Voodoo, vaccines & bed nets

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Child mortality is highest in SSA.

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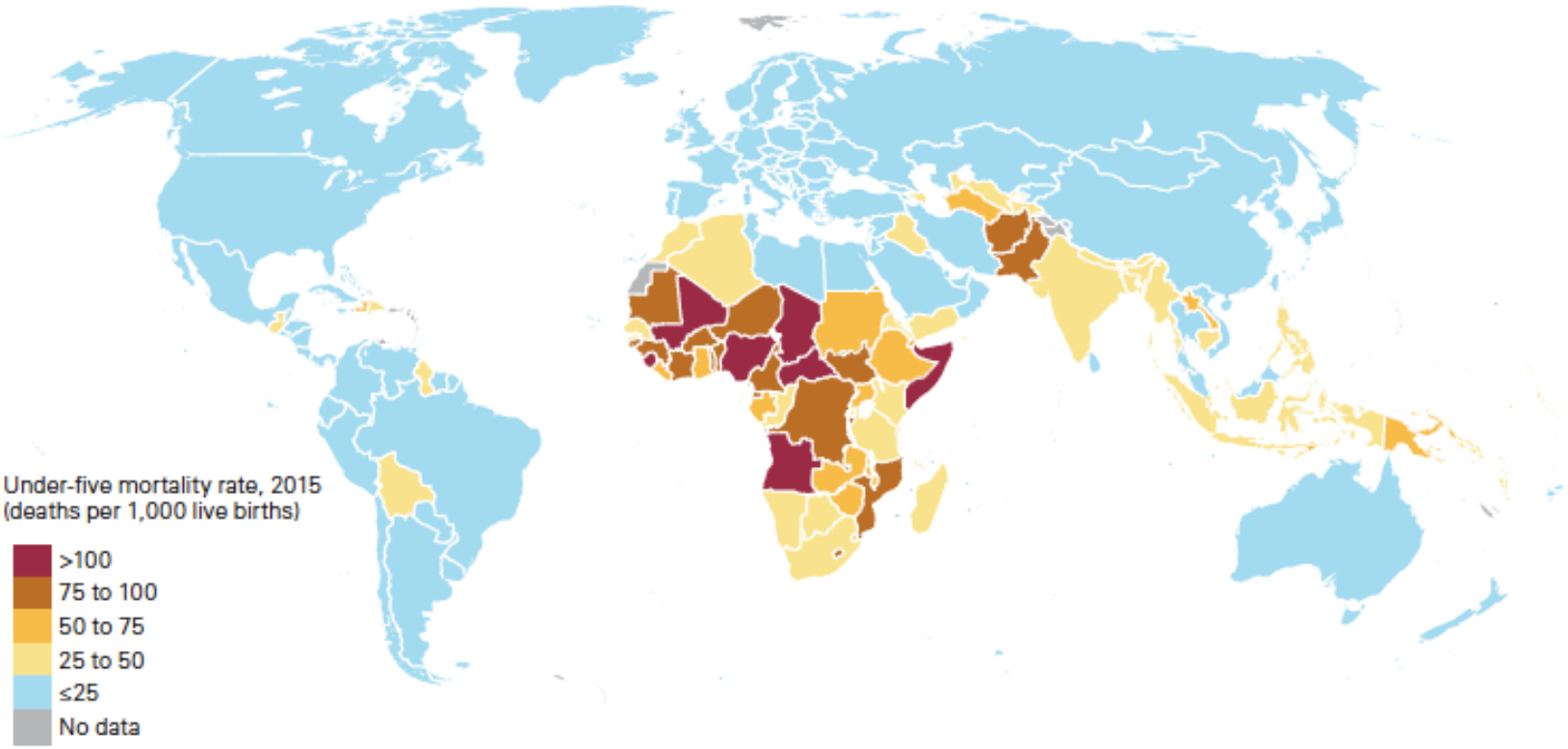
MAP 1 **Children in sub-Saharan Africa and Southern Asia face a higher risk of dying before their fifth birthday**

Under-five mortality rate (deaths per 1,000 live births) in 2015, by country



Notes: The classification is based on unrounded numbers. This map does not reflect a position by UN IGME agencies on the legal status of any country or territory or the delimitation of any frontiers.

Child mortality is highest in SSA. It is getting better

About half of under-5 mortality due to preventable diseases

Basic & cost-effective treatments

- Vaccines
- Bed nets

Past decades

- Large-scale health campaigns
- Treatments provided at low costs or free

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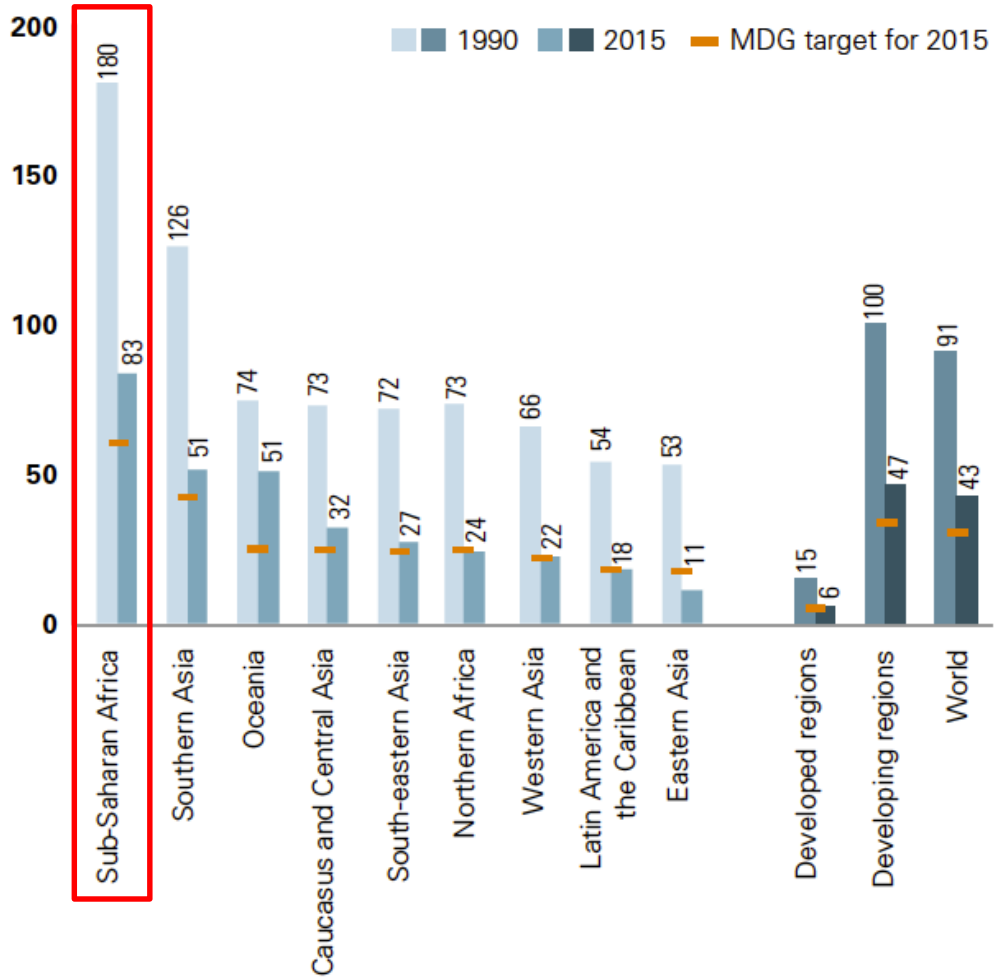
FIGURE 1 **Under-five mortality declined in all regions between 1990 and 2015**

Under-five mortality rate by Millennium Development Goal region, 1990 and 2015 (deaths per 1,000 live births)



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Child mortality is highest in SSA. It is getting better, but the last mile is difficult to bridge.

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Although treatments are available at low cost,
Uptake far from perfect

- RCTs → Bottleneck: demand for healthcare by parents
- provide parents with

subsidies & incentives & information

… hard for parents to empirically observe the (cost-)effectiveness of preventive healthcare measures

Just information?

- "Your child needs to be vaccinated because it will help protect him/her against disease"
- Is this credible?

Polio Vaccine Poster from 196

Just information?

- Heuristic decision making: "a simple procedure that helps find adequate, though often imperfect, answers to difficult questions"

  - Do I like the health provider?
  - Do I trust the public health system?
  - What were/are my parents/neighbors doing?
  - What does my (religious) leader say about the health care provider?
  - Do the actions of the provider make sense to me?

Child mortality is highest in SSA. It is getting better, but the last mile is difficult to bridge. Religion may play a role in the uptake of preventive healthcare.

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Catholic church - HIV/AIDS
(Joshua, 2010)

Nigeria - 2003-2004 polio eradication campaign
(Heymann & Aylward, 2004)

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Child mortality is highest in SSA. It is getting better, but the last mile is difficult to bridge. Religion may play a role in the uptake of preventive healthcare. In SSA, modern medicine does not align well with ATR.

ATR worldview

- "disease is not merely the symptom of a failure of body organs, but results from a spiritual disequilibrium between a human and his ancestors"
- "healing and protection rituals focus on restoring this harmony"
- "the traditional healer treats the body, soul and spirit"

(Ethnographic research by Omonzejele, 2008)

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Ethnographic research

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Traditional African beliefs affect the demand for healthcare:

- belief that preventive healthcare not effective in preventing diseases with a spiritual cause
- traditional healers may advice against conventional healthcare

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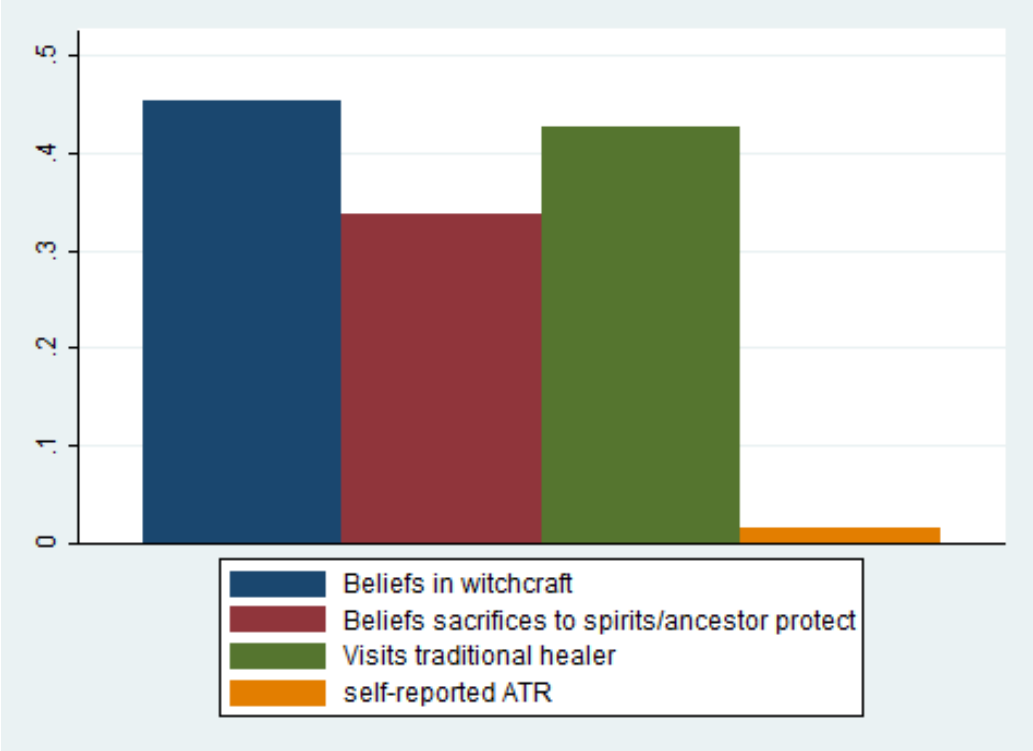
Quantitative evidence is scarce because of empirical caveats.

Empirical caveats

1. Underreporting of ATR-adherence

2. Limited variation at community-level



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Empirical caveats less severe for Benin

1. Official recognition of ATR (Voodoo)

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National Voodoo day – January, 10

Temples also out in the open…

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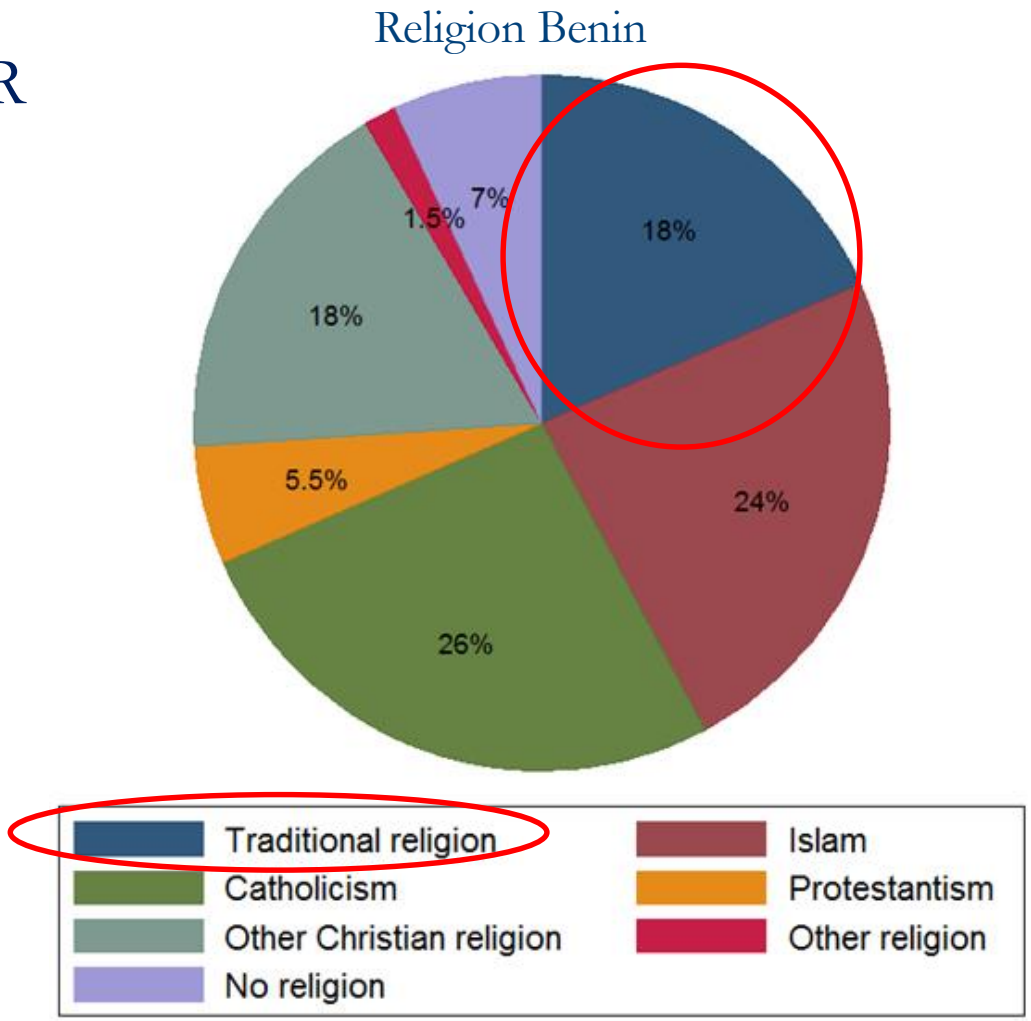
Empirical caveats less severe for Benin

1. Official recognition of ATR (Voodoo)

   → high reported adherence

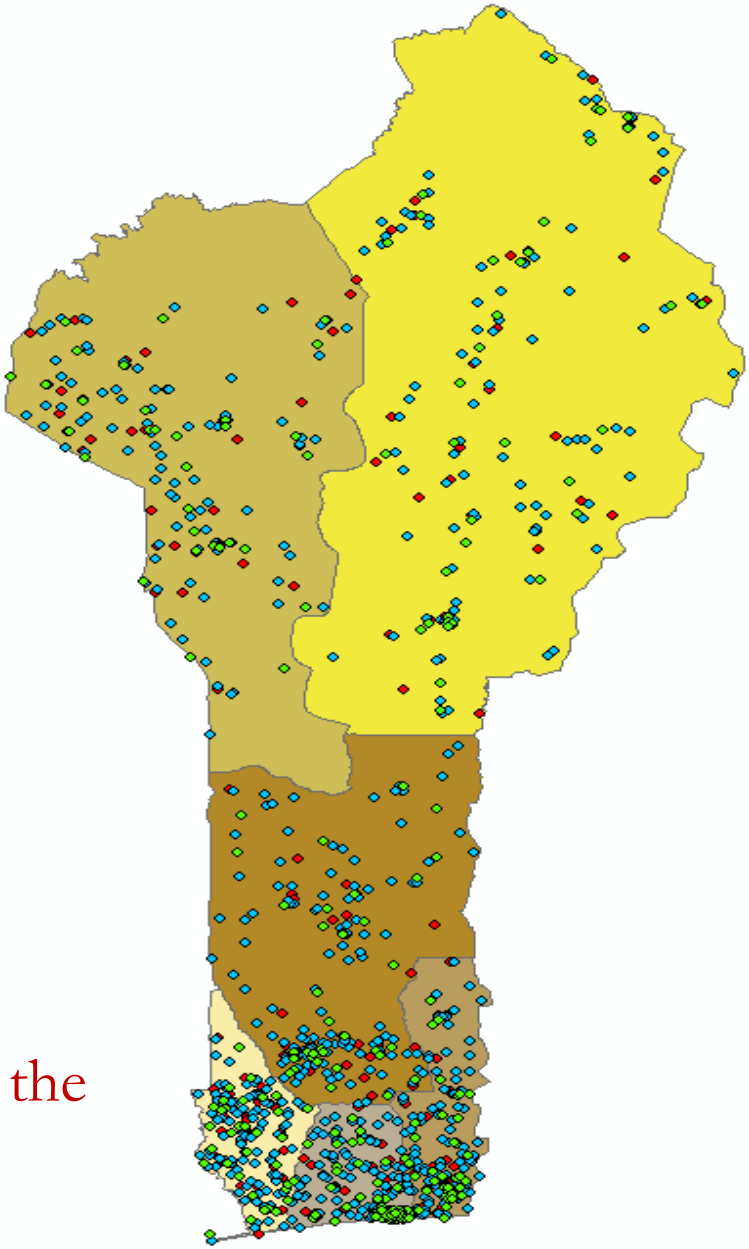
2. Religious pluralism within-village & within-HH religious variation



4 DHS survey rounds

Observations by DHS survey year	obs.	%
1996	2,833	8.07%
2001	5,067	14.43%
2006	14,645	41.70%
2012	12,576	35.81%
Total	35,121	100%

- the average DHS survey cluster counts 24 mothers and 3 to 4 different religious affiliations
- In 27% of households, parents don't have the same religious affiliation



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Measures of preventive healthcare

- Vaccines
  - full immunization = 8 vaccines (bcg, 3 dpt, 3 polio, measles)
  - no vaccination
- Bed nets
  - ownership & use

	no vaccination	full immunization	own bed net	use bed net
ATR mother	15%	37%	56%	73%
not an ATR mother	10% ***	44% ***	74% ***	80% ***

Estimating equation

$$y_{cmhv} = \alpha_0 + \alpha_1 ATR_{mhv} + I'_{cmhv}\,\Omega + H'_{hv}\Delta + DHS'_v\,\Gamma + D'_v\,\Theta + V'_v\,\Lambda + \varepsilon_{cmhv} \quad (1a)$$

$$y_{mhv} = \alpha_0 + \alpha_1 ATR_{mhv} + I'_{mhv}\,\Omega + H'_{hv}\Delta + DHS'_v\,\Gamma + D'_v\,\Theta + V'_v\,\Lambda + \varepsilon_{mhv} \quad (1b)$$

c indexes children, m mothers, h households and v DHS villages

Outcome variables

No vaccination

Full immunization

Ownership & use of bed nets

Variable of interest

ATR-adherence of mother

Estimating equation

$$y_{cmhv} = \alpha_0 + \alpha_1 ATR_{mhv} + I'_{cmhv}\,\Omega + H'_{hv}\Delta + DHS'_v\,\Gamma + D'_v\,\Theta + V'_v\,\Lambda + \varepsilon_{cmhv} \quad (1a)$$

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c indexes children, m mothers, h households and v DHS villages

Child level controls
age (in months)
gender
birth order and interval

Mother level controls
age & age at first birth
years of schooling
ethnicity

HH level controls
wealth quintile
number of children < 5
polygamy

Other controls
DHS survey year
geographical region
village FE

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	(1)	(2)	(3)	(4)	(5)
Determinants of not being vaccinated, for children aged 1-5					
mother is an ATR adherent	0.080***	0.036***	0.033***	0.033***	0.032***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
DHS survey year	Yes	Yes	Yes	Yes	Yes
geographical department	Yes	Yes	Yes	Yes	Yes
village fixed effects	/	Yes	Yes	Yes	Yes
wealth quintile	/	/	Yes	Yes	Yes
mother characteristics	/	/	/	Yes	Yes
household characteristics	/	/	/	Yes	Yes
child characteristics	/	/	/	/	Yes
Observations	26,359	26,359	26,359	26,359	26,359
Adjusted R2	0.03	0.21	0.21	0.21	0.22
Determinants of full immunization, for children aged 1-5					
mother is an ATR adherent	-0.098***	-0.035***	-0.029***	-0.027**	-0.027***
	(0.009)	(0.011)	(0.010)	(0.011)	(0.010)
The ownership of bed nets within a household					
mother is an ATR adherent	-0.152***	-0.084***	-0.071***	-0.064***	-0.064***
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
Determinants of sleeping under a bed net					
mother is an ATR adherent	-0.161***	-0.084***	-0.074***	-0.063***	-0.062***
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)

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Concern: - village FE control for local supply, but not HH access to healthcare
- access to healthcare may be correlated with income
- wealth quintiles may be poor measure of income

→ Study bed net use in subsample of bed net owners

Determinants of sleeping under a bed net		
	all HH	bed net owners
mother is an ATR adherent	-0.062***	-0.025**
	(0.012)	(0.012)
DHS survey year	Yes	Yes
geographical department	Yes	Yes
village fixed effects	Yes	Yes
wealth quintile	Yes	Yes
mother characteristics	Yes	Yes
household characteristics	Yes	Yes
child characteristics	Yes	Yes
Observations	25,038	19,436
Adjusted R2	0.27	0.13

→ Study preventive healthcare in subsample with info on fathers

- mother primary caretaker
- if ATR-effect is mother-specific:
  ATR mother > ATR father

age, years of schooling, ethnicity, ATR-adherence

	no vaccination	full immunization	ownership bed net	use bed net
	(1)	(2)	(3)	(4)
mother is an ATR adherent	0.124***	-0.073*	-0.107***	-0.119**
	(0.031)	(0.038)	(0.041)	(0.055)
father is an ATR adherent	0.017	0.007	-0.043	-0.061*
	(0.019)	(0.031)	(0.028)	(0.036)
DHS survey year	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes
wealth quintile	Yes	Yes	Yes	Yes
mother & father characteristics	Yes	Yes	Yes	Yes
household characteristics	Yes	Yes	Yes	Yes
child characteristics	Yes	Yes	Yes	Yes
Observations	6,826	6,826	5,138	6,266
Adjusted R2	0.32	0.25	0.42	0.37

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Comment: ATR may make use of other effective healthcare measures

→ Traditional healers combine the belief in supernatural causes and cures with knowledge of natural causes and cures

Picture taken in Ouidah, Benin

Comment: ATR may make use of other effective healthcare measures

- study health outcomes:
  - malaria test,
  - under 5 mortality (deaths/1.000 live births)

	malaria positive (1)	under 5 mortality (2)
mother is an ATR adherent	0.069**	9.098**
	(0.030)	(4.341)
DHS survey year	Yes	Yes
village fixed effects	Yes	Yes
wealth quintile	Yes	Yes
mother characteristics	Yes	Yes
household characteristics	Yes	Yes
child characteristics	Yes	Yes
Observations	2,757	22,821
R2	0.43	0.16
Adjusted R2	0.25	0.09

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ATR-worldview?: do the findings also apply to other religions or churches that hold similar beliefs about disease and healing?

Eglise biblique du saint esprit
Picture taken in Cotonou

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ATR-worldview?: do the findings also apply to other religions or churches that hold similar beliefs about disease and healing?

Église du Christianisme Céleste

ATR-worldview?: do the findings also apply to other religions or churches that hold similar beliefs about disease and healing?

→ include adherence to "African Independent Churches" as variable of interest

	no vaccination (1)	full vaccination (2)	ownership bed net (3)	use bed net (4)	malaria positive (5)	under 5 mortality (6)
mother adheres to "another Christian religion"	-0.003	-0.009	0.015*	0.004	0.009	2.947
	(0.005)	(0.010)	(0.009)	(0.010)	(0.027)	(3.779)
DHS survey year	Yes	Yes	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
wealth quintile	Yes	Yes	Yes	Yes	Yes	Yes
mother characteristics	Yes	Yes	Yes	Yes	Yes	Yes
household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,359	26,359	20,327	25,038	2,757	22,821
R2	0.27	0.23	0.41	0.32	0.43	0.19
Adjusted R2	0.22	0.18	0.36	0.27	0.25	0.12

the findings are specific to ATR

traditional healers offer substitutes for conventional medical treatment

	visit health facility	traditional birth attendant	traditional healer to treat diarrhoea or fever	use of ORS to treat diarrhoea	use of medication to treat fever
	(1)	(2)	(3)	(4)	(5)
mother is an ATR adherent	-0.048***	0.017***	0.021**	0.024	-0.046*
	(0.010)	(0.004)	(0.008)	(0.027)	(0.026)
visited a traditional healer				-0.092**	-0.120**
				(0.039)	(0.054)
DHS survey year	Yes	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes	Yes
wealth quintile	Yes	Yes	Yes	Yes	Yes
mother characteristics	Yes	Yes	Yes	Yes	Yes
household characteristics	Yes	Yes	Yes	Yes	Yes
child characteristics	Yes	Yes	Yes	Yes	Yes
Observations	23,791	34,984	5,282	1,996	2,691
Adjusted R2	0.20	0.22	0.03	0.32	0.30

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Bridging the last mile ?

- health projects should acknowledge ATR beliefs and the influence of traditional healers
- uptake preventive health care could be improved through partnerships between public health providers and traditional healers?

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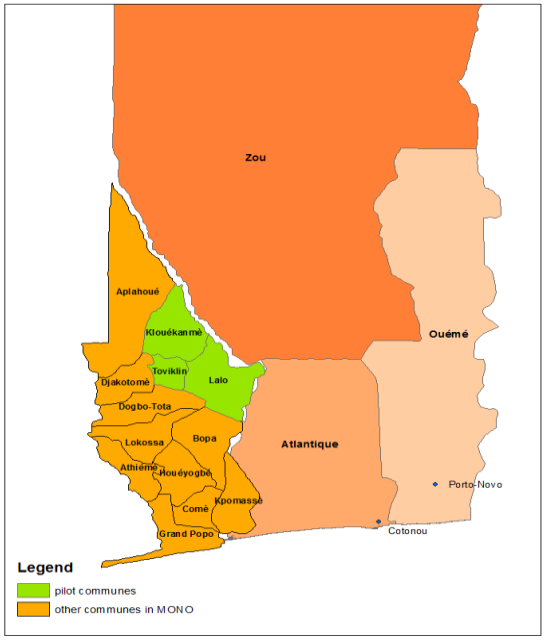
Pilot program (2009):

"interface entre prestataires de soins modernes et traditionnels"



- platform for interaction and exchange of information
- traditional healers received medical training:
  - recognize severe cases of illness;
  - & refer them to public health centers

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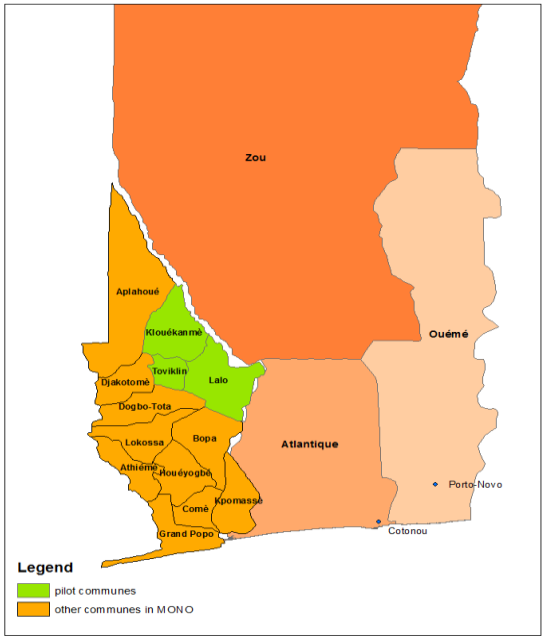
Pilot program (2009):

"interface entre prestataires de soins modernes et traditionnels"



- evaluation report:
  - referral of severe cases to health centers improved;
  - some patients no longer acknowledged contributions by traditional healers ➔ demotivation

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Resonates the account by French colonial administrators in 1906

« Rapport de la Campagne Antivariolique, 1906. Porto-Novo (Benin). Série H: Santé et Assistance. »

- Voodoo priests opposed a smallpox vaccination campaign
- "they used their influence over their adepts to prevent them from getting vaccinated because their benefits are reduced when they have few patients to treat, smallpox being their assured commission money" (Rapport…, 1906, p.7)

- Any collaboration with traditional healers should be cleverly designed and duely take into account their incentives

Comments welcome !

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Appendices

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Concern: Mothers may self-select into ATR

→ cognitive style

→ health history of mother or child

Two Strategies:

→ Altonji et al. (2005) & Oster (2015)

→ IV

Altonji et al. (2005) & Oster (2015)

- uses selection on on observable variables as a guide to assess potential bias from unobservable variables
- looks at coefficient movements in ATR estimate & R-squared movements when additionally controlling for observed covariates
- provides a measure of how large selection on unobservable variables should be, relative to selection on observables, to fully explain away the estimated effect
- Results considered robust to omitted variable bias if $\delta > 1$

Table 9: Using selection on observables to assess the bias from unobservables

	Baseline controls		Baseline controls + father's characteristics	
	δ	$\bar{R}_{max}$	δ	$\bar{R}_{max}$
Received not a single vaccination	5.25	0.35	9.44	0.63
Full immunization	2.08	0.31	12.7	0.77
Ownership of bed net	1.88	0.53	1.73	0.68
Use of bed net	2.06	0.4	1.03	0.58
Malaria positive	1.73	0.56	/	/
Under 5 mortality	2.40	0.21	35.32	0.42

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IV

- ATR-adherence is not merely an individual choice, but is transmitted across generations and shaped by history and tradition

- History of Voodoo in Benin:
  - Voodoo became dominant religion in 17th century
  - as a result of supremacy of Dahomey kingdom
  - which was founded by the Adja
  - Voodoo priests held powerful positions & advised the king to resist evangelization
  - conversion to Christianism was made punishable

- Two instrumental variables:
  - Adja mother dummy
  - dummy indicating if an older ATR-adherent lives in the HH
    (additionally controlling for presence of older HH-members)

IV

- strong 1st stage
- 2nd stage in line with LPM estimates

	1st stage	2nd stage				
	(1)	(2)	(3)	(4)	(5)	(6)
	Mother's ATR-adherence	no vaccines	full immunization	own bed net	use bed net	use bed net if own
mother is an ATR-adherent		0.072**	-0.034	-0.111**	-0.095*	-0.100*
		(0.034)	(0.045)	(0.045)	(0.050)	(0.058)
Adja mother	0.032**					
	(0.016)					
presence of an old ATR-adherent	0.392***					
	(0.019)					
all other control variables	Yes	Yes	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,793	21,793	21,793	17,984	24,667	18,840
F-test	203***					
Hansen J statistic	0.32					

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IV

- Concern: do exclusion restrictions hold … ?
  - method proposed by *Conley, T.G., Hansen, C.B., Rossi, P.E., 2012. Plausibly exogenous. The Review of Economics and Statistics 94, 260–272.*
  - investigate to what extent the exclusion restrictions may be violated without invalidating the IV-results
  - direct effects:
    - Adja mother: 0.38 – 0.50
    - older ATR-adherent: 0.03 – 0.04

« African Traditional Religion »

The term 'African Traditional Religion' was launched by Parrinder (1954) to denote African beliefs and practices that are religious but neither Christian nor Islamic. ATR was further debated by e.g. Awolalu (1976), Ekwunife (2009), Idowu (1973), Mbiti (1990). While 'traditional' suggests that ATR is a thing of the past, in reality it is lived and practiced by Africans today (cf. Section 2.1 of this paper). The term 'traditional' needs therefore to be understood as "handed down from generation to generation by the forebears of the present generation of Africans" (Awolalu, 1976).

Is the finding specific to ATR or does it relate to witchcraft ?

Panel A: Share of mothers who believe aids can be caused by witchcraft				
DHS survey	Overall	Voodoo	Not Voodoo	
2006	51.0	55.5	49.9	***
2012	43.7	47.7	42.9	***
Overall	47.5	52.2	46.5	***

Panel B: Share of belief in aids through witchcraft, by religious affiliation	
Traditional religion	52.2
Catholic	46.2
Protestant	44.7
Other Christian religions	56.3
Islam	38.4
Other religions	50.4
No religion	44.1

Is the finding specific to ATR or does it relate to witchcraft ?

	no vaccination		full vaccination		ownership bed net		use bed net	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
mother is an ATR adherent	0.024**	0.024**	-0.017	-0.017	-0.065***	-0.064***	-0.066***	-0.066***
	(0.010)	(0.010)	(0.015)	(0.015)	(0.014)	(0.014)	(0.015)	(0.015)
mother beliefs aids can be caused by witchcraft		-0.007		0.001		-0.012		-0.002
		(0.006)		(0.010)		(0.008)		(0.010)
DHS survey year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
wealth quintile	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
mother characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
child characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,472	14,472	14,472	14,472	11,958	11,958	16,312	16,312
Adjusted R2	0.18	0.18	0.15	0.15	0.29	0.29	0.26	0.26

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Why Voodoo is cherished in Benin?

Geschiere (2013, p. 313): "assembling a plurality of voduns (gods) in one temple…may have been possible only through the society's growing cosmopolitanism… during the eighteenth century under the impact of the slave trade"

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Why Voodoo is cherished in Benin?

In fact, "the religion of Dahomey includes several systems of belief introduced at different times and from different places, each system having its separate cult groups" (Argyle, 1966, p.174). This is hardly surprising: the king of Dahomey always took the gods and religious chiefs of conquered lands to his capital, Abomey, in order to secure their protection.

Soumonni, E., 2012. Disease, religion and medicine: smallpox in nineteenth-century Benin. História Ciênc. Saúde-Manguinhos.

Why Voodoo is cherished in Benin?

Marxist-Leninist dictatorship
Mathieu Kérékou (from the North)

Religion/Voodoo is repressed
Anti-witchcraft law

Transition to democracy,
Nicéphore Soglo (from the South, Abomey !)

Voodoo is co-opted to consolidate power
+
Soglo turns ill at day of inauguration, and – as rumor goes – healed by Voodoo priest

How vaccine fears fueled the resurgence of preventable diseases in Europe & North America

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Message & message-provider need to be perceived as credible

Ebola : who to believe?

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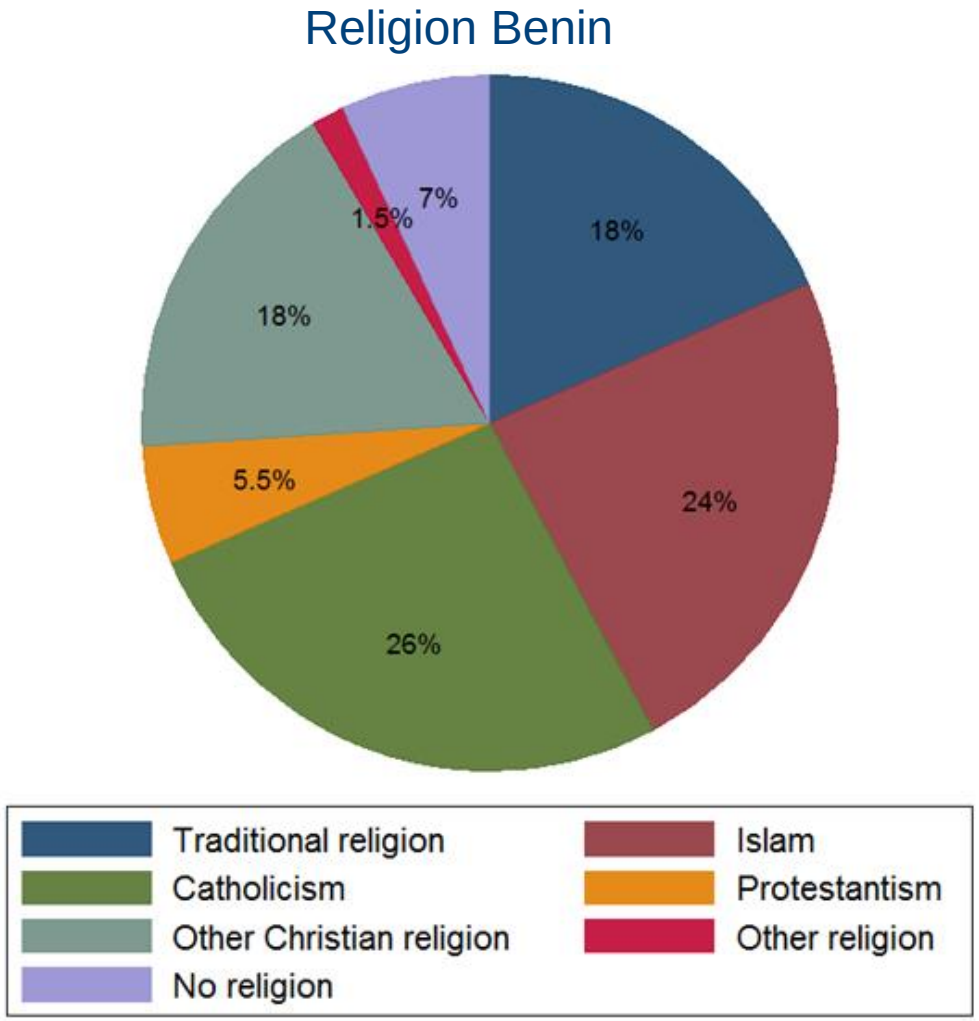
COUNTERFACTUAL

Empirical caveats less severe for Benin, but

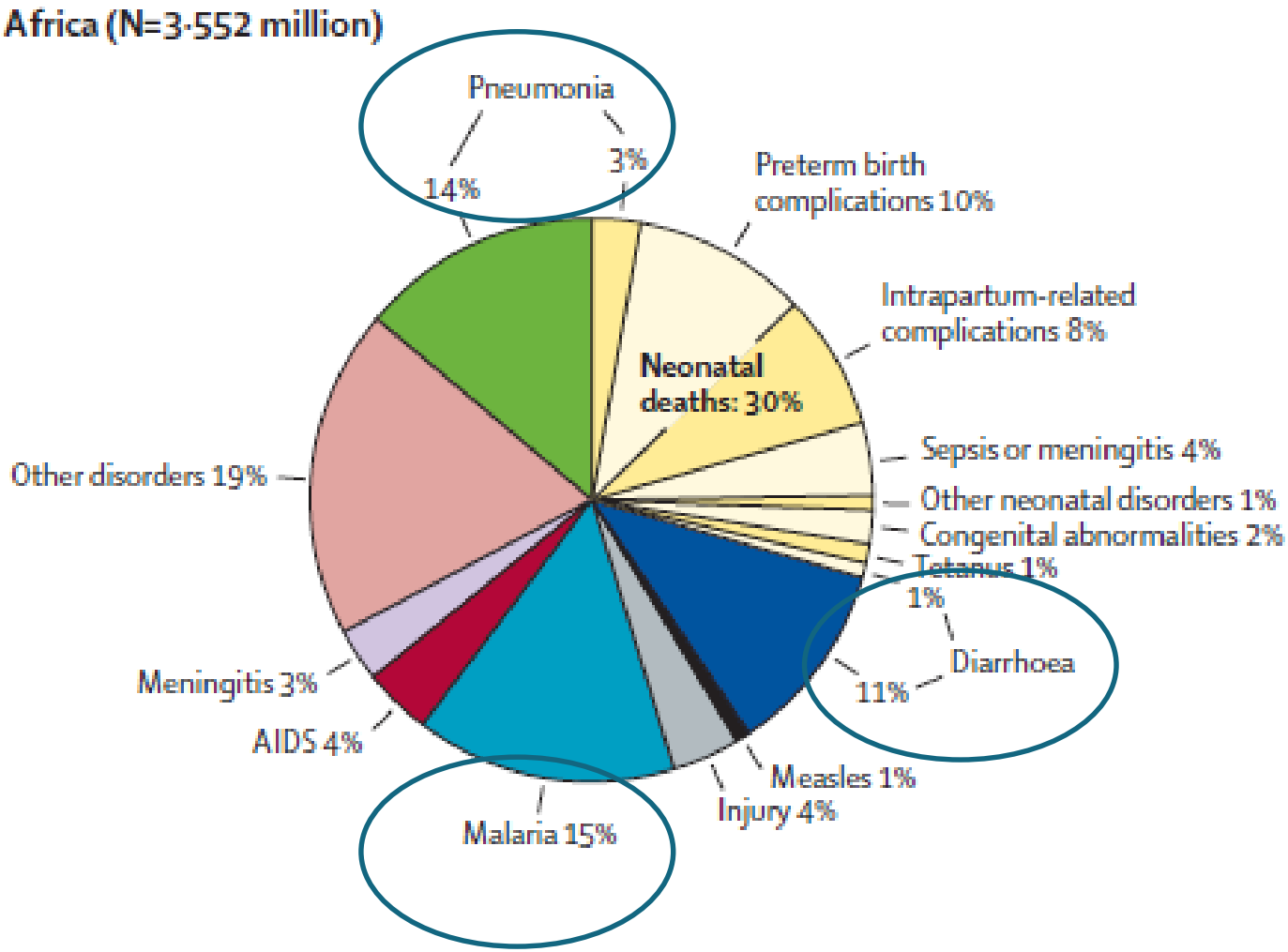
Control group (no Voodoo-adherence) includes Voodoo-related and non-Voodoo-related beliefs that also affect health behavior → our estimate will be a lower bound of ATR's impact on modern health care demand.

The lower-bound estimate will only be negative & significant when :

- reported Voodoo-adherence is a reasonably good proxy for Voodoo-beliefs
- the impact of Voodoo-beliefs on modern health care demand is larger than the impact of other religious beliefs



About 50% caused by **preventable & treatable diseases**

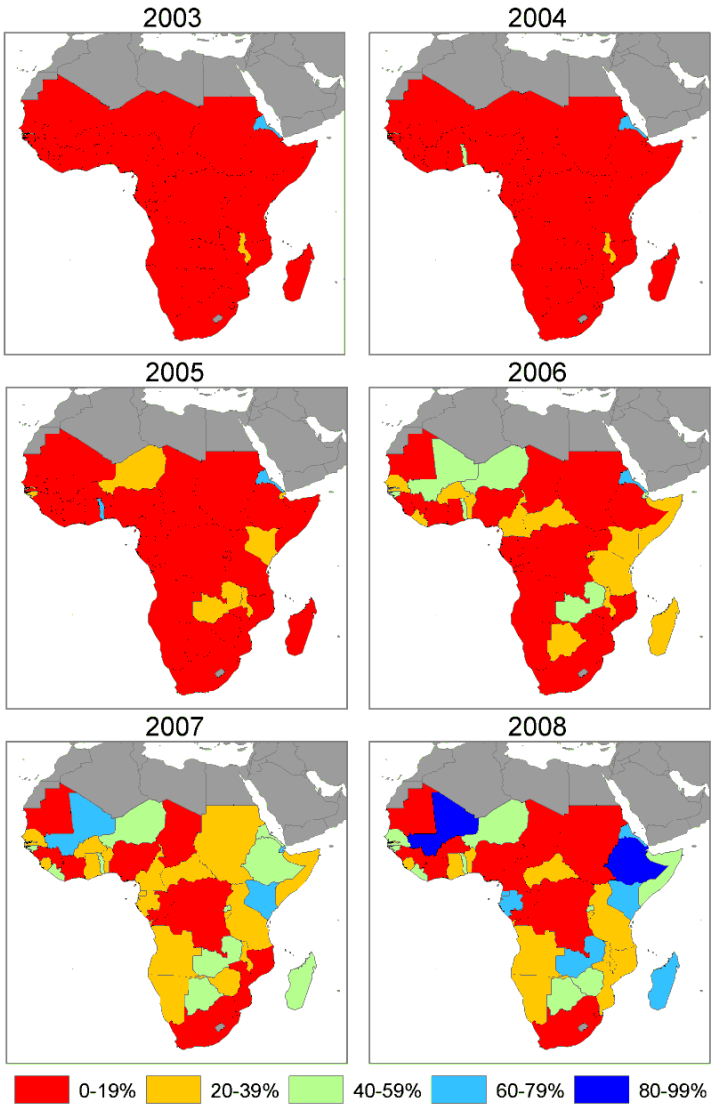


Causes of childhood death 2010 (Liu et al, 2012)

Bed net distribution and coverage

5.6 million nets
delivered in 2004

145 million nets
delivered in 2010



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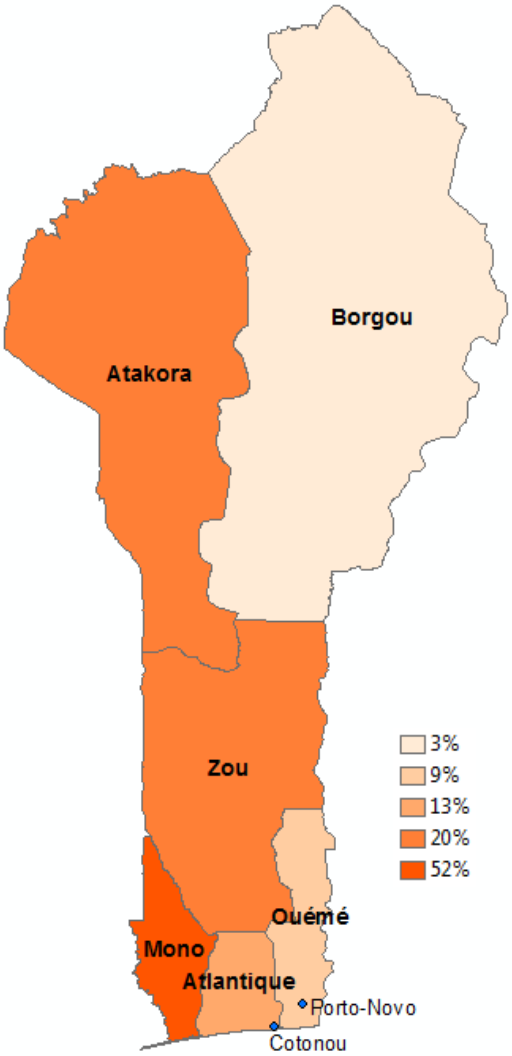
In a nutshell

- exploit variation in self-reported ATR (Voodoo) adherence in Benin;
- 4 rounds of DHS surveys;
- ATR-adherence of the mother is associated with:
  - lower uptake of preventive healthcare measures for child
  - worse child health outcomes
- Relationship holds when controlling for a large set of individual and household characteristics, village FE, and throughout robustness checks;
- Channel: authority of traditional healers or ATR-worldview ?
  - results specific to ATR, and cannot be generalized to other magico-religious beliefs;
  - traditional healers seem to substitute for modern medicine.



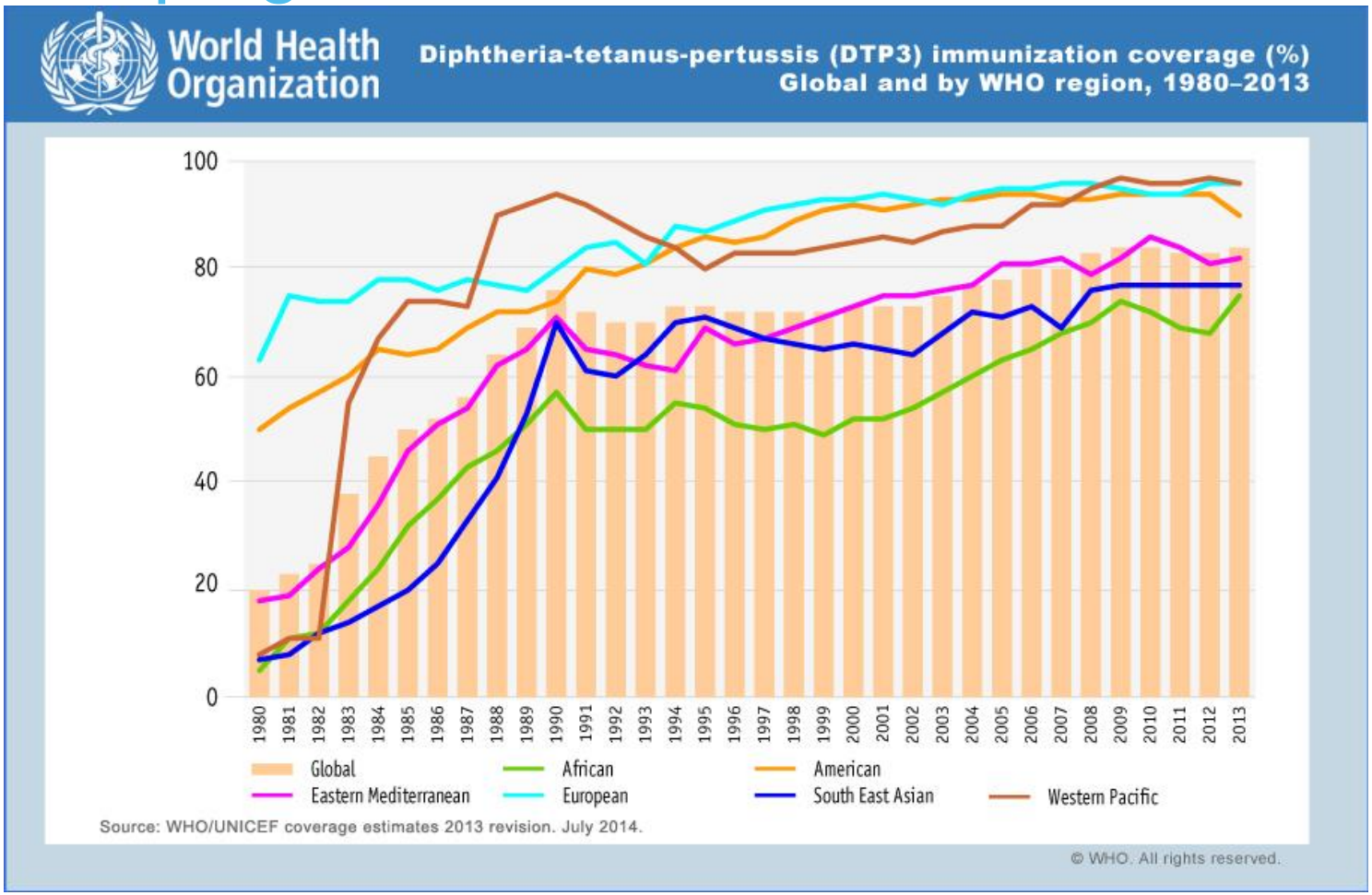
Share of Voodoo adherents among mothers, by region

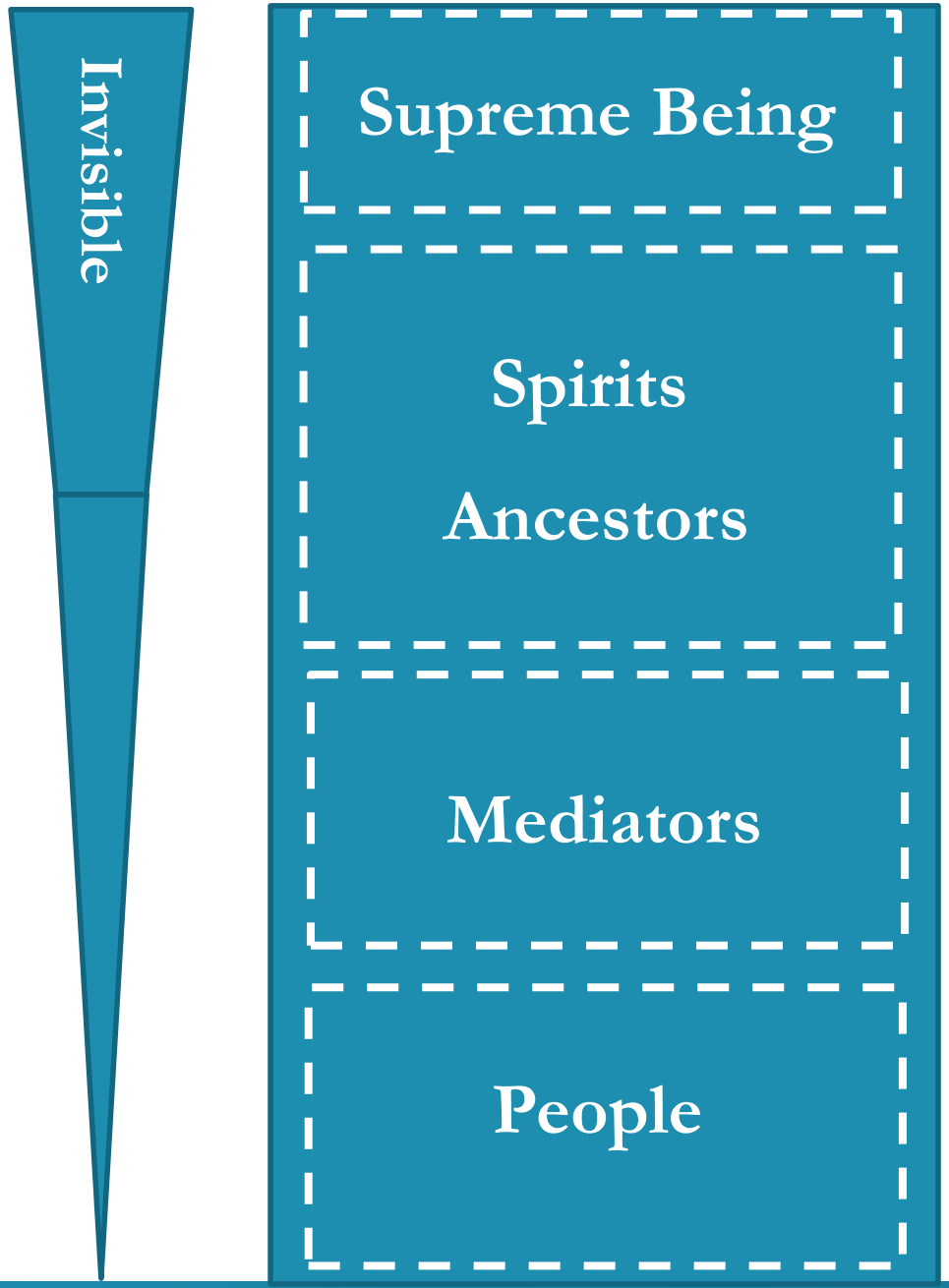
Table 6: Human capital indicators, by Voodoo status of parents

Mother is a Voodoo adherent?	*Voodoo*	*Not Voodoo*	*sig.*
HH Wealth			
Wealth index	-1.33	0.03	***
Wealth quintile	2.32	2.93	***
HH Lives in rural area	80.1	62.43	***
Number of children under five	6.7	5.2	***
Total number of living children	1.93	1.86	***
Mother/father is a Voodoo adherent?	*Voodoo*	*Not Voodoo*	*sig.*
Schooling			
Years of schooling mother	0.46	1.67	***
Years of schooling father	1.54	2.99	***
Age			
Age mother	29.8	29.04	***
Age father	39.38	36.52	***

Notes: *** p<0.01, ** p<0.05, * p<0.1; The wealth-index was calculated at the household-level, as the first principal component of a large number of household assets including: source of water, type of toilet facility, type of floor/wall/roof-material, and the ownership of radio, television, telephone, refrigerator, car. From the index we calculated wealth quintiles which range from 1 to 5 with a mean value of 2.73 and a standard deviation of 1.34.

Vaccination campaigns





'God'
Distant, Creator
Large power

Non-human divinities
Human but divinized ancestors
Lower expression of God's power

Priests, chiefs, healers with ritualized power for maintaining harmony and order

Worship
Sacred acts of ritual practice

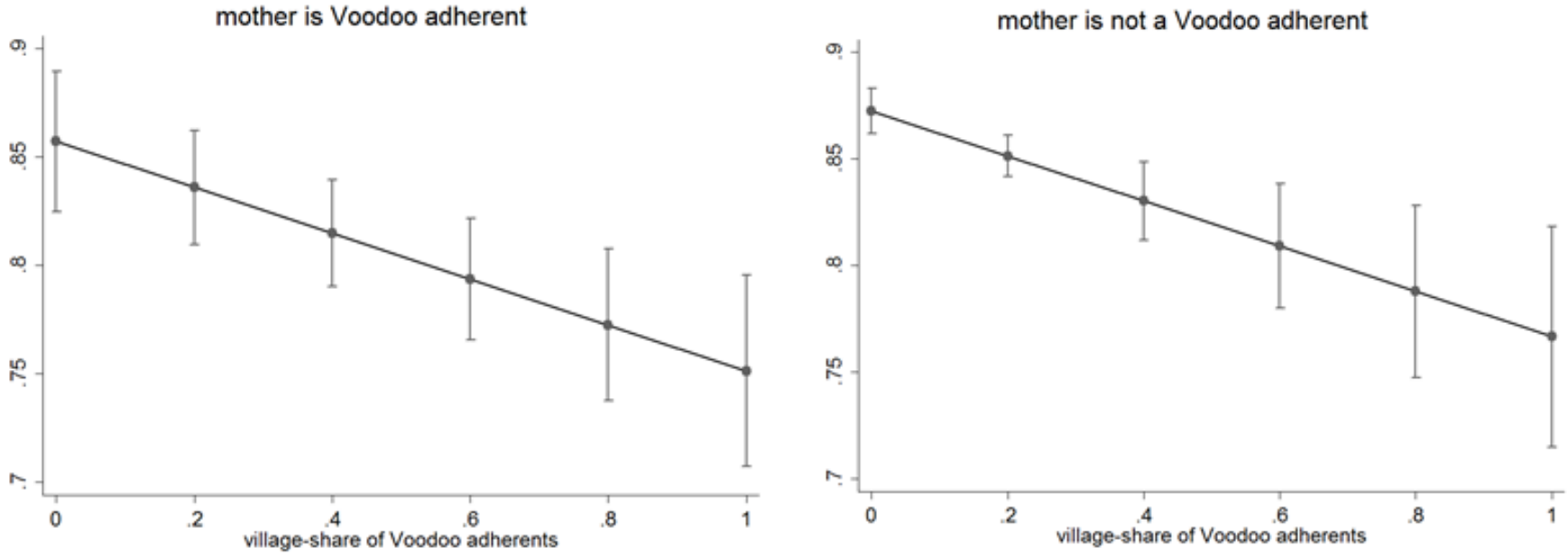
Target individuals or communities?

Picture taken in Possotomè

Target individuals or communities?

→ Look at impact of village-share Voodoo

Figure 7: Use of bed nets among HH which own a bed net, by village-share of Voodoo adherents



Notes: The graphs represent marginal effects calculated from the Linear Probability Model represented in column 6 of Table 17

Target individuals or communities?

This finding may indicate :
- misreporting (in case of panel B)
- peer-effects
- supply-side factors (e.g. presence traditional healer)

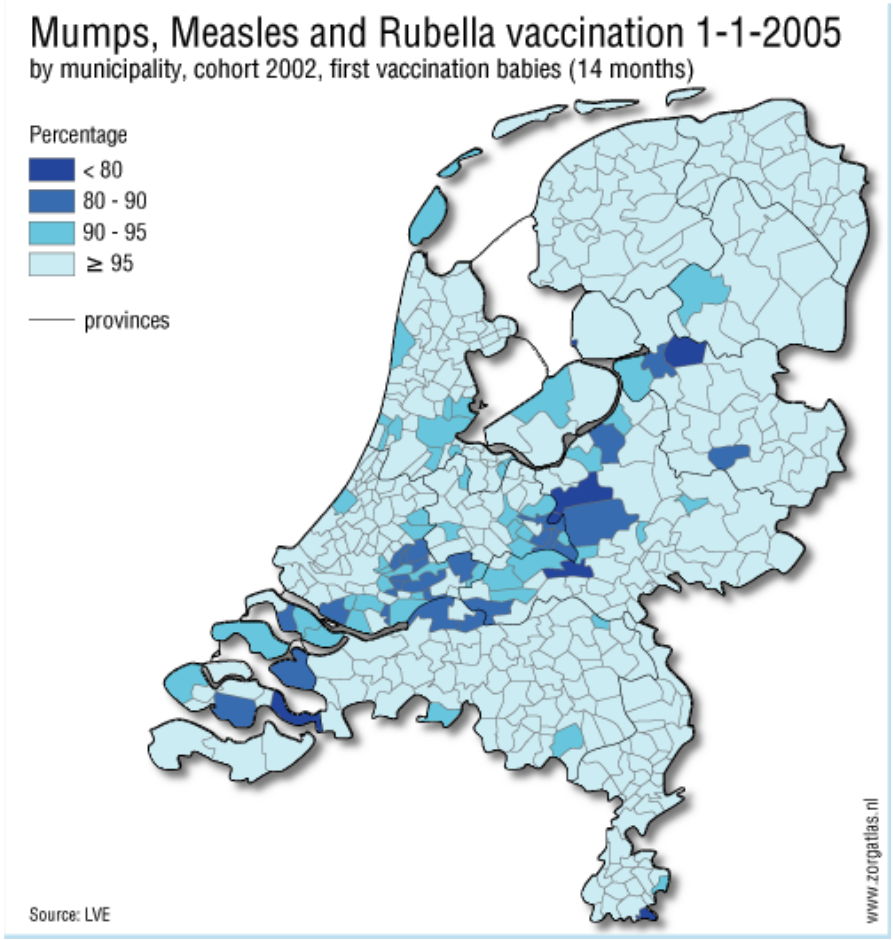
Picture taken in Possotomè

Table A.11: Potential hurdles to visiting a health center

		No problem (1)	Small problem (2)	Big problem (3)	Obs.
(1)	Knowing where to go	0.021	-0.007	-0.014	3,305
		(0.020)	(0.007)	(0.013)	
(2)	Maybe no female health worker	0.030	-0.008	-0.022	3,305
		(0.019)	(0.005)	(0.014)	
(3)	Having to take transport	0.044**	-0.015**	-0.030**	3,301
		(0.021)	(0.007)	(0.014)	
(4)	Getting permission	0.054***	0.006**	-0.060***	11,594
		(0.016)	(0.003)	(0.018)	
(5)	Money for treatment	0.028***	0.030***	-0.058***	11,591
		(0.009)	(0.009)	(0.018)	
(6)	Distance	0.038***	0.022***	-0.060***	11,586
		(0.012)	(0.007)	(0.018)	
(7)	Not wanting to go alone	0.082***	-0.005	-0.078***	11,593
		(0.016)	(0.004)	(0.014)	

*Notes: *** p<0.01, ** p<0.05, * p<0.1; We estimate seven specifications, looking at the determinants of each potential hurdle to visiting a health center; For each hurdle, mothers indicate whether it presents 'no problem', 'a small problem' or 'a big problem'; The reported coefficients represent marginal effects of mothers' ATR adherence for each answer category, calculated after an Ordered Probit regression; Robust standard errors are clustered at the village-level and reported in parentheses; In every specification we control for our full set of covariates and we include village-level fixed effects; Information on the first three hurdles was only available in the 2001 survey, information on the other hurdles was available in the 2001 and 2012 surveys.*

	no vaccination (1)	full immunization (2)	ownership bed net (3)	use bed net (4)
Parents' ATR adherence:				
mother is an ATR adherent	0.124***	-0.073*	-0.107***	-0.119**
	(0.031)	(0.038)	(0.041)	(0.055)
father is an ATR adherent	0.017	0.007	-0.043	-0.061*
	(0.019)	(0.031)	(0.028)	(0.036)
both parents are ATR adherents	0.050***	-0.023	-0.078***	-0.065**
	(0.017)	(0.028)	(0.028)	(0.030)
DHS survey year	Yes	Yes	Yes	Yes
geographical department	Yes	Yes	Yes	Yes
village fixed effects	Yes	Yes	Yes	Yes
wealth quintile	Yes	Yes	Yes	Yes
mother characteristics	Yes	Yes	Yes	Yes
father characteristics	Yes	Yes	Yes	Yes
household characteristics	Yes	Yes	Yes	Yes
child characteristics	Yes	Yes	Yes	Yes
Observations	6,826	6,826	5,138	6,266
Adjusted R2	0.32	0.25	0.42	0.37


Mumps, Measles and Rubella vaccination 1-1-2005
by municipality, cohort 2002, first vaccination babies (14 months)
Percentage
< 80
80 - 90
90 - 95
≥ 95
provinces
Source: LVE
www.zorgatlas.nl

…not only religious beliefs

This article was retracted

RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

Dr AJ Wakefield FRCS [a], SH Murch MB [b], A Anthony MB [a], J Linnell PhD [a], DM Casson MRCP [b], M Malik MRCP [b], M Berelowitz FRCPsych [c], AP Dhillon MRCPath [a], MA Thomson FRCP [b], P Harvey FRCP [d], A Valentine FRCR [e], SE Davies MRCPath [a], JA Walker-Smith FRCP [a]

Summary

RETRACTED

Background

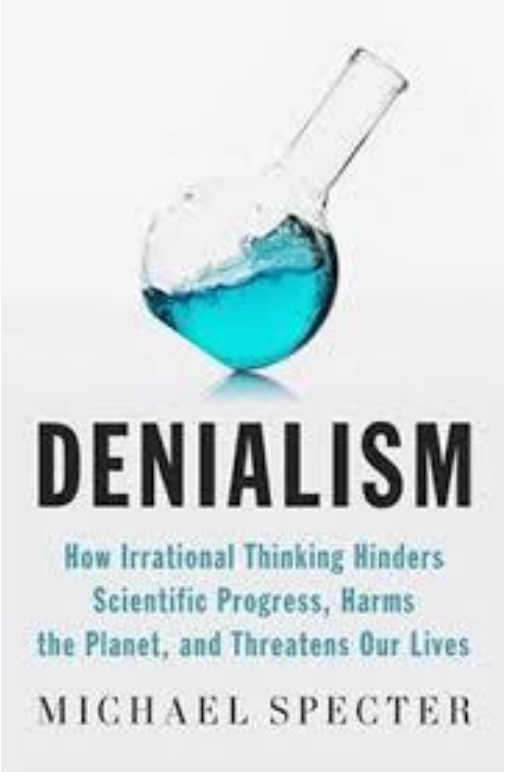
We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods

12 children (mean age 6 years [range 3—10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings

Onset of behavioural symptoms was associated, by the parents, with measles, mumps, and rubella vaccination in eight of the 12 children, with measles infection in one child, and otitis media in another. All 12 children had intestinal abnormalities, ranging from lymphoid nodular hyperplasia to aphthoid ulceration. Histology showed patchy chronic inflammation in the colon in 11



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Ilustration from Benin

- Although mosquito bites were often mentioned as a mode of transmission of malaria, there is still considerable scepticism about this, as this quote shows (male, Hadjava, Savalou):
- **"How can an animal which bites contract malaria? . . . Where does this story about the blood which gives you malaria come from?"**

- Rashed, S., et al. 1999. Determinants of the Permethrin Impregnated Bednets (PIB) in the Republic of Benin. Soc. Sci. Med..