
Cause of Death Determination: Report on Pilot Development

Comparison of Post Mortem (PM)
to Verbal Autopsy (VA) to Improve
HDSS Mortality Data

Kayla Laserson, ScD
KEMRI/CDC Kisumu, Kenya HDSS

Problem: How Obtain Accurate Mortality Data in Resource-Poor Settings?

Surveys

Community and internet surveys : Biased, incomplete coverage, and inaccurate

Post Mortem

Considered the “gold standard” for cause of death determination

Limited availability, even in resource-rich settings

Utilized primarily for forensic (“police”) purposes; far less availability for deaths in-hospital or at home

Majority of deaths in resource-poor settings occur out of hospital

Verbal Autopsy

The “gold standard” most often used is clinician interpretation, either directly or indirectly (as in computerized algorithms)

Needs to be validated against diagnostic pathology autopsy

Determining Cause of Death (COD)

- Clinically-diagnosed causes of death are known to be inaccurate when compared to autopsy determined causes of death, in up to 15-60% of hospital deaths
- This problem is not limited to resource-poor settings
 - 26% of deaths in children which were clinically diagnosed as cerebral malaria were pathologically refuted
 - AM J PATHOL 2011; 178:2146-2158
 - There was a 5-60% error rate in clinical causes of death in maternal deaths
 - J OBSTET GYNAEC RES 2011; 37:58-63
 - 44% of clinically assigned COD's in ICU patients were erroneous versus post mortem cause
 - CHEST 2001; 119:530- 536

Main Goals of the Project

Use of Post Mortems

- To validate VA
 - What is concordance between PM and VA?
- To improve VA
 - Optimize questions for accuracy
 - Suggest ancillary tests for specific categories of deaths
- To monitor disease prevalence
 - Morbidity and mortality
- To improve pathology services for autopsy and diagnostic pathology in live persons
 - Capacity building

Basic Outline of the Research Study

- At least 2 HDSS sites where VA's currently employed (Kisumu/ South Africa TBD)
 - HDSS infrastructure used for prompt notification of a death
 - PM performed within 1-3 days of death
 - VA performed after (and blinded to) the PM, with determination of COD using current standard methods
 - Family informed of most likely cause of death after PM and VA completed
- Site feasibility
 - Community acceptance of PM
 - Available infrastructure for PM and laboratory activities (histology, microbiological culture, tissue culture, etc)
 - Available infrastructure for prompt notification of a death, obtaining consent, transporting the body, and communicating with the family/ community leaders
- Sample size
 - Large sample size for optimal coverage; exclude forensic (“police”) autopsies; include only apparently natural deaths, both at home and in hospital/ medical facilities
 - Include deaths from all ages and sexes (adults, maternal deaths, children, infants, and stillborns) and over all seasons

Feasibility Study for the PM Component: KEMRI/CDC, Kisumu, Kenya site

- Evaluation of infrastructure: Visit by Drs. Fligner and Roberts, 12-16 September 2011
- Identified several funeral homes and mortuaries as acceptable for PM performance
 - New Nyanza Provincial Hospital (PGH) preferred
 - Well-run hospital mortuary with autopsy facility
 - Has refrigerated storage space for bodies prior to autopsy
 - Possible plans for expansion of pathology and autopsy facilities (new medical school affiliation?)
 - Will allow expats to perform PM (with temporary license) and to teach
 - Obtained community support
 - Met with HDSS Community Advisory Board (chiefs and community leaders) who voiced support and enthusiasm for the project
 - Observed two verbal autopsies, and heard support for PM from one set of VA participants

Feasibility Study for the PM Component: KEMRI/CDC, Kisumu, Kenya site

- Identified partners for collaboration and assistance
 - Dr. David Chumba, Head of Pathology, and his 3 pathologist colleagues at Moi University School of Medicine, Eldoret, Kenya
Dr. Muturi, Pathologist at New Nyanza Provincial Hospital
- Discussed infrastructure in the HDSS which could facilitate the project
 - Use of Village Reporters
 - Transportation Services
 - Communication networks
- Discussed infrastructure at KEMRI/CDC which could be used for ancillary tests derived from the autopsy
 - Microbiological culture, tissue preservation, RNA extraction and preservation



Dr. Muturi in Lab at PGH



Drs. Fligner and Roberts with Morris

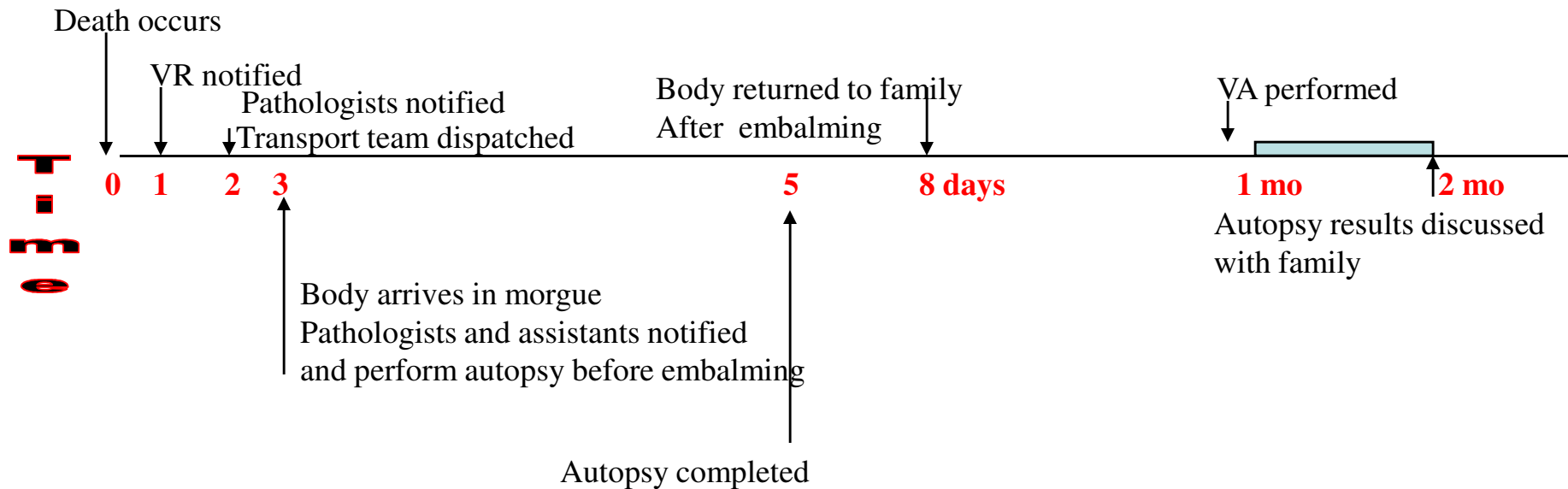
Pilot Study

- Goals
 - Prove feasibility
 - Optimize procedure
 - Correct any problems (logistic, communication, ethical, etc)
 - Evaluate costs
 - Plan for long term, larger study, with training of Kenyan/South African pathologists and assistants
 - Longer term study will validate VA and contribute directly to further refinement of VA models

Procedures for Pilot

- Perform one complete autopsy/each category
 - Stillbirth, infancy (birth - 1 year), childhood (1 - 5 years), young adult (15 - 30 years) [one male, one female]
 - Maternal (pregnant or within 2 weeks of delivery)
 - Elderly (>50 years) one male, one female
- 3 pathologists on site over a 2 week period
- PMs performed within 24 hours of death
- VA performed per current protocol (at one month +)
- Final anatomic cause of death from pathology autopsy within 2 months of autopsy performance
- Family meeting to provide results of pathology autopsy after the VA performed (ideally, immediately after VA)

Proposed Optimized Timeline



Abbreviations:

VR: Village reporter

VA: Verbal Autopsy

Challenges

- Community acceptance
 - No cost for autopsy
 - Incentives (?embalming, transportation, coffin?)
- Payment to mortuary for facility use
- Rapid notification of deaths by Village Reporter:
 - Give cell phone/minutes/other incentive?
- Transportation of body from site to mortuary
 - Car/small truck?
- Possibility of on-site autopsy (babies)
- Immediate public health relevant findings
 - TB– notification/contact investigation
 - Homicide—How to handle
 - Privacy of autopsy report; any required reporting to Kenyan/South African authorities / vital statistics
- Obtaining IRB: in country, and at the institutions of the participating pathologists:

Way Forward

- **Plan to submit FULL PROTOCOL (PILOT + MAIN STUDY) to IRBs before end of year**
- **Thank you to INDEPTH for seed grant to perform pilot**

Thank you