21. Interview-based diagnosis of illness and causes of death in children

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By Ronald H. Gray

Ronald H. Gray is a professor at the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, MD.

This paper is not RAP in the sense that it was conceived and as it has been applied by other authors in this volume. However, it depends on one of the key RAP methodologies, the guided but unstructured interview. R.H. Gray was invited to present this paper at the conference and it is here because it illustrates the power of the personal interview approach to obtaining accuracy for key health statistics. It illustrates the difference between accepting routine quantitative data that the health system provides compared with using a qualitative approach to supplement it. As the author notes, the same general principles apply to both morbidity and mortality diagnoses. He might have added that they apply to checking on the validity of other routine health statistics that are often taken for granted; for example, those for administration of periodic large oral doses of vitamin A for the prevention of xerophthalmia and keratomalacia, the receipt of immunizations, or even the completeness of birth and death registrations. - Eds.

INFORMATION ON ILLNESS and causes of death is used to establish public health priorities, and to evaluate the impact of preventive or therapeutic measures. The objective of this paper is to review information on data collection and reliability of interview based diagnosis.

Medical or vital registration data on morbidity or causes of death are often deficient in developing countries. To overcome these difficulties, investigators have frequently used information derived from interviews with relatives of the ill or deceased person in an attempt to reconstruct events so as to reach a medically acceptable diagnosis. Such interview-based diagnoses, or "verbal autopsies", provide important information, but there has been no critical review of methods and experience with these procedures. The following paper draws on the published and unpublished literature on verbal autopsies, and particularly the results of a workshop held at the Johns Hopkins University School of Hygiene and Public Health 11]. The focus is on deaths during infancy or childhood. Health interview surveys have been reviewed elsewhere [2,3], and will not be considered in detail here. However, the same general principles apply to both morbidity and mortality diagnoses.

The basis for interview diagnosis

Certain diseases have characteristic symptoms and signs that, in association often form a relatively distinct clinical syndrome. The objective of an interview based diagnosis is to identify such medical syndromes using information about the illness elicited from relatives, and the approach is most useful when the characteristic symptoms and signs of the disease are sufficiently distinctive to differentiate the disease of interest from other conditions with which it might be confused. In essence the interview attempts to replicate elements of a conventional

medical history used to establish a differential diagnosis (i.e., a list of conditions consistent with a patient's symptoms and signs). However, unlike a physician's diagnosis, the interview may not establish a definitive diagnosis because there is no confirmatory information derived from physical examination by a trained health professional, nor information from medical investigations, laboratory tests or autopsy. There is, therefore, inevitable uncertainty in the accuracy of verbal autopsy diagnosis.

There are only a limited number of diseases that present sufficiently distinct syndromes to be potentially suitable for verbal autopsy diagnosis. In children, these include acute conditions such as neonatal tetanus, prematurity/low birth weight and birth injury, measles, diarrhoea/dysentery, acute lower respiratory infection (ALRI), pertussis, meningitis, and injury [1]. However, malaria and chronic conditions such as tuberculosis (TB), nutritional deficiency and AIDS present serious difficulty in diagnosis [1]. The main focus of research has been on diseases that constitute common causes of morbidity and mortality amenable to prevention or treatment.

Structure of interviews

The structure of the questionnaire used for verbal autopsy interviews has varied considerably among studies [1,4,5]. Most employ an open ended question regarding the respondents's perception of the circumstances surrounding the death, their views on the probable cause of death, and the use of medical services. It is important to elicit information on "how" the death occurred rather than "why," because the latter question is often interpreted in terms of a culturally specific metaphysical explanation, rather than a medically interpretable description of the antecedents of death. Open ended questions can provide important information on the sequence and timing of events, help establish sympathetic rapport with the bereaved respondent, and can be sensitive to local interpretation of, or terminology, for diseases. However, unstructured interviews may be difficult to interpret, and if used alone, key information may be omitted. Also, open ended questions are vulnerable to interviewer bias and to culturally specific interpretation of illness, which may differ from Western medical notions of disease.

The majority of studies also use structured questionnaires, with either a comprehensive list of specific questions regarding symptoms and signs, or a short series of "filter" screening questions that direct the interviewer to disease-specific modules containing more detailed questions [1] . The "Filter" questions should be very sensitive (i.e., detect all cases of the index disease), and the supplementary questions should be highly specific so as to reduce the number of false positive diagnoses by excluding other conditions that might be confused with the index disease. An example of a filter question is the presence of cough to detect ALRI, followed by subsidiary questions on duration of cough and respiratory distress to exclude non-ALRI respiratory illnesses.

In order to reach a medical diagnosis, it is important to obtain information on the presence or absence of cardinal symptoms and signs, the timing of onset, duration, and persistence of symptomatology relative to the timing of death. Also, for certain questions some estimate of severity is needed; for example, with diarrhoea it may be useful to know the number of motions on the worst day of illness. This can entail lengthy interviews, particularly if there is a long comprehensive list of events. In general, a series of screening filter questions and disease specific

modules provides the most efficient approach to capturing comprehensive information and necessary detail. An example of the structure of a screening questionnaire is given in Table 1.

The optimal interval between death and interview has not been established. Although some investigators have interviewed relatives "as soon as possible" after death, others feel that it is preferable to wait two to three months until the phase of acute grief is over [5]. In most cases, interviews are conducted 9 to 12 months after death [1]. Morbidity interviews usually are restricted to current illness or illness within the past two weeks (diarrhoea, ALRI) or the past three months (measles).

Table 1 Example of Filter Screening Questions

1. Frequent loose or liquid stools	diarrhoea module
2. Blood in stools	diarrhoea module
3. Cough	ALRI module
4. Difficulty breathing	ALRI module
5. Generalized skin rash	measles module
6. Convulsions/spasms	
in a neonate	tetanus module
in older child	meningitis module
7. Stillbirths or death during the first week of life	Perinatal module

Validation of verbal autopsy

It is difficult to evaluate the accuracy of verbal autopsy diagnoses, because this depends on the degree to which an index disease presents as a distinct syndrome, and on the presence of other diseases that might be confused with the index condition. Only a few investigators have attempted formal validation of interview diagnoses of illness or cause of death by comparison with physician diagnoses, confirmatory investigations, or laboratory tests. The objective of validation is to determine the sensitivity and specificity of the interview or "test" diagnoses relative to a reference or "true" diagnosis based on medical assessment. Sensitivity is measured as the proportion of "true" cases of disease correctly identified by interview, and specificity is the proportion of "true" non-cases correctly identified. Thus, a sensitive test will detect the majority of "true" cases, and a specific test will exclude the majority of non-cases [6].

Accuracy of diagnosis can be indirectly inferred by comparison of disease patterns derived from interview diagnoses with the known epidemiology of the disease (e.g., variation by age, sex, or season). This provides "epidemiologic plausibility." Also, changes in disease patterns following interventions such as immunization can provide indirect evidence for the accuracy of interview diagnoses.

The following review will present the diagnostic algorithms for selected disease and the evidence for validity of the diagnoses.

Neonatal tetanus

WHO [7] has conducted numerous clinical studies and mortality surveys using an algorithm for tetanus diagnosis based on the questions in Table 2.

The validity of verbal autopsy diagnoses of neonatal tetanus is difficult to assess directly. In larger clinical series, cessation of suckling is reported in 69% to 100% of clinical cases, rigidity or spasms in 97% to 100%, and trismus/risus sardonicus in 71% to 100% of cases. Fever or umbilical sepsis is reported in 20% to 50%, [7]. One study in Cebu found a sensitivity of 94% to 100% using modification of the WHO algorithm, but the specificity could not be adequately assessed [8]. In a Bangladesh study, the WHO algorithm was compared to all possible cases of tetanus identified by open ended interviews with mothers of deceased children, and the WHO algorithm had a sensitivity of 52% and a specificity of 100%. The low sensitivity was due to the fact that many women do not breast feed for some days after birth, so the question on cessation of feeding had little predictive value in this context [4]. Also, the absence of clinically confirmed diagnoses marked this Bangladesh study difficult to interpret.

Table 2. Algorithm for Neonatal Tetanus

1. Did the infant *die between the 3rd and 30th day of life?*
2. Was the infant *able to suck milk (and/or cry) after birth?*
3. Did the infant *stop suckling milk (and/v crying) when it became ill?*
4. Did the illness *start between 2-28 days* after birth?
5. Did the infant's *body become rigid?*
6. Did the infant have *convulsions*?
7. Did the mother receive two tetanus toxoid immunizations during this pregnancy or her last pregnancy?
8. What in the mother's or health worker's opinion was the cause of death?

There is evidence of epidemiologic plausibility for the verbal autopsy diagnosis in the age distribution of putative tetanus deaths as compared to other perinatal deaths, and in urban/rural or seasonal differentials of estimated disease incidence. Also, use of algorithm diagnosis in evaluation of preventive programmes of maternal tetanus toxoid vaccination or traditional birth attendants (TBA) training in cord care has shown a substantial decline in diagnosed neonatal tetanus deaths as compared to control populations with no interventions [9,10].

Perinatal deaths, prematurity, and low birth weight

Deaths during the perinatal period are often not detected because of failure of maternal recall, or because survey interviews ask questions only about live births, and thus omit stillbirths. Also,

some early neonatal deaths during the first week of life are probably misclassified as stillbirths [11]. Nevertheless, a number of investigations suggest that perinatal mortality is a major and relatively poorly understood public health problem in the developing world. It is, however difficult to diagnose causes of death during the perinatal period, particularly if delivery occurred without medical supervision.

There are no well established questions that have been used to diagnose perinatal causes of death, and the suggested items in Table 3 are derived from a number of reports.

Table 3. Perinatal Deaths

1. Did the baby show *any sign of life after birth* (i.e., breathing, crying)?

2. Did the baby *die within one week of birth?*

3. *How big was the infant at birth?*

Normal size ,_____
Small ,_____
Very small_____

4. What was the *duration of the pregnancy*? _____
Was the duration of the pregnancy normal _____
or *shorter than normal* (< 8 months)?

5. Was the delivery prolonged (> 12 hours)?
Or complicated? (Specify _____)

6. Were there bruises or marks of trauma on the baby's body?
(Specify _____)

7. Was this a multiple pregnancy?

8. *Did the baby fail to breathe, cry or suckle normally after birth?*

9. Did the baby have *spasms or convulsions within the first three days of life?*

10. Was the baby *floppy or unconscious during the first 3 days of life?*

11. Did the baby have *any abnormalities of the head, body or limbs*?
(Specify _____)

Affirmative responses to questions 1 and 2 establish a perinatal death, questions 3 and 4 suggest prematurity/low birth weight, questions 5 to 7 birth trauma/asphyxia, and questions 8 to 10 differentiate perinatal problems from neonatal tetanus. Question 11 attempts to identify congenital effects.

Measles

The WHO EPI programme [12] and other investigations have used verbal autopsy methods to diagnose deaths associated with measles. The most common questions are listed in Table 4.

Measles is often recognized by the mother and there are frequently local terms for the disease that can be useful in diagnosis. But such local terminology may be applied to other illnesses that present rashes and, by itself, may be too non-specific for a diagnosis. The occurrence of a measles epidemic or of other cases in the household also helps to establish measles as a probable cause. A history of measles vaccination makes the diagnosis less likely, but does not exclude the disease because vaccine failures are known to occur.

Table 4. Diagnostic Algorithm for Measles

1. Death of a child *after the 5th month* of life
2. History of *fever*
3. *Blotchy rash lasting 3 or more days*
4. *Peeling of the skin among children who survive for 5 or more days*
5. Cough, runny nose or red eyes (conjunctivitis)
6. Other cases of measles in the household or a measles epidemic
7. The above conditions occurred within 3 months prior to death

Several studies have shown that verbal autopsy diagnosis of measles is highly reliable. A study of 48 measles-associated deaths in Cebu compared maternal interviews with physician diagnoses, and the verbal autopsy diagnosis was found to have 98% sensitivity and 90% specificity [8]. A similar study of children who survived acute measles found a sensitivity and specificity of 94% [13]. In a Kenyan study, serological tests for measles antibodies were compared with maternal interview diagnoses for 556 children; the sensitivity was 96%, but the specificity was 54% for all "possible, probable and definite clinical cases." If only "definite" cases are considered (i.e., those meeting all criteria in the above algorithm), the specificity was 85% [14]. However, a sero-epidemiologic study of 600 unvaccinated children in Mozambique found that a maternal history gave 50% sensitivity and 83% specificity [15]. Several studies have shown declines in verbal autopsy-diagnosed measles death following immunization programmes, which adds epidemiologic plausibility [16].

Diarrhoea and dysentery

Most studies of diarrhoeal morbidity or mortality define an episode of diarrhoea as a history of three to four loose liquid stools per day, and a history of dysentery is defined as frequent liquid stool containing blood. Open-ended questions on the presence of "diarrhoea" may be unreliable, because of the subjective nature of maternal assessment and because of cultural variation in the use of the local terms [17,18]. Since diarrhoeal deaths are generally associated with dehydration,

interviews usually ask questions about such signs as thirst, sunken eyes, dry mouth etc. [19,20]. A suggested list of questions is given in Table 5.

Table 5. Diagnostic Algorithm for Diarrhoea/Dysentery

1. History of *3-4 or more loose or liquid stools per day?*
2. *Presence of blood* in liquid stools?
3. *Dry mouth, thirst, dry wrinkled skin, sunken eyes, lack of urine, depressed fontanelle in infants*
4. Illness persisted unto time of death

A study in Cebu compared verbal autopsy diagnoses of diarrhoea associated deaths with confirmed clinical diagnoses in 43 children who died as a result of diarrhoea alone, and 92 children who died of diarrhoea plus other associated illnesses [8]. Among the children in whom diarrhoea was the sole cause of death, a history of loose or liquid stools had a sensitivity of 84% and a specificity of 79%. Further questions indicating severe diarrhoea (≥ 6 stools per day, thirst, or sunken eyes) decreased the sensitivity to 68%, but increased the specificity to 92%. In the 92 children who died of diarrhoea and another concomitant disease, the history of loose/liquid stools had a sensitivity of 78% and a specificity of 79%; with questions on more severe diarrhoea, the sensitivity was reduced to 57% but the specificity increased to 92%. A related study of children who survived a diarrhoeal episode showed high sensitivity (95%) and specificity (80%) for interview-based diagnoses, but the diagnosis of dehydration was less satisfactory except in the most extreme cases [13]. It is difficult to assess the degree of fluid loss without weighing the child before and after rehydration, and even physicians underestimate the severity of dehydration when using clinical judgment rather than objective weight change [19].

A study in Bangladesh compared maternal histories of diarrhoea with findings of stool cultures in living children, and found an 80% agreement [17]. However, in a Kenyan study maternal reports of "diarrhoea" (without specifying the number or consistency of stools) were compared to visual inspection of stool specimens, and it was found that mothers over-reported 15% to 40% of episodes [21]. This highlights the need for detailed information of stool characteristics and frequency rather than subjective maternal assessment. A Gambian investigation of children with marasmus and chronic diarrhoea showed that maternal interviews on admission correctly identified 75% of cases, and one month after discharge, maternal interviews agreed with the clinical diagnosis in 91% of cases [22]. However, the post discharge interview could be affected by communication with the physician during hospitalization.

Field studies using maternal interviews have shown age, sex, and seasonal patterns of diarrhoea consistent with those observed in clinical studies [17, 21, 23]. Also, ORT programmes have demonstrated declines in diarrhoeal mortality consistent with observations from field trials [24-26]. This suggests epidemiologic plausibility for interview based diagnoses.

In summary, verbal autopsy diagnoses of diarrhoea appear to be reliable if adequate information is obtained on stool frequency and consistency. However, maternal recognition or recall of the severity of dehydration may be problematic.

Acute lower respiratory infection (ALRI)

The diagnosis of ALRI is difficult because the symptoms and signs of respiratory infection vary with age and with severity of illness. Ideally, definitive clinical diagnosis should be based on X-ray findings, sputum culture for causative organisms, or specialized tests (such as pulse oximetry) that measure blood oxygen levels. Without such investigations, there is uncertainty in physician diagnoses due to interobserver variation in the detection of respiratory signs during auscultation of the chest [27-29].

The algorithm in Table 6 is based in part on clinical judgement, and has not been fully evaluated.

A validation study in Cebu examined 100 ALRI associated deaths and found that the diagnosis was problematic [8]. The presence of cough and dyspnoea without qualifying the duration of symptoms had high sensitivity (86%) but low specificity (47%), whereas cough lasting four or more days and dyspnoea for one or more days had a sensitivity of 59% and a specificity of 77%. The main difficulty is that all children who die show signs of terminal respiratory distress that can only be differentiated from ALRI by questions specifying duration of symptoms for more than one day. Also, many severely ill children with non-ALRI respiratory distress have a cough, which may be difficult to distinguish from ALRI without specifying duration (at least 3 to 4 days). We know of no other study to validate verbal autopsy diagnoses of ALRI. However, field trials of pneumococcal vaccine and studies of antibiotic treatment that used verbal autopsy diagnoses have shown declines in ALRI- associated mortality, which suggests that the diagnosis is sufficiently accurate to detect the impact of interventions [30,31].

Table 6. Diagnostic Algorithm for ALRI

1. *Cough (³ 3-4 days)*

2. *Difficulty breathing* (*dyspnoea*) as indicated by chest indrawing, nasal flaring, grunting or wheezing, cyanosis (blue color of lips), lasting ≥ 1 day

3. *Rapid breathing*

There have been several investigations of diagnostic accuracy in children with ALRI who did not die of the disease. Studies that compare physicians' findings in sick children with x-ray confirmation of ALRI or pulse oximetry measurements suggest that the clinical diagnosis itself may be unreliable. For example, in studies of young infants, a rapid respiratory rate (>60 per minute) had sensitivities ranging from 40% to 61%, and specificities ranging from 55% to 61%. Similarly, chest retractions had a sensitivity range of 66% to 94% and a specificity range of 28% to 54% [28]. In older children rapid respiration (>50 per minute) had higher sensitivity (66% to 75%) and specificity (67% to 98%), but these investigations were conducted in selected groups of sick children with suspected pneumonia [29]. A field study in Tari, Papua New Guinea, showed 77% agreement between clinical diagnosis and X-ray findings [Dr. Lehman personal communication 1990].

Maternal interview based diagnoses of ill children with ALRI have been evaluated in a number of investigations. A British study interviewed mothers whose children had physician diagnosed ALRI during infancy, and found that only 17% of mothers remembered the illness when questioned. at the child's first birthday [32]. In the Gambia, clinical diagnoses were compared with maternal interviews at the time of hospitalization and were found to agree in 84% of cases [22]. Also in Cebu, interviews with mothers of children with ALRI who had been discharged from hospital, were compared to physicians' diagnoses [13]. A combination of cough, fever, and dyspnoea gave a sensitivity of 68% and a specificity of around 84% for the maternal interview diagnoses. A study in Burkino Faso found that ALRI diagnoses by field worker interviews underestimated ALRI incidence as compared to physician diagnoses [33].

In summary, efforts to validate ALRI diagnoses based on verbal autopsy interview, physicians' clinical findings or interviews with mothers of surviving children have shown that there is substantial misclassification of children with ALRI. This raises concerns about the reliability of studies of ALRI mortality and morbidity.

Pertussis (whooping cough)

The definitive diagnosis of pertussis is based on culture of the organism or serological tests, but a presumptive clinical diagnosis can be made on a history of paroxysmal coughing persisting for two or more weeks, with choking and/or vomiting after the paroxysm. There may also be a characteristic "whooping" sound during inspiration, and children frequently have conjunctival haemorrhages. The following algorithm (Table 7) is based on WHO studies [12] and studies in Kenya [34-35].

Table 7. Algorithm for Pertussis

1. *History of severe paroxysms of coughing ³ 14 days*
2. *Choking and/or vomiting after the bout of coughing*
3. A "whooping" sound during inspiration
4. Conjunctival haemorrhages and/or swelling of eyelids (periorbital oedema)
5. Contact with other cases of pertussis or an epidemic

There has been no direct validation of the above questions used for verbal autopsy. Studies of sick children have validated these criteria for the diagnosis of morbidity by comparing probable or definite diagnosis of pertussis based on laboratory findings with diagnoses based on maternal history alone. Investigators in Kenya [35] found confirmatory laboratory evidence for pertussis in over 80% of suspected cases during an epidemic, but in only 40% of sporadic cases during non-epidemic periods. A clinical study in the U.S.A. found that a history of prolonged cough (214 days) had a sensitivity of 98% and a specificity of 63%; additional criteria for paroxysmal coughing decreased the sensitivity to 52% but increased the specificity to 83% [36]. Several vaccine trials using interview-based diagnoses have shown declines in pertussis morbidity and mortality [9,34,35]. It is therefore likely that the algorithm for pertussis is satisfactory in field settings.

Malaria

The clinical diagnosis of malaria can be difficult, and a definitive diagnosis depends on demonstration of a high density of parasites in the blood. In Gambian studies, a presumptive diagnosis was made on the basis of a *history of high fever in previously well children, without significant other concomitant respiratory or gastrointestinal illness* [37]. If malaria transmission is seasonal or epidemic, then a febrile illness during periods of peak transmission is more likely to be due to malaria. It is difficult to assess the validity of this presumptive diagnosis, in part because many children in endemic malarious areas have parasitaemia without fever, and children who have received antimalarial drugs have no parasitaemia. Morbidity surveys in the Gambia suggest that around 65% of children with fever have malaria parasites in their blood, but 30% of a febrile children also have parasitaemia [37].

Similarly, a study of illness in Congolese school children showed that 46% of children with fever had evidence of malaria, and among 153 episodes of illness, malaria was suspected in 43% of cases, but the diagnosis could only be confirmed in 20% [38]. Physician diagnoses are also problematic; a study of 104,281 patients in Zimbabwe showed that the percentage of clinically diagnosed cases of malaria confirmed by laboratory tests varied from under 5% in the season of low transmission to over 30% in the season of peak transmission [39]. Thus, fever as a criterion for malaria diagnosis is somewhat insensitive and nonspecific. Nevertheless, one investigation of 16 seriously ill Gambian children with clinically diagnosed malaria found that open-ended interviews with mothers gave a presumptive diagnosis of malaria in 75% of cases on admission to the hospital and in 90% of cases one month after discharge [22] . In summary, there is insufficient information to assess the accuracy of the diagnosis of malaria deaths by verbal autopsy methods, and this is a priority area for research.

Table 8. Algorithm for Chronic Conditions

1. *Weight loss/slow growth* (malnutrition, TB, AIDS)
2. *Chronic cough > 1 month* (TB, AIDS)
3. *Prolonged fever > 1 month* (TB, AIDS)
4. *Prolonged diarrhoea > 1 month* (malnutrition, AIDS)
5. *Blood in the sputum* (TB)
6. Generalized skin rash (AIDS)
7. Repeated common infections (malnutrition, AIDS)
8. Generalized enlargement of lymph nodes (TB, AIDS)

Meningitis

Criteria for verbal autopsy diagnosis of meningitis have not been well established, but studies in Senegal and Nigeria used an algorithm based on *fever, headache, neck extension (often with*

flexed arms and legs), and *swollen fontanelle in infants* [5,40]. Additional signs included convulsions and photophobia. Since most deaths occur during epidemics, the presence of other cases provides supporting evidence. No validation studies for the interview diagnosis of meningitis are available.

Chronic illnesses: malnutrition, tuberculosis, and AIDS

Many children suffer from chronic ill health as a consequence of nutritional deficiencies, recurrent acute infections, and chronic infections with diseases such as tuberculosis. Pediatric AIDS is also a growing public health problem, particularly in Africa. It is, however, difficult to distinguish these chronic conditions from one another and hard to determine their contribution to death using verbal autopsy methods.

There is no satisfactory algorithm for the verbal autopsy diagnosis of chronic malnutrition, TB, or AIDS. The questions listed in Table 8 draw upon several studies but have not been adequately evaluated. For each question, the possible associated diseases are given in parentheses.

Injury and violence

It is relatively easy to obtain information on deaths due to injury using verbal autopsy methods, by asking descriptive questions on how the injury occurred (external cause, e.g., car accident) and on the nature and location of the injury (e.g., fractured skull). However, there may be underreporting of causes such as homicide (particularly infanticide) and suicide, and there may be imprecise descriptions of the nature and location of injury. Confirmation of deaths due to injury may also be obtained from medical or legal records [1].

WHO [41] has classified the external causes of injury into nine categories as shown in Table 9.

The use of verbal autopsy methods and this classification of causes of injury has not been validated.

Table 9. External Causes of Injury

1. Bites or stings of venomous animals
2. Accidental burns
3. Accidental drowning
4. Accidental poisoning (excluding food poisoning)
5. Transport (traffic) accidents, classified by type (e.g., motor vehicle, etc.)
6. Other accidents
7. Suicide, self-inflicted injury
8. Homicide, assault
9. Violence of unknown cause
10. For 5-9, obtain descriptive information on the nature and location of the injury

Summary and conclusions

In the absence of reliable information on causes of death in developing countries, researchers and policy makers will depend upon information derived from secondary sources such as interviews with relatives of ill or deceased individuals. Such verbal autopsy diagnoses will always be subject to error because few diseases present as unmistakably distinct syndromes with symptoms and signs that can be readily perceived and recalled by the relatives. Moreover, the absence of clinical information will, of necessity, result in less precise presumptive diagnoses rather than definitive clinical diagnoses. Nevertheless, verbal autopsies can provide data of value to public health and it is likely they will be more widely used in surveillance and survey studies. There is a need for greater standardization of interview methods and wording of specific questions to provide more consistency among investigations. Also, there is a need for anthropologic studies to help define culturally specific constructs and terminology. Finally, more research is needed to validate interview diagnoses against clinical diagnoses in a variety of cultural settings.

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