



Maternal nutrition and birth outcomes in Efate, Vanuatu: A preliminary cross-sectional analysis

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Background

- Folate (**folic acid**) is a vitamin, essential for the development of a baby's brain and spine in the early stages of pregnancy.
- Dietary folate (folic acid) **reduces risk** of congenital anomalies, including **neural tube defects** (NTDs) and associated **stillbirths** by **up to 90%**.
- Local folate-rich foods include **Aelan cabbage**, Fiji cabbage and eggs, however, crop growth is often impacted by severe weather events such as **cyclones**.
- Neighbouring Pacific nations (Fiji, Solomon Islands, PNG) **fortify grain products** to ensure sufficient maternal folate intake for healthy fetal development.
- In Vanuatu, staple grains are not fortified and **intake of folate in Ni-Vanuatu women is unknown**.

The MaMi Project

Researching maternal **(Ma)** micronutrient **(Mi)** deficiencies and associated maternal and child health impacts amongst Ni-Vanuatu peoples.

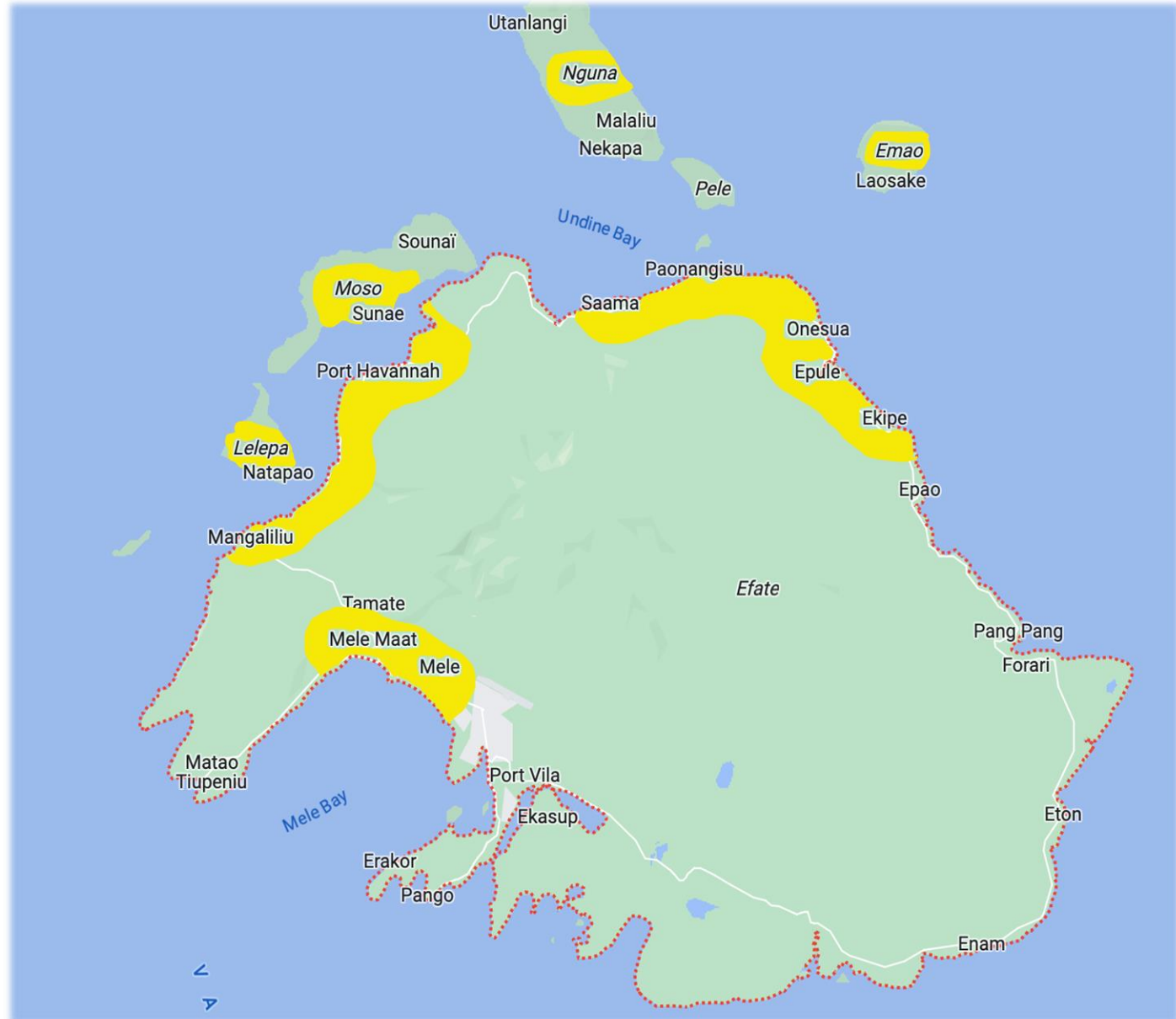
The cross-sectional analysis aims to:

- Identify rates of stillbirth, miscarriage and neural tube defects
- Measure folate-rich food consumption
- Determine the need for folic acid fortification in Vanuatu



Survey Methodology

- **470 women** (18-85 years of age) interviewed across Efate
- Survey areas:
 - Urban/Peri-urban (Mele, Melemat)
 - North Efate (Havannah Harbour – Paunangisu)
 - North East Efate (Takara, Epule, Ekipe)
 - Efate Northern Islands (Leilepa, Mosso, Nguna)



Participant demographics: Age distribution

Study sample



Female population in Vanuatu (SPC, 2023)

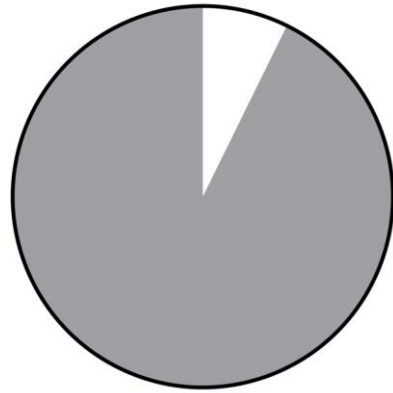


Age group

- Representative of Ni-Vanuatu population
- Majority of participants were **women of reproductive age** (18-49 yrs).
- 55.7% of women interviewed were in their 20s and 30s.

Participant demographics: Nulliparous vs parous women

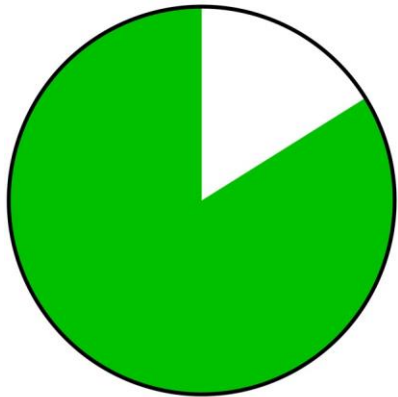
Mele



10 Nulliparous
127 Parous

Total = 137

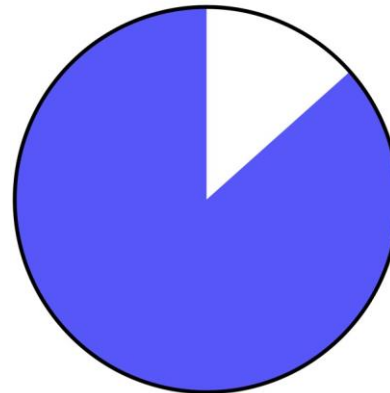
North East Efate



20 Nulliparous
104 Parous

Total = 124

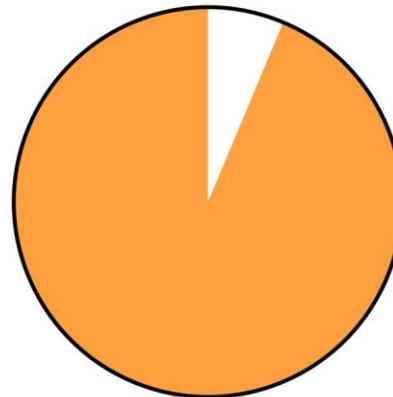
Efate Islands



9 Nulliparous
58 Parous

Total = 67

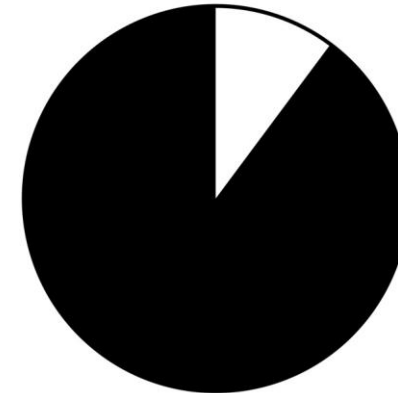
North Efate



9 Nulliparous
133 Parous

Total = 142

Efate (all)



48 Nulliparous
422 Parous

Total = 470

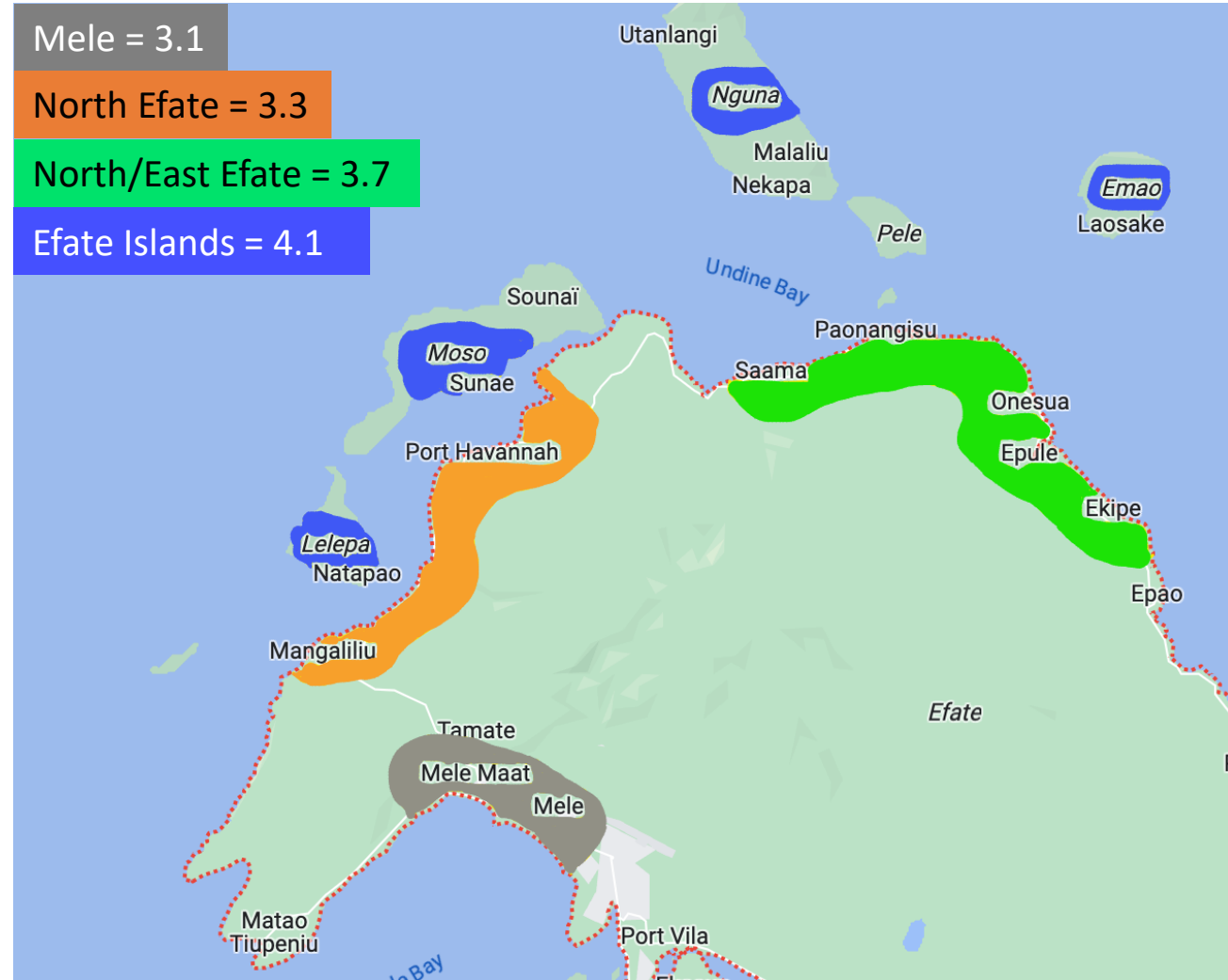
Results: Birth rate by location

Birth rate is the number of children born per woman.

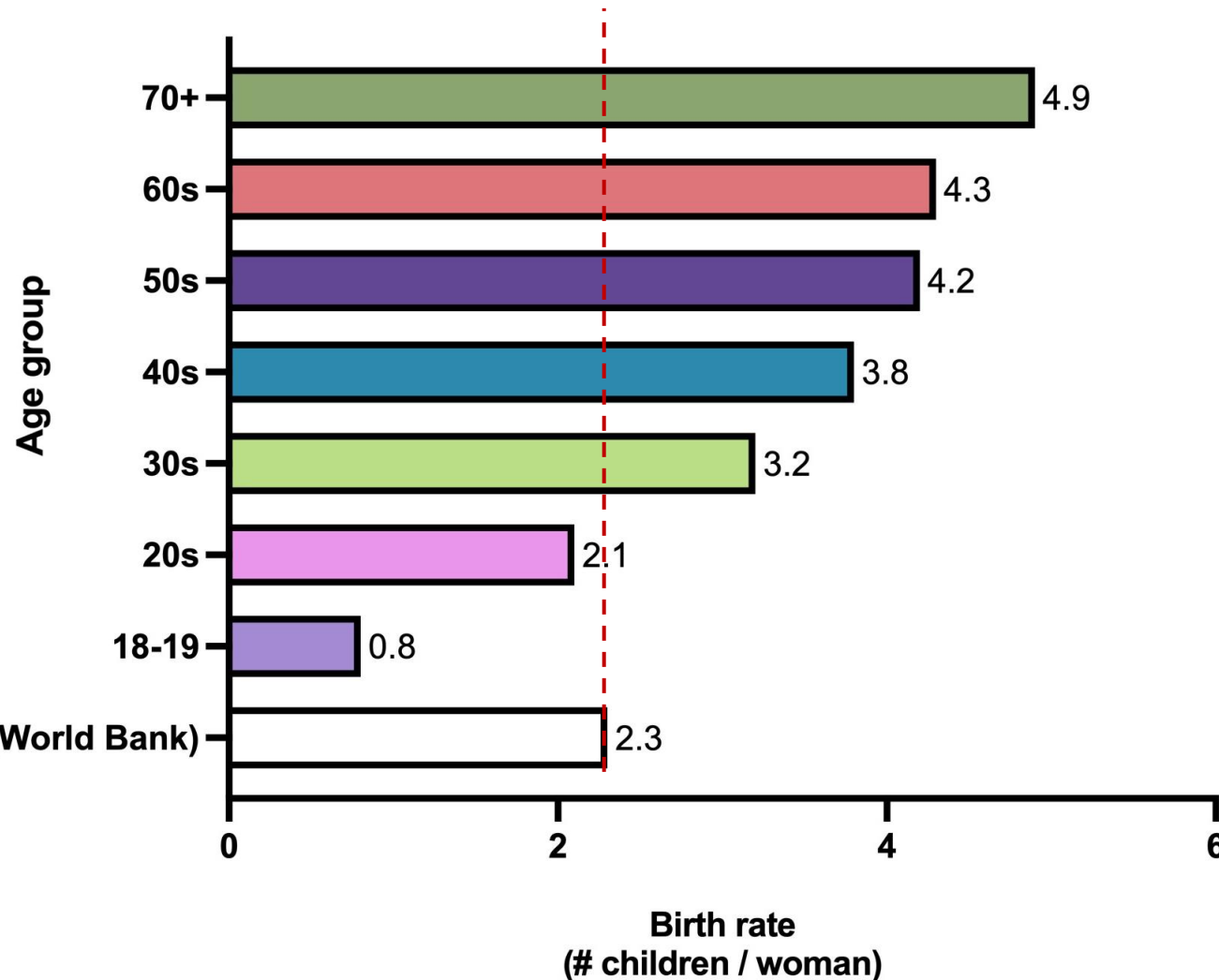
Global average (World Bank) = 2.3



Average # of babies per woman on **Efate** = 3.4

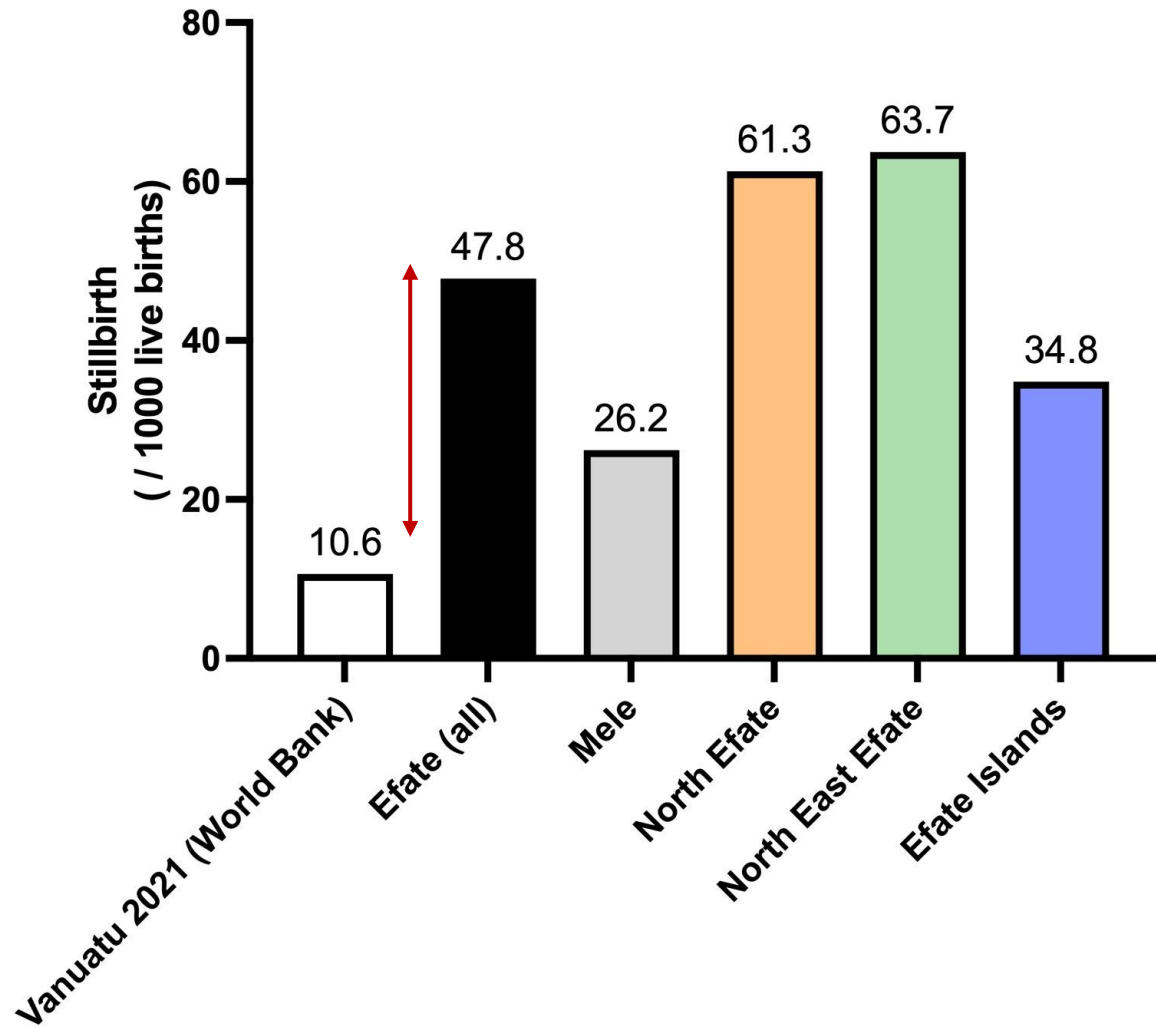


Results: Birth rate by age



Steady decline in birth rate observed in each age group.

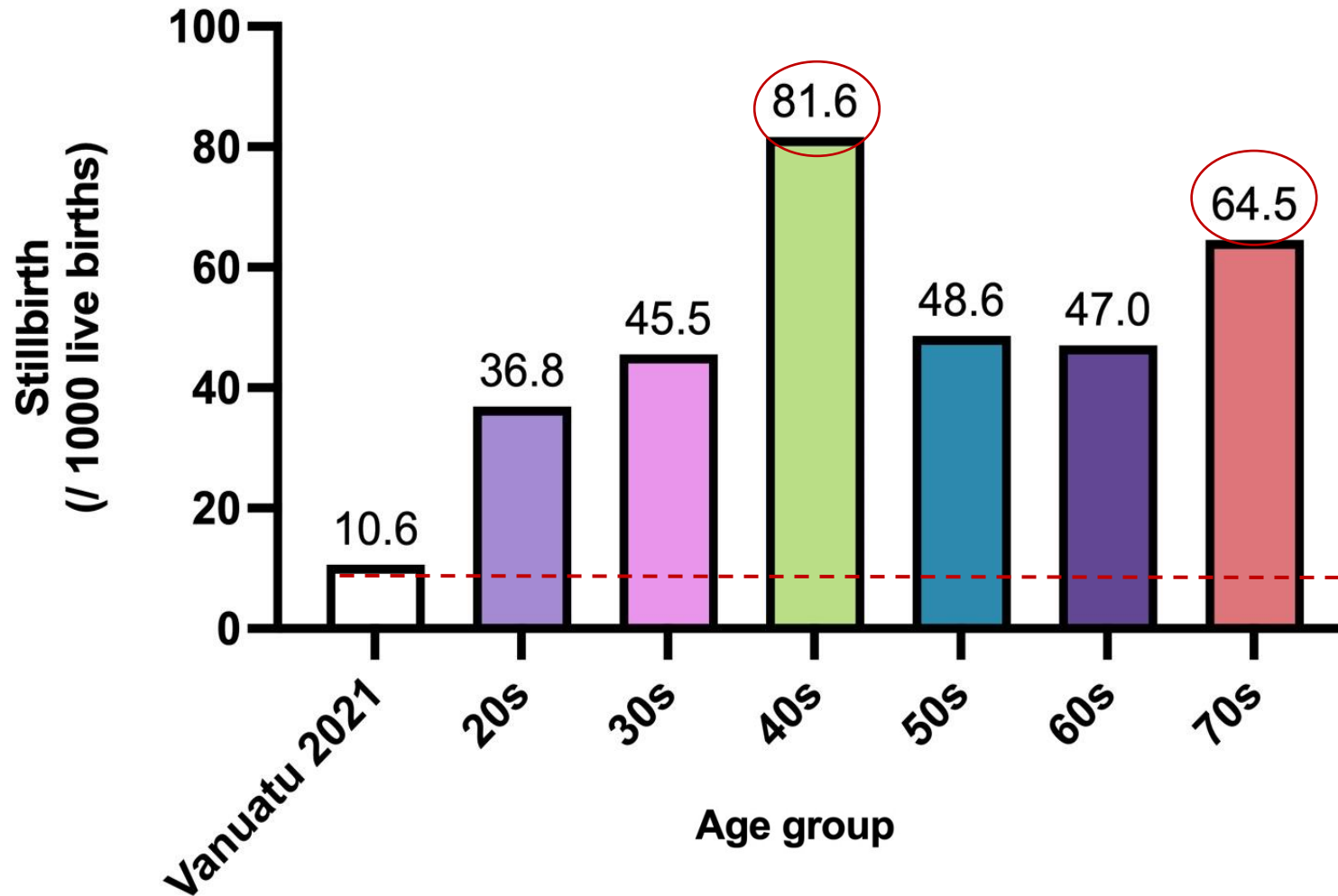
Results: Self-reported stillbirth rate



Stillbirth defined as fetal death in utero > 20 weeks of gestation (5 months).

Observed average stillbirth rate (47.8 per 1,000 live births) **more than 4x higher** than reported values for Vanuatu.

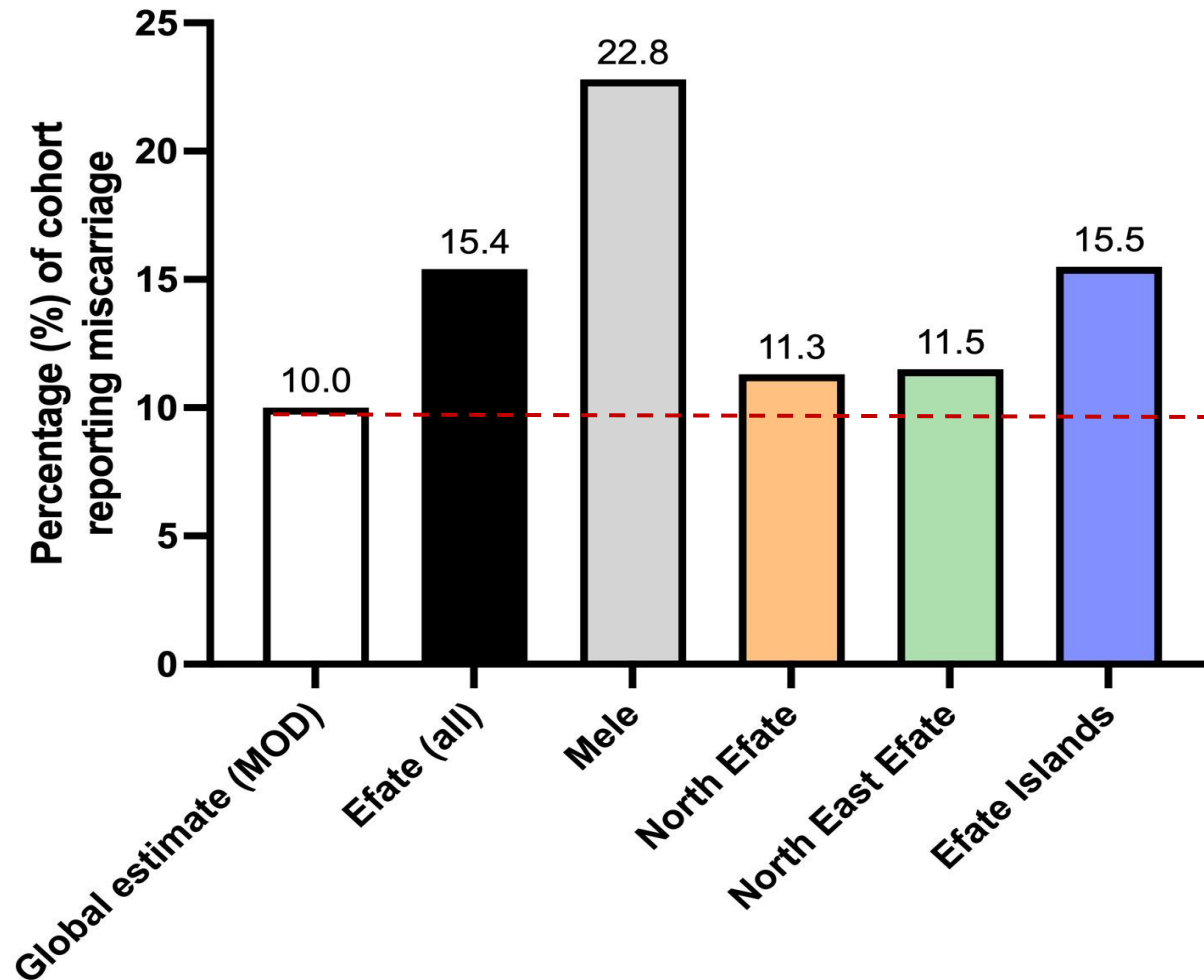
Results: Self-reported stillbirth rate by age



Stillbirth rates across all age-groups **higher** than reported national rate.

Self-reported stillbirth rate highest amongst women aged in their 40s and 70s.

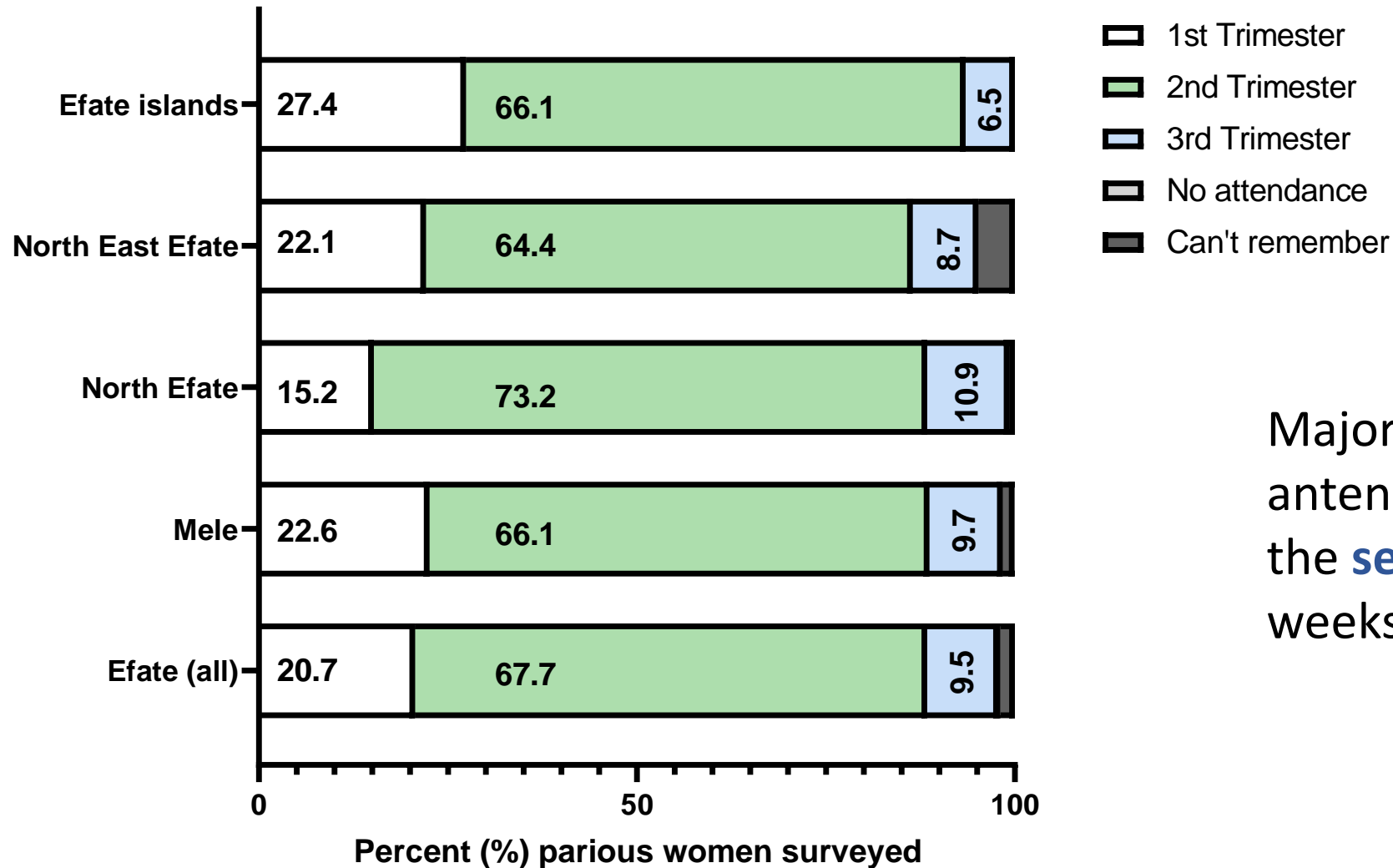
Results: Self-reported miscarriage rate



Miscarriage defined as fetal death in utero < 20 weeks of gestation (5 months).

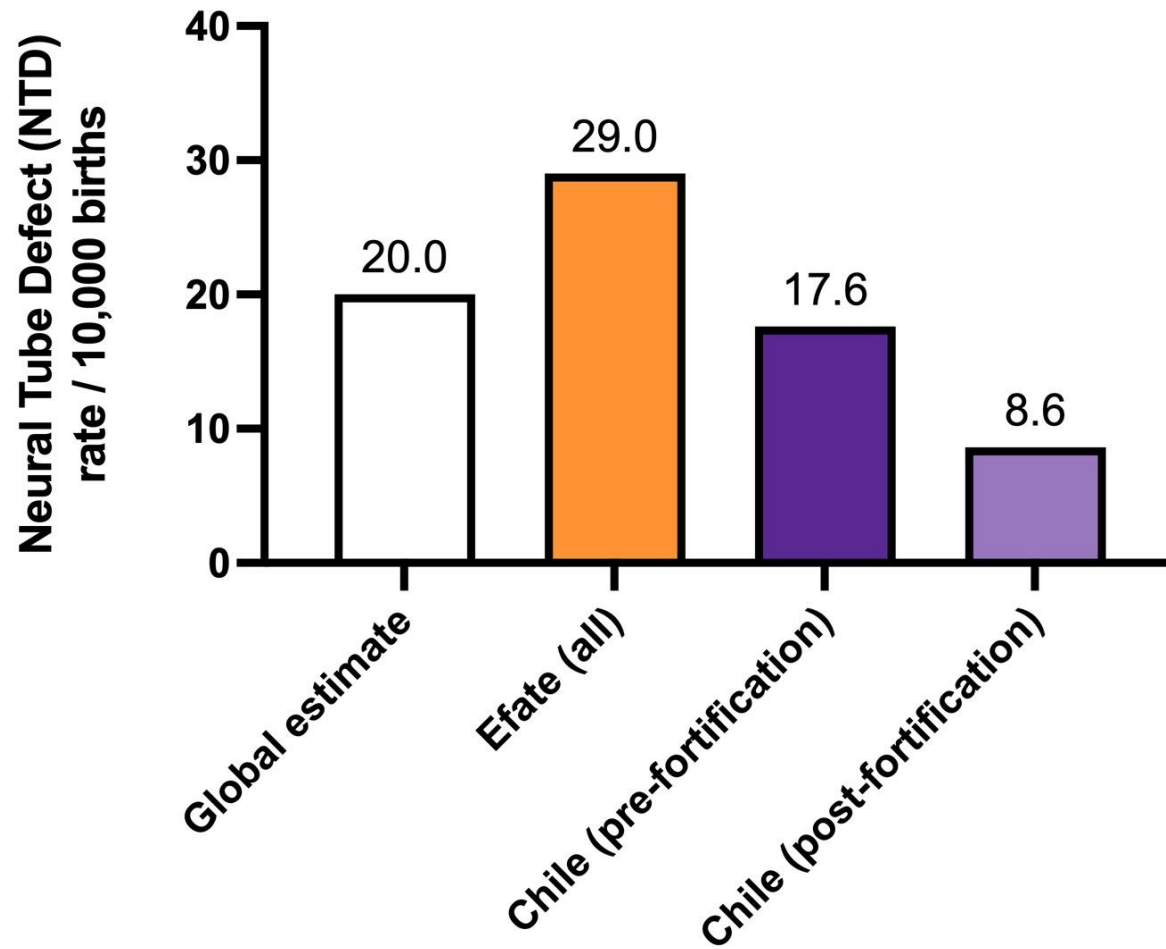
Potential **under-estimation**: Women may not be reporting a miscarriage if it is before their first visit to antenatal care (when they *confirm* they are pregnant).

Results: Antenatal care - self reported attendance



Majority of women attend antenatal care for the first time in the **second trimester** (>12 weeks).

Results: Self-reported neural tube defects (NTDs)

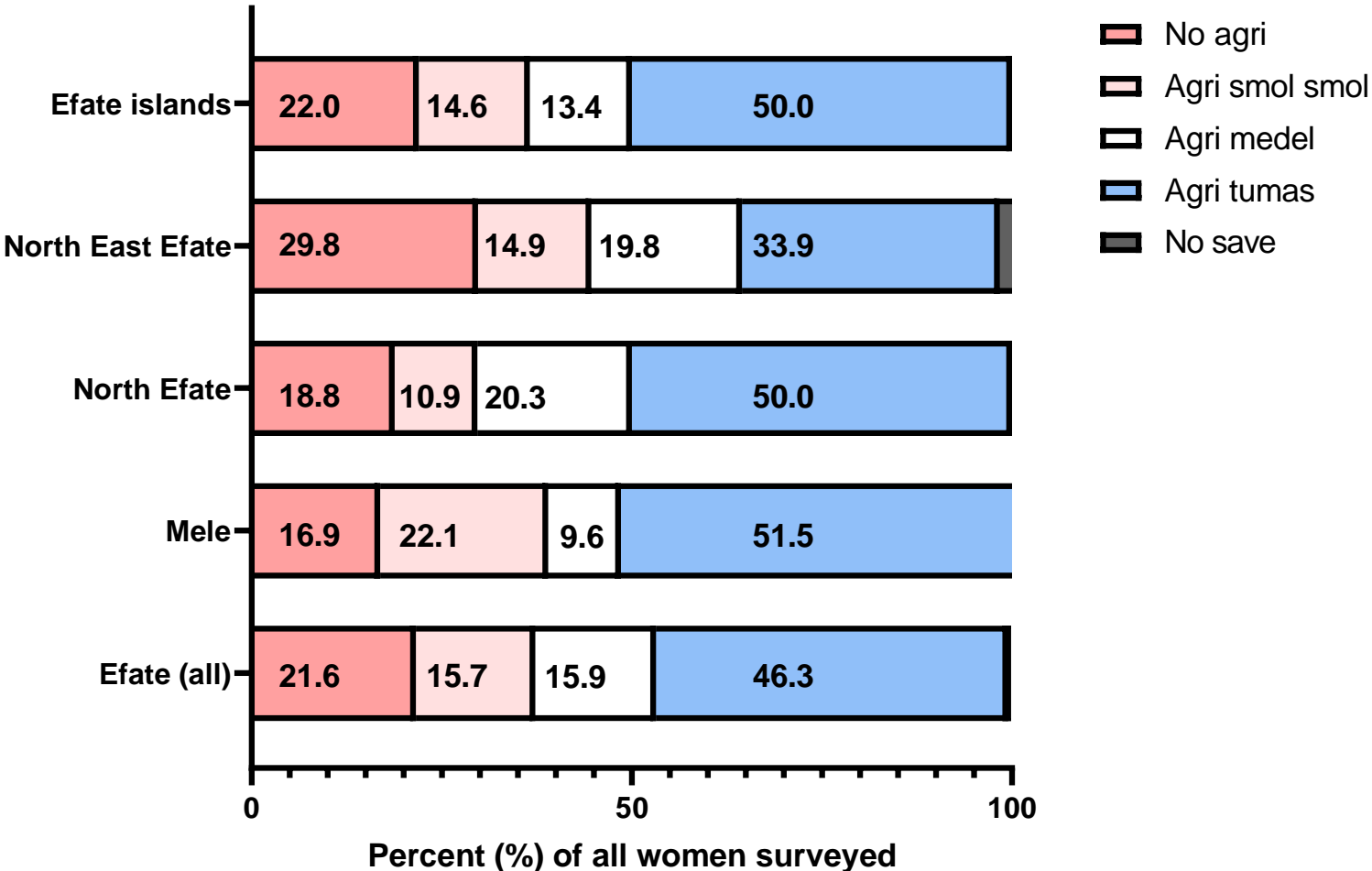


Vanuatu's rate of **neural tube defects** (29 per 10,000 live births) is higher than global average.

Chile case-study demonstrates the efficacy of mandatory fortification, **51% reduction** in neural tube defects.

Results: Health literacy

“Maternal diet (food and drink) can contribute to poor birth outcomes (miscarriage / stillbirth / congenital anomalies)”



Health literacy in relation to maternal nutrition and fetal outcomes varies across the population.

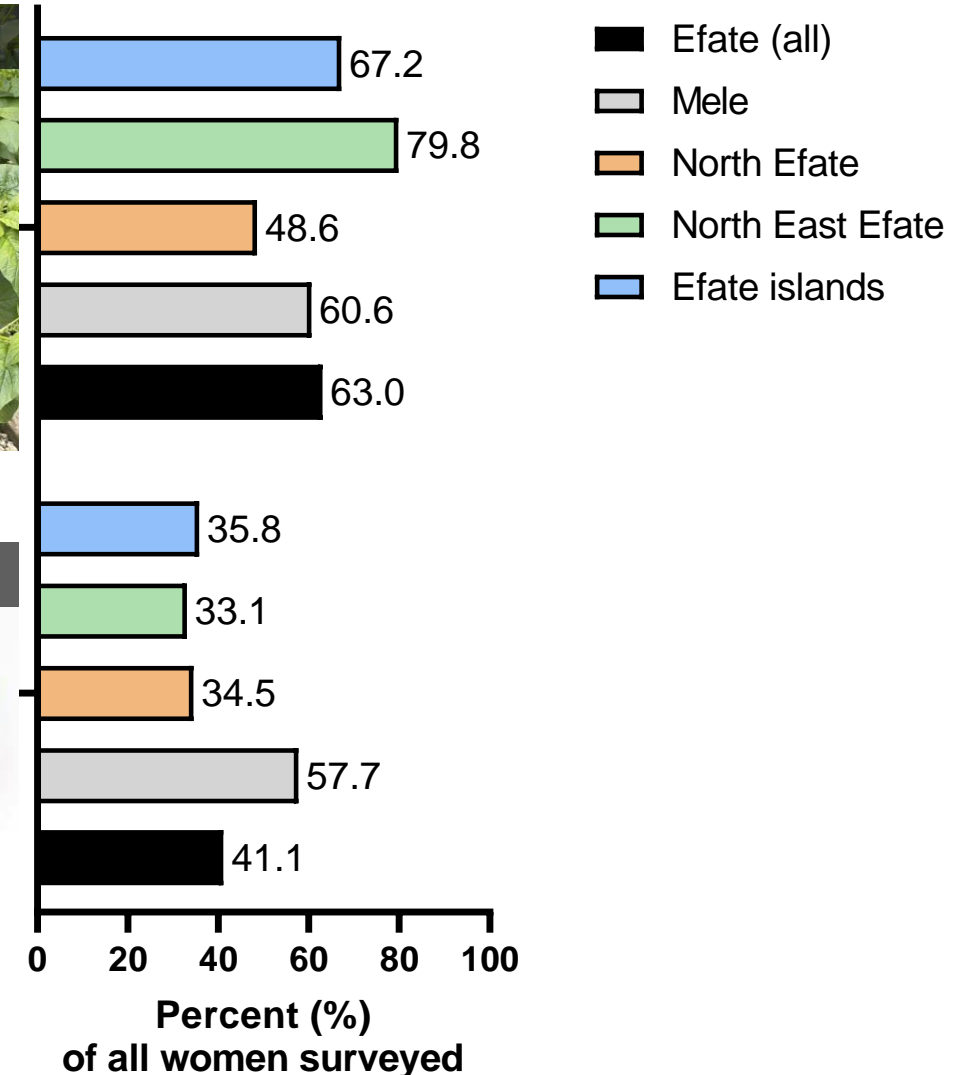
On average, **50% of women** surveyed **agreed** with attitudes statement.

The exception was **NE Efate (34% agri)**.

Results: Availability of folate-rich foods

A significant proportion of women were **unable to access aelan cabbage** or **eggs** daily.

Destruction of household gardens from cyclones in Feb/March additional barrier to accessing fresh island kakae.

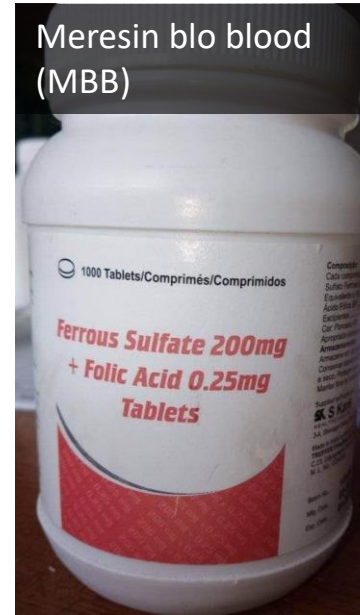


Folic acid in 'Meresin Blo Blood'

WHO recommended women consume **600 ug** of folic acid daily before pre-conception and across all of gestation.

Our study shows that in Vanuatu:

- Antenatal supplements contain **250 ug** of folic acid
- Women surveyed typically dosed with one tablet / day
- Most women only dose from their second trimester



In order to consume the required amount of folic acid, Ni-Vanuatu women would need to consume daily:

- 1x meresin blo blood tablet **AND 2 full cups (0.4 kg) cooked aelan cabbage**
- 1x meresin blo blood tablet **AND 18 eggs**

Summary of findings

- Ni-Vanuatu women experience rates of **stillbirth**, **miscarriage** and **neural tube defects (NTDs)** **above global average**.
- **Health literacy** on maternal nutrition varies, many women believe maternal nutrition does *not* cause adverse birthing outcomes.
- Dietary **folate intake** may not be enough to prevent NTDs.
- Folic acid **fortification** could enable women to have sufficient folate intake pre-pregnancy and in the early stages of pregnancy to prevent NTDs.



Researchers interviewing women at Paunangisu

Future work

- Today presented **snapshot** of data collected
- Dietician to analyse **24-hour Recall** and Food Frequency Questionnaire (**FFQ**) responses
 - Determine macro and micronutrient intakes
 - Generate diet diversity scores
- Future work seeks to validate and extend findings by continuing to work with MoH and VCH collaborators

Acknowledgements



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All the women who gave us their time and participated in our surveys.

**Potential questions – DELETE this slide before presenting

Question: (Slide 10) Why do we see the spikes in stillbirths?

Answer: Potentially linked to cyclones – women in their 40s would have been in their 30s at the time of Cyclone Pam.