Macro Determinants of Mortality in Papua New Guinea

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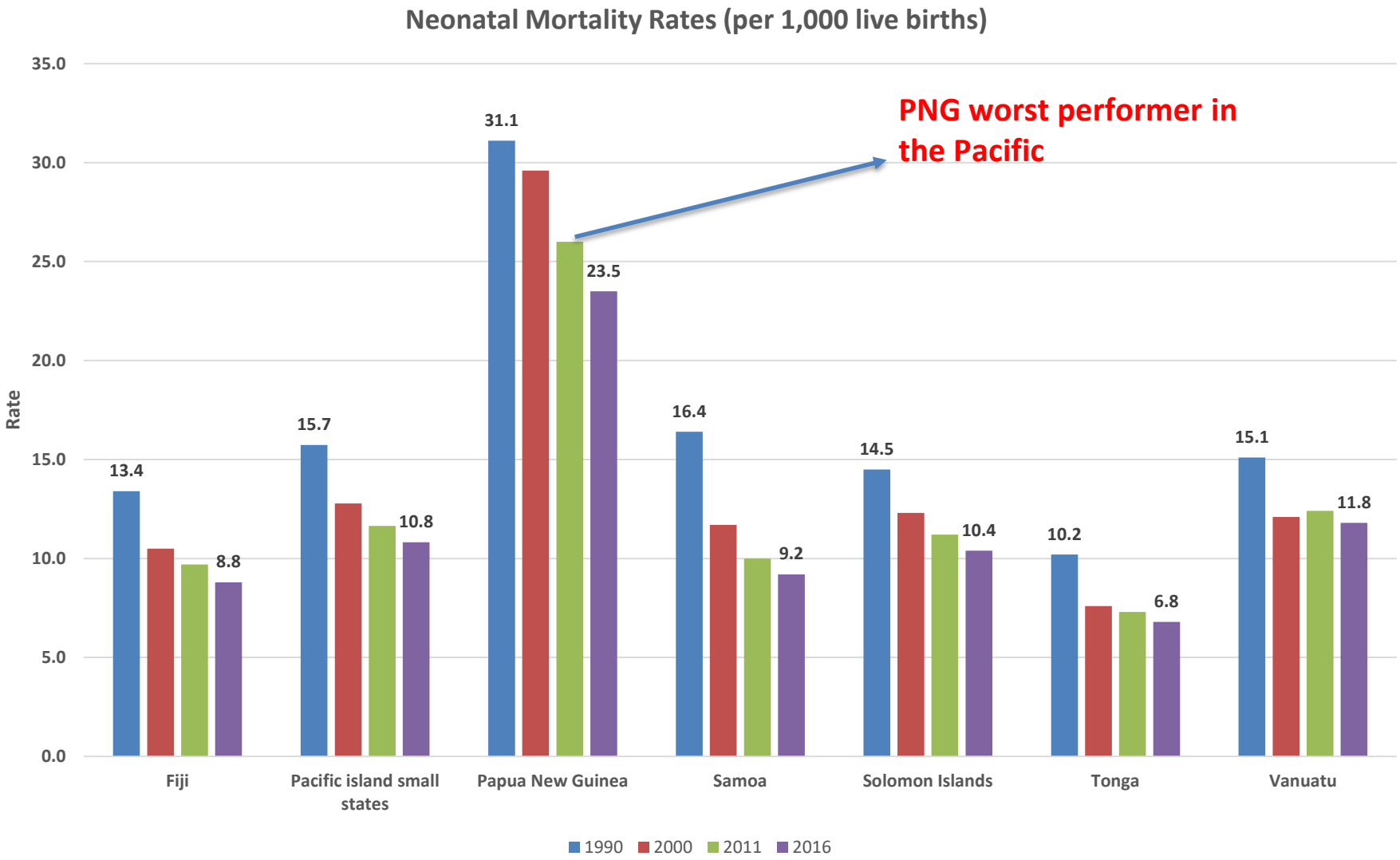
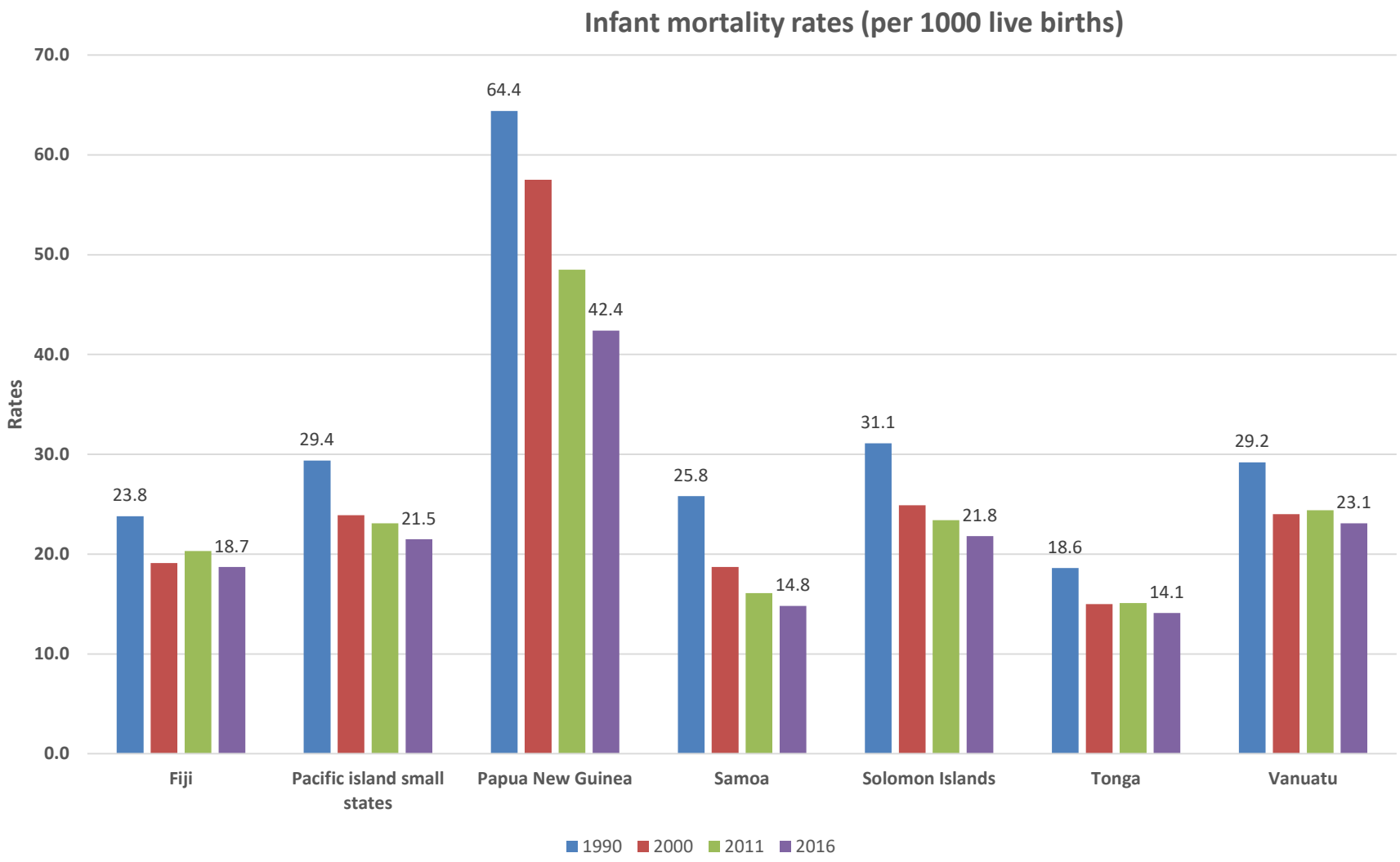
Presentation Scheme

- Trends in Mortality Indicators
- Cause specific Mortalities
- Data and Model
- Econometric Results
- Conclusions
- Limitations

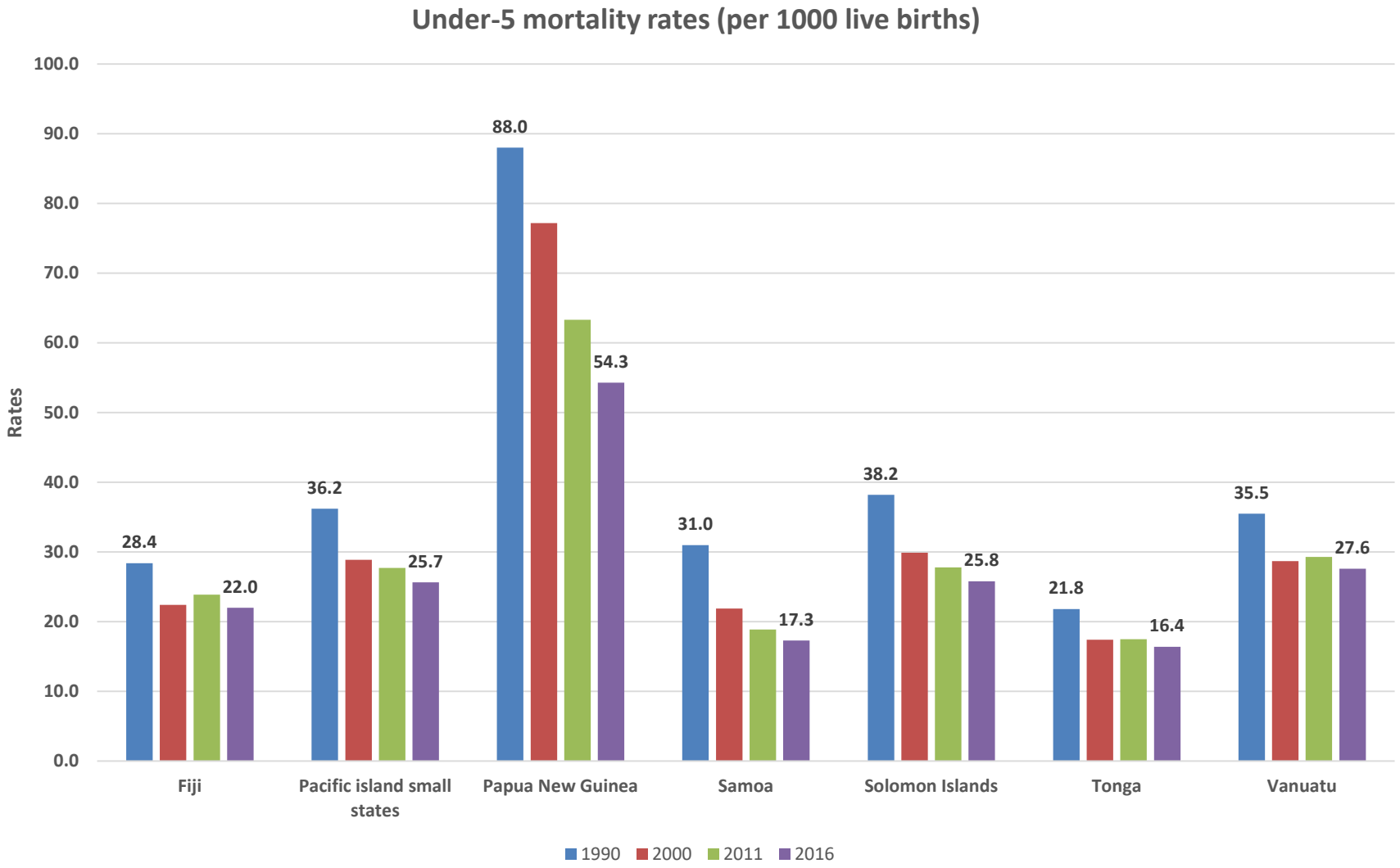
Neonatal Mortality Rates : 1990-2016



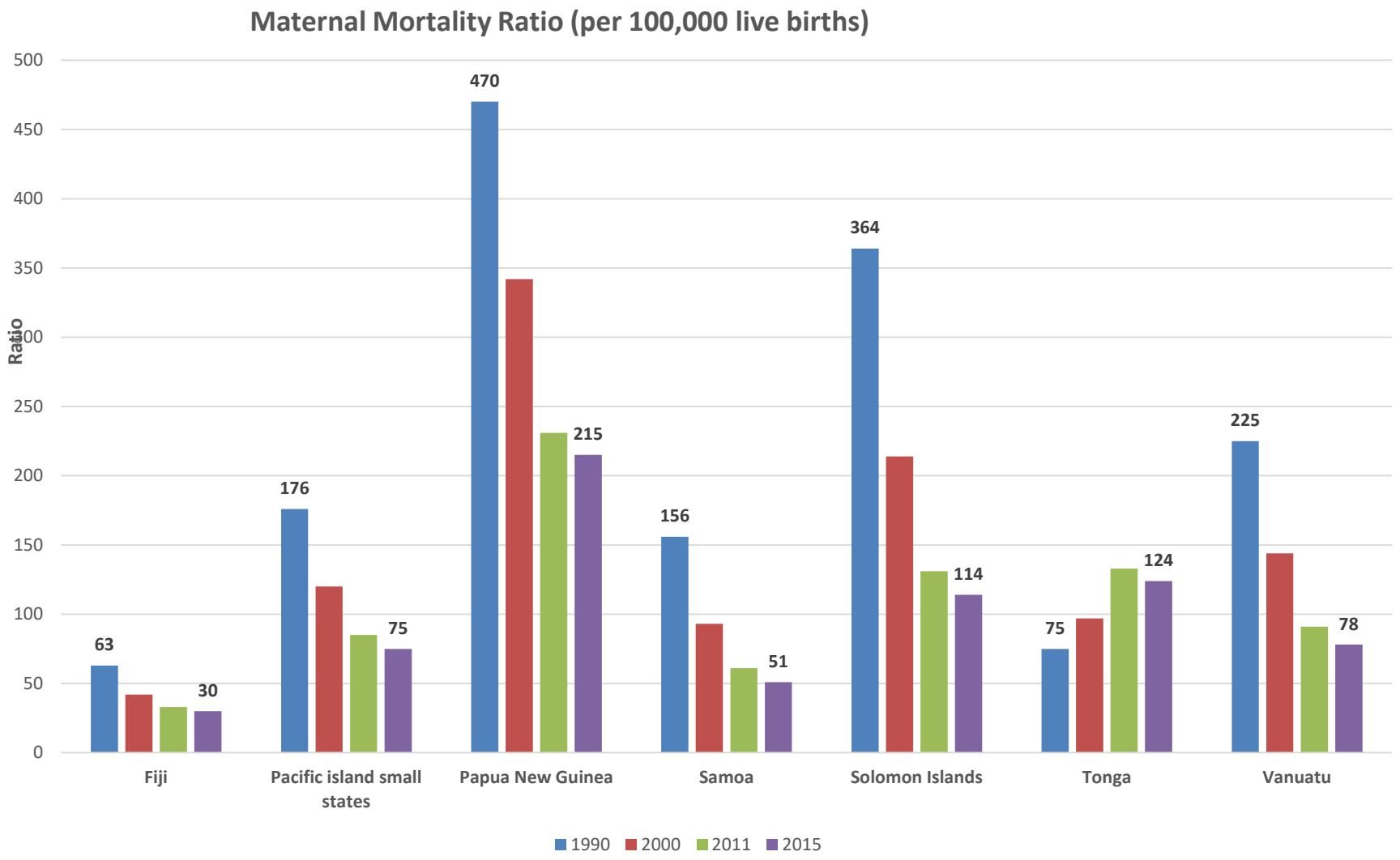
Infant Mortality Rates: 1990-2016



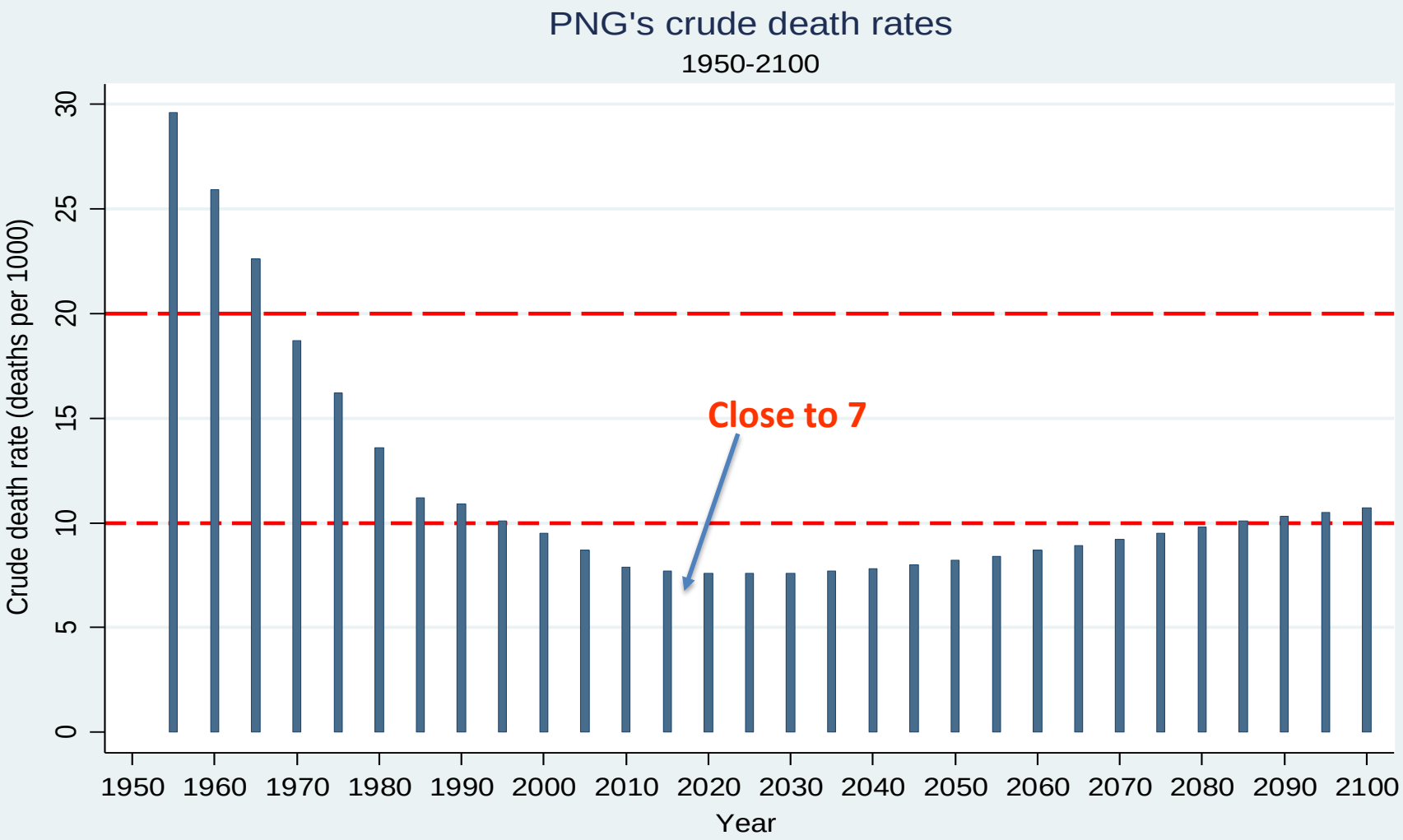
Under-5 Child Mortality Rates : 1990-2016



Maternal Mortality Ratios : 1990-2015

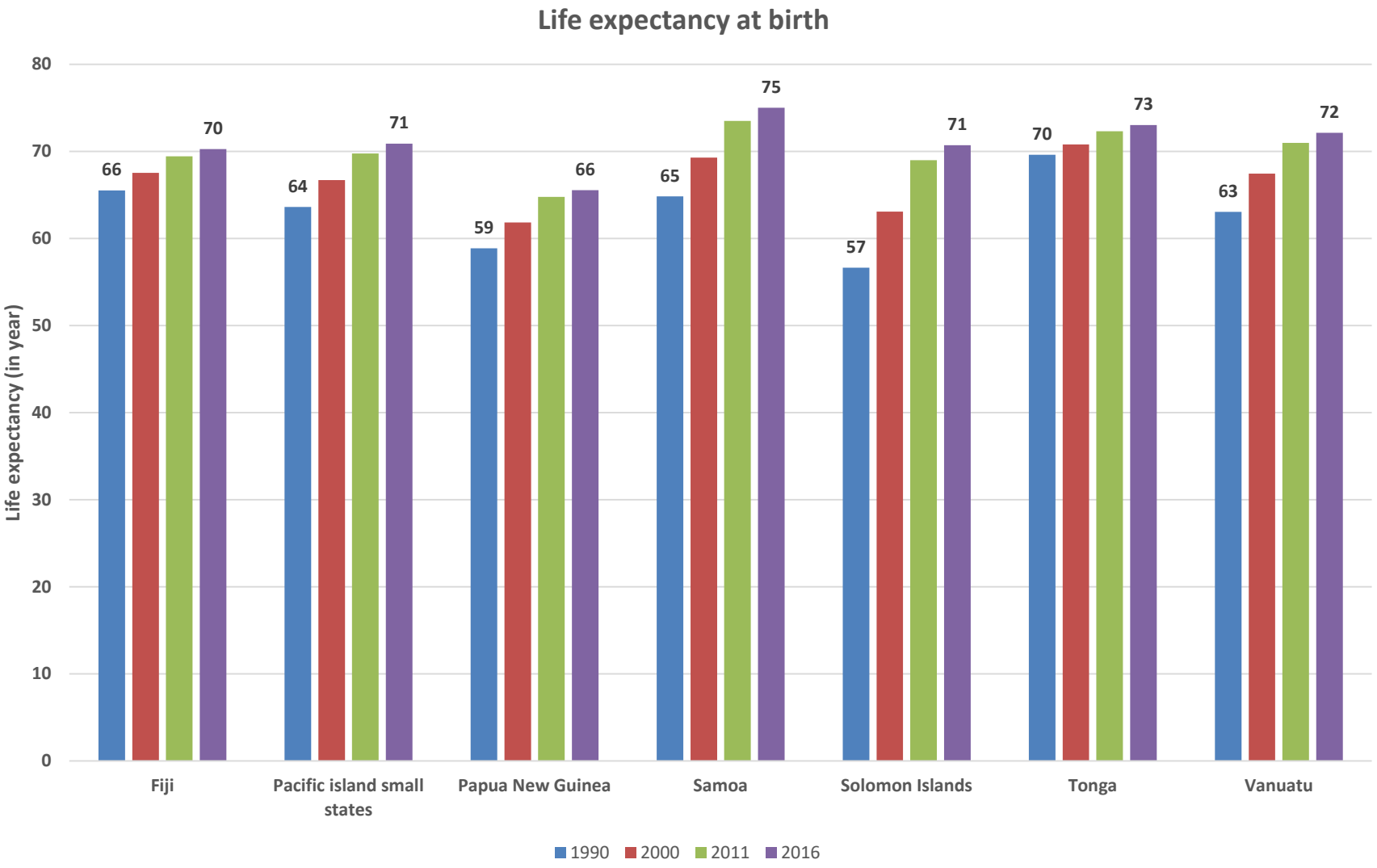


Crude death Rates: 1950-2100

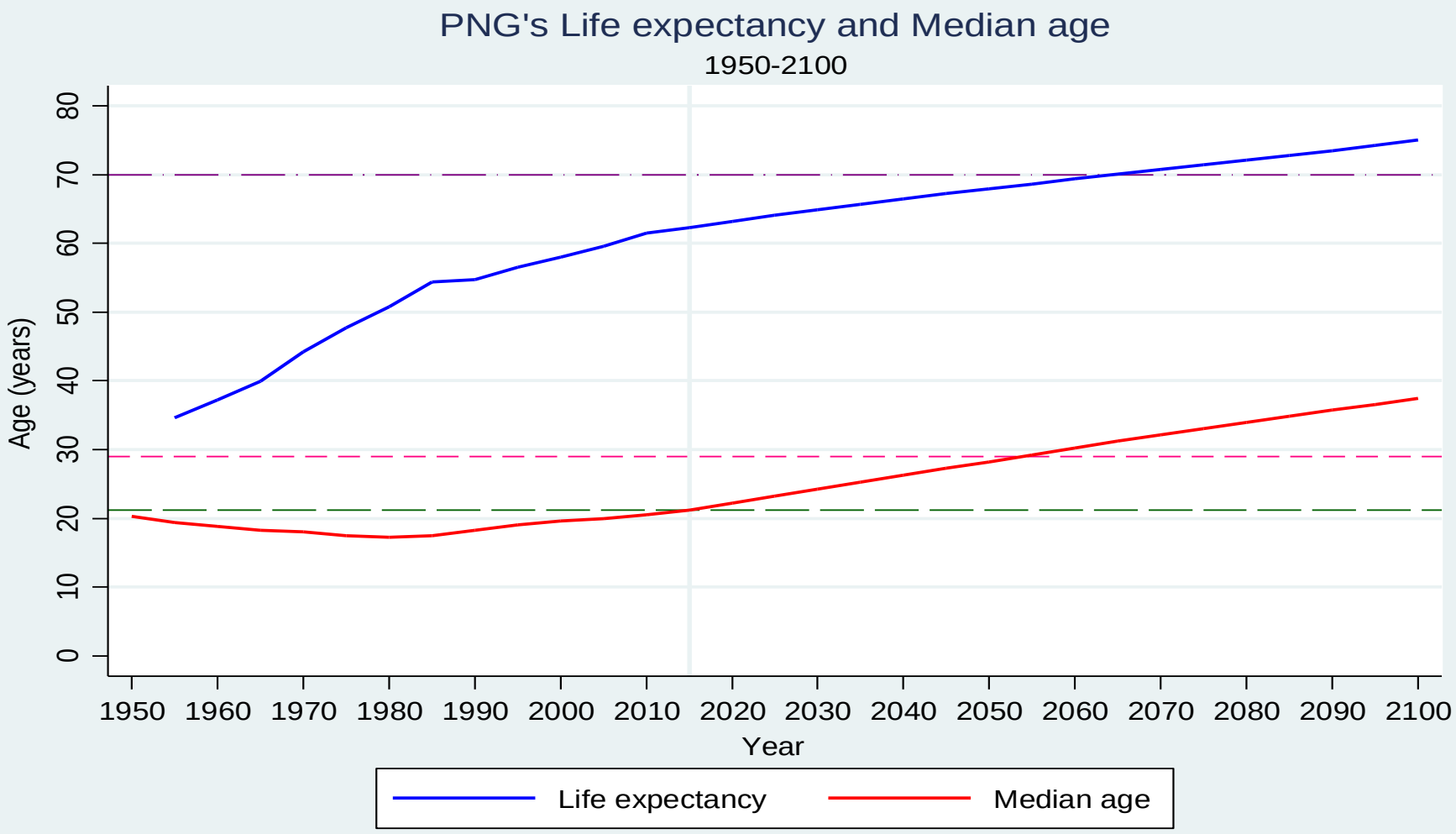


Source: United Nations Department of Economic and Social Affairs

Life Expectancy at birth:1990-2016

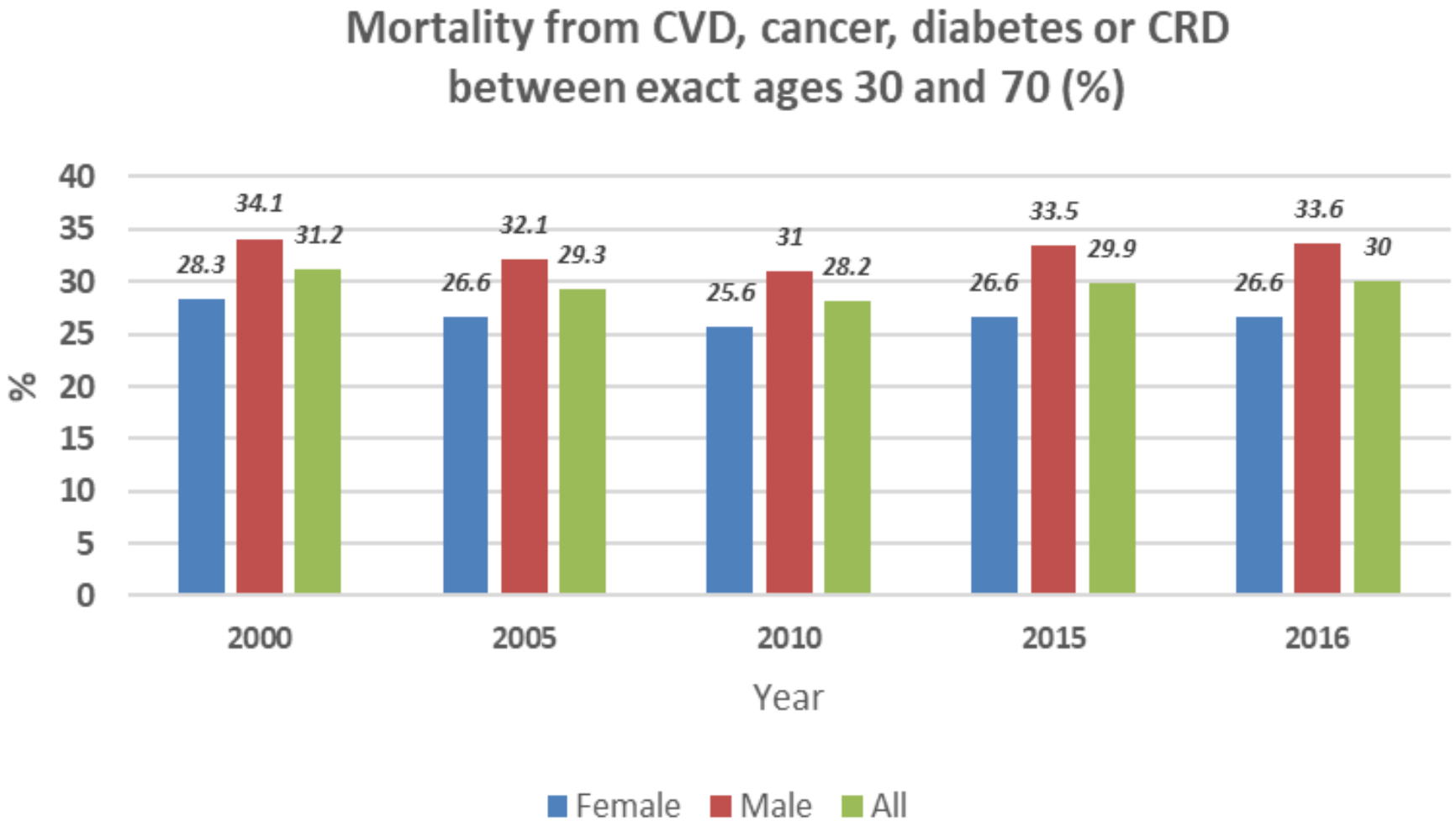


Population is young with lower LE

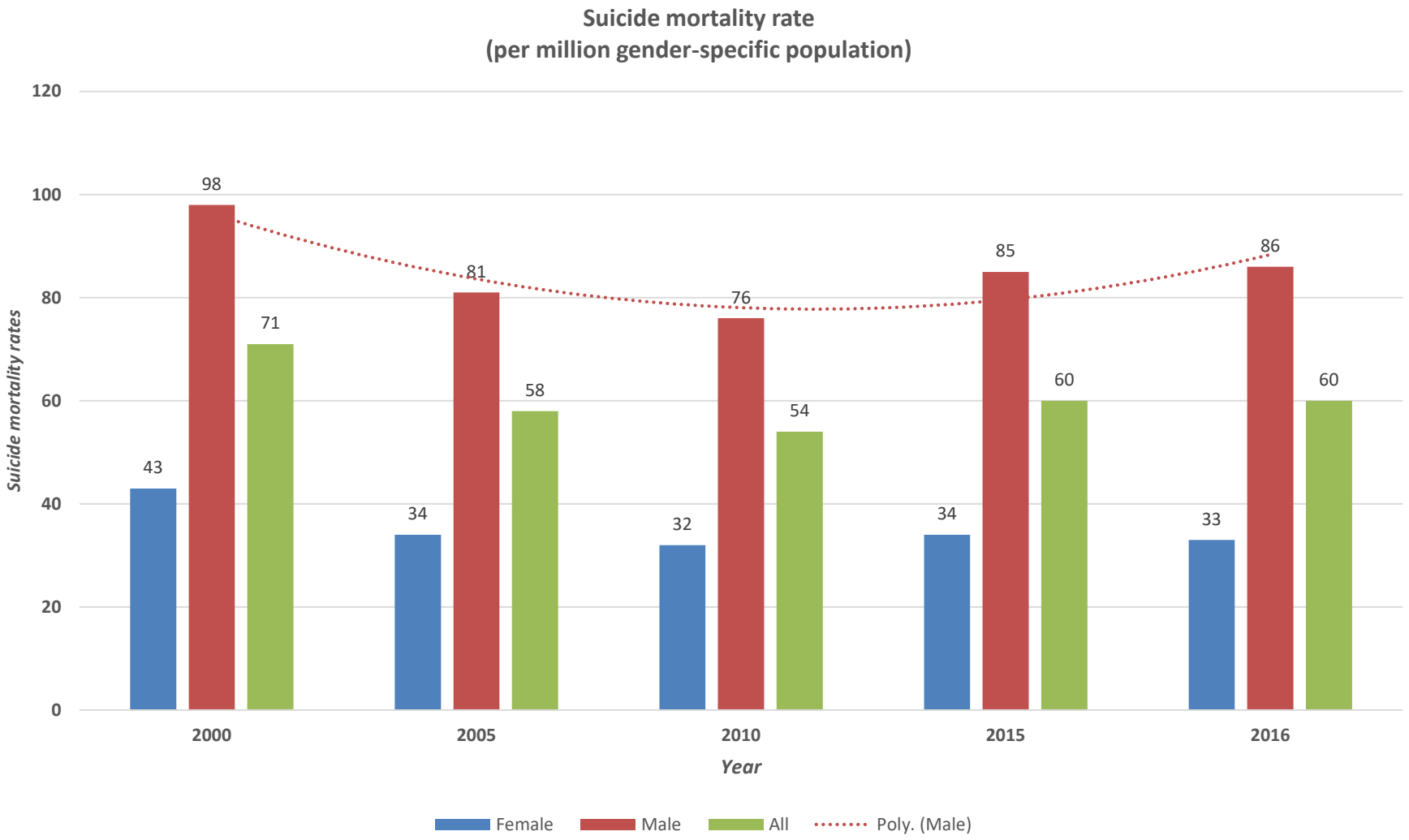


Source: United Nations Department of Economic and Social Affairs

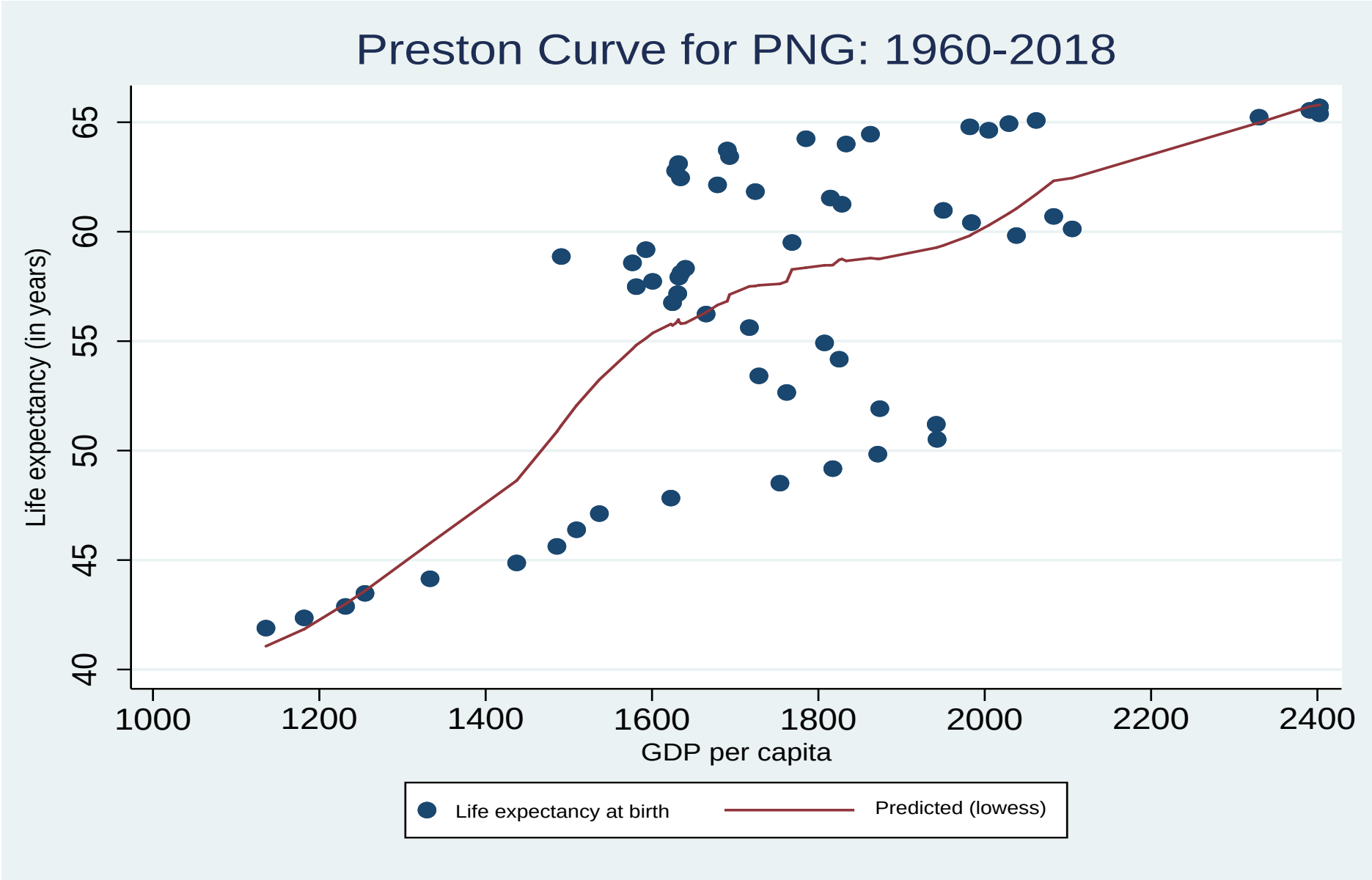
CVD, Cancer, Diabetes or CRD caused Mortality in PNG: 2000-2016



Suicide Mortality in PNG: 2000-2016



Preston Curve for PNG



Data

- *Data Sources: WDI, IHME and ANU election database.*
- *Period: 1990-2016 (but varied)*
- All the variables stationary at level, except log of GDP per capita (1st difference) *[Dickey-fuller and Phillip-Perron unit root tests]*
- Structural break tests: tried, inconclusive. We use dummy for years ruled by political parties/coalition as control variable

Econometric Model

The Model:

$$Mortality_t = \beta_0 + \beta_1 \Delta LnGDPPC_{t-1} + \beta_2 LnInflation_{t-1} + \beta_3 LnPUrban_t + + \beta_4 LnPElectricty_t + \beta_5 LnDAH_{t-1} + \gamma DPolitParty + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

- No presence of serial correlation (Durbin-Watson & Breusch-Godfrey LM tests)
- **Robust regression estimates are presented**

Robust Regression Mortality Results

Variables	Neonatal	Infant	Under-5	CDR	MMR	LE
Δ Log of per capita GDP (t-1)	-3.24*	-5.80	-8.42	0.09	0.17	0.05
	(1.71)	(4.32)	(6.32)	(0.34	(0.27)	(0.83)
Log of inflation (t-1)	-0.03	-0.10	-0.15	0.07**	0.08***	-0.15**
	(0.11)	(0.28)	(0.42)	(0.02)	(0.02)	(0.06
Log of % urban population (t)	-35.83***	-85.54***	-134.36***	-1.76	-4.08***	9.53**
	(7.24)	(18.28)	(26.74)	(1.42)	(1.18)	(3.51)
Log of % population with electricity access (t)	-8.05***	-21.84***	-34.00***	-1.91***	-2.07***	5.77***
	(0.64)	(1.63)	(2.38)	(0.13)	(0.11)	(0.31)
Log of per capita DAH (t-1)	-0.38*	-0.96*	-1.50**	-0.11***	-0.15***	0.31***
	(0.19)	(0.47)	(0.68)	(0.04)	(0.03)	(0.09)
People's progressive party	0.72	1.13	1.67	0.13	-0.11	-0.42
(vs Pangu)	(0.53)	(1.33)	(1.94)	(0.10)	(0.08)	(0.26)
People's democratic movement	0.48	0.71	0.94	0.05	-0.06	-0.19
(vs Pangu)	(0.51)	(1.27)	(1.86)	(0.10)	(0.08)	(0.25)
People's National Congress	0.11	-0.22	-0.48	0.09	-0.05	-0.23
(vs Pangu)	(0.56)	(1.42)	(2.08)	(0.11)	(0.09)	(0.27)
National Alliance Party	0.90	1.73	2.46	-0.08	-0.19*	0.03
(vs Pangu)	(0.61)	(1.55)	(2.27)	(0.12)	(0.10)	(0.30)
Constant	143.13***	335.67***	513.57***	17.67***	19.36***	22.63**
	(20.59)	(52.00)	(76.06)	(4.03)	(3.37)	(9.99)
Observations	26	26	26	26	25	26

Overall health aid vs child and maternal health specific aid

Variables	Neonatal	Infant	Under-5	MMR
Δ Log of per capita GDP (t-1)	-0.06	-0.50	-0.52	-0.03
	(0.83)	(2.38)	(3.34)	(0.19)
Log of inflation (t-1)	-0.02	-0.12	-0.20	0.04***
	(0.06)	(0.18)	(0.25)	(0.01)
Log of % urban population (t)	-54.65***	-117.13***	-179.98***	-5.37***
	(3.98)	(11.35)	(15.97)	(1.11)
Log of % population with electricity access (t)	-10.32***	-25.82***	-39.94***	-2.32***
	(0.38)	(1.07)	(1.51)	(0.12)
Log of PCDAH targeted towards child and new born (t-1)	*-0.07****	*-0.18***	*-0.23***	
	(0.02)	*(0.07)*	*(0.09)*	
Log of PCDAH targeted towards maternal health (t-1)				*-0.011*
				(0.011)
Constant	196.55***	424.61***	642.19***	22.95***
	(11.27)	(32.13)	(45.21)	(3.22)
Observations	24	24	24	24
F-statistics	403.4***	385.6***	466.9***	1057***

*Note: Other control variables include dummy for years ruled by political parties. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Is fertility rate a determinant of mortality?

Variables	Neonatal	Infant	Under-5	CDR	MMR	LE
Δ Log of per capita GDP (t-1)	2.88	7.94	12.29	0.78	0.20	-2.789
	(5.75)	(13.83)	(21.40)	(0.99)	(0.64)	(3.833)
Log of inflation (t-1)	0.35	0.73	1.14	0.09*	0.07**	-0.301
	(0.33)	(0.79)	(1.23)	(0.05)	(0.03)	(0.220)
Log of % urban population (t)	-71.38	-157.61	-220.96	18.32**	27.38***	-18.929
	(60.01)	(144.48)	(223.55)	(6.78)	(4.90)	(40.036)
Log of % population with internet access (t)	-1.59***	-4.20***	-6.23***	-0.20**	-0.06	0.785***
	(0.37)	(0.89)	(1.38)	(0.07)	(0.06)	(0.247)
Fertility rate (detrended)	142.24**	357.30**	548.08**	15.72**	15.37***	-66.679*
	(53.76)	(129.44)	(200.27)	(5.55)	(3.53)	(35.867)
Constant	208.12	450.07	625.76	-39.80**	-68.11***	113.916
	(152.80)	(367.87)	(569.19)	(17.38)	(12.73)	(101.936)
Observations	19	19	19	20	20	19
F (7, 11)	26.42***	31.40***	30.93***	39.75***	118.7***	24.68***

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Other control variables include dummy for years ruled by political parties. We did not include log of % population with electricity access as it is highly correlated with fertlity (corr. Coeff=-0.93). Also, as fertility variable is non-stationary even after 1st difference, we used detrended fertility rates.

Conclusions

- Mortality reduction progress: Slow, still worst in the Pacific
- Very high disease specific and suicide related MRs
- Population is young but slow pace of increase in life expectancy with national income per capita

Conclusions

- Our preliminary econometric analysis find that

1. Per capita GDP growth: Not significantly reducing all forms of MRs
2. Higher inflation: higher MMR and CDR .
3. Increased urbanisation significantly reduce MRs: Not consistent across all models
4. % population with access to electricity (and access to internet): Consistent and –vely significant correlates of MR reduction

Conclusions

5. Per capita development aid for health: significantly reduce MRs

6. While aid for health specific to newborn or child is effective, aid for health aimed for maternal health is not.

7. Higher fertility rate, higher MR and lower life expectancy

Conclusions

7. While it requires further analysis to ascertain performance of political parties in reducing MRs by years they ruled, it is an important control variable.

8. No robust association of per capita health expenditure and MRs (results not presented)

Conclusions

9. Growth in agricultural food production, remittances, ratio of export to import are not significant in any of the specifications used (results not presented)

To recapitulate: inflation control, inflow of health aid, more access to infrastructure such as electrification, internet coverage and rapid urbanisation are some of the key macro-determinants of mortality rates in PNG.

Limitations

1. Data is limited in terms of coverage of variables and periods. As mortality and life expectancy are reduced slowly, a long-term perspective is important.
2. While extra care has been taken, it is difficult to eliminate some of the issues such as endogeneity, and high correlations among covariates.
3. Nonetheless, results are interesting and consistent with the available literature

Thank you!