



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



MINISTRY OF FOREIGN AFFAIRS OF DENMARK

**DANIDA** | INTERNATIONAL  
DEVELOPMENT COOPERATION

# Testing the DTP hypotheses

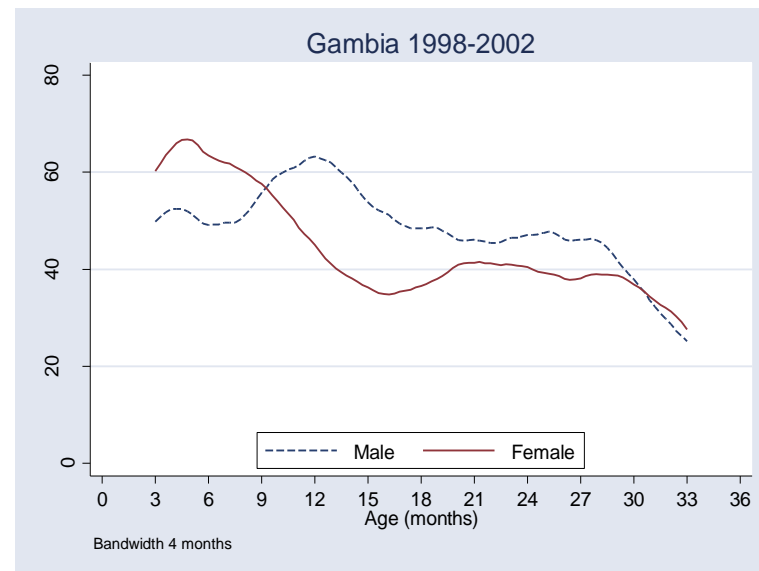
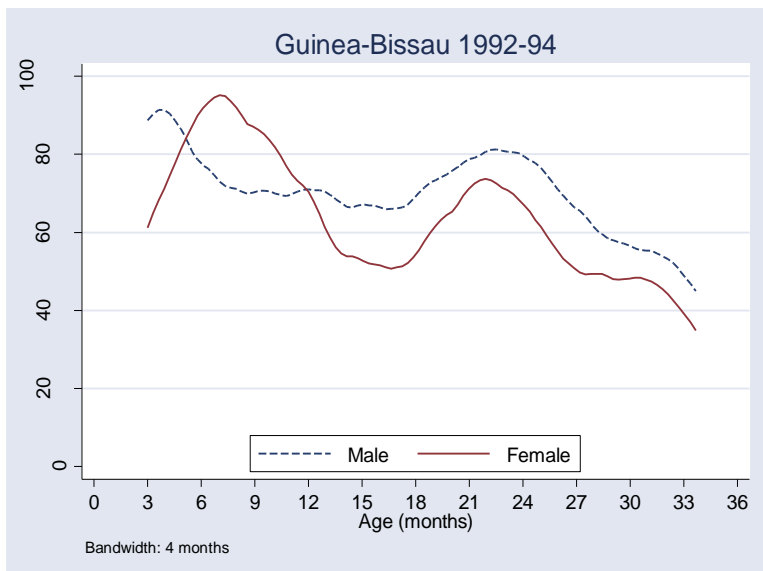


Hypothesis 1: DTP after BCG to girls increases mortality

Hypothesis 2: DTP after BCG is associated with an increase in Female/Male mortality rate ratio

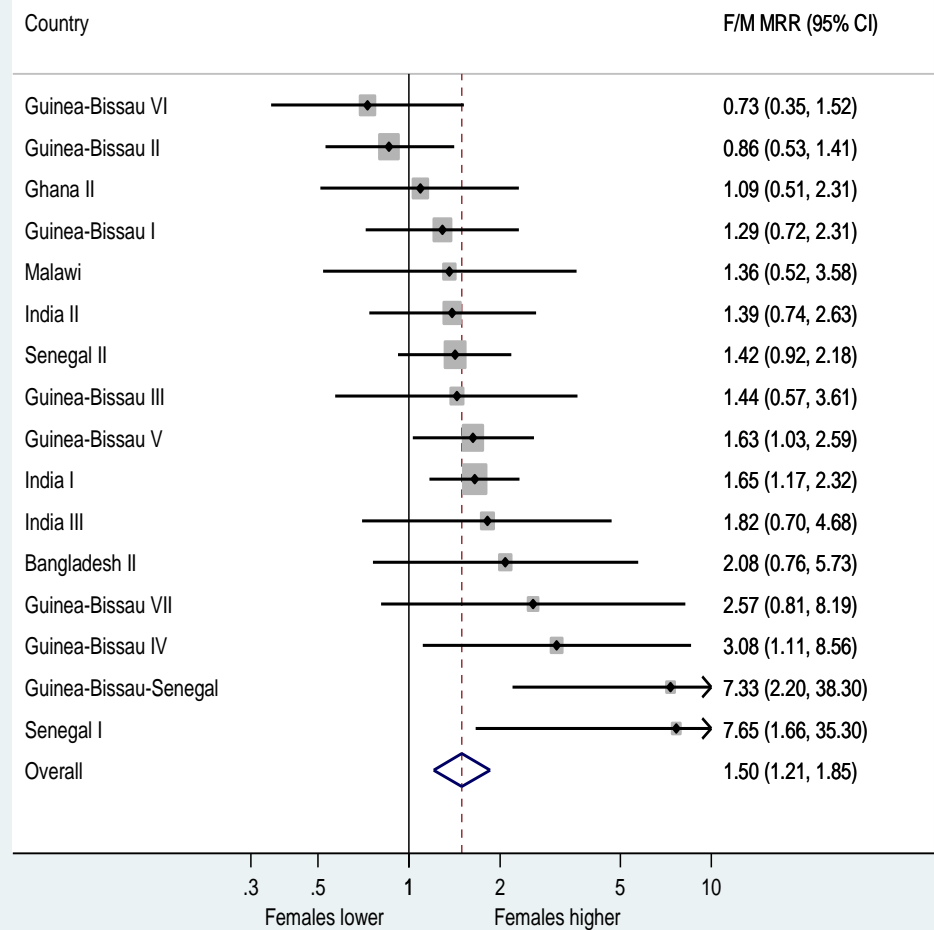
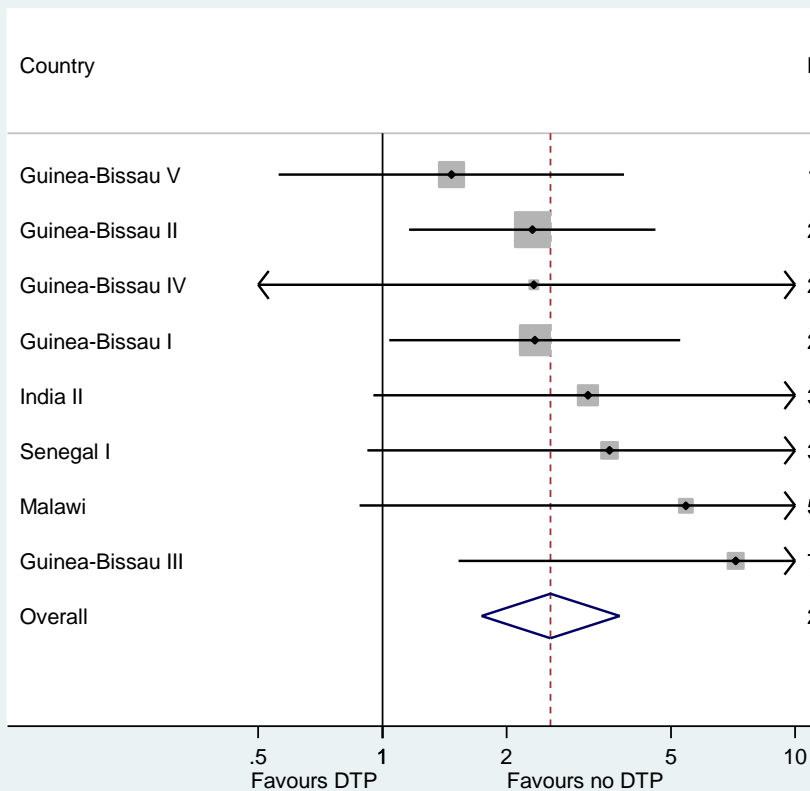
Hypothesis 3: MV after DTP associated with an decrease in Female/Male mortality rate ratio

Fine, TMIH, 2007



# Hypothesis 1+2

Supported by literature review



# Sex-differential effects of Penta?

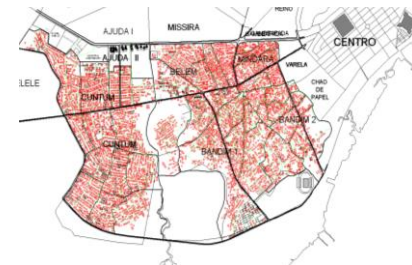


Daily registration of all vaccines at Health Centres

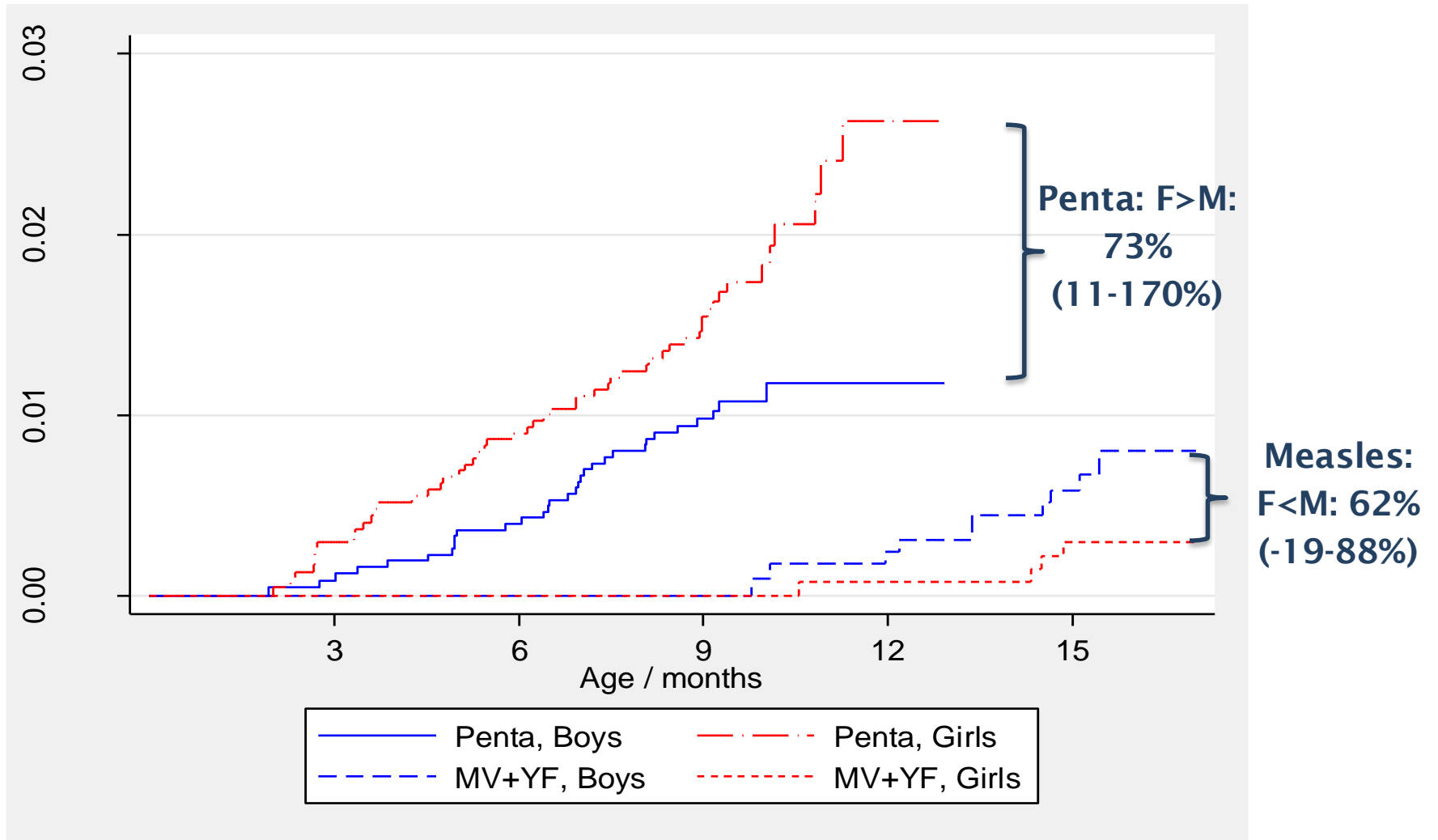
Children between 6 weeks and 12 months presenting for vaccination at health centres



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**

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**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

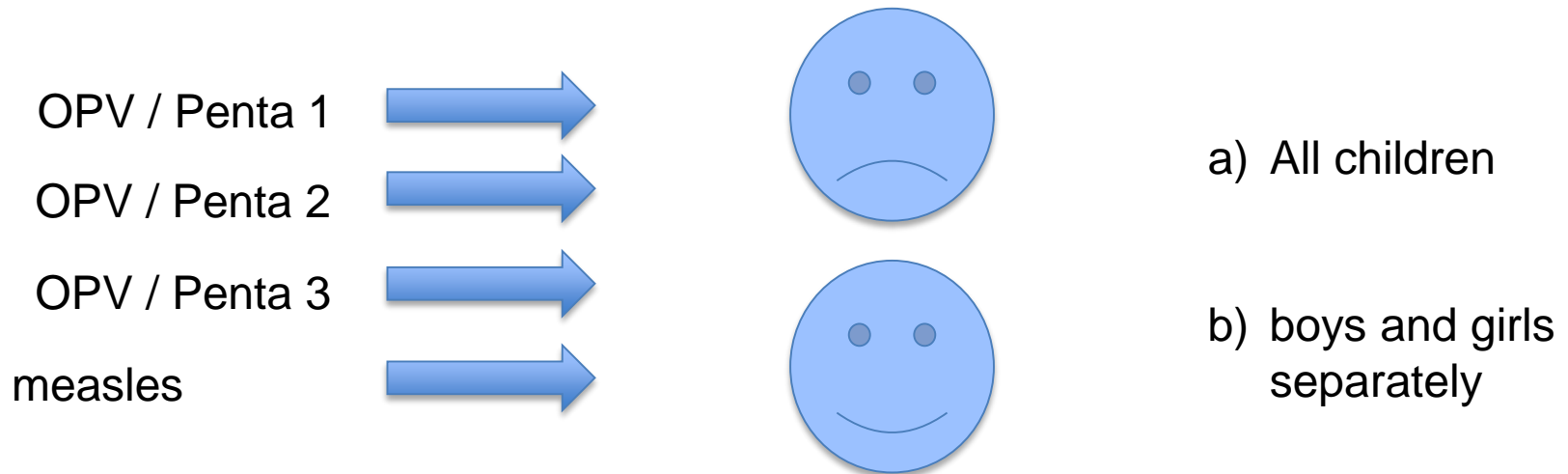
- Demographic data: extracted from routine HDSS data
- Vaccination data: extracted from CSPS vaccination books (date and type of vaccination)

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

OUIBRE/ANNEE	DE VILLAGE DE DARA.....CSPS DARA.....			SUIVI DU CALENDRIER VACCINAL DES ENFANTS DE 0-11 MOIS DE L'ANNEE...2013.....									
	NOM ET PRENOMS DE L'ENFANT DATE DE NAISSANCE (JOUR- MOIS-ANNEE)	NOM ET PRENOMS DU PERE DE LA MERE	ADRESSE PRECISE DES PARENTS (QUARTIER/SECT)	NAISSANCE	B.C.G	POLIO 0	2MOIS DTC- HepB1- Hib1- Polio 1	3MOIS DTC- HepB2- Hib2- Polio 2	4MOIS DTC- HepB2- Hib3- Polio 3	9MOIS V.V	15MOIS V.V	E.C.V	
11	Kientega Rokia 30/01/2013	K. Madi et SABO Adara	DARA	20/1/13	20/1/13	17/05/13	25/4/13	18/5/13					
12	YACORO Roselimp 15/01/2013	M. Alimani ZAWATO Nadlie	DARA	20/1/13	20/1/13	17/05/13	25/4/13	25/5/13					
13	TARO Marcel 17/01/2013	F. Leonard FIAWARA Toutra	//	20/1/13	20/1/13	17/05/13	25/4/13	28/6/13					
14	Dembelle ISOAMA 29/01/2013	Dembelle Lassi Dembelle Awa	Dara	25/02/13		22/3/13	20/4/13	25/5/13					
15	Fofama Donatien 07/01/2013	Fofama Seydou Fafama Djankia	Dara	25/02/13		23/4/13	22/5/13						
16	Kiebra Djamoua 6/02/13	Kiebra Bourkina Sampo Djankia	Dara	25/02/13					Moysaye				
17	Gnimian Hervé 08/02/13	Gnimian Timbo Taro Edou	Dara	25/02/13		25/4/13	25/5/13	27/6/13					
18	Taro Wehaham 19/02/13	Taro Narcisse Yacoro Pauline	Dara	25/02/13		25/4/13	25/5/13	27/6/13					
19	Gnimian Fabrice 17/02/13	Gnimian Sanzo Makya Samuhon	Dara	25/02/13		26/4/13	25/5/13	27/6/13					
20	Taro Etalie 15/02/13	Taro Zouha Yacoro Awa	Dara	25/02/13		25/4/13	25/5/13	27/6/13					

# Statistical Methods

Estimation of the effect of vaccination on mortality with  
“conditional logistic regression”



# 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 CSPA 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)
<b>OPV Penta 1</b>						
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		
<b>OPV Penta 2</b>						
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	-	-	-	
<b>OPV Penta 3</b>						
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*
<b>MV+YF</b>						
<b>Vaccinated</b>	252 (88)	1777 (89)	0.94 (0.6 - 1.46)	0.85 (0.49-1.48)	1.06 (0.57-1.99)	0.56
<b>Unvaccinated</b>	34 (12)	218 (11)	1	1		
<b>Not eligible**</b>	89	640	-	-	-	

# Discussion

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