



SOUTH AFRICAN NATIONAL CAUSE-OF-DEATH VALIDATION PROJECT

VERBAL AUTOPSY PHYSICIAN ASSESSMENT TRAINING

SAMRC BURDEN OF DISEASE RESEARCH UNIT | JULY 2020



NATIONAL CAUSE-OF-DEATH VALIDATION PROJECT



CLINICIAN TRAINING

Reviewing Verbal Autopsy Records for Cause-of-Death Ascertainment

Clinician Reviewer Training Workshop
SA MRC Building, Cape Town, South Africa
03 October 2019

[Pamela Groenewald](#), [Kathy Kahn](#), Jané Joubert, Debbie Bradshaw



VERBAL AUTOPSY DEFINITION

A structured interview with relatives/close caregiver of the deceased, to obtain information on the clinical symptoms, signs and events during the illness leading to death

followed by

A review of the verbal autopsy information to assign a cause of death (either by a clinician or using computerised software)

VA is used

To provide cause of death information in areas with limited access to health care and poor civil registration and vital statistics systems



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THREE KEY ASSUMPTIONS

- The symptom complex for each disease of interest is unique (e.g. neonatal tetanus or motor vehicle accidents)
- Family members or other caregivers can accurately recall symptoms and their timing
- Caregivers are willing to disclose this information (important where a death is stigmatised)



Determining cause of death: Experiences of verbal autopsy in rural South Africa and beyond



Kathleen Kahn

MRC / Wits Rural Public Health & Health Transitions Research Unit

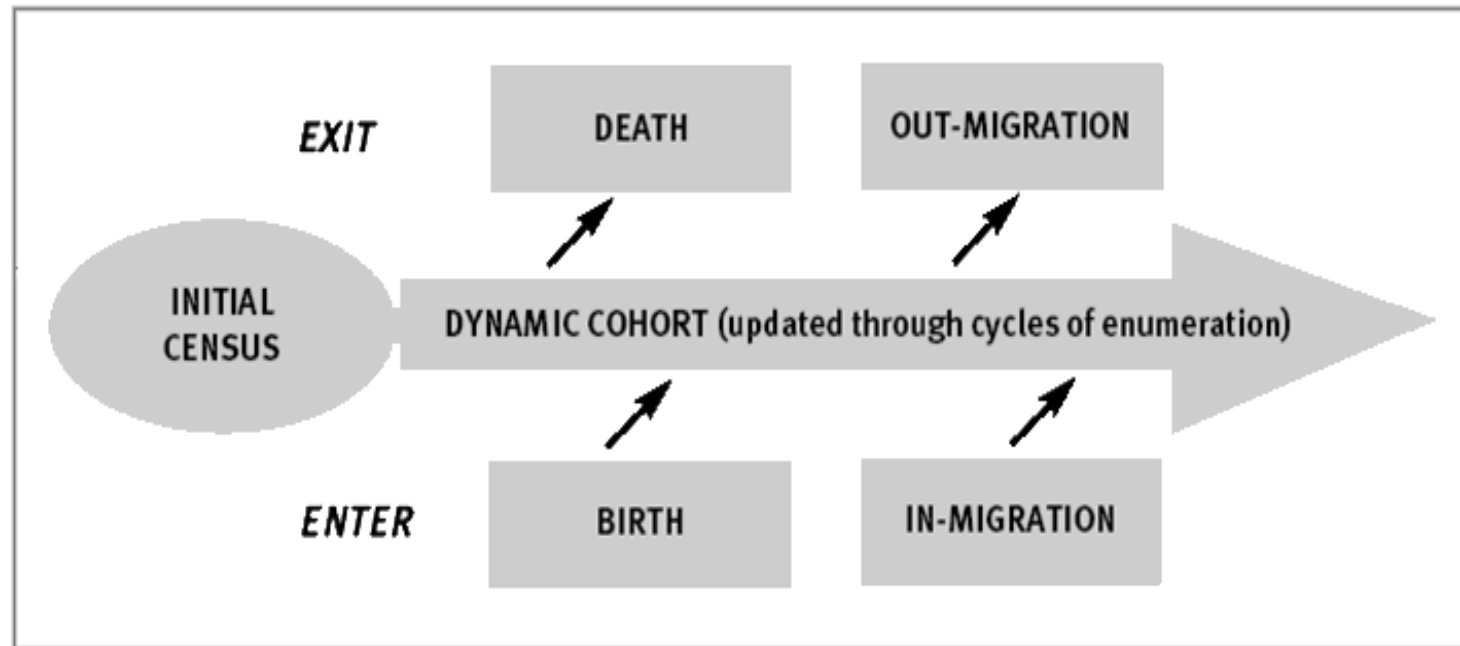
School of Public Health, Wits University

23 January 2019

for National Cause-of-Death Validation Project

Health and Socio-Demographic Surveillance

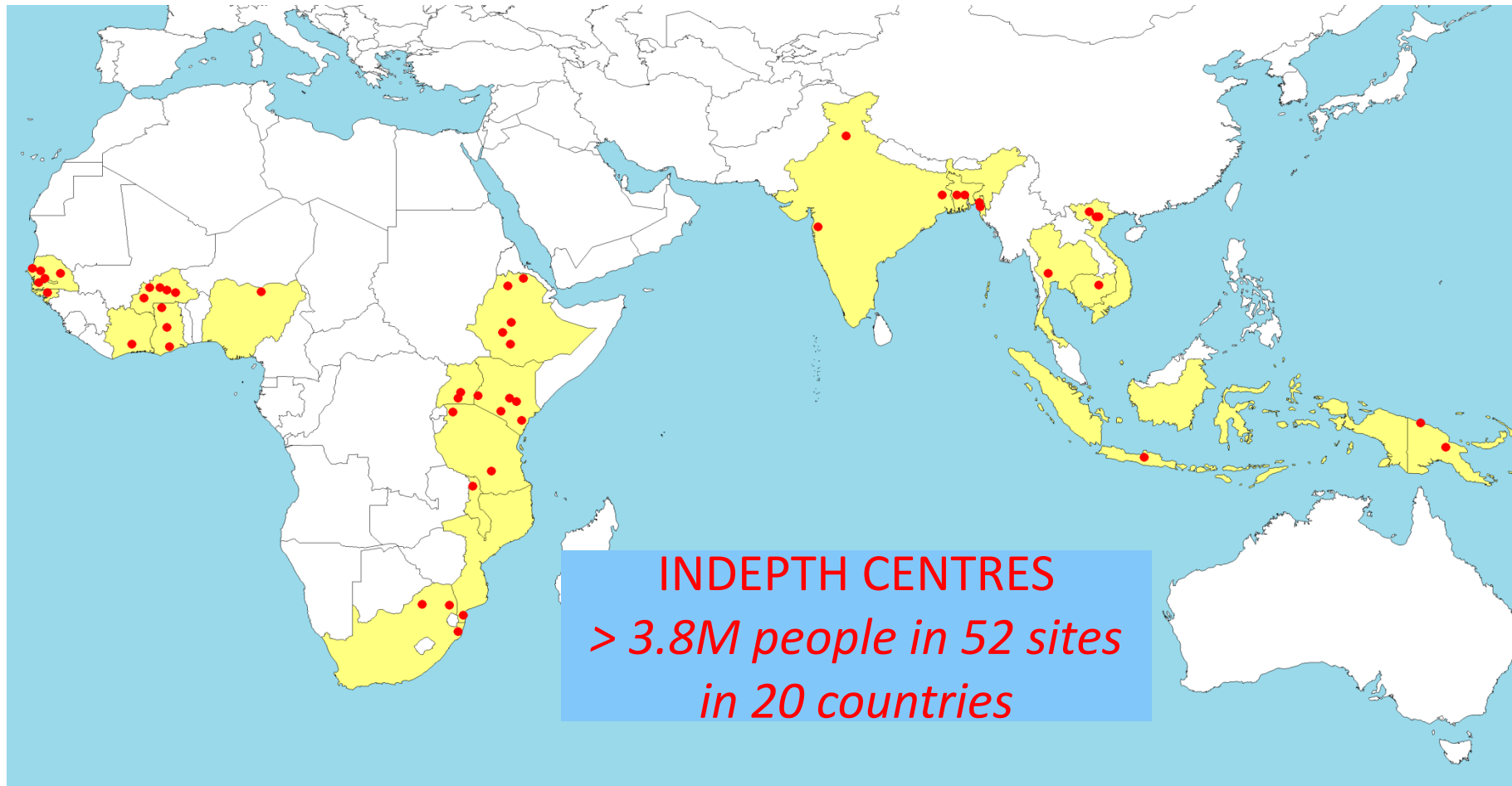
- *Defining and registering a population*
- *Following community over time*
- *Recording all vital events*



INDEPTH Network

Dissemination of ideas, harmonised tools and methods

Special issue: Mortality in Africa and Asia: evidence from INDEPTH health and demographic surveillance system sites. *Glob Health Action*; 7(25363)



South African Population Research Infrastructure Network (SAPRIN)



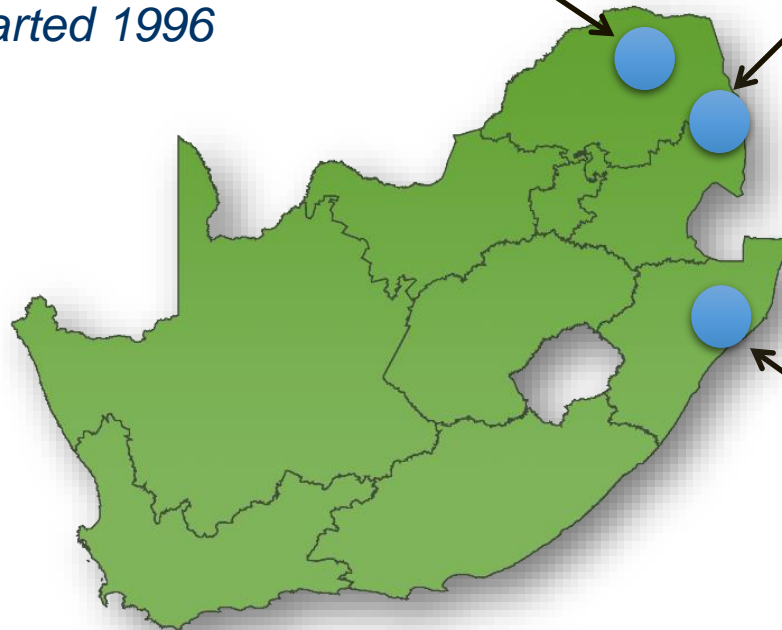
DIMAMO HDSS
Limpopo Province
Started 1996

Pop: 35 000



Agincourt HDSS
Mpumalanga Province
Started 1992

Pop: 120 000



Africa Health Research Institute
KwaZulu-Natal Province
Started 2000

Pop: 165 000



Agincourt area, Bushbuckridge

31 villages, 19,000 households, 120 000 people

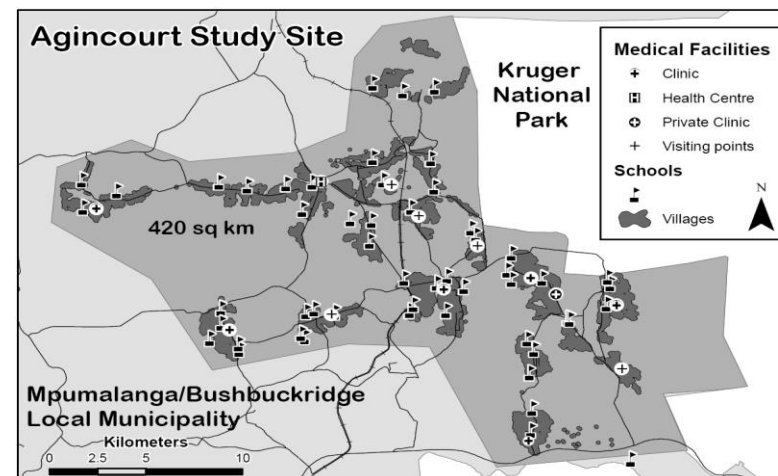
Rural, densely settled former Bantustan

31% Mozambican immigrants (self-settled former refugees)

Established 1992 to:

- generate **valid, empirical information** on rural communities
- inform vital **health reforms**
- bring the **strongest science** to bear where needs are greatest

Kahn K et al. Profile: Agincourt Health and Socio-demographic Surveillance System. *IJE* 2012





HDSS RESEARCH DESIGN

- Baseline census
 - Agincourt 1992; Dikgale (DIMAMO) 1996; Africa Centre (AHRI) 2000
- Annual household and vital events update
- Key information on vital events
 - pregnancy outcome, deaths, in/out migration, maternity history
- **Verbal autopsy on all deaths**
- **Validation study**
 - Kahn K et al. 2000. Validation and application of verbal autopsies in a rural area of South Africa. *Trop Med & Int Health*; 5(11): 824-31
- Migration reconciliation
- Marital/union status
- Special modules – e.g. assets (SES), health care utilisation, temporary migration



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VERBAL AUTOPSY (VA)

- Method of ascertaining cause of death
- VA on all deaths recorded during annual HDSS update
- Trained lay fieldworkers to interview closest caregiver
- Questionnaire: signs and symptoms, lifestyle behaviours, treatment
- Open narrative and filtering questions
- Previously physician coded only; now automated software
 - Completed VA reviewed independently by 3 doctors
 - Consensus accepted as 'probable' cause of death
 - Causes coded according to ICD-10 classification
- Largely used in research – now standardised tools developed for routine systems
- Include questions on circumstances of death



1999 – 2000

Who dies from what? Determining cause of death in South Africa's rural north-east

Kathleen Kahn, Stephen M. Tollman, Michel Garenne, John S. S. Gear

First published: June 1999 [Full publication history](#)

DOI: 10.1046/j.1365-3156.1999.00415.x [View/save citation](#)

Tropical Medicine and International Health

VOLUME 5 NO 11 PP 824-831 NOVEMBER 2000

Validation and application of verbal autopsies in a rural area of South Africa

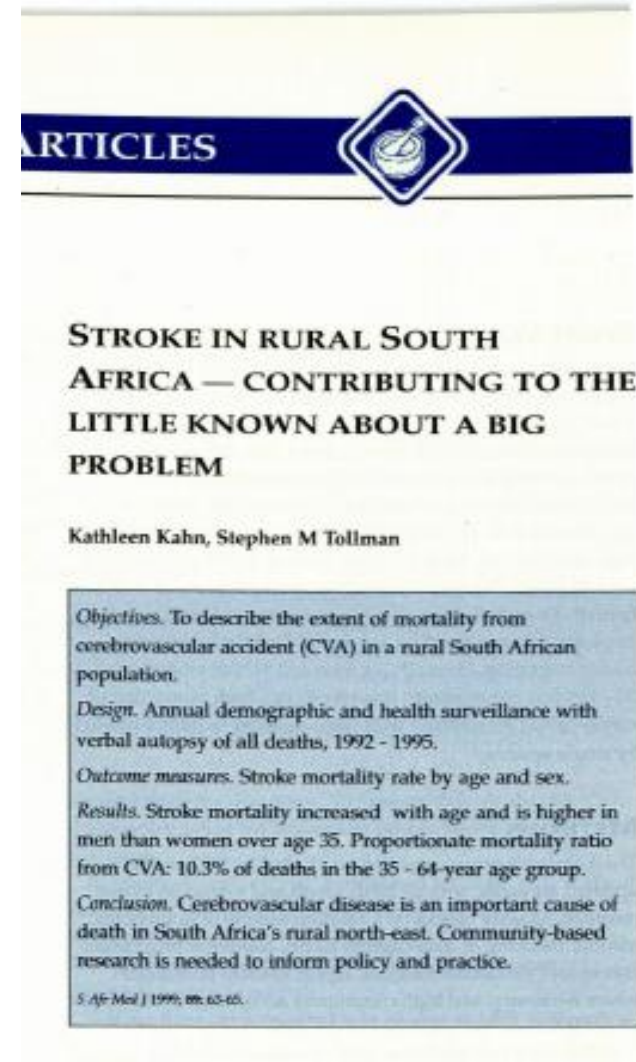
Kathleen Kahn¹, Stephen M. Tollman¹, Michel Garenne² and John S. S. Gear¹

¹ Health Systems Development Unit, Department of Community Health, University of the Witwatersrand, Johannesburg, South Africa

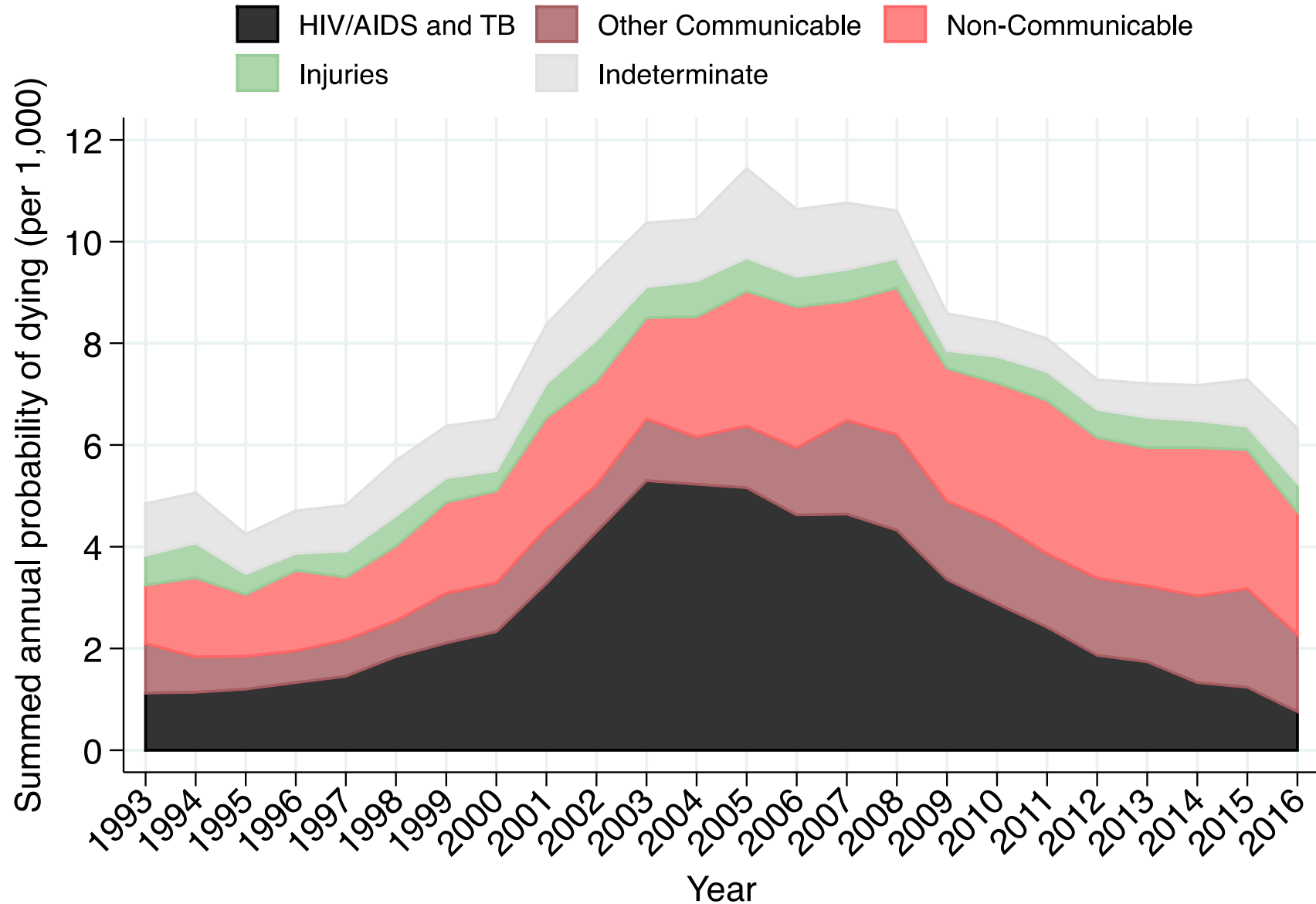
² French Centre for Population and Development (CEPED), Paris, France

Summary

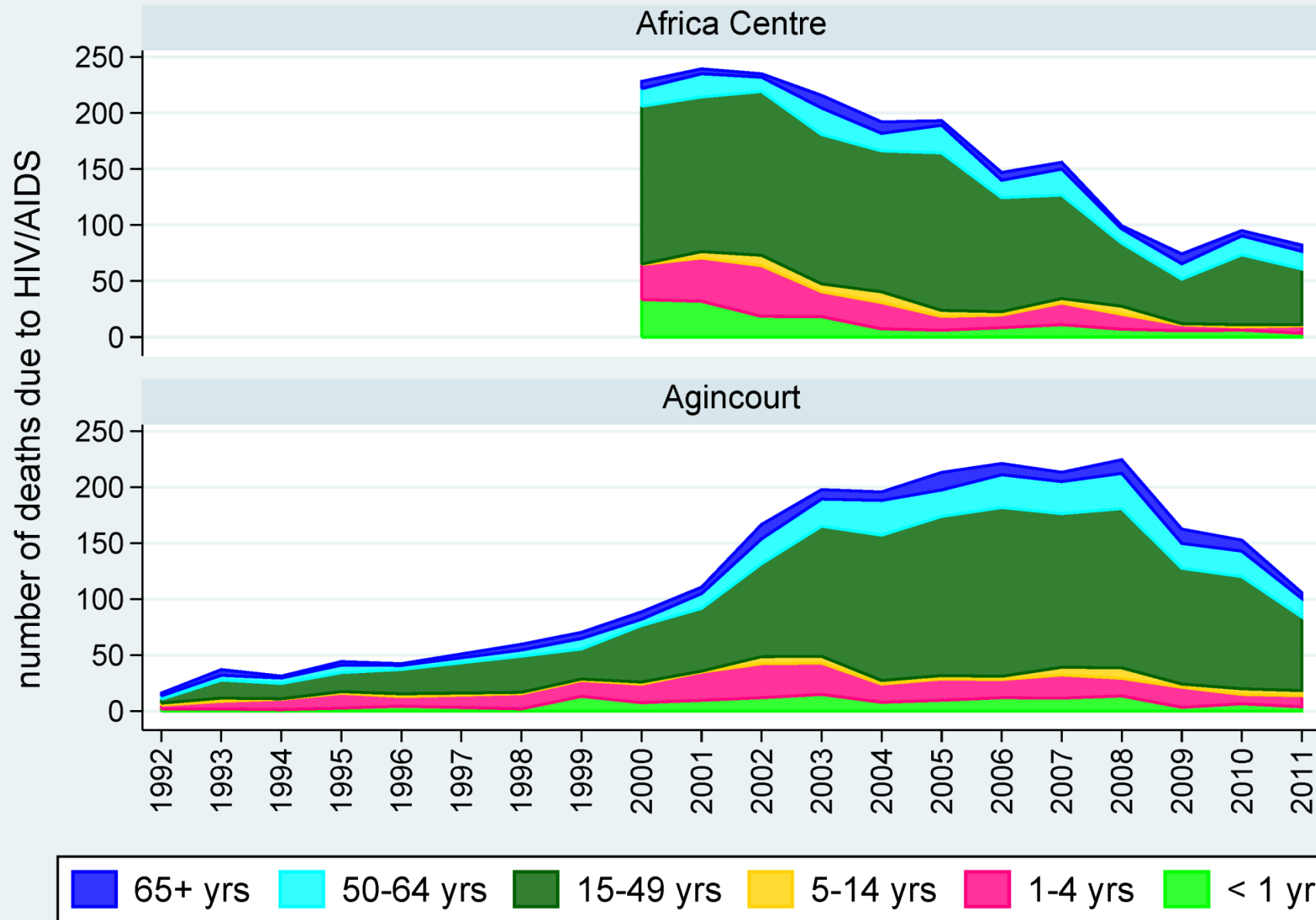
OBJECTIVE To validate the causes of death determined with a single verbal autopsy instrument covering all age groups in the Agincourt subdistrict of rural South Africa.



Colliding epidemics: cause-of-death composition

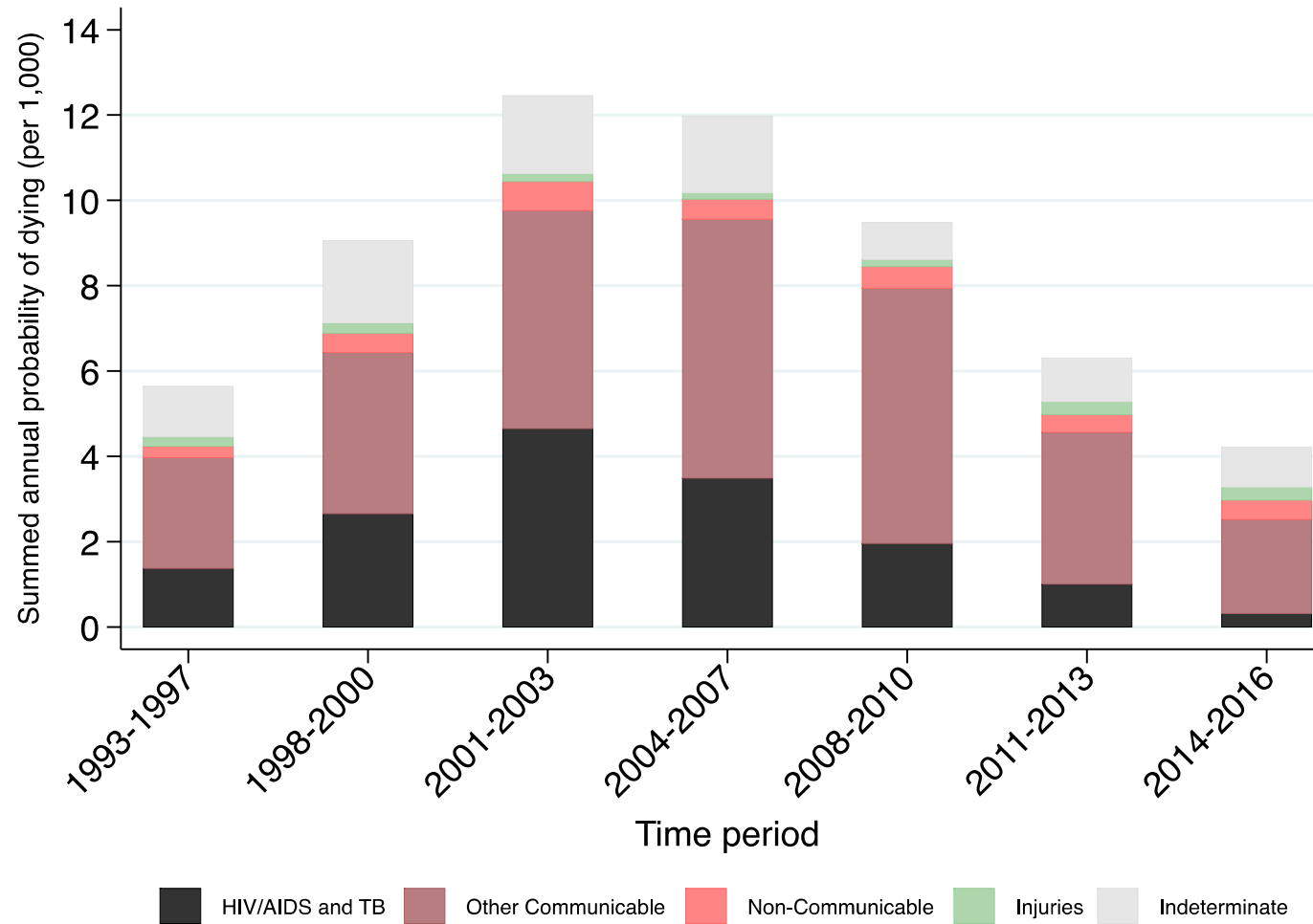


Mortality due to HIV/AIDS

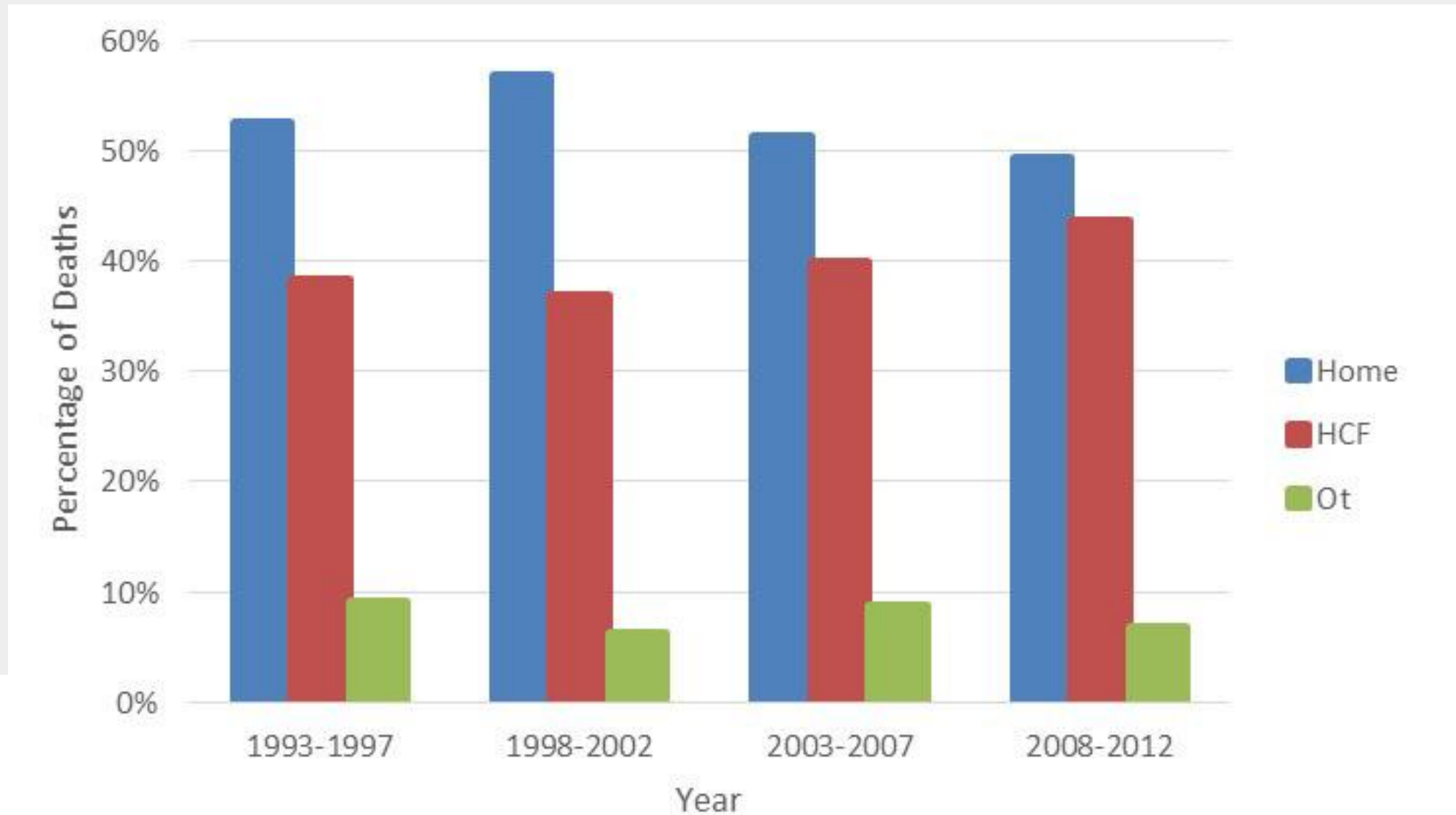


“A successful failure”: monitoring MDG targets

Cause-specific mortality: 0-4 years



% DEATHS 0-4 YEARS BY PLACE OF DEATH, 1993-2012 (N=1992)



EXPERIENCE RELEVANT TO VA DATA COLLECTION

- Selection fieldworkers
- Best respondent
 - Identify; # revisits
- Training
 - Purpose; narrative – sequence; avoid repetition; confidentiality; role-play; managing grief
- Fieldworker debriefing: managing self
- Recall period
 - Mourning period
 - Hussain-Alkhateeb L et al.. Effects of recall time on cause-of-death findings using verbal autopsy: empirical evidence from rural South Africa. *Emerg Themes Epidemiol.* 2016 Oct 18;13:10



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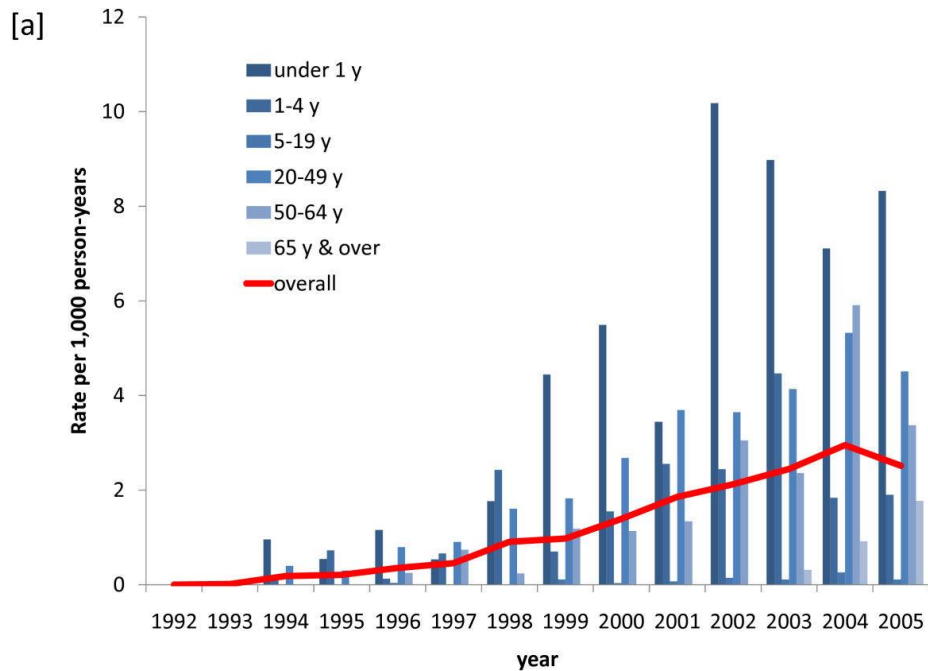


EFFECT OF RECALL PERIOD: VA ASSESSMENTS 1992-2011

| Cause of Death (n) | Recall Period (<3 months = ref group) | | |
|-------------------------|---------------------------------------|-----------------------------|----------------------------|
| | 3-5 Months OR (p-value) | 6-11 Months OR (p-value) | ≥12 Months OR (p-value) |
| HIV / TB (3,759) | 0.94 (0.339) | 1.01 (0.885) | 0.87 (0.065) |
| Acute Respiratory (712) | 0.93 (0.467) | 0.92 (0.468) | 0.88 (0.340) |
| Neoplasm (609) | 0.85 (0.140) | 0.88 (0.247) | 0.99 (0.961) |
| Other NCDs (1,429) | 1.10 (0.181) | 1.04 (0.584) | 1.07 (0.466) |
| Neonatal (187) | 1.17 (0.504) | 1.49 (0.114) | 2.58 (0.000)* |
| External (641) | 0.99 (0.936) | 1.14 (0.326) | 1.27 (0.097) |

Hussain-Alkhateeb L et al. Emerging Themes in Epidemiology 2016

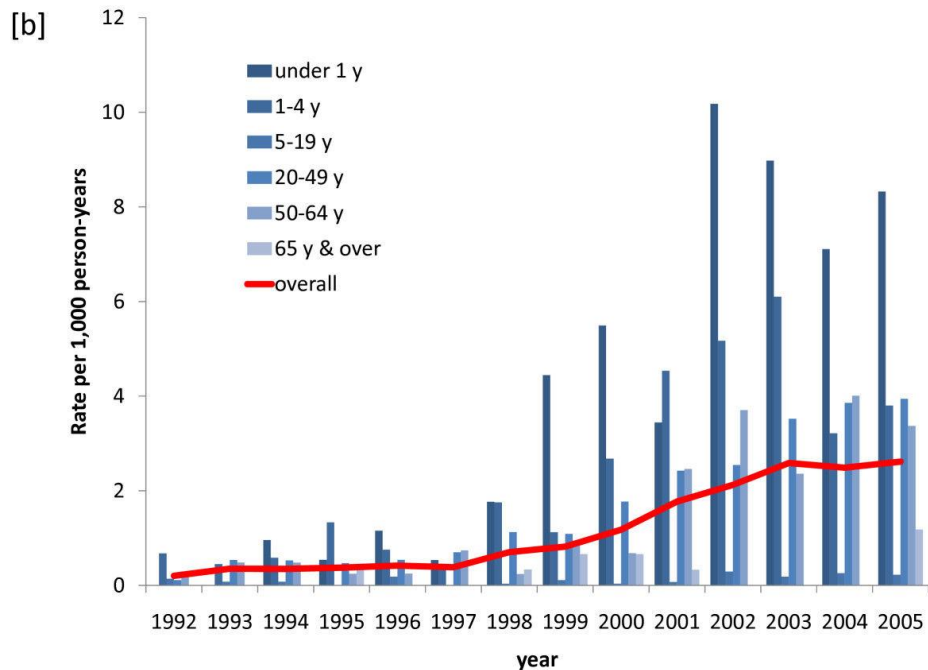
Other than for neonatal causes, a recall period of up to 1 year between death and VA had no significant effect on cause of death patterns determined



HIV-specific mortality rates by age group by

(a) physician consensus interpretation of VA data

(b) by InterVA interpretation (HIV-related death as most likely cause)



Byass P et al. Population Health Metrics 9(46) 2011



BACKGROUND TO 2016 WHO VERBAL AUTOPSY INSTRUMENT



BACKGROUND TO 2016 WHO VERBAL AUTOPSY INSTRUMENT

- **2004** – WHO technical consultation on VA tools
- **2007** – WHO set out standard tools for VA, largely presuming physician interpretations of cause of death
- **2012** – updated to WHO 2012, geared towards automated interpretation
 - WHO, HMN, INDEPTH, others
 - Short form
 - Questions on circumstances of death
- **2014** – updated to WHO 2014, reflecting new developments and including extra items from IHME
- **2016** – updated to WHO 2016 as a final harmonized version, including WHO 2012, as well as IHME subsets of inputs
 - May have too many questions
 - Given hierarchies and skips, probably not more onerous than previous versions



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WHO 2016 VERBAL AUTOPSY QUESTIONNAIRES

- Questionnaires and other resources are available for download on the World Health Organization (WHO) website at:

<http://www.who.int/healthinfo/statistics/verbalautopsystandards>

WHO VA Questionnaire 1 — for neonatal, perinatal deaths and stillbirths (deaths of children aged less than four weeks or 0-27 completed days).

WHO VA Questionnaire 2 — for post-neonatal and child deaths up to 11 years (deaths of children aged four weeks (day 28) up to 11 years).

WHO VA Questionnaire 3 — for adolescent and adult deaths (death of a person aged 12 years and above).



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DETAILED STRUCTURE OF THE VERBAL AUTOPSY QUESTIONNAIRES (1)

- All 3 questionnaires follow the same general structure across 5 broad segments
- “Skip patterns” facilitate the use of the questionnaires
 - When an answer to a specific question results in bypassing or “skipping” other irrelevant questions
 - “Entry level” questions always asked; Level 2 & 3 questions may be asked depending on response to entry level



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DETAILED STRUCTURE OF THE VERBAL AUTOPSY QUESTIONNAIRES (2)

- Skip patterns driven by:
 - Age
 - Sex
 - Maternal or perinatal death
 - Symptoms/signs
 - Constructs requiring more detail (e.g., duration, timing, severity, and location)



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SKIP INSTRUCTIONS

- Avoids asking irrelevant questions
- Based on age, sex, perinatal death status, select signs/symptoms
- ODK: automatically programmed

| | | | | | |
|-------|---|------|--------------------------|---|-------|
| 10362 | At birth was the baby of usual size? | YES | <input type="checkbox"/> | ➔ | 10365 |
| | | NO | <input type="checkbox"/> | | |
| | | DK | <input type="checkbox"/> | | |
| | | Ref. | <input type="checkbox"/> | | |
| 10363 | At birth was the baby smaller than usual (weighing under 2.5 kg)? | YES | <input type="checkbox"/> | | |
| | | NO | <input type="checkbox"/> | ➔ | 10365 |
| | | DK | <input type="checkbox"/> | ➔ | 10365 |
| | | Ref. | <input type="checkbox"/> | ➔ | 10365 |

SPECIFIC QUESTIONNAIRE SECTIONS (1)

- ✓ Introductory Section: Team information, GPS and HH outcome
- ✓ E-consent
- ✓ Preset HIV-Malaria mortality and season
- ...



SPECIFIC QUESTIONNAIRE SECTIONS (2)

1. Information on the respondent and background about interview
2. Information about the deceased and vital registration
 1. Socio-demographic information
 2. Civil registration information
3. History of injury/accidents
4. Health history on information required for assigning causes of death
5. Open narrative
 1. Text field
 2. Check list of additional items to record in the narrative open space



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QUESTION STRUCTURE 2016 WHO VA INSTRUMENT

INTERVIEWER INFORMATION

Team ID

Interviewer ID

VA Unique study ID

PRESET HIV-MALARIA AND SEASON INFORMATION

(Id10002) [Is this a region of high HIV/AIDS mortality?]

(Id10003) [Is this a region of high malaria mortality?]

(Id10004) [During which season did (s)he die?]

RESPONDENT INFORMATION

(Id10013) [Did the respondent give consent?]

(Id10008) What is your/the respondent's relationship to the deceased?

(Id10009) Did you/the respondent live with the deceased in the period leading to her/his death?

INFORMATION ABOUT THE DECEASED

(Id10019) What was the sex of the deceased?

(Id10020) Is the date of birth known?

(Id10021) When was the deceased born?

Confirm the date of birth as \${Id10021}

(Id10022) Is the date of death known?

(Id10023_a) When did (s)he die?

(Id10023_b) When did (s)he die?

Id10023

(Id10024) Please indicate the year of death.

Confirm the date of death as \${Id10023_a}



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CIVIL REGISTRATION NUMBERS

(Id10069) [Is there a need to collect civil registration numbers on the deceased?]

(Id10069_a) Do you have a death registration certificate? Is it available?

If available, may I take a photograph of the certificate for reference purposes? If the respondent refuses

Capture image of the first page of the death certificate

Capture image of the second page of the death certificate

If an image could not be taken, even though the respondent agreed, please provide a reason

(Id10070) [Death registration number/certificate]

Confirm the death registration number is \${Id10070}

(Id10071_check) [Is the date of registration available?]

(Id10071) [Date of registration]

(Id10072) [Place of registration]

(Id10073) [National identification number of deceased]

Confirm the National ID number is \${Id10073}



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SECTION 1: PRESET HIV-MALARIA MORTALITY AND SEASON

- Collects information about the prevalence of malaria and HIV in the area where the deceased lived and whether the death occurred in rainy or dry season
- Essential for selecting the appropriate algorithm used by some software for assigning the cause of death
- In most settings, this information will be pre-completed by study staff or supervisors



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SECTION 2: INFORMATION ON THE RESPONDENT AND BACKGROUND ABOUT INTERVIEW

- Collects information about the respondent (identification is confidential)
- Collects consent to conduct interview from respondent
- Documents **Time** the VA interview was started.



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SECTION 3: INFORMATION ABOUT THE DECEASED AND VITAL REGISTRATION

- Contains key identifying and socio-demographic information and data fields necessary for the management of completed forms.
- **Identifiers confidential – use study id number**



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SECTION 4: HISTORY OF INJURY/ACCIDENTS

- Provides essential information for assigning the cause of death due to accidental and intentional injuries.



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HISTORY OF ACCIDENTS OR INJURIES

(Id10077) Did (s)he suffer from any injury or accident that led to her/his death?

(Id10079) Was it a road traffic accident?

(Id10080) What was her/his role in the road traffic accident?

(Id10081) What was the counterpart that was hit during the road traffic accident?

(Id10082) Was (s)he injured in a non-road transport accident?

(Id10083) Was (s)he injured in a fall?

(Id10084) Was there any poisoning?

(Id10085) Did (s)he die of drowning?

(Id10086) Was (s)he injured by a bite or sting by venomous animal?

(Id10087) Was (s)he injured by an animal or insect (non-venomous)?

(Id10088) What was the animal/insect?

(Id10089) Was (s)he injured by burns/fire?

(Id10090) Was (s)he subject to violence (suicide, homicide, abuse)?

(Id10091) Was (s)he injured by a firearm?

(Id10092) Was (s)he stabbed, cut or pierced?

(Id10093) Was (s)he strangled?

(Id10094) Was (s)he injured by a blunt force?

(Id10095) Was (s)he injured by a force of nature?

(Id10096) Was it electrocution?

(Id10097) Did (s)he encounter any other injury?

(Id10098) Was the injury accidental?

(Id10099) Was the injury self-inflicted?

(Id10100) Was the injury intentionally inflicted by someone else?



VERIFICATION OF POSSIBLE STILLBIRTH

(Id10104) Did the baby ever cry?

(Id10105) Did the baby cry immediately after birth, even if only a little bit?

(Id10106) How many minutes after birth did the baby first cry?

(Id10107) Did the baby stop being able to cry?

(Id10108) How many hours before death did the baby stop crying?

(Id10109) Did the baby ever move?

(Id10110) Did the baby ever breathe?

(Id10111) Did the baby breathe immediately after birth, even a little?

(Id10112) Did the baby have a breathing problem?

(Id10113) Was the baby given assistance to breathe at birth?

(Id10114) If the baby didn't show any sign of life, was it born dead?

(Id10115) Were there any bruises or signs of injury on baby's body after the birth?

(Id10116) Was the baby's body soft, pulpy and discoloured and the skin peeling away?



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SECTION 5: HEALTH HISTORY RELATED TO FINAL ILLNESS

- Information required for assigning causes of death
 - a. Duration of final illness
 - b. Medical history associated with final illness
 - c. General signs and symptoms associated with final illness
 - d. Signs and symptoms associated with pregnancy and maternal deaths
 - e. Neonatal and child history, signs and symptoms
 - f. Health service utilisation
 - g. Background and context
 - h. Death certificate with cause of death (**specific cause of death not available in SA**)



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Duration of final illness

(Id10351) How many days old was the baby when the fatal illness started?

(Id10408) Before the illness that led to death, was the baby/the child growing normally?

(Id10120_0) For how many days was (s)he ill before death?

(id10120_unit) For how long was (s)he ill before death?

(Id10121) Months

(Id10122) Years

(Id10120_1) Days

Id10120

(Id10123) Did (s)he die suddenly?



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Duration of final illness (child)

(Id10352_units) How old was the child when the fatal illness started?

(Id10352_a) [Enter how old the child was when the fatal illness started in months]:

(Id10352_b) [Enter how old the child was when the fatal illness started in years]:

Id10352

Duration of final illness (ADULT)

(Id10120_0) For how many days was (s)he ill before death?

(id10120_unit) For how long was (s)he ill before death?

(Id10121) Months

(Id10122) Years

(Id10120_1) Days

Id10120

(Id10123) Did (s)he die suddenly?



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Medical history associated with final illness

(Id10125) Was there any diagnosis by a health professional of **tuberculosis**?

(Id10126) Was an **HIV test** ever positive?

(Id10127) Was there any diagnosis by a health professional of **AIDS**?

(Id10128) Did (s)he have a recent **positive test** by a health professional for **malaria**?

(Id10129) Did (s)he have a recent **negative test** by a health professional for **malaria**?

(Id10130) Was there any diagnosis by a health professional of **dengue fever**?

(Id10131) Was there any diagnosis by a health professional of **measles**?

(Id10132) Was there any diagnosis by a health professional of **high blood pressure**?

(Id10133) Was there any diagnosis by a health professional of **heart disease**?

(Id10134) Was there any diagnosis by a health professional of **diabetes**?

(Id10135) Was there any diagnosis by a health professional of **asthma**?

(Id10136) Was there any diagnosis by a health professional of **epilepsy**?

(Id10137) Was there any diagnosis by a health professional of **cancer**?

(Id10138) Was there any diagnosis by a health professional of **Chronic Obstructive Pulmonary Disease (COPD)**?

(Id10139) Was there any diagnosis by a health professional of **dementia**?

(Id10140) Was there any diagnosis by a health professional of **depression**?

(Id10141) Was there any diagnosis by a health professional of **stroke**?

(Id10142) Was there any diagnosis by a health professional of **sickle cell disease**?

(Id10143) Was there any diagnosis by a health professional of **kidney disease**?

(Id10144) Was there any diagnosis by a health professional of **liver disease**?



General signs and symptoms associated with final illness

(Id10147) Did (s)he have a **fever**?

(Id10148_a) How many days did the fever last?

(Id10148_units) How long did the fever last?

(Id10148_b) [Enter how long the fever lasted in days]:

(Id10148_c) [Enter how long the fever lasted in months]:

Id10148

(Id10149) Did the fever continue until death?

(Id10150) How severe was the fever?

(Id10151) What was the pattern of the fever?

(Id10152) Did (s)he have **night sweats**?

(Id10153) Did (s)he have a **cough**?

(Id10154_units) For how long did (s)he have a cough?

(Id10154_a) [Enter how long (s)he had a cough in days]:

(Id10154_b) [Enter how long (s)he had a cough in months]:

Id10154

(Id10155) Was the cough productive, with sputum?

(Id10156) Was the cough very severe?

(Id10157) Did (s)he cough up blood?

(Id10158) Did (s)he make a whooping sound when coughing?



Signs and symptoms associated with pregnancy and women

(Id10294) Did she have any swelling or lump in the breast?

(Id10295) Did she have any ulcers (pits) in the breast?

(Id10296) Did she ever have a period or menstruate?

(Id10297) When she had her period, did she have vaginal bleeding in between menstrual periods?

(Id10298) Was the bleeding excessive?

(Id10301) Was there excessive vaginal bleeding in the week prior to death?

(Id10299) Did her menstrual period stop naturally because of menopause or removal of uterus?

(Id10302) At the time of death was her period overdue?

(Id10303) For how many weeks had her period been overdue?

(Id10300) Did she have vaginal bleeding after cessation of menstruation?

(Id10304) Did she have a sharp pain in her belly (abdomen) shortly before death?

(Id10305) Was she pregnant at the time of death?

(Id10306) Did she die within 6 weeks of delivery, abortion or miscarriage?

(Id10307) Did this woman die more than 6 weeks after being pregnant or delivering a baby?

(Id10308) Was this a woman who died less than 1 year after being pregnant or delivering a baby?

(Id10309) For how many months was she pregnant?

(Id10310) Please confirm, when she died, she was NEITHER pregnant NOR had delivered, had an abortion, or miscarried within 12 months of when she died--is that right?



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Neonatal and child history, signs and symptoms

(Id10354) Was the child part of a multiple birth?

(Id10355) Was the child the first, second, or later in the birth order?

(Id10356) Is the mother still alive?

(Id10357) Did the mother die before, during or after the delivery?

(Id10358_units) How long after the delivery did the mother die?

(Id10358) How many months after the delivery did the mother die?

(Id10359) How many days after the delivery did the mother die?

(Id10359_a) How many weeks after the delivery did the mother die?

(Id10360) Where was the deceased born?

(Id10361) Did you/the mother receive professional assistance during the delivery?

(Id10362) At birth, was the baby of usual size?

(Id10363) At birth, was the baby smaller than usual, (weighing under 2.5 kg)?

(Id10364) At birth, was the baby very much smaller than usual, (weighing under 1 kg)?

(Id10365) At birth, was the baby larger than usual, (weighing over 4.5 kg)?

(id1036X_check) It is not possible to select "No usual size at Birth", "No weighing under 2.5 kg" and "No weighing over 4.5 kg" together. Please go back and correct the selection.

(Id10366) What was the weight (in grammes) of the deceased at birth?

(Id10367) How many months long was the pregnancy before the child was born?

(Id10368) Were there any complications in the late part of the pregnancy (defined as the last 3 months, before labour)?

(Id10369) Were there any complications during labour or delivery?

(Id10370) Was any part of the baby physically abnormal at time of delivery? (for example: body part too large or too small, additional growth on body)?

(Id10371) Did the baby/ child have a swelling or defect on the back at time of birth?

(Id10372) Did the baby/ child have a very large head at time of birth?

(Id10373) Did the baby/ child have a very small head at time of birth?

(Id10394) How many births, including stillbirths, did the baby's mother have before this baby?

(Id10376) Was the baby moving in the last few days before the birth?

(Id10377) Did the baby stop moving in the womb before labour started?

(Id10379_unit) How long before labour did you/the mother last feel the baby move?

(Id10379) [Enter how long before labour did you/the mother last felt the baby move in days]: (maybe the respondent or health worker had examined the mother)

(Id10380) [Enter how long before labour did you/the mother last felt the baby move in hours]: (maybe the respondent or health worker had examined the mother)

(Id10382) How many hours did labour and delivery take?

(Id10383) Was the baby born 24 hours or more after the water broke?

RISK FACTORS

(Id10411) Did (s)he drink alcohol?

(Id10412) Did (s)he use tobacco?

(Id10413) Did (s)he smoke tobacco (cigarette, cigar, pipe, etc.)?

(Id10414) What kind of tobacco did (s)he use ?

(id10414_check) It is not possible to select cigarettes or pipe and "no" to "Did (s)he smoke tobacco?". Please go back and correct the selections.

(Id10415) How many cigarettes did (s)he smoke daily?

(Id10416) How many times did (s)he use tobacco products each day?



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HEALTH SERVICE UTILISATION

(Id10418) Did (s)he receive any treatment for the illness that led to death?

(Id10419) Did (s)he receive oral rehydration salts?

(Id10420) Did (s)he receive (or need) intravenous fluids (drip) treatment?

(Id10421) Did (s)he receive (or need) a blood transfusion?

(Id10422) Did (s)he receive (or need) treatment/food through a tube passed through the nose?

(Id10423) Did (s)he receive (or need) injectable antibiotics?

(Id10424) Did (s)he receive (or need) antiretroviral therapy (ART)?

(Id10425) Did (s)he have (or need) an operation for the illness?

(Id10426) Did (s)he have the operation within 1 month before death?

(Id10427) Was (s)he discharged from hospital very ill?

(Id10428) Did (s)he receive any immunizations?

(Id10429) Do you have the child's vaccination (Road to Health) card?

(Id10430) Can I see the vaccination card (note the vaccines the child received)?



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BACKGROUND AND CONTEXT

- (Id10450) In the final days before death, did s/he travel to a hospital or health facility?
- (Id10451) Did (s)he use motorised transport to get to the hospital or health facility?
- (Id10452) Were there any problems during admission to the hospital or health facility?
- (Id10453) Were there any problems with the way (s)he was treated (medical treatment, procedures, interpersonal attitudes, respect, dignity)?
- (Id10454) Were there any problems getting medications or diagnostic tests in the hospital or health facility?
- (Id10455) Does it take more than 2 hours to get to the nearest hospital or health facility from the deceased's household?
- (Id10456) In the final days before death, were there any doubts about whether medical care was needed?
- (Id10457) In the final days before death, was traditional medicine used?
- (Id10458) In the final days before death, did anyone use a telephone or cell phone to call for help?
- (Id10459) Over the course of illness, did the total costs of care and treatment prohibit other household payments?



SECTION 6: OPEN NARRATIVE

- Open text field that allows for comments and additional information. Captures key items such as signs and symptoms, timing of care seeking, and any points that need to be clarified.
- Respondent provides brief description of the illness and terminal events.
- Useful for quality control and for providing additional information for physician assessment of the cause of death if needed.
- Also used to complete a checklist of some indicators that are required for assigning causes of death using an automated algorithm.
- **Critical for clinicians involved in interpreting VA.**
 - Asked near beginning of the questionnaire; recorded in notebook.
 - Entered in tablet after interview as image.



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HANDWRITTEN NARRATIVE IMAGE

Respondent said that on the 29/11/2022 she had an urge to go to the toilet. She smelled a foul smell, and when she look, the feet of the child was hanging out. She called out to others in the house to come and help her. They managed to get the child out.

There was no umbilical cord attached to the baby, and she said the family said that the child came out with the placenta.

The baby moved his hands and breathed, as per the Respondent, but did not cry. She kepted him in her arms - he died an hour later - just stopped breathing she said. He

was warm in her arms, and it appeared that his one arm was bluish.

Respondent was 6 months pregnant when this happened. The family went (walked) to the Police Station to get the ambulance. They left the baby at home for forensics to collect and took the mother to the hospital where she stayed for a few days to check that "nothing" was left behind, as per her.

No-one mentioned cause of death, but Respondent believes that because no-one took out the stym, the child died. Child was male - death cert. She said was written incorrectly.

Words present in narrative

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Chronic kidney disease

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Dialysis

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Fever

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Heart attack

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Heart problem

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Jaundice

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Liver failure

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Malaria

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Pneumonia

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Renal (kidney) failure

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Suicide

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/None of the above words were mentioned

(Id10477) [Select any of the following words that were mentioned as present in the narrative.]/Don't know



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VA CAUSE OF DEATH CATEGORIES

- **WHO 2016:** divides all ICD-10 causes of death into 64 categories
- **InterVA-4:** codes all deaths into 63/64 categories
 - dengue and other haemorrhagic fevers merged into one category
- **SmartVA/Tariff-2:** codes all deaths into 43/64 categories
- **InterVA-5:** codes all deaths across all 64 WHO categories



VERBAL AUTOPSY ANALYSIS: CAUSE OF DEATH LIST

- VA cannot ascertain all causes of death & VA does not perform equally well for all causes that it can ascertain
- The WHO 2016 VA instrument includes a list of causes that can be ascertained with reasonable accuracy from a well-administered VA interview
- Causes correspond with codes from the International Classification of Diseases (ICD-10)
- Cause of death assignment requires correct completion of questions

| Verbal autopsy code | Verbal autopsy title | ICD-10 code (to ICD) | ICD-10 codes (from ICD) |
|---|--|----------------------|-------------------------|
| VAs-01 Infectious and parasitic diseases | | | |
| VAs-01.01 | Sepsis | A41 | A40-A41 |
| VAs-01.02 | Acute respiratory infection, including pneumonia | J22/J18 | J00-J22 |
| VAs-01.03 | HIV/AIDS related death | B24 | B20-B24 |
| VAs-01.04 | Diarrheal diseases | A09 | A00-A09 |
| VAs-01.05 | Malaria | B54 | B50-B54 |
| VAs-01.06 | Measles | B05 | B05 |
| VAs-01.07 | Meningitis and encephalitis | G03; G04 | A39; G00-G05 |



TOOLS FOR ASSIGNING A PROBABLE CAUSE OF DEATH

- **InterVA** (www.interva.net)
 - 2003: first launched; relatively small set of inputs
 - Developed InterVA-3 (general deaths) & InterVA-M (maternal causes)
 - 2012: updated to InterVA-4, corresponding to WHO 2012
 - **2017: update to InterVA-5, corresponding to complete WHO 2016**
- IHME
 - 2015: launched SmartVA
- **OpenVA** (<https://cran.r-project.org/package=openVA>)
 - Free, open-source software for automated VA coding algorithms
 - Fully compatible with WHO 2016
 - Standard way of running VA coding algorithms and producing standardised output that can be easily compared
 - InterVA4.02 / InterVA4.03, Tariff 1.0; Naive Bayes Classifier (NBC); InSilicoVA; CrossVA (planned)



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GUIDELINES FOR PHYSICIAN CAUSE OF DEATH CERTIFICATION FROM VA



EXPERIENCE RELEVANT TO PHYSICIAN ASSESSMENT

- Suspend expectations based on clinical assessment
- “Detective” role
- Make note of salient findings – present and absent
- Narrative assessment – differential diagnosis
- Multiple causes
- “Evidence” to justify COD assignment
- Look hard for a cause of death **BUT** do not make things up!



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ASSIGNING CAUSES OF DEATH IN VERBAL AUTOPSY

- Information on deceased used to assign cause of death
 - Reported Diseases - *medical history associated with final illness*
 - Signs and symptoms prior to death
 - Age
 - Sex
 - History / **narrative**
- Diagnostic criteria (algorithms) describe which combination of symptoms, duration and severity may lead to a specific diagnosis
 - Provide guidance to clinician who is expected to use clinical judgment
 - Ensure focus on probable conditions; reduce highly improbable ones



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FROM INTERVIEW TO DIAGNOSIS

The wife of a man who died 2 months ago is interviewed. She reports that he had complained for some days of headache. He then had problems turning his head and complained of neck pain.

She noticed that he felt increasingly hot to the touch, had chills and sweated heavily. During his last days he was vomiting and was confused. He was tired and slept most of the time.

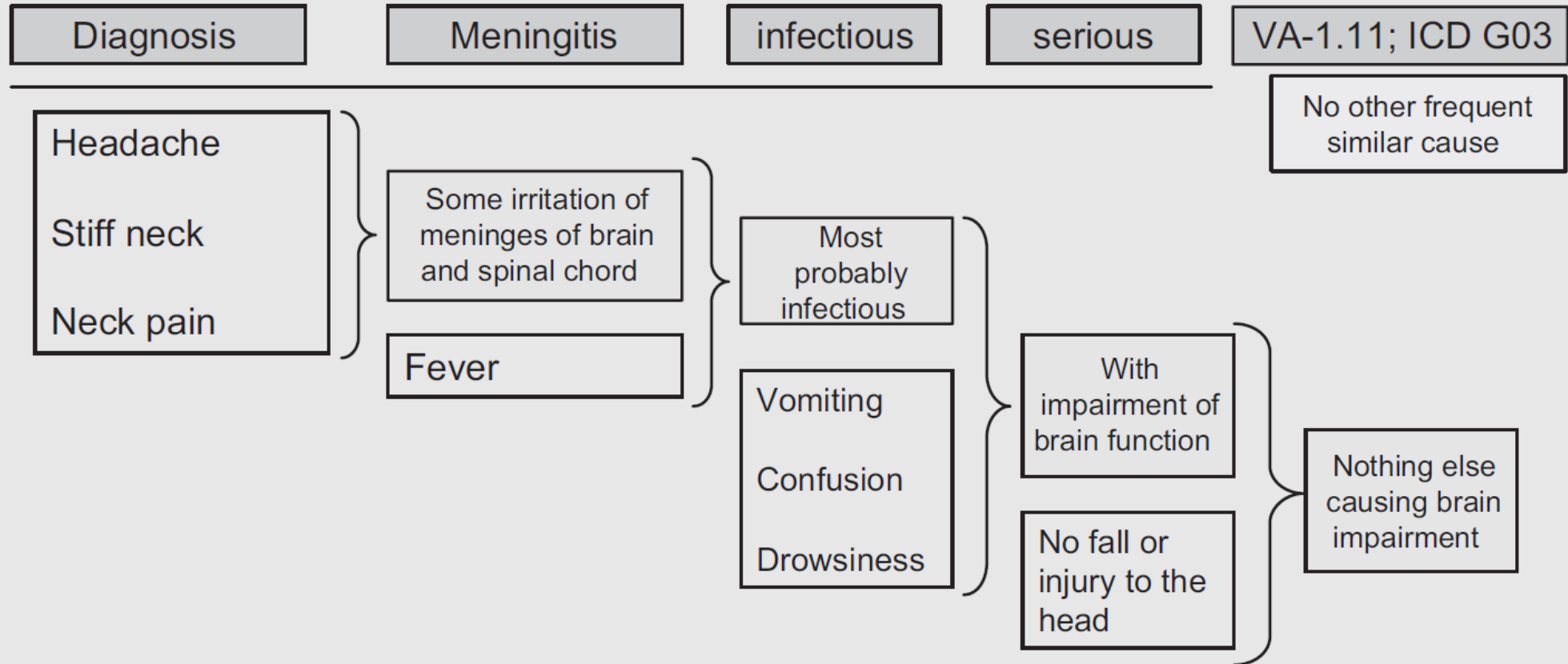
The interviewer asked if the dead man had had an accident and whether he had hurt his head during the weeks before he died. His wife reported that he had not fallen or had an injury to his head.



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FIG. 1. SAMPLE OF A DIAGNOSTIC ALGORITHM FOR IDENTIFYING THE DIAGNOSIS "MENINGITIS"



CRITERIA FOR DIAGNOSIS OF “MENINGITIS”

| | | | | |
|----------|------------|------|---|---|
| VA-01.11 | Meningitis | G009 | Bacterial meningitis, unspecified | Other diseases of the brain can be found under VA-04.03 and VA-08. Several other infections may manifest with meningitis or encephalitis, but in these cases the mention of the infection is more specific than the mention of meningitis. For a detailed list of such diseases see the “dagger codes” (†) mentioned in ICD-10 under G02* and G05*. Relevant information Headache Stiff neck Neck pain Fever Vomiting Confusion Drowsiness No fall or injury to the head |
| | | G039 | Meningitis due to other and unspecified causes | |
| | | G049 | Encephalitis, myelitis and encephalomyelitis, unspecified | |

*WHO, 2007. Verbal autopsy standards: ascertaining and attributing the cause of death.
Section 3. Applying ICD-10 to verbal autopsy.*



Infant death with respiratory symptoms = breathing problems, cough, ± fever

Check if symptoms start immediately at birth

YES

Check gestational age

≤ 37 weeks

Full term (37 weeks)

RESPIRATORY DISTRESS SYNDROME
Immature lungs due to prematurity
Code: ICD3: P07
Code VA: 10.01

BIRTH ASPHYXIA
Meconium aspiration etc
Code ICD3: P21
Code VA: 10.02

NEONATAL PNEUMONIA
ICD 3: P23
VA Code: 10.03

PNEUMONIA
ICD 3: J18
VA Code: 01.02

Newborn cries, breathes, and moves normally at birth, **BUT** after a period of normalcy develops breathing problems, cough, ± fever **AND**

NO

dies within 28 days

dies after 28 days