

# Sequence of vaccination in LMICs: data from DHS and MICS

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# Objectives

To use existing nationally representative survey data for a *preliminary* examination of the following:

For what % of children:

1. is BCG is *not* the first vaccine given (H1)?
2. is DTP the *last* vaccine given (H2, H3)?
3. are live (BCG or MCV) and killed (DTP) vaccines given on the same day (H4)?
4. are MCV and vitamin A given on the same day (H4)?

# Methods

*Data:* DHS (rounds 5, 6) & MICS (round 3)  
children *aged 24-59m* at time of survey.

*Analysis:* median and upper quartile values

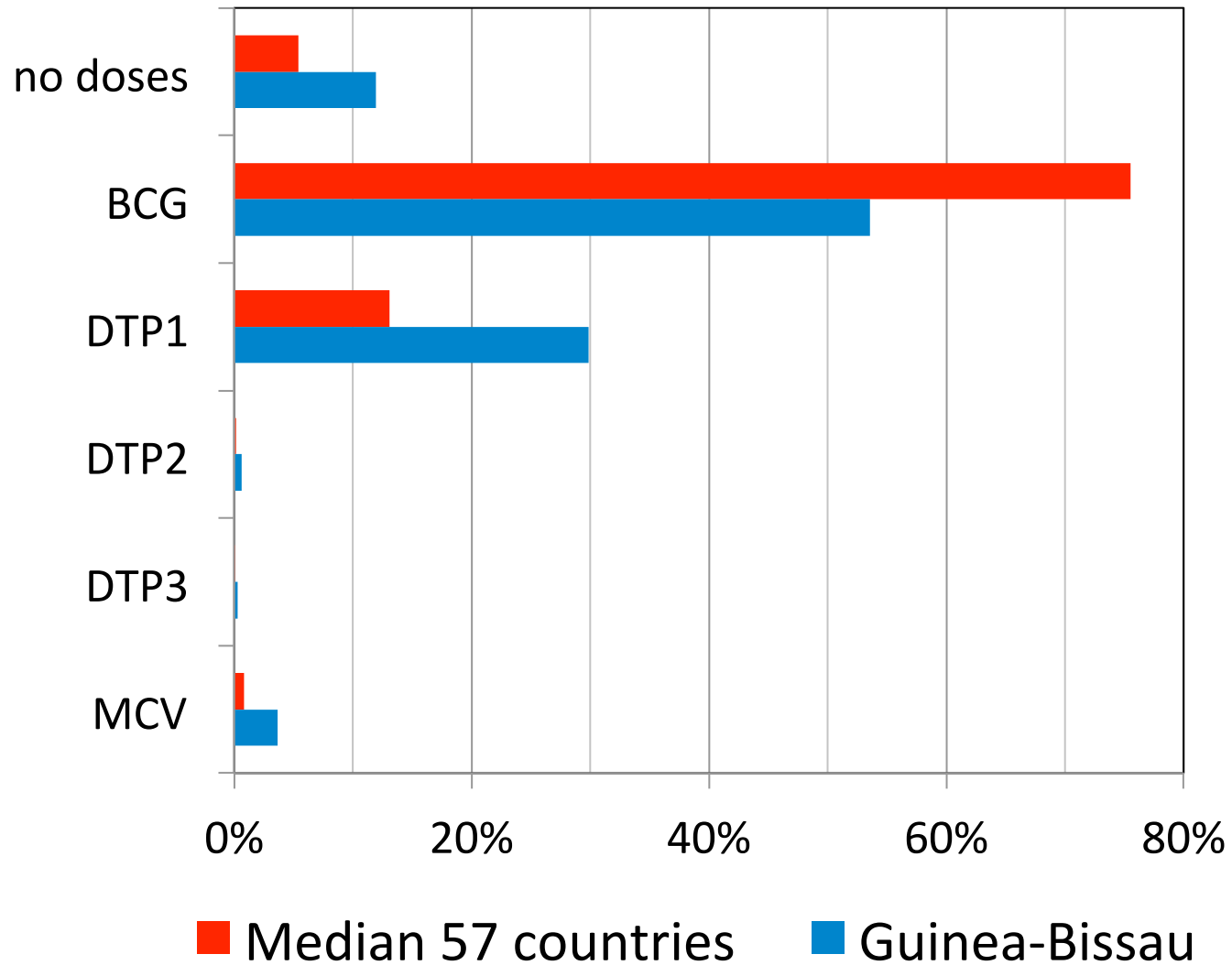
- overall and by WHO region
- boys v girls
- urban v rural
- highest wealth quintile v lowest

*Assumption:* %s for children without dates of administration  
(mother's reports only)  
= %s for children with dates  
(from vaccination cards)

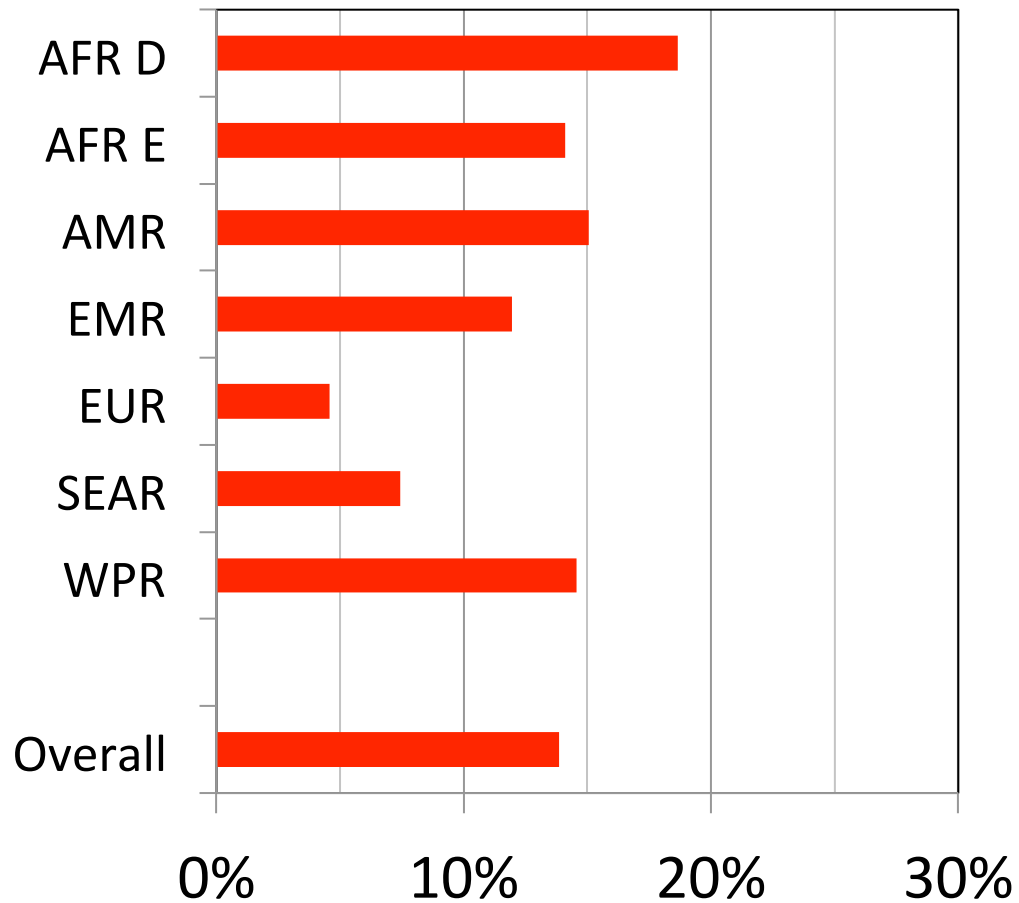
# Background data

WHO Region	Surveys		Median values for the group of countries						
	available	used	Children in survey aged 24m +	Year of vaccination earliest BCG	latest MCV	Child died before interview	% of MCV given after age 24m	% of vaccinated children that have dates on cards age median	
AFR D	20	14	7,917	2002	2006	9%	4%	24-35m	58%
								24-59m	49%
AFR E	23	14	7,072	2005	2008	8%	3%	24-35m	68%
								24-59m	63%
AMR	13	11	6,015	2002	2005	3%	7%	24-35m	75%
								24-59m	72%
EMR	8	4	10,988	2003	2006	3%	1%	24-35m	50%
								24-59m	45%
EUR	10	5	2,297	2002	2005	2%	3%	24-35m	92%
								24-59m	93%
SEAR	9	5	9,444	2003	2006	5%	2%	24-35m	49%
								24-59m	39%
WPR	7	4	3,886	2003	2006	5%	5%	24-35m	75%
								24-59m	69%
Overall	90	57	6,570	2002	2006	6%	3%	24-35m	71%
								24-59m	54%

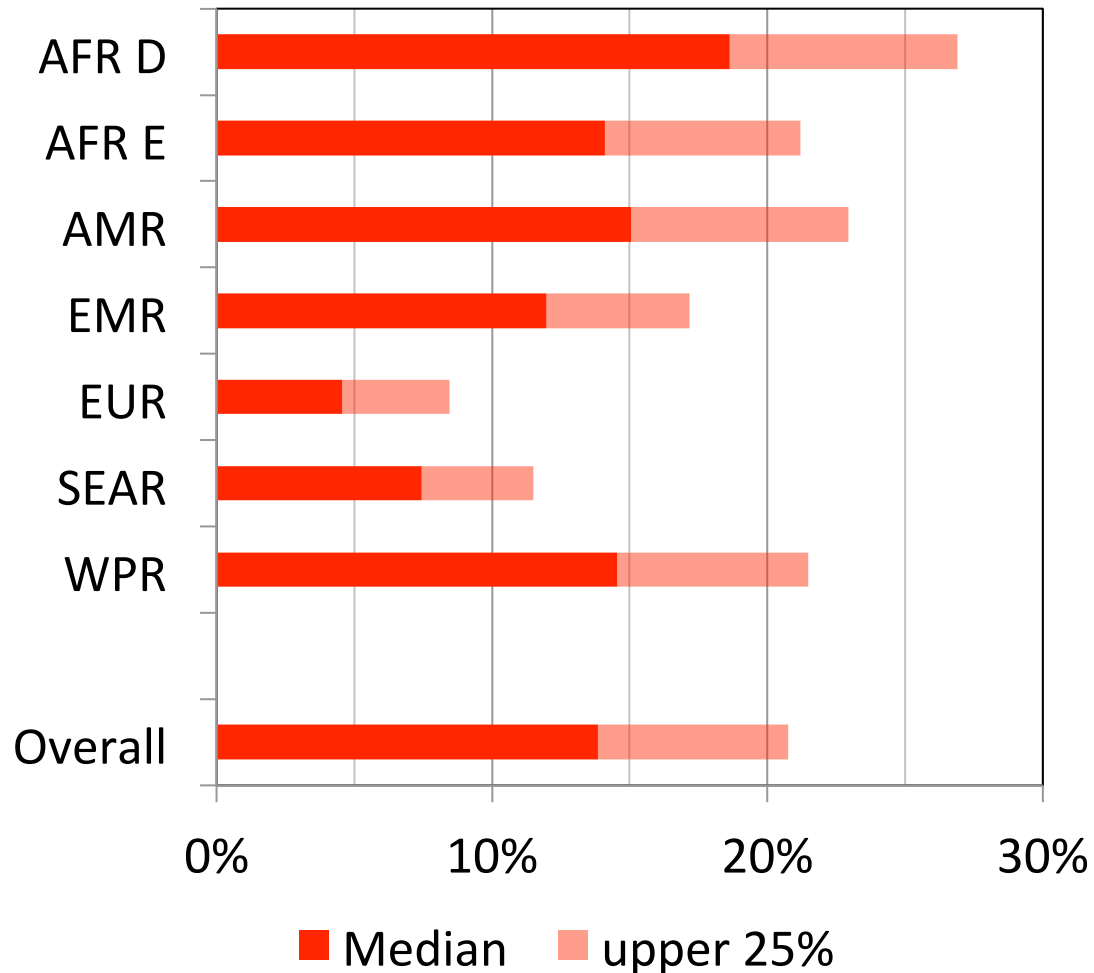
# Which vaccine is given first?



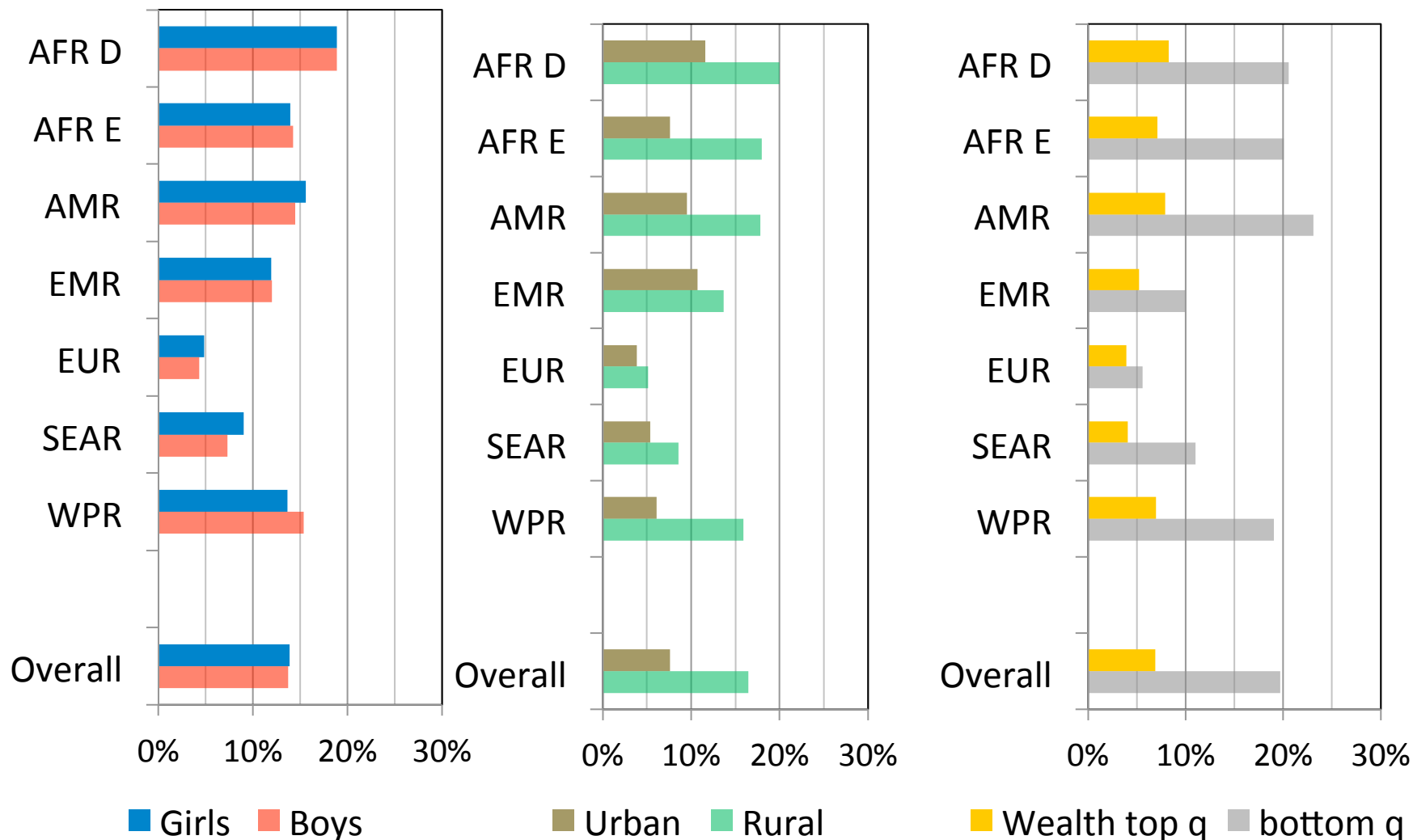
## **% of children with first vaccine *not* BCG: median by WHO region**



## % of children with first vaccine *not* BCG: median and 3<sup>rd</sup> quartile

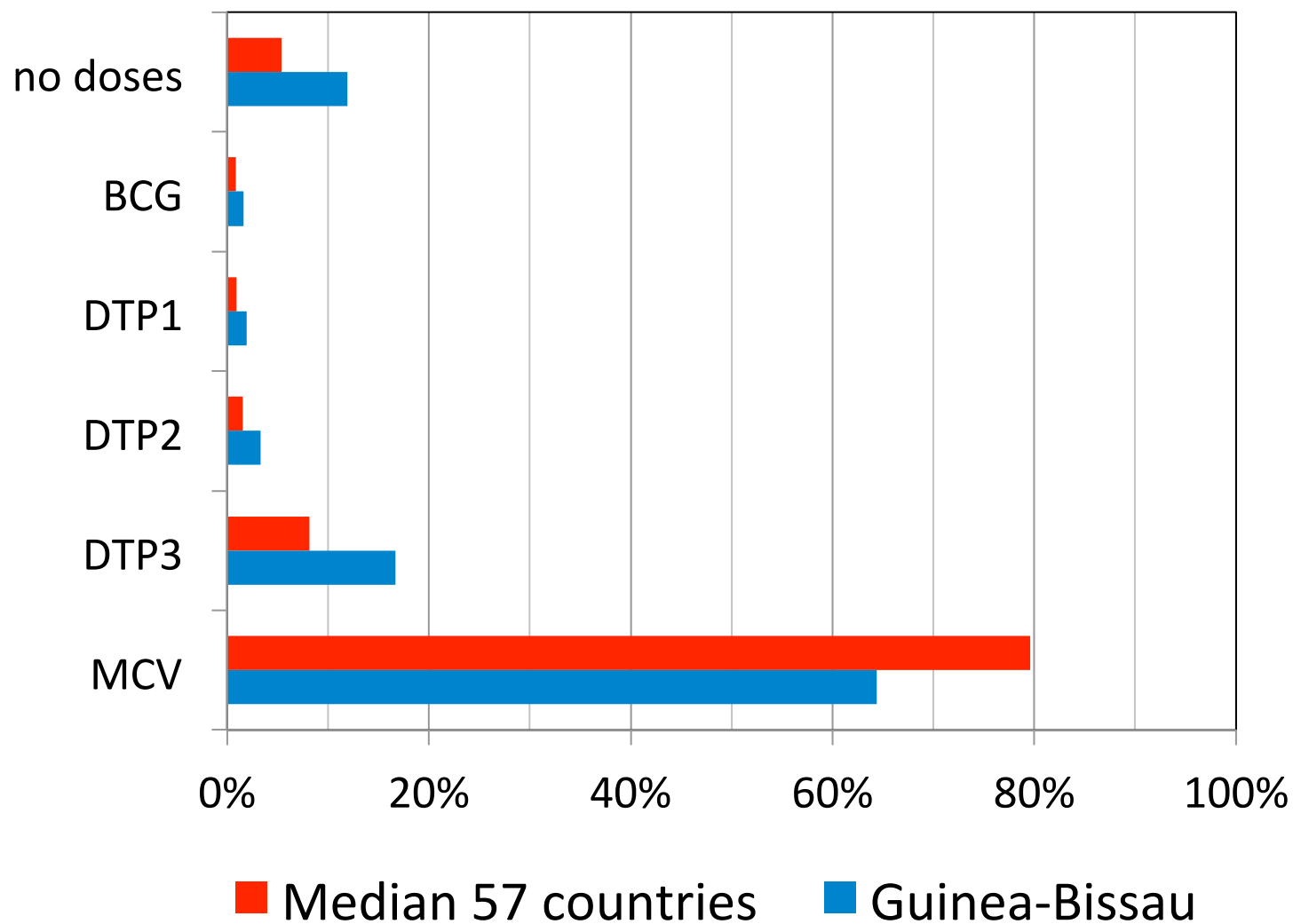


## % of children with first vaccine *not* BCG: correlates.

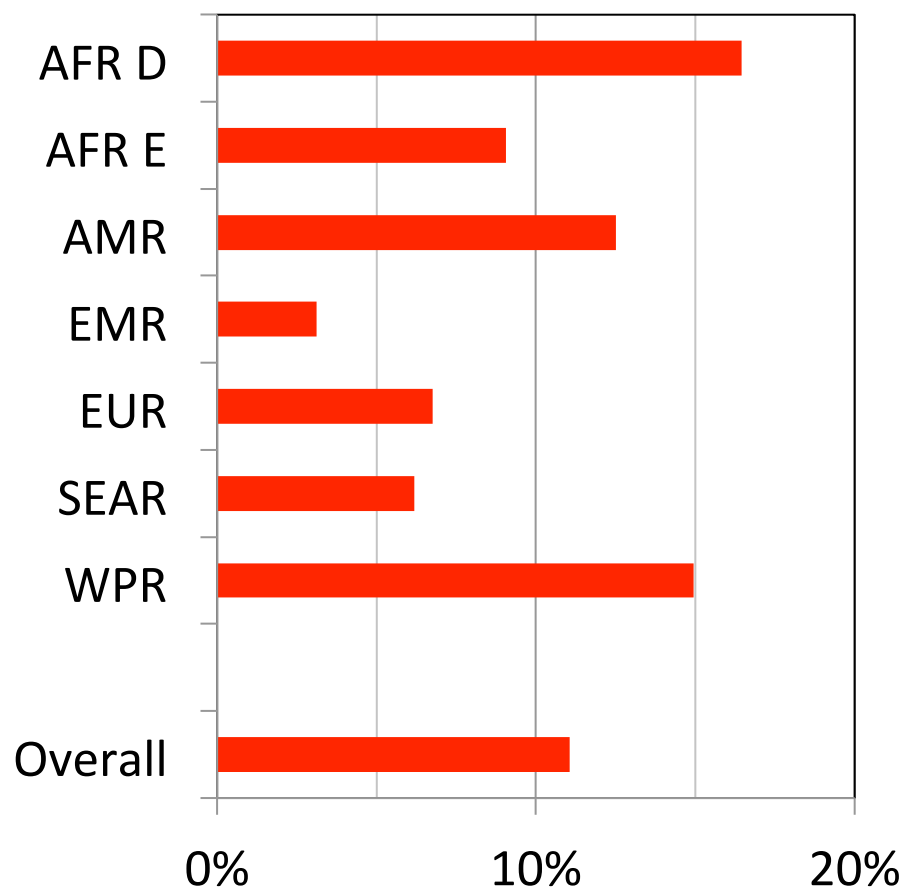




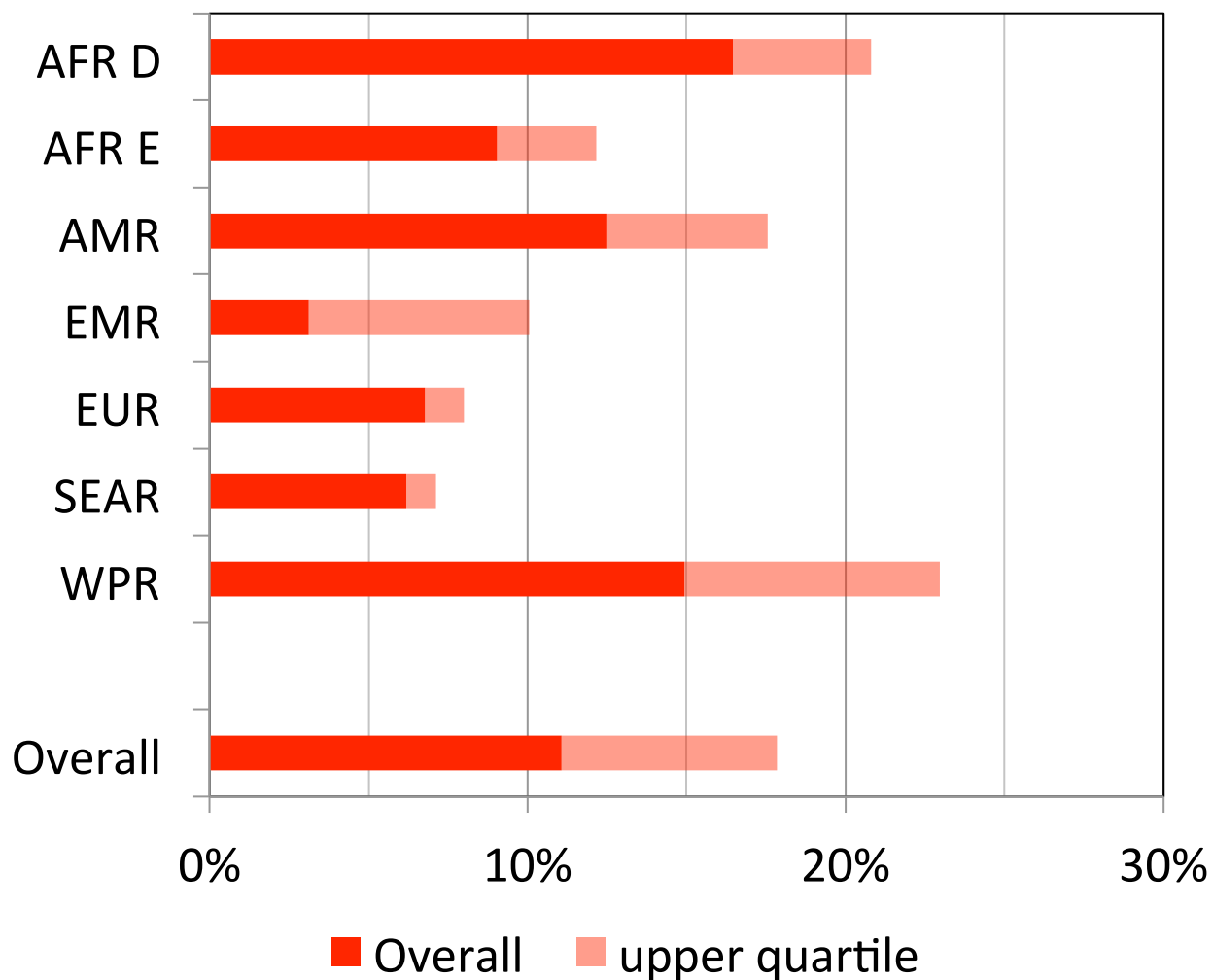
## Which vaccine is given last?



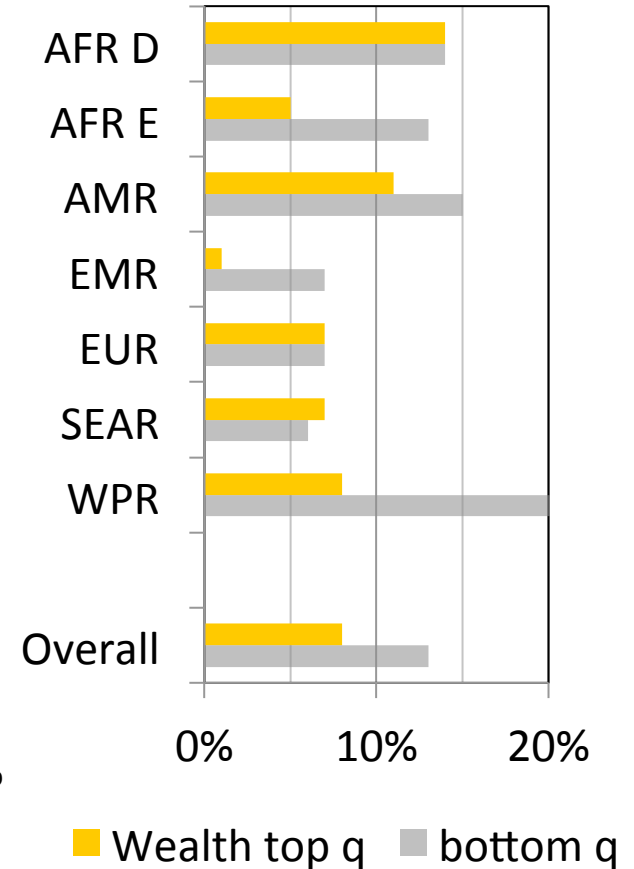
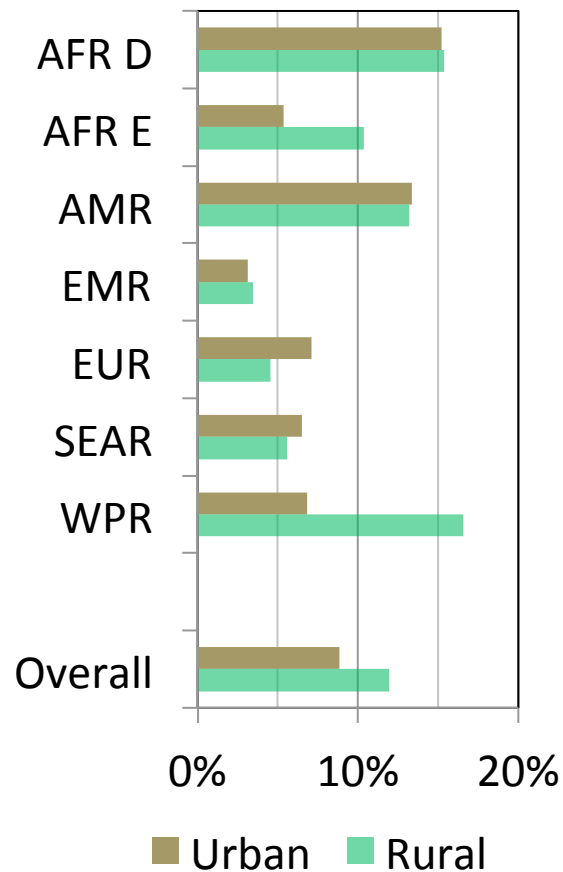
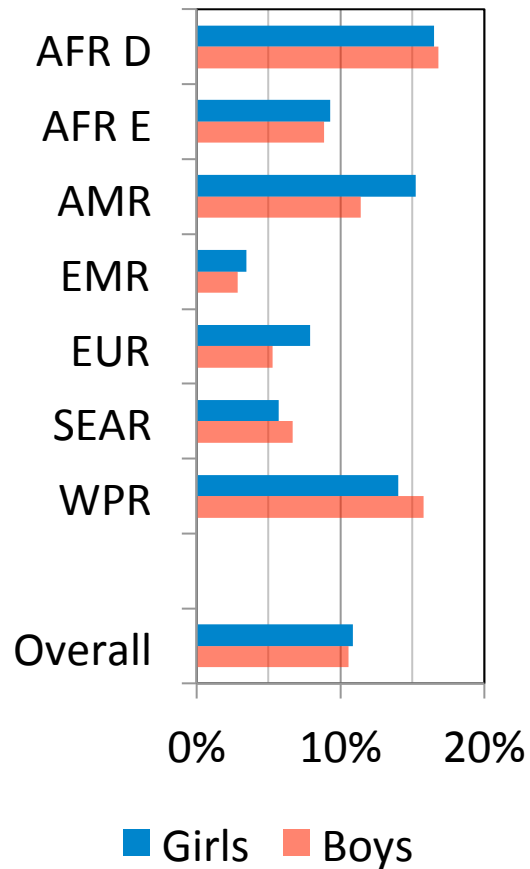
## **% of children with DTP as last vaccine given: median by WHO region**



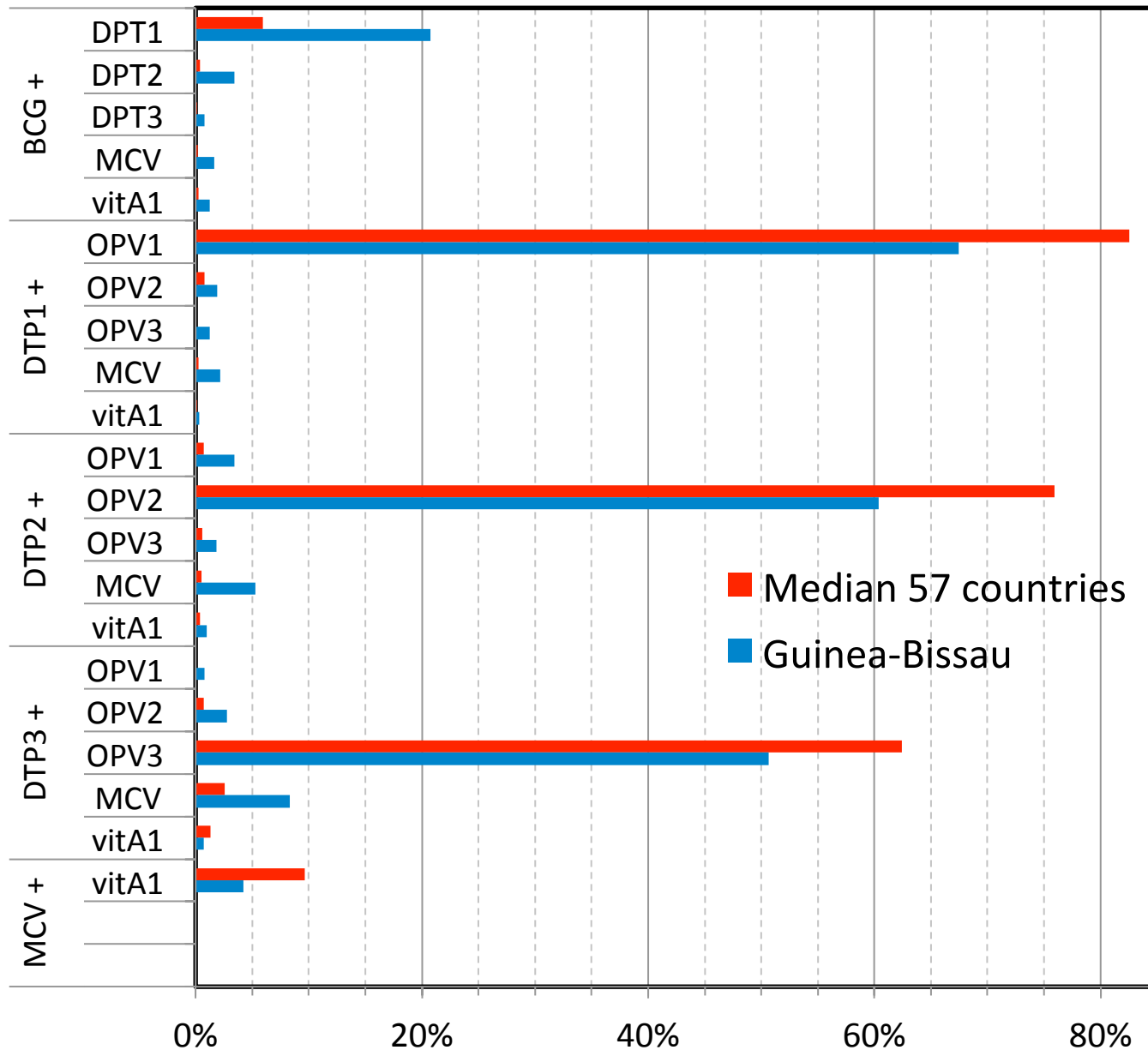
## % of children with DTP as last vaccine given: median and 3<sup>rd</sup> quartile



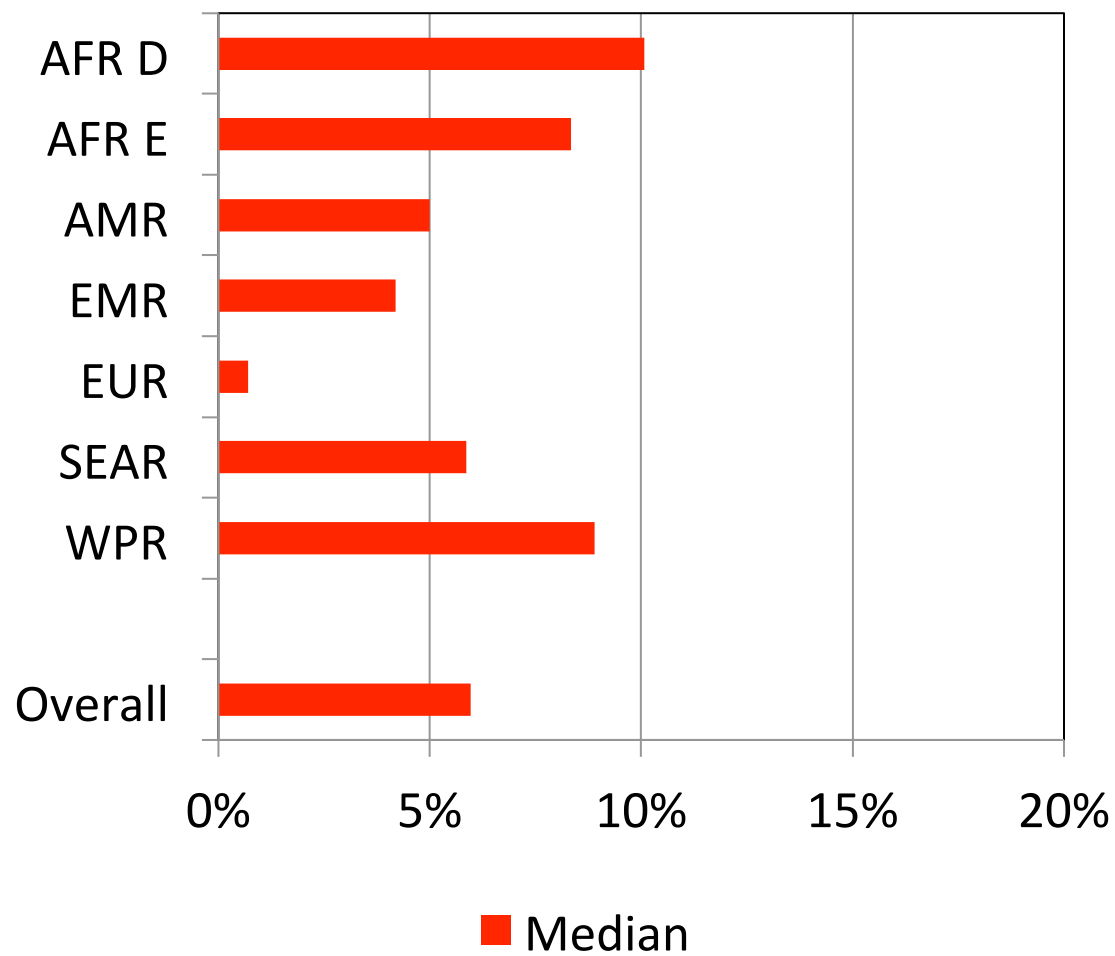
# % of children with DTP as last vaccine: correlates



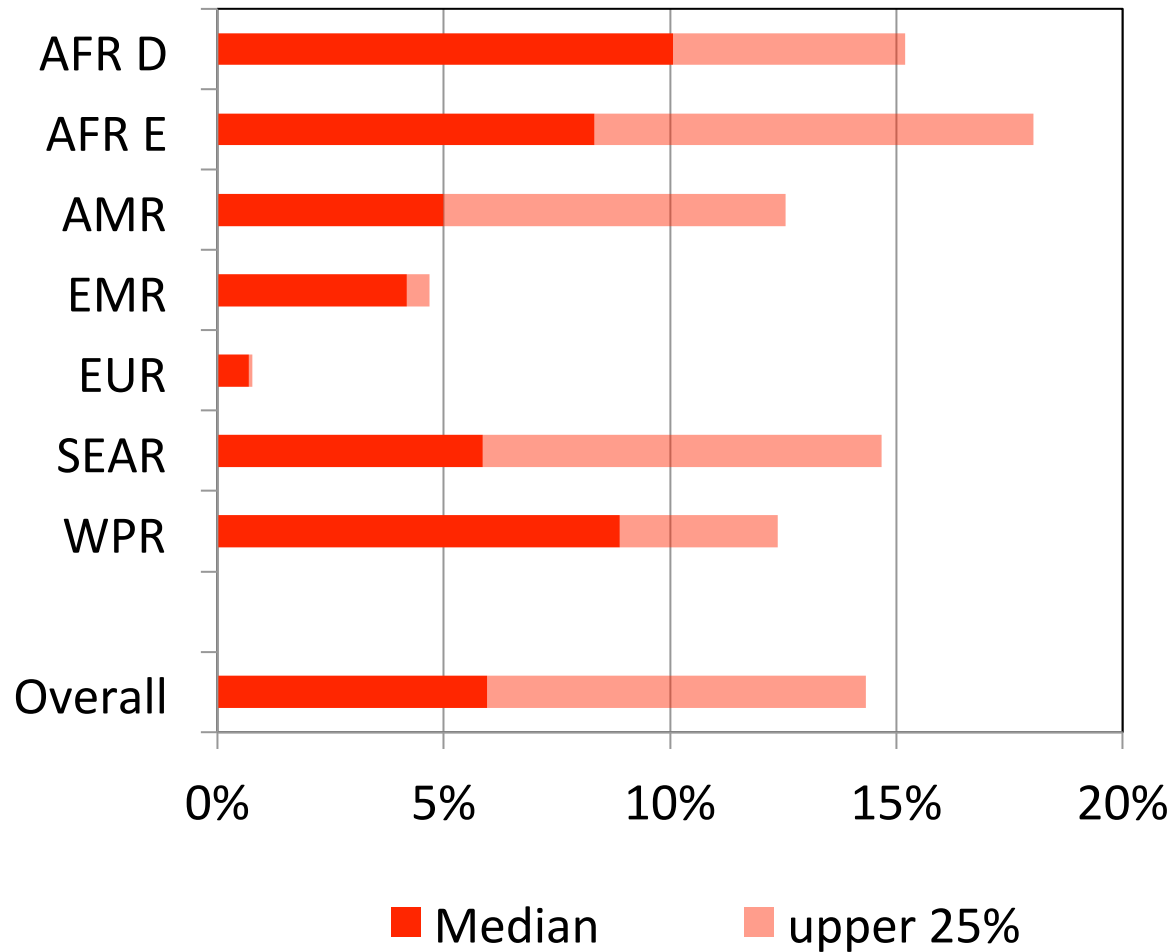
## Vaccines on same day: median of 57 countries vs Guinea-Bissau.



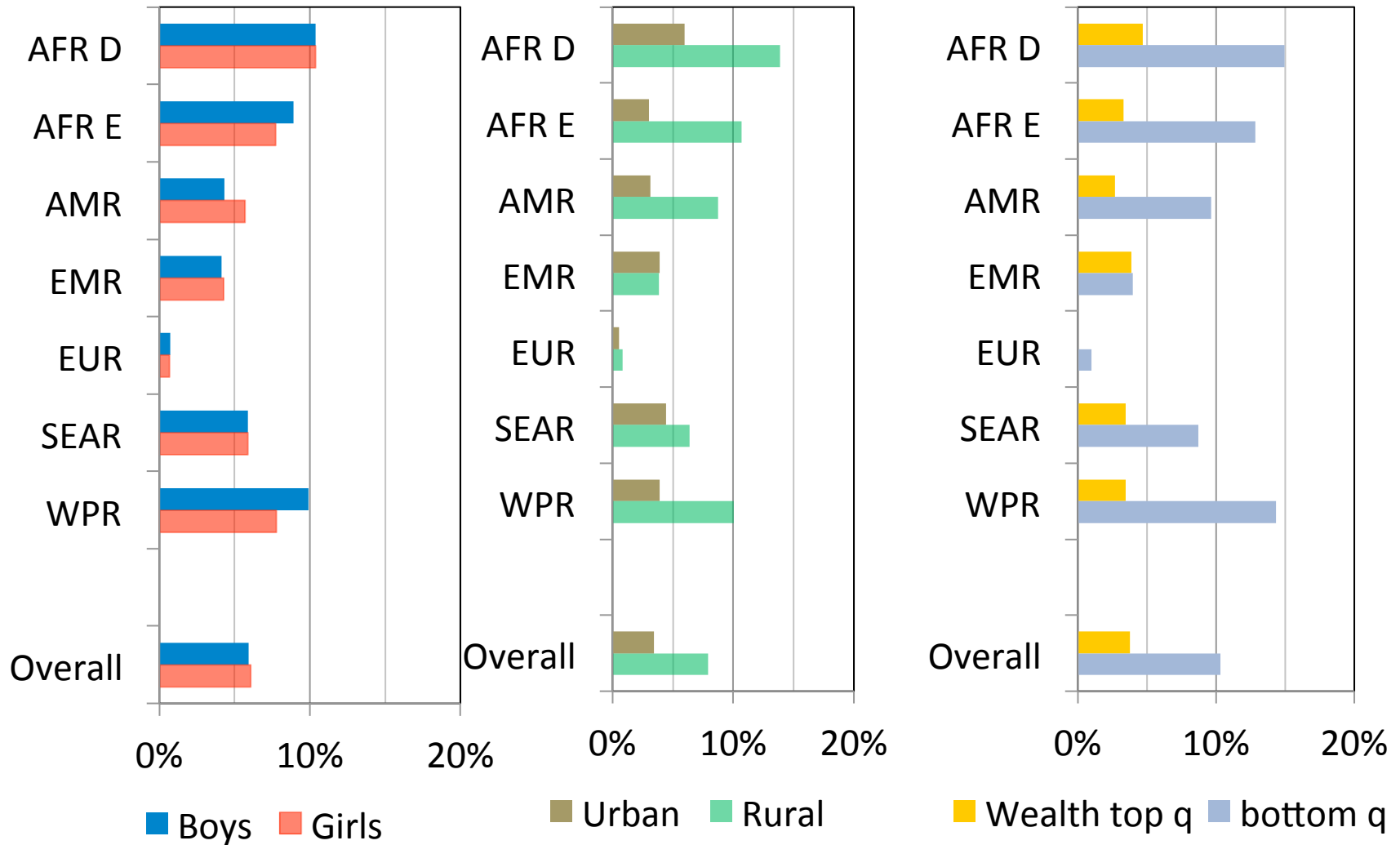
## % with BCG & DTP1 on same day: median by WHO region



## % with BCG & DTP1 on same day: median & 3<sup>rd</sup> quartile

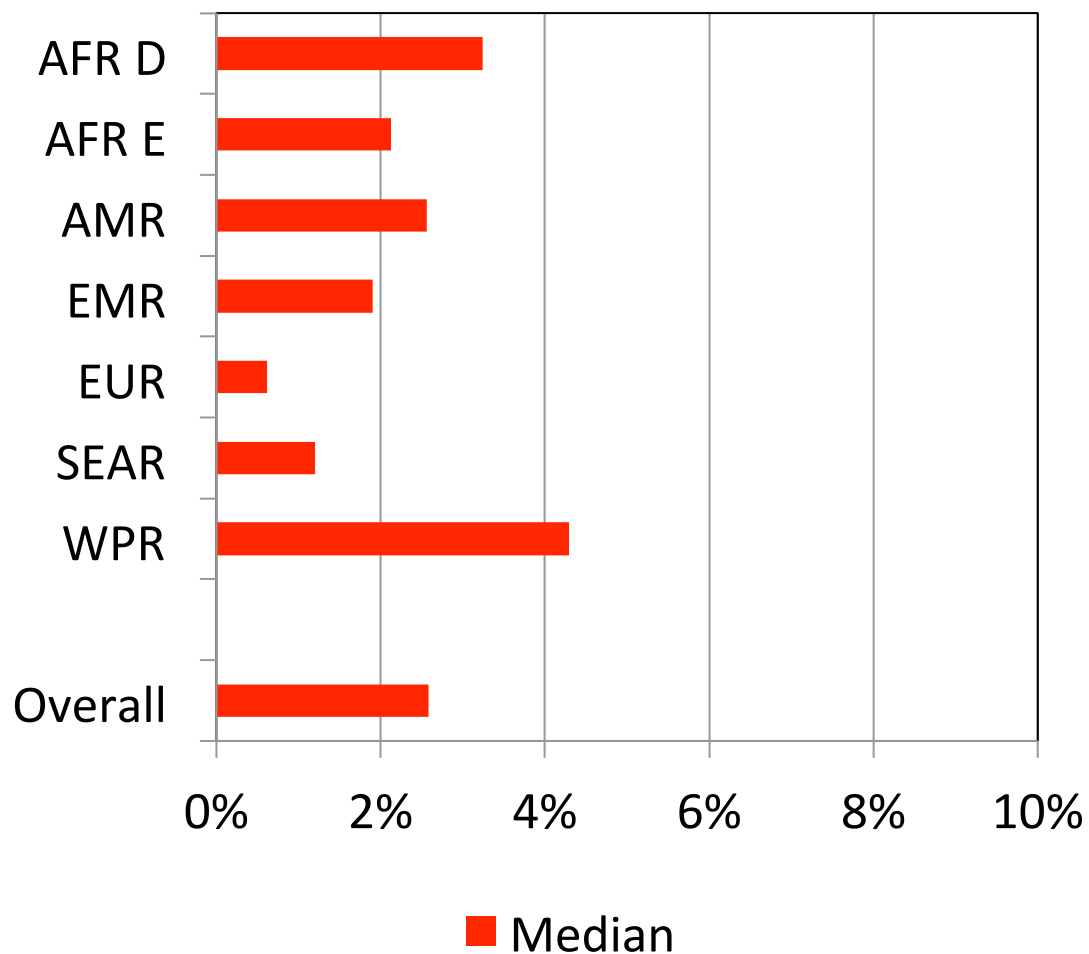


## BCG & DTP1 on the same day: correlates

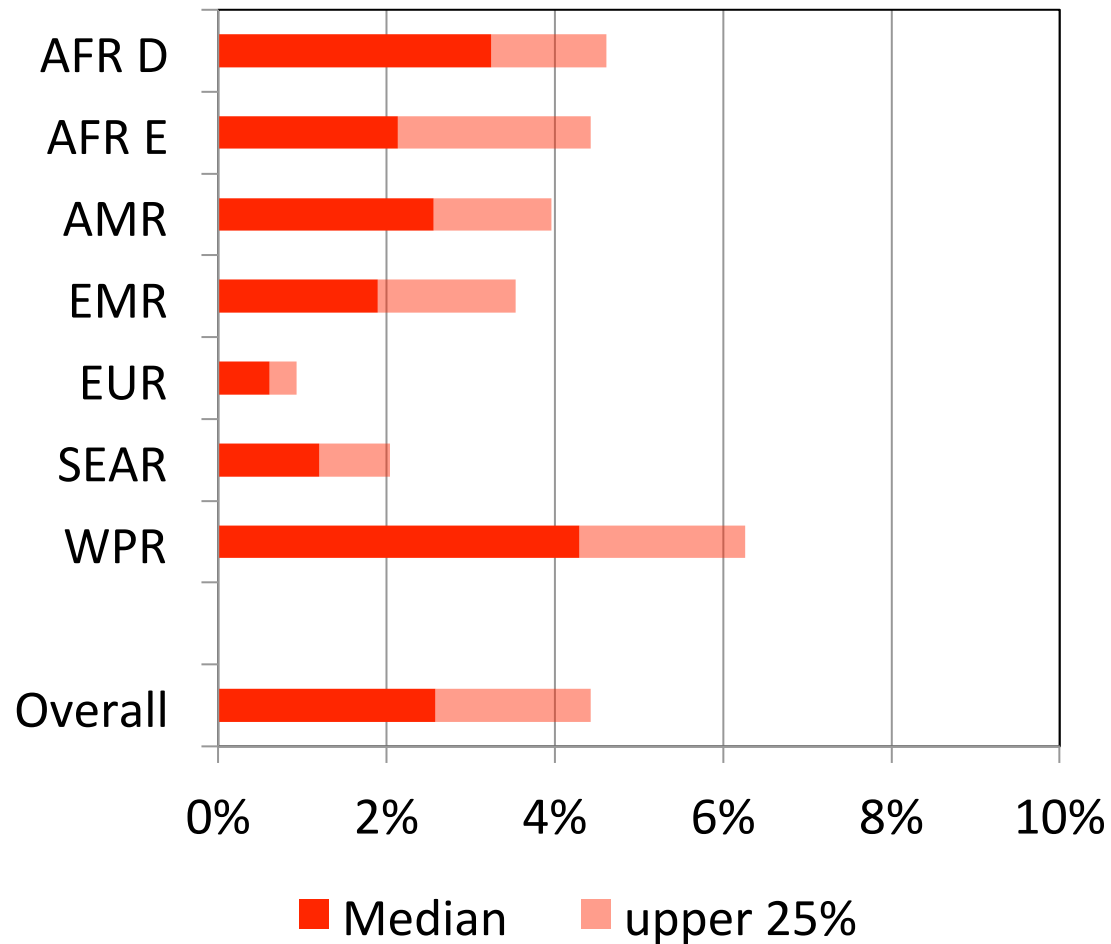




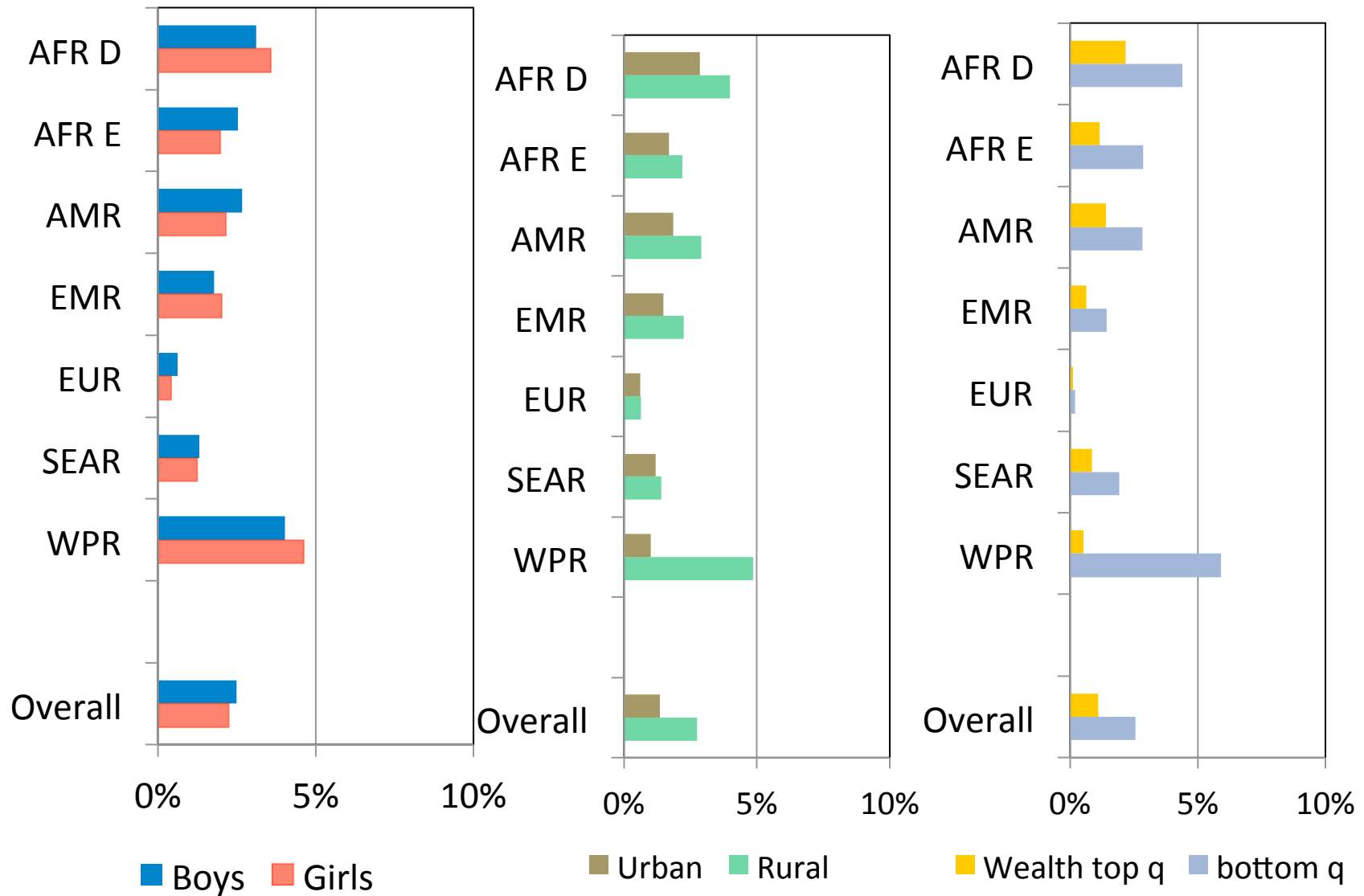
## % with MCV & DTP3 on same day: median by WHO region



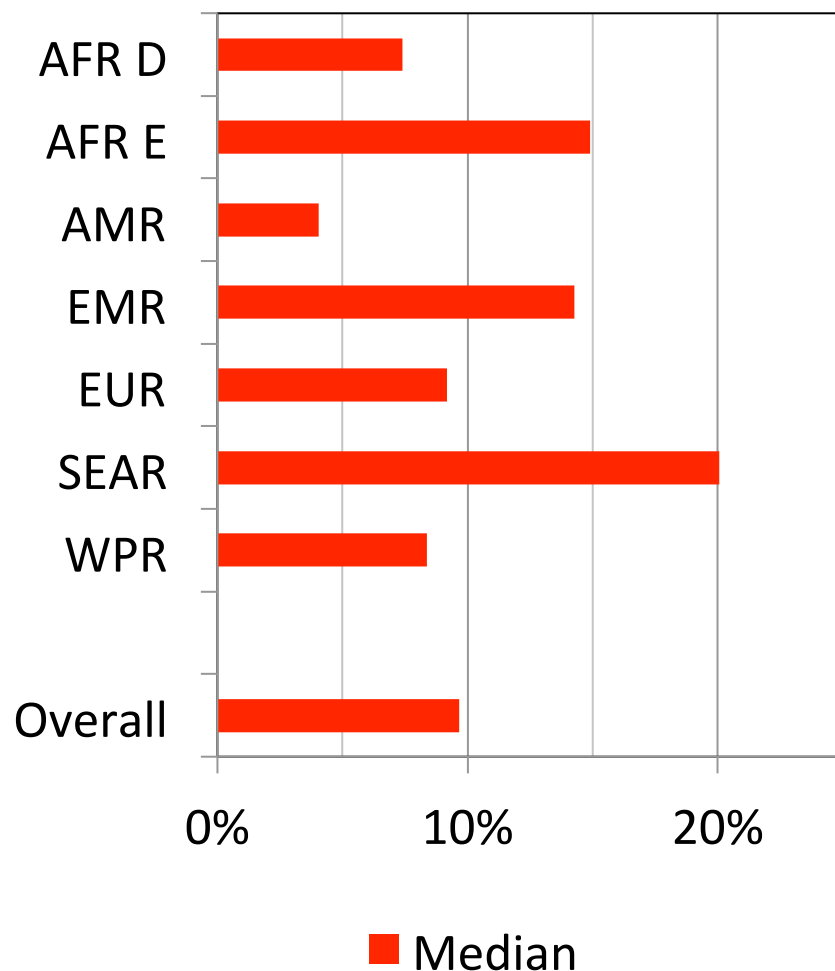
## % with MCV & DTP3 on same day: median & 3<sup>rd</sup> quartile



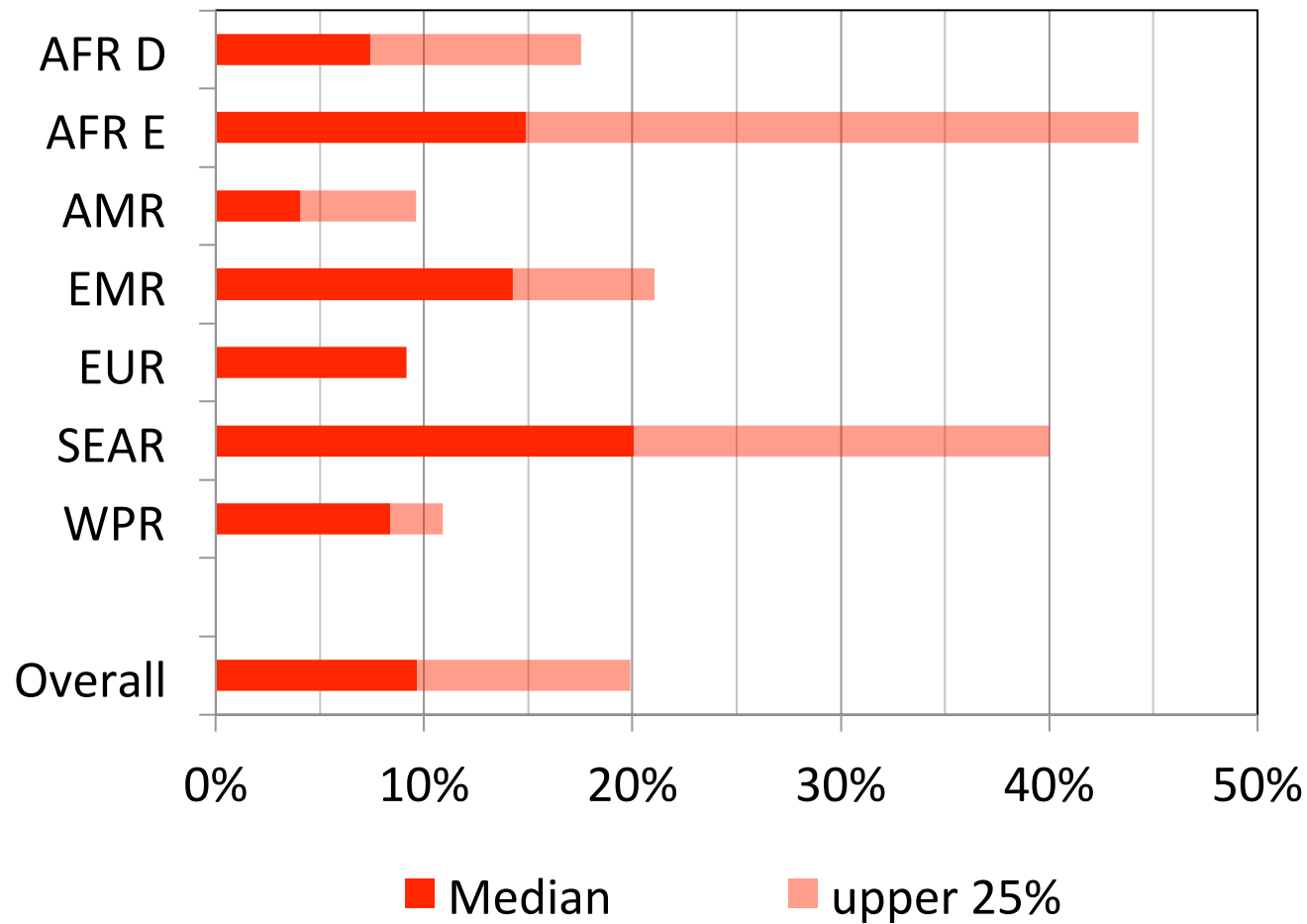
## % with MCV & DTP3 on same day: correlates



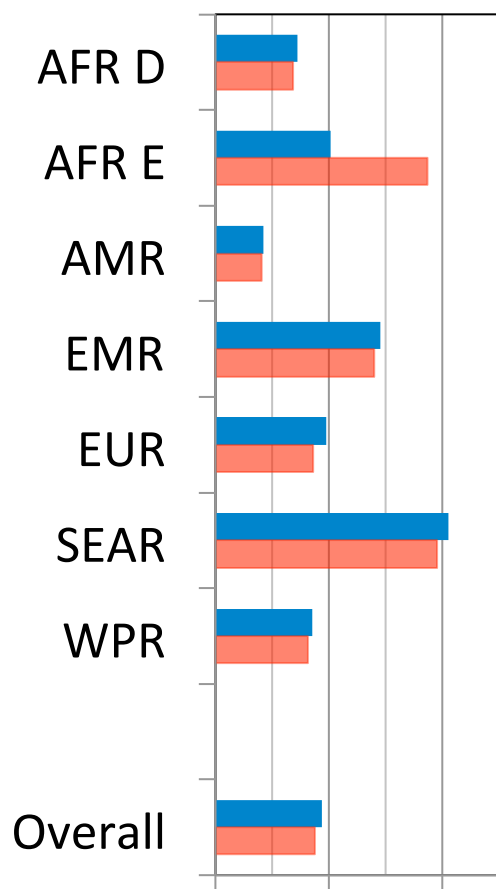
## % with MCV & vitamin A on same day: median by WHO region



## % with MCV & vitamin A on same day: median & 3<sup>rd</sup> quartile

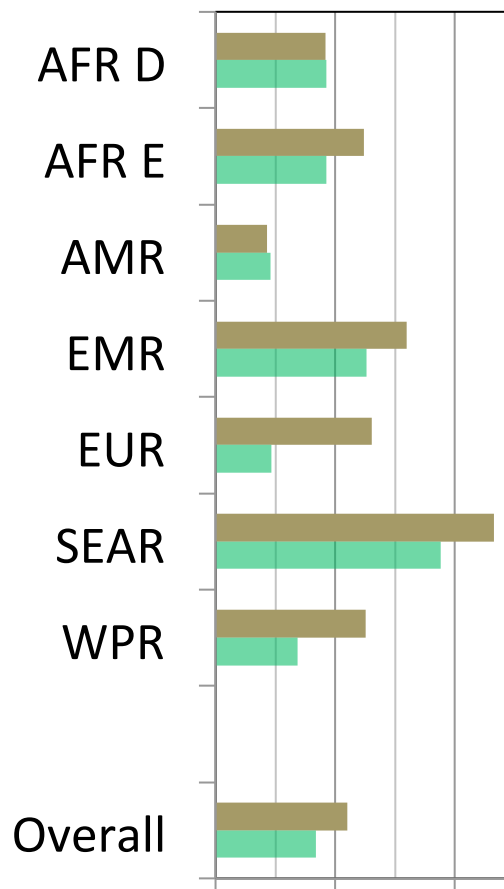


## % with MCV & vitamin A on same day: correlates



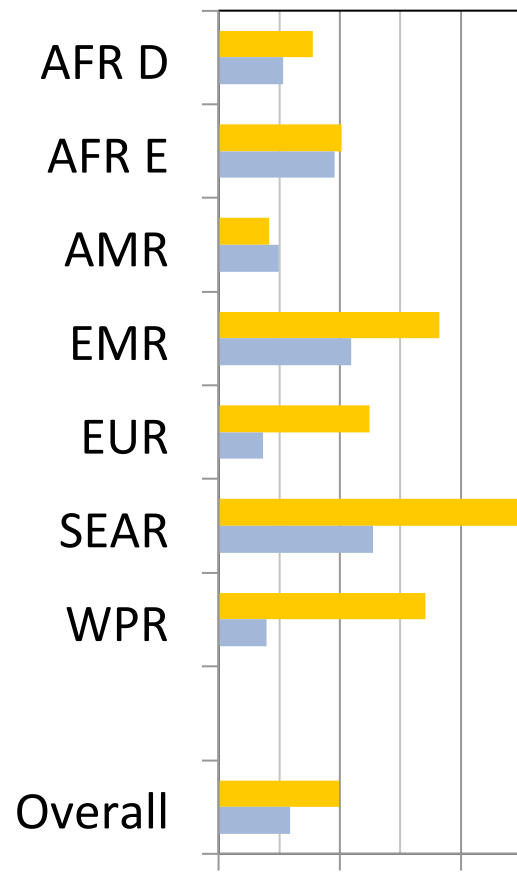
0% 10% 20%

Boys Girls



0% 10% 20%

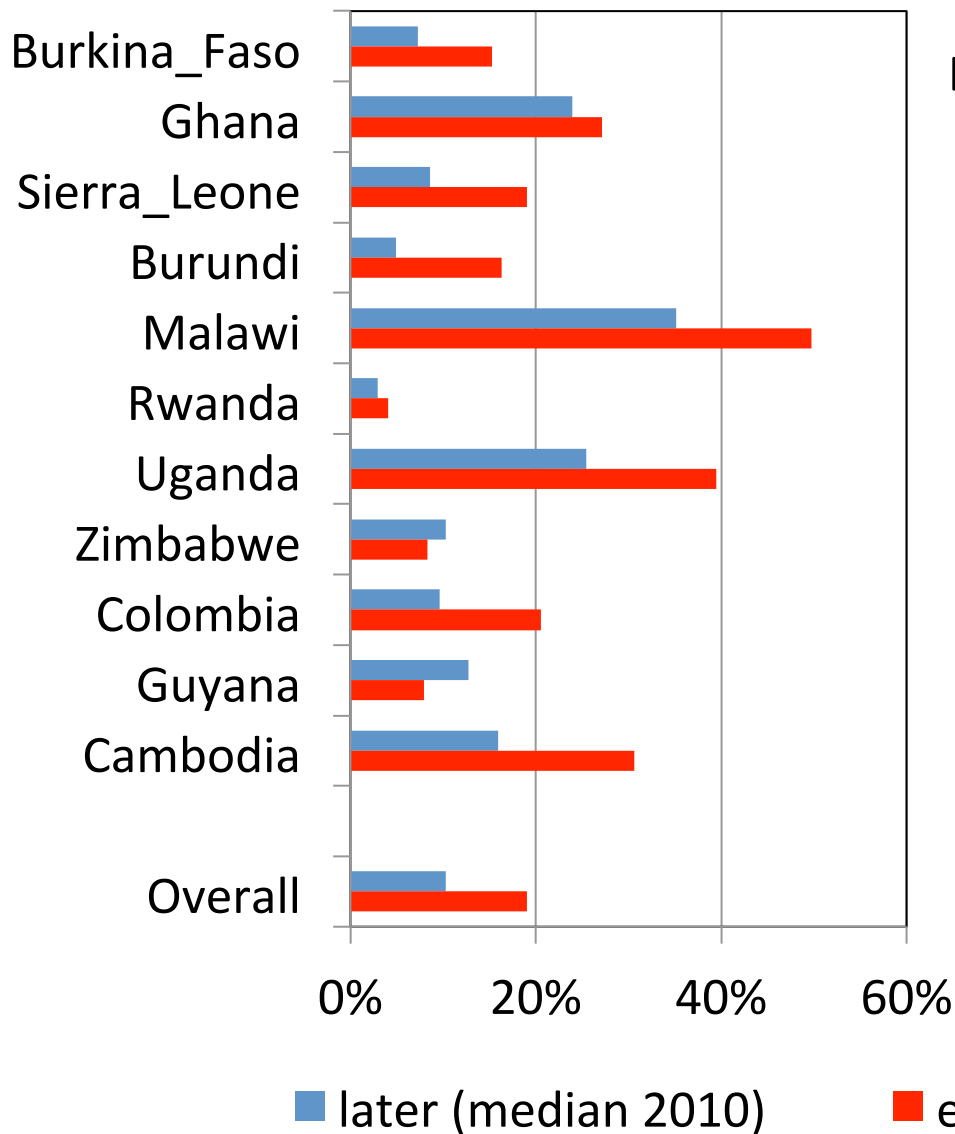
Urban Rural



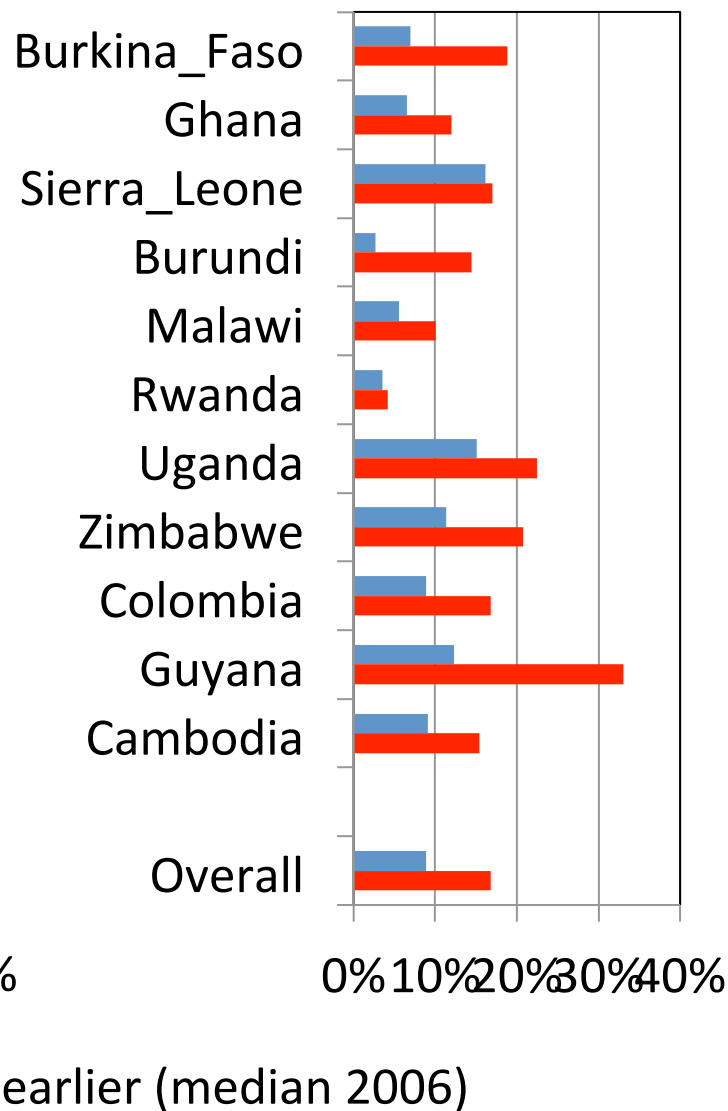
0% 10% 20%

Wealth top q bottom q

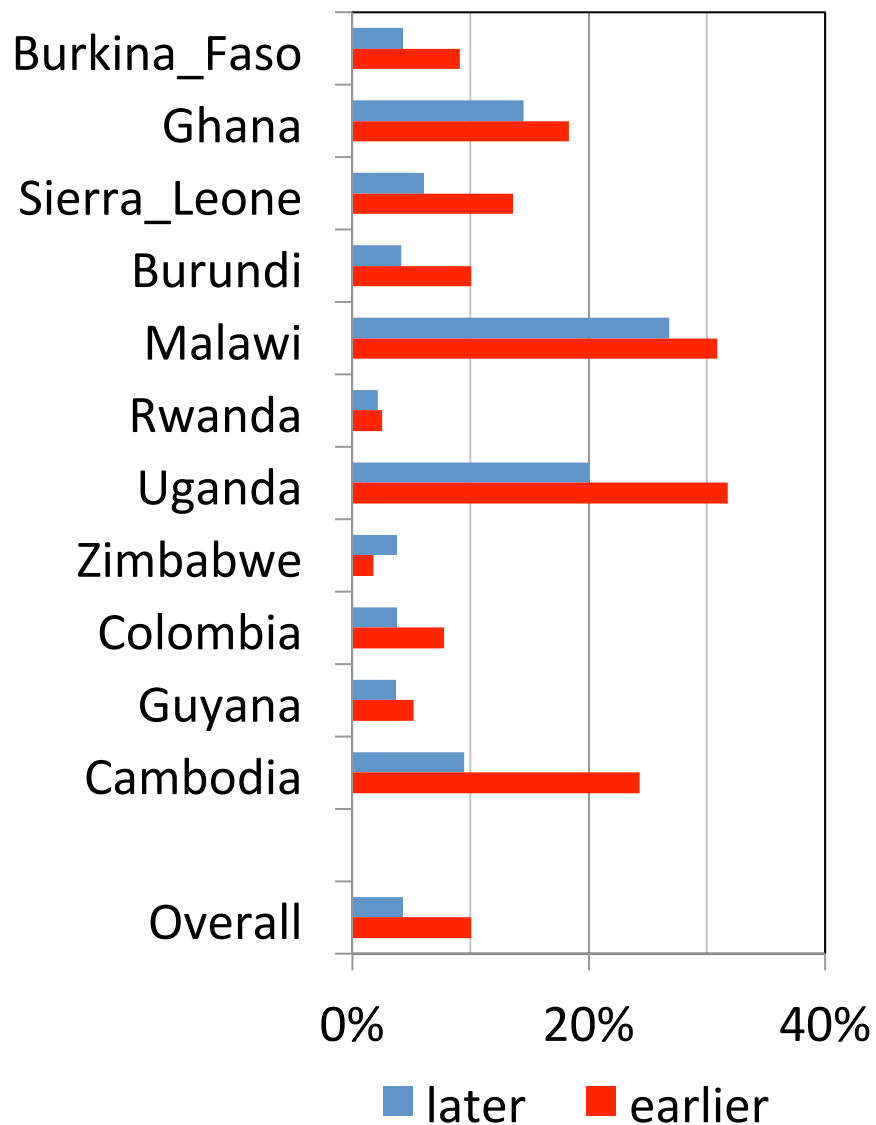
## BCG *not* first: trends



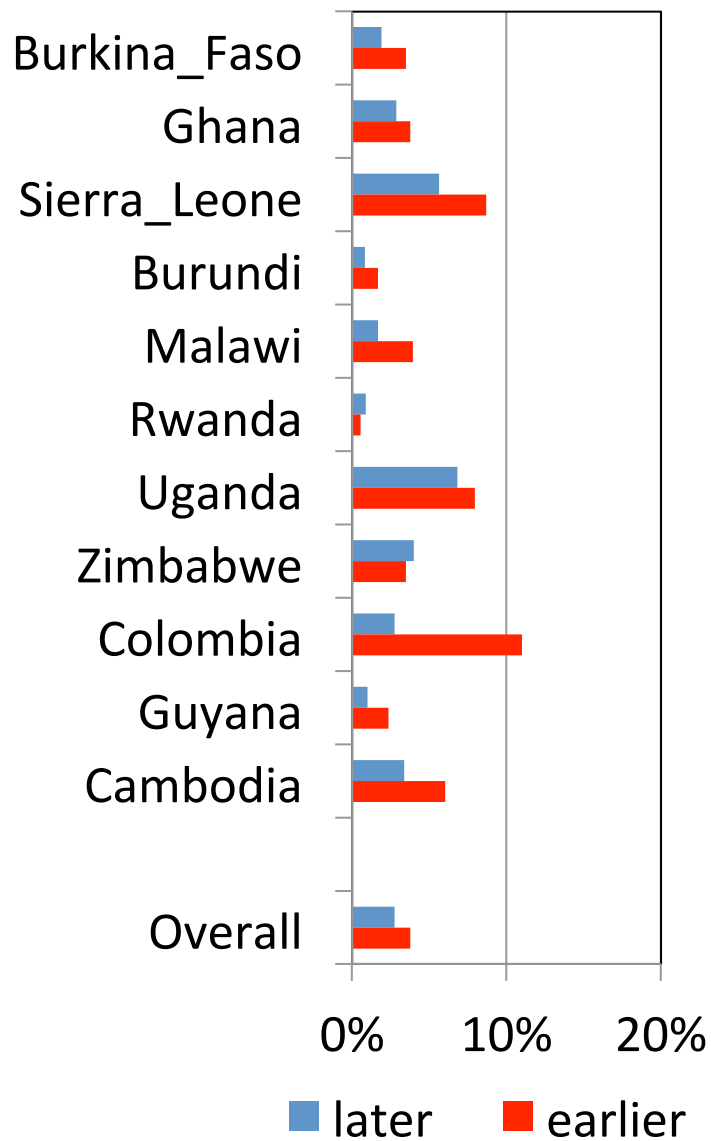
## DTP last: trends



## BCG & DTP1 on same day



## DTP3 & MCV on same day





# Preliminary conclusions

*Median of surveys in 57 countries*

- BCG not first vaccine given: 14%
- DTP last vaccine given: 11%
- BCG and DTP1 on same day: 6%
- DTP3 and MCV on same day: 3%
- Vit A and MCV on same day: 10%
- Substantial variation between countries
- %s similar in boys and girls
- %s greater in rural than urban populations
- %s greater in lowest wealth quintile than top
- Some evidence for reducing trends
- A person-years-at-risk approach would be better



## % of children with first dose not BCG.

*Median values for the group of countries*

WHO Region	Median	upper 25%	Boys	Girls	Urban	Rural	Wealth top q	bottom
AFR D	<b>19%</b>	29%	19%	19%	12%	20%	8%	21%
AFR E	<b>14%</b>	25%	14%	14%	8%	18%	7%	20%
AMR	<b>15%</b>	39%	14%	16%	10%	18%	8%	23%
EMR	<b>12%</b>	23%	12%	12%	11%	14%	5%	10%
EUR	<b>5%</b>	6%	4%	5%	4%	5%	4%	6%
SEAR	<b>8%</b>	30%	7%	9%	5%	9%	4%	11%
WPR	<b>15%</b>	20%	15%	14%	6%	16%	7%	19%
Overall	<b>14%</b>	30%	14%	14%	8%	16%	7%	20%

## % of children with last dose before age 24m DTP.

*Median values for the group of countries, based on data for children a*

WHO Region	Overall	upper quartile	Boys	Girls	Urban	Rural	Wealth top q	bottom q
AFR D	<b>16%</b>	21%	17%	16%	15%	15%	14%	14%
AFR E	<b>9%</b>	12%	9%	9%	5%	10%	5%	13%
AMR	<b>13%</b>	18%	11%	15%	13%	13%	11%	15%
EMR	<b>3%</b>	10%	3%	3%	3%	3%	1%	7%
EUR	<b>7%</b>	8%	5%	8%	7%	5%	7%	7%
SEAR	<b>6%</b>	7%	7%	6%	7%	6%	7%	6%
WPR	<b>15%</b>	23%	16%	14%	7%	17%	8%	21%
Overall	<b>11%</b>	18%	11%	11%	9%	12%	8%	13%

## % of children given 2 vaccines on the same day

*Median values for the group of countries*

WHO Region	BCG + DPT1						DPT3 + MCV					
	Median	upper 25%	Boys	Girls	Urban	Rural	Median	upper 25%	Boys	Girls	Urban	Rural
AFR D	<b>10%</b>	15%	10%	10%	6%	14%	<b>3%</b>	5%	3%	4%	3%	4%
AFR E	<b>8%</b>	18%	9%	8%	3%	11%	<b>2%</b>	4%	3%	2%	2%	2%
AMR	<b>5%</b>	13%	4%	6%	3%	9%	<b>3%</b>	4%	3%	2%	2%	3%
EMR	<b>4%</b>	5%	4%	4%	4%	4%	<b>2%</b>	4%	2%	2%	1%	2%
EUR	<b>1%</b>	1%	1%	1%	1%	1%	<b>1%</b>	1%	1%	0%	1%	1%
SEAR	<b>6%</b>	15%	6%	6%	4%	6%	<b>1%</b>	2%	1%	1%	1%	1%
WPR	<b>9%</b>	12%	10%	8%	4%	10%	<b>4%</b>	6%	4%	5%	1%	5%
Overall	<b>6%</b>	14%	6%	6%	3%	8%	<b>3%</b>	4%	2%	2%	1%	3%

# Surveys included

## ***AFR D***

*DHS6* Burkina\_Faso, Senegal

*DHS5* Benin, Ghana, Guinea  
Madagascar, Mali, Niger  
Nigeria, Sierra\_Leone

*MICS3* Cameroon, Gambia,  
Guinea\_Bissau, Togo

## ***AFR E***

Burundi, Lesotho, Malawi, Rwanda,  
Tanzania, Uganda, Zimbabwe

Congo\_Brazzaville, Kenya,  
Namibia, Swaziland, Zambia  
Cote\_d'Ivoire, Mozambique

## ***AMR***

Colombia, Dominican\_Rep,  
Guyana, Honduras

Belize, Jamaica, Suriname,  
Trinidad  
Bolivia, Haiti, Peru

## ***EMR***

*DHS6*

*DHS5* Egypt, Jordan

*MICS3* Iraq, Syria

## ***EUR***

Armenia

Albania, Azerbaijan

Bosnia, Kazakhstan

## ***SEAR***

Timor-Leste

Bangladesh, India  
Maldives

Thailand

## ***WPR***

Cambodia

Lao, Mongolia,  
Vanuatu