**Part A- Single best answer, Multiple choice (Questions 1 – 10)**

**Q -1 Standard errors described by which of the following statements?**

* How much a sample mean tends to vary from the population mean
* The amount of variation or dispersion of a set of data values
* The probability of rejecting the null hypothesis when it is true
* When the statistical characteristics of a population are estimated from a subset of that population

**Q-2 The precision (or inprecison) of sample values as estimates of the population values’ describes what?**

* Sampling error
* Standard deviation
* Confidence interval
* Standard error

**Q- 3 When determining sample size, what is statistical power?**

* The likelihood that a study will detect an effect when there’s an effect there to be detected
* The likelihood that a result or relationship is caused by something other than random chance
* A quantitivate measure of the strength of a phenomenon
* A range of values which is likely to contain the ‘true’ population parameter of interest

**Q-4**

**Which is of the following is prevalence?**

* 5 per cent
* 1000 persons per year
* 1.2 per 1000, per year
* 0.085 person years

**Q-5 ‘person time at risk’ is a measure employed in epidemiological studies to:**

* Quantify the prevalence of disease
* Quantify the numerator in an incidence rate
* Quantify the denominator in an incidence rate
* Quantify the survival time following diagnosis

**Q-6 which of the following is NOT a type of analytical study?**

* Randomised control trials
* Case-series study
* Cohort study
* Case-control study

**Q- 7 In survival analysis, which is not a type of censoring?**

* Intermittent
* One-tailed
* Left
* Right

**Q- 8 which of the following describes confidence interval?**

* A measure that is used to quantify the amount of variation or dispersion of a set of data values
* A measure of statistical dispersion equal to the difference between upper and lower quantiles
* The precision (or imprecision) of sample values as estimates of the population values.
* The probability of rejecting the null hypothesis when it is true

**Q-9 which of the following describes the use of a chi-squared test?**

* To assess the strength of a relationship between two continuous variables and an estimate of change in one variable change by one unit
* To compare two populations proportions using binary data
* To assess the strength of a relationship between two continuous variables
* To compare the means of two independent groups

**Q- 10**- **in population estimating, which of the following terms describes the phenomenon of the registered population larger than the resident population?**

* Unregistered death
* Unregistered births
* List inflation
* Internal migration

**Part B- extended multiple matching questions (Questions 11, 12, 13)**

**Question 11 – identify the epidemiological study design which would be most appropriate to evaluate the following hypothesis**

Choose from:

Cluster randomised controlled trial,

Cohort study,

Ecological study,

RCT

Case control study

Case series

5 Questions:

* 1: That exposure to cigarette smoke may be associated with increased risk of sudden infant death syndrome.
* Answer:
* 2: That a new antiplatelet drug is associated with reduced risk of heart attack. Answer:
* 3: That higher consumption of fruit is associated with reduced mortality from ischaemic heart disease. Answer:

4: That school based healthy eating lessons are associated with a lower rate of obesity.

Answer:

5: That exposure to noise pollution is associated with raised blood pressure.

Answer:

**Question 12:**

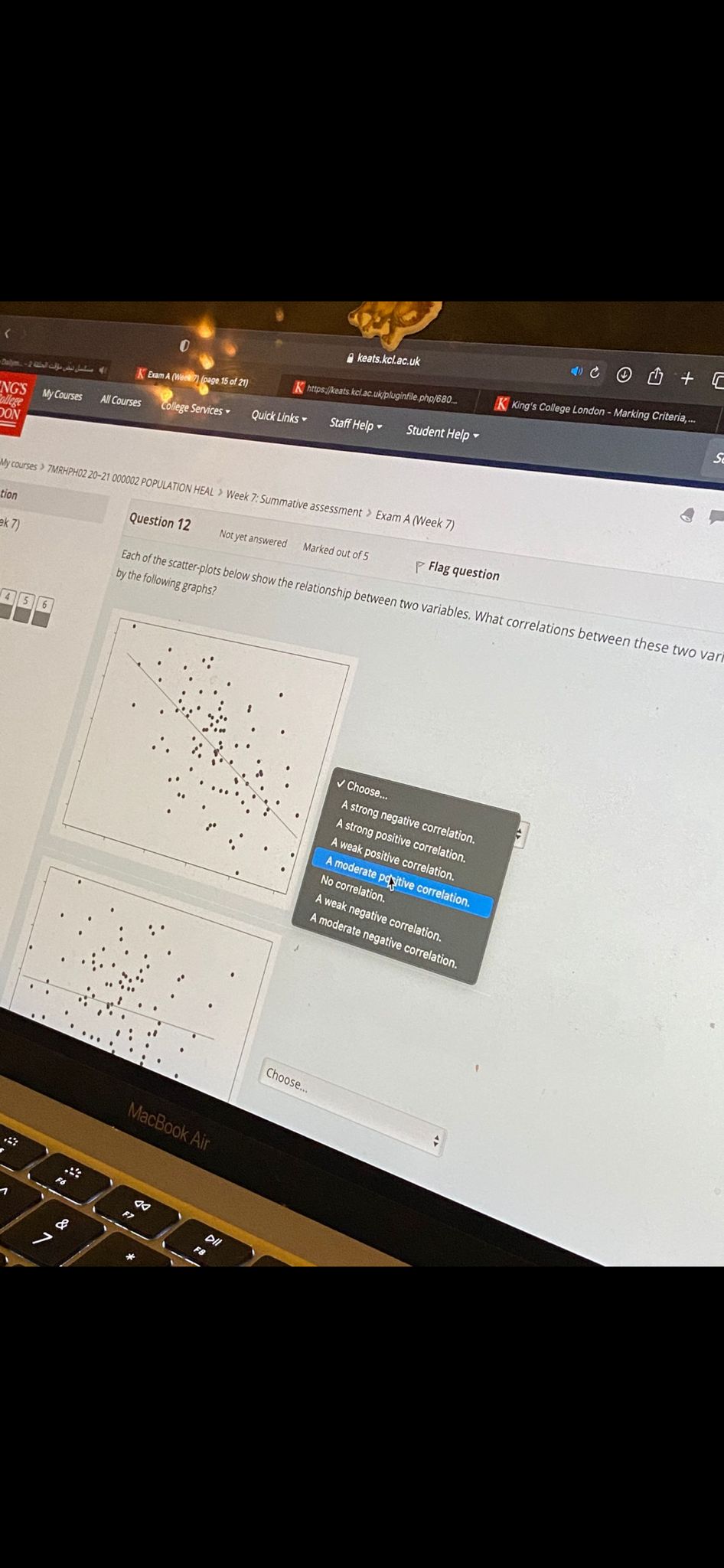
**Each of the scatter plots below show the relationship between two variables. What correlations between these two variables are shown by the following graphs?**

**5 graphs.**

**The answer options, Choose 1 for each graph:**

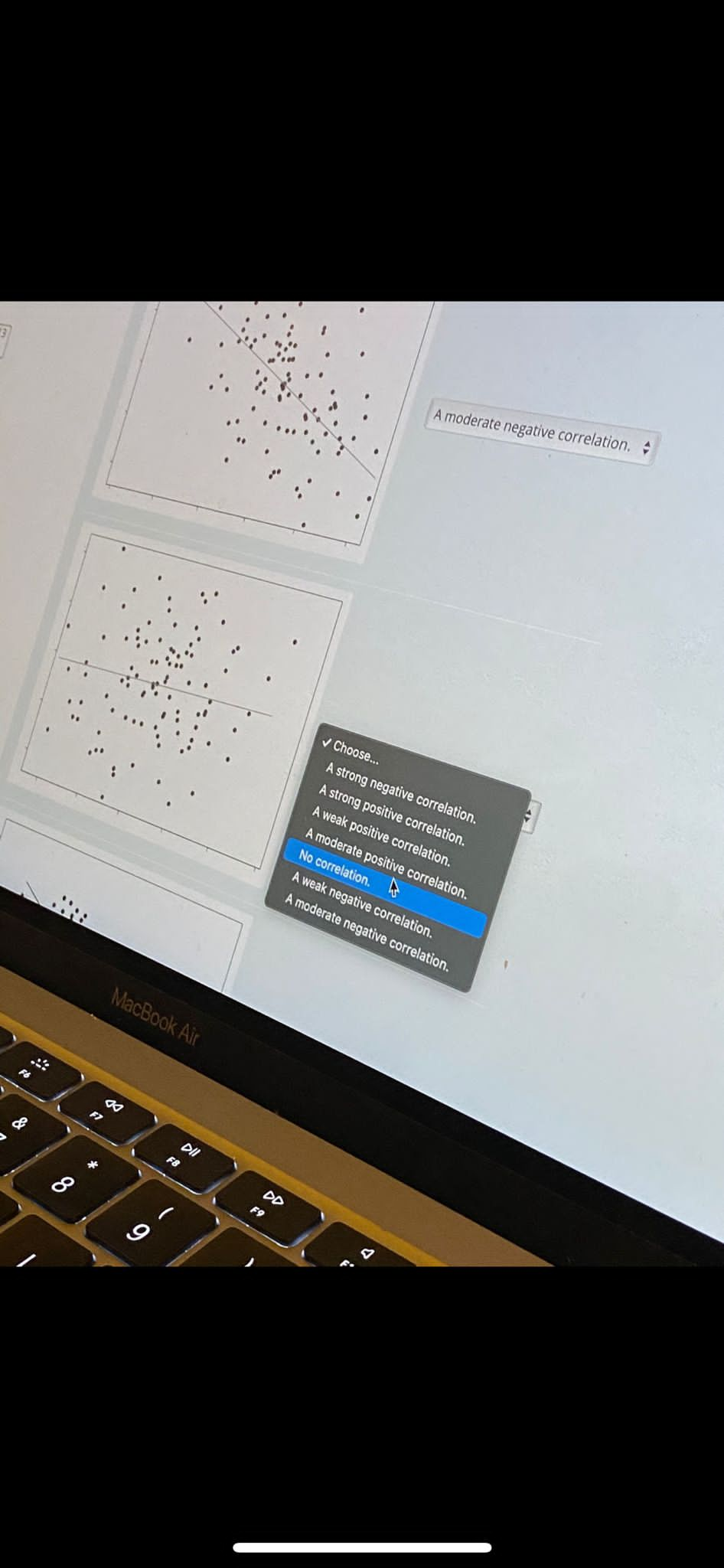
* A strong negative correlation
* A strong positive correlation
* A weak positive correlation
* A moderate positive correlation
* No correlation
* A weak negative correlation
* A moderate negative correlation

Graph 1



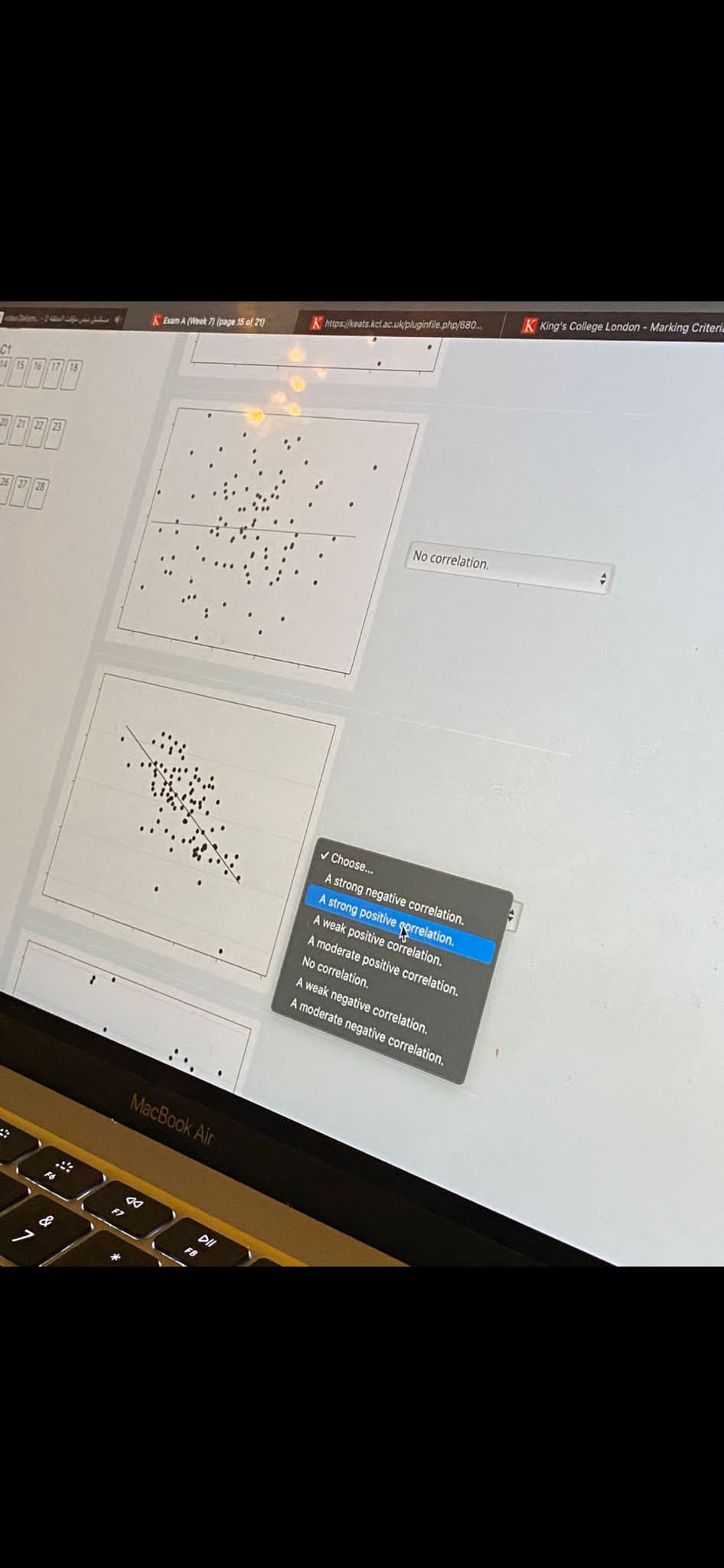
Answer:

Graph 2



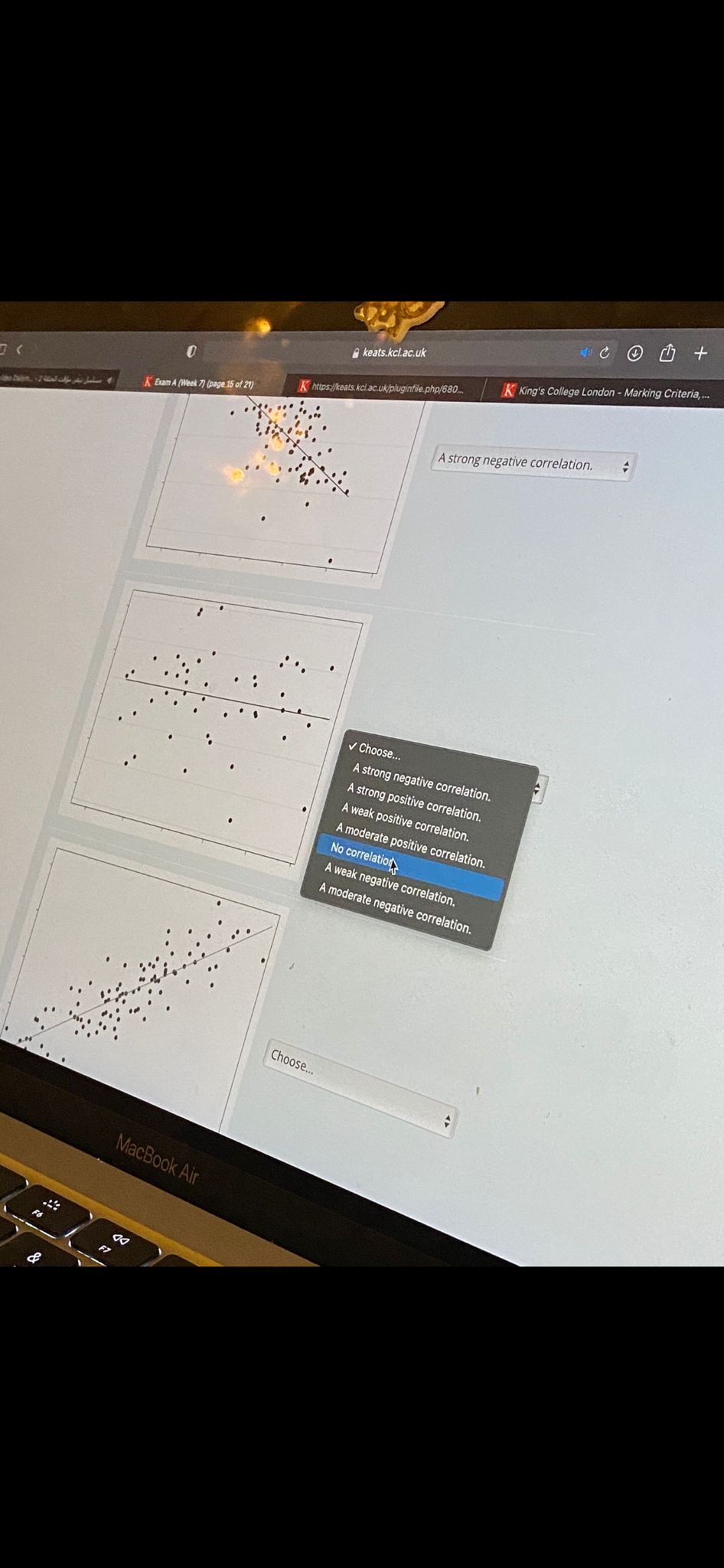
Answer:

Graph 3



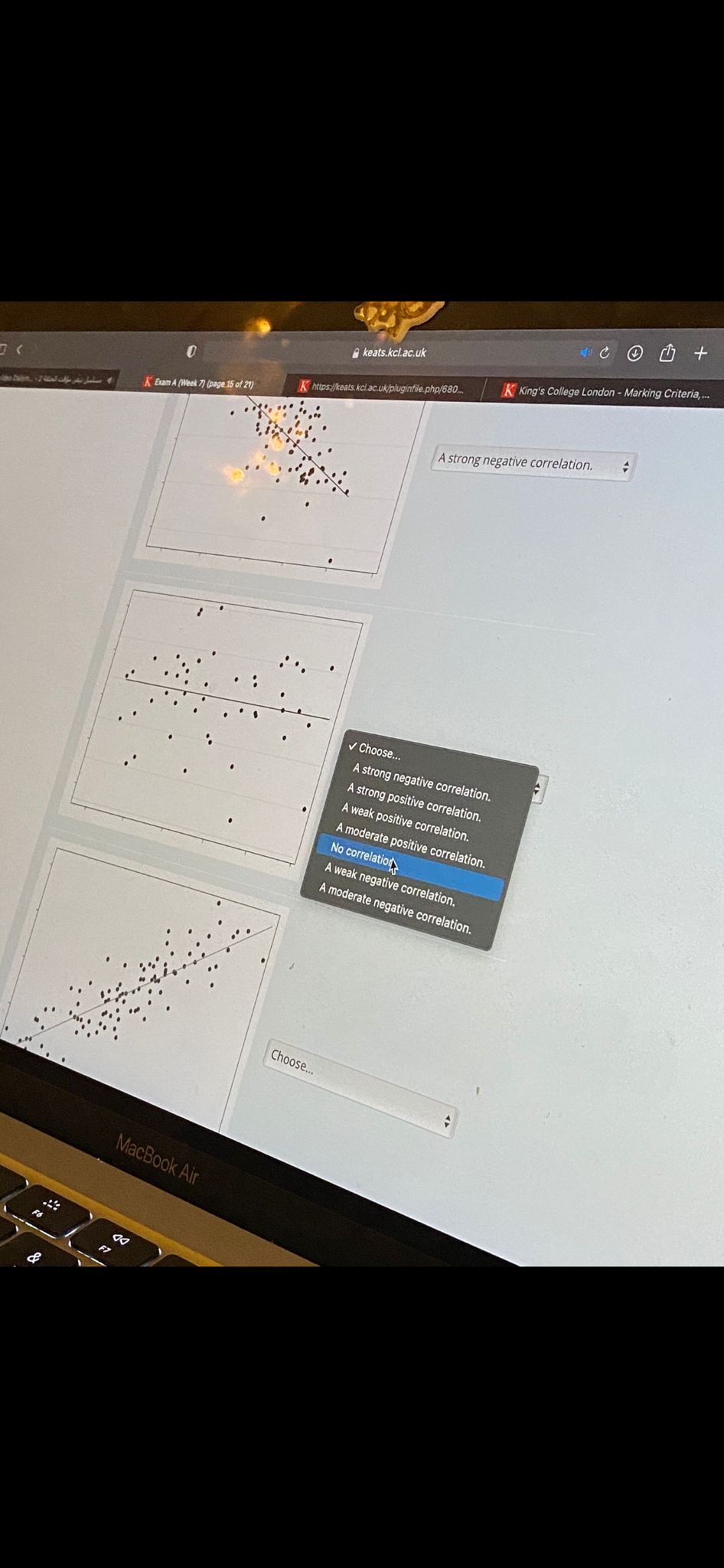
Answer:

Graph 4



Answer:

Graph 5



Answer:

**Q-13**

**Marked out of 5.**

**5 P values.**

P value were obtained from several studies of asthma in children. the studies compared the proportion with diagnosed asthma between boys and girls. The null hypothesis was that the population proportions were equal in the boys and girls. Choose the appropriate P value for the following inferences:

**P=0.98** Answer:

**P=0.05** Answer:

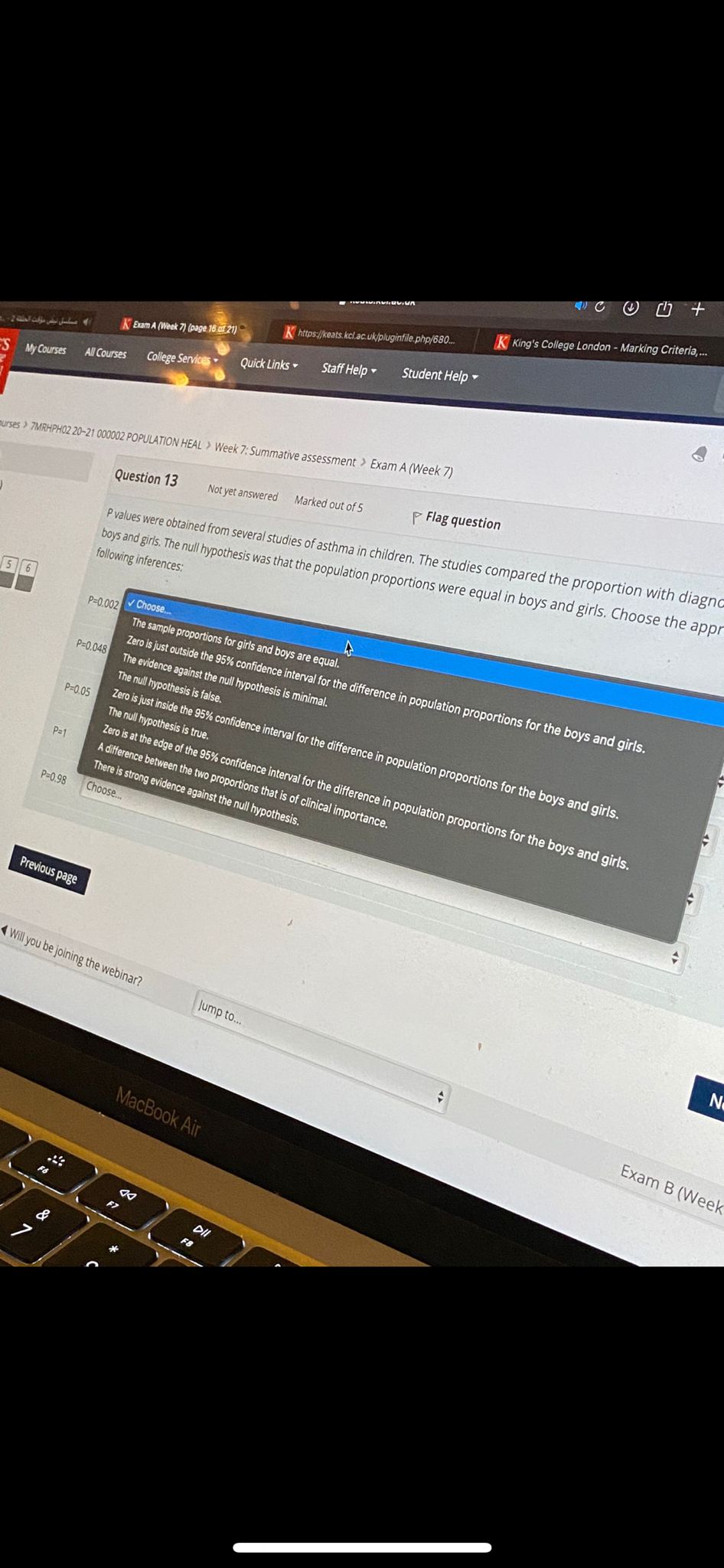
**P=0.02** Answer:

**P=0.048** Answer:

**P=1** Answer:

Choose from these answer options, 9 options :

* The evidence against the null hypothesis is minimal
* A difference between the two proportions that is of clinical importance
* The sample proportions for girls and boys are equal
* The null hypothesis is false
* The null hypothesis is true
* Zero is just outside the 95% CI for the difference in population proportions for the boys and girls
* Zero is just inside the 95% confidence interval for the difference in population proportion for the boys and girls
* There is strong evidence against the null hypothesis
* Zero is at the edge of the 95% CI for the difference in population proportions for the boys and girls



**Part C – (C1 – Questions: 14, 15, 16, 17, 18)**

**Q14 Marked out of 5**

In a study of suicide after discharge from psychiatric inpatient care the standardised mortality ratio (SMR) for suicide among men (defined by coroner’s verdict of suicide) in the first 28 days after discharge from inpatient care was 213 (137-317 95%CI). The equivalent SMR for female patients was 134 (67-240). Most of the patients studied (both those who committed suicide and those who did not) had been psychiatric inpatients for only a short time.

1. Explain what is meant by SMR, how it is calculated, and its advantage and disadvantages

**Q15 Marked out of 5**

In a study of suicide after discharge from psychiatric inpatient care the standardised mortality ratio (SMR) for suicide among men (defined by coroner’s verdict of suicide) in the first 28 days after discharge from inpatient care was 213 (137-317 95%CI). The equivalent SMR for female patients was 134 (67-240). Most of the patients studied (both those who committed suicide and those who did not) had been psychiatric inpatients for only a short time.

1. Explain why SMRs are used in the study of mortality generally, and why you think they were used in this study

**Q16 Marked out of 5**

In a study of suicide after discharge from psychiatric inpatient care the standardised mortality ratio (SMR) for suicide among men (defined by coroner’s verdict of suicide) in the first 28 days after discharge from inpatient care was 213 (137-317 95%CI). The equivalent SMR for female patients was 134 (67-240). Most of the patients studied (both those who committed suicide and those who did not) had been psychiatric inpatients for only a short time.

c. Explain what is meant by CI, how it is calculated, and the benefit of using it?

**Q17 Marked out of 5**

In a study of suicide after discharge from psychiatric inpatient care the standardised mortality ratio (SMR) for suicide among men (defined by coroner’s verdict of suicide) in the first 28 days after discharge from inpatient care was 213 (137-317 95%CI). The equivalent SMR for female patients was 134 (67-240). Most of the patients studied (both those who committed suicide and those who did not) had been psychiatric inpatients for only a short time.

d-discuss how you would interpet the 95% CI 67-240 and explain what it means in the context of this study.

**Q18 Marked out of 5**

In a study of suicide after discharge from psychiatric inpatient care the standardised mortality ratio (SMR) for suicide among men (defined by coroner’s verdict of suicide) in the first 28 days after discharge from inpatient care was 213 (137-317 95%CI). The equivalent SMR for female patients was 134 (67-240). Most of the patients studied (both those who committed suicide and those who did not) had been psychiatric inpatients for only a short time.

**e- What conclusions can be drawn from the study?**

**Part C (C2, Questions 19, 20, 21, 22, 23)**

**Question 19**

**Marked out of 5**

in a population- based cohort of 3112 patients with ulcerative colitis, 102 cases of colorectal cancer and 196 matched controls without cancer were compared. Hospital records were used to abstract information on pharmacological therapy disease activity, and extra-intestinal manifestations. The relative risk (RR) of cancer was estimated by conditional logistic regression. Results suggested that pharmacological therapy lasting at least 3 months, was associated with an effect independent of disease activity (RR=0.38, 0.20-0.69 99%CI).

1. Name this type of study, describe its main characteristics and what it can be used to evaluate.

**Q – 20 Marked out of 5**

b. with reference to this study, discuss the strength and weaknesses of this type of study design.

**Q21 – Marked out of 5**

c. Explain what is meant by relative risk, how it is calculated, and how it is interpreted.

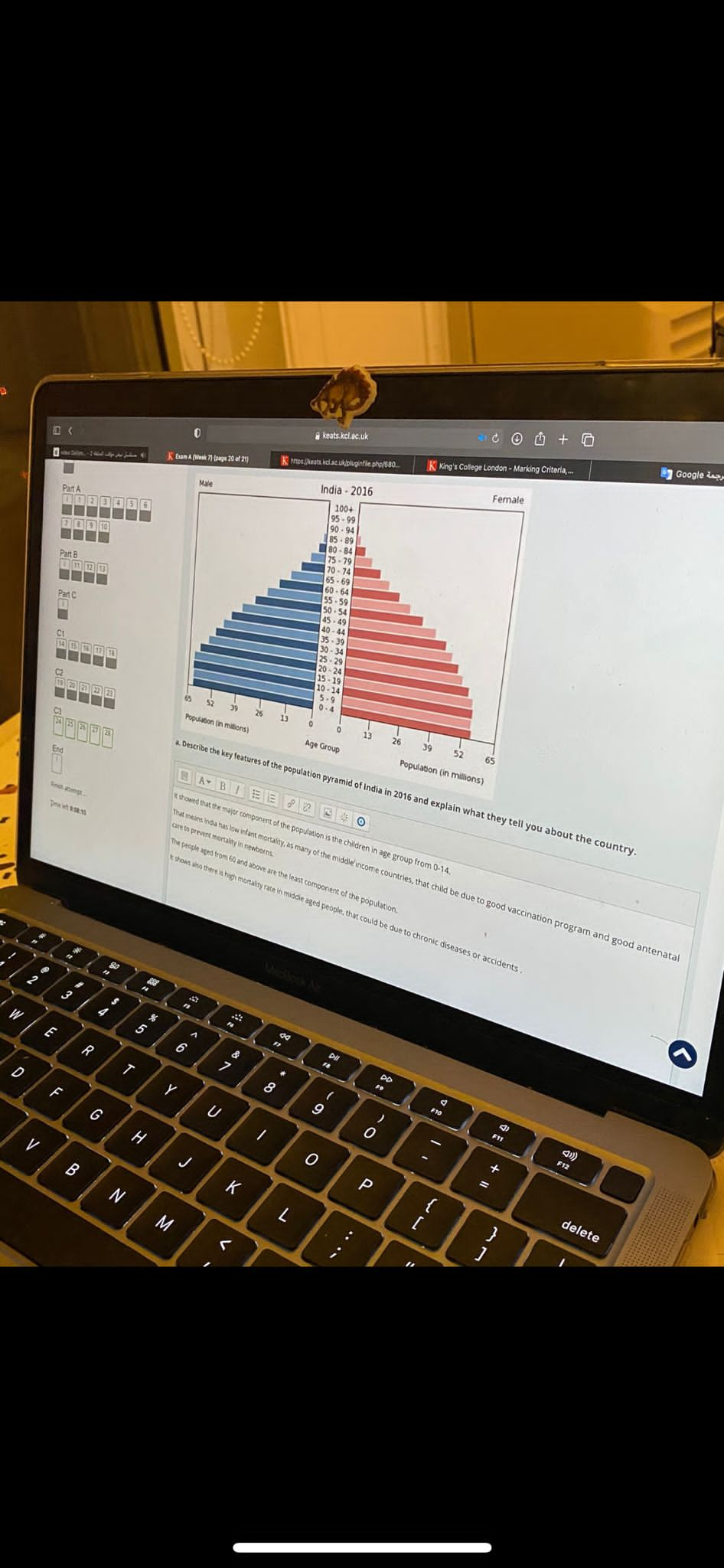
**Q 22 – Marked out of 5**

d.Interpret the RR 0.38 (0.20-0.69 99% CI) and explain what it means in the context of this study.

**Q 23 – Marked out of 5**

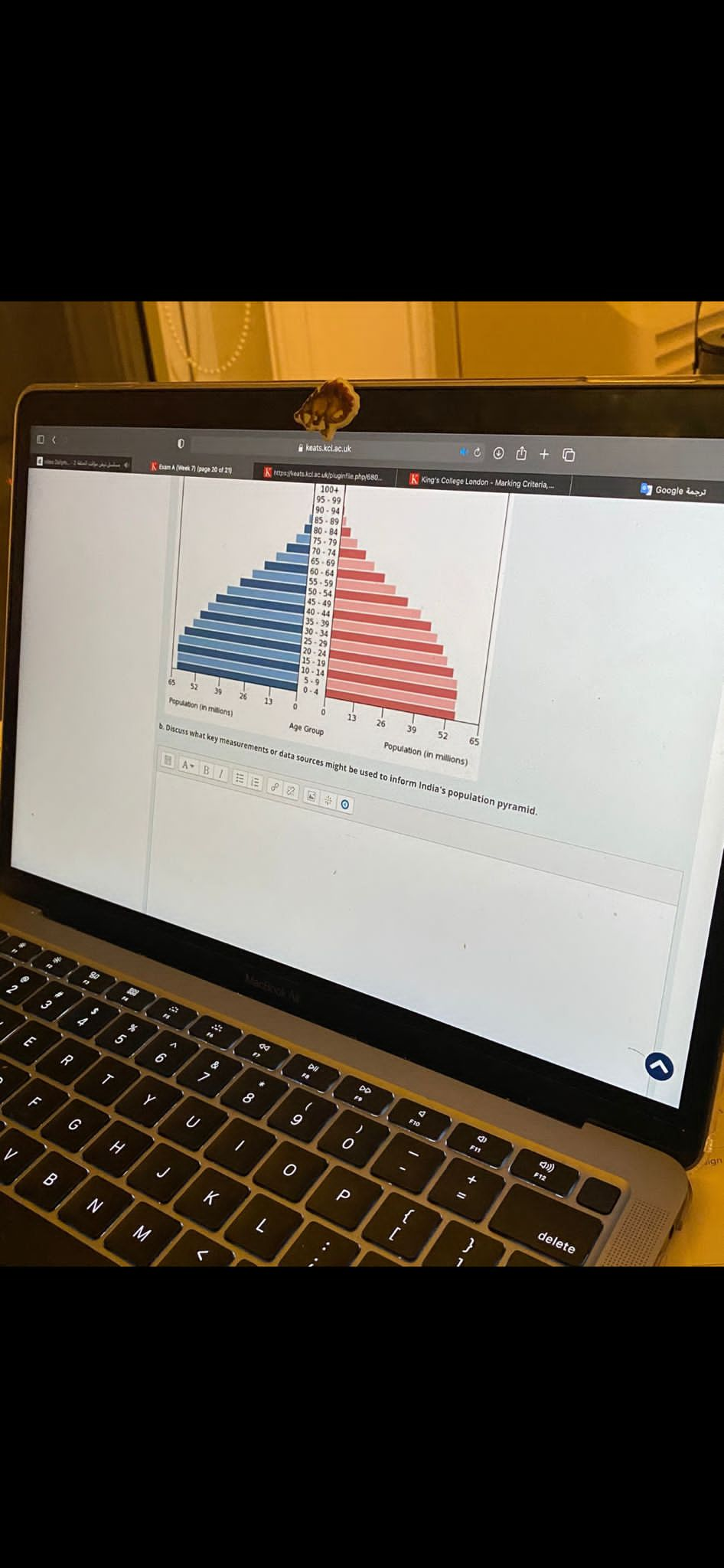
e. Explain what a confounding variable is, discuss what confounding variables might exist in this study and how you would address them.

**Part C (C3, Questions 24, 25, 26, 27, 28)**



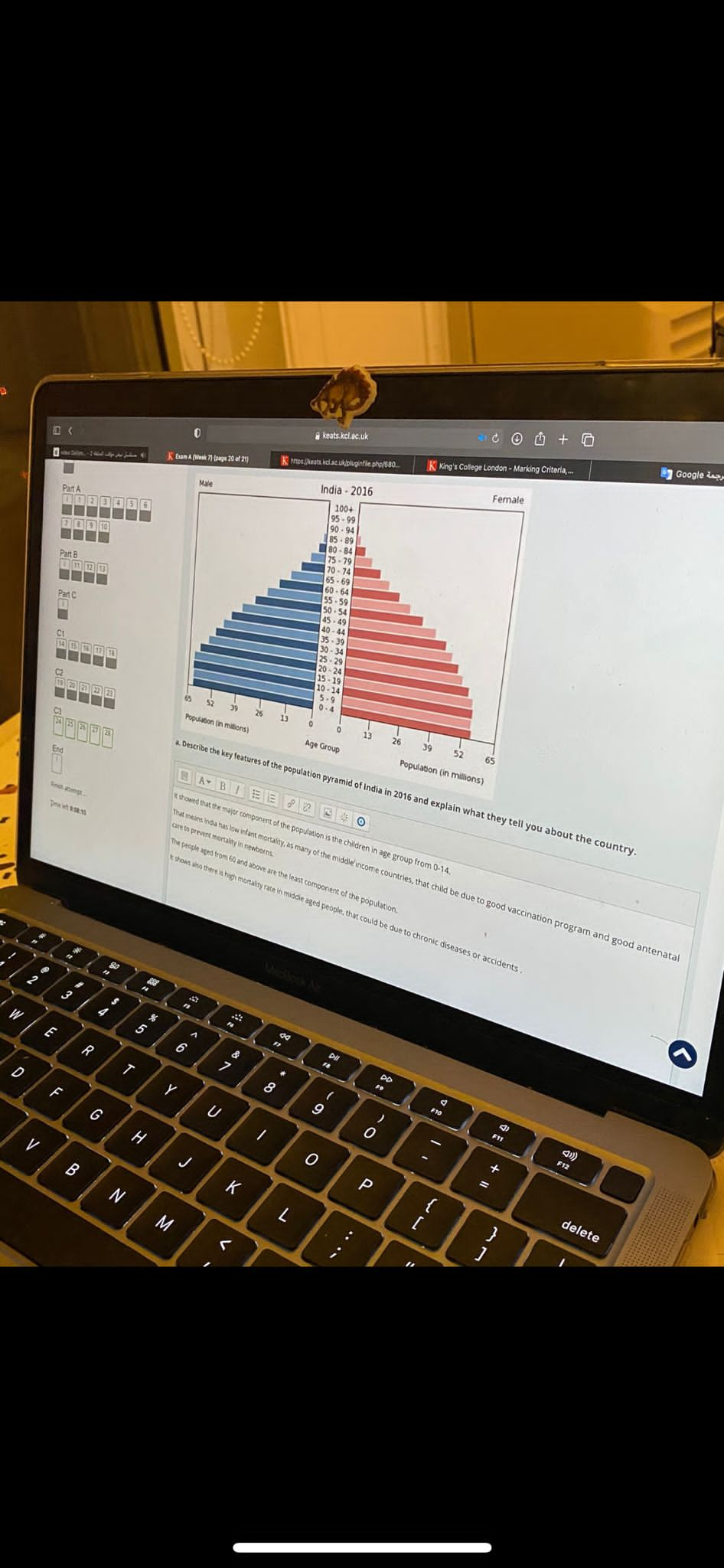
Q 24:

1. Describe the key features of the population pyramid of India 2016 and explain what they tell you about the country.



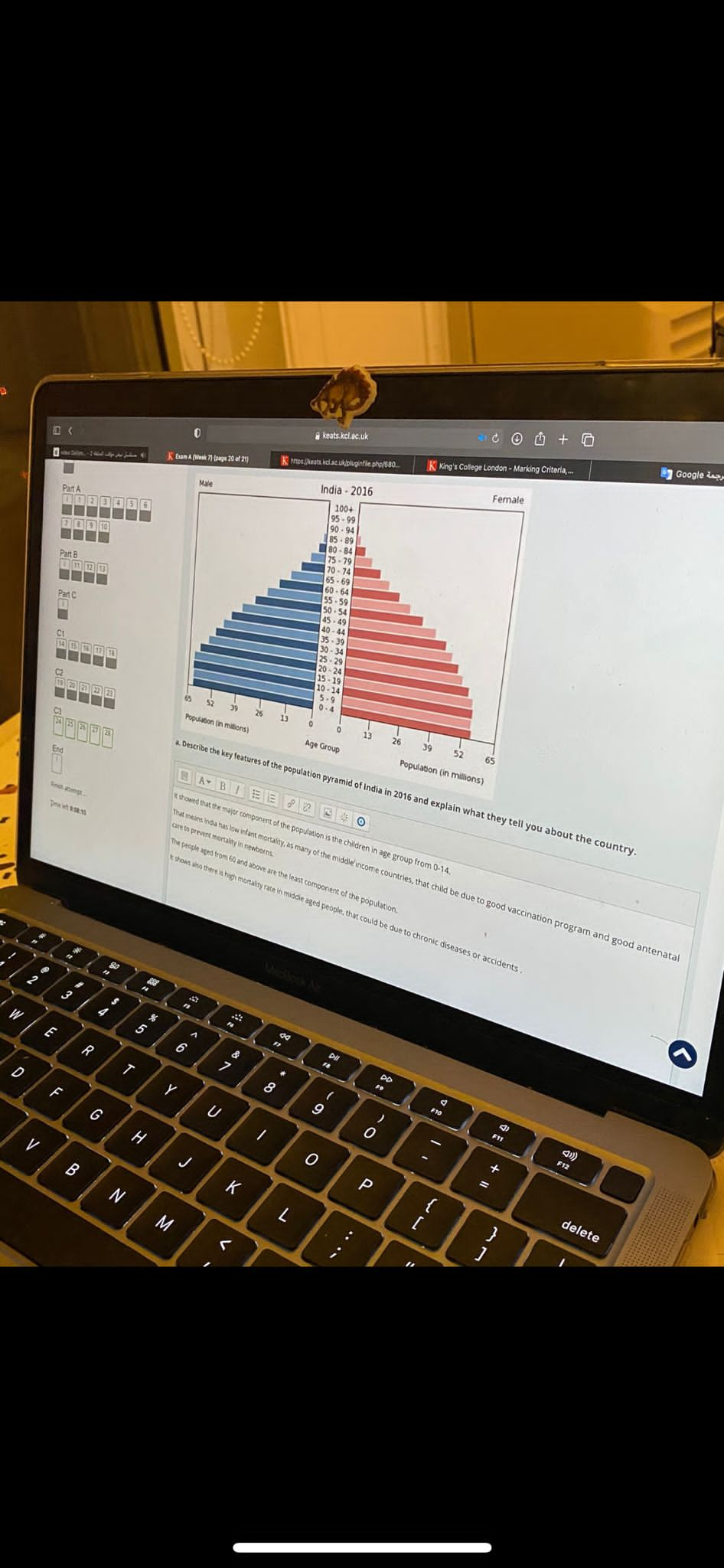
Q25:

B. Discuss what key measurements or data sources might be used to inform India’s population pyramid.



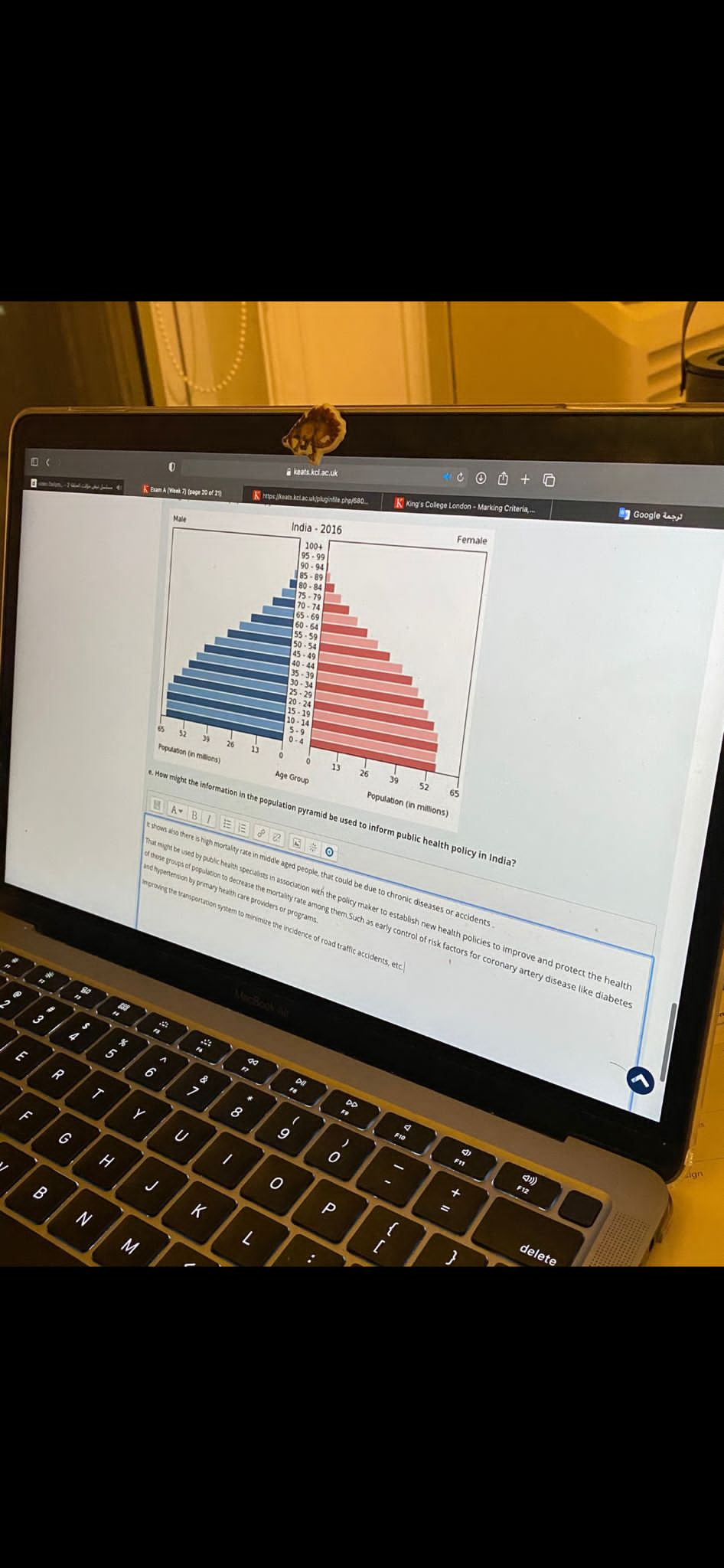
Q26:

C. What are some potential limitations of the data that underlie this population pyramid



**Q27:**

D. which theory seeks to explain changes in population structure over time and what does it tell us about the causes of population change?



**Q28:**

E. How might the information in the population pyramid be used to inform public health policy in India?