

# Malaria and blood group

JP Allain, F Sarkodie, S Owusu-Ofori

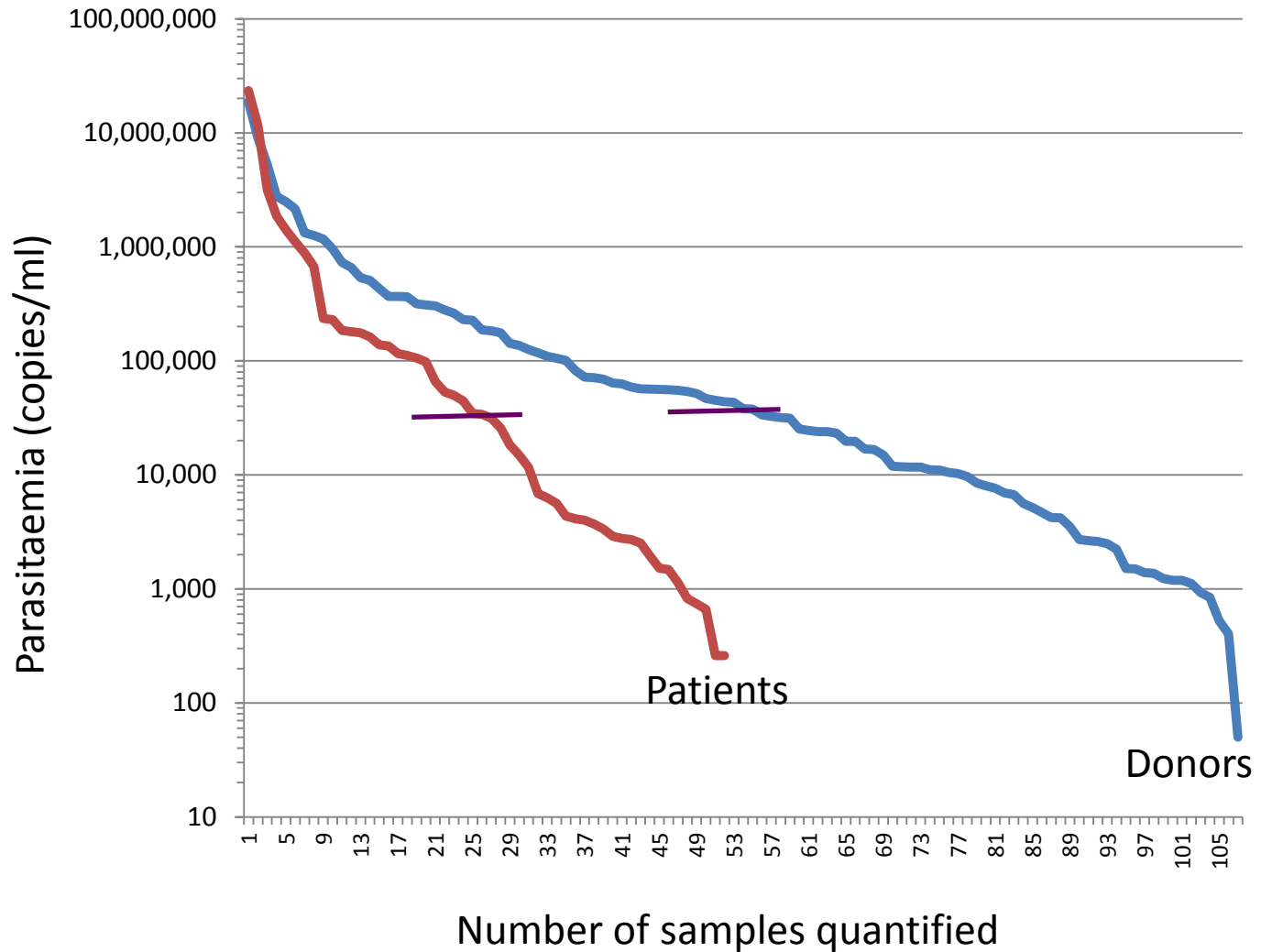
Dept Haematology, University of Cambridge, UK

Transfusion Medicine Unit, KATH, Kumasi, Ghana

# Plasmodium parasitaemia in Ghanaian blood donors

<b>Year tested</b>	<b>Population</b>	<b>N samples</b>	<b>Blood group</b>	<b>% parasitaemic</b>	<b>Median parasitaemia (cps/ml)</b>
2006-2008	Donors	106	unselected	50	20,000
	Patients	106	unselected	50	5,300
<hr/>					
2013	Donors	40	unselected	52.5	
<hr/>					
2014	Donors	486	O	22.6	33,100
	Patients	213	O	24.4	32,700

# Distribution of parasitaemia in donors and patients



# Hypotheses

The difference in parasitaemia prevalence may be related to:

1. Selection of group O donor and recipients
2. Improvement in malaria epidemiology through:
  - Increased usage of treated bed netting
  - Destruction of major mosquito breeding ground
  - Additional spraying of stagnant waters
3. Lower sensitivity of malaria genome detection assay

# Blood group and malaria clinical outcome

Country	Year	Author	Clinical presentation	N patients	% A	B	AB	O	P value O/non-O
India	2011	Panda	Severe	247	19	49	7	25	
			Uncomplicated	106	19	23	9	51	<0.001
Kenya	2007	Rove	Severe	19	25.3	15.8	36.8	21.6	
			Uncomplicated	36	25	16.7	5.6	52.8	0.04
			Severe	20	35	30	0	35	
			Uncomplicated	19	15.8	21.1	0	63.2	0.1
Mali	2007	Rowe	Severe	124	32.4	37.9	8.9	21	
			Uncomplicated	65	25	23.4	7.3	44.4	<0.001
			Control	124	22.6	23.4	8.9	45.2	
Ethiopia	2013	Tadesse	Severe	42	39.3	35	14.3	5.1	
			Uncomplicated	159	21.4	16.4	3.8	58.5	<0.01

# ABO blood group and laboratory severity of malaria

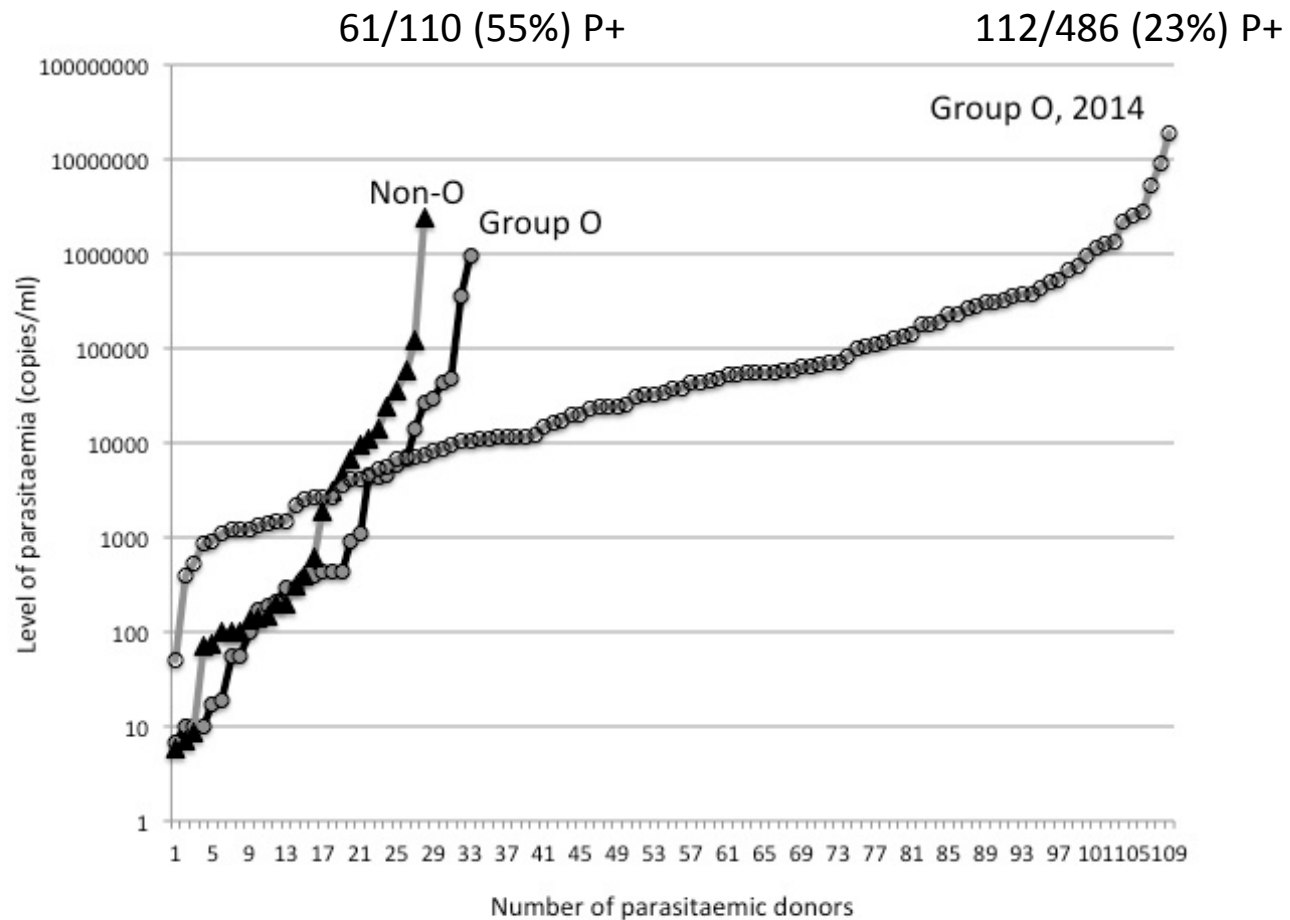
Kuadzi et al. Pan Afr Med J 2011

Lab presentation	Definition	Blood group (%)			
		A	B	AB	O
Severe	>250,000/ $\mu$ l >10% RC+ Hb <5g/dl	6 (25)	5 (15.6)	3 (60)	12 (15)
Moderate	50-250,000/ $\mu$ l Hb 5-8g/dl	7 (29.2)	12 (37.5)	1 (20)	20 (33.3)
Mild	<50,000/ $\mu$ l Hb >8g/dl	11 (45.8)	15 (33.3)	1 (20)	28 (46.7)
Total		24 (19.8)	32 (26.4)	5 (4.2)	60 (49.6)

# Parasite density according to blood group

Author	Country	Population	N cases	Median parasite/ $\mu$ l				P value
				A	B	AB	O	
Tadesse	Ethiopia	Patients	398	128.5	140	84	56	NS
Alemu	Ethiopia	Donors	416	80	320	320	377	NS
Lopera-Mesa	Mali	Children	1543	14,400	14,250	15,750	14,915	NS

# Distribution of parasite genomes/ml over time in Ghanaian blood donors





# Conclusions

- Blood group does not affect:
  - Malarial infection
  - Level of parasitaemia tested by microscopy or genomic amplification
  - Intensity of red cell destruction (level of anaemia)
- Blood group does affect clinical severity of primary or recurrent malarial infection:
  - Cerebral malaria
  - Non-cerebral severe malaria
  - Multi-organ dysfunction
  - Uncomplicated malaria