

Background

- No rubella vaccine in immunization schedule in the **Democratic Republic of Congo (DRC)**
- Vaccination depends on age:
- Youth \rightarrow mild infection
- Pregnant Women \rightarrow infection leads to **Congenital** Rubella Syndrome (CRS) with severe birth defects
- Low vaccine coverage may increase age of infection, escalating rubella incidence among pregnant women \rightarrow increase in CRS cases
- WHO recommends 80% measles vaccination coverage before introducing rubella vaccine



Prior Research

Cheng et al. 2021 investigates whether introducing rubella vaccine into the DRC is likely to increase the disease burden of congenital rubella syndrome



Problem Statement

- Explore assumptions and understand how they impact model predictions
- Changing demographics (according to UN estimates of an aging population), changes in rubella infectivity (basic reproductive number R_0), changes in routine immunization rates (RI), varying exogenous case importation rate

Exploring Model Assumptions of Rubella Vaccine Introduction in the Democratic Republic of Congo Fan Liu, Helen Gu, Xiaoying Shi, Kurt Frey Contact: fliu6@stanford.edu



immunization due to fewer susceptible people





- At higher R_0 , the CRS burden has a rebound
- CRS burden at 60% routine immunization is worse than at 0% routine immunization



Results

3. Varying the Importation Rate (RI)

Prolonged negative shocks \rightarrow sharp increase in CRS



10x importation rate \rightarrow more outbreaks, less variance



Conclusions

- **Dynamic population pyramid:** aging population results in **lower CRS burden in the long run** at 60% RI
- **R0 is important:** as R_0 increases, the benefits of incomplete vaccination are less compelling
- Negative RI shocks can lead to sharp increase in **CRS** burden
- **RI** doesn't seem to impact the overall trajectory of CRS burden but results in less volatility/uncertainty in estimates

Acknowledgements

Thank you to Kurt Frey at the Bill & Melinda Gates Foundation for his mentorship and to the CME 217 team for their assistance.

