

**MENTOR AKT STATS – POWERHOUSE PLOTS | MODULE 3 : ONLINE COURSE WITH DR GIAM
RISK EXTRACTION FROM PLOTS**

The course can be applied for as a single module

To book : <https://www.mentormedication.com/mentor-akt-powerhouseplots>

Or in conjunction with Module 1 and Module 2 | **POWERHOUSE STATS ON LINE COURSE**

<https://www.mentormedication.com/mentoraktstatsonline>

QUESTION 1:

Pancreatic Cancer - “symptom-based” early diagnosis?

New onset diabetes	Diarrhoea	Constipation	Malaise	Nausea or vomiting	Abdominal pain	Loss of weight	Jaundice	
0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.2 (0.2, 0.2)	0.2 (0.2, 0.3)	0.3 (0.3, 0.4)	0.3 (0.3, 0.4)	0.8 (0.7, 1.0)	21.6 (14,52)	PPV as a single symptom
0.3 (0.2, 0.4)	0.2 (0.1, 0.3)	0.3 (0.2, 0.4)	0.3 (0.2, 0.6)	0.3 (0.2, 0.5)	0.4 (0.3, 0.5)	2.0 (1.0, 4.3)	8.9 –	Back pain
	0.4 (0.3, 0.5)	0.4 (0.3, 0.6)	0.5 (0.3, 0.9)	0.7 (0.5, 1.0)	0.9 (0.7, 1.1)	1.6 (1.0, 2.9)	22.3 –	New onset diabetes
		0.2 (0.1, 0.3)	0.3 (0.1, 0.5)	0.2 (0.2, 0.3)	0.4 (0.3, 0.5)	2.7 –	>10 –	Diarrhoea
			0.3 (0.2, 0.5)	0.6 (0.4, 0.8)	0.5 (0.4, 0.7)	1.5 (0.8, 3.0)	>10 –	Constipation
				0.5 (0.3, 0.8)	0.6 (0.4, 0.8)	0.9 (0.4, 2.1)	>10 –	Malaise
					0.9 (0.7, 1.2)	2.2 (1.1, 4.6)	14.6 –	Nausea or vomiting
					1.0 (0.8, 1.2)	2.5 (1.5, 4.4)	15.0 –	Abdominal pain
							>10 –	Loss of weight
							31.6 –	Jaundice

- <1% = white
- 1-2% = yellow
- 2-5% = orange
- >5% = red

The background risk of pancreatic cancer is 0.25%

What is the **relative risk** of developing pancreatic cancer if the presenting symptoms are loss of back pain and loss of weight?

A : 2%

B : $2\% \times 0.8\% = 1.6\%$

C : Between 1% to 4.3%

D : Risk 1-2%

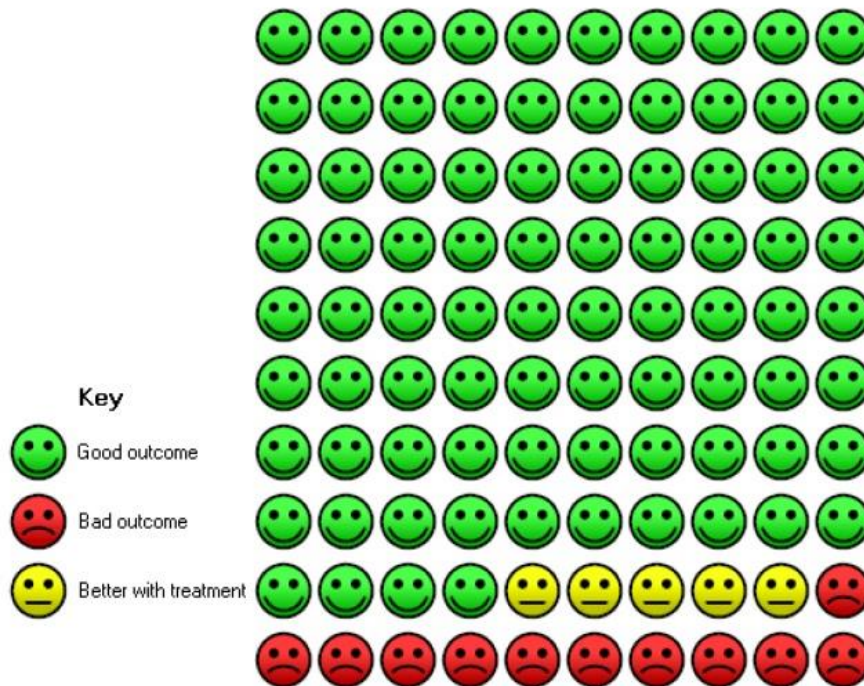
E : Risk of almost 18 times normal

F : Risk of 8 times normal

G : RR cannot be calculated

QUESTION 2:

Cates plot of pain at 2-3 days in children given antibiotics versus placebo for acute otitis media



Calculate the CER

Calculate the EER

Calculate the RR in the treatment group

Calculate the RRR

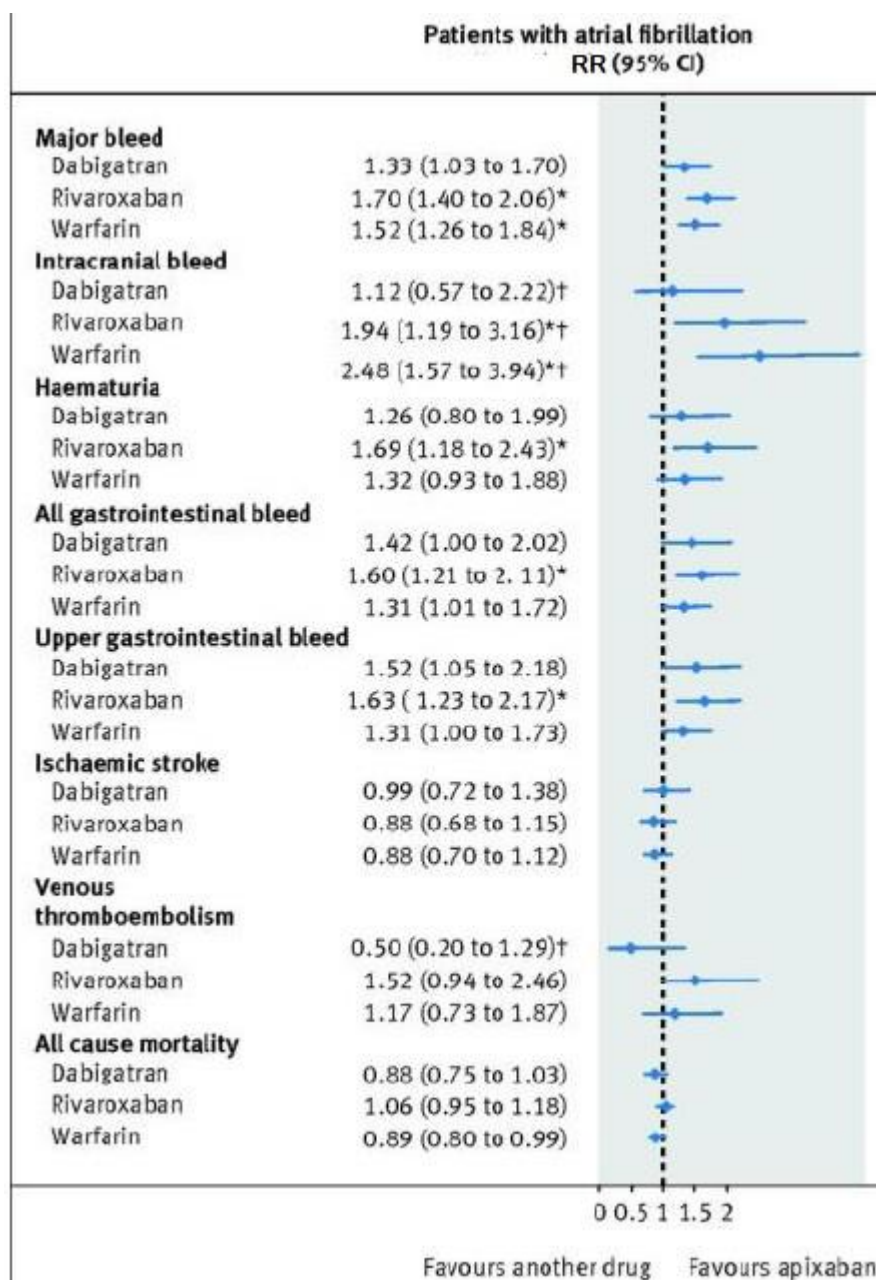
Calculate the NNT

How many children had no difference in terms of outcome?

QUESTION 3:

Which **ONE** of the following statements best describes the Forrest Plot?

- A. Apixaban is significantly safer compared to all other drugs with regards to intracranial bleeds
- B. With regards major bleeds, apixaban is not significantly safer compared to dabigatran
- C. With regards to upper GI bleeds, apixaban is significantly safer compared to warfarin
- D. Warfarin is the only drug to significantly reduce all cause mortality in patients with atrial fibrillation compared to apixaban
- E. The point estimate for the relative risk reduction of being warfarin compared to apixaban for all cause mortality is 0.11%

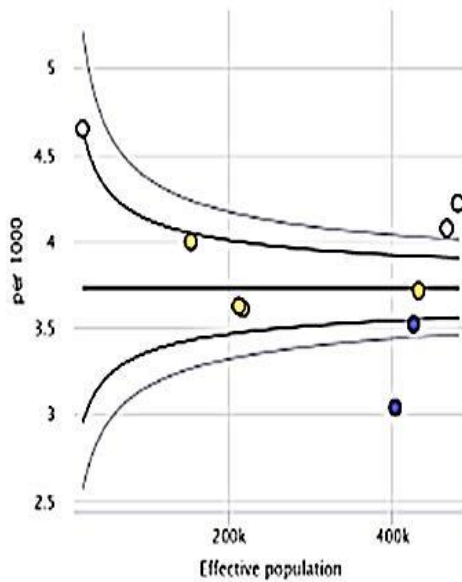


QUESTION 4:

Adults (18 to 64) with learning disability getting long term support from Local Authorities 2014/15

Crude rate - per 1000

Export chart as image



Export table as image

Area	Value	Lower CI	Upper CI
England	3.73	3.71	3.75
East Midlands region	3.74	3.67	3.81
Derby	4.00	3.69	4.33
Derbyshire	4.07	3.89	4.26
Leicester	3.61	3.36	3.87
Leicestershire	3.04	2.87	3.21
Lincolnshire	3.52	3.34	3.70
Northamptonshire	3.71	3.54	3.90
Nottingham	3.63	3.38	3.89
Nottinghamshire	4.22	4.04	4.41
Rutland	4.85	3.78	5.68

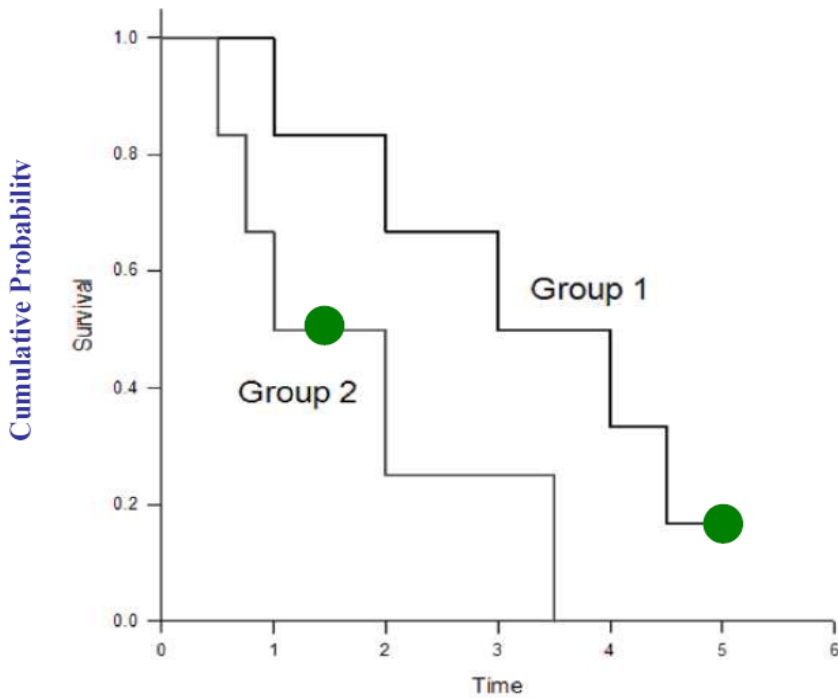
Source: Health and Social Care Information Centre; NASCIS - SALT

- England
- 95.0% Confidence
- 99.8% Confidence

In a population of over 300k, which area are you most confident in receiving long term support if you are an adult with a learning disability?

Q5: KAPLAN| MEIER PLOT

Survival Analysis



The above Kaplan –Meier Plot displays the probability of cancer survival times in two groups of patients.

● - indicates a censored patient

Please answer the following questions:

1. How many subjects are there in each group?
2. What is a censored patient?
3. Up to the 1st year of the study – how many patients were alive in each group?
4. What is the approximate probability of being alive in each group at 3 years?
5. How many patients were alive at the end of the study at 5 years?

Basic Statistics for the AKT

DEFINITIONS

- **Risk** – the probability that an adverse event will happen
- **Absolute Risk (AR)** = number of events/total number of people
- **Absolute Risk Reduction (ARR) of a treatment**
= ARC (Control Event Rate) – ART (Experimental Event Rate)
- **Absolute Risk Increase (ARI) of a treatment** = ART- ARC
- **Relative Risk of an event happening in the treatment group (RR)** = ART/ARC
- **Relative Risk Reduction (RRR) of a treatment** = 1 (100%) –RR
- **Number Needed to Treat (NNT)** = 1/ARR where ARR is in decimal form
- **Number Needed to Harm (NNH)** = 1/ARI where ARI is in decimal form

- **Odds Ratio (OR)** – Definition
 - used to give an **estimate of relative risk** from retrospective case-controlled studies
 - or
 - **odds of an event happening** in the experimental group, expressed as a proportion of odds of it happening in control group

IF RR (or OR) = 1,
there is no significant difference between treatment and control groups

Calculating the Odds Ratio (OR)

	Cases	Controls
Exposure to Risk Factor : +ve	a	b
-ve	c	d

	Effect	No Effect
Treatment Group	a	b
Control Group	c	d

$$OR = ad/bc$$

Screening

Screening Test	Disease Present	Disease Absent
+ve	a	b
-ve	c	d

Sensitivity : proportion of those with disease correctly identified by the test= $a/a+c$

Specificity : proportion of those without disease correctly identified by test= $d/b+d$

Positive Predictive Value [ART]:

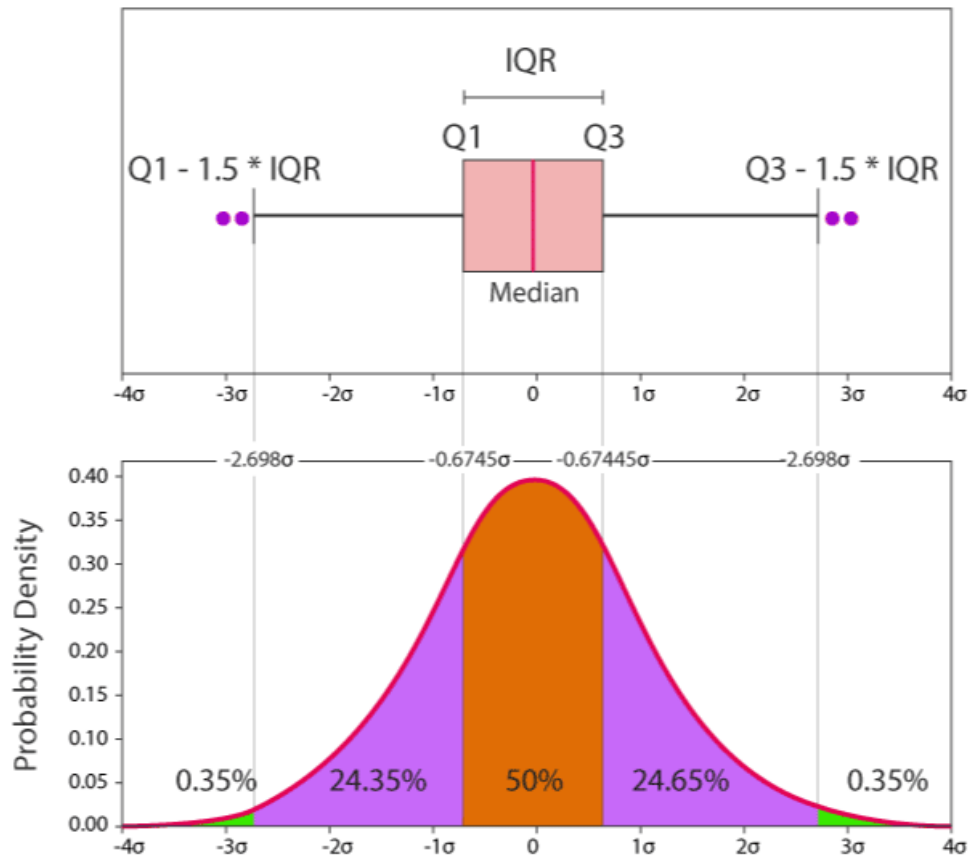
proportion of those who test positive who have the disease = $a/a+b$

Negative Predictive Value :

proportion of those who test negative who do not have the disease = $d/c+d$

Box Plots

Check the image below which shows the minimum, maximum, first quartile, third quartile, median and outliers.



Boxplot on a normal distribution

© Byjus.com

Minimum: The minimum value in the given dataset

First Quartile (Q1): The first quartile is the median of the lower half of the data set.

Median: The median is the middle value of the dataset, which divides the given dataset into two equal parts. The median is considered as the second quartile.

Third Quartile (Q3): The third quartile is the median of the upper half of the data.

Maximum: The maximum value in the given dataset.

Apart from these five terms, the other terms used in the box plot are:

Interquartile Range (IQR): The difference between the third quartile and first quartile is known as the interquartile range. (i.e.) $IQR = Q3 - Q1$

Outlier: The data that falls on the far left or right side of the ordered data is tested to be the outliers. Generally, the outliers fall more than the specified distance from the first and third quartile.

(i.e.) Outliers are greater than $Q3+(1.5 \cdot IQR)$ or less than $Q1-(1.5 \cdot IQR)$.

Positively Skewed: If the distance from the median to the maximum is greater than the distance from the median to the minimum, then the box plot is positively skewed.

Negatively Skewed: If the distance from the median to minimum is greater than the distance from the median to the maximum, then the box plot is negatively skewed.