Enhancing the identification of causes of death through community-based verbal autopsy methods during the COVID-19 outbreak

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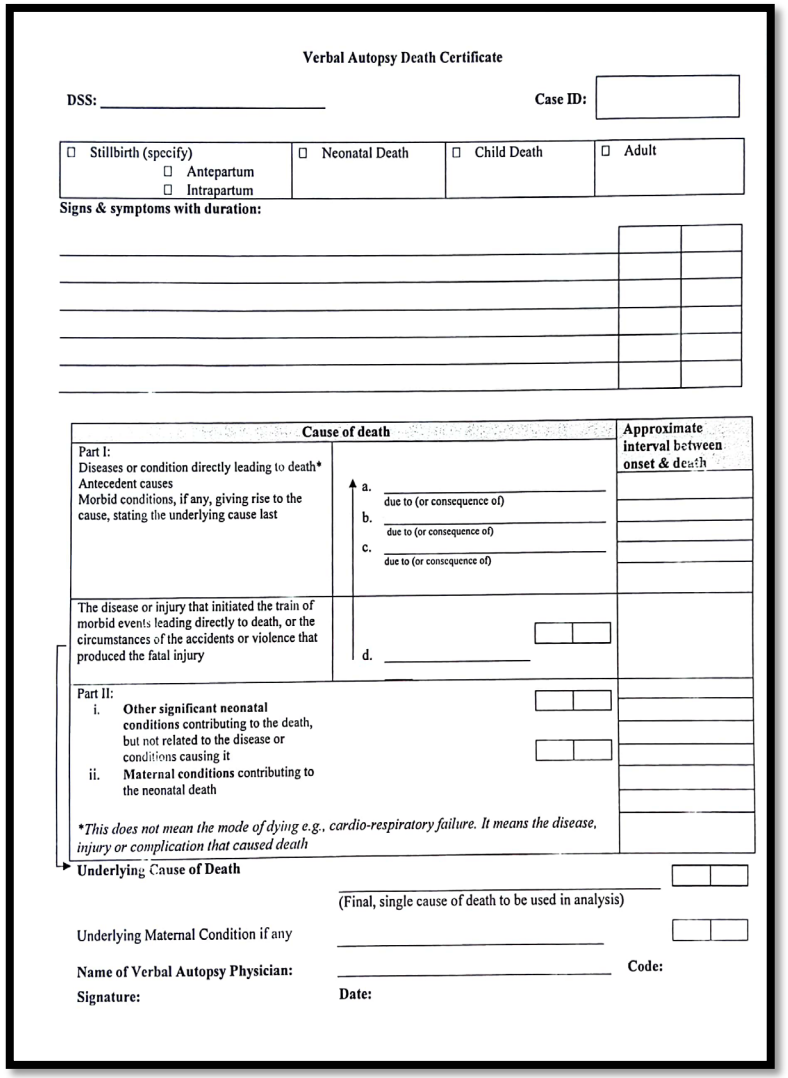
Knowledge Gap

- In LMICs, verbal autopsy has become a scalable and affordable way to acquire data on causes of death.
  - Vital registration systems are often weak or nonexistent
  - Lack of resources for cause of death diagnostics
  - Lack of reliable cause-specific mortality data.



Verbal Autopsy Death Certificate

DSS: _____ Case ID:

☐ Stillbirth (specify) ☐ Antepartum ☐ Intrapartum	☐ Neonatal Death	☐ Child Death	☐ Adult

Signs & symptoms with duration:

Cause of death	Approximate interval between onset & death
Part I: Diseases or condition directly leading to death* Antecedent causes Morbid conditions, if any, giving rise to the cause, stating the underlying cause last — a. _____ due to (or consequence of); b. _____ due to (or consequence of); c. _____ due to (or consequence of)	
The disease or injury that initiated the train of morbid events leading directly to death, or the circumstances of the accidents or violence that produced the fatal injury — d. _____	
Part II: i. Other significant neonatal conditions contributing to the death, but not related to the disease or conditions causing it; ii. Maternal conditions contributing to the neonatal death	

*This does not mean the mode of dying e.g., cardio-respiratory failure. It means the disease, injury or complication that caused death

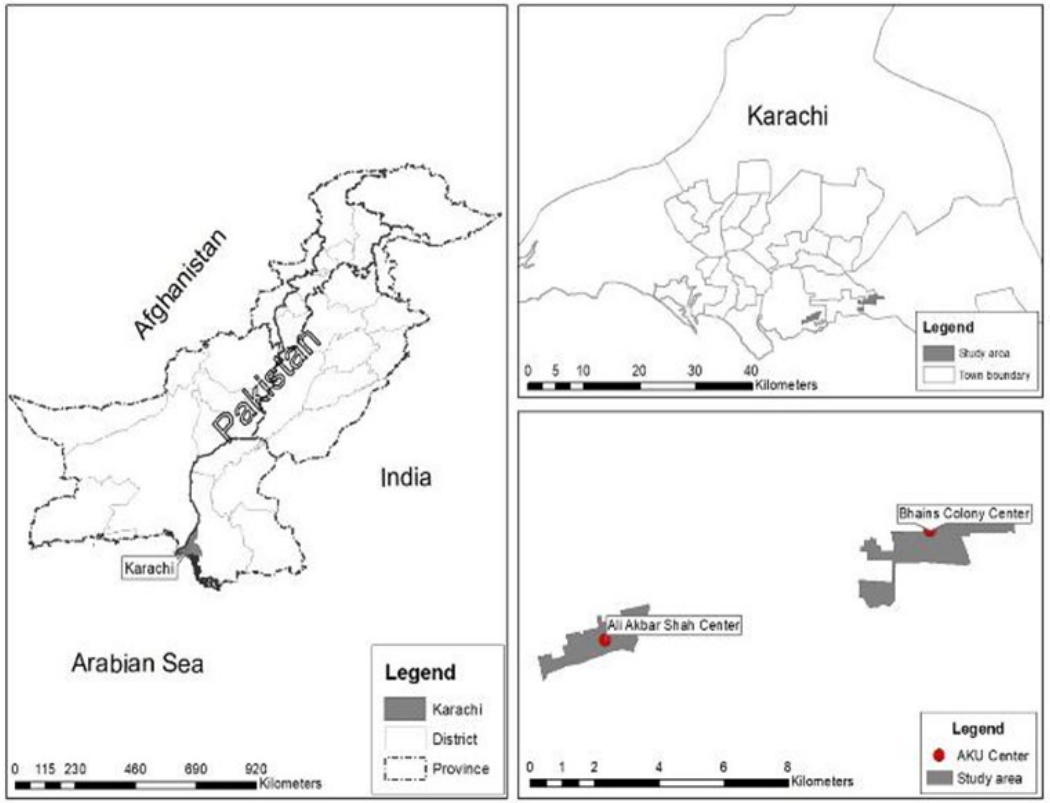
Underlying Cause of Death _____ (Final, single cause of death to be used in analysis)

Underlying Maternal Condition if any _____

Name of Verbal Autopsy Physician: _____ Code:

Signature: Date:

Study Summary



Study Type: Observational Surveillance Study

Population: Next of kin or parents of deceased all age group (25% of all fatalities)

Number of Sites: Two peri-urban low-income settlements of Karachi, Pakistan:

- Ali Akbar Shah (Site 1)
- Bhains Colony (Site 2)

Study Duration: 1-year scale up surveillance phase from Oct. 2022 – May 2023

Objectives

Step 1

To determine the all-cause mortality rates in Karachi, Pakistan

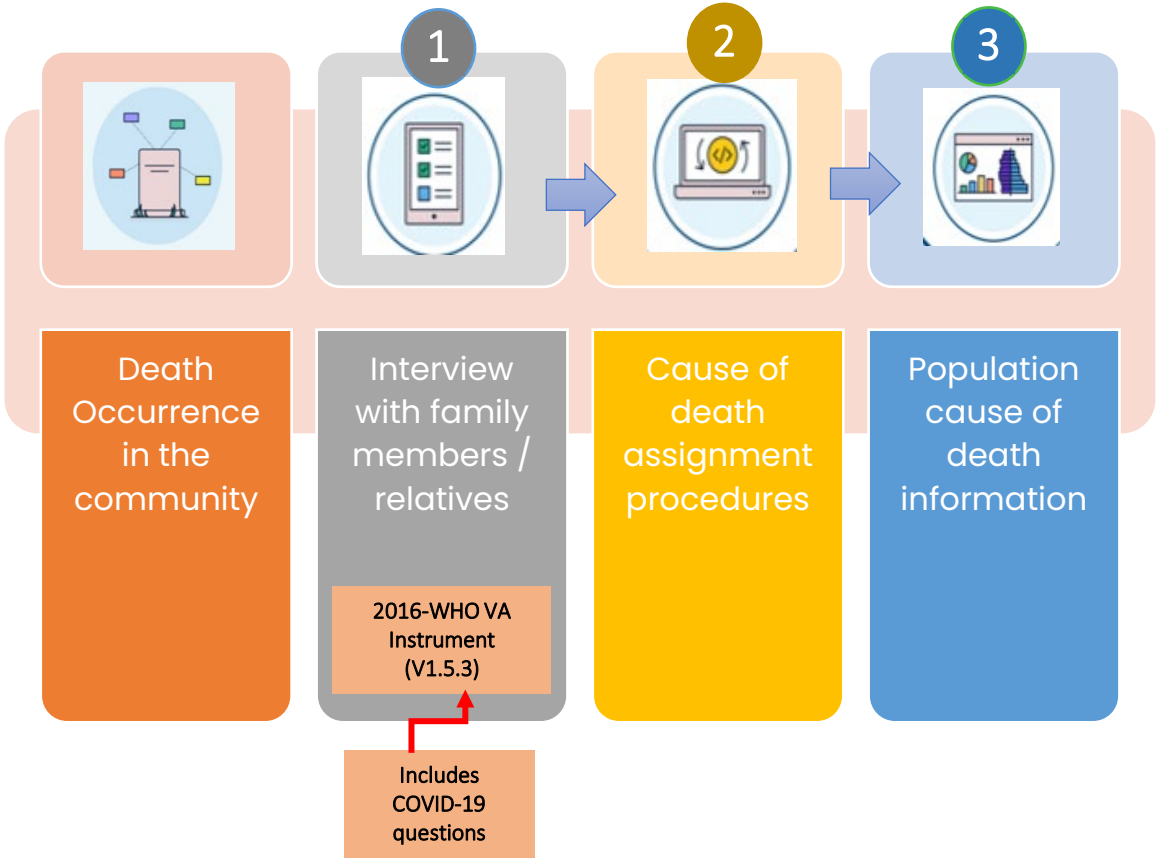
Step 2

To estimate the burden of all deaths related to COVID-19 and identify the risk factors associated with death in Karachi, Pakistan

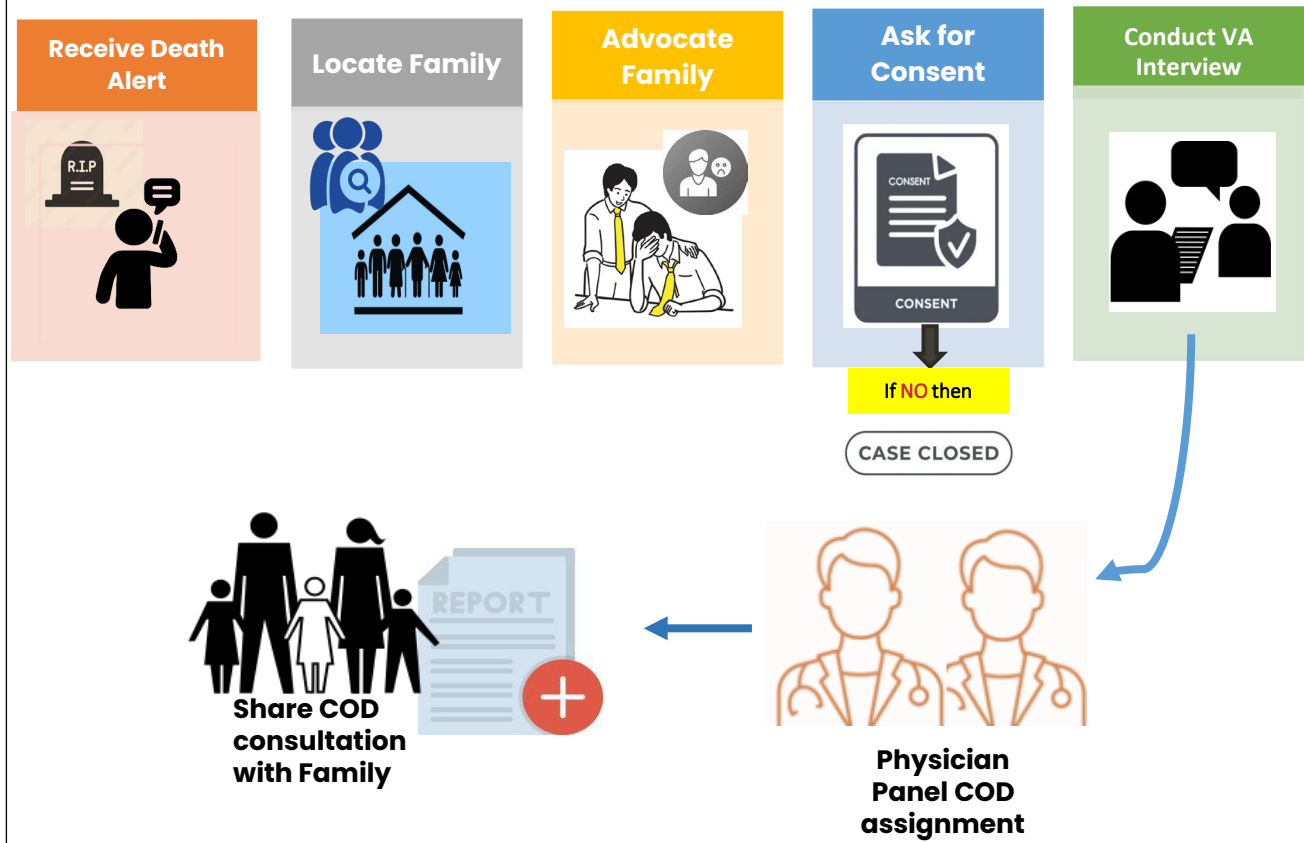
Step 3

To assess the main causes of death & the sociodemographic of affected individuals in Karachi, Pakistan

The Verbal Autopsy (VA) System: tools and process overview



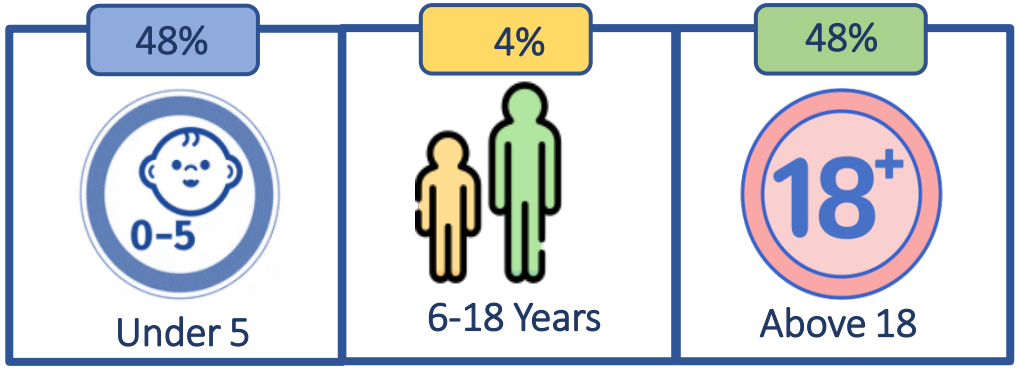
Community-based VA Surveillance



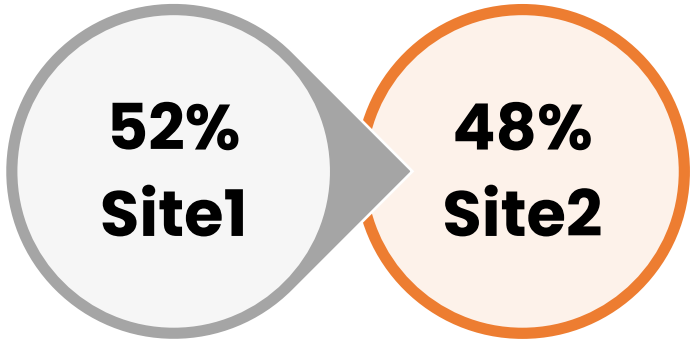
Demographic characteristics of the deceased (N=1143)

Gender

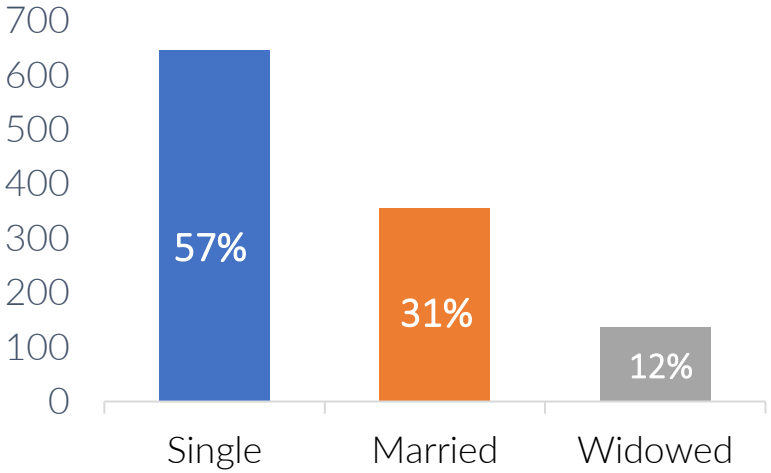
Age Group



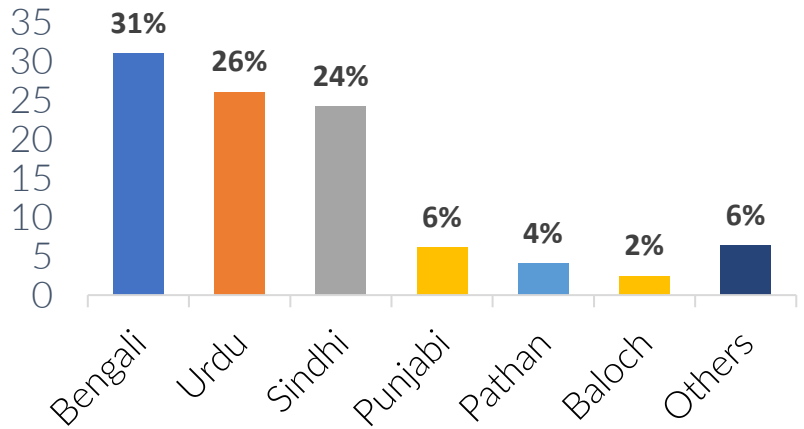
Site



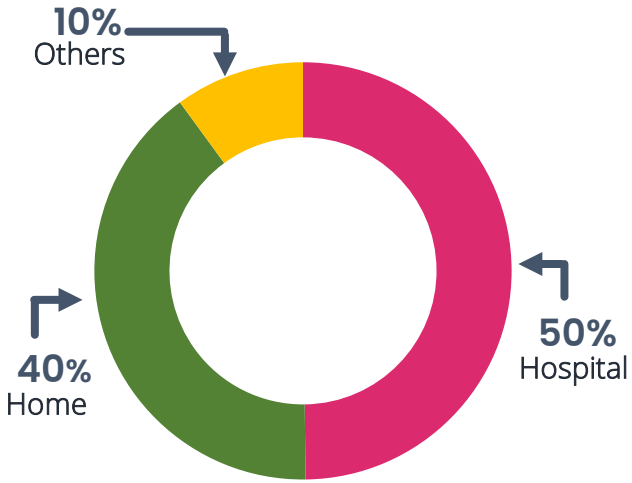
Marital Status



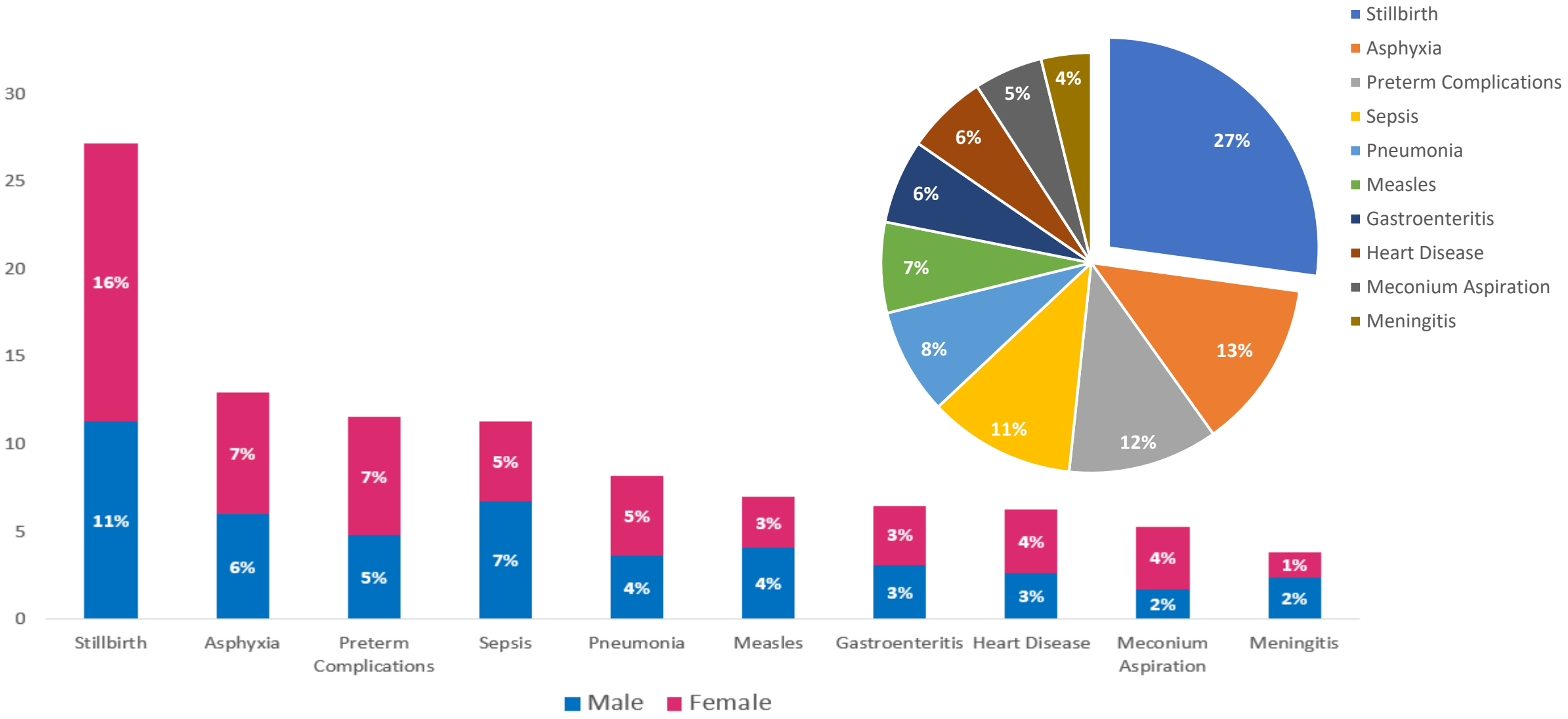
Ethnicity



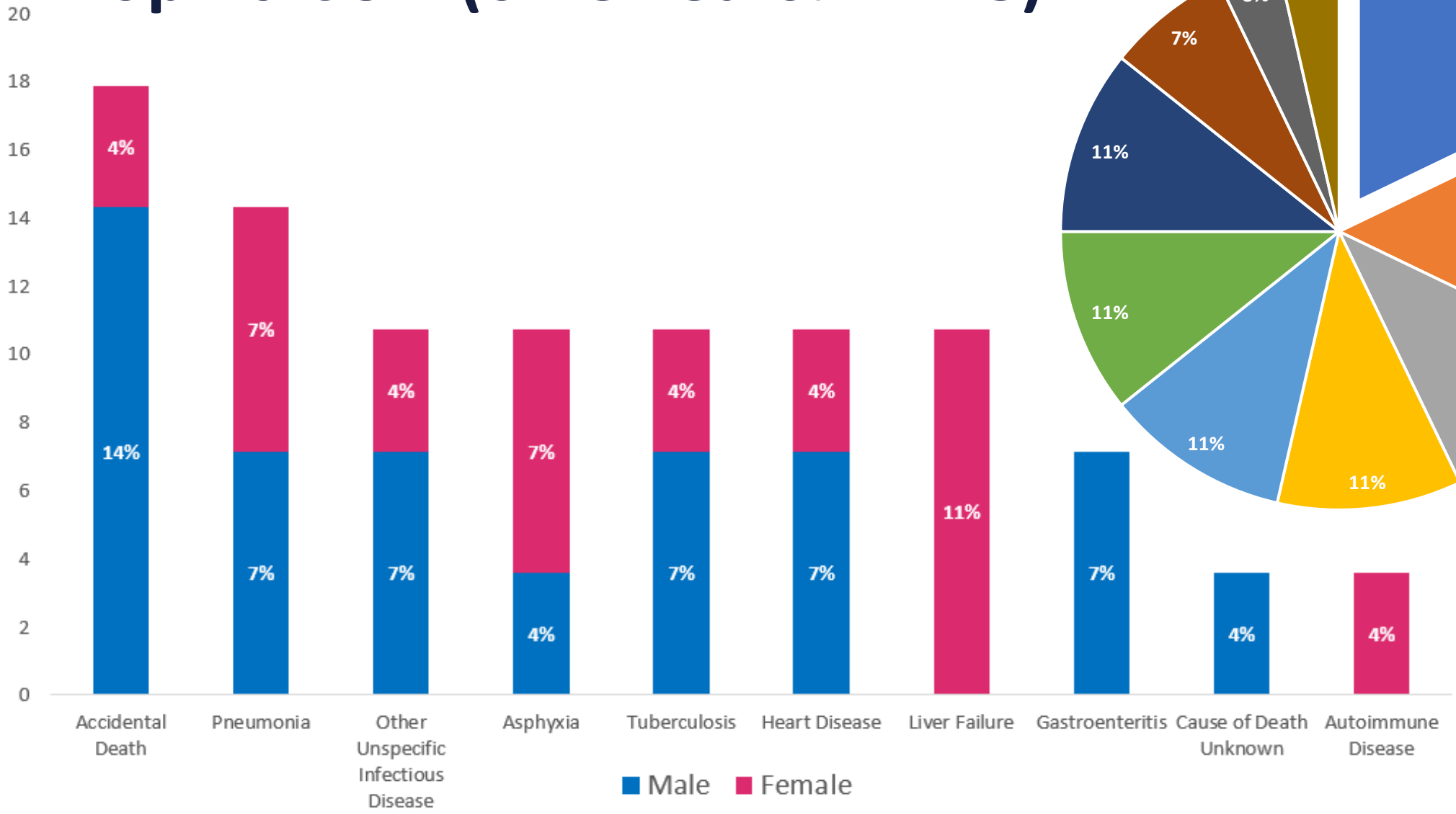
Place of Death

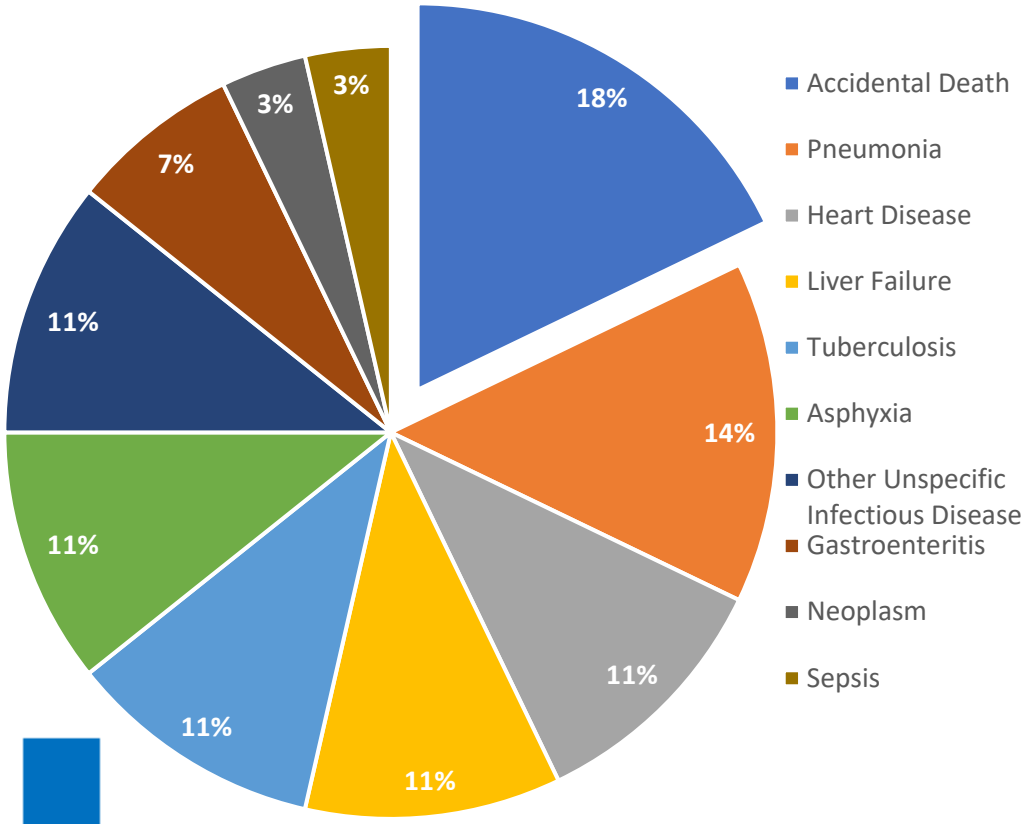


Top 10 COD (Under 5 years: n= 416)

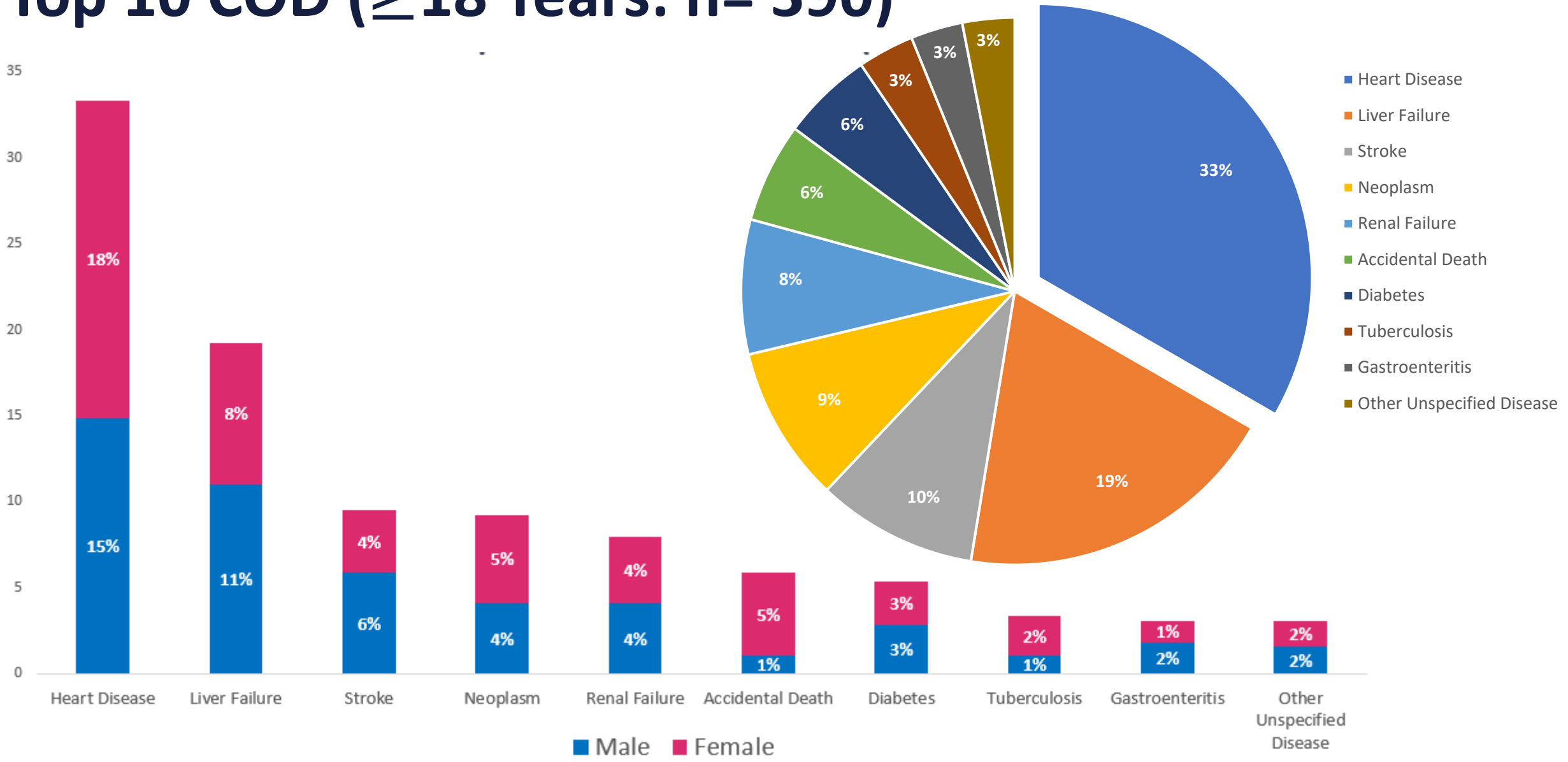


Top 10 COD (6-18 Years: n= 28)



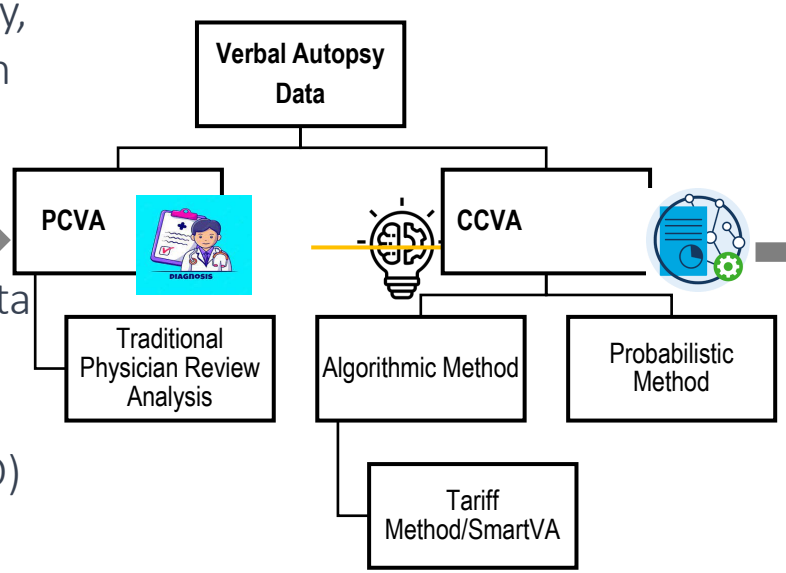


Top 10 COD (≥18 Years: n= 390)



Future Evolution (Methodology)

Traditionally, VA relies on physician analysis of verbal autopsy data to assign cause of death (COD) diagnoses.



However, with advancements in technology, computer-based algorithms have emerged as potential alternatives for automated COD assignment.

Compare the COD diagnoses assigned by the physician panel with those generated by the computer-based algorithm

Assess the agreement and disagreement rates between the two methods, using appropriate statistical measures (e.g., Cohen's kappa coefficient)

Conduct sensitivity and specificity analyses to evaluate the accuracy and reliability of each method

A study to compare the accuracy and reliability of physician analysis with a computer-based algorithm for VA COD diagnosis is planned.

Conclusion

The collaboration between physicians and automated systems can lead to more robust and accurate cause of death diagnoses, ultimately contributing to effective interventions and improved health outcomes.