The impact of performance-based financing schemes in the health sector on child and maternal care in Mozambique

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on behalf of the

Performance-based financing mechanisms for health system strengthening in Africa

PEMBA project Team

Maputo, 21 November 2019

Introduction

Sustainable Development goal (3): *Good Health and Well-being*

- **Universal Health Coverage**
- **Child and Maternal Health**

How can we improve access and delivery of child and maternal care?

- Performance-based-financing (PBF) proposed in many countries as a strategy to increase access and improve quality
- Payment of budget to health care providers based on the achievement of pre-defined targets for selected indicators
- Incentive payment is accompanied by increased supervision and monitoring

Evidence on Performance-based Financing

Globally, evidence is so far mixed

- Existing research has focused mostly on the delivery of targeted health care services (*Basinga et al., 2011; Eijkenaar et al., 2013; Bonfrer et al., 2014; Rajkotia et al., 2017; Gergen et al., 2018*)

- Little is known on heterogeneous effects and on health outcomes

In Mozambique *Rajkotia et al., 2017* also found mixed evidence on targeted indicators

- Higher impact: Pregnant women HIV positive start ARV and complete PTV, Pregnant women attend 4 or more ANC visits

- Mixed impact: institutional delivery, full vaccination

- No impact: Malaria and other non- incentivised indicators

PBF in Mozambique

Phase I
Jan. 2011

26 facilities

60 facilities

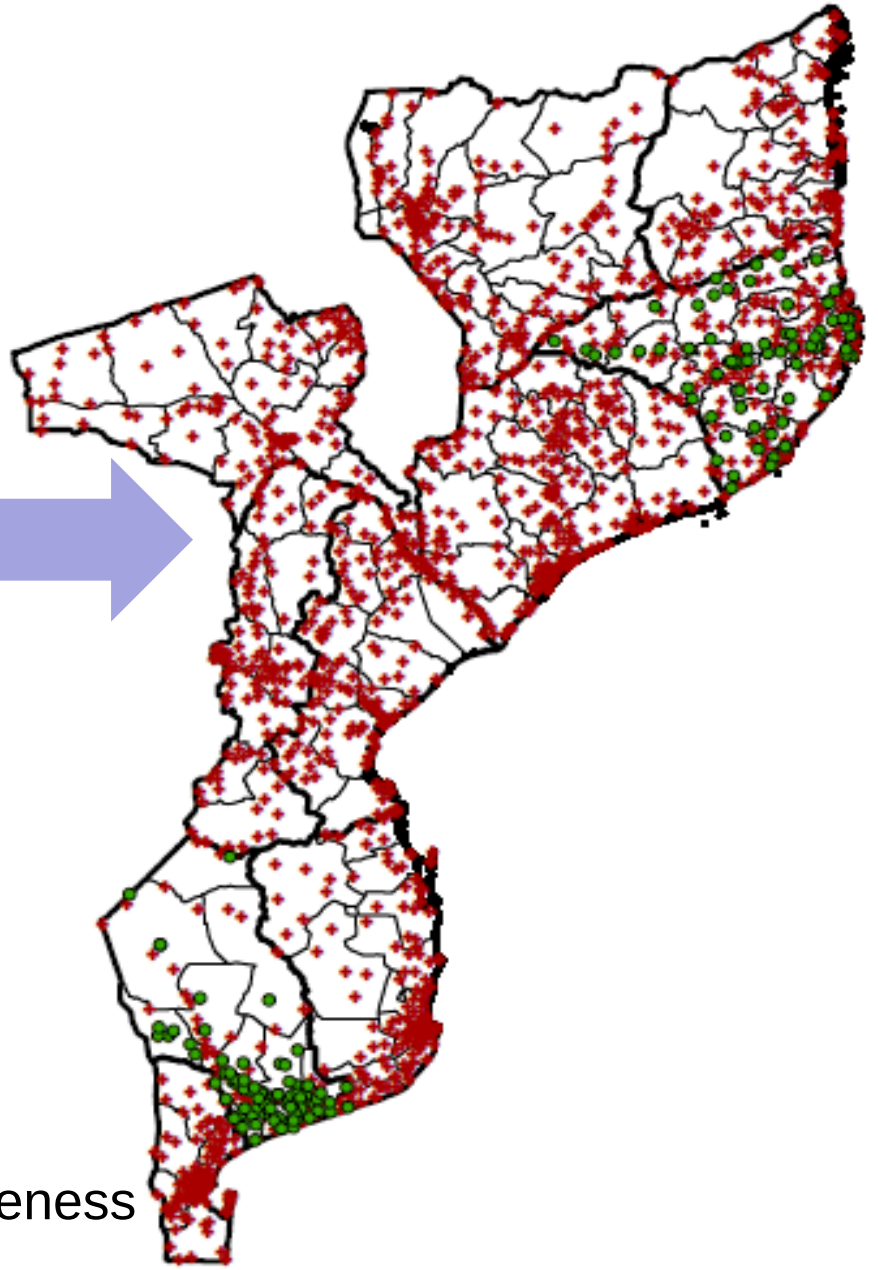
Phase II Mar. 2012

Phase III
Sep. 2013

100 facilities

121 facilities

Phase IV
Sep. 2014



- Implemented in health facilities in Gaza and Nampula
- 21 indicators in 5 groups incentivised
- Incentives: quantity-based bonus weighted by quality and HF remoteness
- Monthly reporting and quarterly reports using HF-registers

21 Targeted PBF Indicators

Adult HIV Care and Treatment

- Nb. HIV-infected adults (excluding pregnant women) initiating ART
- Nb. of adults co-infected with HIV and tuberculosis (TB) who initiated ART
- Nb. HIV-infected patients who initiated Isoniazid to prevent TB
- Nb. of HIV-infected adults alive 12 months after initiating ART

Paediatric HIV

- Nb. PCR tests for HIV for children (4-8weeks) of HIV-infected mothers
- Nb. HIV rapid tests for children 9-12months of HIV-infected mothers
- Nb. HIV-infected children 0-23months initiating ART
- Nb. HIV-infected children 2-14yearsmonths initiating ART
- Nb. HIV-infected children 0-14 years alive 12 months after initiating ART

Maternal and Child Health

- **Nb. pregnant women >=4 ANC-visits**
- **Nb. pregnant women who delivered at the health facility**
- **Nb. children who receive full vaccination for BCG, DPT, polio and measles in 9 months**
- Nb. women (excluding HIV-infected) receiving family planning and contraceptives
- Nb. Women >=1 PNC 3-28days after birth
- Nb. Children acute malnutrition, treated and discharged

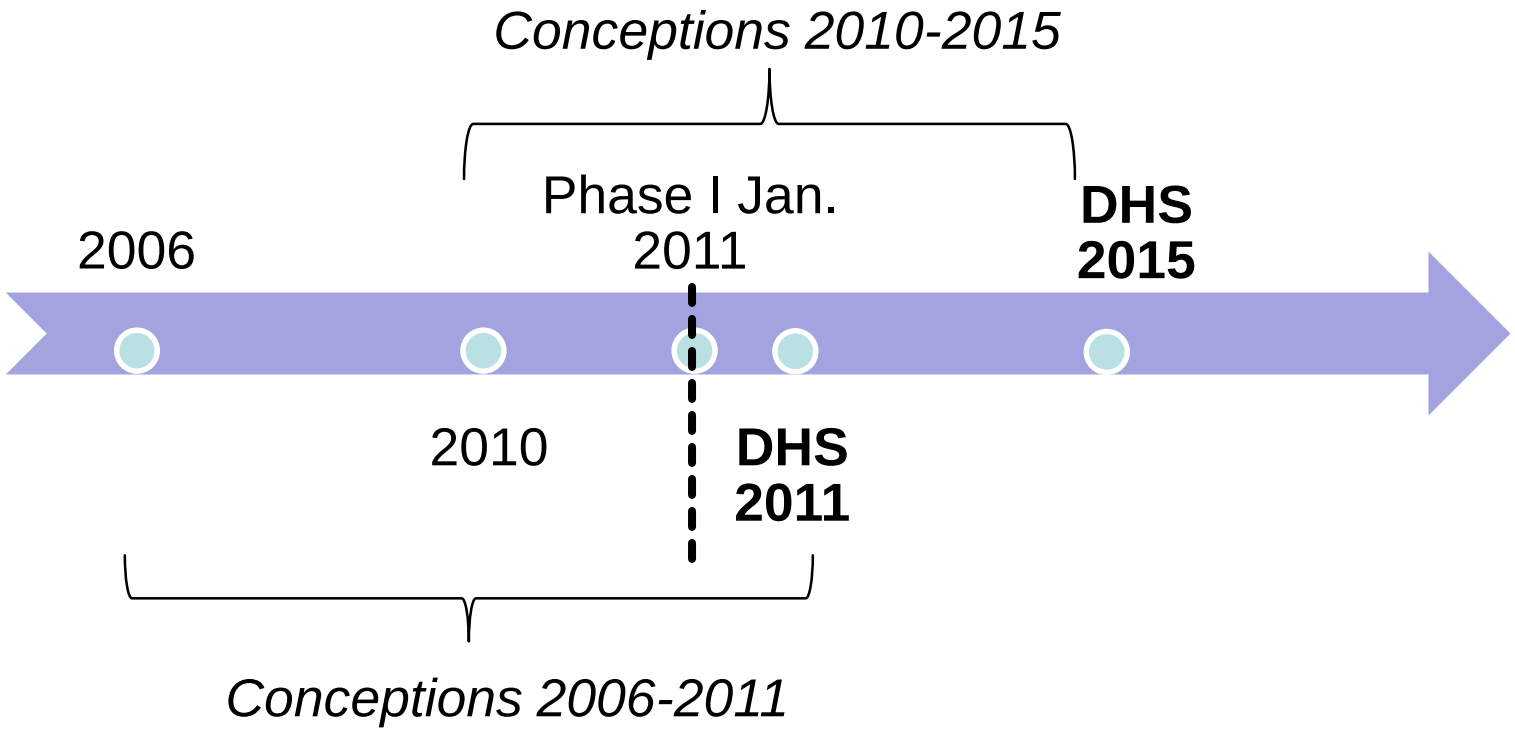
Preventing vertical HIV transmission

- Nb. HIV-infected pregnant women receiving antiretroviral prophylaxis
- Nb. HIV-infected pregnant women initiating ART
- Nb. HIV-infected pregnant women receiving family planning and contraceptives

Other HIV

- Nb. HIV-infected patients lost to follow up coming back for ART
- Nb. Male partners tested for HIV
- Nb. HIV-tests at HF

Demographic Health Survey (DHS)



- Women report all pregnancy and related care 5 years prior interview
- Construct pooled cross-sectional conceptions 2006-2015

GPS info and health facility data

Need to identify if:

a.) closest health facility is PBF-exposed

b.) district is PBF-district

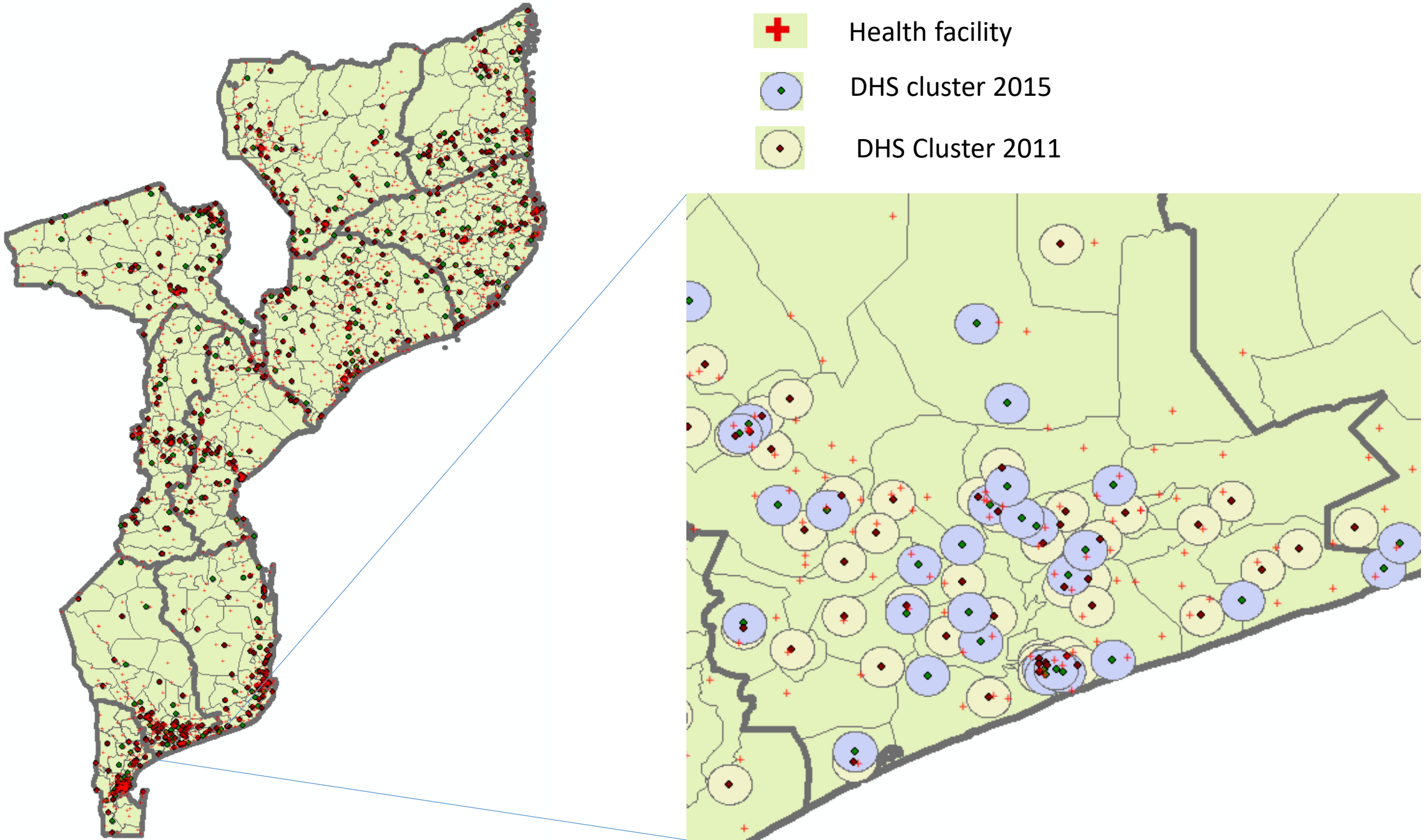
Link mothers to districts and closest HF and identify if HF is PBF-exposed:

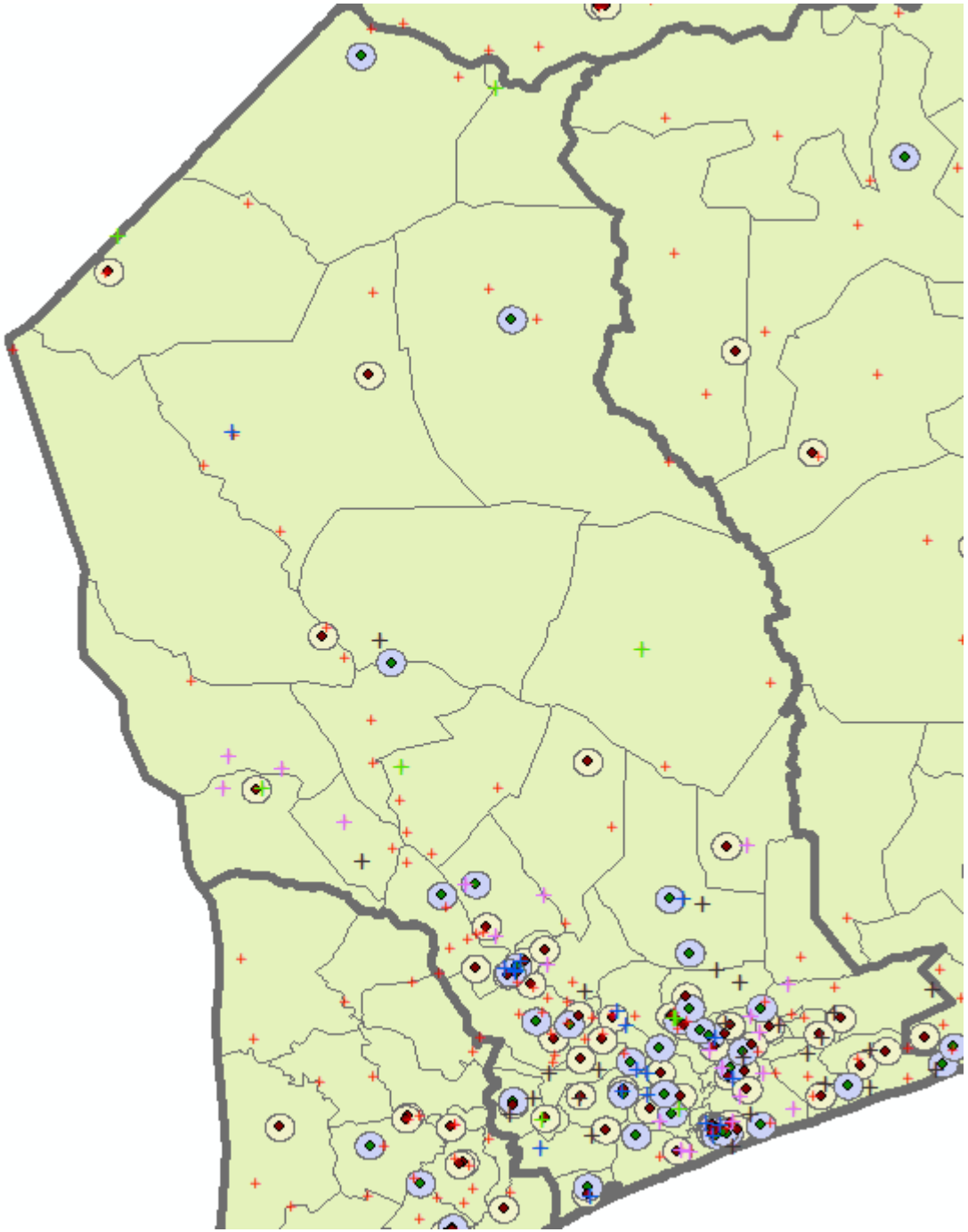
WHO-SARA: info about health facilities geo-coordinates;

EGPAF: info about HF-PBF status

Link to….

DHS: GPS-location of HH in clusters (5km positional error)


Health facility
DHS cluster 2015
DHS Cluster 2011



Gaza

Health facility

DHS cluster 2015

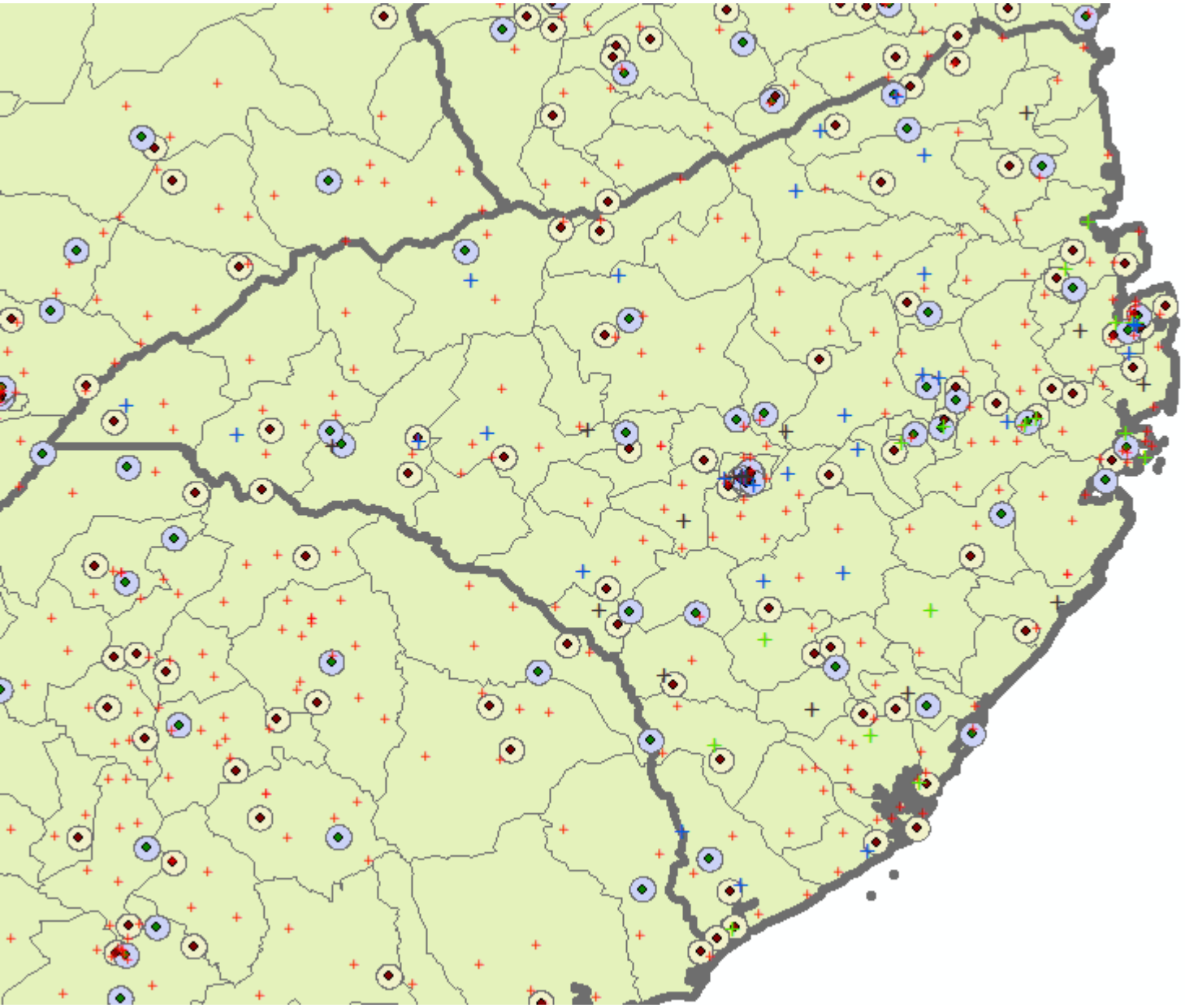
DHS Cluster 2011

Health facility – PBF Phase 1

Health facility – PBF Phase 2

Health facility – PBF Phase 3

Health facility – PBF Phase 4



Nampula

- Health facility
- DHS cluster 2015
- DHS Cluster 2011
- Health facility – PBF Phase 1
- Health facility – PBF Phase 2
- Health facility – PBF Phase 3
- Health facility – PBF Phase 4

Outcome variables

ANTENATAL CARE (ANC):

- **At least 4 ANC visits**
- HIV test offered at ANC visit
- Tested for HIV at ANC visit
- Knowledge: Vertical HIV transmission
- Knowledge: Drugs to avoid vertical HIV transmission

DELIVERY AND POSTNATAL CARE:

- **Institutional delivery**
- Vaccination within 1 year
- **Vaccination within 9 months**

CHILD MORTALITY:

- Neonatal mortality
- Infant mortality

Sample(s)

I: Analysis of ANC, delivery and postnatal care effects

- N=5,031; Gaza: 561 (HF:83; D:226), Nampula: 451(HF:63; D:186), ROC:4,055

II+III: Analysis of child mortality effects

- Neonatal mortality: N=8,889; Gaza: 824, Nampula789: ROC:7,276
- Infant mortality: N=5,996; Gaza: 541, Nampula: 532, ROC: 4,923

Average Treatment Effect (ATE)

$$Y_i = \beta_0 + \beta_1 DID_i + \beta_2 PBF_i + \beta_3 After_i + \beta_4 Dist_i + \beta_5\, SQ(Dist_i) + X_i\beta_6 + \beta_7 \boldsymbol{BYr_i} + \beta_8 \boldsymbol{DHS_i} + \beta_9 \boldsymbol{Supply} + \epsilon_i$$

- β_1 *is the ATE*
- PBF_i *PBF area*
- $After_i$ *conception after PBF started*

- $\mathbf{X_i}$ set of control variables
- $Dist_i$ is distance to closest HF
- $SQ(Dist_i)$ non-linear distance

Fixed effects:

- Supply side
- Birth Year
- DHS Cohort

Clustered SE

Heterogeneity of Effect

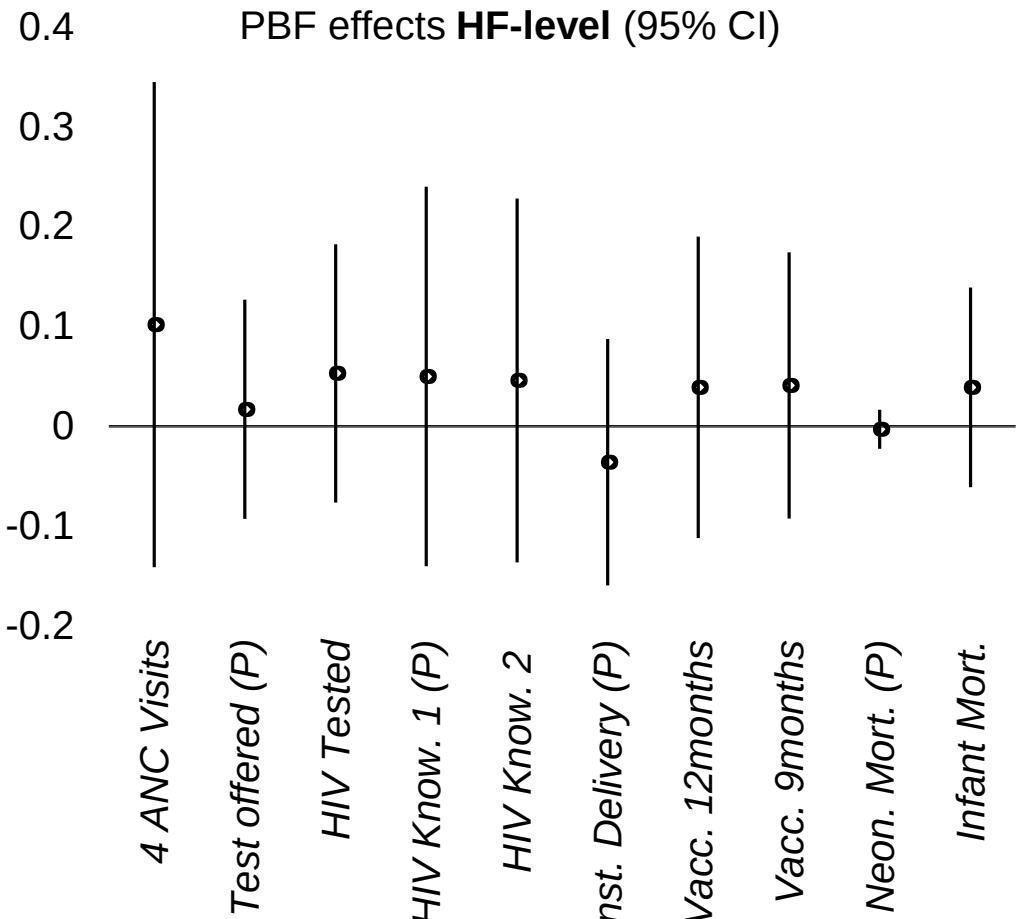
$$Y_i = \beta_0 \ldots + \beta_4 DID_i * VAR_i + \beta_5 PBF_i * VAR_i + \beta_6 After_i * VAR_i + \beta_7 VAR_i + \cdots + \epsilon_i$$

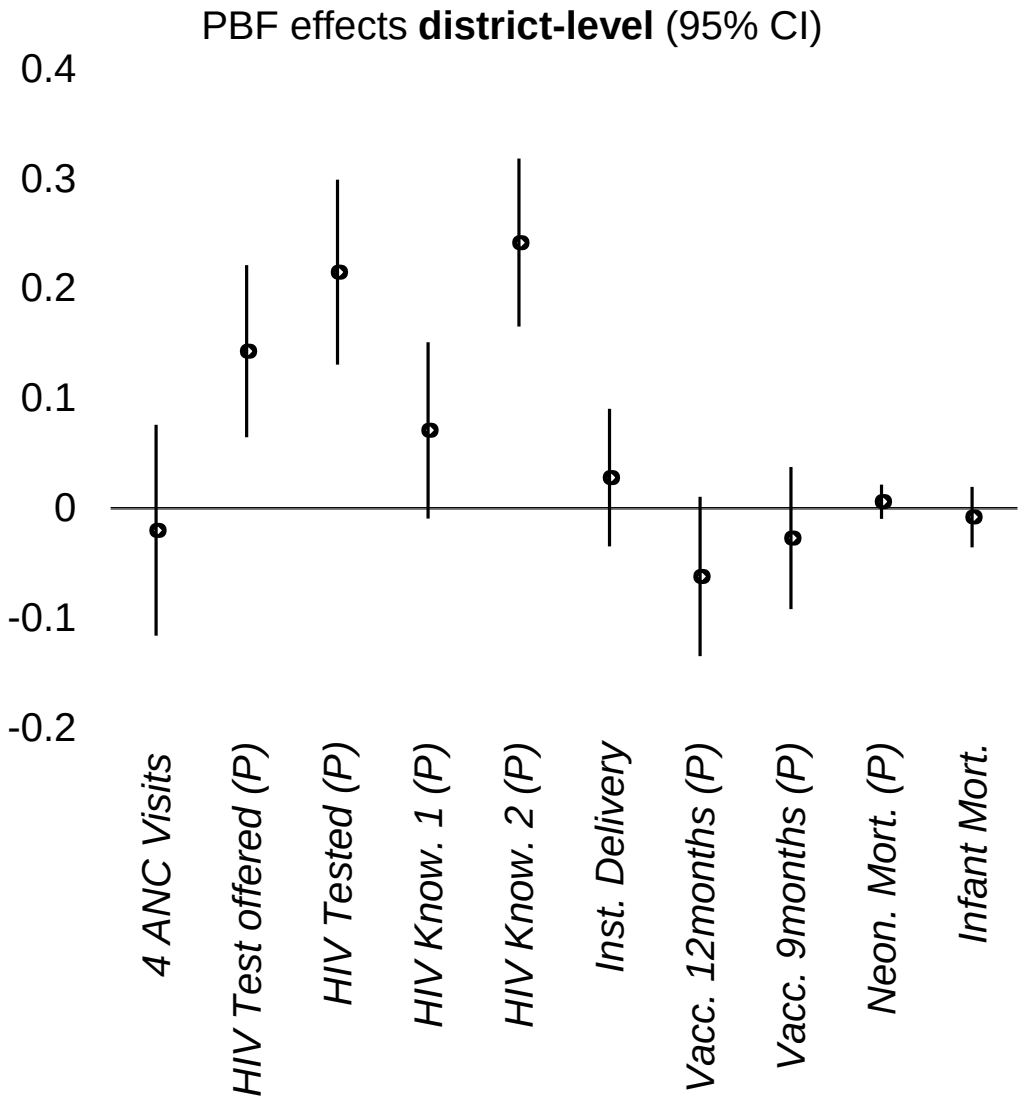
VAR_i is here a placeholder for three binary variables, either:

- individual lives in a ***household below median***
- individual has ***no education***
- individual lives in ***Gaza province***

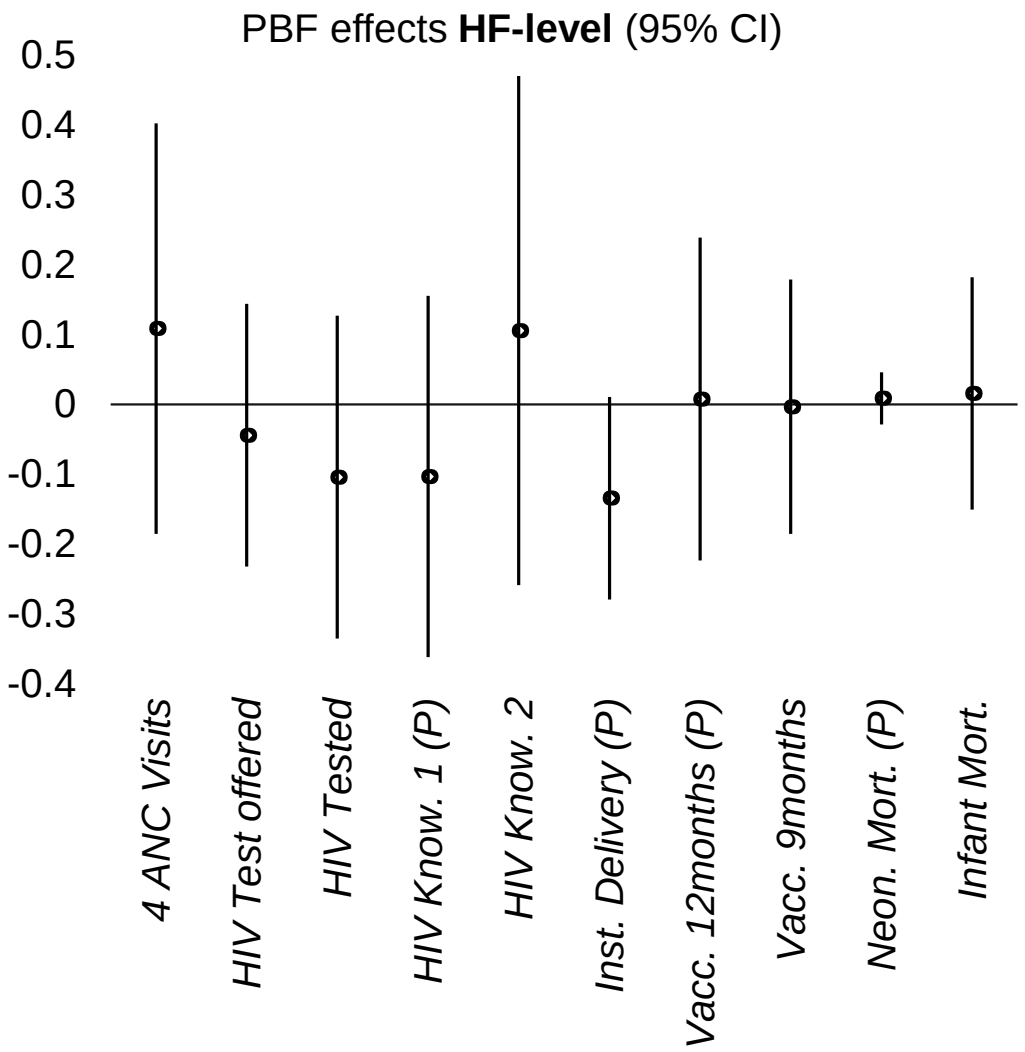
β_4 is PBF-effect difference when using respective binary indicator comparison

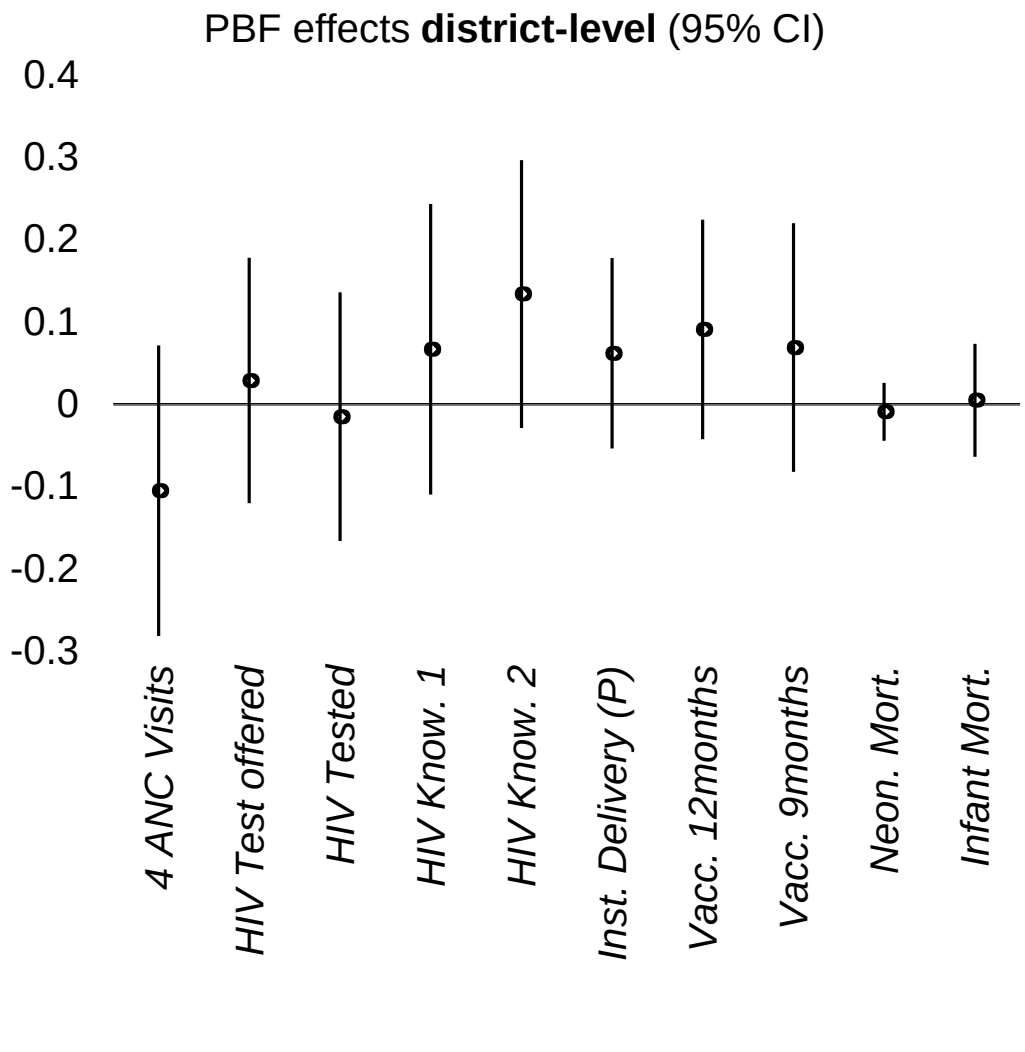
Results: Average Treatment Effect



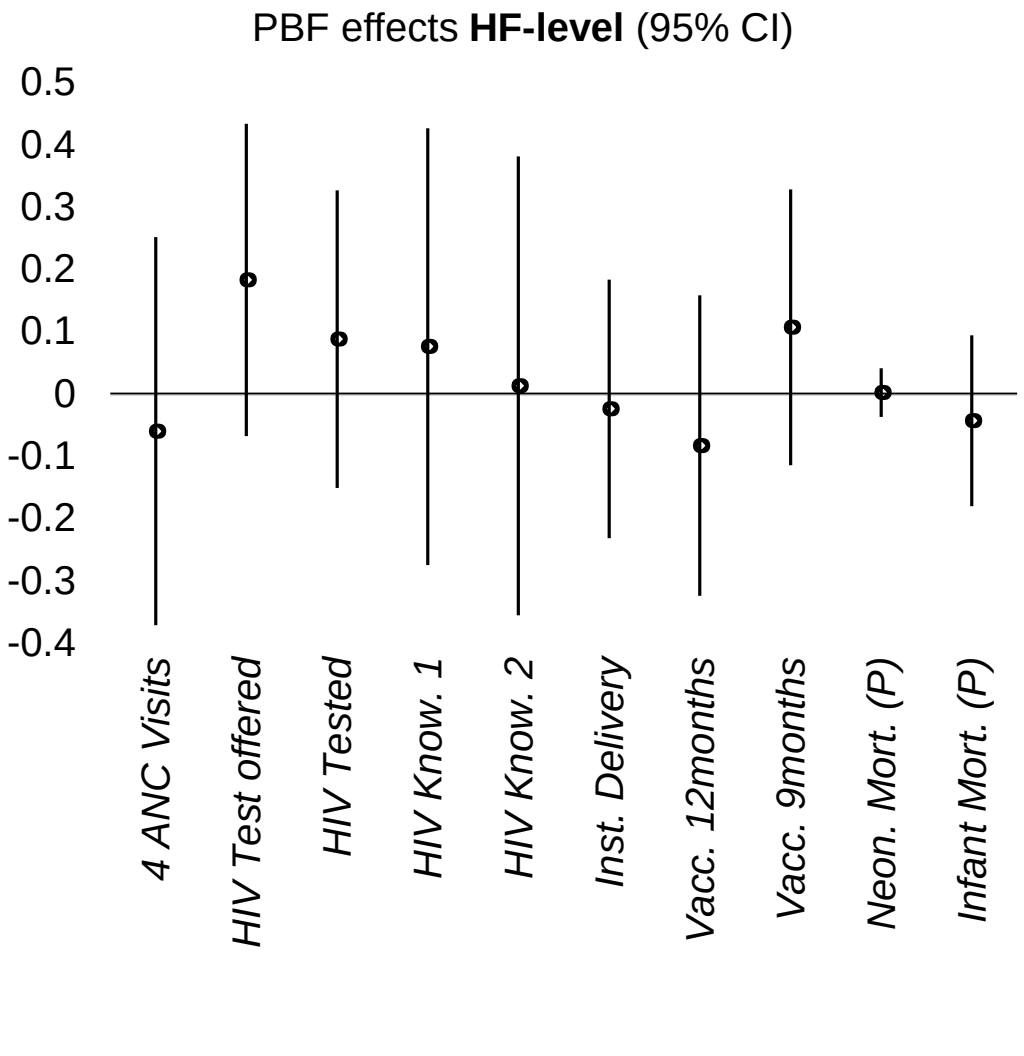


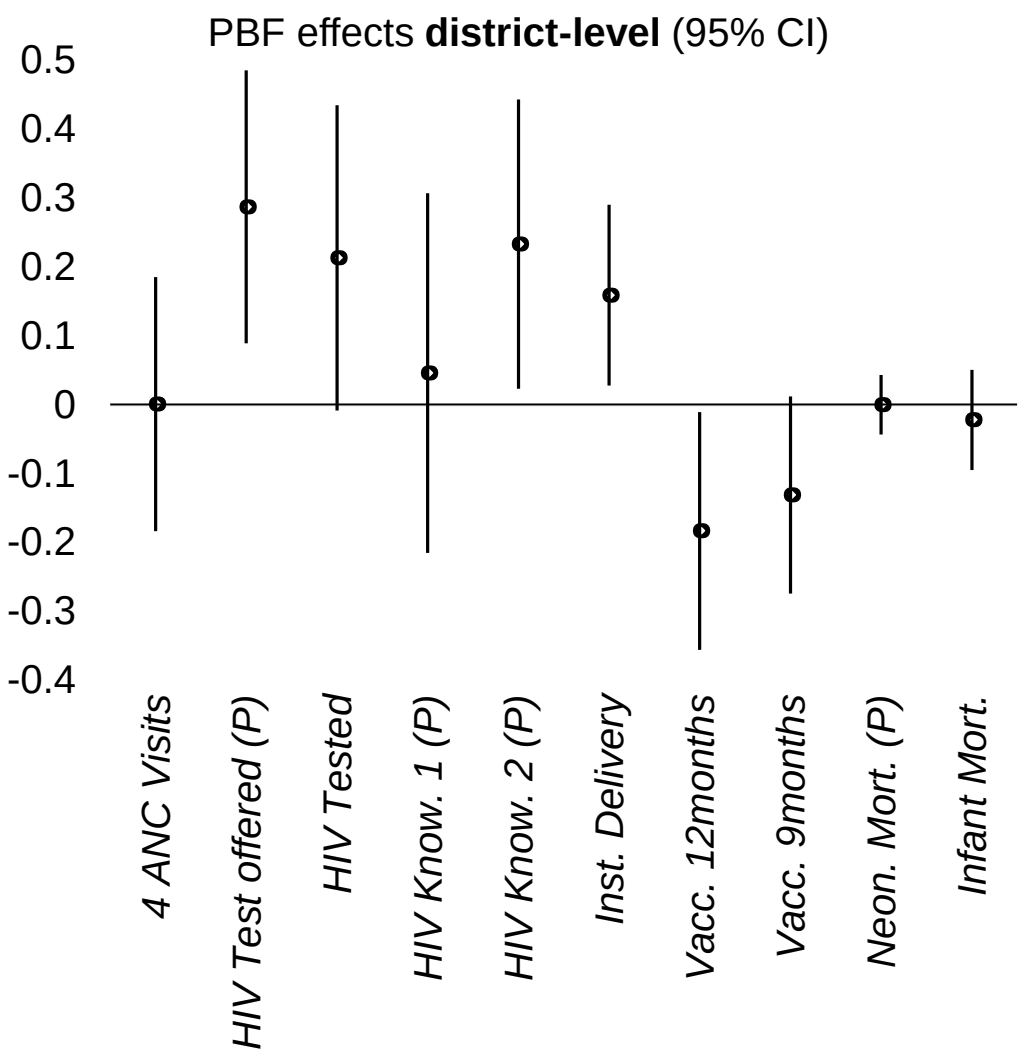
Results: Below median wealth vs Above



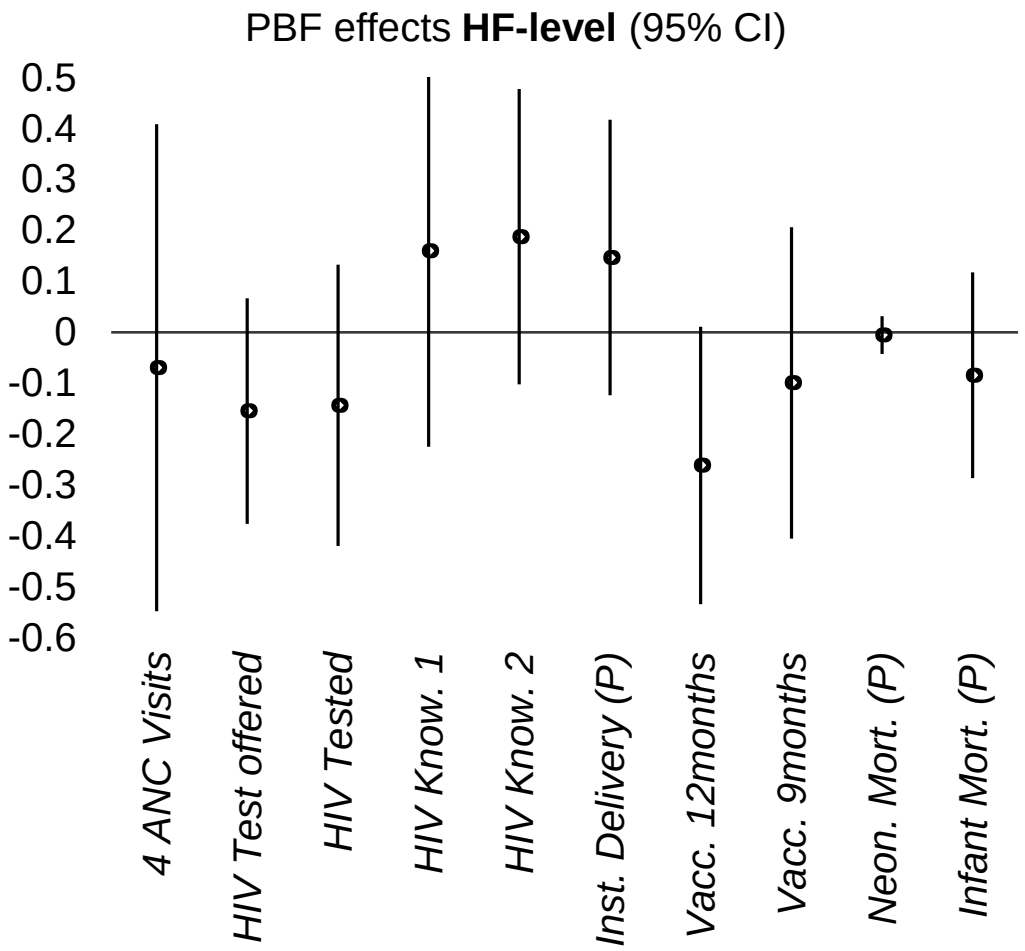


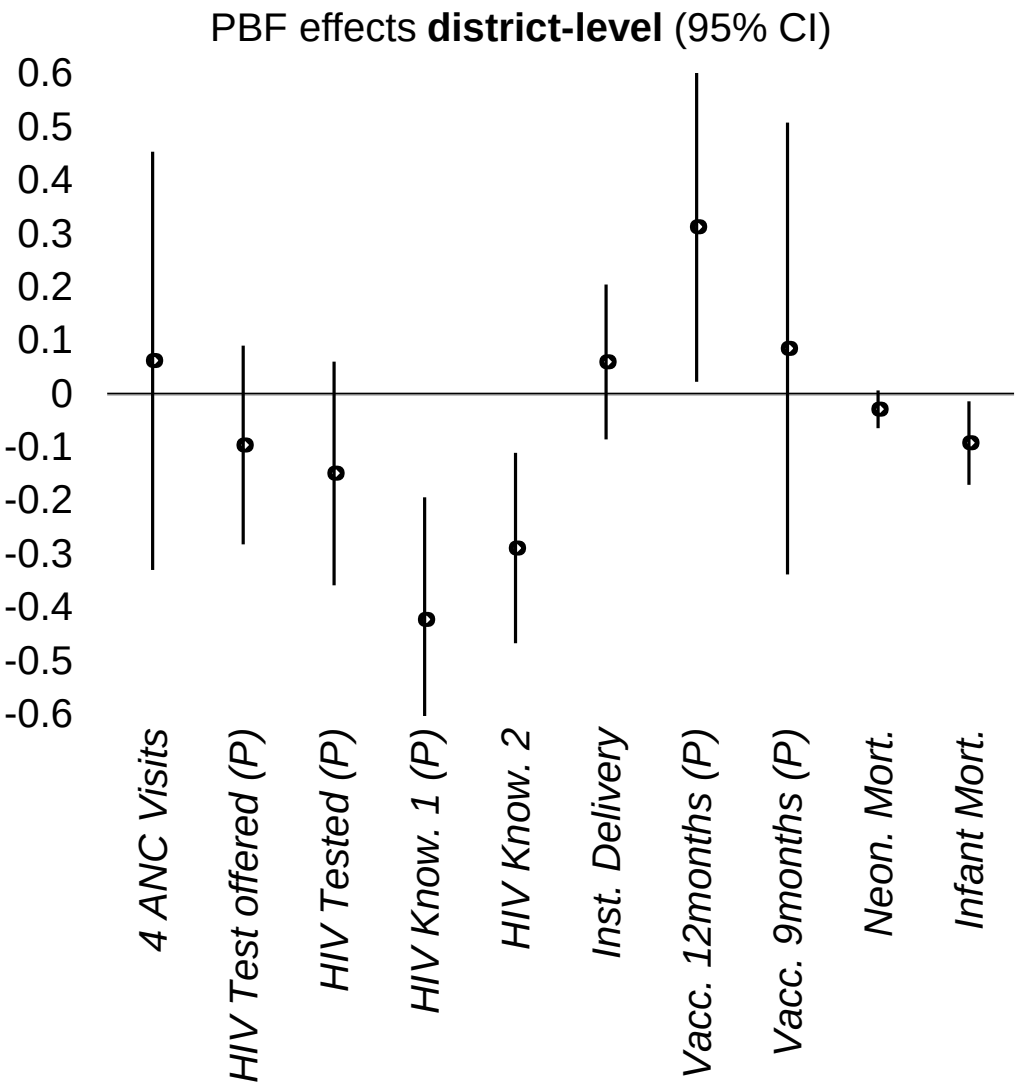
Results: No education versus all other





Results: Gaza versus Nampula





Results: Sensitivity analysis

1. *Maputo city* effects → *no difference in effects*
2. Spill-over effects in treated provinces → *no difference in effects*
3. District selection into PBF → *no difference in effects*
4. Treatment definition → *no difference in effects*
5. Border cluster effects → *no difference in effects*
6. Asses area effects → *no difference in effects*

Limitations

- Assumption of limited mobility of mothers → exiting studies suggest low internal migration among females
- Can only assess limited set of indicators → data permits ind. level analysis and to test identification assumptions
- Limit child mortality data; ideally assess 5-year mortality
- Covariates observed at time of interview → low variation in DHS wealth index and education
- Small sample size of treated mothers may in particular drive findings for health facility level analysis

Discussion

- **Effects on district level** → larger health care provider level → referral system in place…?
- **Strong positive effects on HIV-testing** offered (14pp), HIV-tested (21.5pp), knowledge **vertical transmission** (7pp), knowledge **drugs avoid transmission** (24pp) → in line with previous research (Rajkotia et al., 2017)
- **Heterogenous by education** → PBF with potential to overcome socio-economic inequalities in health care access
- **Stronger effects in Nampula vs Gaza** for HIV-related outcomes → in line with previous research (Rajkotia et al., 2017)
- **Stronger effects in Gaza vs Nampula** for Vaccination → different to previous research (Rajkotia et al., 2017)

Conclusion + Future Research

Conclusion

- Positive effects on maternal HIV knowledge and HIV testing on district level
- No effects on child and maternal care nor on neo-natal and infant mortality
- PBF-effects strongly varies by local heterogeneities in health care need
- PBF can overcome inequality in health care access (education) for outreach services

Future Research

- Understand PBF-effect on child health and child/maternal mortality
- Understand underlying pathways to effect, e.g. supply or demand driven?

Acknowledgements

To all other members of the PEMBA Team:

Pedroso Nhachengo (INS Misau Mozambique), Garret Brown (*University of Leeds*), Matt Sutton (*University of Manchester*), Soeren Rud Kristensen (*Imperial College London*), Roxanne Kovacs (LSHTM), Artwell Kadungure and Rene Loewensen (TARSC Zimbabwe), Gwati Gwati and Susan Mutambu (*Ministry of Health and Child Care Zimbabwe*).

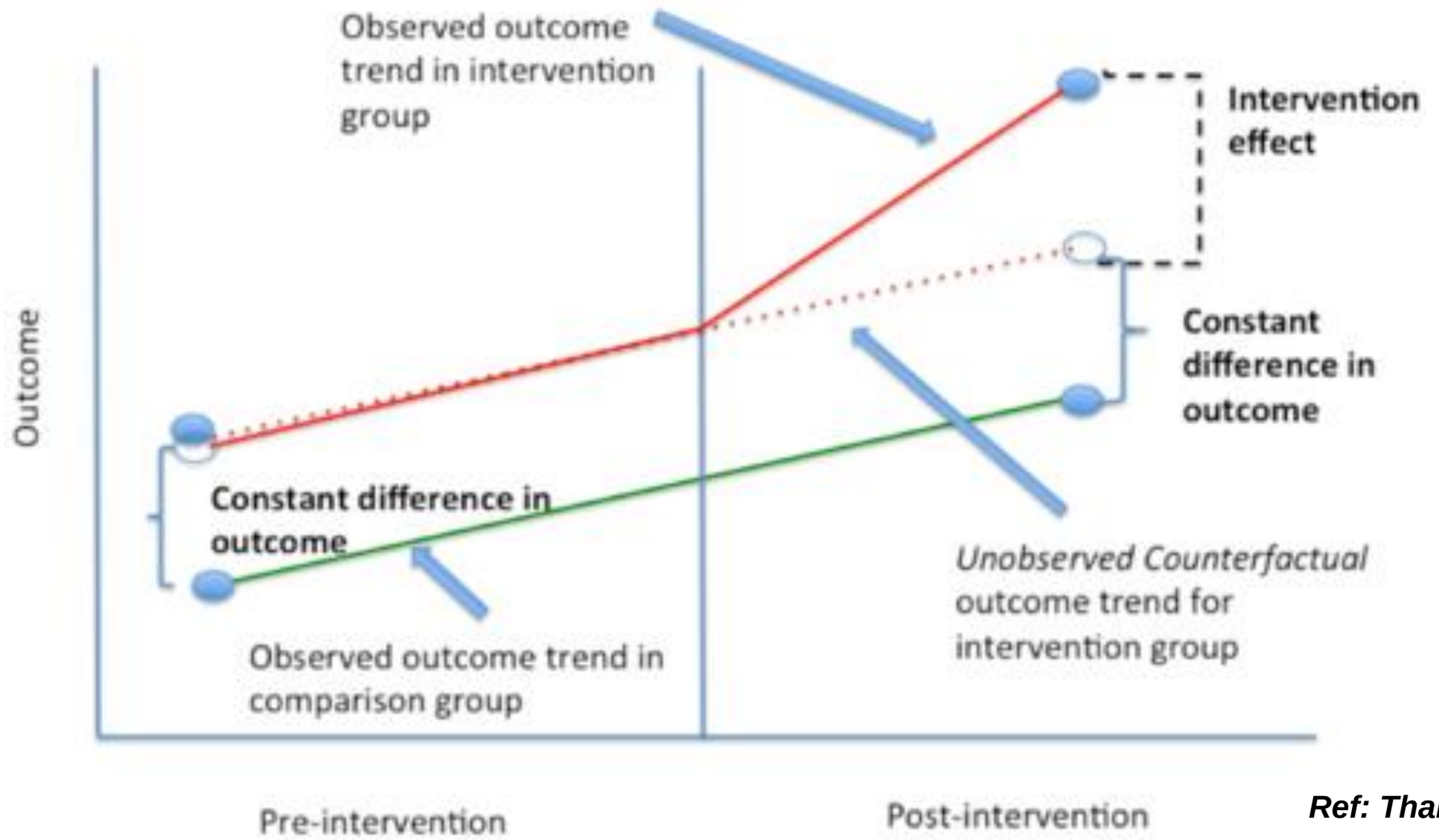
To Elizabeth Glaser Paediatric AIDS Foundation

To the UK Research Initiative through the Health System Strengthening Initiative which is jointly funded by the MRC, DFID, Wellcome Trust and ESRC.

Thank you for your attention!

Province	Phase1	Phase2	Phase3	Phase4
Nampula	D: 11/23 HF: 17	D: 22/23 HF: 31	D: 23/23 HF: 46	D: 23/23 HF: 46
Gaza	D: 8/14 HF: 9	D: 13/14 HF: 29	D: 14/14 HF: 54	D: 14/14 HF: 75

Difference-in-Difference Estimation



Ref: Thanks to the internet