



Virtual Event 15-18 June
2020
**2020 Asia-Pacific
Statistics Week**

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Measuring Maternal Mortality Using Civil Registration Data (Philippines)

Action Area B. Assuring quality and instilling trust in Statistics (SB1)

Session Title

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Background: Maternal Mortality

- About **810** women a day died in 2017 due to **maternal mortality** (WHO, 2019)
- MMR in 2017 is estimated at **211 deaths per 100,000 live births**, showing a **38% reduction** since 2000 (WHO, 2019)
- SDG Target 3.1 is to reduce global maternal mortality ratio (MMR) to **less than 70 per 100,000 live births by 2030**





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Background: Maternal Mortality in the Philippines

- There is a discrepancy in MMR estimates in 2017:
 - **World Health Organization (WHO):**
 - **121** deaths per 100,000 live births
 - **Philippine Statistics Authority (PSA):**
 - **87.3** deaths per 100,000 live births



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Background

- Challenge of PSA in CRVS MMR Estimation:
 - **underreporting** and the **misclassification of maternal deaths**
- These cause data quality problems and gravely affect the estimates PSA generates



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Objectives of the Study

- The Philippine Statistical Research and Training Institute (PSRTI) aims to help improve the reliability and accuracy of the MMR in the Philippines by:
 1. reviewing the current methodology of its computation
 2. evaluating existing methodologies for estimation enhancement
 3. providing policy guidance for the MMR calculation of the PSA



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Current MMR Estimation

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Maternal Mortality Statistics

- **Maternal mortality ratio (MMR)**
 - frequency of maternal death relative to the **number of live births**
- **Maternal mortality rate (MMRate)**
 - number of maternal deaths divided by the **number of women of reproductive age** in a population
- **Proportion Maternal (PM)**
 - proportion of maternal deaths among **all deaths of women of reproductive age**



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Maternal Mortality Data Sources

- Maternal Mortality has several data sources
 - Civil Registration System
 - Surveys, Sisterhood Method
 - Reproductive-age Mortality Studies (RAMOS)
 - Census



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Maternal Mortality Estimation in the Philippines

- In the Philippines, the large under registration rates are found among indigenous population groups due to their religious and societal traditions and beliefs
- However, civil registration practices are adaptive and respects various cultures in the Philippines



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UN Maternal Mortality Estimation Inter-Agency Group (UN MMEIG)

- There were two models used by UN MMEIG for different purposes:

1. Bayesian CRVS adjustment model

- used to account for errors in reporting of maternal death in the CRVS to obtain the CRVS adjustment factors

2. Bayesian maternal mortality estimation model (BMat Model)

- used to estimate the MMR for each country-year of interest



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Enhancement in CRVS Adjustment

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Enhancement in CRVS Adjustment for the Philippines

- The current initiative is to use the CRVS for MMR estimation
- The PSA has to address primarily the underreporting and misclassification of maternal death

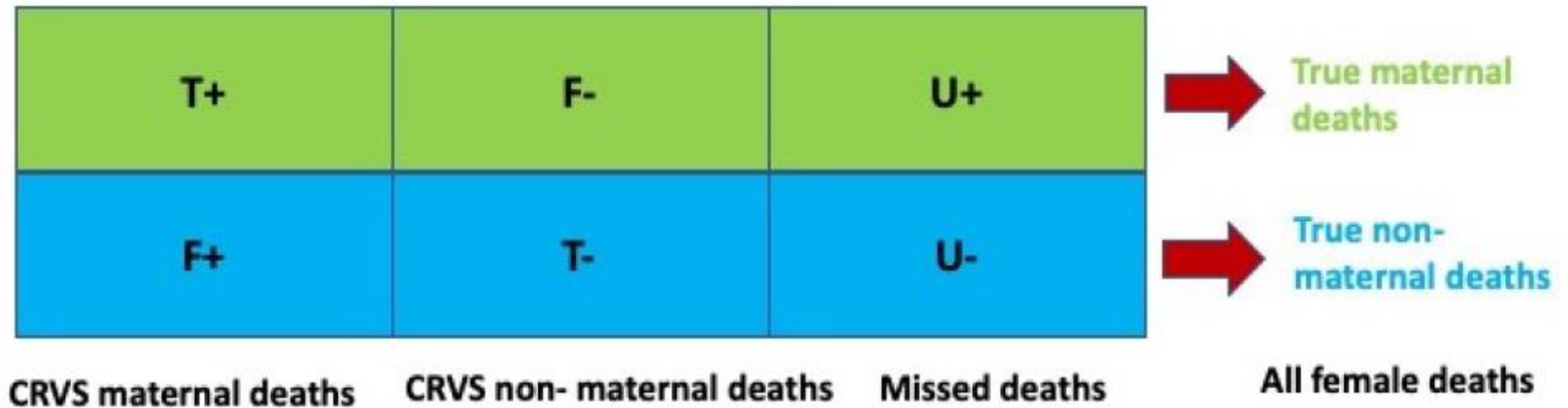


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Peterson et al. (2019) Framework

- The CRVS can be described as follows:





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Peterson et al. (2019) Distribution of CRVS Counts

- Peterson et al. (2019) assumed that the distribution of the CRVS counts is multinomial:

$$\mathbf{y}_{ct} \sim \text{Multinom} \left(y_{ct}^{(tot)}, \boldsymbol{\rho}_{ct} \right)$$

- From this specification, the authors developed a Bayesian analysis framework that uses specialized CRVS studies on misclassification and underreporting as **prior information**



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Peterson et al. (2019) CRVS Adjustment

- Peterson, et al. (2019) defined the CRVS adjustment factor ($CRVSadj_{c,t}$) based on estimates of sensitivity ($\lambda_{c,t}^{(+)}$) and specificity ($\lambda_{c,t}^{(-)}$) which varies with the true PM ($p_{c,t}^{truemat}$), as follows:

$$CRVSadj_{c,t} = \frac{p_{c,t}^{truemat}}{\lambda_{c,t}^{(+)} \cdot p_{c,t}^{(truemat)} + (1 - \lambda_{c,t}^{(-)}) \cdot (1 - p_{c,t}^{(truemat)})}$$

- For countries without specialized studies, the CRVS-adjustment factor uses the estimates of sensitivity, specificity, and true PM from the Bayesian analysis



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Challenges in Localizing the Peterson et al. (2019) Approach

- Applying the methodology for the Philippines requires specialized CRVS study on misclassification and underreporting
 - Currently, there is no study of this nature
 - Prior information is needed for regional CRVS adjustments
- The methodology can only be applied in estimating the PM
- The next challenge is to estimate the denominator of the MMR



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Discussion and Conclusion

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Discussion

- Despite the several data sources for maternal mortality, several countries face the problem of underreporting and misclassification
- For the study to be successful, a specialized study on the CRVS is needed
 - Without it, this study can only do simulations on MMR values based on the Peterson et al. (2019) results



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Discussion

- Moreover, there is also a need to enhance the estimation of the MMR's denominator
 - One option is to explore the completeness of death registration (Adair & Lopez, 2018)
 - Already being explored by PSA to address underreporting of MMR



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Conclusion

- Overall, the study explores a possible approach that can help improve the current methodology in computing the MMR
- Future studies may look into the validation of the Bayesian CRVS adjustment



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Thank you



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