# Prism Manual Categorical Data Analysis

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This lab will introduce the methods of conducting categorical data analysis using examples from Categorical data analysis workshop in Prism. For more analysis for categorical data analysis in Prism, please check chapter in <u>Prism statistics guide</u>. To learn more about the examples and interpretation, please categorical data analysis lecture note provided by BCBB.

## 0. Outline:

- 1) Positive predictive value and Negative predictive value
- 2) Sensitivity, Specificity
- 3) Odds ratio
- 4) Relative risk
- 5) Perform statistical testing for contingency table

## 1. Positive predictive value and Negative predictive value

1.1 Copy the data 1 from Prism example.csv. Open Prism, Select **Contingency** under "New Table & Graph"; Select **Enter or import data into a new table**, then click **Create**.

00 🕀	New Data Table and Graph	3
NEW TABLE & GRAPH		
XY	Contingency tables: Each row defines a treatment or exposure, each	n column defines an
Column	outcome, and each value is an exact count of objects or events	
Grouped	Table format A B	
Contingency	Contingency Cases Control	
Survival	1 Smoked	
Parts of Whole	2 Never smoked Smoked Never smoked	2
Multiple variables		C Learn more
Nested	Data table:	
	Enter or import data into a new table	
EXISTING FILE	Start with sample data to follow a tutorial	
	Options:	
		Cancel Create

1.2 **Copy data 1** from "Prism examples.xlsx" into the blank sheet.

File	Sheet	Undo	CI	ipboard	Analy	sis		Change	Import	Dr
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Q~ Search				Tal	ble format:	Outcome	eΑ	Outcome B	Outcome	С
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🔲 Data '	1				0	Y		Y	Y	
) New L	Data Table			1	Test Positive		100	900		
▼ Info			>>	2	Test Negative		50	5000		
Projec	t info 1			3	Title					
+ New II	nto			4	Title					
Results     Hew A	Analysis		,,	5	Title					

1.3 Click Analyze Analyze then select Chi-square (and Fisher's exact) test

under Contingency table analyses list, then click OK.

vnich analysis?	Analyze which data sets?
<ul> <li>Transform, Normalize Transform Transform concentrations (X) Normalize Prune rows Remove baseline and column math Transpose X and Y Fraction of Total</li> <li>XY analyses</li> <li>Column analyses</li> <li>Grouped analyses</li> <li>Gouped analyses</li> <li>Contingency table analyses</li> <li>Contingency table analyses</li> <li>Chi-square (and Fisher's exact) test Row means with SD or SEM Fraction of Total</li> <li>Survival analyses</li> <li>Parts of whole analyses</li> <li>Multiple variable analyses</li> <li>Nested analyses</li> </ul>	<ul> <li>A:Diseased</li> <li>B:Not Diseased</li> </ul>
<ul> <li>Generate curve</li> <li>Simulate data</li> </ul>	
<ul> <li>Simulate data</li> </ul>	

1.4 Check **Sensitivity, specificity and predictive values** under Main Calculations menu. Click **OK**.

Parameters: Chi-square (and Fisher's exact) test
Main Calculations Options
Effect sizes to report
Relative Risk
Used for prospective and experimental studies
Difference between proportions (attributable risk) and NNT
Used for prospective and experimental studies
Odds ratio
Used for retrospective case-control studies
Sensitivity, specificity and predictive values
Used for diagnostic tests
Method to compute the P value
Fisher's exact test
Yates' continuity corrected chi-square test
O Chi-square test
O Chi-square test for trend
Looking for the z test to compare proportions? Choose the chi-square test (with or without the Yates' correction). The chi-square and z tests are equivalent.
? Cancel OK

1.5 Prism will return the report with 95% confidence interval. They are circled in red below.

	Contingency				
4	Test	Fisher's exact test			
5	P value	<0.0001			
6	P value summary	****			
7	One- or two-sided	Two-sided			
8	Statistically significant (P < 0.05)?	Yes			
9					
10	Effect size	Value	95% CI		
11	Sensitivity	0.6667	0.5879 to 0.737		
12	Specificity	0.8475	0.8381 to 0.856		
13	Positive Predictive Value	0.1000	0.08291 to 0.12		
14	Negative Predictive Value	0.9901	0.9870 to 0.992		
15	Likelihood Ratio	4.370			
16					
17	Methods used to compute CIs				
18	Sensitivity, specificity, etc.	Wilson-Brown			
19					
20	Data analyzed	Diseased	Not Diseased	Total	
21	Test Positive	100	900	1000	
22	Test Negative	50	5000	5050	
23	Total	150	5900	6050	
24					
25	Percentage of row total	Diseased	Not Diseased		
26	Test Positive	10.00%	90.00%		
27	Test Negative	0.99%	99.01%		
28					
29	Percentage of column total	Diseased	Not Diseased		
30	Test Positive	66.67%	15.25%		
31	Test Negative	33.33%	84.75%		
32					
33	Percentage of grand total	Diseased	Not Diseased		
34	Test Positive	1.65%	14.88%		
35	Test Negative	0.83%	82.64%		
36					

# 2. Sensitivity, specificity

2.1 Open a blank contingency sheet (see 1.1). Copy data 2 from "Prism examples.xlsx".

• • •												
File	Sheet	Undo	CI	ipboard	Analy	sis		C	hange		Import	
- 🔁 💌 📑	2- * * * -	C	of		$\chi^2$ %		←□	→	≩↓ - 👌 -	•		
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Q~ Search	1			Tab	le format:	Outcome	϶A	Out	come B	Ou	tcome C	1
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📰 Data 🗄	2				0	Y			Y		Υ	
+ New L	Data Table			1	Positive		10		400			
▼ Info			>>	2	Negative		1		4500			
(i) Projec	ct info 1			3	Title							
⊕ New I	nfo			4	THE							-
Results			>>	4	nue							

2.2 Follow 1.3 and 1.4 (same way as calculating PPV and NPV). Prism will return result with 95% confidence interval.

	Contingency			
1	Table Analyzed	Data 2		
2				
3	P value and statistical significance			
4	Test	Fisher's exact test		
5	P value	<0.0001		
6	P value summary	****		
7	One- or two-sided	Two-sided		
8	Statistically significant (P < 0.05)?	Yes		
9				
10	Effect size	Value	95% CI	
11	Sensitivity	0.9091	0.6226 to 0.995	
12	Specificity	0.9184	0.9104 to 0.925	
13	Positive Predictive Value	0.02439	0.01330 to 0.04	
14	Negative Predictive Value	0.9998	0.9987 to 1.000	
15	Likelihood Ratio	11.14		
16				
17	Methods used to compute CIs			
18	Sensitivity, specificity, etc.	Wilson-Brown		
19				
20	Data analyzed	Diseased	Not Diseased	Total
21	Positive	10	400	410
22	Negative	1	4500	4501
23	Total	11	4900	4911
24				
25	Percentage of row total	Diseased	Not Diseased	
26	Positive	2.44%	97.56%	
27	Negative	0.02%	99.98%	
28				
29	Percentage of column total	Diseased	Not Diseased	
30	Positive	90.91%	8.16%	
31	Negative	9.09%	91.84%	
32				
33	Percentage of grand total	Diseased	Not Diseased	
34		0.20%	0 1 4 0/	
	Positive	0.20%	0.14 /0	

# 3. Odds ratio

3.1 Open a blank contingency sheet (see 1.1). Copy data 3 from "Prism examples.xlsx".

• • •								
File	Sheet	Undo	Cli	ipboard	Analy	sis	Change	Import
	2- ** *-	Ċ	of		$\chi^2 \ \mathbf{T}$	← []	→∎ AJ → A	•
•••	× + New -	5	Ê	<b>•</b> •	Analyze	1 🥕 📑	⊯ 123 #.# ↓ <del>1.23</del>	تعاد العام الع
Q~ Search				Tab	ole format:	Outcome A	Outcome B	Outcome C
▼ Data Tabl	es		>>	Co	ntingency	Case	Control	Title
🖽 Data 2	2				8	Y	Y	Y
🔲 Data	3			1	Yes	688	650	
⊕ New L	Data Table			2	No	21	59	
▼ Info	at infa 1		>>	3	Title			

3.2 Click Analyze, select Chi-square (and Fisher's exact) test under Contingency table analyses list, then click OK. Select Odds ratio. Then OK.

Parameters: Chi-square (and Fisher's exact) test
Main Calculations Options
Effect sizes to report
Relative Risk
Used for prospective and experimental studies
Difference between proportions (attributable risk) and NNT
Used for prospective and experimental studies
🗹 Odds ratio
Used for retrospective case-control studies
Sensitivity, specificity and predictive values
Used for diagnostic tests
Method to compute the P value
• Fisher's exact test
<ul> <li>Fisher's exact test</li> <li>Yates' continuity corrected chi-square test</li> </ul>
<ul> <li>Fisher's exact test</li> <li>Yates' continuity corrected chi-square test</li> <li>Chi-square test</li> </ul>
<ul> <li>Fisher's exact test</li> <li>Yates' continuity corrected chi-square test</li> <li>Chi-square test</li> <li>Chi-square test for trend</li> </ul>
<ul> <li>Fisher's exact test</li> <li>Yates' continuity corrected chi-square test</li> <li>Chi-square test</li> <li>Chi-square test for trend</li> <li>Looking for the z test to compare proportions? Choose the chi-square test (with or without the Yates' correction). The chi-square and z tests are equivalent.</li> </ul>

3.3 It will return result with 95% confidence interval. It is circled in Red below.

	Contingency			
2				
3	P value and statistical significance			
4	Test	Fisher's exact test		
5	P value	<0.0001		
6	P value summary	***		
7	One- or two-sided	Two-sided		
8	Statistically significant (P < 0.05)?	Yes		
9				
10	Effect size	Value	95% CI	
11	Odds ratio	2.974	1.819 to 4.900	
12	Reciprocal of odds ratio	0.3363	0.2041 to 0.54	
13				
14	Methods used to compute CIs			
15	Odds ratio	Baptista-Pike		
16				
17	Data analyzed	Case	Control	Total
18	Yes	688	650	1338
19	No	21	59	80
20	Total	709	709	1418
21				
22	Percentage of row total	Case	Control	
23	Yes	51.42%	48.58%	
24	No	26.25%	73.75%	
25				
26	Percentage of column total	Case	Control	
27	Yes	97.04%	91.68%	
28	No	2.96%	8.32%	
29				
30	Percentage of grand total	Case	Control	
31	Yes	48.52%	45.84%	
32	No	1.48%	4.16%	
22				

## 4. Relative Risk

4.1 Open a blank contingency sheet (see 1.1). Copy data 4 from "Prism examples.xlsx".

File	Sheet	Undo	CI	ipboard	Analy	sis		Change		Import
• • 🚱	<ul> <li>✓ * * * *</li> <li>× + New •</li> </ul>	C 5	& 1	Ē. ∎.▼	$\chi^2$ % Analyze	11 /	←0 	→	•	txt xml
Q~ Search	1			Tal	ble format:	Outcome	A	Outcome B	Outc	ome C
<ul> <li>Data Tabl</li> </ul>	es		>>	Co	ontingency	Case		Control	Т	ïtle
🖽 Data :	2				8	Y		Y		Y
🔲 Data	3			1	Yes		688	650		
+ New L	Data Table			2	No		21	59		
▼ Info	at infa 1		>>	3	Title					

4.2 Click **Analyze**, select **Chi-square (and Fisher's exact) test** under Contingency table analyses list, then click **OK**. Select **Relative risk**. Then **OK**.

4.3 Result return with 95% confidence interval.

Contingency				
1	Table Analyzed	Data 1		
2				
3	P value and statistical significance			
4	lest	Fisher's exact test		
5	P value	<0.0001		
6	P value summary	****		
7	One- or two-sided	Two-sided		
8	Statistically significant (P < 0.05)?	Yes		
9				
10	Effect size	Value	95% CI	
11	Relative Risk	0.5501	0.4339 to 0.697	
12	Reciprocal of relative risk	1.818	1.434 to 2.305	
13				
14	Methods used to compute CIs			
15	Relative Risk	Koopman asymptot		
16				
17	Data analyzed	МІ	No MI	Total
18	Aspirin	104	10933	11037
19	Placebo	189	10845	11034
20	Total	293	21778	22071
21				
22	Percentage of row total	МІ	No MI	
23	Aspirin	0.94%	99.06%	
24	Placebo	1.71%	98.29%	
25				
26	Percentage of column total	МІ	No MI	
27	Aspirin	35.49%	50.20%	
28	Placebo	64.51%	49.80%	
29				
30	Percentage of grand total	м	No MI	
31	Aspirin	0.47%	49.54%	
32	Placebo	0.86%	49.14%	
23				

### 5.1 Pearson Chi-square test

5.1.1 Select **Contingency** under "New Table & Graph"; Select **Enter or import data into a new table**, then click **Create**.

• • •	Welcome to GraphPad Prism
GraphPad Prism Version 8.0.1 (145)	Contingency tables: Each row defines a treatment or exposure, each column defines an outcome, and each value is an exact count of objects or events
NEW TABLE & GRAPH XY Column	Table formal         Cases         Contingency         Cases         Control           1         Smoked         V         V         Control         Control
Grouped	Data table:
Survival Parts of Whole Multiple variables Nested	Start with an empty data table
EXISTING FILE Open a File LabArchives Clone a Graph Graph Portfolio	
Prism Tips	Cancel Create

5.1.2 Open a blank contingency sheet (see 1.1). **Copy data 3** from "Prism examples.xlsx".

Table format: Contingency		Outcome A	Outcome B	
		Case	Control	
	8	Y	Y	
1	smoking	688	650	
2	not smoking	21	59	

5.1.3 Click Analyze Analyze then select Chi-square (and Fisher's exact) test under Contingency table analyses list. Check the columns you want to analyze on the right side, then click OK.

'hich analysis?	Analyze which data sets?
<ul> <li>Transform, Normalize <ul> <li>Transform</li> <li>Transform concentrations (X)</li> <li>Normalize</li> <li>Prune rows</li> <li>Remove baseline and column math</li> <li>Transpose X and Y</li> <li>Fraction of Total</li> </ul> </li> <li>XY analyses <ul> <li>Column analyses</li> <li>Grouped analyses</li> <li>Contingency table analyses</li> <li>Chi-square (and Fisher's exact) test</li> <li>Row means with SD or SEM</li> <li>Fraction of Total</li> </ul> </li> <li>Survival analyses</li> <li>Parts of whole analyses</li> <li>Multiple variable analyses</li> <li>Mested analyses</li> <li>Generate curve</li> <li>Simulate data</li> </ul>	<ul> <li>✓ A:Case</li> <li>✓ B:Control</li> </ul>
	Select All Deselect All

5.1.4 Select test type under Method to compute P value and other report statistic under Effect sizes to report. Click **Chi-square test**, then **OK**.

	Param	eters: Chi-square (and	Fisher's exact) test	
		Main Calculations	Options	
Effect siz	es to repo	ort		
Rela	tive Risk			
Use	for prosp	ective and experiment	al studies	
Diffe	rence betw	veen proportions (attri	butable risk) and NNT	
Use	for prosp	ective and experiment	al studies	
Odd	s ratio			
Use	for retros	pective case-control s	tudies	
Sens	itivity, spe	cificity and predictive	values	
Use	for diagn	ostic tests		
Method t	o compute	e the P value		
Fish	er's exact	test		
O Yate	s' continui	ty corrected chi-squar	re test	
• Chi-	square tes	t		
O Chi-	square tes	t for trend		
Looking or witho	for the z tes ut the Yates	t to compare proportions? correction). The chi-squa	? Choose the chi-square tes are and z tests are equivaler	t (with nt.
			Cancel	OK

5.1.5 Result includes p-value, marginal table, and marginal percentage. Chi-square statistic, degree of freedom and p-value are circled. Test result is significant, which means reject the null hypothesis that smoking and lung cancer are independent.

	Contingency			
1	Table Analyzed	Data 3		
2				
3	P value and statistical significance			
4	Test	Chi-square		
5	Chi-square, df	19.13, 1		
6	Z	4.374		
7	P value	<0.0001		
8	P value summary	****		
9	One- or two-sided	Two-sided		
10	Statistically significant (P < 0.05)?	Yes		
11				
12	Data analyzed	Case	Control	Total
13	smoking	688	650	1338
14	not smoking	21	59	80
15	Total	709	709	1418
16				
17	Percentage of row total	Case	Control	
18	smoking	51.42%	48.58%	
19	not smoking	26.25%	73.75%	
20				
21	Percentage of column total	Case	Control	
22	smoking	97.04%	91.68%	
23	not smoking	2.96%	8.32%	
24				
25	Percentage of grand total	Case	Control	
26	smoking	48.52%	45.84%	
27	not smoking	1.48%	4.16%	

## 5.2 Fisher's exact test

5.2.1 Follow 5.1.1 to open a blank data sheet. Copy data 5 from "Prism

#### examples.xlsx".

т	able format:	Outcome A	Outcome B
C	Contingency	Guess mik first	Guess tea first
	8	Y	Y
1	Pour milk first	3	1
2	Pour tea first	1	3

5.2.2 Select test type under Method to compute P value and other report statistic under Effect sizes to report. Click **Fisher's exact test**, then go to **Options**, select **One-sided** under Calculations options, then click **OK**.

Para	ameters: Chi-square (and	l Fisher's exact) test	
	Main Calculations	Options	
Effect sizes to re	eport		
Relative Risk			
Used for pro	spective and experiment	al studies	
Difference b	etween proportions (attri	ibutable risk) and NNT	
Used for pro	spective and experiment	al studies	
Odds ratio			
Used for retr	rospective case-control s	studies	
Sensitivity, s	pecificity and predictive	values	
Used for dia	gnostic tests		
Method to comp	ute the P value		
• Fisher's exa	ct test		
Yates' contin	nuity corrected chi-squar	re test	
Chi-square	test		
Chi-square	test for trend		
Looking for the z or without the Ya	test to compare proportions tes' correction). The chi-squ	? Choose the chi-square test (with are and z tests are equivalent.	
		Ormal	
		Cancel	JK

P values: • One-sided Two-sided	
Confidence Interval: 95% 🗘	
Method to calculate CI:	
Relative risk:	
Koopman asymptotic score (recommended)	٥
Difference between proportions:	
N/W score with CC (recommended)	٢
Odds ratio:	
Baptista-Pike method (recommended)	\$
Sensitivity, specificity, etc.:	
Wilson/Brown (recommended)	٢
utput	
Show this many significant digits (for everything exce	pt P values): 4
P value style: GP: 0.1234 (ns), 0.0332 (*), 0.0021 (*	<b>•), 0 ≎</b> N= 6

5.2.3 Review Result includes p-value, marginal table, and marginal percentage. p-value is circled. Test result is not significant, which means cannot reject the null hypothesis that pouring order and guessing order are independent.

Contingency				
1	Table Analyzed	Data 1		
2				
3	P value and statistical significance			
4	Test	Fisher's exact test		
5	P value	0.2429		
6	P value summary	ns		
7	One- or two-sided	One-sided		
8	Statistically significant (P < 0.05)?	No		
9				
10	Data analyzed	Guess mik first	Guess tea first	Total
11	Pour milk first	3	1	4
12	Pour tea first	1	3	4
13	Total	4	4	8
14				
15	Percentage of row total	Guess mik first	Guess tea first	
16	Pour milk first	75.00%	25.00%	
17	Pour tea first	25.00%	75.00%	
18				
19	Percentage of column total	Guess mik first	Guess tea first	
20	Pour milk first	75.00%	25.00%	
21	Pour tea first	25.00%	75.00%	
22				
23	Percentage of grand total	Guess mik first	Guess tea first	
24	Pour milk first	37.50%	12.50%	
25	Pour tea first	12.50%	37.50%	

### 5.3 McNemar test

McNemar test is available via Prism web. (<u>https://www.graphpad.com/quickcalcs/</u>) 5.3.1 Click in the website above, select Categorical data, select McNemar's test to analyze a matched case-control study, then click Continue.

1. Select category2. Choose calculator3. Enter data4. View results

#### Analyze categorical data

- O Confidence interval of a proportion or count.
- Chi-square. Compare observed and expected frequencies.
- Fisher's and chi-square. Analyze a 2x2 contingency table.
- McNemar's test to analyze a matched case-control study.
- O Binomial and sign test. Compare observed and expected proportions.
- NNT (Number Needed to Treat) with confidence interval.
- Predictive values from sensitivity, specificity, and prevalence.
- O Kappa. Quantify interrater agreement.

CONTINUE >

5.3.2 Input # of pairs of case and control. In our example, 2004 Election as case and 2008 Election as control (or they can be exchanged, result won't change), then click Calculate.

1. Select category

2. Choose calculator

3. Enter data

4. View results

#### McNemar's test to analyze a matched case-control study McNemar's test is used to compare paired proportions. It can be used to analyze retrospective casecontrol studies, where each case is matched to a particular control. Or it can be used to analyze experimental studies, where the two treatments are given to matched subjects. Read an example with explanation. **Risk Factor?** Control Case # of pairs \$ Yes 16 No \$ 54 Yes No \$ Yes 175 Yes \$ No 188 No

Calculate

Use McNemar's test (and this calculator) only when you are analyzing matched pairs. Each value you enter above represents a number of PAIRS. The total number of subjects in the study is twice the total of the values you enter above.

Note that the calculations are based entirely on the first two numbers you enter. Enter the remaining two numbers in order to document your full results.

5.3.3 Results include summary, p-value, odds ratio and contingency table. The result is significant, we can reject the null hypothesis that 2004 and 2008 election are independent.

1. Select category

2. Choose calculator

3. Enter data 4. View results

# Results of McNemar's test for a case-control study **Summary**:

If there were no association between the risk factor and the disease, you'd expect the number of pairs where cases was exposed to the risk factor but control was not to equal the number of pairs where the control was exposed to the risk factor but the case did not. In this study, there were 70 discordant pairs (case and control had different exposure to the risk factor). There were 54 (77.143%) pairs where the control was exposed to the risk factor but the case was not, and 16 (22.857%) pairs where the case was exposed to the risk factor but the control was not.

#### P Value:

The two-tailed P value is less than 0.0001

By conventional criteria, this difference is considered to be extremely statistically significant.

The P value was calculated with McNemar's test with the continuity correction. Chi squared equals 19.557 with 1 degrees of freedom.

The P value answers this question: If there is no association between risk factor and disease, what is the probability of observing such a large discrepancy (or larger) between the number of the two kinds of discordant pairs? A small P value is evidence that there is an association between risk factor and disease.

#### Odds ratio:

The odds ratio is 0.296, with a 95% confidence interval extending from 0.158 to 0.525

#### **Review your data:**

		Cor	ntrol	
		+	-	Total
Case	+	175	16	191
	-	54	188	242
	Total	229	204	433

#### 5.4 Chi-square Test for Trend

5.4.1 Follow 5.1.1 to open a blank data sheet. Copy **data 6 from "Prism** examples.xlsx".

• •									
File	Sheet	Undo	Cl	ipboard	Analy	sis		Change	Import
	2 - 🛞 🖈 -	C	of	6	$\chi^2$ %		← □ →	A↓ → 🖄	•
• • •	× + New -	5	Ê	-	Analyze	1 🎢	#.#	123 <del>1.23</del> (	y - xml
Q~ Search	1			Та	ble format:	Outcome	A C	Outcome B	Outcome C
▼ Data Tabl	les		>>	Contingency Res		Respons	e No	ot Reponse	Title
📰 Data	1				0	Y		Y	Y
⊕ New L	Data Table			1	1		10	0	
▼ Info			>>	2	2		9	1	
(i) Project info 1			3	3		10	0		
<ul><li>⊕ New Info</li><li>▼ Results &gt;&gt;&gt;</li></ul>			4	4		7	-		
		>>	4	4			3		
(+) New Analysis			5	Title					

5.4.2 Click Analyze Analyze then select Chi-square (and Fisher's exact) test under Contingency table analyses list. Select Chi-square for trend. Click Options. Here only two-sided test is default. Then click OK.

	Parameters: Chi-square (and Fisher's exact) test
	Main Calculations Options
Eff	fect sizes to report
	Relative Risk
	Used for prospective and experimental studies
	Difference between proportions (attributable risk) and NNT
	Used for prospective and experimental studies
	Odds ratio
	Used for retrospective case-control studies
	Sensitivity, specificity and predictive values
	Used for diagnostic tests
Me	ethod to compute the P value
	Fisher's exact test
	Yates' continuity corrected chi-square test
(	Chi-square test
	O Chi-square test for trend
	Looking for the z test to compare proportions? Choose the chi-square test (with
	or without the fates correction). The chi-square and 2 tests are equivalent.
	Cancel
	Caller

5.4.3 Review results. P-value is 0.0593. This is two-sided test. We cannot reject the null hypothesis of no linear trend between response across increasing dosage at significance level 0.05.

●     ●       File     Sheet     Unc       ●     ●         ●     ●          ●     ●           ●     ●           ●     ●     ●          ●     ●          ●     ●          ●     ●          ●     ●          ●     ●          ●     ●          ●     ●          ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●         ●     ●          ●     ●	do Cli	pboard	Analysis Interpret	Change Draw Write	т А <sup>*</sup> А <sup>*</sup>
Q~ Search		Contingency			
▼ Data Tables >>					
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<ul> <li>↔ New Data Table</li> <li>▼ Info         <ul> <li>④ Project info 1</li> <li>⊕ New Info</li> </ul> </li> </ul>	»	1	Table Analyzed	Data 1	
		2			
		3	P value and statistical significance		
		4	Test	Chi-square test for trend	
Contingency of Data 1		5	Chi-square, df	3.556, 1	
<ul> <li>→ New Analysis</li> <li>◆ Graphs &gt;&gt;</li> <li>▶ Data 1</li> <li>→ New Graph</li> <li>▼ Layouts &gt;&gt;</li> <li>↔ New Layout</li> </ul>	6	P value	0.0593		
	» 	7	P value summary	ns	
		8	One- or two-sided	NA	
		9	Statistically significant ( $P < 0.05$ )?	No	
		10			
		11	Data analyzed		
		11	Data analyzed		
		12	Number of rows	4	
		13	Number of columns	2	
		14			

In the end, if you have any questions regarding to this topic, please contact me (jingwen.gu@nih.gov) or submit a request to BCBB (bioinformatics@niaid.nih.gov).