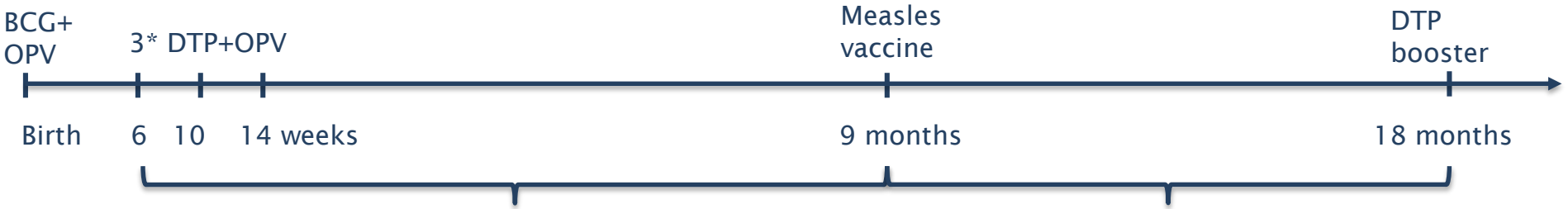
Sex-differential effects of vaccines: Evidence from Bandim and Nouna

SEVENTH FRAMEWORK PROGRAMME

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
DANIDA | INTERNATIONAL DEVELOPMENT COOPERATION

Testing the DTP hypotheses

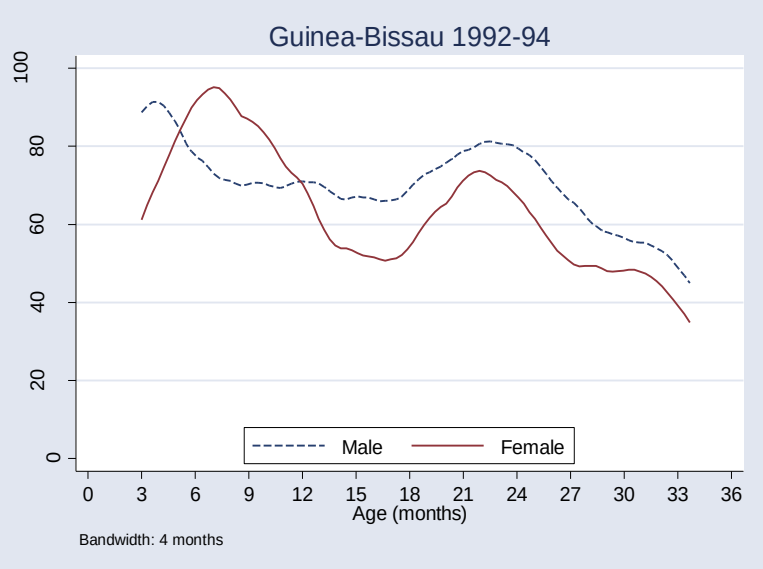


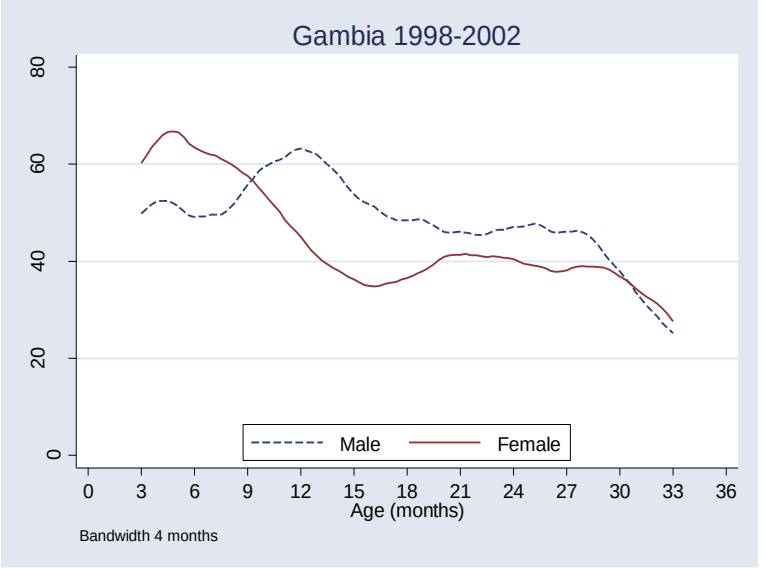
Hypothesis1: DTP after BCG to girls increases mortality

Hypothesis2: DTP after BCG is associated with an increase in Female/Male mortality rate ratio

Hypothesis3: MV after DTP associated with an decrease in Female/Male mortality rate ratio

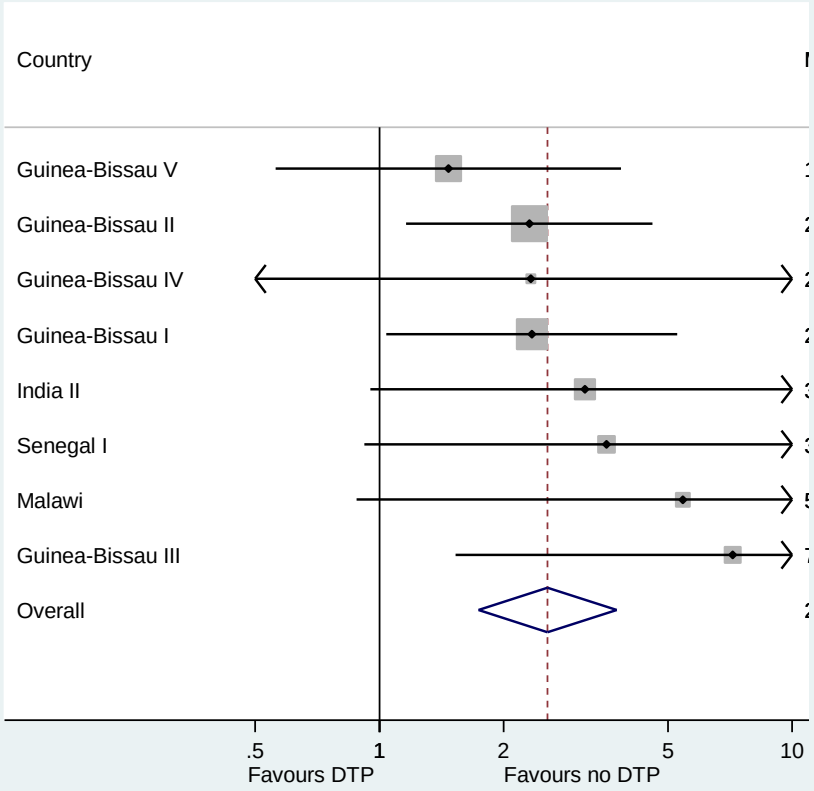
Fine, TMIH, 2007

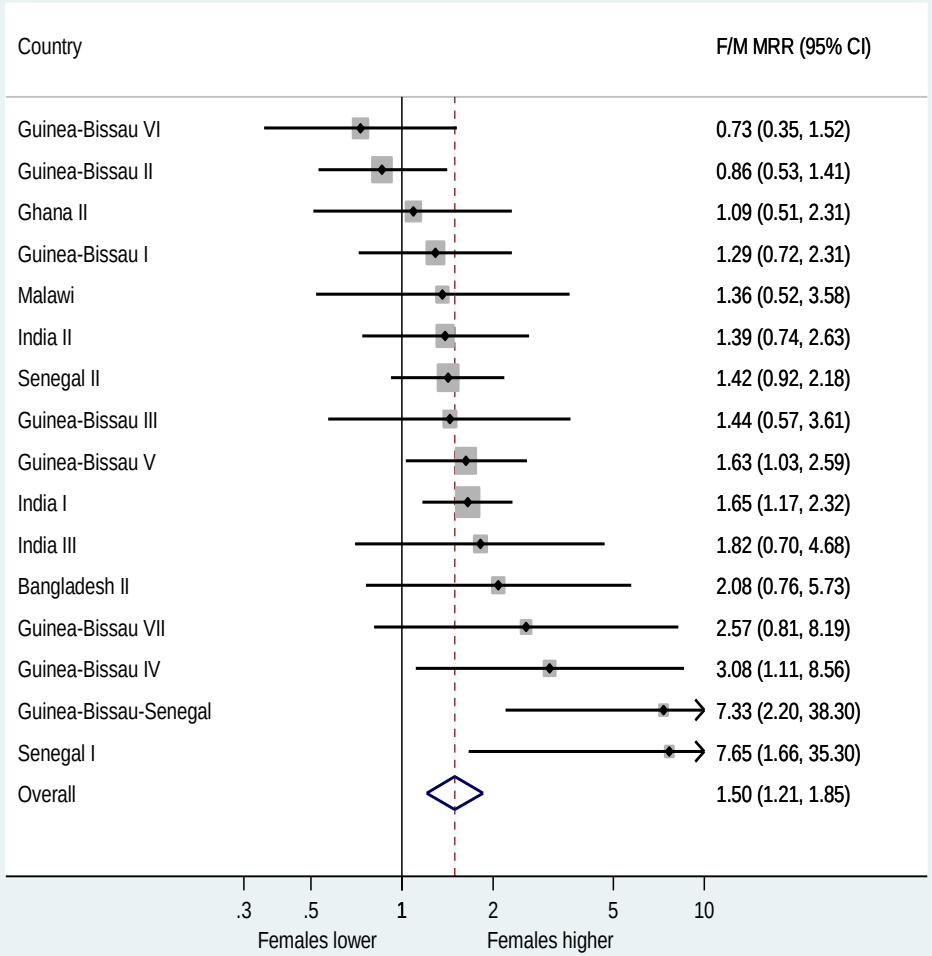




Hypothesis 1+2

Supported by literature review





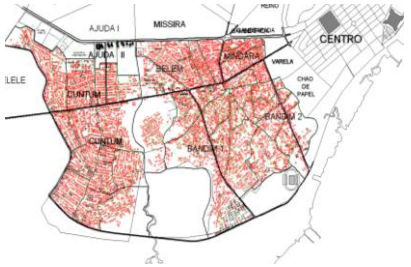
Aaby, under review, 2016

Sex-differential effects of Penta?

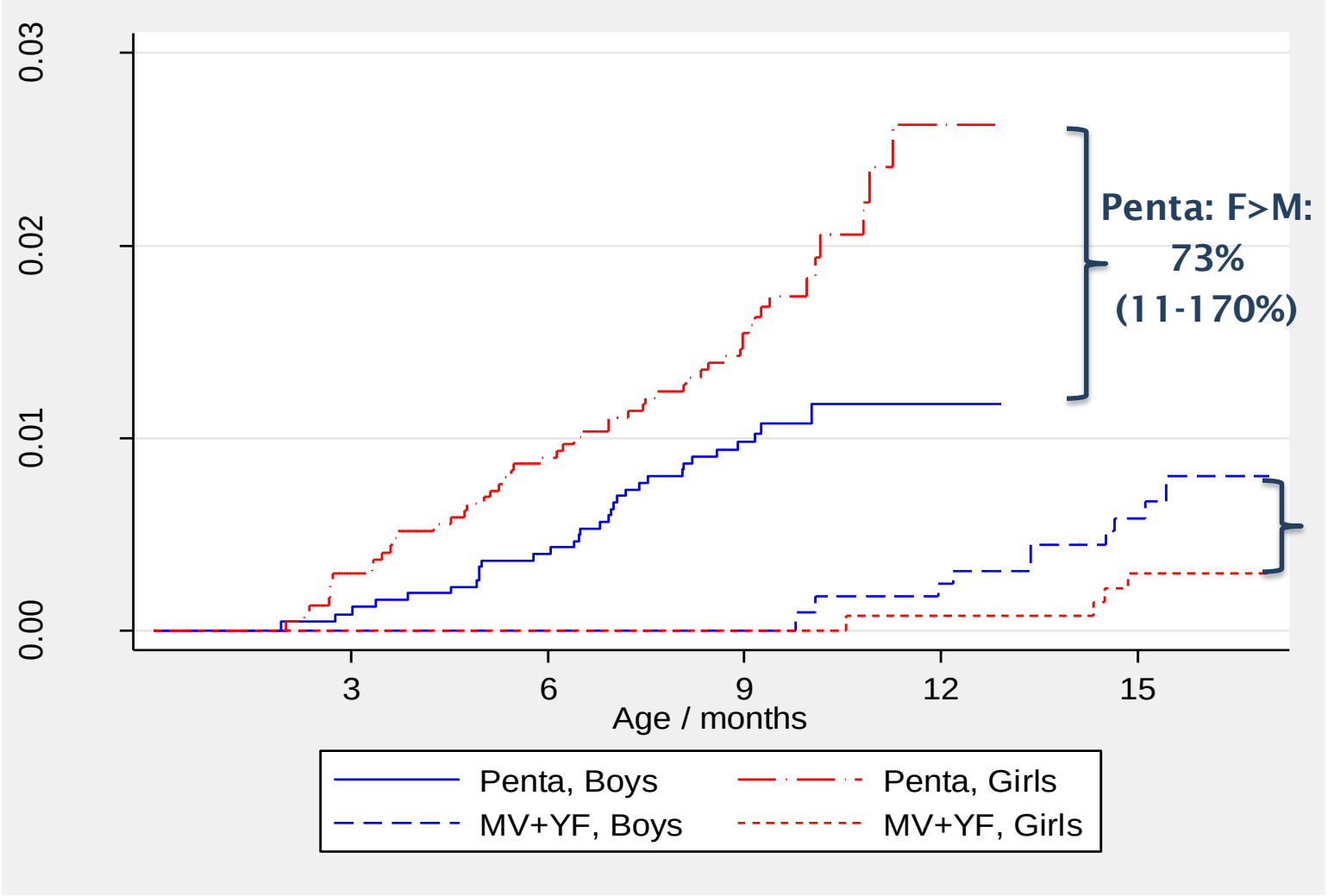
Daily registration of all vaccines at Health Centres

Children between 6 weeks and 12 months presenting for vaccination at health centres

Prospective follow up through Bandim Surveillance



Results



Penta-unvaccinated children: No sex-difference in mortality between 6w-8m

Conclusion

- Data supporting Hypotheses 2+3

Increase in the female to male (F/M) mortality when Penta vaccinations are given.

Decrease in the female to male (F/M) mortality when measles + yellow fever vaccination is given.

Non-specific effects of childhood vaccinations – A case control study nested into a Health and Demographic Surveillance System in rural Burkina Faso

Pfeiffer G[1], Fisker AB[2], Nebie E[3], Hengelbrock J[4], Sié A[3], Becher H[1,4], Müller O[1]

[1]Institute of Public Health, Ruprecht-Karls Universität Heidelberg, Germany
[2]Research Centre for Vitamins and Vaccines, Bandim Health Project, Statens Serum Institut, Copenhagen, Denmark
[3]Centre de Recherche en Santé, Nouna, Burkina Faso
[4]Institute for Medical Biometry and Epidemiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Accra, Ghana, August 2016

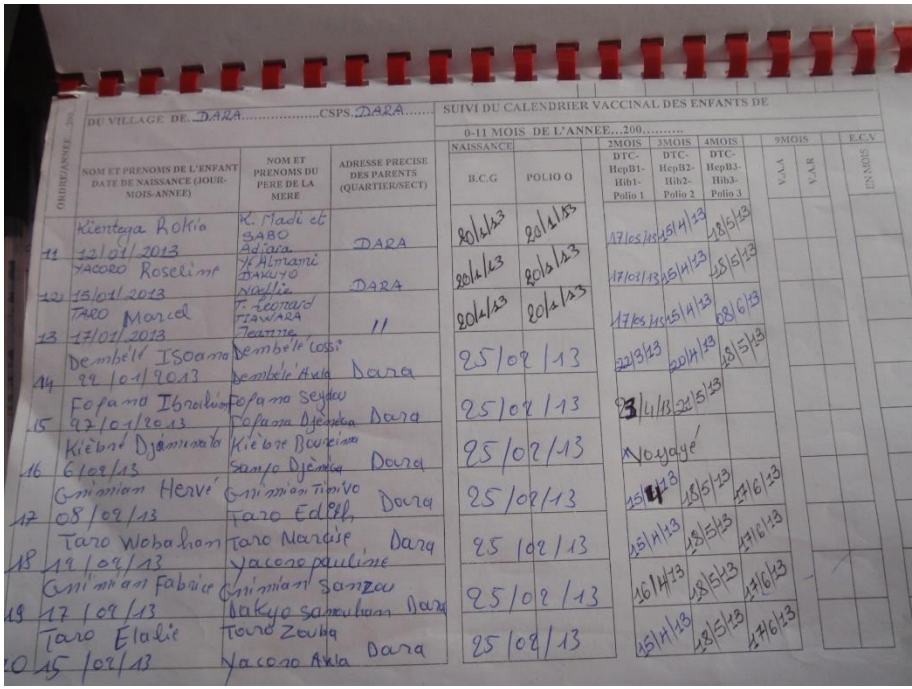
Study Design

- Case-control design
- Nested into the dynamic cohort of the Nouna HDSS
- children born between 01.01.2009 and 31.12.2011
- Cases: children who died between the age of 2 and 24 months
- Controls: from surviving the age of the case, matched to cases by date of birth (within a year) and village of residence
- Up to 10 controls per case

Data collection

- Demographic data: extracted from routine HDSS data
- Vaccination data: extracted from CSPS vaccination books (date and type of vaccination)

➔Only cases/controls with at least one vaccination were considered



Statistical Methods

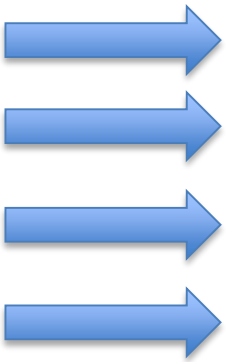
Estimation of the effect of vaccination on mortality with "conditional logistic regression"

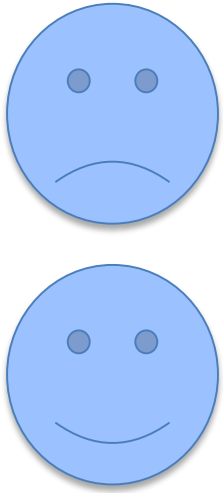
OPV / Penta 1

OPV / Penta 2

OPV / Penta 3

measles





a) All children

b) boys and girls separately

Results

- 407 potential cases and 3,319 potential controls identified from the complete HDSS data .
- Of these (375/407 cases, 92%; 2,636/3,319 controls, 79%) were identified in the CSPS vaccination books

Gender	Cases not found/ total cases (%)	Controls not found/ total control (%)
Male	17/223(8)	344/1626 (21)
Female	15/184 (8)	340/1693 (20)
Total	32/407 (8)	684/3319 (21)

Results OPV / Penta

Exposure	Cases (%)	Controls (%)	Overall OR (95%CI)	Male OR (95%CI)	Female OR (95%CI)	p (interaction)
OPV Penta 1						
Vaccinated	84 (94.4)	606 (94.7)	0.9 (0.3-2.69)	0.46 (0.1-2.08)	1.46 (0.32-6.72)	0.26
Unvaccinated	5 (5.6)	34 (5.3)	1	1		
OPV Penta 2						
Vaccinated	67 (84.8)	503 (88.9)	0.57 (0.25-1.30)	0.37 (0.11-1.23)	1.27 (0.27-5.85)	0.02
Unvaccinated	12 (15.2)	63 (11.1)	1	1		
Not included(<91days)	10	74	-	-	-	
OPV Penta 3						
Vaccinated	57 (81.4)	411 (82.2)	0.93 (0.42-2.04)	0.73 (0.26-2.11)	1.11 (0.41-3.00)	0.54
Unvaccinated	13 (18.6)	89 (17.8)	1	1		
Not included(<122days)	19	140	-	-	-	

Results MV

Exposure	Cases (%)	Controls (%)	Overall OR (95%CI)	Male (95%CI)	Female (95%CI)	p-value*
MV+YF						
Vaccinated	252 (88)	1777 (89)	0.94 (0.6 - 1.46)	0.85 (0.49-1.48)	1.06 (0.57-1.99)	0.56
Unvaccinated	34 (12)	218 (11)	1	1		
Not eligible**	89	640	-	-	-	

Discussion

The findings both of these studies provide further support on the existence of sex-differential NSE of Penta.