criteria Construction—With regard to the first operation, analyses performed on the *normative* data led to the selection of empirical criteria. The empirical criteria items (obtained from the original 55 items which appeared on the Death Investigation Checklist) were obliged to meet the following three selection requirements:

1. Following the theoretical definition of suicide, all final items were selected according to their correlations with self-infliction and intention respectively. (Phi correlation

coefficients were calculated for each item and a conservative level of statistical probability of $P < 0.01$ was used.)

2. Final items were further selected through the use of multivariate analyses (that is, principle component and discriminant function analyses). All final criteria items were required to be in concordance with a factor-analytic item-selection convention described by Tinsley and Tinsley [*22*]. As a convention, this method is used to retain the "best" set of items in a particular factor loading, an item value cutoff of 0.30 or more was used to pick the "most important" or "substantial" variables in the interpretation of a factor loading.

3. All final items were required to meet the selection requirements of Empirical Criterion Keying [*23*]. Used in the development of the Minnesota Multiphasic Personality Inventory (MMPI) and the Strong Campbell Interest Inventory (SCII) as well as other psychological tests, the Empirical Criterion Keying approach is an extensively tested and time-honored method of item evaluation and selection.

Thus, empirical criteria items were selected when they met all the correlation, multivariate, and Empirical Criterion Keying requirements. After selecting the empirical items, the investigators established a manner-of-death scoring system based on the presence or absence of empirical variables in the *normative* suicide and accident cases. Manner-of-death cutoff score thresholds were established by determining the minimum number of obtained variables required to discriminate *normative* suicides from accidents with *no* false-positive identifications of suicide.

Testing Empirical Criteria—Subsequent to selecting the final empirical criteria items and developing a scoring system using *normative* data, the investigators applied the criteria to the *concurrent* sample of cases to test the capacity of the instrument to discriminate suicide cases from accident cases validly and reliably. The validity of the instrument was therefore tested on the *concurrent* cases by analyzing the relationship between the actual manner of death and the criteria-determined manner of death. The reliability of the instrument was tested by using a Kuder-Richardson split-half procedure.

Results[5]

Empirical Definition of Suicide

Exploratory correlation and multivariate analyses performed on the *normative* data led to an important initial finding—medical examiners in the current sample clearly defined suicide in terms of self-infliction and intention. As presented in Table 1, the theoretical notions of the definition of suicide previously cited in the literature [*13,24,25*] were supported. Indeed, as seen in the bottom row of Table 1, the checklist item variables of "self-infliction" and "intention" were present in all but two previously certified suicides. In contrast, both item variables were present in only one previously certified accident for the *normative* set of cases (Table 1, top row).

TABLE 1—*Presence of "self-infliction" and "intention" item variables (*normative *data).*[a]

Manner of Death	No Self-Infliction and No Intent	Self-Infliction Only	Intent Only	Self-Infliction and Intent	Totals
Accident	22	5	0	1	28
Suicide	0	2	0	33	35

[a]Chi-square = 122.75, $df = 2$, $P < 0.0001$.

From a purely data-based perspective, the "self-infliction" and "intention" item variables appeared to be the strongest discriminators for suicide as a manner of death. Considering both the theoretical and empirical support, the empirical criteria were constructed around these defining components. The final instrument would, therefore, consist of items which could empirically establish the presence of self-infliction as well as items which could empirically establish the presence of intention. A sufficient presence of items related to both of these defining constructs would empirically indicate a suicide, while an absence of items related to these constructs would empirically indicate an accident.

Empirical Criteria Construction

Item Selection—As described in the Method section, the items which were ultimately selected were those which best discriminated *normative* suicides from accidents in terms of self-infliction and intention. Altogether, 16 items met the correlation, multivariate, and Empirical Criteria Keying selection requirements (Fig. 2). Of the 16 final criteria, there were 13 common items between self-infliction and intention. Two of the final criteria met the requirements for self-infliction only, and one additional item met the requirements for intention only.

Manner of Death Scoring—Self-infliction and intention cutoff score thresholds were established by determining the minimum number of empirical items needed to discriminate *normative* suicides from accidents with no false-positive identifications of suicides as accidents. Following this approach, it was determined that in order to identify all the previously certified *normative* suicides correctly, a case would be required to have a "self-infliction score" of 3 (or more) and an "intention score" of 3 (or more). Conversely, correct identification of an accident required that a case have a "self-infliction score" of 2 (or less) or an "intention score" of 2 (or less).

Use of the preceding scoring system led to the correct identification of 100% of the previously certified suicides in the *normative* sample of cases, with only six false-positive determinations (that is, identifying a previously certified accident incorrectly as a suicide)—a hit rate of 89% for all of the *normative* cases. The full capacity of the empirical criteria and the scoring system to distinguish suicides from accidents in the *normative* set of cases can be seen in Table 2. (Note that Table 1 presents *normative* data relevant to the specific checklist item variables of "self-infliction" and "intention," while Table 2 presents *normative* data relevant to self-infliction and intention as the defining constructs of the empirical criteria.)

Testing Empirical Criteria

To test the instrument's validity and reliability, the criteria and scoring system were applied to the *concurrent* data set of cases. As shown in Table 3, when applied to the *concurrent* set of data, the empirical criteria were able to identify 100% of the previously certified suicides and 82.75% of the previously certified accidents correctly. In summary,

TABLE 2—*Empirical criteria prediction of manner (*normative *data).*[a]

Manner of Death	No Self-Infliction and No Intent	Self-Infliction Only	Intent Only	Self-Infliction and Intent	Totals
Accident	22	0	0	6	28
Suicide	0	0	0	35	35

[a]Chi-square = 42.256, $df = 1$, $P < 0.0001$.

EMPIRICAL CRITERIA FOR THE DETERMINATION OF SUICIDE (ECDS-1)

Decedent_____ Today's Date_____
Date of Death_____

Mark all that apply:

Section A: Self-Infliction and Intention

____Pathological (autopsy) evidence indicates self-inflicted death
____Toxicological evidence indicates self-inflicted death
____Statements by witnesses indicate self-inflicted death
____Investigatory evidence indicates self-inflicted death (e.g., police report, photos/diagrams from scene of death)
____Psychological evidence indicates self-inflicted death (e.g., observed behavior, life style, personality)

____Statements of the deceased indicate self-inflicted death
____Evidence that decedent recognized high potential lethality of means of death (e.g., a pharmacist drug overdose)
____Decedent had suicidal thoughts
____Decedent had recent and sudden change in affect (emotions)
____Decedent had experienced serious depression or mental disorder

____Decedent had made an expression of farewell, indicated desire to die, or acknowledged impending death
____Decedent had made an expression of hopelessness
____Decedent had experienced stressful events, or significant losses (actual or threatened)

Section B: Self-Infliction Only

____Decedent had experienced general instability in immediate family
____Decedent had recent interpersonal conflict

Section C: Intention Only

____Decedent had history of generally poor physical health

_____*Total* Self-Infliction Score (count marks in Sections A and B)

_____*Total* Intention Score (count marks in Sections A and C)

ECDS Determination:

_____**SUICIDE** (both *Totals* = 3 or more)

_____**ACCIDENT** (at least one *Total* = 2 or fewer)

FIG. 2—*The Empirical Criteria for the Determination of Suicide (ECDS).*

the empirical criteria had a specificity of 1.00, a sensitivity of 0.83, and an overall efficiency of 0.92.

The manner of death determined from the empirical criteria correlated highly with the determination of manner of death recorded by the participants for cases in the *concurrent* sample (phi correlation coefficient = 0.849, Chi-square = 45.454, $df = 1$, $P < 0.0001$). In addition, the criteria appeared to be valid and reliable. The results of the concurrent

TABLE 3—*Empirical criteria prediction of manner (*concurrent *data).*[a]

Manner of Death	No Self-Infliction and No Intent	Self-Infliction Only	Intent Only	Self-Infliction and Intent	Totals
Accident	24	0	0	5	29
Suicide	0	0	0	34	34

[a]Chi-square = 45.454, $df = 1$, $P < 0.0001$.

THE CRITERIA

The ECDS are predicated upon the notion that suicide is *"death arising from an act inflicted upon oneself with the intent to kill oneself"*. The ECDS are a set of criteria developed to discriminate suicide deaths from accident deaths. In the development study, each criterion was present far more frequently in certified suicides than accidents. The criteria are to be used as an investigatory *tool* and are not meant to usurp professional medicolegal judgment.

ECDS INSTRUCTIONS

1) For a given case, investigate for the criteria in Sections A, B, and C marking all criteria that apply.
2) To obtain the total Self-Infliction score, add the number of items marked in Sections A and B. To obtain the total Intention score, add the number of items marked in Sections A and C. Fill in the totals in the spaces provided at the bottom of the page.
3) Mark SUICIDE or ACCIDENT in accordance with the "ECDS KEY", below.

ECDS KEY

ECDS Determination

Presence of the defining components of suicide, Self-Infliction and Intention, is determined by their respective Total scores. Self-infliction is indicated by a score of 3 or more. Similarly, Intention is indicated by a score of 3 or more. These defining components are used to discriminate suicides from accidents as follows:

- **SUICIDE** is the ECDS determination in a case where both Self-Infliction AND Intention *Totals* = 3 or more.
- **ACCIDENT** is the ECDS determination in a case where either of the *Totals* Self-Infliction OR Intention = 2 or fewer.

Decisionmaker's Determination

In most cases the decisionmaker's determination is expected to be consistent with the ECDS determination. However, when the decisionmaker is considering a determination which differs from that of the ECDS, the following information should be reviewed:

- In cases where the ECDS indicates SUICIDE but the decisionmaker is considering an ACCIDENT determination, it is important to know that in a previous sample of 40 ECDS-determined SUICIDES, the examiners certified ACCIDENT in six cases. These cases were notable in that they were highly equivocal because the **intention** of the decedent was difficult to determine (e.g., a case involving death by Russian roulette).

- In cases where the ECDS indicates ACCIDENT but the decisionmaker is considering a SUICIDE determination, a first consideration is that in a previous sample of 23 ECDS-determined ACCIDENTS, there were no cases of examiner disagreement. This does not, however, rule out the possibility of such an occurrence. A second consideration is that in a concurrent validation study of the ECDS, using the database of 63 suicides and accidents, each of the following commonly used factors was present as often where examiners certified ACCIDENT as it was where the finding was SUICIDE:

Ineffective Discriminators for Suicide

- Previous suicide threat
- Previous suicide attempt
- Precautions to avoid rescue
- Rehearsal of fatal behavior
- Preparations for death
- Previous effort to procure or learn about means of death

FIG. 2—*Continued.*

validity of self-infliction scoring for *concurrent* data were phi = 0.898, chi-square = 49.971, $df = 1$, and $P < 0.0001$. The results of the concurrent validity of the intention scoring for the *concurrent* data were phi = 0.843, chi-square = 42.625, $df = 1$, and $P < 0.0001$. Computations for the Kuder-Richardson test of internal reliability produced two coefficients—one for self-infliction scoring ($r = 0.8692$) and another for intention scoring ($r = 0.8762$).

Discussion

As shown in Fig. 2, the final form of the Empirical Criteria for the Determination of Suicide (ECDS) proved to be a 16-item set of empirically derived criteria with a cutoff scoring system for determining suicide and accident manner of death. The ECDS are printed on the front and back of a single-sheet form. The criteria checklist (broken into

Sections A, B, and C) appears on the front of the form and spaces are provided at the bottom for the entry of total self-infliction and intention scores and the ECDS determination. On the reverse of the form are detailed instructions, the scoring key, and additional information relevant to the ECDS and its use as an investigatory instrument.

In practice, the medicolegal official may wish to use the ECDS as a tool to guide his or her investigation of key variables which bear on the presence of self-infliction and intention, and which therefore define suicide as a manner of death. In a very practical sense, the ECDS form can be used as an investigatory work sheet. Through interviews and direct examination of evidence, the presence of the 16 ECDS variables can usually be readily established and checked in the appropriate spaces on the ECDS form. The calculation of the total self-infliction and intention scores then leads to a recommended determination of suicide (if the two respective scores equal 3 or more) or accident (if either score equals 2 or less). According to the validity study, from a purely statistical perspective, an official whose professional medicolegal judgment concurs with the ECDS determination of manner of death has a 92% chance of accurately identifying the true manner of death.

While the empirical findings of the present study are robust and may be viewed as compelling, there are some qualifications, limitations, and observations which should be considered. First, it must be emphasized that the ECDS do not provide absolute and definitive determinations of the manner of death independent of professional medicolegal judgment. Indeed, the ECDS should only be understood (and used) as a tool for investigation which augments professional judgment.

A second consideration is that the ECDS were constructed using data obtained from participants' most recent suicide and accident cases that required relatively in-depth medicolegal investigation to determine the manner of death (that is, data from cases certified "undetermined" were not collected). In effect, the construction and use of the ECDS centers around a binary ("yes" or "no") determination which may be seen to represent an oversimplification of a very complex medicolegal certification process (especially when the appropriate certification of a case may be undetermined). It should be noted, however, that "undetermined" is not a frequently used manner-of-death certification [*20*].

A related consideration involves the potential for false-positive identifications of suicide. As shown in the data of the concurrent validity study, almost 8% of the previously certified accident cases were incorrectly identified as suicides by the ECDS. Although these cases were highly equivocal in terms of intention (for example, a case involving a depressed and intoxicated individual playing Russian roulette), they were nevertheless considered to be accidents by the medical examiner participants. Again, the preeminence of professional medicolegal judgment over a purely statistical model for determining complex human behavior cannot be overemphasized. While statistically unlikely, the practitioner must nevertheless guard against the possible ECDS false-positive determination.

A final observation relates to the relative face validity of the ECDS. Some practitioners may be unfamiliar with the usefulness of a correlation-based instrument, which may rely on relationships that seem illogical or counterintuitive. Results of the data analyses revealed that some items with seemingly obvious face validity (for example, "previous suicide threat" or "previous suicide attempt") proved to be poor suicide discriminators. While these items were clearly evident in suicide cases, they were also present in enough accident cases to render them less useful discriminatively. In contrast, other items with less obvious face validity (such as "recent interpersonal conflict" or "history of poor general health") proved to be very good suicide discriminators. These items were clearly present in suicide cases but were rarely evident in accident cases, thus reflecting their discriminative power.

Further research with larger samples of cases, and possibly the inclusion of undetermined cases, might address the preceding limitations, qualifications, and observations more fully. New studies may help to explain why some items which are apparently meaningful do not have discriminatory power.

Conclusions

As a logical follow-up to the development of the OCDS, the present study represents an initial effort to extend the OCDS concept into the empirical realm. While the OCDS and ECDS address a similar set of concerns and were developed with a common set of goals, their respective development and potential use are uniquely different.

The OCDS were built through consensus of experts and appear to have relatively high content and face validity. (Results of the present study provide clear support for the general construct validity of the instrument as well.) In contrast, the ECDS (while largely based on OCDS) add the element of empirical test construction and demonstrated validity and reliability. In practice, some medicolegal officials may prefer the relative subjectivity (of experts) and content/face validity of the OCDS while others may prefer the statistical confidence and scientific empiricism of the ECDS. In relation to the construction of the ECDS, the authors hope that this initial empirical effort may lead to similar follow-up projects with new and larger data sets which could extend and further refine determination criteria.

Similar to the OCDS, the ECDS were developed as a resource to assist medicolegal officials in their investigations and certifications of suicides. Ultimately, medicolegal judgment may be strengthened through the use of such tools, leading to more objective and scientific determinations of suicide as a manner of death. It is critical to note that the ECDS instrument (like the OCDS) is *not* meant to be a rigid and definitive standard designed to usurp the professional's judgment and authority. Consider, for example, the case of a person who dies in the course of attempting to escape from a house after intentionally setting it on fire. While the ECDS may indicate self-infliction and intention in such a case, accident may well be the correct manner of death certification. As an investigatory tool, the ECDS were constructed to augment professional medical judgment with empirically based probability, guidance, and direction, resulting in more valid and reliable investigations and subsequent certifications of suicides.

References

[1] Datel, W. E., "The Reliability of Mortality Count and Suicide Count in the United States Army," *Military Medicine,* Vol. 144, No. 8, Aug. 1979, pp. 509–512.

[2] Douglas, J., *The Social Meaning of Suicide,* Princeton University Press, Princeton, NJ, 1967.

[3] Dublin, L., *Suicide,* Ronald Press, New York, 1963.

[4] Farberow, N. L., MacKinnon, D. R., and Nelson, F. L., "Suicide—Who's Counting?," *Public Health Records,* Vol. 92, No. 3, June 1977, pp. 223–232.

[5] Hlady, W. G. and Middaugh, J. P., "The Underrecording of Suicides in State and National Records, Alaska, 1983–1984," *Suicide and Life-Threatening Behavior,* Vol. 18, No. 3, Fall 1988, pp. 237–244.

[6] Jobes, D. A. and Berman, A. L., "The Numbers Game: A Critique of Mortality Stats," presented at the 18th meeting of the American Association of Suicidology, Toronto, ON, Canada, May 1985.

[7] Jobes, D. A., Berman, A. L., and Josselson, A. R., "Improving the Validity and Reliability of Medical-Legal Certifications of Suicide," *Suicide and Life-Threatening Behavior,* Vol. 17, No. 4, Winter 1987, pp. 310–325.

[8] Kleck, G., "Miscounting Suicides," *Suicide and Life-Threatening Behavior,* Vol. 18, No. 3, Fall 1988, pp. 219–236.

[9] Litman, R. E., "Psychological-Psychiatric Aspects of Certifying Modes of Death," *Journal of Forensic Sciences,* Vol. 13, No. 1, Jan. 1968, pp. 46–54.

[10] Nelson, F. L., Farberow, N. L., and MacKinnon, D. R., "The Certification of Suicide in Eleven Western States," *Suicide and Life-Threatening Behavior,* Vol. 8, No. 2, Summer 1978, pp. 75–88.
[11] O'Carroll, P. W., "A Consideration of the Validity and Reliability of Suicide Mortality Data," *Suicide and Life-Threatening Behavior,* Vol. 19, No. 1, Spring 1989, pp. 1–16.
[12] Pescosolido, B. A. and Mendelsohn, R., "Social Causation or Social Construction of Suicide? An Investigation into the Social Organization of Official Rates," *American Sociological Review,* Vol. 51, 1986, pp. 80–100.
[13] Rosenberg, M. L, Davidson, L. E., Smith, J. C., Berman, A. L., Buzbee, H., Gantner, G., Gay, G. A., Moore-Lewis, B., Mills, D. H., Murray, D., O'Carroll, P. W., and Jobes, D. A., "Operational Criteria for the Determination of Suicide," *Journal of Forensic Sciences,* Vol. 33, No. 6, Nov. 1988, pp. 1445–1456.
[14] Shneidman, E. S., "The Reliability of Suicide Statistics: A Bomb Burst," *Suicide and Life-Threatening Behavior,* Vol. 10, No. 2, Summer 1980, pp. 67–69.
[15] Jobes, D. A., Berman, A. L., and Josselson, A. R., "The Impact of Psychological Autopsies on Medical Examiners' Determination of Manner of Death," *Journal of Forensic Sciences,* Vol. 31, No. 1, Jan. 1986, pp. 177–189.
[16] Litman, R. E., "Psychological Aspects of Suicide," *Modern Legal Medicine: Psychiatry and Forensic Science,* W. J. Curran, A. L. McGarry, and C. S. Petty, Eds., F. A. Davis, Philadelphia, 1980.
[17] National Center for Health Statistics, *Suicide in the United States, 1950–1964,* U.S. Public Health Service, Publication No. 1000, Series 20:1, Rockville, MD, 1967.
[18] Toolan, J. M., "Suicide in Children and Adolescents," *American Journal of Psychotherapy,* Vol. 29, 1975, pp. 339–344.
[19] Sainsbury, P. and Jenkins, J. S., "The Accuracy of Officially Reported Suicide Statistics for the Purposes of Epidemiological Research," *Journal of Epidemiology and Community Health,* Vol. 36, 1982, pp. 43–48.
[20] Jobes, D. A., *Response Biases and the Impact of Psychological Autopsies on Medical Examiners' Determination of Mode of Death,* University Microfilms Inc., Ann Arbor, MI, 1984.
[21] Jobes, D. A., *Medicolegal Certification of Suicide: An Investigation of Expert Criteria and the Construction of Empirical Criteria,* University Microfilms Inc., Ann Arbor, MI, 1988.
[22] Tinsley, H. E. A. and Tinsley, D. J., "Uses of Factor Analysis in Counseling Psychology Research," *Journal of Counseling Psychology,* Vol. 34, No. 4, 1987, pp. 414–424.
[23] Anastasi, A., *Psychological Testing,* MacMillan Publishing Co., Inc., New York, 1976.
[24] Shneidman, E. S., *Death: Current Perspectives,* Mayfield, Palo Alto, CA, 1980.
[25] Shneidman, E. S., *Definition of Suicide,* John Wiley and Sons, Inc., New York, 1985.

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