

The Effect of Ethnicity and Race on Semen Analysis and Hormones in the Infertile Patient



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OBJECTIVE

- To determine if race and ethnicity have any impact on semen analysis or baseline hormonal profiles for men with infertility

INTRODUCTION

- Numerous studies have shown differences in disease biology, outcomes and treatments based on race and ethnicity
- Limited data exists with regards to the effect of race or ethnicity on semen parameters and hormones in men with infertility

METHODS

Study Design and Setting:

- Population based, prospectively collected retrospective study using patient survey and laboratory data (2008-2017)
- All men who presented a single tertiary institution for male infertility work-up

Questionnaire:

- Self-reported questionnaire to collect data on:
 - Demographics & clinical history

Ethnicities:

- Caucasian
- African-Canadian
- Asian
- Indo-Canadian
- Native-Canadian
- Hispanic
- Middle Eastern

Semen Parameters:

- Assessed using 2010 World Health Organization Criteria
- Recorded parameters included
 - Volume
 - Count
 - Morphology
 - Motility
 - Vitality

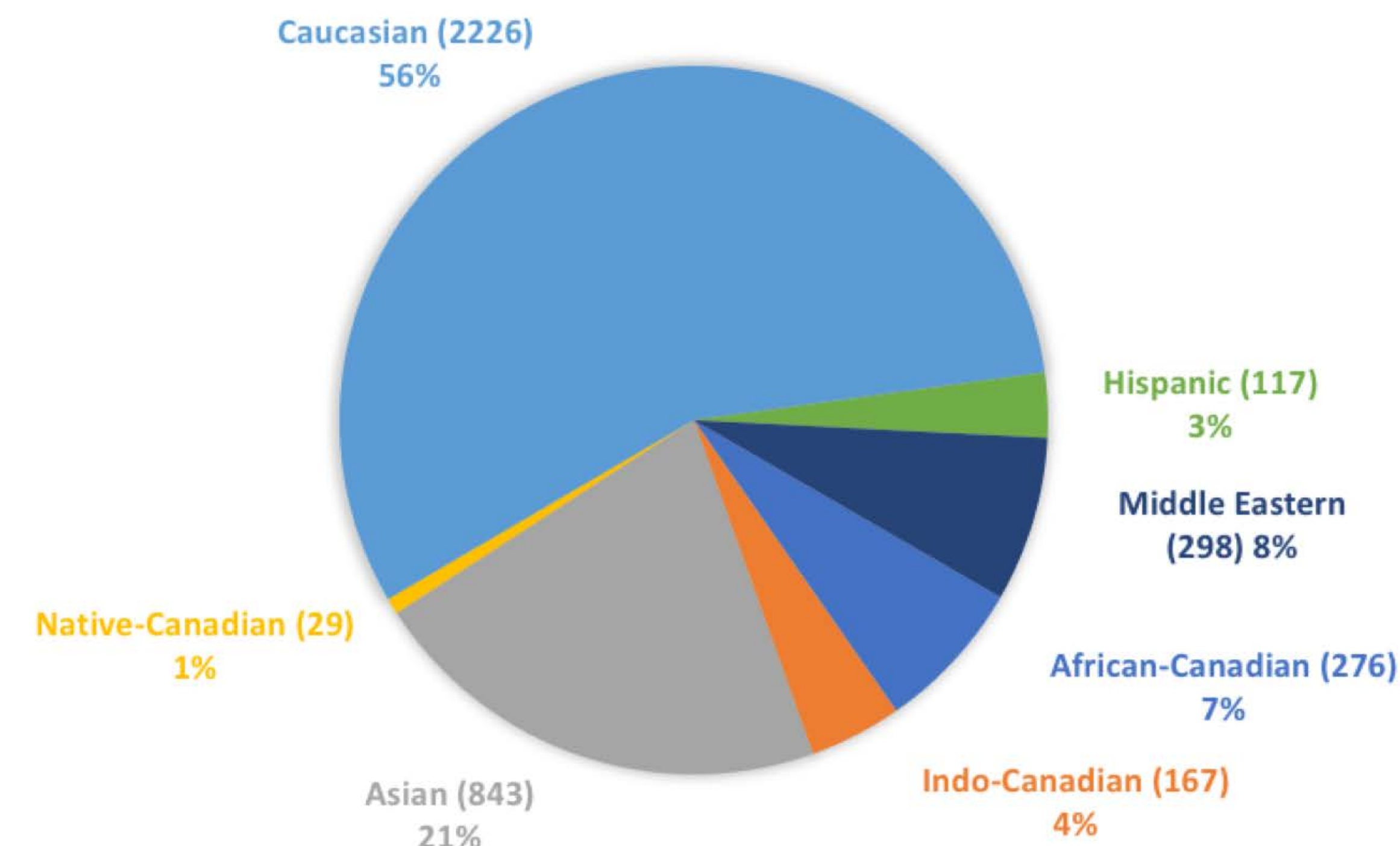
Hormone Levels

- Total Testosterone (nmol/L)
- FSH levels (mIU/ml)

Statistical Analysis:

- Reported medians (IQR) and frequencies (count) for demographics
- Linear regression for ethnicity and hormonal profiles
- Multivariate logistic regression for ethnicity and semen parameters

RACE/ETHNICITY DISTRIBUTION



RESULTS

Median FSH and Testosterone Levels

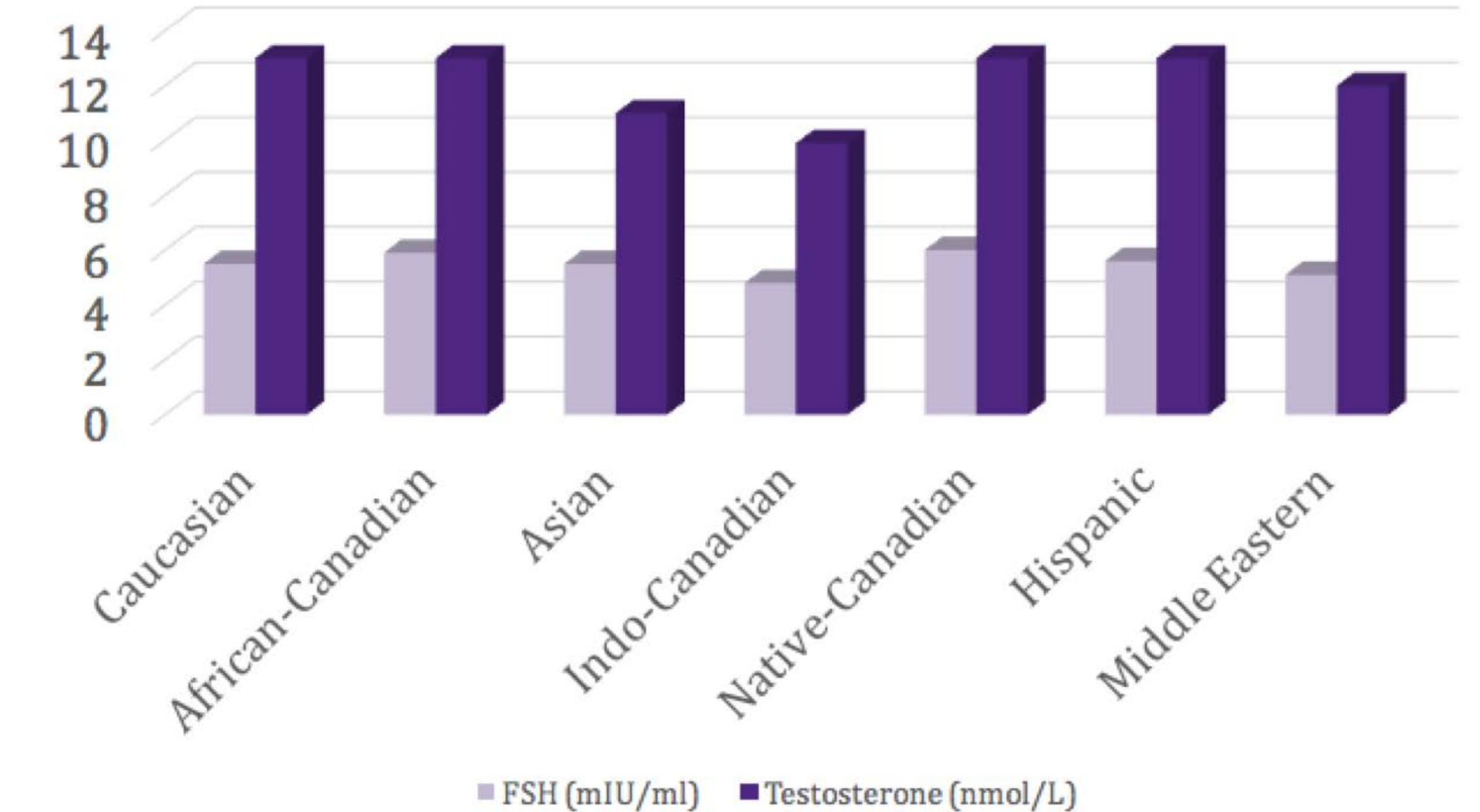


Table 1 – Demographics by Ethnicity

	African-Canadian (n=276)	Asian (n=843)	Indo-Canadian (n=167)	Caucasian (n=2226)	Native-Canadian (n=29)	Hispanic (n=117)	Middle Eastern (n=298)
Age (mean, range)	38 (20-71)	37 (19-70)	36 (24-74)	37 (17-79)	37 (24-61)	38 (22-67)	38 (17-71)
Primary Infertility (%)	215 (77.9%)	775 (91.9%)	152 (91.0%)	1925 (86.5%)	27 (93.1%)	95 (81.2%)	262 (87.9%)
Secondary Infertility (%)	61 (22.1%)	68 (8.1%)	15 (9.0%)	301 (13.5%)	2 (6.9%)	22 (18.8%)	36 (12.1%)
Intercourse Frequency (per month)(mean, range)	9 (0-90)	7 (0-40)	7 (0-30)	8 (0-90)	10 (0-30)	9 (0-31)	8 (0-45)
Duration of Infertility (yrs) (median, IQR)(mean)	3 (2-5) 4.3	2 (1.5-5) 3.7	2 (1.5-4) 3.4	2 (1-4) 3.3	3 (1.5-8) 5.6	2 (1-5) 4.0	2 (1-4) 3.5

Table 2 – Multivariate Logistic Regression for Semen Parameters vs. Ethnicity

	Azoospermia (n=839)	Oligospermia (n=2239)	Asthenospermia (n=2658)	Teratozoospermia (n=581)	Low Volume (n=748)	Poor Vitality (n=654)
Caucasian (n=2226) (OR, 95%CI, p-value)	ref	ref	ref	ref	ref	ref
African-Canadian (n=276) (OR, 95%CI, p-value)	1.70* (1.28-2.25) p<0.01	1.75* (1.33-2.29) p<0.01	1.50 (0.90-2.48) p=0.12	1.08 (0.74-1.57) p=0.70	1.42* (1.05-1.91) p=0.02	1.27 (0.89-1.82) p=0.19
Asian (n=843) (OR, 95%CI, p-value)	1.34* (1.11-1.62) p<0.01	0.82* (0.70-0.97) p=0.01	0.73* (0.57-0.93) p=0.01	0.73* (0.57-0.94) p=0.01	1.23 (1.01-1.51) p=0.04	1.17 (0.94-1.47) p=0.17
Indo-Canadian (n=167) (OR, 95%CI, p-value)	1.03 (0.69-1.53) p=0.88	0.87 (0.64-1.20) p=0.40	0.72 (0.46-1.14) p=0.16	0.58* (0.35-0.99) p=0.05	1.47 (1.01-2.13) p=0.05	1.38 (0.89-2.15) p=0.15
Native-Canadian (n=29) (OR, 95%CI, p-value)	1.60 (0.70-3.63) p=0.26	0.70 (0.34-1.46) p=0.34	1.49 (0.34-6.44)	2.45 (0.99-6.04) p=0.05	1.37 (0.59-3.19) p=0.47	1.14 (0.41-3.21) p=0.80
Hispanic (n=117) (OR, 95%CI, p-value)	1.10 (0.70-1.75) p=0.68	0.74 (0.51-1.08) p=0.11	0.58 (0.34-0.99) p=0.04	0.66 (0.36-1.21) p=0.18	1.37 (0.88-2.14) p=0.16	0.59 (0.32-1.09) p=0.09
Middle Eastern (n=298) (OR, 95%CI, p-value)	1.19 (0.89-1.60) p=0.25	1.22 (0.95-1.56) p=0.12	0.84 (0.57-1.23) p=0.36	1.19 (0.85-1.66) p=0.31	0.83 (0.60-1.16) p=0.28	1.20 (0.85-1.68) p=0.29

* Significant with inverse probability weighting for age and duration of infertility

Table 3 – Linear Regression for Hormones and Ethnicity

	FSH (mIU/ml)	Testosterone (nmol/L)
Caucasian (n=2226)	ref	ref
African-Canadian (n=276)	0.49 (-0.68-1.66) p=0.41	0.55 (-0.22-1.32) p=0.16
Asian (n=843)	-0.07 (-0.85-0.70) p=0.84	-1.26* (-1.77-(-0.76)) p<0.01
Indo-Canadian (n=167)	-1.38* (-2.82-0.04) p=0.06	-1.92* (-2.85-(-0.99)) p<0.01
Native-Canadian (n=29)	1.65 (-1.37-4.67) p=0.28	-1.43 (-3.38-0.52) p=0.15
Hispanic (n=117)	0.23 (-1.79-2.24) p=0.83	-0.47 (-1.78-0.84) p=0.48
Middle Eastern (n=298)	-0.78 (-1.94-0.38) p=0.19	-0.59 (-1.35-0.17) p=0.13

* Significant with inverse probability weighting for age and duration of infertility

SUMMARY/CONCLUSION

- Differences do exist amongst racial and ethnic groups for hormonal profiles and semen parameters
- Further study is needed to understand the nature of these differences (ie. genetics, biology etc.)
- This may provide insight into the work-up and management for infertile patient