INTRODUCTORY MEDICAL STATISTICS

To be held virtually on Friday 14 May 2021
Faculty: Cosetta Minelli and James Potts [course organisers];
Diana van der Plaat, Chloe Bloom
Course administrator: Magda Wheatley

Provisional PROGRAMME

Time	Session number, lecture title and summary points covered	Presenter
9.30 – 9.40am	*Welcome and introduction*	
9.40 – 10.30	**1. Basic epidemiological concepts** The hierarchy of evidence; Differences in study designs; The problem of confounding in observational studies. Classroom exercise (questions answered through online voting, using Mentimeter)	**Cosetta Minelli** Reader in Medical Statistics, National Heart and Lung Institute at Imperial College London (NHLI)
10.30 – 11.00	**2. Descriptive statistics** Calculating and interpreting descriptive statistics for different types of data (quantitative, ordinal and qualitative data): mean, median, mode, and standard deviation, percentiles, frequency distribution; Understanding the normal distribution and impact of skewness in the data. Classroom exercise	**Chloe Bloom** Senior Clinical Research Fellow, NHLI
11.00 – 11.20	**3. Inferential statistics – Estimation** Estimating parameters of interest in the population; Difference between standard error and standard deviation; Calculating and interpreting confidence intervals for means and proportions. Classroom exercise	**Diana van der Plaat** Research Associate – Epidemiologist, NHLI
11.20 – 11.35	*Tea*	
11.35 – 12.40	**4. Inferential statistics – Hypothesis testing** Testing a hypothesis and meaning of the p-value; Choosing a test based on the type of data and variable; Illustration of the t-test and the chi-squared test. Classroom exercise	**Cosetta Minelli**
12.40 – 13.10	*Lunch break*	
13.10 - 13.25	**5. Type I and II errors in hypothesis testing** Understanding the two types of errors when testing a hypothesis; Multiple testing and ways to address it	**Cosetta Minelli**
13.25 – 14.00	**6. Sample size calculations** Sample size and power calculations - why we need them and what parameters we need to perform them; Examples of sample size calculations for: comparing proportions (binary outcome), and comparing means (continuous outcome)	**James Potts** Medical Statistician, NHLI
14.00 – 15.00	**7. Correlation and Simple Linear Regression** (continuous outcomes) Testing the relationship between two quantitative variables: correlation vs. regression; Parametric and non-parametric correlation; Concept and assumptions of simple linear regression; Links between correlation and simple linear regression. Classroom exercise	**James Potts**
15.00 – 15.15	*Tea*	
15.15 – 15.35	**8. Multiple Linear Regression** (continuous outcomes) Moving from simple to multiple linear regression Interpreting the results from multiple linear regression; Recognising the impact of confounding. Classroom exercise	**Diana van der Plaat**
15.35 – 16.00	**9. Different measures of risk** (binary outcomes) Relative vs. absolute measures of risk; Odds Ratio and Relative risk, and difference between them; Absolute Risk Reduction/Increase; Number Needed to Treat/Harm	**Cosetta Minelli**
16.00– 16.30	**10. Simple and Multiple Logistic Regression** (binary outcomes) Understanding the basic concepts of logistic regression; Interpreting the results from simple and multiple logistic regression. Classroom exercise	**James Potts**
16.30 – 17.00	**11. Questions & Answers** Final Q&A session	**Cosetta Minelli, James Potts**

Approval by the Federation of the Royal College of Physicians UK to be sought