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# THE EXCESS MORTALITY OF TWINS COMPARED TO SINGLETONS FROM BIRTH TO AGE 5 IN SUB-SAHARAN AFRICA (SSA)

## Analysis of Health and Demographic Surveillance Systems (HDSS) Data

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### 1- INTRODUCTION & CONTEXT

This research follows on from a previous study we did on the excess mortality of twins in SSA, using national surveys (Ouedraogo et al., 2021). The issue was that of **excess twin mortality**, universally known, but which is more worrying in SSA for several reasons:

- It's the area with the highest twinning rate: around 17.5‰ in 2016 (Ouedraogo, 2020);
- child mortality is there higher than anywhere else.

SSA context is also one of **imperfect data**: national surveys are less reliable (accuracy of: birth dates, age at death, etc.) and civil registration is weak.

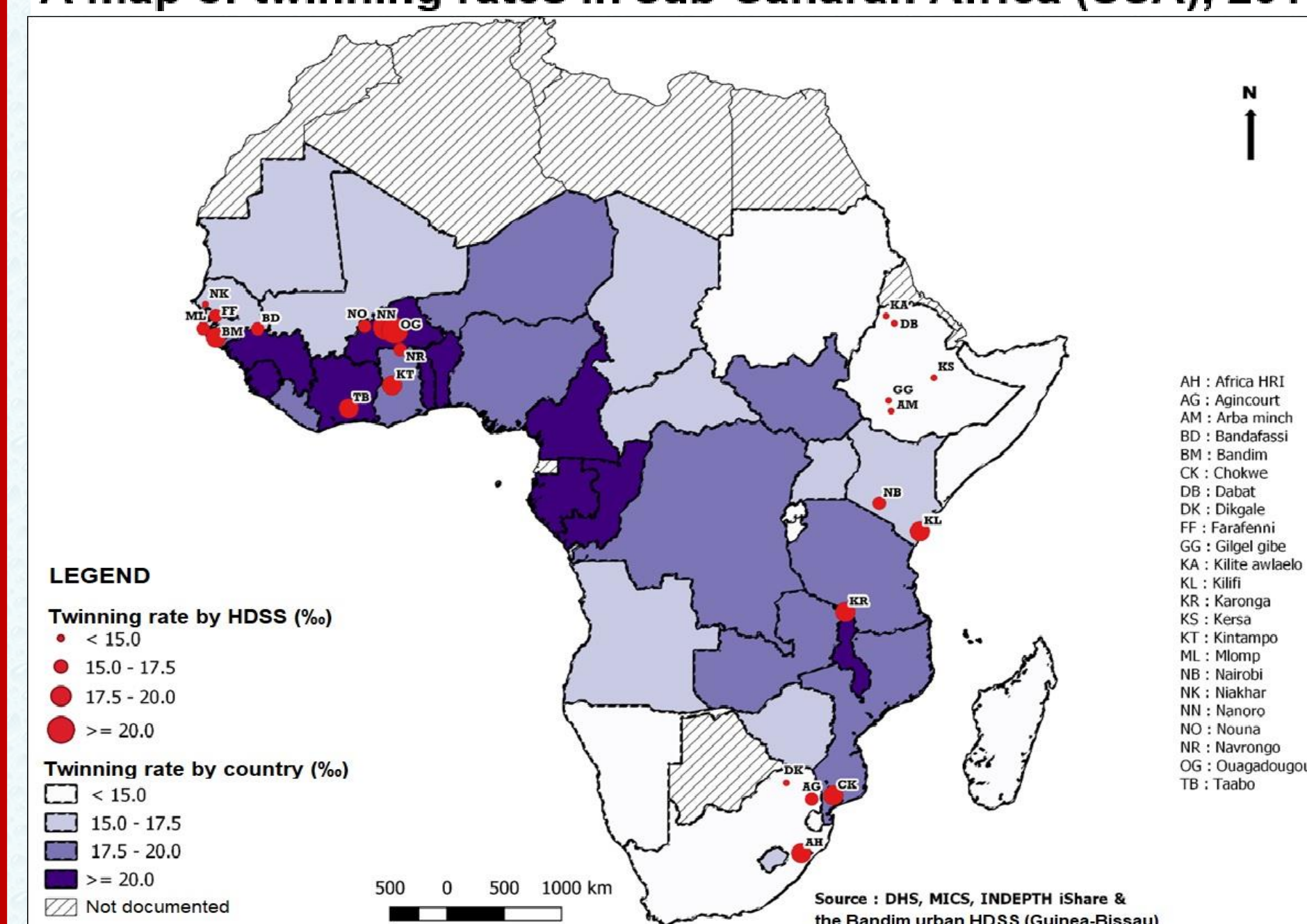
Here we decided to use **HDSS data** (considered to be of **better quality**) to confirm and complete the previous findings (from national surveys). An HDSS is a data collection system that consists in a long-term prospective follow-up of the entire population of an area.

However, HDSSs are not nationally representative and do not cover the whole of SSA. But they are sufficiently diverse to illustrate heterogeneous contexts and convergence at the continental level (Bocquier et al. 2019).

This research aims to:

- estimate comparative survival curves of twins and singletons (0-5 years old) over the period 2010 – 2014;
- analyse their evolution over time (1995-2014);
- study the factors associated with twin excess mortality.

#### A map of twinning rates in sub-Saharan Africa (SSA), 2016

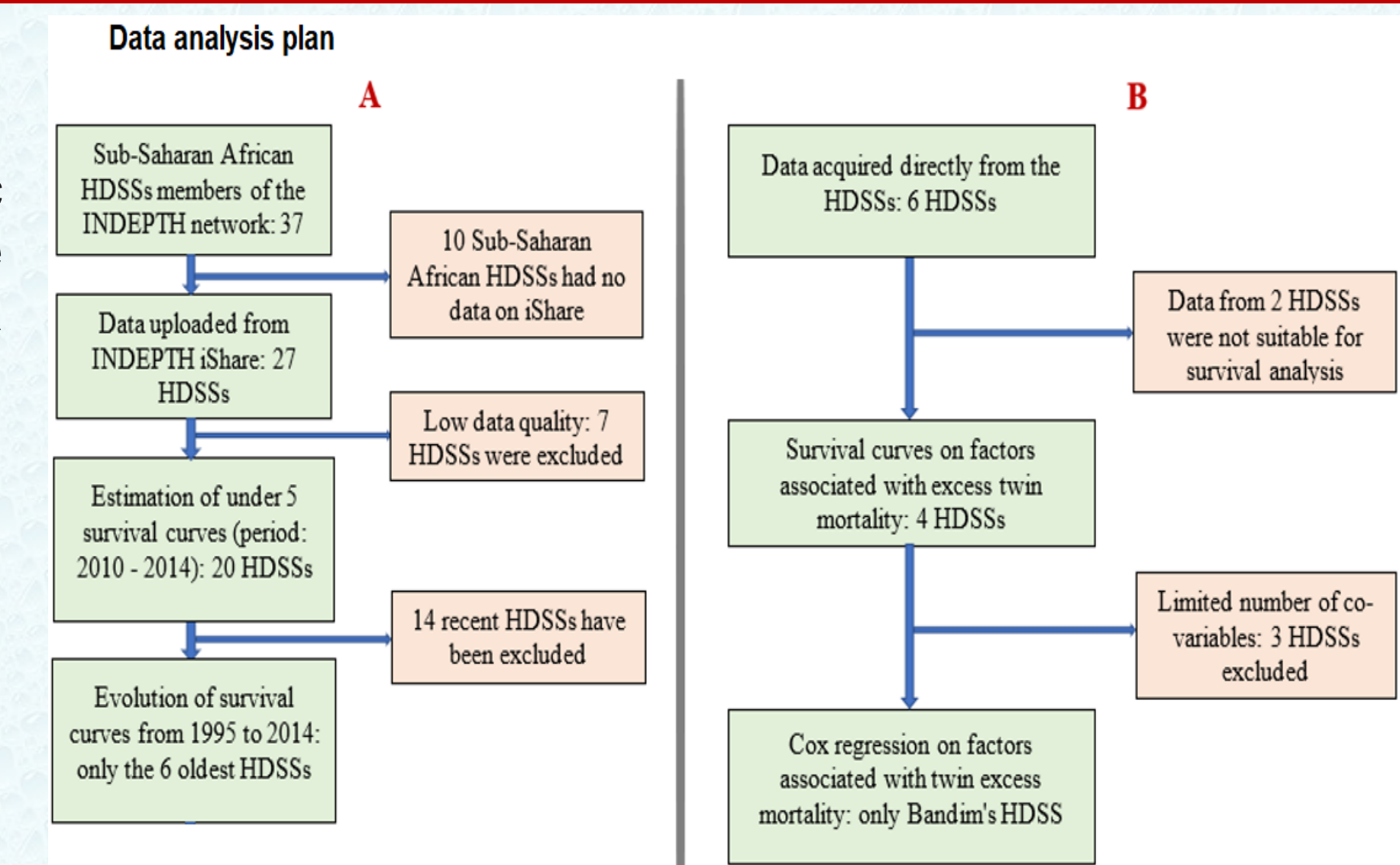


### 2- DATA & METHODS

Data used are those of the **21 HDSSs of the INDEPTH network** (International Network for the Demographic Evaluation of Population and Their Health). They come from two sources: INDEPTH iShare online data (<https://www.indepth-ishare.org/>) (A) and data obtained directly from some HDSSs (B).

The HDSS data are longitudinal, so we used survival analysis methods to study them:

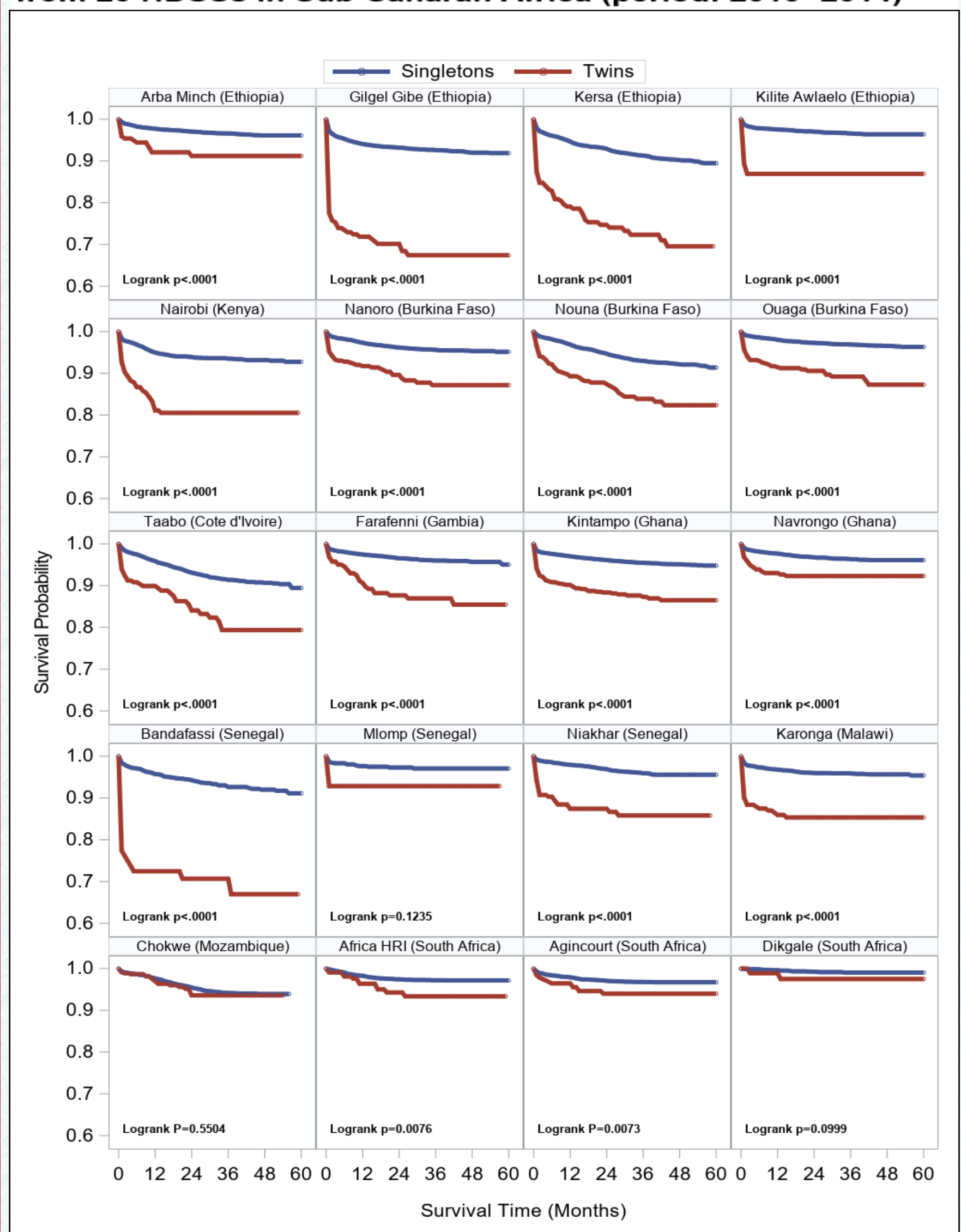
- actuarial life table method to build survival curves.
- Cox regression to analyse the factors associated with excess mortality among twins.



### 3- KEY FINDINGS

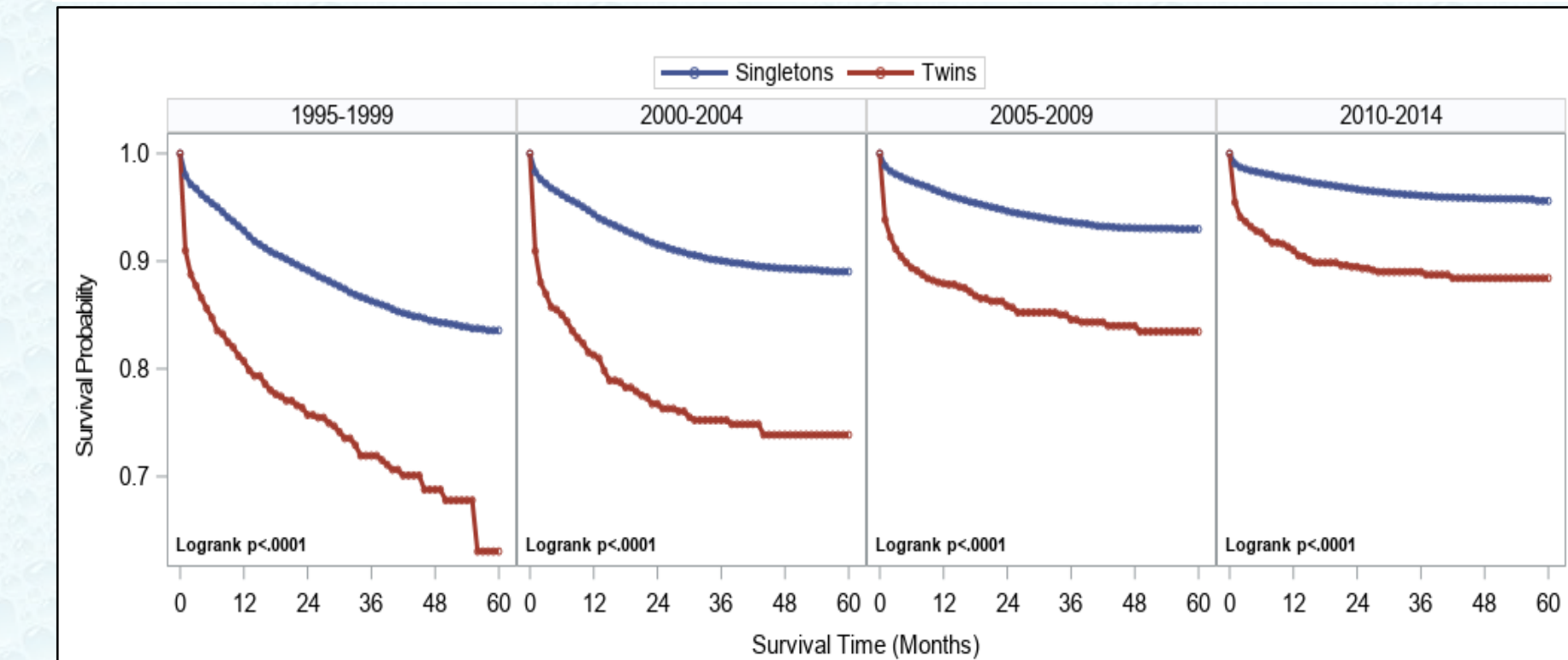
**Result 1:** twin children have significantly lower survival probability than non-twin children in SSA according to HDSSs data (2010-2014)

Survival curves from 0 to 5 years old for twins and singletons from 20 HDSSs in Sub-Saharan Africa (period: 2010- 2014)



**Result 2:** an increase in the survival probability of children over time (1995-2014)

Survival curves from 0 to 5 years old for twins and singletons in 6 oldest HDSSs in SSA - aggregate change between 1995 and 2014



**Result 3:** a set of biomedical variables (low birthweight, preterm births and home delivery) are main factors associated with excess mortality risks among twins (in Bandim HDSS)

Risk of death in the Bandim's HDSS (Guinea-Bissau), 1985-2014

Variables	Unadjusted Hazard Ratio		Adjusted Hazard Ratio (HR)			
	HR	95% CI	By biomedical co-variables		By biomedical, demographic and socio-cultural co-variables	
<b>Twinship</b>						
Twin	2.46***	2.25-2.70	1.35***	1.15-1.57	1.43***	1.22-1.66
Singleton	Ref		Ref		Ref	
<b>Preterm birth</b>						
No			Ref		Ref	
Yes	3.33***	2.70-4.10	3.40***	2.72-4.21	3.50***	2.80-4.35
<b>Birthweight</b>						
< Normal >> birthweight			Ref		Ref	
Low birthweight	2.04***	1.84-2.25	2.00***	1.82-2.22	2.01***	1.82-2.23
<b>Place of delivery</b>						
Home	1.24**	1.05-1.50	1.10	0.92-1.30	1.08	0.91-1.30
Health Service			Ref		Ref	
<b>Sex of child</b>						
Male			1.14***	1.06-1.23	1.13**	1.05-1.22
Female			Ref		Ref	
<b>Maternal age</b>						
<20 years old			1.14**	1.04-1.24	1.12*	1.02-1.22
20-39 years old			Ref		Ref	
>=40 years old			1.20	0.95-1.55	1.21	0.94-1.55
<b>Year of birth</b>						
Year of birth	0.956***	0.95-0.961	0.955***	0.95-0.96		
<b>Mother's education</b>						
Formal education					Ref	
None			1.74***	1.42-2.13		
<b>Mother's ethnicity</b>						
Balanta			0.98	0.80-1.21		
Mancanha			0.92	0.75-1.13		
Mandinga			Ref			
Mandjaco			1.20*	1.00-1.44		
Papel			1.21*	1.02-1.43		
Fulani			0.88	0.73-1.06		
Other			1.01	0.85-1.20		

HR= Hazard Ratio measuring the instant risk of death; CI= confidence interval; \*\*\*=1%, \*\*=5% and \* = 10%; ref=reference parameter.

### 4- CONCLUSION

Our results from 21 HDSSs in SSA confirm that **twin children have significantly lower survival probability** than non-twin children.

We also found a significant **increase in survival probability over time** (1995-2014) for both twins and singletons in these HDSSs.

Our results show an important role played by **low birthweight, preterm births and home delivery** in explaining the excess mortality of twins. However **socio-demographic factors such as child gender, maternal age, and mother's ethnicity should be taken into account**, even if they play a less important role.

**Our findings are in line with those found by using national survey data** (Ouedraogo et al., 2021).

### 5- REFERENCES

- Ouedraogo, A., Pison, G., Le Cœur, S., & Soutra, A. "Levels, Spatial and Temporal Variations, and Associated Factors of Twin Excess Mortality From Ages 0–5 in Sub-Saharan Africa: Analyses of National Surveys From 42 Countries". Poster presentation at the Population Association of America annual meeting, May 5-8, 2021.
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