

# **SYPHILIS TESTING IN THE SOUTH AFRICAN NATIONAL BLOOD SERVICE - JANUARY 2010 TO DECEMBER 2018**



Wendy Sykes, Charl Coleman, Thys Van Emmenis,  
Cordelia Mmenu, Nessini Govender,  
Marion Vermeulen



# Background



- All SANBS blood donations are routinely screened for Syphilis
- Syphilis is a highly contagious sexually transmitted bacterial infection caused by *Treponema pallidum* (TP)
- Primarily spread
  - close sexual contact
  - from an infected mother to her unborn baby (congenital syphilis)
- Easy to treat and cure in the early stages
  - intramuscular injection of long acting penicillin



# Background: Stages of Syphilis Infection



- Primary syphilis
  - Characterised by firm, painless syphilitic sores (chancre)
  - disappear within 3 to 6 weeks with treatment
- Secondary syphilis
  - rash - palms of the hands, soles of the feet,
  - sores in the mouth
  - may resolve in a few weeks



# Background: Stages of Syphilis Infection



- Latent syphilis
  - may last for years - few or no symptoms
- Tertiary syphilis
  - Soft, non-cancerous growths (gummas)
  - Neurological problems (neuro syphilis) – dementia, confusion, numbness in extremities
  - Only 15 to 30% of people with untreated syphilis will progress to tertiary syphilis



# Background



- Syphilis was initially regarded as a surrogate marker for sexually transmitted infections but in recent years has been shown to have a low efficacy as a surrogate marker – incident infections
- Denmark and Iceland do not test for Syphilis\*
  - Lower disease incidence compared to developing countries
- Norway – targeted testing of first time donors\*
- Syphilis testing still mandated in most countries due to – insufficient scientific data



# Background



- As there have been no reported cases of transfusion-transmitted (TT) syphilis globally for at least 4 decades, a number of blood services are questioning the need for TP screening especially considering
  - the number of false positives detected
  - e.g. biological false positives may be detected in people with
    - autoimmune diseases, viral infections and other conditions unrelated to syphilis
  - detection of positive test results after the donor has been successful treated
  - failure to detect antibodies during the highly infectious window-period (first 2-6 weeks of infection)



# Aims



- To determine donor demographics associated with incident syphilis in SANBS blood donors
- Use this information to improve donor education pre donation
  - educate donors during the 1:1 interview so that they self-exclude if at risk



# Study Design



- Screening for TP antibodies was performed using a TP Haemagglutination (TPHA) reagent on the Beckman Coulter PK7300 instrument
- Confirmatory testing
  - all reactive samples tested on the Cobas e411 analyser
  - Carbon Antigen Venereal disease Research Laboratory (VDRL) test to distinguish between past and current infections



# Study Design



- For the purposes of this study
  - Incident infections – potentially infectious syphilis
    - Repeat donors - TPHA positive
    - First time donors - VDRL positive (current infection)
- Donations from January 2010 to December 2018 were analysed and data compared using Chi Square statistics to assess significance



# Results 2010 - 2018



Donations Total	Donations Repeat donors	Donations New donors	Repeat + new donors
7,423,405	5,765,971	948,994	6,714,965

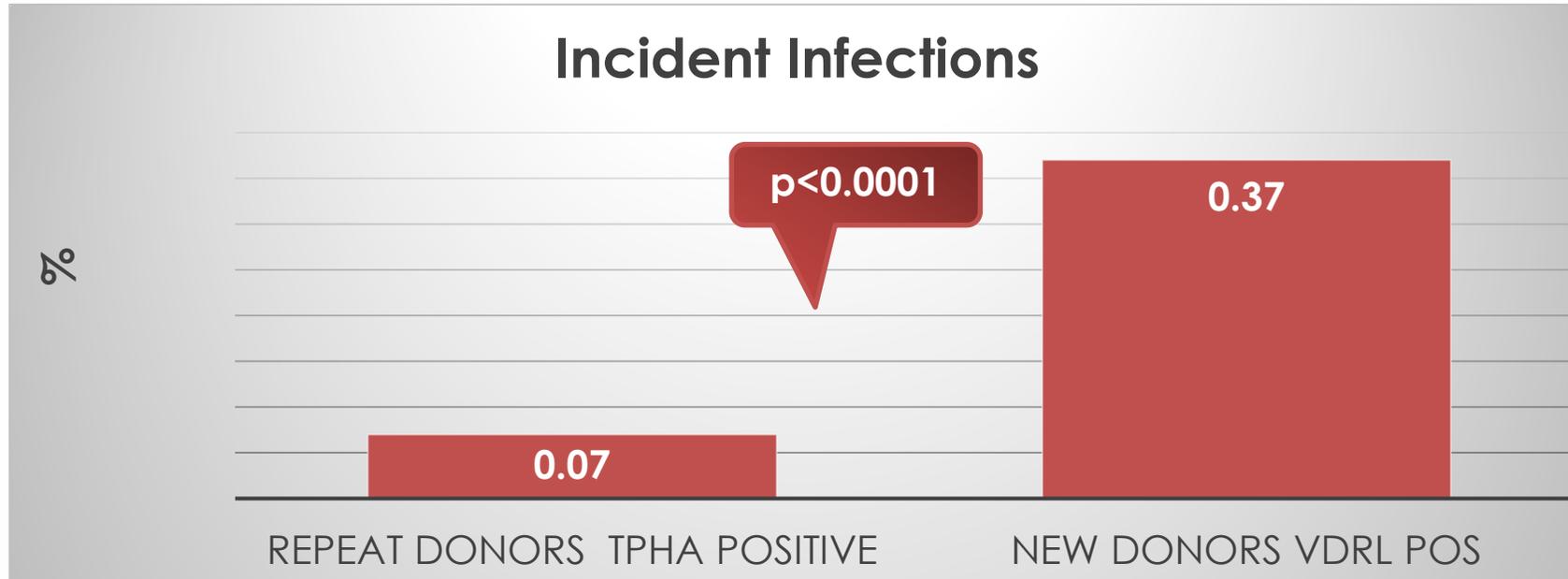
TPHA Positive	%	VDRL Positives	%
19,388	0.26	5,158	0.07



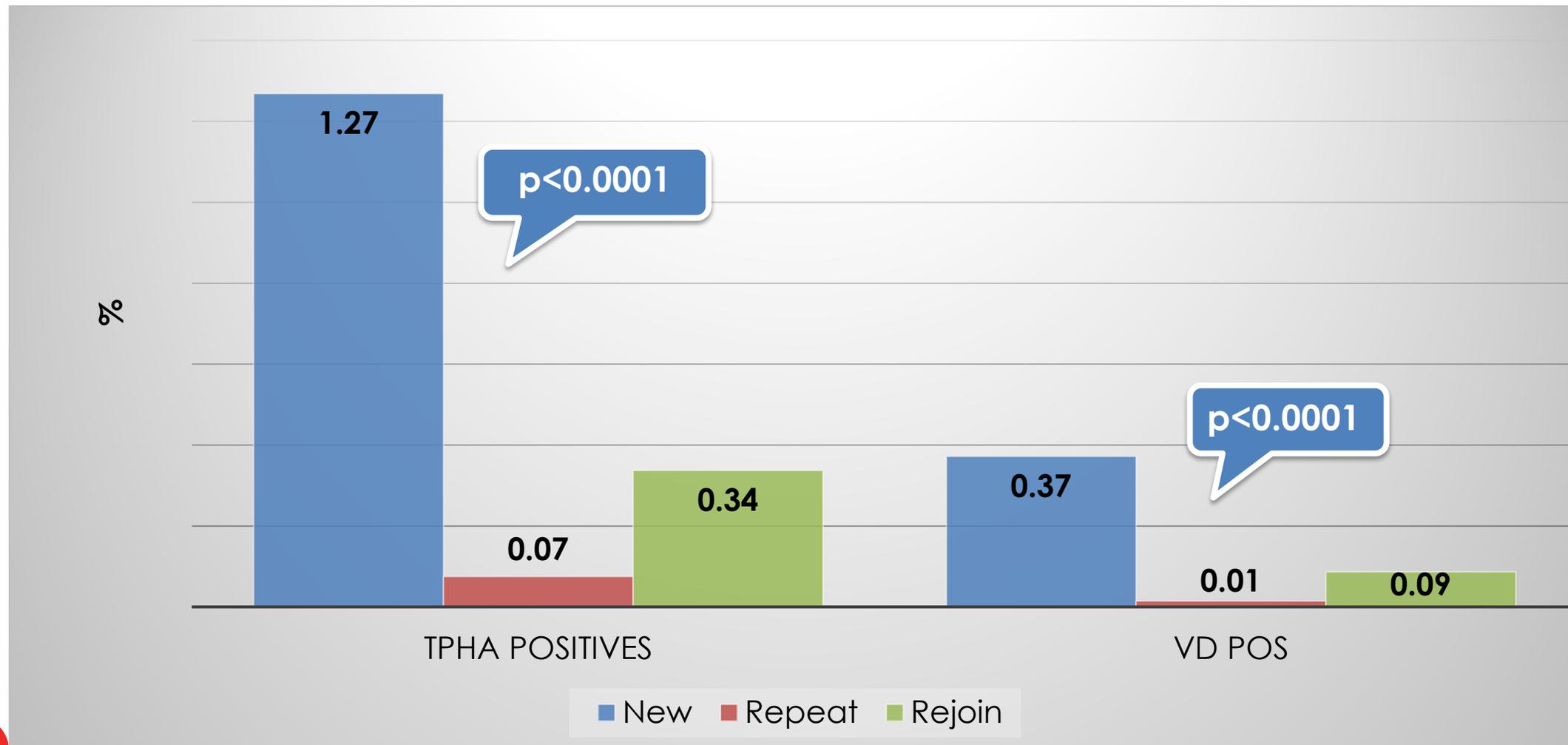
# Incident Infections



Repeat donors TPHA Positive	%	New donors VDRL Positive	%	Incident Infections	%
4,324	0.07	3,531	0.37	7,855	<b>0.12</b>



# Rate of TPHA & VDRL Positives by Donor Type



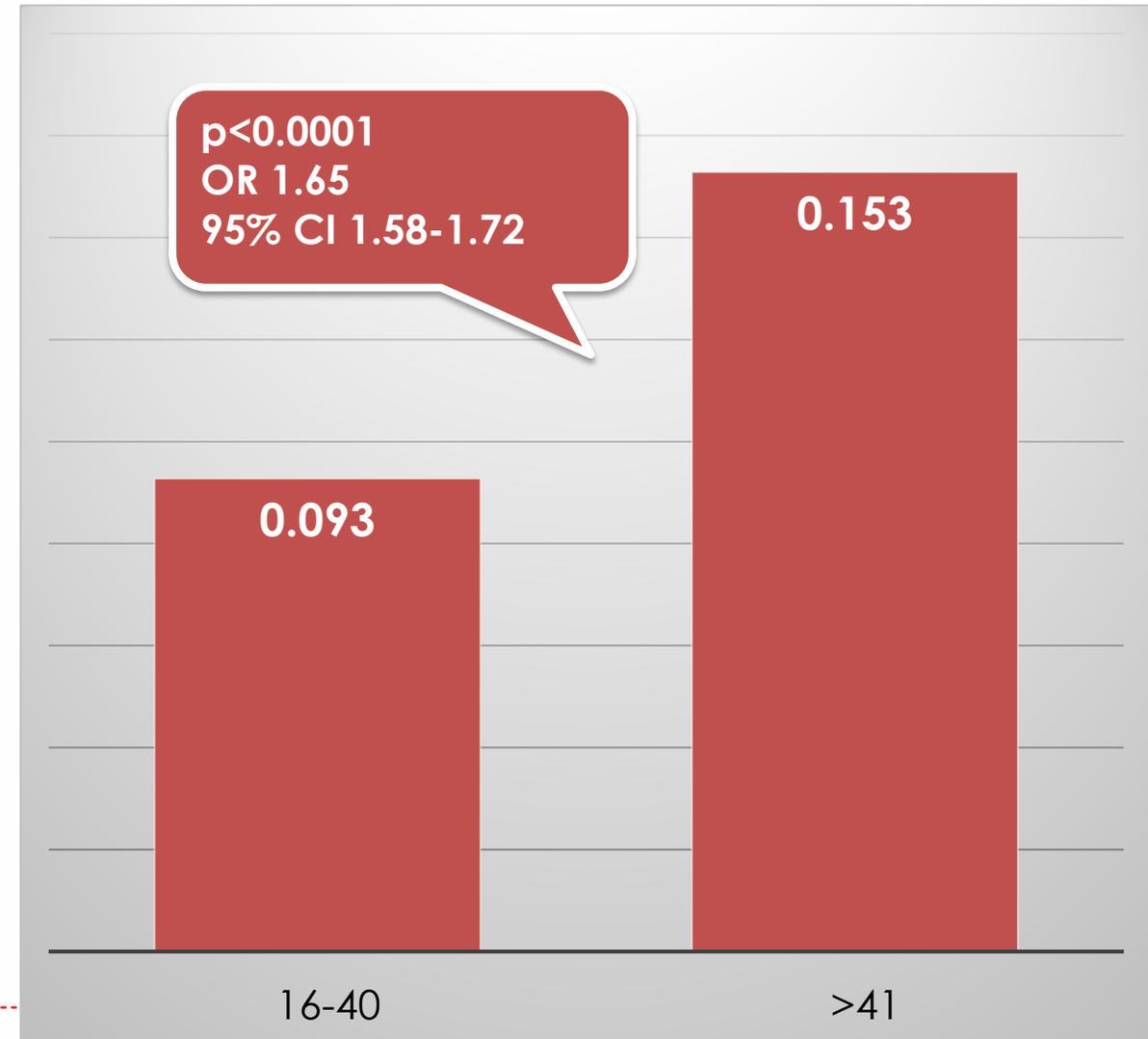
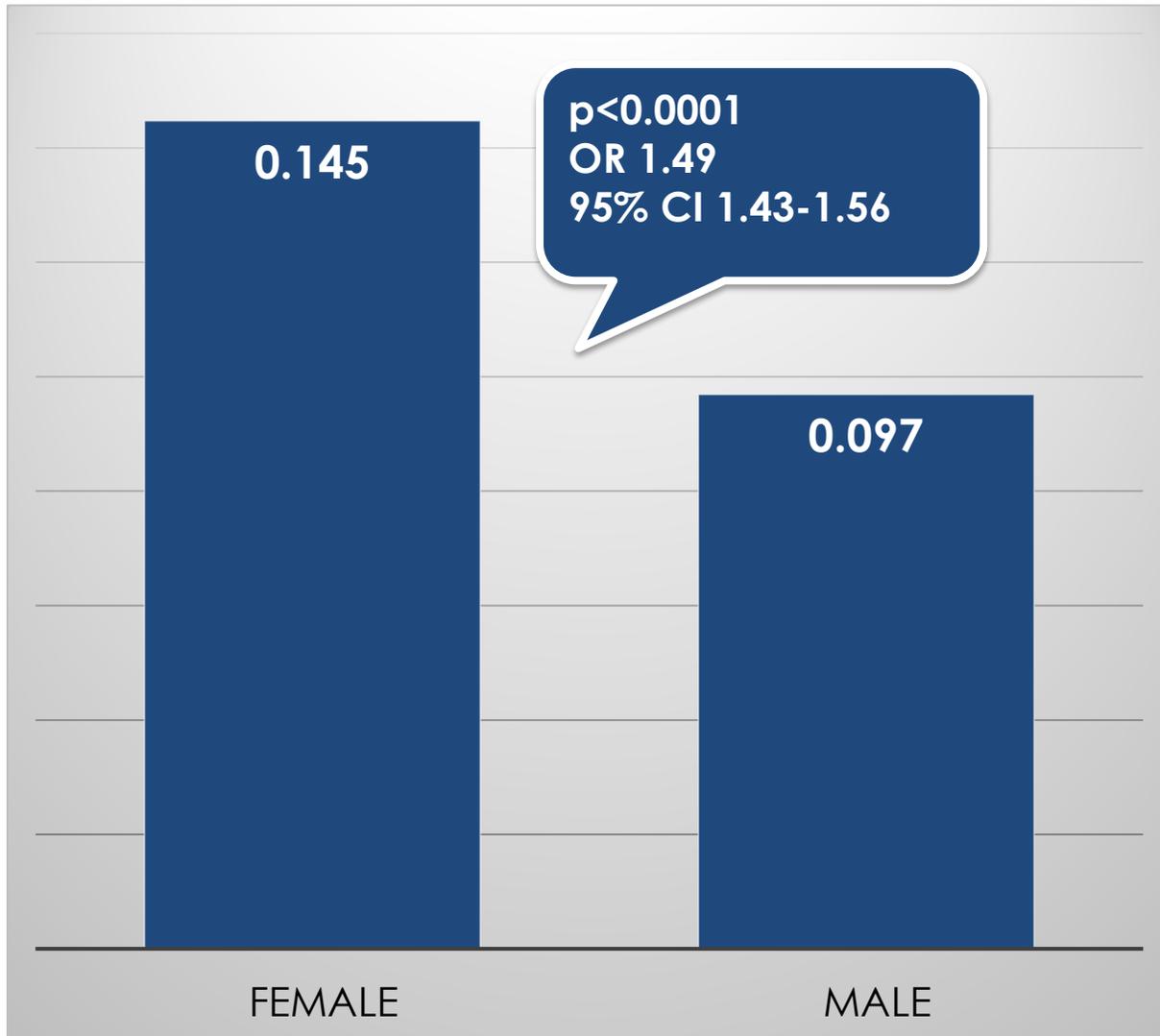
# Results



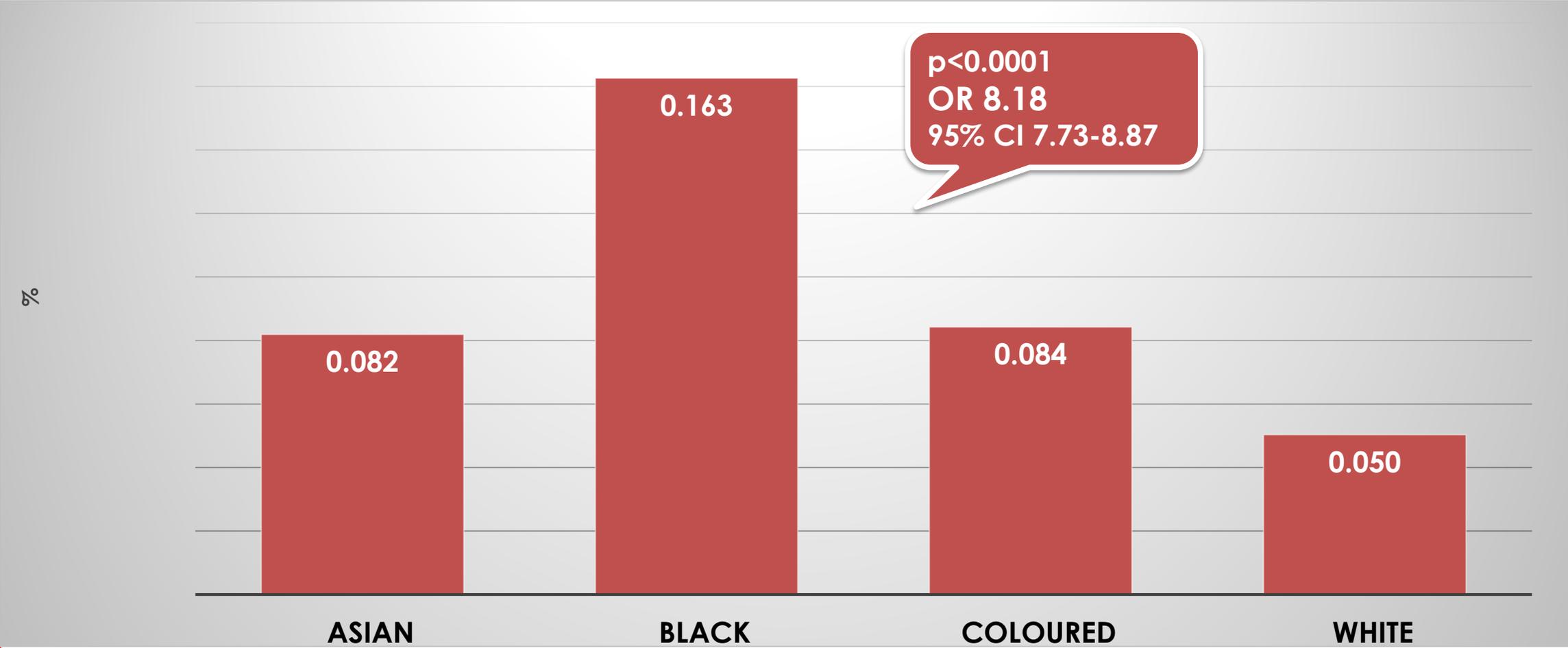
	Donations TOTAL	Repeat + new donors	Incident infections	%	p values	95% CI		
Total	7,423,405	6,714,965	7,855	0.12		OR	LL	UL
<b>Gender</b>								
Female	3,196,016	2,813,794	4,073	0.145	<0.0001	1.49	1.43	1.56
Male	4,227,381	3,901,162	3,781	0.097				
<b>Population Group</b>								
Asian	547,016	469,082	384	0.082				
Black	2,042,925	1,883,624	3,062	0.163	<0.0001	8.18	7.73	8.87
Coloured	397,108	356,199	300	0.084				
White	4,354,026	3,932,513	1,979	0.050				
<b>Age</b>								
16-40	4,510,300	4,004,251	3,712	0.093				
>41	2,913,105	2,710,714	4,143	0.153	<0.0001	1.65	1.58	1.72



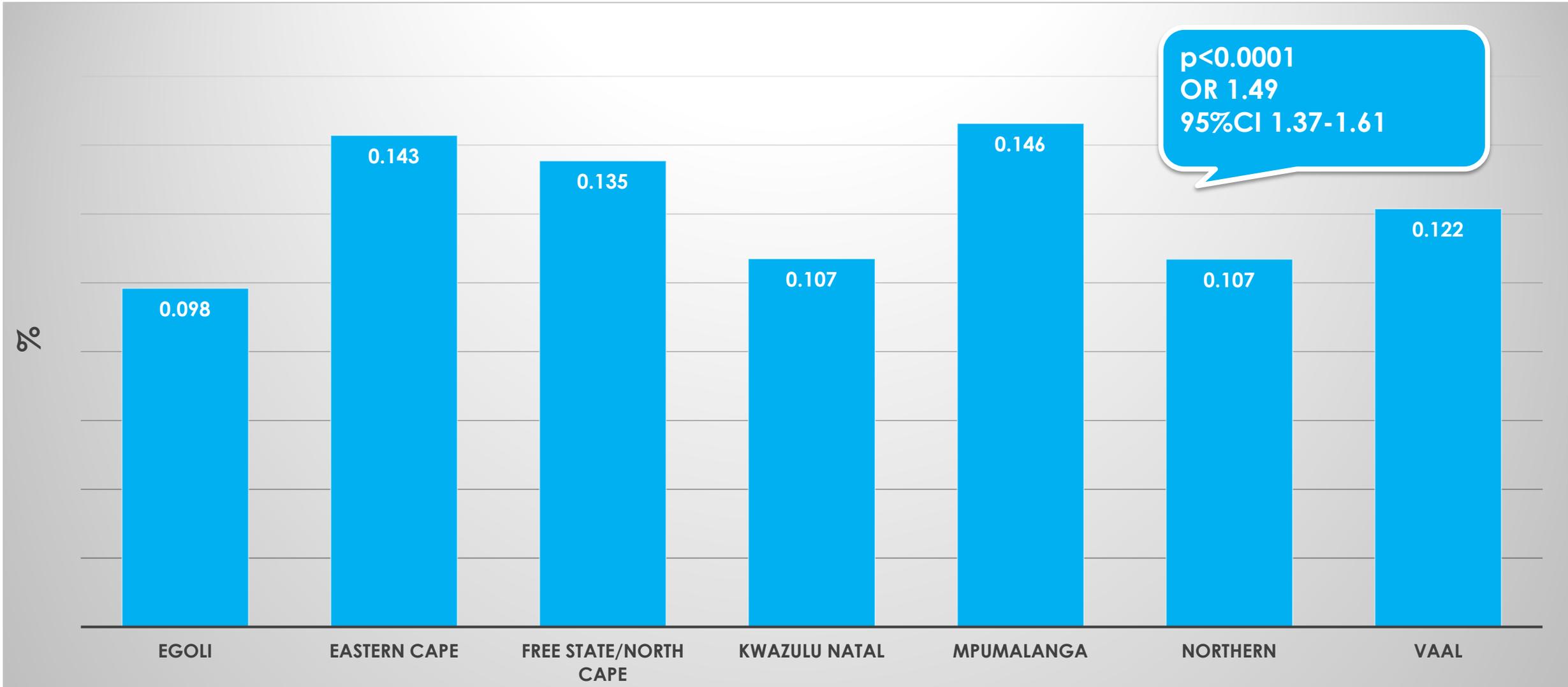
# Rate of Syphilis Incident Infections by Gender & Age (%)



# Rate of Syphilis Incident Infections by Population Group



# Rate of Syphilis Incident Infections by Zone



# Discussion



- The rate of TPHA and VDRL positives was significantly higher in new than in repeat or rejoin donors
- The rate of incident syphilis infections (potentially infectious) was significantly higher in new donors, in females donors and in donors over 41 years of age
- Black donors were 8 fold more likely to have an incident syphilis infection than donors in other population groups
- Mpumalanga and the Eastern Cape Zones had the highest rates of incident syphilis infections while Egoli zone had the lowest rate



# Discussion



- There are a number of factors that may reduce the risk of transfusion transmitted syphilis :
  - storage of blood and blood products that may inactivate the spirochete in red cells - does not survive at 4°C
  - toxicity to TP due to oxygen flow levels in platelet storage bags
  - donor exclusion due to clinical symptoms that accompany infectious stages of syphilis
    - e.g. chancre in primary syphilis, rash in secondary syphilis and gummas or neurological problems in tertiary syphilis
  - hospital patients receiving antibiotics as part of their treatment that may prevent syphilis infection



# Conclusion



These factors together with improved donor education could potentially make testing for syphilis redundant or restrict syphilis screening to high risk groups such as first time donors or for screening of platelet concentrates

Further work is required using antibiotic use and age of blood when transfused, to model the residual risk of transfusion transmitted syphilis



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