

# The double burden of disease in low and middle-income countries



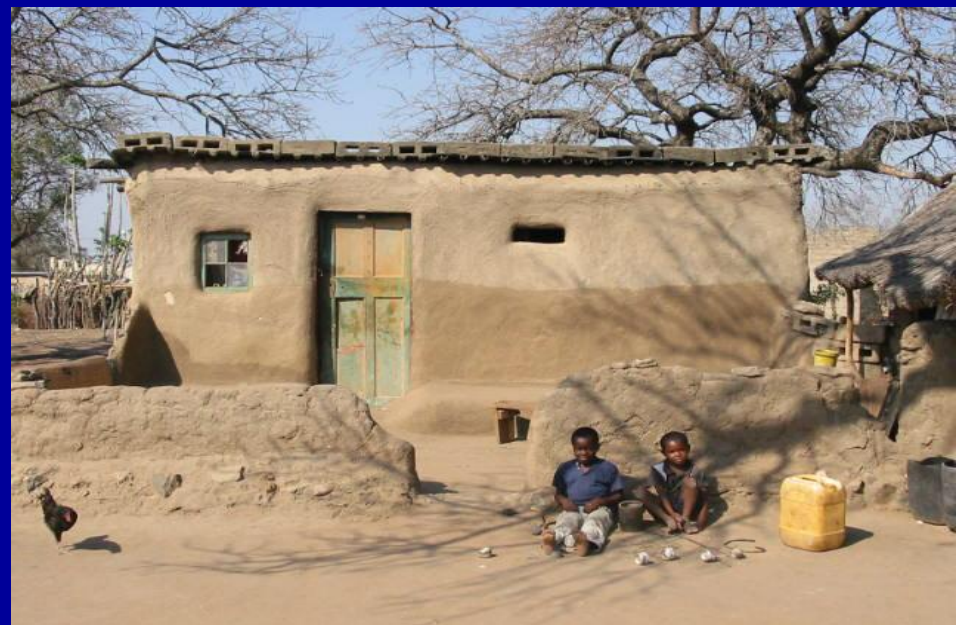
Steve Tollman

MRC and Wits Public Health, South Africa  
Umeå University and INDEPTH Network

# Border region Southern Africa - Agincourt

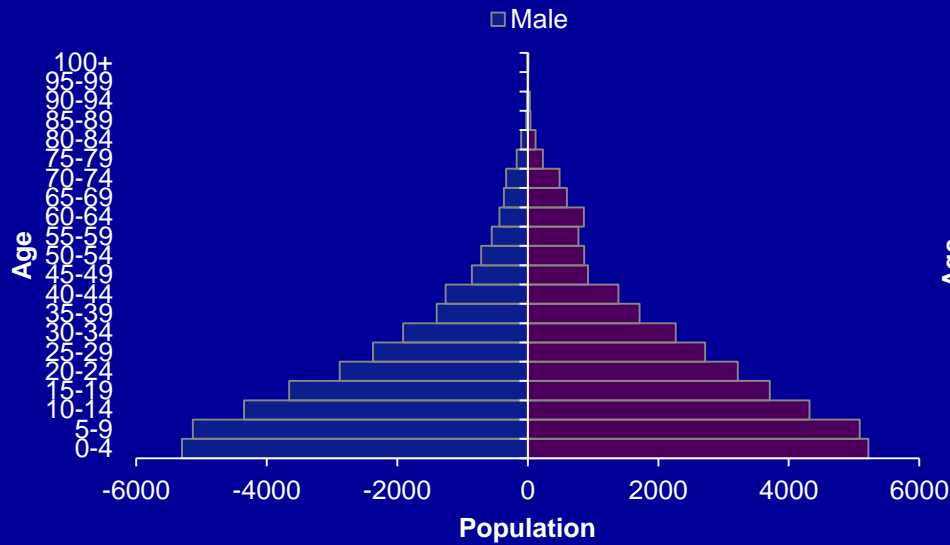




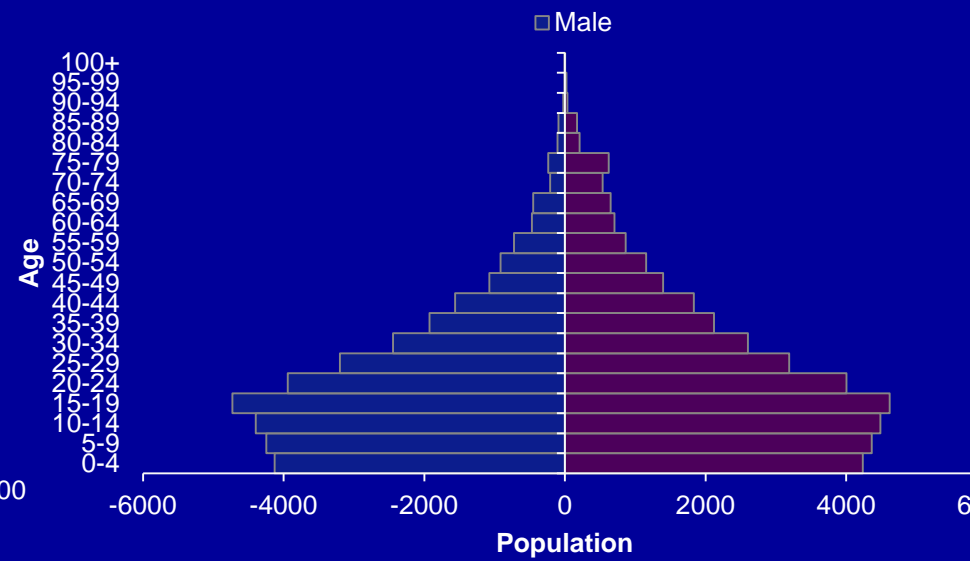


Agincourt sub-district

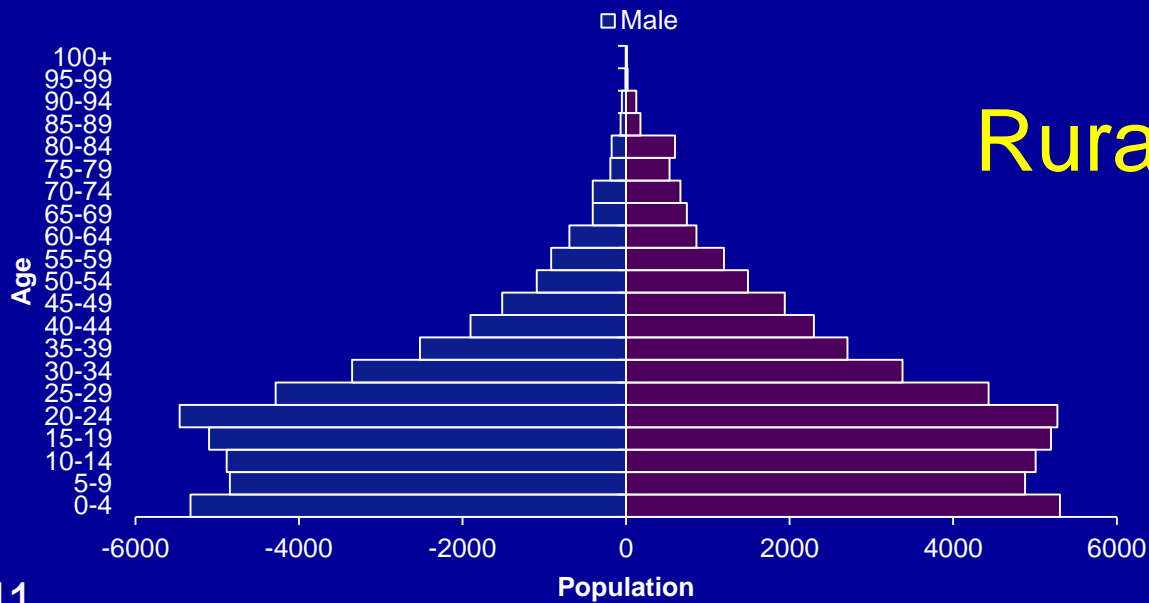




1994



2006

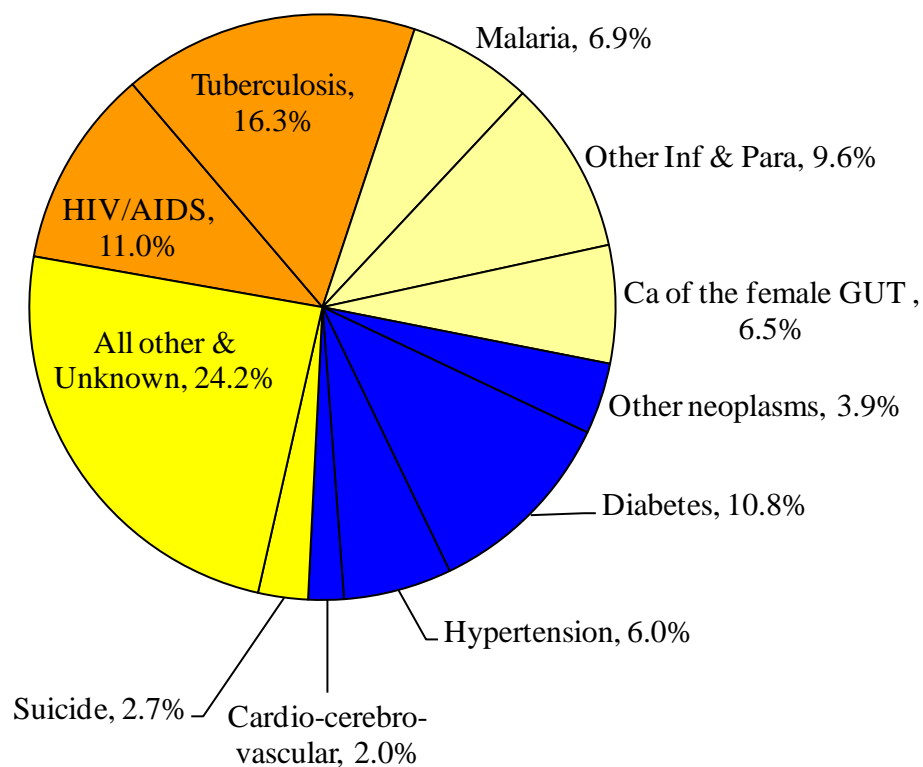


2011

Rural South Africa



# Cause-specific mortality increase in women 50-64 years, Agincourt 1992-2003



# Top five causes of death, children and elders

## Agincourt 1992-2005

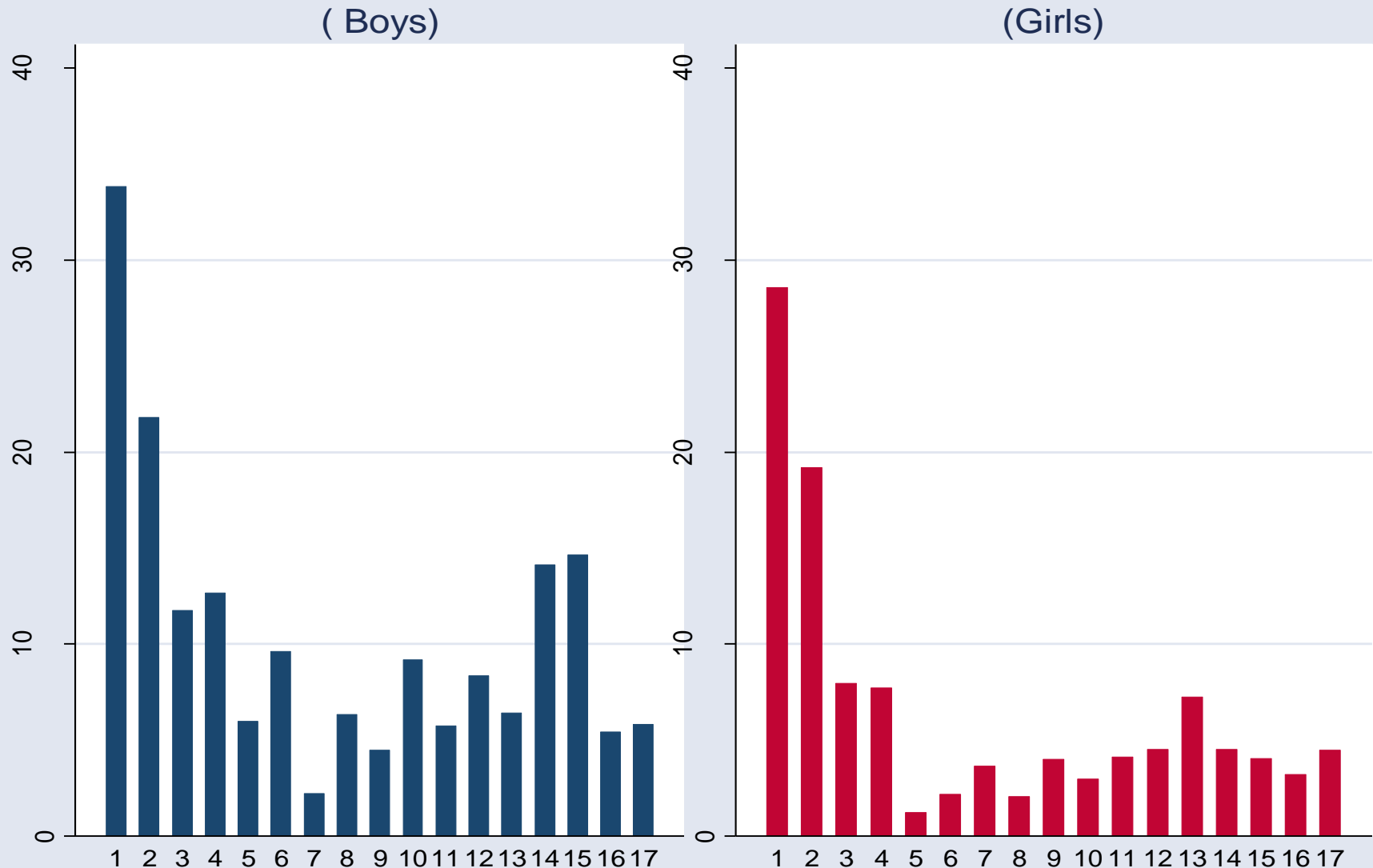
1992-1994		1995-1997		1998-2001		2002-2005	
<b>0-5</b>	n = 158		n = 140		n = 336		n = 417
Diarrhoea	(20)	Diarrhoea	(24)	HIV/TB	(22)	HIV/TB	(34)
Malnutrition	(18)	HIV/TB	(11)	Diarrhoea	(12)	Diarrhoea	(10)
Perinatal conditions	(8)	ARI	(8)	ARI	(10)	ARI	(8)
Accidental injuries	(6)	Malnutrition	(6)	Perinatal	(9)	Malnutrition	(8)
Other Infectious	(5)	Accidents	(4)	Malnutrition	(8)	Perinatal conditions	(6)
<b>65+</b>	n = 193		n = 355		n = 479		n = 578
Other cardiac	(16)	Vascular disease	(11)	Vascular disease	(13)	Vascular disease	(13)
Vascular disease	(9)	Other cardiac	(9)	Neoplasms	(10)	Other cardiac	(10)
TB	(8)	TB	(7)	Other cardiac	(8)	Neoplasms	(8)
Neoplasms	(4)	Neoplasms	(6)	TB	(6)	TB	(5)
Liver disease	(3)	Diarrhoea	(5)	Other NCDs	(6)	Other NCDs	(4)

# Households with children, fostered children and orphans 2003

	All Households	Households with NO woman 60+	Households with woman 60+
Households with at least one child under 15	77.7%	77.8%	76.2%
Household with at least one fostered child	15.4%	12.1%	26.5%*
Household with at least one maternal orphan	5.5%	4.7%	15.9%*
Total N	11,665	8,994	2,671

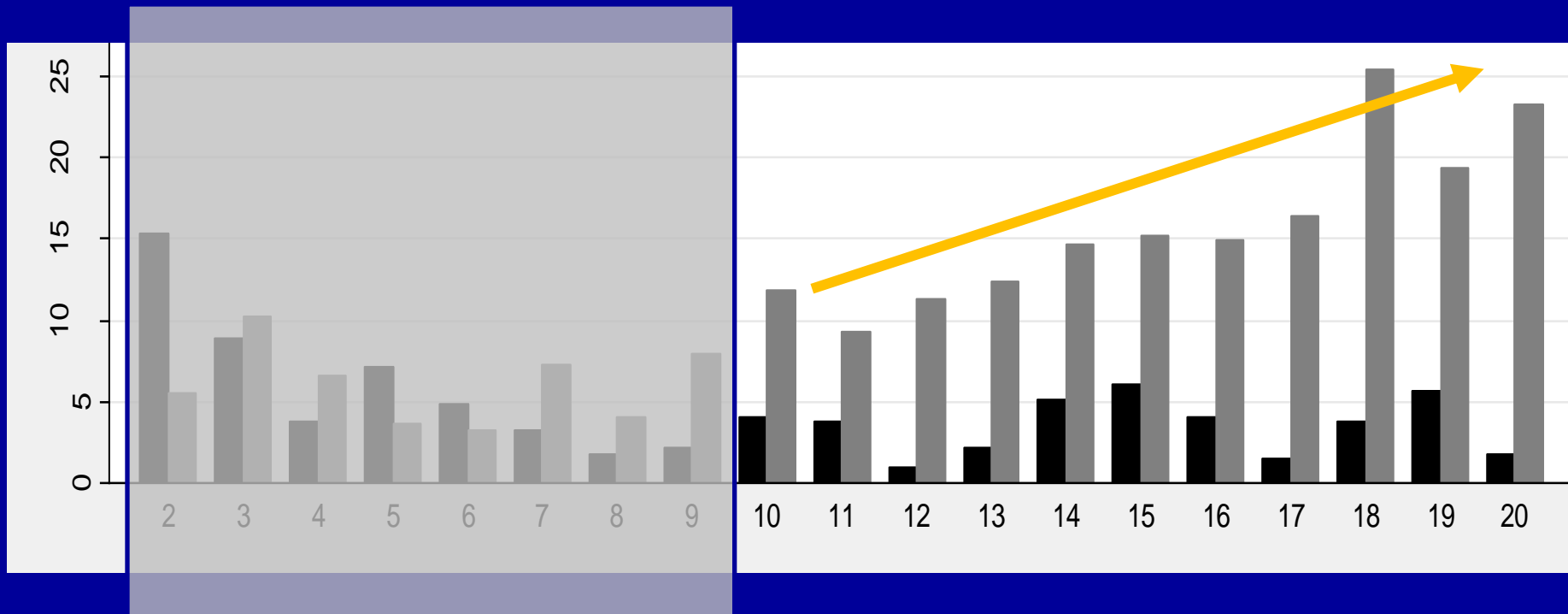
# Nutritional transition , Agincourt 2007

## Age-sex patterns of stunting in children 1-17 years



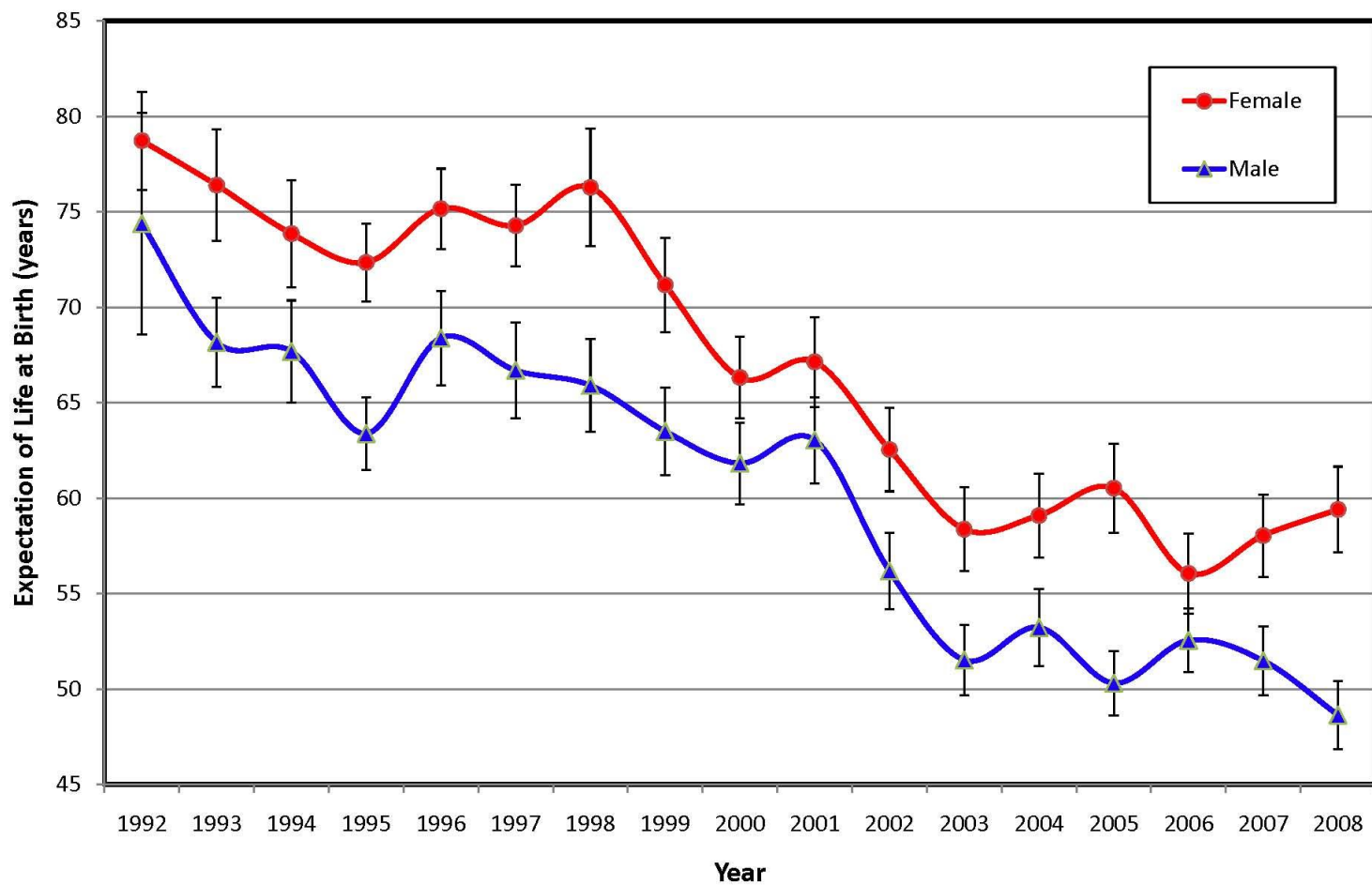


# Overweight and obesity

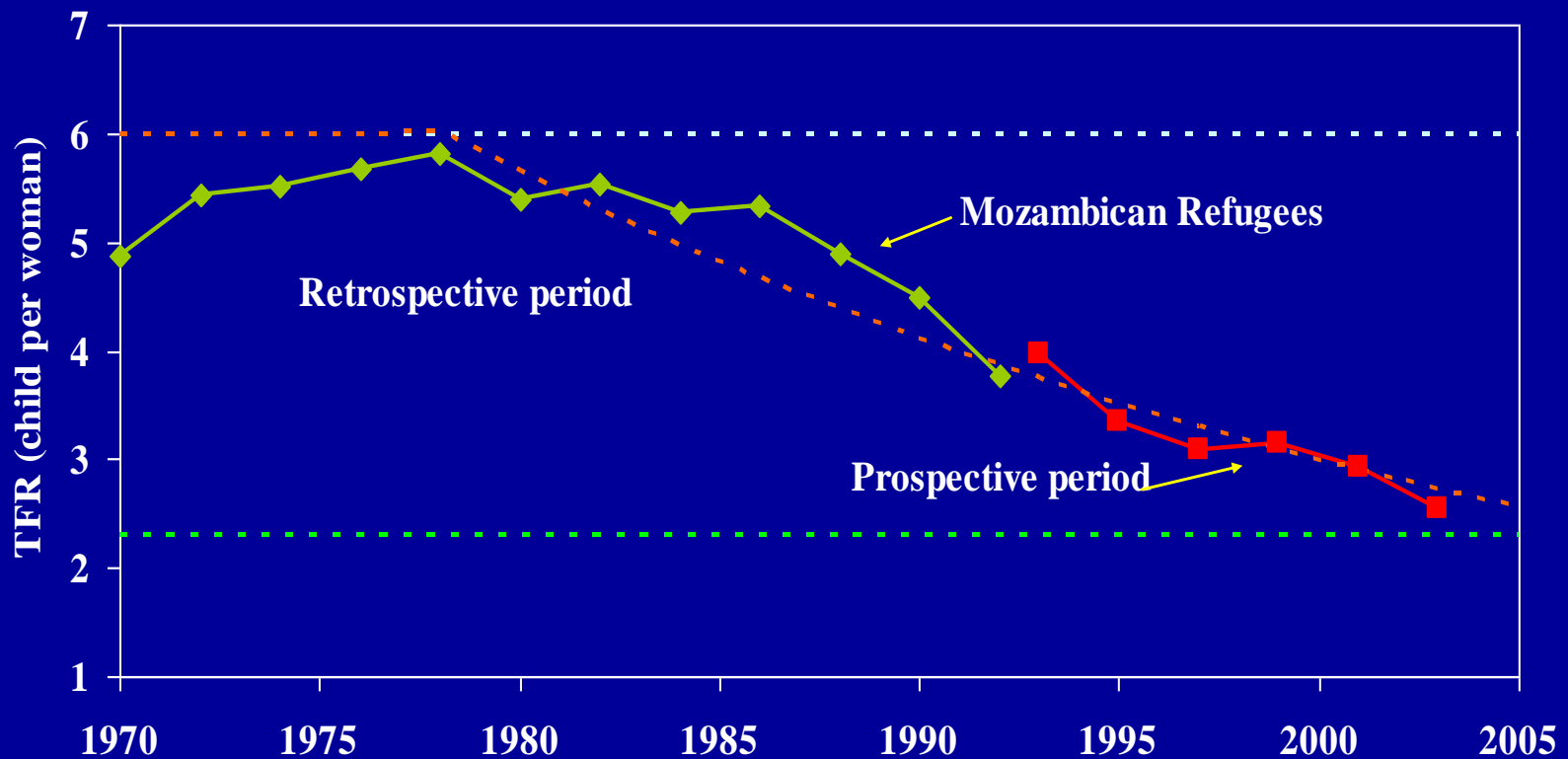


Kimani et al, 2010

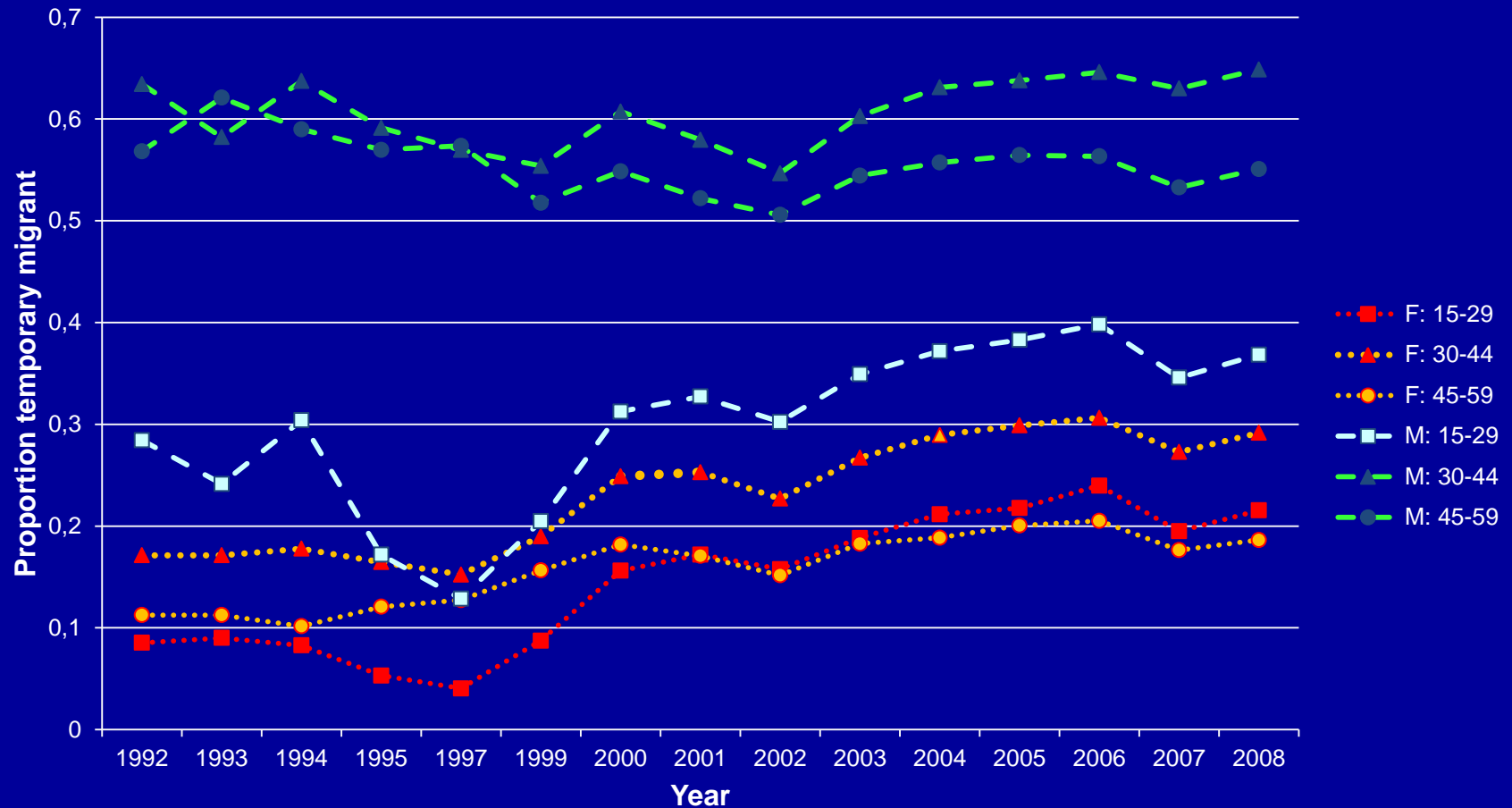
# Life Expectancy Agincourt, 1992-2008



# Fertility in rural South Africa



# Trends in proportion of labour migrants, Agincourt, 1992 - 2008

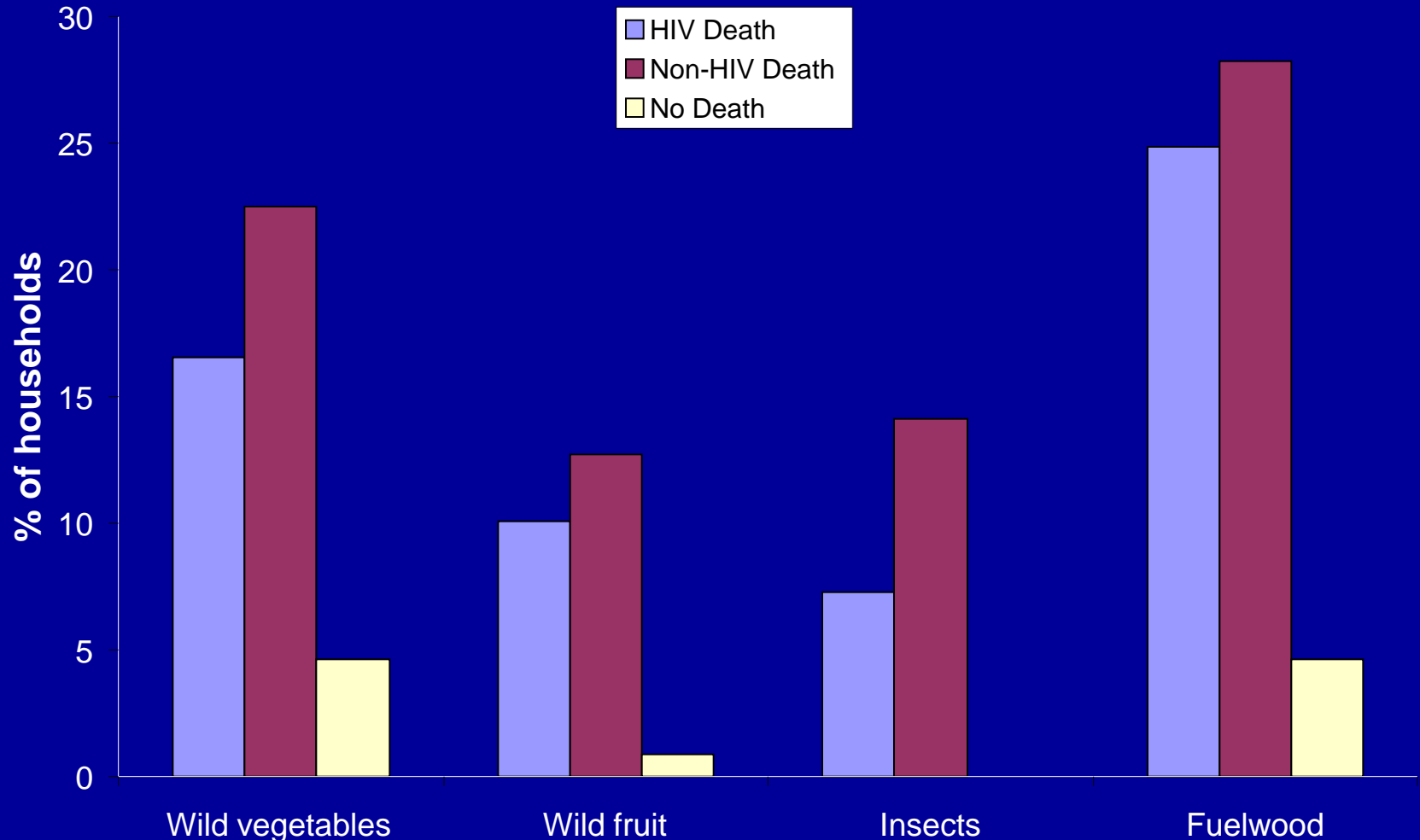


# Child mortality (under-5): *impact of migration and HH configuration*

Parental status	Multivariate odds ratios (95% CI)
mother and father present	[ref]
mother present, father not attached to HH or has died	1.90 (1.49 to 2.42)
mother present, father migrant worker	1.05 (0.75 to 1.49)
mother migrant worker	2.83 (1.56 to 5.13)
mother died	5.22 (2.37 to 11.54)



# Use of natural resources to save money



Proportion of households using natural resources to save money  
(across categories of household experience of an adult death)

# Birth to Twenty

Cohort

1990 (JHB-Soweto)

3273 mothers and babies

70% remain in the study

16 waves of data collection



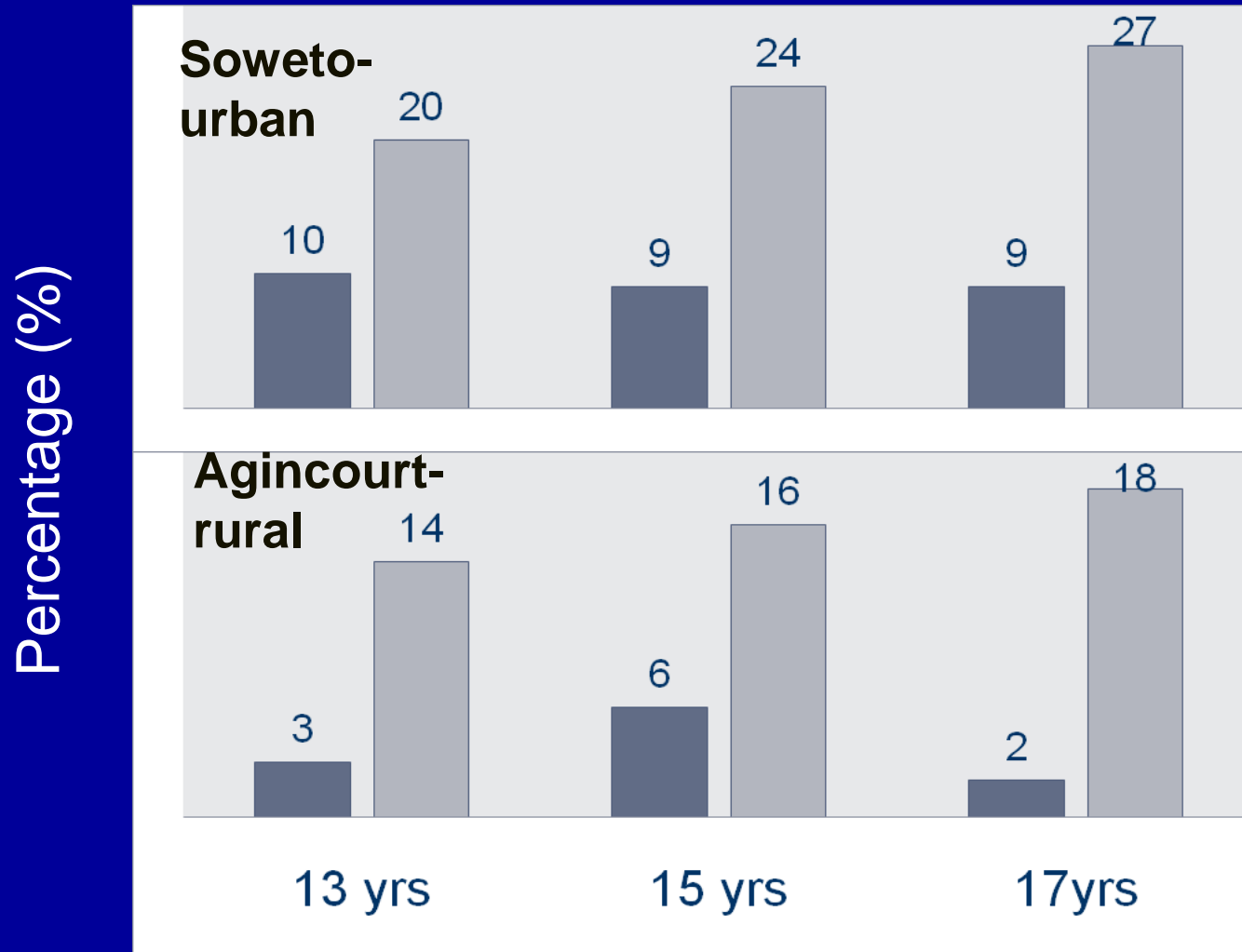
# Nutritional status of urban and rural children

	<b>Soweto 1992 (urban)</b>	<b>Agincourt 2007 (rural)</b>
	24 months	24 months
Stunting	26.5 %	24 %
Underweight	8.7 %	13 %
Wasting	6.5 %	7 %

- Levels of stunting, underweight and wasting in Agincourt today similar to levels in urban Soweto 15 years ago
- Association of stunting particularly at age 2 with later cognitive development, educational attainment and human capital

# Risk: overweight and obesity

Overweight & obesity prevalence in adolescent males & females



Data from Bt20 & Kimani et al 2010

# Obesity & metabolic disorders

Variable (prevalence)	Agincourt (rural)	Soweto (urban)
<b>Obesity</b> (BMI $\geq$ 30)	33%	50%
<b>Hypertension</b>	42%	42%
<b>Diabetes</b> (glucose >7mM)	8.3%	14.3%

**2003 Surveys; females >35years**





# Risk: Obesity

Energy In & Energy Out  
“BIG MAC” - the “Kota”



# Health & Socio-demographic Surveillance System (HDSS)

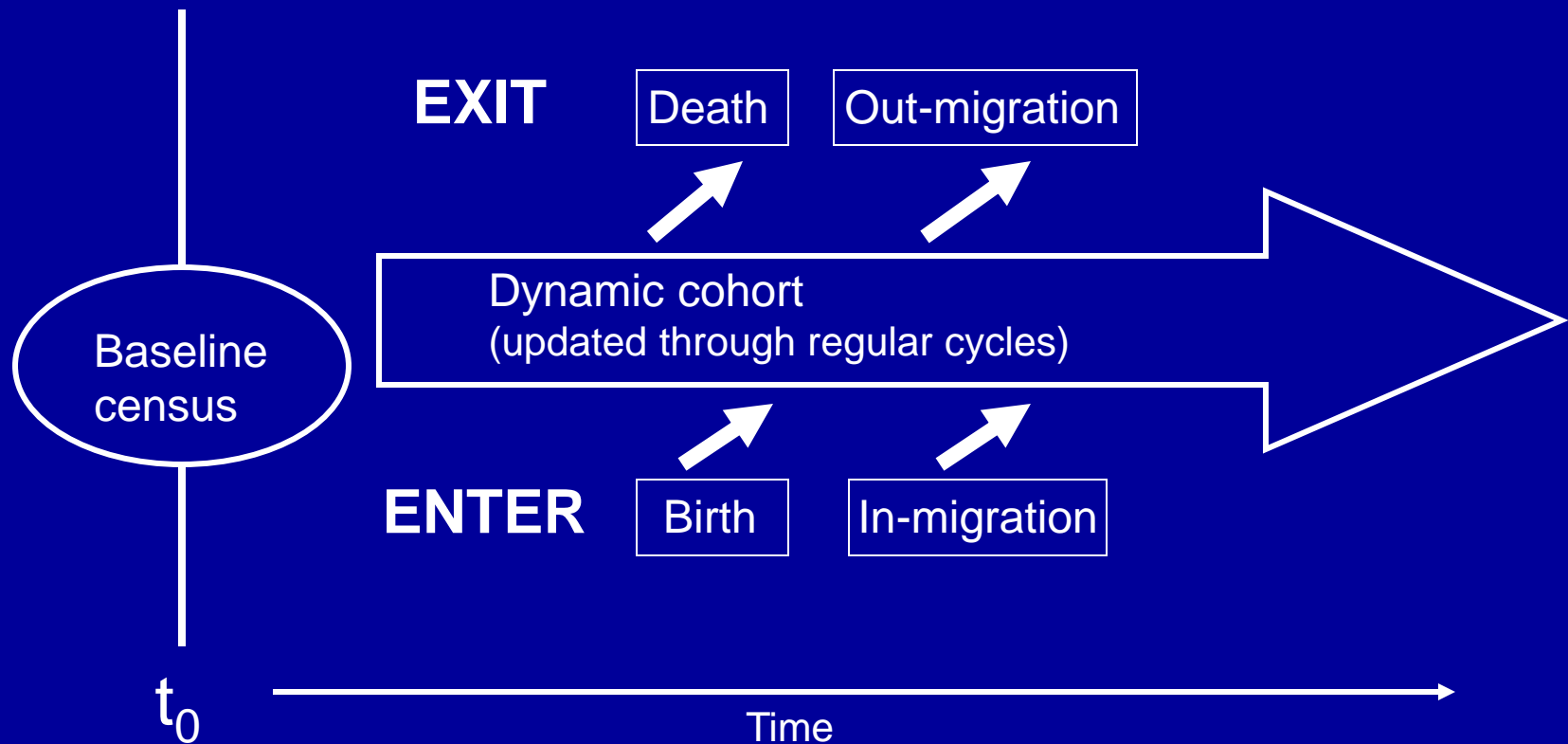
**Continuous monitoring of a geographically-defined population, with timely production of data on all vital events (births, deaths, migrations)**

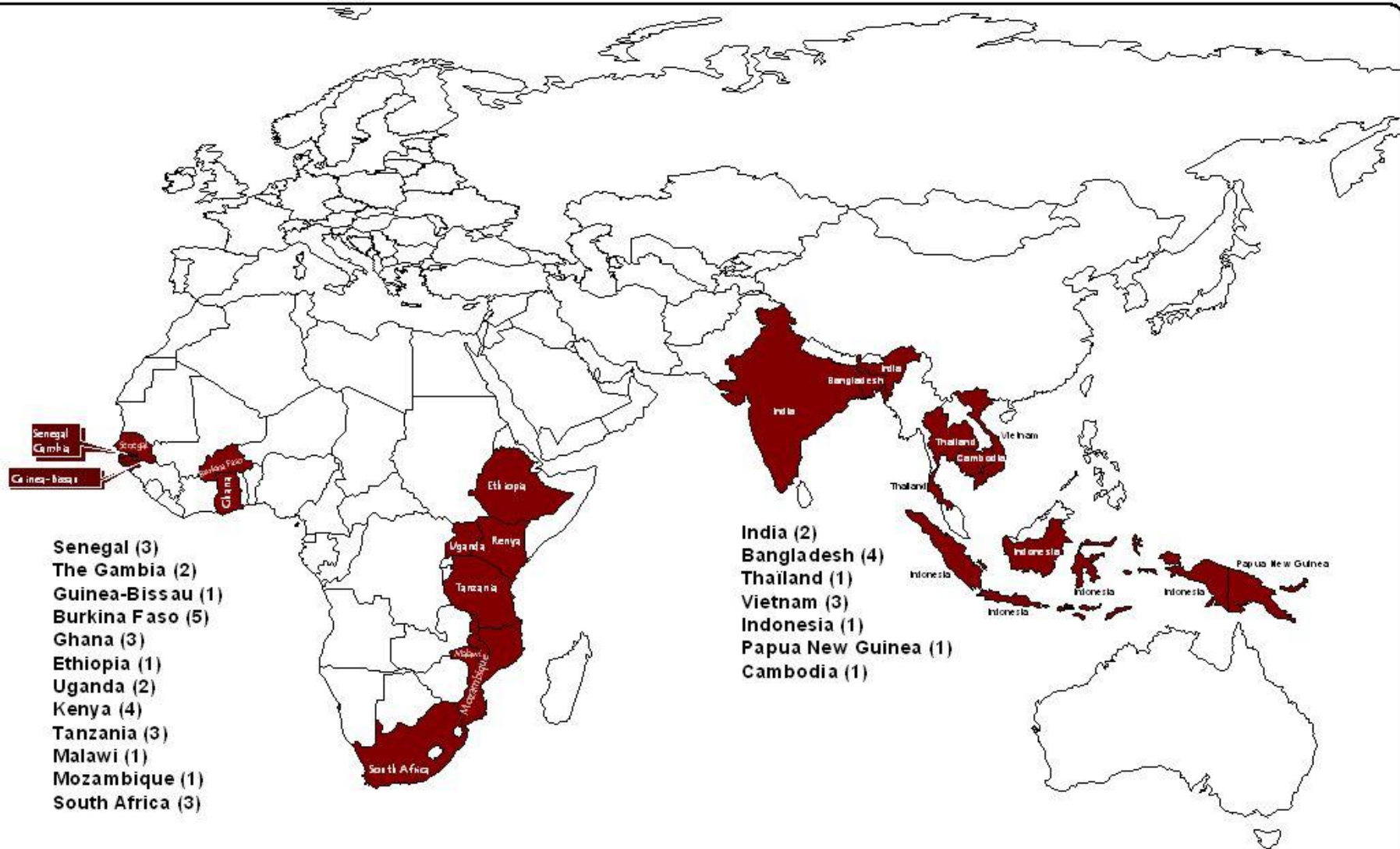
Additional information on:  
cause of death, morbidity,  
disability & function, unions,  
lifestyle, food security,  
economic & social activity



*Defining and registering a population*  
*Following community over time*  
*Recording all vital events*

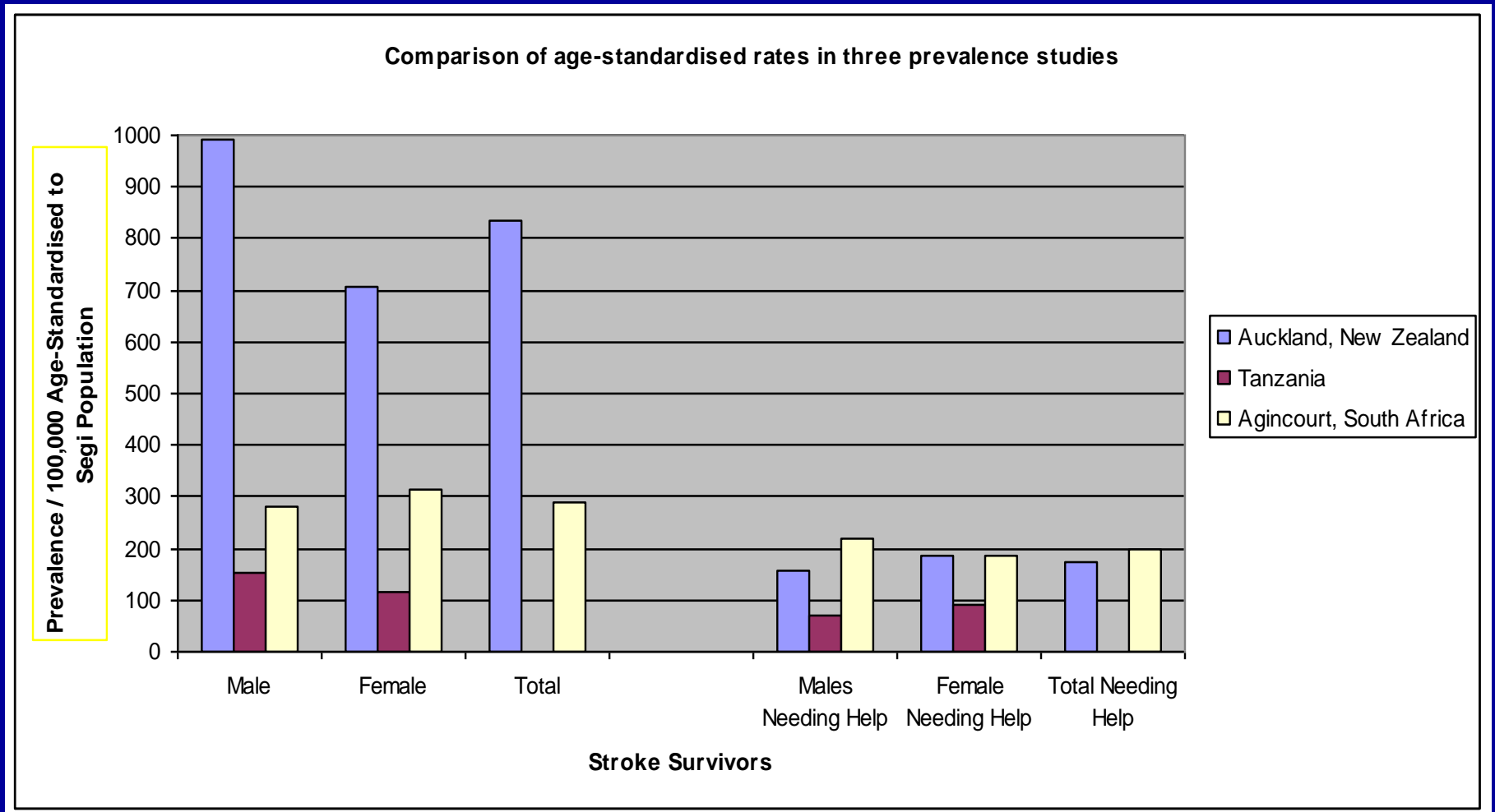
# Health and Socio-demographic Surveillance System (HDSS)



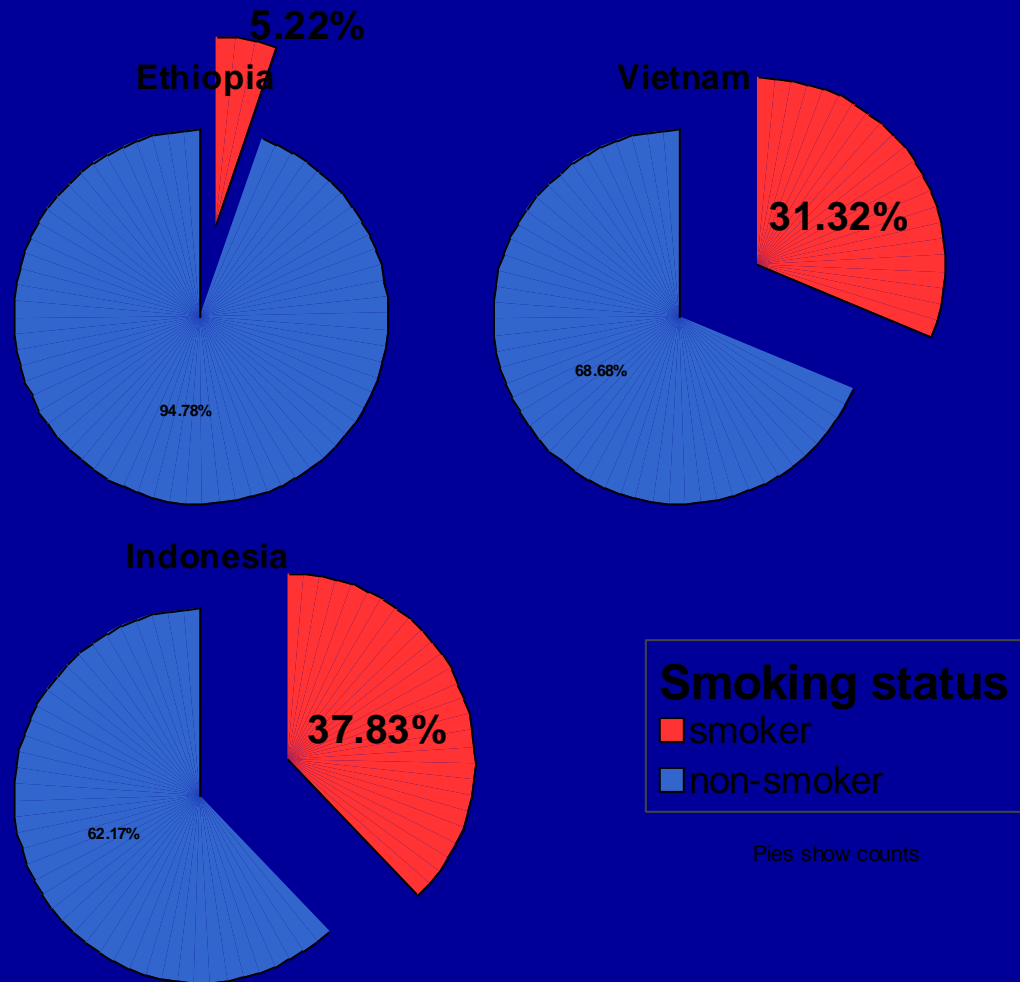


# Southern Africa Stroke Prevention Initiative (SASPI):

## Prevalence of stroke survivors, 2002-3







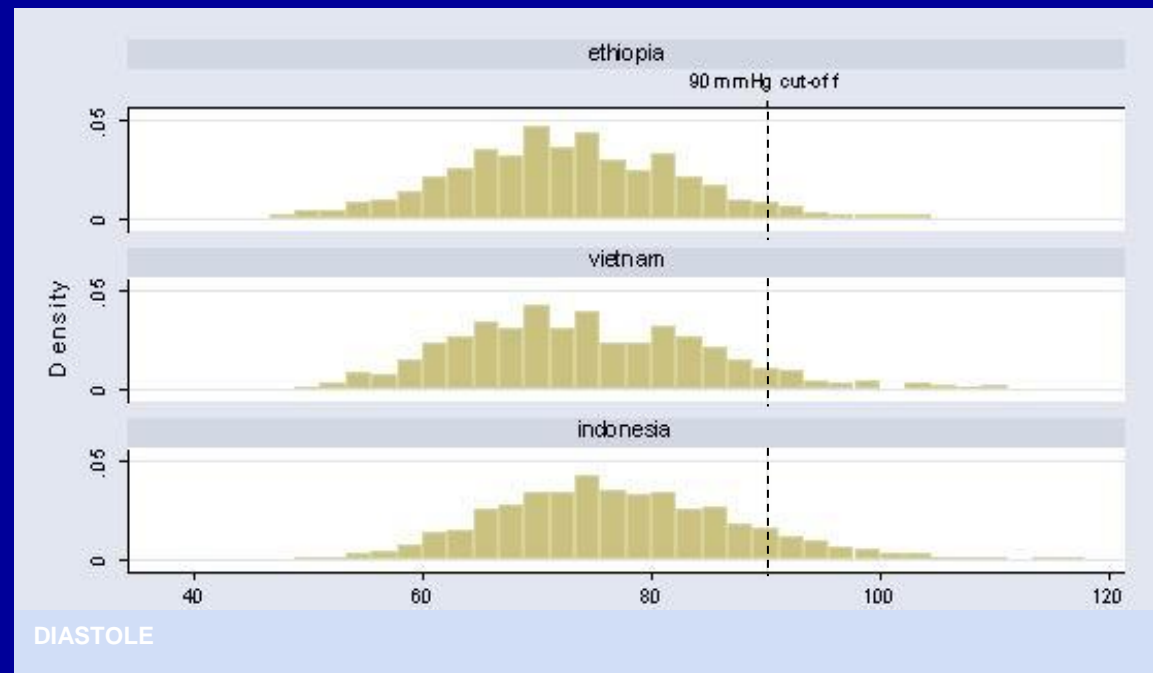
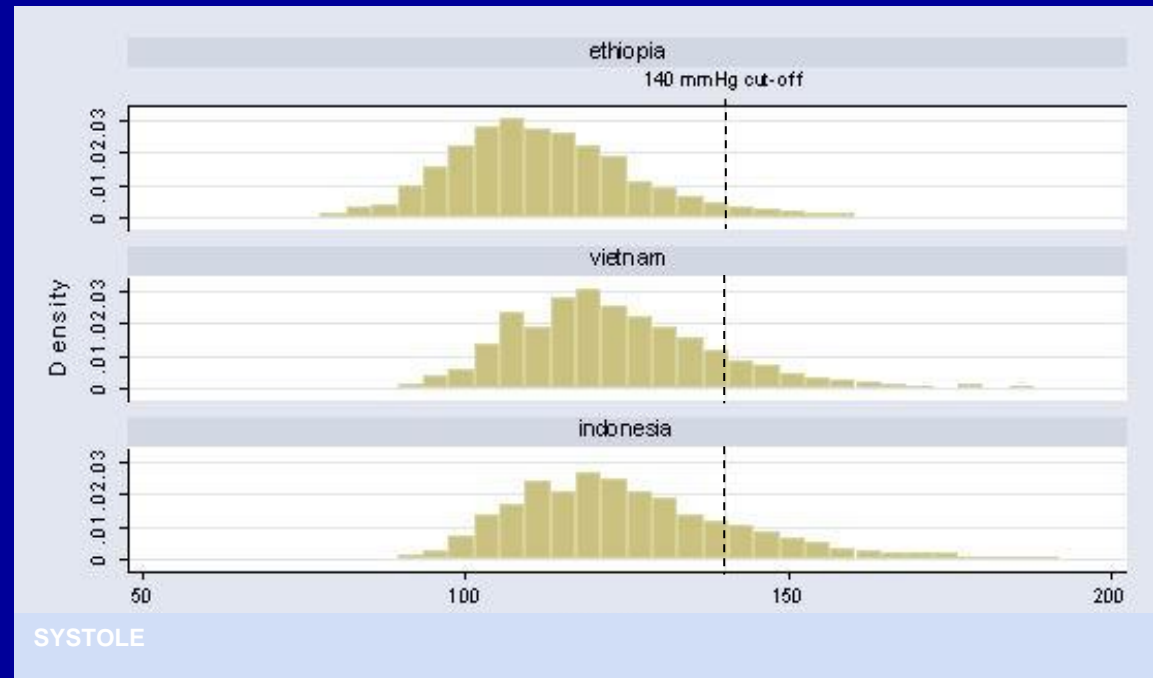
Proportion of smokers among adults (25-64)  
across Ethiopia, Vietnam and Indonesia

# Blood pressure distribution

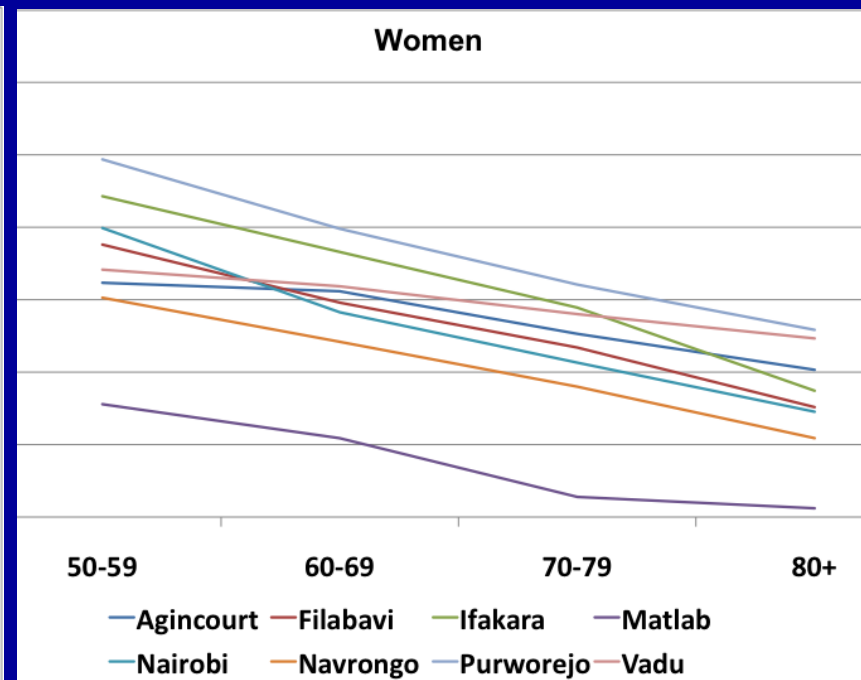
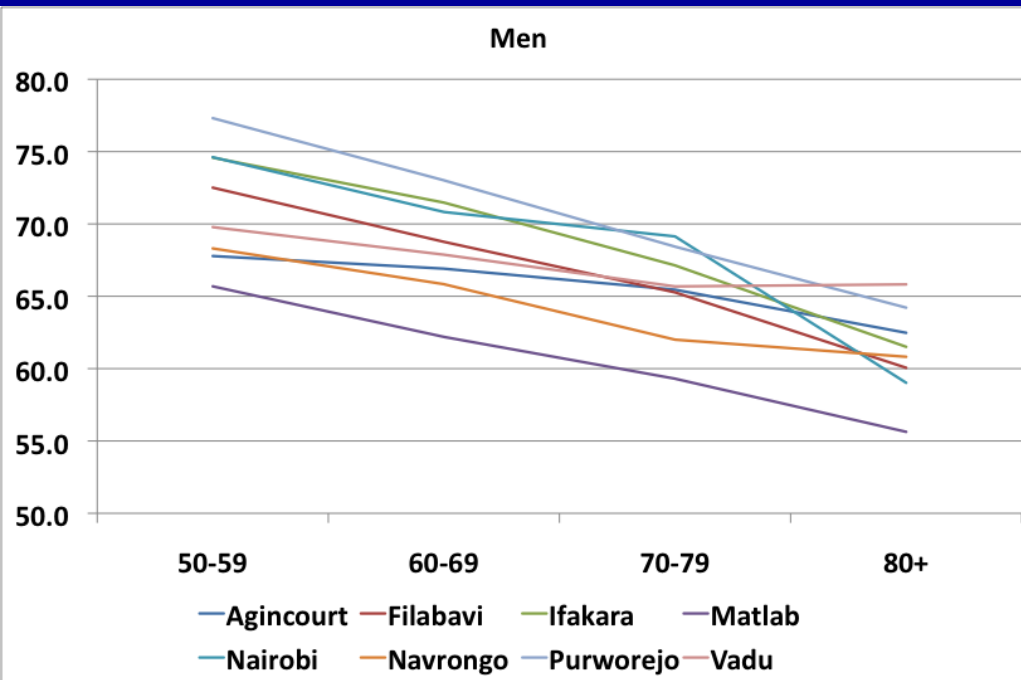
Consistent pattern of systolic/diastolic BP in countries

Transition in a risk factor

INDEPTH Network



# Older men consistently report... better health, on Health Score, than older women



<b>Agincourt South Africa</b>	<b>Ifakara Tanzania</b>	<b>Nairobi Kenya</b>	<b>Navrongo Ghana</b>
<b>-2.48 Sleep/Energy</b>	<b>-3.51 Pain</b>	<b>-3.88 Vision</b>	<b>-2.66 Sleep/Energy</b>
<b>-2.25 Cognition</b>	<b>-3.19 Mobility</b>	<b>-3.57 Sleep/Energy</b>	<b>-2.20 Affect</b>
<b>-2.24 Affect</b>	<b>-2.60 Vision</b>	<b>-3.53 Pain</b>	<b>-2.15 Mobility</b>
<b>-2.23 Pain</b>	<b>-2.42 Sleep/Energy</b>	<b>-3.38 Affect</b>	<b>-2.04 Pain</b>
<b>-1.80 Vision</b>	<b>-2.30 Cognition</b>	<b>-2.56 Mobility</b>	<b>-2.00 Cognition</b>
<b>-1.70 Mobility</b>	<b>-1.89 Affect</b>	<b>-2.38 Cognition</b>	<b>-1.54 Interpersonal</b>
<b>-1.50 Interpersonal</b>	<b>-0.56 Interpersonal</b>	<b>-1.87 Interpersonal</b>	<b>-1.51 Vision</b>
<b>-0.50 Selfcare</b>	<b>-0.46 Selfcare</b>	<b>0.16 Selfcare</b>	<b>-0.19 Selfcare</b>

Health score was used as outcome variable, and the regression analyses were adjusted to sex, age, education level, socio-economic quintiles, and marital status in each site

<b>Filabavi Viet Nam</b>	<b>Matlab Bangladesh</b>	<b>Purworejo Indonesia</b>	<b>Vadu India</b>
<b>-2.81 Mobility</b>	<b>-2.09 Mobility</b>	<b>-4.06 Pain</b>	<b>-3.17 Vision</b>
<b>-2.70 Sleep/Energy</b>	<b>-1.85 Pain</b>	<b>-3.41 Cognition</b>	<b>-2.61 Mobility</b>
<b>-2.38 Pain</b>	<b>-1.82 Affect</b>	<b>-3.18 Vision</b>	<b>-2.59 Pain</b>
<b>-2.14 Cognition</b>	<b>-1.66 Sleep/Energy</b>	<b>-2.81 Sleep/Energy</b>	<b>-2.52 Affect</b>
<b>-1.88 Affect</b>	<b>-1.55 Cognition</b>	<b>-2.43 Affect</b>	<b>-2.43 Interpersonal</b>
<b>-1.80 Vision</b>	<b>-1.48 Vision</b>	<b>-2.19 Mobility</b>	<b>-2.26 Cognition</b>
<b>-1.10 Interpersonal</b>	<b>-0.96 Selfcare</b>	<b>-0.94 Interpersonal</b>	<b>-1.39 Selfcare</b>
<b>0.20 Selfcare</b>	<b>-0.94 Interpersonal</b>	<b>0.94 Selfcare</b>	<b>-1.39 Sleep/Energy</b>

Health score was used as outcome variables, and the regression analyses were adjusted to sex, age, education level, socio-economic quintiles, and marital status in each site



# Self-reported health & mortality, 2006-7

Predictors of death	Agincourt S Africa	Filabavi Vietnam	Ifakara Tanzania	Matlab Bangladesh	Nairobi Kenya	Purworejo Indonesia	Vadu India
<b>Poor SRH</b>	1.8 (1.39-2.33)	1.18 (0.89-1.56)	3.64 (2.77-4.79)	3.58 (2.3-5.6)	1.51 (0.93-2.44)	4.8 (3.47-6.63)	4.54 (3.19-6.47)
<b>Moderate SRH</b>	1.44 (1.15-1.8)	1.03 (0.8-1.32)	1.81 (1.42-2.31)	1.51 (0.93-2.44)	1.1 (0.7-1.73)	1.92 (1.55-2.38)	1.34 (1.04-1.73)
<b>Good SRH</b>	1	1	1	1	1	1	1

Outcome: death (M and F)

Independent variable: self-rated health

Analysis: univariate Poisson regression

Numbers represent relative risk (95% CI)

# These are new agendas

- ? What **precedents** from industrialized experience
- Posing major challenges to **investments** policy, programs, service development
- With profound **limits** to available evidence and data sources

# Acknowledgments

- Sida, Sweden; The Wellcome Trust, UK
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- Study communities

