Q1. The COVID-19 pandemic has brought substantial morbidity and mortality worldwide. In particular, fatality was high among COVID-19 patients requiring invasive mechanical ventilation (IMV). To examine the case fatality ratio of patients with COVID-19 receiving IMV, a systematic review and meta-analysis was carried out for relevant studies.

After the systematic review, 20 studies were identified appropriate for the meta-analysis. Data were saved in the file "exam_question1.csv" with the following variables (modified from Lim et al. Am J Respir Crit Care Med. 2021):

Variable name	Description for data variable
study	Last name of the first author
country	Study location
sample_size	Sample size of the study
cfr	Estimated case fatality ratio (CFR, %) of COVID-19 patients requiring invasive mechanical ventilation
cfr.lb	The lower bound of the 95% confidence interval for the estimated CFR
cfr.ub	The upper bound of the 95% confidence interval for the estimated CFR

Q2. A cross sectional study was carried out to investigate the relationship between calcium intake on bone health in children with vitamin D deficiency. 2000 children aged 8-10y were randomly selected for interviews from student health service and were invited for a bone density test. Part of the data were extracted and saved in the file "exam_question2.csv", with the following variables:

Variable name	Description for data variable	Value description
id	Identity number of the participants	NIL
male	Sex	0: female; 1: male
age	Age (y)	NIL
phy.index	Physical activity index	0 (low) - 100 (high)
bmi	Body mass index (kg/m^2)	NIL
low.income	Low household income	1: low household income
low.calc	Low calcium intake	1: low calcium intake
poor.bone	Poor bone health	1: poor bone health as determined by quantitative ultrasound T-score < -1.0

Q3. A novel zoonotic disease emerged which has caused high fatality. Some researchers wanted to study impact of age on the fatality rate and collected a dataset of 1000 patients. Data were saved in the file "exam_question3.csv" with the following variables:

Variable name	Description for data variable	Value description
id	Patient ID	NIL
age	Age of the patient	NIL
comorbid	Comorbid conditions	0: no; 1: yes
death	If the patients died of the disease	0: no; 1: yes